



Transport
Roads & Maritime
Services

CREMORNE POINT WHARF REDEVELOPMENT

Review of environmental factors

AUGUST 2014

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Roads and Maritime Services

Cremorne Point Wharf redevelopment

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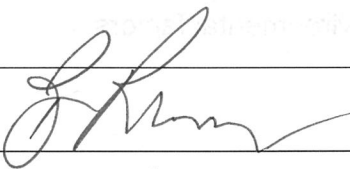
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Document Controls

Title: Cremorne Point Wharf redevelopment review of environmental factors

Approval and authorisation

Accepted on behalf of Roads and Maritime Services NSW by:	
	Signed: 
	Dated: 8/9/14

Document status	Author	Reviewed	Date
Rev A	Mia Fay	Peter Mangels	7 April 2014
Rev B	Peter Mangels		2 May 2014
Rev C	Greg Tallentire	Peter Mangels	16 June 2014
Rev 0	Peter Mangels		27 August 2014

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Executive summary

The proposal

Roads and Maritime Services (RMS) proposes to redevelop the ferry commuter wharf at Cremorne Point, commonly referred to as Cremorne Point Wharf.

The proposal includes the upgrade of an existing wharf including the demolition of the existing gangway and pontoon and the construction of a new wharf adjacent to its current location. The existing wharf building would be retained.

Construction of the proposal is expected to commence about July 2014 and is likely to take about four months, weather permitting. However, for the purpose of the environmental assessment RMS has considered impacts for up to six months of construction. The wharf would be closed for the duration of the construction period.

Need for the proposal

The proposal is essential to provide wharf access for people with a disability to meet the requirements of the *Disability Discrimination Act 1992* (DDA) and current legislative standards for disabled access.

Options considered

Three options were identified for the proposal. These were:

- Option 1 – The do nothing (base case) option.
- Option 2 – Addition of a new wharf attached to the existing wharf which improves accessible to people with a disability.
- Option 3 – Demolition of the existing pontoon and gangway and replacement with a new wharf which provides improved accessibility to people with a disability.

Option 3 is the preferred option as it best meets the project objectives whilst minimising impacts on the environment.

Statutory and planning framework

State Environmental Planning Policy (Infrastructure) 2007 permits development on any land for the purpose of wharf or boating facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for a wharf and boating facility and is to be carried out by RMS, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent is not required.

Community and stakeholder consultation

Key government stakeholders including North Sydney Council and Sydney Ferries as well as the local community have been consulted to date and all issues raised have been taken into account during development of the proposal. Issues raised have been addressed in this review of environmental factors (REF). Consultation will continue prior to and during construction of the proposal.

Environmental impacts

The main environmental impacts of the proposal and the management measures to address those impacts are summarised below:

Noise and Vibration

- There would be exceedances of the noise criteria by up to 37 dB(A) for residential receivers during the daytime period during construction.
- There would be exceedances of the noise criteria by up to 48 dB(A) for residential receivers during the night time period during construction.

- There is potential for an exceedance of OEHS's sleep disturbance screening criteria of up to 33 dB(A) during intricate lifts (11pm to 7am) and 51 dB(A) during piling (5am to 7am) which could cause awakening.
- With windows open, there is potential that noise levels at the facade of the nearest sensitive receiver during the night time period would be up to 70 dB(A) during intricate lifts (11pm to 7am) and 88 dB(A) during piling (5am to 7am) and could potentially affect the health and wellbeing of nearby residents.

A noise and vibration management plan would be prepared prior to the commencement of construction and it would be implemented during the construction period. Noise and vibration impacts on the local community would be minimised by the implementation of suitable noise management strategies and restricting construction works to predominantly the day time period. However, piles would be installed during the night time period at the beginning of the project for about two weeks and there would be about 10 intricate lifts during the night over the construction period (up to about six months). There would be at least two nights per week where night works would not be undertaken. The community would be informed of construction activities and a community information and complaints line would be provided throughout the works to take inquiries and follow up on complaints.

Land surface

- There would be disturbance of sediments on the harbour bed where piles are installed, the bridge is constructed, or where construction vessels anchor, especially in shallow waters.

Impact on land surface would be minimised through the installation of booms fitted with turbidity curtains around all water-based works for sediment containment.

Landscape character and visual impact

- There would be a moderate to low impact on landscape character.
- There would be a moderate to low impact on views and vistas. Important views would not be impacted.

Impacts on landscape character and views have been minimised during the design process by locating the new pontoon in the same alignment to the existing to minimise view loss, and the use of neutral colours and transparent materials which are low in reflectivity and complement the adjacent features of the land.

Water quality

- There is potential for water pollution as a result of materials, spills or wastes accidentally entering the waters of Parramatta River and the broader Sydney Harbour during demolition and/or transportation.
- There would be increased water turbidity due to the removal and installation of piles and the operation of construction vessels, especially in shallow waters.

The impact on water quality would be minimised through the installation of booms fitted with turbidity curtains around all water-based works for spill and sediment containment. Emergency spill kits would be kept on site at all times.

Flora and fauna

- Increase in hard substratum algae and attached biota habitat by about 54m². This would have a beneficial impact by providing increased shelter and feeding habitat for small reef fish and for the larger pelagic fish that prey on these reef fish.
- Loss of organisms living in the rock rubble and sediments of the seabed (ie benthic biota) due to the placement of proposed new piles.
- Disturbance of aquatic habitats from construction vessel propeller wash and piling activities.
- Loss of up to about 18m² of rocky reef habitat in the short term. This loss would be

mitigated in the medium to long term by relocating loose rock that needs to be cleared for the installation of the piles and relocating it to form rock rubble algae reef in front of the existing wharf building.

The disturbance of aquatic habitat would be minimised by:

- Setting up exclusion zones around rocky reef habitats where appropriate.
- Removing loose rock that needs to be cleared for the installation of the piles and relocating it to form rock rubble algae reef in front of the existing wharf building.

Social and economic

- There would be temporary disruptions to commuters as ferry and water taxi services would not operate from Cremorne Point Wharf for up to six months during the construction period. Commuters may choose to use an alternative wharf during this time. This would be likely to result in an increase in commuter travel times.
- Wharf access for people with a disability would be improved.
- Temporary reduction in patronage of Sophies Place cafe during construction associated with the closure of the ferry wharf.

Socio-economic impacts would be managed through continued communication and consultation with the community throughout the construction period. Impacts on Sophies Place cafe would be minimised through installation of signage and maintain clear access to the cafe.

Land transport and parking

- There would be additional traffic due to about 15 vehicle movements per day comprising sub-contractors and concrete trucks travelling to and from the construction site.
- Minor temporary changes to public transport use would occur during construction as commuters use other public transport services or switch to private vehicles for up to six months when the wharf is to be closed.

Land transport and parking impacts would be minimised through measures contained in a traffic control plan such as management of pedestrian paths and signage. This plan would be prepared prior to the commencement of works and implemented during construction.

Water transport

- There would potentially be some temporary reduction in commuters using the Mosman Bay ferry route due to the closure of Cremorne Point Wharf during the construction period.
- There would be increased water-based traffic within Sydney Harbour due to construction vessels transporting plant, equipment, materials and personnel between an off-site facility within Sydney Harbour, and the construction site.
- There would be impact to all non-construction related vessels that would be prohibited to enter the area of the construction work site.

Water transport impacts would be minimised by clearly marking out the construction zone onsite and by informing commercial and recreational users of the changes to wharf access prior to and during construction.

Climate change

- The new wharf is designed to be resilient to projected sea level rise.

Waste management

- Generation of waste through demolition and disposal of existing wharf structures that are unable to be re-used or recycled.

Waste would be minimised through re-use of the existing pontoon and other components to be demolished where appropriate.

Detailed environmental safeguards and management measures to be implemented are provided in chapter 7.0.

Justification and conclusion

The proposal is justified because it would meet the proposal objectives which include providing wharf access for people with a disability in accordance with the DDA and current legislative standards for disabled access.

The proposal is not likely to have a significant impact on the environment and therefore the necessity of an environmental impact assessment is not required under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

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1 Introduction

This chapter introduces the proposal and provides the context of the environmental assessment. It provides a summary of the location and need for the proposal and identifies the purpose of this report.

1.1 Proposal identification

Roads and Maritime Services NSW (RMS) proposes to redevelop the ferry commuter wharf at Milson Road, Cremorne (the proposal), referred to throughout the Review of Environmental Factors (REF) as Cremorne Point Wharf

The main elements of the proposal include:

- Site establishment and closure of Cremorne Point Wharf.
- Demolition and removal of the existing pontoon and gangway.
- Construction of a concrete bridge.
- Installation of steel piles.
- Construction of new wharf.
- Site clean-up and opening of new wharf.

A detailed description of the proposal is provided in chapter 3.

The proposal is part of the RMS Sydney Commuter Wharf Upgrade Program. It is needed to improve ferry commuter services and to provide services that meet the requirements of the *Disability Discrimination Act 1992* (DDA) and current standards for disabled access.

The proposal is located on the western side of the Cremorne Reserve on the southern tip of the suburb of Cremorne. Cremorne is within the North Sydney local government area (LGA) and is bound by the suburb of Neutral Bay to the west and Mosman to the east.

Cremorne Point Wharf is located at the southern end of Milson Road and is accessed from Cremorne Reserve. On street car parking, a detached dwelling and greenery from the reserve are located adjacent to the site. Further north of the site, off Milson Road onto Wharf Road and Wulworra Avenue are residential apartment buildings and other detached dwellings. The surrounding area is predominately comprised of residential uses. The proposal location is shown in figure 1-1.

The marshalling and storage of most equipment, plant and materials, and the pre-fabrication of parts, pre-casting of headstocks and fit outs, would be carried out by a contractor at an off-site facility. The construction and demolition materials and equipment would be delivered/removed from the site using barges. A majority of the construction and demolition activity would also be undertaken from the barges on the water with only minor works such as connection to services undertaken from the land. Construction contractors would generally arrive at the site via water with only minimal vehicle access to the site required.

Construction is anticipated to take up to four months following commencement of works. However, for the purposes of this report up to six months has been assessed. During construction, the existing Cremorne Point Wharf would remain closed to all ferries, water taxis and other water craft.

The NSW Government has allocated funding in the 2013/14 budget for this work.

1.2 Purpose of the report

This REF has been prepared by RPS Australia East Pty Ltd. For the purposes of these works, RMS is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed works and associated environmental impacts have been

undertaken in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of section 111 of the EP&A Act that RMS examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Infrastructure under Part 5.1 of the EP&A Act.
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in accordance with section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement.
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Commonwealth Government Department of Sustainability, Environment, Water, Population and Communities for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.



Figure 1-1: Location of the proposal

2 Need and options considered

This chapter describes the need for the proposal in terms of its strategic setting and operational need. It identifies the various options considered and the selection of the preferred option for the proposal.

2.1 Strategic need for the proposal

Sydney Harbour's commuter wharves are an integral part of the Sydney transport system. Following an assessment of the condition of each wharf for items such as safe berthing, lighting, structural integrity and disability access by RMS, it was concluded that many of these wharves require substantial upgrade works to be restored to a state suitable for RMS and Sydney Ferry operations.

The *Disability Standards for Accessible Public Transport 2002* (DSAPT) and *Disability (Access to Premises – Buildings) Standards (2010)* (Disability Standards 2010) made under the DDA require all public transport infrastructure, including wharves, to provide fully compliant disabled access by 2022.

The proposal is therefore needed to improve ferry commuter services including items such as safe berthing, lighting, structural integrity and to provide services that meet the requirements of the DDA and current standards for disabled access.

2.1.1 Strategic planning and policy framework

The proposal is consistent with the strategic aims and directions of relevant strategic planning documents. Strategic planning documents most relevant to the proposal are identified below.

NSW 2021 A Plan to Make NSW No 1

NSW 2021 A Plan to Make NSW No 1 (Department of Premier and Cabinet, 2011) is the NSW Government's strategic business plan, setting priorities for action and guiding resource allocation over the next 10 years. It sets out five strategies including rebuild the economy, return quality services, renovate infrastructure, strengthen our local environment and communities and restore government accountability.

The goals, targets and actions in this plan set the priorities for funding, guiding decisions and focusing the day to day work of the public sector.

This proposal is particularly relevant to the following NSW 2021 goals:

- Goal 7 - reduce travel times.
- Goal 8 - grow patronage on public transport by making it a more attractive choice.
- Goal 9 - improve customer experience with transport services.
- Goal 14 - increase opportunities for people with a disability by providing supports that meet their individual needs and realise their potential.
- Goal 20 - build liveable centres.
- Goal 25 - increase opportunities for seniors in NSW to fully participate in community life.

The proposal is also relevant to the NSW 2021 priority action to 'build wharves to significantly increase the speed at which passengers embark and disembark'.

The plan earmarks delivery of improved coordination between transport modes and a renewed focus on customer satisfaction to deliver the highest possible standards of service to transport users across the NSW network.

The proposal is consistent with the goals of the plan as it would improve unassisted use of Cremorne Point Wharf by people with a disability, which would increase potential patronage. The proposal would enable wheelchair access simultaneously in both directions for those embarking and disembarking, which would increase boarding efficiency. The new facilities provided by the proposal would improve the overall customer experience for ferry users and contribute to the liveability of Sydney.

State Infrastructure Strategy 2012-2032

The *State Infrastructure Strategy 2012-2032* (Infrastructure NSW, 2012) is a 20 year strategy that supports the delivery and funding of infrastructure in NSW.

The strategy builds on the NSW Government's existing public commitments and outlines a forward program for urban and regional projects and reforms across transport, freight, aviation, energy, water, health, education and social infrastructure.

The strategy reports that almost 80 percent of commuter journeys to the Sydney Central Business District (CBD) are by public transport and that due to the limitations of parking in the CBD, public transport will need to increase as employment in the CBD grows over the next 20 years. The proposal is consistent with the strategy as it supports increased patronage of public transport in Sydney.

Draft Metropolitan Strategy for Sydney to 2031

The draft *Metropolitan Strategy for Sydney to 2031* (Department of Planning and Infrastructure (DPI), 2011) sets the management framework for Sydney's growth to over the next two decades.

One of the five key focuses of the strategy is accessibility and connectivity. It aims to encourage the growth of centres that have access to transport and improve access to major employment hubs and global gateways.

The proposal is consistent with this plan by improving existing public transport services including increased accessibility, increased commuter comfort and more efficient travel times and therefore support increased patronage of public transport in Sydney.

Central Subregion

Cremorne Point Wharf is located within the Central Subregional under the Strategy which is identified as Sydney's global economic driver and recognises the importance of Sydney Harbour as an icon that will continue to drive investment in and around the subregion. The vision for Sydney Harbour is to plan to protect and enhance Sydney Harbour and its environs and improve public access.

The proposed upgrade of the wharf is consistent with the vision for the Central subregion through improving the Harbour and its public access.

Inner North Draft Subregional Strategy

The *Inner North Draft Subregional Strategy* (Department of Planning, 2008) translates objectives of the NSW Government's Metropolitan Strategy and the former state plan to the local level. The draft subregional strategy acts as a broad framework for the long term development of the area, guiding government investment and linking local and state planning issues. The 2031 vision for the Inner North includes a strengthened economic corridor, provision of new economic activities, promotion and protection of the region's superior lifestyle and amenity, supporting the diverse community and improved public transport use and availability. The proposal is consistent with the vision for the Inner North subregion.

Disability Standards for Accessible Public Transport (2002) and Disability (Access to Premises – Buildings) Standards (2010)

The *Disability Standards for Accessible Public Transport (2002)* and *Disability (Access to Premises – Buildings) Standards (2010)* are both legislative standards made under the DDA. Each standard establishes prescribed minimum standards of accessibility for public transport buildings and conveyances and public transport premises respectively. Both establish a mandatory upgrade timetable for public transport premises to meet the prescribed accessibility requirements.

The proposal includes upgrade of the existing Cremorne Point Wharf to provide access for people with a disability in accordance with current legislation and regulatory standards.

Sydney Commuter Wharf Upgrade Program

The proposal is a project under the RMS Sydney Commuter Wharf Upgrade Program which will provide upgrades to all existing Sydney commuter wharves by 2022.

In 2006 the NSW Government transferred control and responsibility for all 46 commuter and charter wharves in Sydney Harbour to NSW Maritime (now RMS). RMS has embarked on the

first stage of the Sydney Commuter Wharf Upgrade Program to upgrade these wharves with the initial package of works, which includes the upgrade of the Cremorne Point Wharf, to be completed by June 2015.

The objectives of the program include the following:

- Upgrade passenger facilities in order to meet increasing public needs and expectations.
- Create a functional, distinctive and unique design theme for Sydney Harbour which would both unify and identify the harbour wharves and the ferry commuter system.
- Meet current disabled access standards.
- Facilitate cost effective ongoing maintenance through standardising wharf design.
- Build wharves to significantly increase the speed at which passengers embark and disembark.

The proposal is consistent with all the objectives of the RMS Sydney Commuter Wharf Upgrade Program. In particular the proposal would provide a new wharf that meets current disabled access standards.

2.2 Existing infrastructure

The existing Cremorne Point Wharf comprises a wharf building, gangway and a floating pontoon.

The timber wharf building is about 10 metres wide by about 10 metres long and is constructed over water. It is of a timber construction with a flat roof, concrete deck and is supported by timber piles.

The gangway is about 12 metres long and three metres wide. It is of steel construction with a timber deck and an arched corrugated steel roof.

The floating pontoon is about 22 metres long and eight metres wide with a single berthing face on the south eastern side. The pontoon is held into position by twelve steel piles. It is constructed of concrete with a curved corrugated steel roof supported by steel uprights. It contains glass and perspex weather screens at the north western and south eastern ends of the pontoon and along the roof line on the north eastern side.

The wharf facilities include seating, CCTV cameras, a lifesaving ring, video monitor with timetable information, lighting, help point, two Opal card readers, a waste bin and information totem.

Due to the design of the existing gangway, the current standards for disabled access cannot be met at various tides and access from the wharf to vessels is via a moveable ramp which is stored on the ferries. The current access arrangements do not meet the requirements of the DDA or current legislative standards for disabled access.

The existing wharf is shown at figure 2-1 to 2-4 below.



Figure 2-1: Cremorne Point Wharf looking south from Milson Road



Figure 2-2: View of Cremorne Point Wharf from Sydney Harbour looking south east



Figure 2-3: Looking south west towards Cremorne Point Wharf from Milson Road. Sophie's Place cafe is located within the wharf and is shown in the centre of the figure.



Figure 2-4: Looking south west towards gangway and pontoon from inside of wharf building

2.3 Proposal objectives

The objectives of the proposal are to:

- Provide a wharf that is accessible to people with a disability in accordance with the DDA, *Building Code of Australia* (2011), *Disability Standards for Accessible Public Transport* (2002), *Disability (Access to Premises – Buildings) Standards* (2010) and Australian Standard series 1428.
- Increase speeds at which passengers embark and disembark to improve boarding efficiency and travel times.
- Create a practical, functional and robust ferry commuter wharf with appropriate waiting areas, passenger seating, standing and shelter while allowing for the enjoyment of good weather, harbour views and aquatic activity.
- Reduce potential public safety risk and impacts on water quality and aquatic ecology associated with vessels manoeuvring within a shallow waterway.

In delivering the proposal RMS seeks to meet the following delivery objectives:

- Maintain the heritage significance of the wharf.
- Provide civilian, fire and marine rescue/safety equipment.
- Reduce maintenance through the use of appropriate materials, surfaces and details that facilitate easy cleaning of the structures.
- Reduce vandalism with the use of appropriate materials, surfaces and designs.
- Eliminate unauthorised and inappropriate use of terminals and facilities.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

In 2006 the former NSW Maritime took control of all ferry commuter wharves in Sydney Harbour and proceeded to undertake maintenance and upgrade works and to develop a program of substantial works for the years ahead. The upgrade of each wharf was prioritised based on a comprehensive risk assessment and a review workshop. Cremorne Point Wharf was planned for upgrade in 2014 and subsequently such works are currently proposed as detailed in this REF.

Commuter ferry wharves are not easily re-located due to the considerable impacts that result to adjacent public transport and vessel movements within Sydney Harbour, including changes to navigational lanes and routes. For this reason commuter ferry wharves are generally upgraded or redeveloped in or near their existing locations. These considerations assisted with identification of the three options described in section 2.4.2.

The preferred option was selected as it was found to best meet the project objectives and the following additional criteria:

- Strategic need for the proposal.
- Requirement to minimise the impacts of the proposal on the surrounding environment.
- Safety.
- Cost.

Following selection of the preferred option, design refinements were made and approval was sought from Sydney Ferries on the concept design (refer to Chapter 5 for a summary of the consultation undertaken).

2.4.2 Identification of options

Three options were identified for the proposal. These were:

Option 1 – The do nothing (base case) option.

The do nothing (base case) option would involve no active measures, outside of routine maintenance, to improve the existing wharf. The existing wharf would continue to be used for ferry commuter services.

Option 2 – Addition of a new wharf attached to the existing wharf which improves accessible to people with a disability.

Option 2 would involve retaining the existing wharf and the addition of a new ferry wharf connected to the existing wharf. The new wharf would be accessible to people with a disability.

Option 3 – Demolition of the existing pontoon and gangway and replacement with a new wharf which provides improved accessibility to people with a disability.

Option 3 would involve the demolition and removal of the existing wharf and all associated structures and the construction of a new wharf that would be accessible to people with a disability. It would also be a stand-alone structure that is consistent with the unifying visual theme developed for wharfs to be replaced and upgraded throughout Sydney Harbour.

2.4.3 Analysis of options

Each of the options were analysed against the project objectives and the criteria described above in section 2.4.1. A summary of the analysis including the advantages and disadvantages of each of the options considered for the proposal is outlined below.

Option 1 – the do nothing (base case) option

The do nothing option would not improve the commuter wharf facilities as per the objectives of the proposed activity. Nor would it improve the level of accessibility to the wharf in accordance with the requirements of the DDA, the *Disability Standards for Accessible Public Transport* (2002) or the *Disability (Access to Premises - Buildings) Standards* (2010) (the wharf is currently accessible for no more than 50 per cent of all tides).

There would be no improvement in commuter comfort, safety or security.

Initially, this option would not cost anything however it is likely that maintenance of the wharf would cost more than the other options as the wharf would deteriorate over time.

This option would result in views to and from the harbour being maintained. It would also have the least environmental impacts of the three options as there would be no additional structures and no disturbance of the land surface. As with the other 2 options, this option would maintain the heritage significance of the wharf.

As this option would not achieve each of the proposal objectives (see section 2.3) or the objectives of the RMS Sydney Commuter Wharf Upgrade Program (see section 2.1), particularly in regard to accessibility, it was not pursued further.

Options 2 and 3

Option 2 would have increased impacts on views from surrounding residences and the public domain then Option 3 given the larger scale of two wharves combined. Option 2 would require the wharf would require the gangway to protrude further into the bay increasing impacts on the landscape character and could affect navigation routes.

Both Options 2 and 3 would provide:

- A wharf that would comply with the requirements of the DDA and current legislative standards for disabled access for 80 per cent of the high and low tide levels listed in standard tide charts.
- Improvements to the public domain and the quality of commuter facilities. Therefore, meeting objectives for upgrading facilities.

Option 3 would better meet the project objectives and has the following benefits:

- Views to and from the bay would be largely maintained.
- The existing wharf would be removed reducing the need for, and costs associated with, the maintenance of two wharves as opposed to a single wharf.
- Standardisation of wharf structures throughout Sydney Harbour, which would improve

maintenance timeframes and costs as well as unifying and identifying the harbour wharves and ferry commuter system. Therefore, meeting objectives to facilitate cost effective maintenance.

2.5 Preferred option

Option 3 is the preferred option as it was found to best meet the objectives for the commuter wharf program (section 2.1), objectives for the proposal (section 2.3), and the criteria identified in section 2.4.1. In particular, it would provide access for people with a disability while minimising impacts on the environment.

A detailed description of the preferred option (the proposal) is provided in chapter 3.

3 Description of the proposal

This chapter describes the proposal, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

The proposal would include the demolition and removal of the existing pontoon and gangway and the construction of a new wharf. The positioning of the new wharf is expected to be as shown in figure 3-1. However for the purposes of this REF, an envelope (shown in red dotted outline in figure 3-1) has been assessed to consider potential changes to the position of the wharf should they be required following further design development.

The proposal would be as follows:

Demolition and removal of the existing pontoon and gangway

- The existing covered pontoon and gangway including steel piles, glass screens, and associated facilities such as signage, information totem, seating, and closed circuit television (CCTV) system would be demolished and removed to an off-site location by barges.
- The existing wharf building which connects the gangway to the foreshore is to be retained. The entrance to the gangway at the southern end of the waiting shed will remain open and a glass balustrade would be installed within the opening.

Construction of a new wharf

- Relocation of about 18m² of loose surface rock on the seafloor from the area of the piles supporting the proposed bridge to an area directly adjacent to the western side of the existing wharf building.
- Construction of a covered concrete bridge about three metres wide by six metres long connecting the land to a gangway. The bridge would contain a curved zinc roof supported by steel columns and stainless steel balustrades. The bridge would connect to the land adjacent to the north eastern corner of the existing waiting shed and would be oriented at an angle of about 90 degrees to the land. The bridge descends to a platform at a maximum 1:14 gradient. The concrete bridge would be supported by six steel piles.
- Construction of a covered aluminium gangway about 16 metres long and about three metres wide. The gangway would connect the bridge with a new floating pontoon. The gangway would be supported by the bridge and the floating pontoon and its gradient would vary according to the tides. The orientation of the gangway would be at an angle of about 135 degrees to the ramp.
- Construction and installation of a rectangular shaped steel floating pontoon about 12 metres wide by 27 metres long off the gangway. The pontoon would have one berthing face on the southern side. The pontoon would contain a curved zinc roof supported by steel columns, glass and stainless steel balustrades and seating. The floating pontoon would be held in place by four steel piles. The new pontoon would be located about 15 metres further to the south east from the existing pontoon but with a similar alignment (about a 90 degree angle to the gangway).
- Installation of safety and security facilities including lighting, closed circuit television (CCTV), ladders to the water from the pontoon, a life ring on the pontoon platform, glass weather screen and tactile floor treatments.

Ancillary facilities

- A temporary compound would be established including site sheds, an amenities shed and storage containers for tools and some materials. The location of the temporary compound is to be confirmed and would be subject to local council review and agreement. The location of the temporary compound would maintain access to and from Sophies Place

cafe within the wharf building.

- The connection of electrical power to an existing supply to provide power to the wharf for lighting and security.
- The connection of water lines and meter to existing supply to provide water to the wharf for maintenance.
- The proposal would include provision for electronic ticketing systems, which may be implemented in the future but would not be provided as part of this proposal.

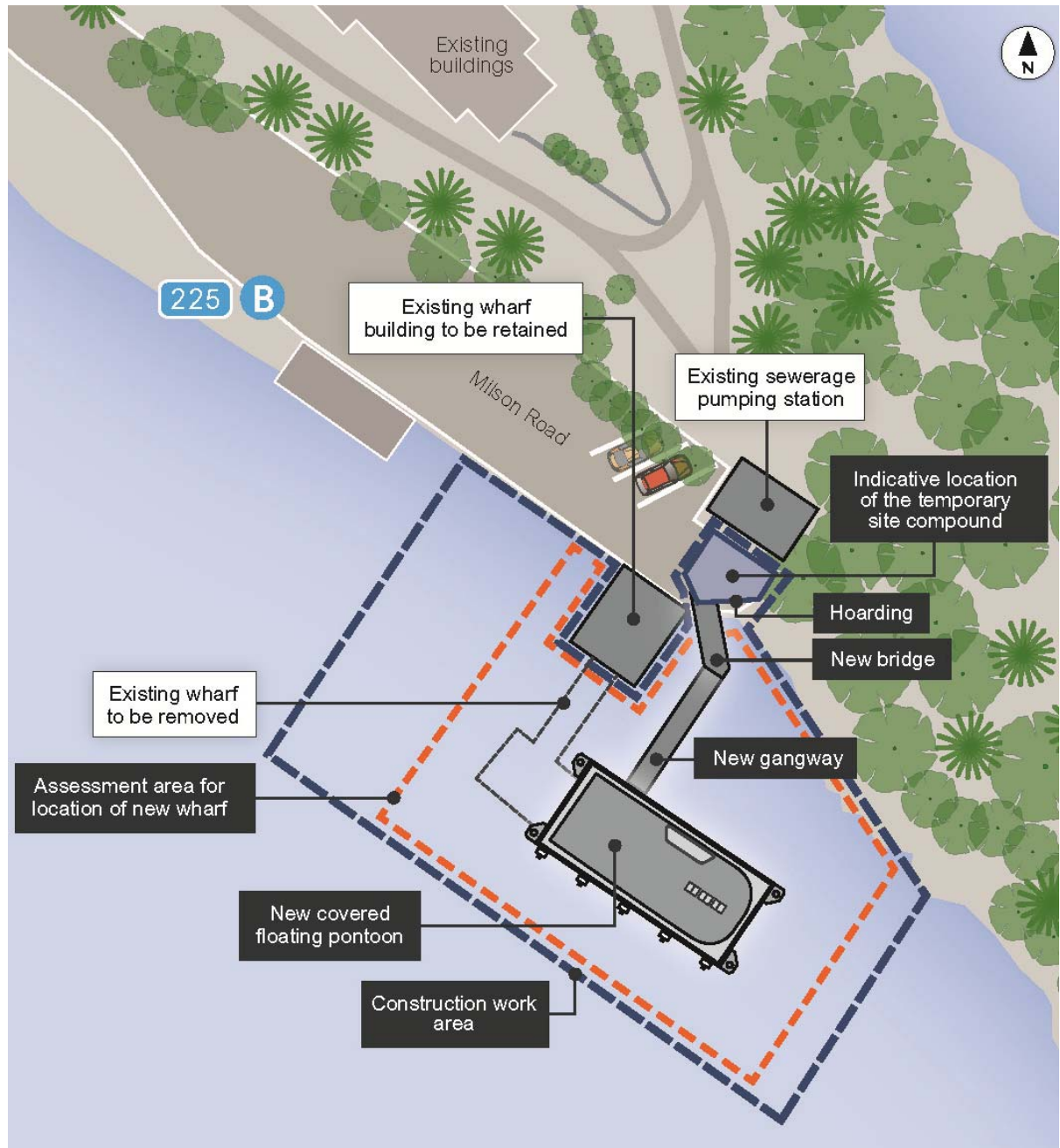


Figure 3-1: Overview of the proposal and indicative location of temporary compound

The wharf (including the bridge, ramp, gangway and pontoon) would be constructed to be accessible to people with a disability for no less than 80 per cent of the high and low tide levels listed in standard tide charts.

The marshalling and storage of most equipment, plant and materials, and the pre-fabrication of parts, pre-casting of headstocks and fit outs, would be carried out by a contractor at an offsite facility. The construction and demolition materials and equipment would be delivered/removed from the site using barges. A majority of the construction and demolition activity would also be undertaken from the barges on the water with only minor works such as connection to services undertaken from the land. Construction contractors would generally arrive at the site via water with only minimal vehicle access to the site required (up to about 15 vehicle movements per day).

The proposal would require the Cremorne Point Wharf to be closed to all ferries, water taxis and other vessels/watercraft for the duration of construction to enable the works to be carried out and would be re-opened to these vessels on completion of construction.

An overview of the proposal including the approximate location of the temporary compound is shown in the figure 3-1. The proposal viewed from Sydney Harbour is illustrated in figure 3-2.



Figure 3-2: Perspective of the proposed wharf viewed from Sydney Harbour

3.2 Design

3.2.1 Design criteria

The proposal has been designed to meet the *Australian Standard AS 4997-2005 Guidelines for the Design of Maritime Structures*, the *Building Code of Australia* and with general compliance to Maritimes' Standard Practice for Type C3 and C5 loadings using various materials and general purpose, heavy duty and heritage balustrades.

Further design criteria for the proposal include:

- Provide a roof form/shape that is innovative but is not visually intrusive or reflective, and minimises impact on views from adjacent/nearby residences and facilities.
- Improve disabled access and use of wharves to achieve compliance (where possible)

with the DDA and relevant standards.

- Improve the location to help facilitate ferry operations and berthing, loading and unloading requirements.
- Minimise upgrade and maintenance costs by maximising economies of scale with the use of similar materials, elements and design/construction approach throughout Sydney Harbour including size and design of roof structure.
- Reduce maintenance by the use of appropriate materials, surfaces and details.
- Reduce vandalism with the use of appropriate materials, surfaces and designs.

Horizontal and vertical alignment

The proposal would provide a similar horizontal alignment to the existing wharf. Consistent with the existing wharf, the new wharf would be parallel to the land.

The height of the new pontoon roof structure would vary according to the tide but would generally be around the same height of the existing roof.

The vertical grade of the proposal would be consistent with the requirements of the current disabled access standards and requirements of the DDA. The ramp, gangway and pontoon, would be constructed so that the wharf would be accessible to people with a disability for no less than 80 per cent of the high and low tide levels listed in standard tide charts. For the remaining 25 per cent of the time the gradient of the gangway would be maintained between 1:8 and 1:13.

Typical cross section

Cross sections of the proposal are provided in appendix A. The cross section for the wharf would provide a gangway width of about three metres to enable two wheelchair users to pass each other in opposite directions simultaneously.

Appropriate capacity for the waiting area on the pontoon has been determined from current and projected future demand for the Cremorne Point Wharf over the 50 year lifespan of the structure.

Consistent wharf design

A consistent thematic design for all upgraded wharves in Sydney Harbour has been developed to unify and identify the harbour wharves and ferry commuter system. The design of the proposal is consistent with the design concept for the RMS Sydney Commuter Wharf Upgrade Program.

Service life

Structural replacement and upgrade work would be designed for around a 50 year service life while subject to wear from berthing forces and weather-induced stresses.

3.2.2 Constraints

Constraints identified for the design and construction of the proposal include:

- Disabled access: The new wharf is required to be accessible to people with a disability to meet the standards of the DDA and current legislative standards for disabled access.
- Sea level rise: The wharf has been designed for future sea level rise from projected climate change. A sea level rise allowance of 516 millimetres over 50 years has been adopted for the proposal. This allowance was developed using a range of Global Climate Models and adopting the median result as a 'best estimate'.
- Weather and tide: The new pontoon has been designed to provide appropriate clearance of tide, storm surge and wave action during operation of the wharf. Calm wind and water conditions are required for certain construction activities such as the removal and installation of the piles and installation of glass and stainless steel balustrades and screens. The pontoon has also been designed in respect of its exposure to extreme weather and swell conditions that can be experienced from time to time on the harbour. This has required a larger pontoon than other typical ferry wharves within the harbour.

3.3 Construction activities

3.3.1 Work methodology

It is anticipated that the main construction activities would be carried out in the following sequence:

- Site establishment and closure of Cremorne Point Wharf.
- Demolition and removal of the existing pontoon and gangway.
- Construction of a concrete bridge.
- Installation of steel piles.
- Construction of new wharf.
- Site clean-up and opening of new wharf.

This construction sequence would enable water-side access to the foreshore for large water-based equipment and supply barges that would be used for demolishing the existing wharf and piles and to construct the bridge, gangway and pontoon.

The working envelope of the barges also makes allowance for the outward reach of its four anchorage points, over which marine vessels may not cross for safety reasons. The anticipated size of the barges is up to about 20 metres by 30 metres in size.

The methodology is based on the current concept design and may need adjustment to meet the site conditions or the type/size of equipment used by the contractor during the construction period. Any material changes to the construction methodology which could result in additional environmental impacts to those assessed in this REF, would be the subject of additional environmental assessment.

Site establishment and closure of Cremorne Point Wharf

- An off-site facility would be used for marshalling and storage of most equipment, plant and materials, pre-fabrication of parts, pre-casting of headstocks and fit outs. The operation of this facility does not form part of this proposal but would have the necessary approvals in place for such activities to be undertaken. The proposal has been designed so that as much construction work as possible would occur at the appropriately licensed facility rather than at Cremorne Point Wharf.
- Site entry and exit points would be established for the construction work site.
- Appropriate way-finding signage would be installed advising of alternative transport options.
- Environmental controls would be established in accordance with the construction environmental management plan (CEMP) for the proposal.
- The temporary compound would be established adjacent to the wharf. The site compound is anticipated to be about 50 square metres in area based on the size of site compounds used on the other recent wharf projects. The location of the compound area is to be adjacent to the wharf entry and extending south inside Blues Point Reserve and would be subject to council review and agreement.
- The majority of construction plant, equipment, materials and personnel would access the construction site via Parramatta River and the Sydney Harbour, travelling by boat and/or barge from the off-site facility.
- Traffic control measures would be established in accordance with the traffic management plan (TMP).

Demolition and removal of the existing wharf structures

- About three barges (about 20 metres by 30 metres in size) would travel to the site from the off-site facility. One barge would be fitted with a crane (about 12 metres high). When on-site it would be anchored by four points but would reposition around the site during the work, as required.
- The waiting shelter, tidal stairs, lights, posts, fencing, information totems and CCTV

system would and be loaded onto a barge by crane and transported to an appropriately approved and licensed facility for reuse and/or disposal.

- Timber (or steel) piles would be removed using a vibratory hammer to extract the piles from the bedrock. The hammer would be placed over the pile using a barge mounted crane. If the pile is unable to be pulled out, it would be cut level to the harbour bed to remain in situ. Divers would cut the pile at seabed level using appropriate underwater equipment.
- Piles would be removed by barge to the off-site facility. The piles would be reused, where possible, or eventually removed to a licensed waste management facility for recycling or disposal.

Construction of the concrete bridge

- Relocation of loose surface rock in location of bridge:
 - A crane and a diver would remove about 18m² of loose surface rock to expose basement rock from the immediate location of the piles that are to support the bridge.
 - The loose surface rock would be relocated by crane to within the waterway directly adjacent to the western edge of the existing wharf building. The placement of the rock would be guided by a diver.
- Installation of six steel piles. The methodology for the installation of piles is outlined below.
- Installation of the bridge headstocks and bridge deck would be constructed in situ. This would involve the construction of formwork for the length of the wharf deck, installation of steel, and the filling of the formwork with concrete.

Installation of steel piles

Four steel locator piles for the pontoon and six steel bridge support piles would be installed into bedrock. These piles would be transported by barge to the site from the off-site facility. There would be sufficient water to carry out piling operations for the locator piles and the four outer (furthest from the land) bridge support piles. The installation of the two inner (closest to the land) bridge support piles would be carried out at or around high tide with the rear of the barge anchored to an existing pontoon pile (which would remain temporarily) to ensure the barge does not come into contact with the rock rubble reef and seafloor.

Constructing pile foundation systems in bedrock consists of three components:

Phase 1 drilling piles into rock in calm water

Phase 2 hammering piles to refusal in calm water

Phase 3 cutting, welding and plugging of piles with concrete

The proposal requires about eight nights to complete the drilling of piles and six early mornings to complete the hammering of piles. This work would be spread over a period of about two weeks to allow respite from noise and a contingency for unfavourable conditions from weather, seas, swell, wind, and boat wash.

- Phase 1 Drilling into rock would take three to four hours per pile plus setup time and pack up time (with continuous noise from the diesel generator and large electric motors whilst drilling the pile).

Each pontoon restraint pile would be lifted from the barge and put into place using a barge-mounted crane. A drill rig mounted onto a barge would attach to the pile using a helmet fitting. The drill rig would screw the pile into the bedrock to a depth of up to about three metres.

- Phase 2 The piles are hammered (using a 30 tonne weight) to refusal. Hammering of piles would take place at least one day after drilling of piles. It is anticipated that each pile would be hammered for one minute (approximately 10 hits with the hammer within one minute). For each pile this activity is likely to occur five times over a period of one hour. There are four piles to be hammered over six morning

sessions.

Phase 3 The steel piles would then be cut, welded and plugged with concrete.

Investigations have identified that it may be necessary to install the two inner (closest to the land) bridge support piles from the land due to the narrow work area in this location. This would be determined with further design development and would involve the two piles and piling rig being transported to the land by the barge mounted crane. The piling rig would operate from within the construction work area on the land with generally the same three phase work method above for drilling and hammering of piles. These works would be likely to happen during the day time and at low tide when there is low wash.

Construction of new gangway and pontoon

- Following the completion of the piling activities, the gangway would be constructed. Most of the structure (eg beams, headstocks and roof) would be pre-fabricated/pre-cast then transported to site from the off-site facility. Temporary walkways would be installed down each side of the structure. In-situ works would include about two concrete pours (involving up to three concrete trucks) over about three days to construct the bridge and to fill the piles.
- Intricate lifting and placement of components of the new wharf would be carried out using a barge mounted crane. This activity needs to be undertaken during calm environmental conditions (eg still water and minimal wind). Intricate lifts and placement can take up to about six hours. For lifting and placement to be completed while the environmental conditions are appropriate, intricate lifting and placement would commence at about 11pm and may continue till about 7am, Monday to Saturday.
- The new pontoon structure would be constructed at an off-site facility and floated to Cremorne Point Wharf by barge. The pontoon would be attached to the gangway.
- Installation of electrical power lines and water pipes to connect to the existing water services and new electrical services cupboard servicing within the waterside building.

Site clean-up and opening of the new wharf

- The site would be cleaned up and restored to its previous state.
- Controls and temporary structures would be removed.
- A safety assessment of the structure would be carried out to identify any risks and rectify any safety hazards resulting from construction before opening these areas to the public.
- All construction fencing/hoarding and signage would be removed to re-open the wharf to the public.

3.3.2 Construction hours and duration

RMS plans to carry out the proposal over a period of about six months (weather permitting), starting around September 2014.

Construction would normally be limited to between the following standard work times:

- 7am to 6pm Monday to Friday.
- 8am to 1pm Saturday.

No work would be undertaken on Sundays or public holidays. However, work outside of standard hours would also be required in order to carry out piling activities and intricate lifts from the barge mounted crane, due to requirements for still water. Activities that are likely to be undertaken outside of standard work hours are outlined below.

Intricate lifting activities

There would be about 10 lifts throughout the duration of the construction period.

Intricate lifting and placement of components of the new wharf would be carried out using a barge mounted crane. This activity needs to be undertaken during calm environmental conditions (still water and minimal wind). Intricate lifts and placement can take up to six hours.

For lifting and placement to be completed while the environmental conditions are appropriate, intricate lifting and placement is expected to be as follows:

Early morning Monday (during night time period):

- Commence around 12am and continue to about 7am.

Monday night through to Saturday morning:

- Commence around 11pm and continue to about 7am.

Piling activities

Piling work typically takes around two weeks to complete (about 10 nights in total) toward the beginning of the construction period. Piling works are highly sporadic. There may be noise from hammering and drilling of a pile for around 10 minutes or so and then no significant noise for 30 minutes or more.

Installation of the piles would require calm environmental conditions (still water and minimal wind) so that the floating barge used for the piling can remain still for the piles to be installed accurately. Calm conditions are also required to provide safe conditions for the construction crew. The waterway is usually calmer early in the morning, with wind and wind chop increasing throughout the day. The conditions required for piling usually occur during this early morning period. As a result it is anticipated that the installation of piles would occur as follows:

Summary of hours of night works for piling drilling activities

Early morning Monday (during night time period):

1. Setup for drilling from 12am to 1am.
2. Drilling of piles from 1am to 6am.
3. Pack up generally 6am to 7am.

Monday night through to Saturday morning:

1. Setup for drilling from 11pm to 12am.
2. Drilling of piles from 12am to 6am.
3. Pack up generally 6am to 7am.

Summary of hours of night works for piling hammering activities

Early morning Monday to Saturday morning:

1. Setup for hammering from 4am to 5am.
2. Hammering of piles from 5am to 7am.

Respite nights

There would be no intricate lifting or piling activities during the night time period on Saturday night, Sunday night (prior to midnight) or public holidays (prior to midnight). There will also be one respite night between Monday 12am and Saturday 7am resulting in at least two respite nights per week including Saturday night.

3.3.3 Plant and equipment

The equipment to be used would be confirmed during the construction planning process. Typical plant and equipment likely to be used during construction would include:

- Generators.
- Lighting towers.
- Power hand tools.
- Light vehicles.
- Boats.
- Barges.
- Drill rigs.
- Cranes (barge mounted).
- Water pumps.
- Chainsaws.
- Concrete trucks.
- Hammer drills.
- Concrete boom pump.
- Hand tools.

3.3.4 Earthworks

The proposal does not involve any earthworks or land disturbance.

3.3.5 Materials

The proposal does not require the importation of fill material or disposal of materials from the seabed as no reclamation or filling is required. Natural resources for construction include aggregate for use in concrete batching and sand, aggregate and select material for the production of cement and glass. Manufactured items, including steel, pre cast components and pipes and utilities would also be required.

Materials would be sourced from overseas and local commercial suppliers, using local suppliers wherever feasible and cost-effective.

3.3.6 Traffic management and access

Most of the construction plant, equipment, materials and personnel would travel to the site by barge or boat from the off-site compound. Some construction traffic movements would occur on the road network with around 15 movements per day during peak construction times. These would be managed in accordance with the management measures outlined in the traffic management plan for the proposal.

3.4 Ancillary facilities

A temporary compound would be established at the site. It would be operated for the duration of the work. The compound would include site sheds for use as an office, mess and amenities as well as a lay-down and storage area and potentially a container for storage of some tools, equipment and materials. The indicative location of the temporary compound is directly adjacent to the wharf entrance at the end of Milsons Road (see figure 3-1).

3.5 Public utility adjustment

The existing gangway and pontoon's electricity and water supply would be disconnected prior to demolition and reconnected to the new wharf.

It is not expected that there would be any public utility adjustment required for the proposal. As detailed at section 5.4, Ausgrid and Sydney Water were notified of the proposal and neither raised any objections to the proposal or issues regarding servicing. Ausgrid and Sydney Water would be consulted during construction and where necessary applications for connections would be made.

3.6 Property acquisition

No property acquisition would be required for the proposal. The temporary compound within Milson Road would require approval from North Sydney Council.

4 Statutory and planning framework

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 68(4) of ISEPP permits development on any land for the purpose of wharf or boating facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for a wharf and boating facility and is to be carried out by RMS, it can be assessed under Part 5 of the EP&A Act. Development consent from North Sydney Council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* (NPW Act) and does not affect land or development regulated by State Environmental Planning Policy No. 14 - Coastal Wetlands, State Environmental Planning Policy No. 26 - Littoral Rainforests, State Environmental Planning Policy (State and Regional Development) 2011 or State Environmental Planning Policy (Major Development) 2005.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in chapter 5 of this REF.

4.1.2 State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP) provides that development for the purpose of port and wharf facilities or boat facilities (not including marinas) carried out by or on behalf of a public authority that has a capital investment value of more than \$30 million is State significant infrastructure and would require approval from the Minister for Planning and Infrastructure under Part 5.1 of the EP&A Act.

The proposed Cremorne Point Wharf upgrade has a capital investment value of less than \$30 million and does not trigger the State significant infrastructure provisions of the SRD SEPP.

4.1.3 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (now a deemed State Environmental Planning Policy)

The proposal falls within the area that is the subject of SREP Sydney Harbour.

The site falls within W1 Maritime Waters and W8 Scenic Waters: Passive use zone under the SREP. The proposal would be characterised as public water transport facilities under the SREP which are permissible with development consent. However, as discussed in section 4.1.1 the ISEPP permits the proposed activity without development consent despite this SREP requirement. Accordingly, assessment under Part 5 of the EP&A Act is appropriate.

The relevant aims of the SREP Sydney Harbour are considered in table 4.1 below.

Table 4.1 Relevant aims of the SREP Sydney Harbour

Objective	Comment
(a) to ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are recognised, protected, enhanced and maintained as an outstanding natural asset and as a public asset of national and heritage significance for existing and future generations	The proposal protects and maintains the natural and heritage values of the area and their contribution to Sydney Harbour.

Objective	Comment
(b) to ensure a healthy sustainable environment on land and water	The proposal would not result in any ongoing adverse impacts on the environment of the land or water. Appropriate safeguards would be applied to the work to minimise impacts in both construction and operation.
(c) to achieve a high quality and ecologically sustainable urban environment	The proposal would introduce a number of ecologically sustainable development measures. The design has sought to minimise waste generation and elements would be recycled and reused wherever possible. The design of the new wharf is of high quality and would result in an improved visual appearance compared to the existing wharf.
(d) to ensure a prosperous working harbour and an effective transport corridor	<p>The proposal would enhance the role of the harbour as both a working harbour and an effective transport corridor by improving the facilities for water-based public transport. Cremorne Point Wharf would be closed for the duration of construction. There would be some temporary disruptions to public transport access during the construction period but this would be of a temporary nature. Commuters may choose to use an alternative public transport option such as bus (refer to section 6.6).</p> <p>There would be appropriate communication with commuters ahead of any disruption to ferry services.</p>
(e) to encourage a culturally rich and vibrant place for people	The proposal would improve access to a range of cultural sites around the harbour.
(f) to ensure accessibility to and along Sydney Harbour and its foreshores	The proposal, once complete, would not change existing arrangements to access to the harbour or foreshore area. During construction there would be some temporary changes to boat and pedestrian movement in and around the location of the wharf. This would not be permanent and would be communicated to users of the waterway and commuters ahead of the work commencing. The proposal would provide accessibility to the wharf in accordance with the DDA. Access to the wharf for vessels would also be improved by locating the berthing faces within deeper water.

The proposal has been considered in respect of the objectives of Zone W1 Maritime Water and Zone W8 Scenic Waters: Passive use in table 4.2 and 4.3.

Table 4.2 SREP Harbour Zone W1 Maritime Waters objectives

Zone W1 objective	Comment
(a) to give preference to and protect waters required for the effective and efficient movement of commercial shipping, public water transport and maritime industrial operations generally,	The proposal would provide greater accessibility, passenger comfort and improving public water transport in Sydney Harbour. There would be some temporary disruptions to public water transport during the construction period, however these would not be permanent. The changes, including details of alternate transport options available, would be communicated to commuters and commercial craft operators ahead of the work commencing.
(b) to allow development only where it is demonstrated that it is compatible with, and will not adversely affect the effective and efficient movement of, commercial shipping, public water transport and maritime industry operations,	The proposal would replace an existing commuter wharf with a new commuter wharf. It would not result in the obstruction of vessels in and around the harbour and would therefore maintain the effective and efficient movement of commercial shipping, public water transport and maritime industrial operations. There would be temporary disruptions to boating movements and access during the construction period, however these would not be permanent. The changes would be communicated to relevant boating groups and commercial craft operators ahead of the work commencing.
(c) to promote equitable use of the waterway, including use by passive recreation craft.	Both public and private vessels would be able to use the wharf for passenger pick up and drop off in operation. During the construction period there would be temporary disruptions to the use of the wharf, including establishment of a construction area in the water around the wharf. These would not be long term changes and would be communicated to relevant boating users and commercial craft operators ahead of the work commencing.

Table 4.3 SREP Harbour Zone W8 Scenic Waters: Passive Use objectives

Zone W8 objective	Comment
(a) to give preference to unimpeded public access along the intertidal zone, to the visual continuity and significance of the landform and to the ecological value of waters and foreshores,	The works are primarily water-based and therefore would not interfere with accessibility to the foreshore in operation. There would be some disruptions to public access to the foreshore during the construction period; however, this would not be long term. The ecological value of waters and foreshores would not be adversely affected in the long term. An aquatic ecology assessment has been undertaken which indicates that there would be no major long term harm to marine species as a result of the proposal. Flora and fauna issues are assessed in section 6.5. Any changes to access would be

Zone W8 objective	Comment
	communicated to residents, businesses and commuters ahead of the work commencing.
(b) to allow low-lying private water-dependent development close to shore only where it can be demonstrated that the preferences referred to in paragraph (a) are not damaged or impaired in any way, that any proposed structure conforms closely to the shore, that development maximises open and unobstructed waterways and maintains and enhances views to and from waters in this zone,	The replacement of an existing wharf with a new wharf in a similar location ensures that access along the intertidal zone is not affected by the proposal and the visual continuity of the area is not adversely affected. The ecological values of the waterway will be maintained in the long term.
(c) to restrict development for permanent boat storage and private landing facilities in unsuitable locations,	Commuter ferries, private vessels, water taxis and commercial operators would use the wharf for pick up and set down passengers, with priority access given to ferries.
(d) to allow water-dependent development only where it can be demonstrated that it meets a demonstrated demand and harmonises with the planned character of the locality,	The proposal is the replacement of an existing ferry wharf as part of the Sydney Commuter Wharf Upgrade Program. The need for the proposal is considered in section 2.
e) to ensure that the scale and size of development are appropriate to the locality and protect and improve the natural assets and natural and cultural scenic quality of the surrounding area, particularly when viewed from waters in this zone or areas of public access.	The scale and size of the development is appropriate to the locality. A visual impact assessment has been carried out for the proposal which indicates impacts on the landscape character and views and vistas would be moderate to low.

The matters for consideration listed in Part 2, Division 2 of the SREP Sydney Harbour are provided in table 4.4.

Table 4.4 Division 2 matters

Division 2 matter	Comment
Clause 21 Biodiversity, ecology and environment protection	<p>Flora and fauna issues have been considered and assessed for the proposal.</p> <p>An aquatic ecology assessment has been undertaken which indicates that there would be no significant long term harm marine species as a result of the proposal. It is not expected that there</p> <p>There would be no impact on vegetation subject to the implementation of the environment protection management measures at section 7.2. There would be an increase in the amount of hard-substratum habitat for marine species as a result of additional hard surfaces within the waterway.</p>

Division 2 matter	Comment
Clause 22 Public access to, and use of, foreshores and waterways	There would be some temporary disruptions to public water transport, during the construction period, however these would not be long term changes. The changes would be communicated to residents, businesses, commuters and commercial craft operators ahead of the work commencing. Alternative public transport options would be available while the wharf is closed in the construction period.
Clause 23 Maintenance of a working harbour	The proposal would enhance the role of the harbour as both a working harbour and an effective transport corridor by improving access to water-based public transport facilities in operation.
Clause 24 Interrelationship of waterway and foreshore uses	The interrelationship of waterway and foreshore uses would be unchanged in the long term as a result of the proposal.
Clause 25 Foreshores and waterways scenic quality	There would be a moderate to low impact on the scenic quality of the area as discussed at section 6.8.
Clause 26 Maintenance, protection and enhancement of views	There would be a moderate to low impact on views as discussed at section 6.8.
Clause 27 Boat storage facilities	The proposal does not involve boat storage facilities.

The SREP Sydney Harbour clause 31 requires that the Foreshore and Waterways Planning and Development Advisory Committee (FWPDAC) be given notice of proposals that fall within Schedule 2 and that any comments be taken into consideration. Schedule 2 includes public water transport facilities. Service providers are also required to be notified of the proposal. FWPDAC, Ausgrid and Sydney Water were notified and comments received are discussed at section 5.

The site is located within the Sydney Opera House buffer zone on the SREP Sydney Harbour mapping. Clause 58B provides matters to be taken into consideration to protect the world heritage value of the Sydney Opera House. These matters include:

- *The objectives set out in clause 53(2).*
- *The need for development to preserve views and vistas between the Sydney Opera House and other public places within that zone,*
- *The need for development to preserve the world heritage value of the Sydney Opera House.*
- *The need for development to avoid any diminution of the visual prominence of the Sydney Opera House when viewed from other public places within that zone.*

The proposal's impact on views and vistas between the Sydney Opera House and other public places has been assessed at section 6.8. It was found that there would be a negligible impact on these views and vistas. Therefore, the proposal would not impact on the world heritage value of the Sydney Opera House and the proposal is acceptable when assessed against clause 58B.

Part 6 of the SREP relates to Wetland Protection. The site and adjacent areas to the north and south of the wharf are identified as being Wetland Protection Areas. The impacts of the proposal on these areas are considered in table 4.5 below.

The proposal has also been considered in the context of the Sydney Harbour Foreshores and

Waterways Areas Development Control Plan 2005 (DCP) as the proposal falls within the Foreshores and Waterways Areas under the SREP. The proposal is considered to be consistent with the relevant planning principles and requirements of the DCP.

Table 4.5 Clause 63(2) matters

Clause 63(2) matters	Comment
(a) the development should have a neutral or beneficial effect on the quality of water entering the waterways,	<p>The proposal has the potential to impact on water quality both during construction and into operation. This is likely to be a neutral effect on the quality of water entering waterways.</p> <p>More serious water quality impacts have the potential to occur during construction due to spills from construction equipment working on or near to the waterway. Appropriate management measures would be used to minimise the risk of pollutants entering the waterway during construction such as the use of a boom and visual monitoring of the waterway for changes in turbidity. These measures would ensure impacts do not transfer outside the work site or cause adverse impacts to the waterway.</p> <p>When the construction is complete, impacts on water quality during operation would be the same as those for the existing wharf.</p>
<p>(b) the environmental effects of the development, including effects on:</p> <p>(i) the growth of native plant communities,</p> <p>(ii) the survival of native wildlife populations,</p> <p>(iii) the provision and quality of habitats for both indigenous and migratory species,</p> <p>(iv) the surface and groundwater characteristics of the site on which the development is proposed to be carried out and of the surrounding areas, including salinity and water quality and whether the wetland ecosystems are groundwater dependent</p>	<p>An aquatic ecology assessment has been carried out and identified that there would be no net loss of fish habitat. Impacts on aquatic ecology would be temporary and minimised by appropriate environment protection management measures. This is discussed in detail at section 6.5.</p> <p>No terrestrial native flora or fauna would be impacted by the proposal.</p> <p>The proposal would not impact on surface and groundwater characteristics of the site, surrounding areas or of groundwater dependent ecosystems.</p>
(c) whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the environment,	The REF includes appropriate management measures to avoid or minimise impacts on the environment as far as practicably possible.
(d) whether carrying out the development would be consistent with the principles set out in the <i>NSW Wetlands Management Policy</i> ,	The proposal would be generally consistent with the principles of the NSW Wetlands Management Policy.
(e) whether the development adequately preserves and enhances local native vegetation,	<p>An aquatic ecology assessment has been carried out and identified that there would be no net loss of fish habitat. Impacts to marine vegetation would be temporary and minimised by appropriate environment protection management measures. This is discussed in detail at section 6.5.</p> <p>No terrestrial native vegetation would be</p>

Clause 63(2) matters	Comment
	impacted by the proposal.
(f) whether the development application adequately demonstrates: (i) how the direct and indirect impacts of the development will preserve and enhance wetlands, and (ii) how the development will preserve and enhance the continuity and integrity of the wetlands, and (iii) how soil erosion and siltation will be minimised both while the development is being carried out and after it is completed, and (iv) how appropriate on-site measures are to be implemented to ensure that the intertidal zone is kept free from pollutants arising from the development, and (v) that the nutrient levels in the wetlands do not increase as a consequence of the development, and (vi) that stands of vegetation (both terrestrial and aquatic) are protected or rehabilitated, and (vii) that the development minimises physical damage to aquatic ecological communities, and (viii) that the development does not cause physical damage to aquatic ecological communities,	Appropriate management measures would be used to minimise impacts on water quality as discussed in response to Clause 63(2)(a). The proposal would result in direct and indirect impacts on algae marine vegetation. The proposal would require a permit under the <i>Fisheries Management Act 1994</i> (FM Act) to harm marine vegetation. Nevertheless, with the implementation of the safeguards and management measures at section 6.5.3 the proposal would result in a net increase in macroalgae habitat.
(g) whether conditions should be imposed on the carrying out of the development requiring the carrying out of works to preserve or enhance the value of any surrounding wetlands.	Section 7.2 includes appropriate management measures to avoid or minimise impacts on the environment as far as possible.

4.2 Local Environmental Plans

4.2.1 North Sydney Local Environmental Plan 2013

The subject site is located within North Sydney Council local government area and is partly within the North Sydney Local Environmental Plan 2013 (LEP 2013) area. Under the NSLEP the indicative location of the compound is zoned RE1 Public Recreation.

As an ancillary component of a wharf facility, the temporary compound is prohibited within the RE1 zone. However, as discussed in section 4.1.1 the ISEPP permits the proposed activity without development consent despite the LEP 2013 prohibition. Accordingly, assessment under Part 5 of the EP&A Act is appropriate.

4.3 Other relevant legislation

4.3.1 Fisheries Management Act 1994

The FM Act requires a permit to be obtained for works that are likely to:

- Harm marine vegetation such as mangroves, seagrasses and seaweeds.

- Involve the use of explosives.
- Obstruct fish passage.

The FM Act requires that the Minister for Trade and Investment be notified of works involving dredging or reclamation.

An aquatic ecology assessment has been undertaken for the proposal which indicates that there would be direct and indirect short term impacts to algae marine vegetation. With the implementation of the safeguards and management measures at section 6.5.3 the proposal would result in a net increase in macroalgae habitat. Nevertheless, a permit to harm marine vegetation would be required.

The proposal does not involve explosives, obstruct fish passage or require any dredging or reclamation works.

Details of the proposal and a copy of the aquatic ecology assessment (Appendix B) were provided to the DPI (Fisheries) for review. Fisheries responded in correspondence dated 21 August 2014 (Appendix C) confirming that they have no objections to the proposal subject to the following measures being implemented:

- A section 205 permit to harm marine vegetation under the FM Act is obtained from Fisheries prior to commencement of construction. This is for the likely shading of macroalgal communities from the new wharf.
- The mitigation measures outlined in the REF are to be implemented. In particular the use of a silt curtain, the relocation of algae covered boulders within the footprint of future piling works, and the avoidance of the direct harm of algal habitat from vessels during construction.

The need for the proposal to obtain a section 205 permit under the FM Act is included at section 7.3. Appropriate safeguards and management measures have been included at section 7.2.

4.4 Commonwealth legislation

4.4.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in appendix D and chapter 6 of the REF.

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Accordingly, the proposal has not been referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

4.4.2 Native Title Act 1993

A search of the National Native Title Tribunal search application returned no current native title claims for the North Sydney Council LGA (accessed on 9 March 2014).

4.5 Confirmation of statutory position

An assessment of the relevant statutory planning instruments has concluded that the proposal can be carried out as development without consent under ISEPP and can be assessed under Part 5 of the EP&A Act by RMS as a determining authority.

5 Stakeholder and community consultation

This chapter discusses the consultation undertaken to date, and the consultation proposed for the future, for the proposal. The description contains the consultation strategy or approach used and the results of consulting with the community, the Aboriginal community and relevant government agencies and stakeholders.

5.1 Consultation strategy

RMS has developed a communications plan which outlines the consultation and communication approach for the proposal. The plan is evolving and would change prior to and throughout the proposal as necessary.

The following consultation and communication activities have been undertaken for the proposal:

- Meeting with North Sydney Council on 30 April 2014.
- Information and update of the proposal on RMS website (http://www.maritime.nsw.gov.au/mpd/wharf_upgrades.html) on 15 May 2014.
- Email to Council's General Manager, councillors and distribution to committees to inform them of the proposal on 15 and 16 May 2014.
- Communications posters installed at Cremorne Point Wharf and Circular Quay Wharf and information flyers distributed to commuters at Cremorne Point Wharf on 15 and 16 May 2014.
- Meeting with local business community and telephone with operators of Sophies Place cafe on 16 May 2014.
- Doorknock notification of the proposal to property immediately adjacent to the Cremorne Point Wharf on 16 May 2014. A follow up call to the real estate agent and email to property owner followed the doorknock notification.
- Community information session held on 27 May 2014.

The community have raised issues for the proposal through the above community consultation and communication activities. Table 5.1 outlines the issues raised by the community to date and references where these issues have been addressed within the REF.

Table 5-1: Issues raised through community consultation and communication

Issue	Details	Response / Where addressed in REF
Alternative transport	<ul style="list-style-type: none">• Currently there are ferry services timetabled to stop at Cremorne Point Wharf but don't stop at Old Cremorne Wharf – a number of requests received.• Would like services to Old Cremorne Wharf increased during the closure of Cremorne Point Wharf.	<ul style="list-style-type: none">• This feedback has been passed on to Transport for NSW (TfNSW) TfNSW for consideration. Transport for NSW are considering diverting F2 and F6 services currently not running to Old Cremorne Wharf during closure of Cremorne Point Wharf. Alternative transport options are considered at section 6.12.2.
Alternative transport	<ul style="list-style-type: none">• Request for a mini bus service between Cremorne Point Wharf and Old Cremorne Wharf as the bus service is not	<ul style="list-style-type: none">• The 225 bus service brings commuters to Cremorne Point Wharf. It is not possible to coordinate a shuttle with the 225 timetable and provide connections at Old Cremorne Wharf. A similar

Issue	Details	Response / Where addressed in REF
	considered practical as it doesn't stop near Circular Quay.	shuttle from Neutral Bay Wharf which also didn't coordinate with the bus service bringing customers to the Wharf had extremely low patronage, Alternative transport options are discussed at section 6.12.
Alternative transport	<ul style="list-style-type: none"> Limited capacity on buses travelling to the city on Military Road at the Cremorne stop. 	<ul style="list-style-type: none"> There are a number of services on Route 246 that commence at the corner of Spofforth Street and Military Road during the AM peak period as the first stop there would be capacity on these services. Routes E65, E66, E68, E71, E76, E77, E78 and E79 as well as all routes commencing with a 1, 2 or M operate from the bus stop at Cremorne Junction on Military Road. Timetables for these services can be found on the Trip Planner at transportnsw.info to coordinate travel times and minimise wait time. Services will be monitored during the upgrade to monitor capacity and we encourage customers to provide feedback once the wharf closes for upgrade. Refer to section 6.6.1.
Design	<ul style="list-style-type: none"> Positive feedback was heard about the design, like the Neutral Bay Wharf. 	<ul style="list-style-type: none"> Noted.
Design	<ul style="list-style-type: none"> Clarification about where the entry for the new wharf would be located. 	<ul style="list-style-type: none"> Access will be via a new bridge and gangway located north east of the existing wharf building. Refer to section 3.1 and figure 3-1.
Design	<ul style="list-style-type: none"> Owner of the property at 2 Milson Road, the closest residence to the wharf on the water edge, advised his bedroom is located on the side closest to the wharf and already experiences issues with noise at night from anti-social behaviour on the wharf. The owner would like some form of screening or closure of the wharf at night. 	<ul style="list-style-type: none"> Chapter 6.0 has not identified any potential decrease in amenity of the adjacent residence during operation, Nevertheless, RMS will investigate if additional screening can be included at the western edge of the pontoon and to consider incorporating additional screening in the design. Design criteria and constraints that would be considered as part of this process are discussed at section 3.2.

Issue	Details	Response / Where addressed in REF
Anti social behaviour	<ul style="list-style-type: none"> A number of reports about anti social behaviour on the wharf. Would like the wharf closed after ferry services end at night. 	<ul style="list-style-type: none"> RMS is aware of issues on a number of wharves and have implemented the 'Clean Safe Wharf Initiative' and engaged with Councils and police to try to address the issue. RMS would continue to monitor this issue.
Anti social behaviour	<ul style="list-style-type: none"> A number of reports about bad behaviour by fisherman on the wharf. Consider fishing banned on the new wharf and suggested keeping the old wharf structure for fishing. 	<ul style="list-style-type: none"> Feedback related to fishing on the new wharf will be passed on to the relevant section of RMS for consideration under the 'Clean Safe Wharf' initiative. RMS to investigate retaining opportunities to fish at the wharf.
Social and Economic	<ul style="list-style-type: none"> Sophies Place cafe users concerned about closure of cafe during construction and following the re-opening of the wharf. Sophies Place cafe operator concerned about closure of cafe during construction. 	<ul style="list-style-type: none"> The existing structure that houses the cafe will remain and access to the cafe would be maintained throughout construction. Refer to section 6.12. Glass balustrade will be installed on the waterside of the structure looking out to the harbour. Refer to section 3.1.

5.2 Aboriginal community involvement

The proposal has been considered against the requirements of the *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (RMS, 2011) (PACHCI). This procedure is generally consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a). An outline of the procedure is presented in table 5.2.

Table 5.2: RMS Procedure for Aboriginal Cultural Heritage Consultation and Investigation

Stage	Description
Stage 1	An internal RMS assessment to determine whether a project is likely to affect Aboriginal cultural heritage.
Stage 2	A preliminary external assessment with limited stakeholder consultation to determine whether a project requires Part 6 approval from the NSW Office of Environment and Heritage under the <i>National Parks and Wildlife Act 1974</i> .
Stage 3	If a Part 6 approval is required, Aboriginal community consultation and investigation is required. Preparation of cultural and archaeological assessments to be undertaken with the involvement of the Aboriginal community.
Stage 4	Implementation of the assessment process.

Aboriginal cultural heritage impacts are not expected as a result of the proposal (see section

6.10).

The Aboriginal Cultural Heritage Adviser for RMS Sydney Region has considered whether the project is likely to affect Aboriginal cultural heritage and has advised there is no requirement to proceed to Stage 2 of the PACHCI (appendix E). An Aboriginal Heritage Impact Permit under the *National and Parks and Wildlife Act 1974* is not required for the proposal. Aboriginal heritage is addressed further in section 6.10.

5.3 ISEPP consultation

Clauses 13, 14, 15 and 16 of the ISEPP states that public authorities may need to consult with councils and other public authorities, when proposing to carry out development without consent. As part of these requirements, a formal consultation letter was sent to North Sydney Council notifying them of the proposal in accordance with the ISEPP due to potential impacts on public places. North Sydney Council responded by letter on 12 May 2014. The matters raised by Council are considered in table 5.3.

Table 5.3: Issues raised through ISEPP notification requirements

Issue	Details	Response / Where addressed in REF
North Sydney Council		
Heritage	<ul style="list-style-type: none">No concerns raised.	<ul style="list-style-type: none">Noted
Site works	<ul style="list-style-type: none">Installation of construction work area and management of traffic and pedestrian safety is to be agreed upon by Council.	<ul style="list-style-type: none">This has been included as a safeguard and management measure at section 6.1.3 and 7.2.
Traffic flow	<ul style="list-style-type: none">A traffic management plan is to be agreed upon by Council.	<ul style="list-style-type: none">This has been included as a safeguard and management measure at section 6.6.3 and 7.2.
Worker parking	<ul style="list-style-type: none">Suitable parking arrangement for workers is to be agreed with Council prior to commencing works.	<ul style="list-style-type: none">This has been included as a safeguard and management measure at section 6.6.3 and 7.2.
Reconstruction of Council assets	<ul style="list-style-type: none">Reconstruction of Council assets is to be agreed upon prior to works commencing.	<ul style="list-style-type: none">While no demolition or construction works are proposed on the land any construction site rectification works would be completed to their pre-construction state and to Council satisfaction. This has been included as a safeguard and management measure at section 6.1.3 and 7.2.
Impact on seawall	<ul style="list-style-type: none">All works and stormwater disposal should preserve the integrity of the wall. The proposed works should be entirely dependent of the seawall and should permit	<ul style="list-style-type: none">While works to the seawall would be minimal, the detailed design is still to be determined. Any works to Council assets would be agreed upon with Council

Issue	Details	Response / Where addressed in REF
	convenient access for inspection and future repairs.	prior to construction. This has been included as a safeguard and management measure at section 6.1.3 and 7.2.
Connection to services	<ul style="list-style-type: none"> The use of Council land to host services should be agreed with Council prior to commencement of construction. 	<ul style="list-style-type: none"> This has been included as a safeguard and management measure at section 7.2.
Fixed jetty	<ul style="list-style-type: none"> The portion of the existing wharf building to be retained should be regularly maintained to a high standard. 	<ul style="list-style-type: none"> The wharf building would continue to be maintained by RMS consistent with the maintenance of all RMS publically accessible waterside structures.
Future of kiosk located within waterside building	<ul style="list-style-type: none"> Any change in use of the existing kiosk will be subject to consent by North Sydney Council under the provisions of Part 4 of the EP&A Act. 	<ul style="list-style-type: none"> Any changes to the use of the kiosk (Sophies Cafe) would be considered under the relevant parts of the EP&A Act and other relevant legislation to ensure a lawful use.
Sydney water infrastructure	<ul style="list-style-type: none"> Suitable arrangement should be made with Sydney Water to ensure that new works are compatible with the operation of the Sydney Water Pumping Station. 	<ul style="list-style-type: none"> Sydney Water has been notified of the proposal as detailed in Section 5.4.
Bus turning area	<ul style="list-style-type: none"> The current turning arrangement for buses is considered to be inadequate. Any works undertaken to the wharf should be designed to facilitate upgrades to the bus turning area. It is also important that the entrance to the wharf bridge is designed to separate pedestrian from vehicle traffic. 	<ul style="list-style-type: none"> Landside interchange facilities are not part of the current scope for this program. This request has been passed on to Transport for NSW (TfNSW) for consideration.
Community consultation	<ul style="list-style-type: none"> It is urged that details of the notification process including posted notice area and duration be forwarded to Council and maintained for future reference. 	<ul style="list-style-type: none"> RMS has developed a communications plan. This plan is underway and is to continue through to operation as detailed throughout section 5.0.
Alternative public transport arrangement	<ul style="list-style-type: none"> Alternative transport arrangements are to be advised to the public in 	<ul style="list-style-type: none"> Alternative transport options are discussed at section 6.12. Alternative transport options

Issue	Details	Response / Where addressed in REF
during the works	advance of wharf closure.	will be advised to the public during ongoing consultation as outlined in section 5.6.

5.4 SREP Sydney Harbour consultation

The SREP Sydney Harbour provides requirements for the notification of certain proposals. Relevant to the proposal, clause 31 applies to development which is listed in Schedule 2 and development that requires the provision of services (including water, sewerage or stormwater systems). Clause 31 requires the following:

- Development listed within Schedule 2 to be notified to the FWPDAC.
- In the case of development that requires the provision of services, the public authority responsible for providing the service concerned is to be notified.

The FWPDAC, Ausgrid and Sydney Water were consulted via formal correspondence on 17 April 2014 in accordance with clause 31. No response was received within 30 days of giving notice to these agencies.

5.5 Government agency and stakeholder involvement

Various government agencies and stakeholders have been notified and consulted about the proposal, including:

- North Sydney Council.
- Sydney Ferries.
- FWPDAC.
- DPI (Fisheries).

Issues raised by Council have been identified in table 5.3. Comments received from DPI (Fisheries) are detailed at section 4.3.1. No response was received from FWPDAC as discussed at section 5.4. Sydney Ferries approved the concept design in correspondence dated 11 December 2013.

5.6 Ongoing or future consultation

The activities that are expected to be carried out in the lead up to and throughout the work to ensure that the community is fully informed about the proposal, are as follows:

- Project information would continue to be provided via the project website http://www.maritime.nsw.gov.au/mpd/wharf_upgrades.html
- Key stakeholders and Council would be informed. Council would be provided information material for distribution to committees.
- Notification to property immediately adjacent to the Cremorne Point Wharf.
- Letterbox distribution of closure notification to nearby households and stakeholders (about 3,900 in Cremorne area).
- Advertising Mosman Daily.
- Stakeholder letters with notification (about 50 in Cremorne area) and notification to operators of Sophies Place cafe to be notified.
- Commuter communications – posters at Cremorne Point and Circular Quay Wharves, announcements on ferries, handout of closure notifications.

- Website update.
- A contact number would be provided for the community to register any comments or complaints during construction of the proposal.

Prior to carrying out noisy or night time works:

- Letterbox distribution of night time works notification to households and stakeholders (distribution area to be in accordance with the recommendations of Appendix F).
- Doorknock to adjacent resident in accordance with the recommendations of Appendix F.
- Website update.

Prior to the re-opening of the wharf:

- Key stakeholders and Council would be informed. Council would be provided information material for distribution to committees.
- Letterbox distribution of re-opening notification to nearby households and stakeholders (about 3,900 in Cremorne area).
- Stakeholder letters with notification (about 50 in Cremorne area) and notification to operators of Sophies Place cafe to be notified.
- Notification to property immediately adjacent to the Cremorne Point Wharf.
- Advertising Mosman Daily.
- Commuter communications – posters at Cremorne Point, Old Cremorne Wharf and Circular Quay Wharves, announcements on ferries.
- Website update.

6 Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the guidelines *Marinas and Related Facilities* (DUAP 1996) and *Is an EIS required?* (DUAP 1999) as required under clause 228(1)(a) and (b) of the Environmental Planning and Assessment Regulation 2000. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in appendix D. Site-specific safeguards are provided to ameliorate the identified potential impacts.

6.1 Land surface

6.1.1 Existing environment

This section is divided into:

- Land based – the surface of the land onshore
- Water based – the surface of the land beneath water

Land based

Cremorne Point Wharf has been constructed alongside Cremorne Reserve. Cremorne Reserve stretches around the entire shoreline of Cremorne Point and comprises a large bushland area at the southern end of the peninsular. In the direct vicinity of the Cremorne Point Wharf the reserve is generally comprised of bitumen and concrete hardstand. This area includes the southern end of Milson Road, a bus turning area, accessible car parking spaces, and a concrete footpath which connects the wharf with the foreshore north of the wharf and surrounding streets. A Sydney Water Pumping Station, Telstra telephone box and concrete stairs leading to the top of an escarpment are also located directly adjacent to the wharf on the eastern side of Milson Road.

The surrounding land along the edge of the foreshore to the north of the wharf is reclaimed land retained by a concrete and stone wall. The land to the south of the wharf is retained by a concrete and stone wall for about 10 metres before returning to its natural landscape which is comprised of a rocky foreshore against bushland slopes.

The indicative location of the temporary compound is located at the southern end of Milson Road where it terminates as shown in figure 3-1. The surface of the road within this area is bitumen. Concrete kerb and guttering is provided on the western side of the road to the north of the wharf. There is no kerb and guttering to the south of the wharf.

The construction work area has a very low susceptibility to erosion due to the retainment of the reclaimed land by a seawall and the general absence of any slope.

Mapping for the area indicates that the land adjacent to the wharf does not comprise potential acid sulphate Soils (ASS) (North Sydney Council, 2001). The source of fill used to reclaim the land within the vicinity of the wharf is unknown and therefore there is potential for the fill to be contaminated.

A search of the NSW Office of Environment and Heritage (OEH) contaminated land database on 25 November 2013 found that there are no existing notices for contaminated land in Cremorne Point.

Water based

A diver based survey of the construction work area reports that rock rubble is located along the foreshore under and to the north and south of the ferry wharf. Beyond the areas of rock rubble, sand extends out into the harbour. The character of the sand changes to silty-sand with depth up to about 13 metres (Appendix B).

Within the vicinity of the site, the seabed has a moderate slope from less than three metres below the zero of the Fort Denison Tide Gauge (ZFDTG) at the seawall to about 13 metres below ZFDTG about 55 metres seaward from the land. ZFDTG is 0.555 metres above Australian Height Datum (AHD). The existing pontoon is located in about nine metres of

water.

There are no other jetties, moorings or marinas within the vicinity of the wharf.

Sediment contamination

Previous studies indicate that parts of Sydney harbour have the potential for sediments to contain contaminants, particularly closed areas of the harbour and areas where there is a history of industries on or near the water.

Cremorne Point Wharf is situated within an open section of the harbour. Marine sediments in the vicinity of Cremorne Point Wharf are disturbed by the operation of vessels at the wharf, and tide and wave action. Historically, the area has not been developed for industry. Therefore, it is unlikely that sediments would contain contaminants.

6.1.2 Potential impacts

Construction Impacts

Land based

Land based activities would be limited to the erection of a temporary compound on Milson Road adjacent to the wharf. No excavations or trenching is proposed. The indicative location (refer figure 3-1) of the compound is on a bitumen surface to the east of the wharf and would not require any excavation or land disturbance. There are no trees within the vicinity of the construction work area.

The Telstra telephone box and Sydney Water Pumping Station is outside of the construction work area.

Water based

Most of the proposed activity is located within the waterway area below the mean high water mark. The construction work would disturb sand sediments on parts of the harbour bed where the piles are removed and installed and where the loose surface rock is to be relocated. Sediments would also be disturbed by manoeuvring and anchoring of barges. This disturbance may increase turbidity in waters of the local area and may disturb any existing contaminants in the sediments on the harbour bed. However, this would be localised and of a temporary nature. The re-suspension of sediments would be minimised by undertaking works from floating barges, which would minimise sediment disturbance. The harbour bed would not be significantly impacted as a result of the removal or installation of new piles or by the anchoring or manoeuvring of construction vessels. The proposed work methodology at section 3.3.1 has been designed to prevent construction barges hitting the seafloor or rock rubble reef. Safeguards are also included to minimise potential impacts on the seafloor.

There is potential that the proposal may disturb acid sulphate soils during the removal of piles. To minimise impacts, piles that have been removed would be checked for debris and any potential acid sulphate soils would be removed, contained and disposed of in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (DECCW, 2009b).

The proposal does not involve any dredging, filling or excavation works above or below the mean high water mark.

There would be no relocation or replacement of any swing moorings.

Safeguards and mitigation measures to minimise disturbance of sediments during piling works and to prevent construction barges hitting the seafloor or rock rubble reef are contained in section 6.1.3.

Operation Impacts

The proposal would continue to cater for Sydney Ferry operations, and recreational vessels and water taxis.

The new pontoon would be located about 15 metres further to the south east from the existing pontoon but with a similar alignment. Both existing and proposed pontoons are parallel to the shore, over bare coarse silty-sand habitat and in about the same depth of water. The existing and proposed pontoons are oriented parallel to the shore which means that propeller wash is directed over deep waters and not towards the shallow in-shore rock and rubble reef. As such it is anticipated that impacts during operation would be negligible.

No dredging for ferry access would be required.

6.1.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Water based land surface	<ul style="list-style-type: none"> Silt and sediment controls will be established prior to any disturbance of the land surface. Controls will be in accordance with edition 4 of '<i>Managing Urban Stormwater, Soils and Construction</i>' (NSW Government, 2004) (the blue book). Disturbance to the seafloor will be minimised wherever possible. 	Project manager	Pre-construction Construction
Water based land surface	<ul style="list-style-type: none"> A silt curtain, extending from a minimum of 100 millimetres above the water line and extending to no less than two metres below the surface of the water will be installed around the entire redevelopment work area at Cremorne Point Wharf prior to commencement of works that disturb the seafloor. 	Project manager	Pre-construction
Water based land surface	<ul style="list-style-type: none"> An additional silt curtain will be installed around the immediate construction work area for the bridge. The silt curtain would extend to a minimum of 100 millimetres above the water line and will attach to the seafloor prior to commencement of the construction works for the bridge. On completion of the construction of the bridge this silt curtain can be removed. 	Project manager	Pre-construction of the bridge
Water based land surface	<ul style="list-style-type: none"> Visual observations of the effectiveness of the silt curtain are required to be made at least twice each day. Results of observations of the integrity of the silt curtain are required to be recorded in a site notebook maintained specifically for the purpose. The notebook is required to be kept on the site and to be available for inspection by persons authorised by RMS. 	Project manager	Construction
Water based land surface	<ul style="list-style-type: none"> An acid sulfate soil management plan will be prepared and implemented in the event that acid sulfate soil is exposed to the atmosphere as a result of removing the piles. This will include: <ul style="list-style-type: none"> checking piles for potential acid sulphate soils on removal of piles from water, carrying out pH and the peroxide tests, as relevant, to detect the presence of any potential acid sulfate soils on soils in areas of 	Project manager	Pre-construction and construction

Impact	Environmental safeguards	Responsibility	Timing
	excavation on the land <ul style="list-style-type: none"> removing, containing, and disposing of potential acid sulphate soils in <i>Waste Classification Guidelines: Part 1 Classifying Waste</i> (DECCW, 2009b). 		
Water based land surface	<ul style="list-style-type: none"> In the event that the two inner (closest to the land) bridge support piles would be installed from the water, this will be carried out at or around high tide with the rear of the barge anchored to an existing pontoon pile (which will remain temporarily). This is to prevent the barge from coming into contact with the seafloor or the rock rubble reef. 	Project manager	Construction
Water based land surface	<ul style="list-style-type: none"> Anchors will be lifted prior to moving construction vessels to minimise disturbance of the harbour bed. 	Project manager	Pre-construction and construction
Land surface	<ul style="list-style-type: none"> Following removal of the temporary compound the area will be restored with all land surfaces rehabilitated. 	Project manager	Construction
Land surface	<ul style="list-style-type: none"> Following removal of the temporary compound the area will be restored with all land surfaces rehabilitated. Council assets would be rehabilitated back to pre-construction state and to Council satisfaction. 	Project manager	Construction
Land surface	<ul style="list-style-type: none"> All of the 'land surface' environmental control measures listed are to be implemented during establishment of the temporary compound and will be set out in the CEMP. The CEMP will be completed by the Contractor and endorsed by RMS prior to any works commencing on the Site. 	Project manager	Pre-construction
Land surface	<ul style="list-style-type: none"> The installation of the construction work area is to be agreed upon by Council. 	Project manager	Pre-construction

Other safeguards and management measures that would address both land surface and water quality impacts are identified in Section 6.3.3.

6.2 Hydrological issues

6.2.1 Existing environment

Existing drainage

The stormwater drainage system within Cremorne Point and surrounding areas is generally roadside kerb and guttering which flows into an underground pipe system before being discharged into Sydney Harbour.

Stormwater drainage within the vicinity of the wharf flows from roadside kerb and guttering into a stormwater grates on either side of Milson Road adjacent to the wharf before entering

Sydney Harbour via stormwater pipes located on the northern side of the wharf.

Tides

The proposal is located on the northern side of Sydney Harbour, Port Jackson. The water levels of Port Jackson are subject to ocean tides and the site has similar tides to Fort Denison, that is:

- Tides are semi-diurnal meaning that two high and two low tides normally occur each day.
- The mean high water mark would be at around 1.48 metres above the ZFDTG.
- The 50 year average recurrence interval (ARI) tide level would be 2.4 metres ZFDTG.
- The minimum tide level is around 0.0 metres ZFDTG.
- The mean spring tide at Fort Denison is about 1.23 metres and the mean neap tide is about 0.75 metres.

Currents

The site is exposed to winds across the harbour from the south east (bout 2.6 kilometre fetch) to south west (about 1.8 kilometres fetch) and as a result currents generated by wind shear generally have the potential to be moderate to high. The site is sheltered or has only limited fetch for other wind directions.

Currents within Sydney Harbour are most commonly driven by astronomical tides. The mean spring and neap tides stated above translate to a maximum current of 0.5 knots or less (0.25 metres per second).

Waves

Given the open nature of the site, the site is exposed to wind wave action. It is expected that waves of varying heights would be experienced at the wharf particularly as the wind increases throughout the day. Waves at Cremorne Point Wharf are also influenced by boat wash associated with the moderately trafficked section of the Sydney Harbour. Vessel traffic within this part of the harbour is generally busiest between the hours of 7am and 7pm.

Given its exposure to large fetches, the wharf experiences extreme weather and swell conditions from time to time. This has resulted in the sinking of its pontoons in both 1995 and 2007.

Flooding

There are no major drainage lines identified on any maps that are within the vicinity of the site. Due to the topography of the site, flooding would be limited to storm surges or stormwater inundation associated with a flood event. Safeguards have been included at section 6.2.3 to minimise impacts in the event of a flood.

6.2.2 Potential impacts

Construction impacts

The proposal does not involve any construction work that would affect tide levels, tidal flows, currents or water levels. The use of floating barges may have a minor localised reduction in wave energy in the inshore area. This impact would be temporary and contained in the area where the barges are anchored.

Given that no stormwater issues or flooding issues have been identified at the site, it is not expected that there would be any flood hazards associated with the location of the temporary compound adjacent to the wharf. North Sydney Council has not raised any concerns about the location of the temporary compound. Although unlikely, given the open nature of the site, there is potential for environmental damage from spills, leaks or collisions with aquatic habitat and damage to construction equipment during large swell and extreme weather events. Safeguards have been included at section 6.2.3 to minimise impacts in the unlikely event of a flood or extreme weather event.

Operation impacts

The pontoon would float on top of the water while being held in place by four piles. The floating pontoon would largely move up and down with the water so would not inhibit existing water movement patterns. The gangway would be supported by the new bridge and floating

pontoon above the water level allowing existing water movement patterns to continue.

It is expected that there would be a minor reduction in wave energy in the inshore area during the wharf's operation. The impact would be relative to the size of the pontoon and the location of the berthing area further away from the shoreline. This reduction in wave energy may decrease the sea wall's deterioration and sediment movement.

The operation of the proposal would not impact upon stormwater discharges as there would only be a marginal increase in discharge from the wharf directly into the water as a result of the marginal increase in the area of pontoon and gangway canopy.

Consideration of sea level rise is discussed in section 6.15.

6.2.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Hydrology	<ul style="list-style-type: none">Weather forecasts will be checked regularly during construction and where flooding is forecast, all equipment and materials will be removed from the compound site and wharf construction area or appropriately secured.	Project manager	Pre-construction

6.3 Water quality

6.3.1 Existing environment

The suburb of Cremorne Point has been developed for mostly residential purposes. Water quality in Cremorne Point is largely influenced by point source water pollution such as stormwater drainage outlets and diffuse water pollution such as urban runoff that does not enter stormwater drains. Boat effluent and anti-fouling paints may also contribute to existing water quality impacts. Stormwater and urban runoff pollutants commonly include:

- Sediments (eg soil erosion).
- Pathogens (eg bacteria from leaking septic tanks).
- Gross pollutants (eg litter).
- Toxicants (pesticides, accidental spills or deliberate dumping).
- Nutrients (eg sewage overflows, fertilizers, detergents and animal faeces).
- Oils and lubricants from road and boat based pollutants.
- Organic matter (eg leaf litter).
- Anti-fouling paints, disposal or overflow of sewerage, and galley wastes from boats.

Stormwater drainage within the area flows from kerb and guttering along Milson Road before discharging into the Sydney Harbour from drains located at the edge of Cremorne Reserve. The outlets do not appear to have any stormwater treatment devices such as gross pollutant or sand filter.

Stormwater flows directly from the existing wharf and shelter roofs into Sydney Harbour.

OEH measures the recreational water quality of Sydney Harbour, Parramatta River and surrounding beaches through the Harbourwatch and Beachwatch programs. Rainfall data is used to predict the likelihood of bacterial contamination at sample sites. The risk of bacterial contamination increases following periods of rainfall. Samples have been taken at various locations in the harbour, however none in Cremorne Point. The monitoring site closest to Cremorne Point Wharf is Hayes Street Beach in Neutral Bay which indicates that water quality is good (OEH, 2014a).

The waters of Cremorne Point are used by a variety of vessels, which create propeller wash, anchor on the harbour bed, use swing moorings in Shell Cove to the north of the proposal and have the potential for accidental spills or leaking of hydrocarbons. These are recurring issues for the existing water quality in Sydney Harbour. No swing moorings are located within the

vicinity of the site that would require relocation or that would be affected by the proposal.

6.3.2 Potential impacts

Construction impacts

The removal of the existing steel piles and installation of new steel piles has the potential to destabilise marine sediments and increase turbidity in the water. This disturbance would increase turbidity in the waters of the local area. Mitigation measures such as the use of silt curtains are identified in section 6.1.3.

All piling works would be done from a crane positioned on top of a barge. This would aid the construction process with the added advantage of reducing potential impacts to water quality. Accidental spills or discharges during construction works would be a risk to water quality. Spills could occur at the construction site or on route to or from the off-site facility.

All barges and construction plant would be refuelled at an appropriately approved and licensed refuelling depot prior to accessing the site. However, the barge may also leak hydraulic oil or fuel into the water and cause localised contamination. Hydrocarbons may condense and become suspended in the water column or degrade and be released into the atmosphere.

A temporary compound located at Cremorne Reserve has the potential to spill chemicals, and leak oils or lubricants into the water via a stormwater drain. This potential risk is considered to be low as there would be no oils, fuels, chemicals, other hazardous substances, plant or equipment stored at the temporary compound.

Operation impacts

Operation of the Cremorne Point Wharf may result in water quality impacts from general litter generated by wharf users or from spill incident involving a ferry or another vessel using the wharf. These are existing impacts and are not expected to increase in frequency or magnitude as a result of the proposal. Bins would be provided to discourage littering.

The new pontoon would be located in a similar position to the existing pontoon and therefore any disturbance of sediments associated with vessels operating at the wharf would remain as current.

The operation of the proposal would not impact upon stormwater discharges as there would only be a marginal increase in discharge from the wharf directly into the water as a result of the marginal increase in the area of pontoon and gangway canopy.

6.3.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Water quality	<ul style="list-style-type: none">Emergency spill kits would be kept on-site and on all construction barges at all times and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site. A spill kit would be kept on each barge and at the temporary construction compound site.Spill kits for the construction barges will be specific for working within the marine environment.All staff would be made aware of the location of the spill kits and trained in their use.If a spill occurs, the RMS Contract Manager and RMS environment staff would be notified as soon as practicable.	Project manager	Construction

Impact	Environmental safeguards	Responsibility	Timing
	<ul style="list-style-type: none"> A spill/emergency management plan which incorporates these safeguards will be set out within the CEMP. The spill/emergency management plan will also include methods to be used to stop the spill, contain and control the flow, clean up the spill, and record the spill. 		
Water quality	<ul style="list-style-type: none"> Equipment barges carrying plant or machinery would be fitted with bunding around equipment which contain chemicals to prevent chemical spills or leakages from entering the water. 	Project manager	Construction
Water quality	<ul style="list-style-type: none"> No chemicals or fuels would be stored at the compound site. 	Project manager	Construction
Water quality	<ul style="list-style-type: none"> All equipment, materials and wastes transported between an off-site facility, and the construction work site would be secured to avoid spills during transportation. 	Project manager	Construction
Water quality	<ul style="list-style-type: none"> Vehicles, vessels and plant will be properly maintained and regularly inspected for fluid leaks. 	Project manager	Construction
Water quality	<ul style="list-style-type: none"> No vehicle or vessel wash down or re-fuelling would occur on-site. 	Project manager	Construction
Water quality	<ul style="list-style-type: none"> Emergency contacts will be kept in an easily accessible location on the construction work site and on all construction vessels. All crew would be advised of these contact details and procedures. 	Project manager	Construction
Water quality	<ul style="list-style-type: none"> In an event of a spill during operation, the incident emergency plan will be implemented in accordance with Sydney Ports Corporation's response to shipping incidents and emergencies outlined in the '<i>NSW State Waters Marine Oil and Chemical Spill Contingency Plan</i>' (Maritime, 2008). 	Project manager	Operation

Other safeguards and management measures that would address both water quality and land surface impacts are identified in Section 6.1.3.

6.4 Noise and vibration

A noise and vibration impact assessment was undertaken for the proposal by Acoustic Logic. The full report is provided in appendix F and a summary of the report is provided below.

6.4.1 Methodology

The noise and vibration impact assessment was prepared in accordance with the following:

- Interim Construction Noise Guideline (ICNG) (DECCW, 2009c).*
- British Standard 6472: 1992 – Guide to evaluation of human exposure to vibration in buildings (1Hz to 80Hz).*

- *German Standard DIN 4150-3 (1992-02): Structural vibration – Effects of vibration on structures (the German Standard DIN 4150-3).*

6.4.2 Existing environment

The nearest noise sensitive receivers to Cremorne Point Wharf are shown in figure 6-1 and include:

- Receiver 1 - residences located about 50 metres to the north west of the proposal (8 Wulworra Avenue).
- Receiver 2 – residence located about 30 metres to the north of the proposal (2 Milson Road).
- Receiver 3 – recreational reserve (Cremorne Reserve) about 20 metres to the east of proposal.
- Receiver 4 – commercial receiver (Sophies Place cafe) within the wharf building.

Sophies Place cafe typically operates between the following hours:

- Monday to Friday 6.30am - 1.30pm.
- Saturday to Sunday 6.45am – 2.30pm to 3.30pm weather dependant.

No seating is provided at the cafe. Patrons normally make a purchase and move on to other areas of Cremorne Reserve.

Long-term unattended noise monitoring was carried out within Cremorne Reserve, at the location shown on figure 6-1, to determine the existing background noise levels.

The monitoring results were used to establish the average background noise levels (known as the rating background levels, or RBLs) for the day, evening and night time periods, as shown in table 6.1.

Table 6.1: Background noise levels for day, evening and night time periods

Location	Background noise level – dB(A) (LA ₉₀ (15 mins))		
	Day time (7am – 6pm)	Evening (6pm – 10pm)	Night time (10pm – 7am)
Cremorne Reserve	39	37	33

Recorded noise levels showed typical trends where levels were highest during the day time period. Background noise levels during the day time were dominated by general vehicular traffic movements on surrounding roadways and boats on the harbour.

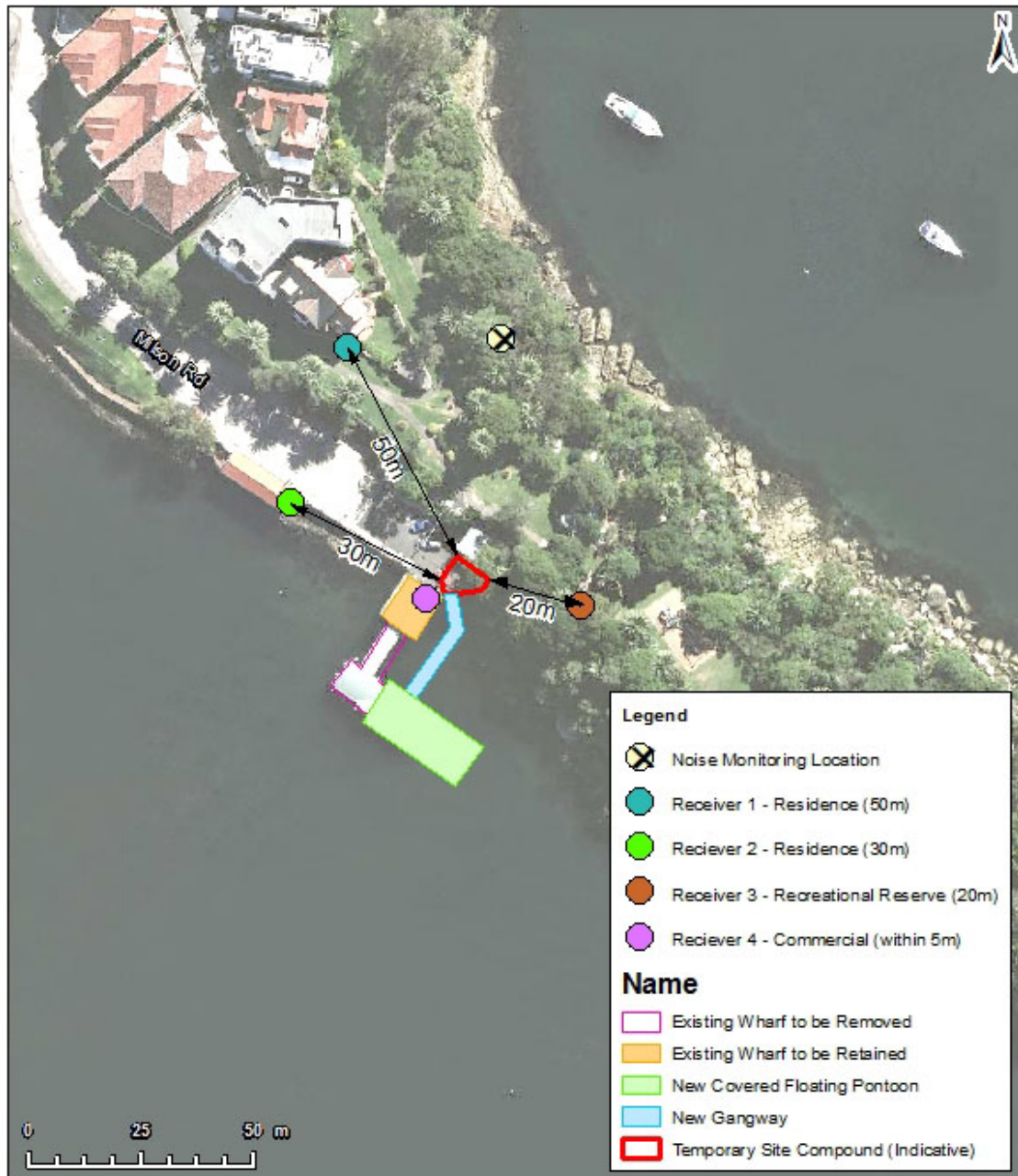


Figure 6-1: Proximity of nearest sensitive receivers to the proposal

6.4.3 Criteria

Construction noise criteria

The ICNG provides noise management levels for construction activities. Noise management levels differ depending on the type of sensitive receiver that may be affected and the time of day that the activity is being carried out.

The ICNG provides that, for residential receivers, construction noise levels should be managed with the aim of not exceeding the noise affected level, which is the RBL plus 10dB(A) during standard working hours or the RBL plus 5dB(A) outside of standard working hours (refer to table 6.2). Where construction noise is predicted to exceed the noise affected level, all reasonable and feasible mitigation measures should be applied. The highly noise affected level is 75dB(A). Where construction noise is predicted to reach this level, respite periods for very noisy activities may be required.

The ICNG provides that, for recreational and commercial receivers, construction noise levels should be managed with the aim of not exceeding 65dB(A) and 70dB(A) throughout the day

and night, respectively.

Table 6.2: Noise management levels for residences for airborne noise

Time of day	Noise management level (LA _{eq} (15 mins))
Recommended standard hours	Noise affected
Monday – Friday: 7am to 6pm	RBL + 10dB(A)
Saturday: 8am to 1pm	Highly noise affected
No work on Sundays or public holidays	75dB(A)
Outside recommended standard hours	Noise affected
	RBL + 5dB(A)

As discussed in section 3.3.2, construction activities would normally be restricted to standard working hours. However, work outside of standard hours would be required for piling activities and intricate lifts from the barge mounted crane. These activities require calm or very calm water conditions which are typically experienced during the night time and early morning periods with wind chop and wind increasing throughout the day. To ensure the safety of construction workers, effective operation, and to avoid future noise and maintenance issues which can be caused by incorrect alignment during pile installation, these activities are anticipated to be carried out generally during the night time period (11pm to 7am) as detailed in Section 3.3.2.

The noise management levels for the proposal corresponding to the nearest sensitive receiver are detailed in table 6.3.

Table 6.3: Construction noise management levels for receivers

Receiver location	Receiver type	Noise management level		
		Standard construction hours	Out of Hours	
			Evening	Night time
1 and 2	Residential	49	42	38
3	Recreation reserve	65	65	65
4	Commercial	70	70	70

Standard daytime construction hours: 7:00 am to 6:00pm Monday to Friday and 8:00am to 1:00 on Saturday

Evening period 6.00pm to 10:00pm

Night time period 10:00pm to 7:00am except on Sunday morning when night time period is extended to 8:00am

In addition to the noise management levels, where construction would be required during the night time period the potential for sleep disturbance would also be applied. The ICNG states that where works are planned over two consecutive nights the maximum noise levels should be applied. OEH's approach is to apply an initial screening criterion of background noise levels plus 15 dB(A) and to undertake further analysis if the initial screening criteria cannot be met. This analysis may include consideration of the number of potential sleep disturbance events during the night, the level of exceedance and the noise levels from other events.

Vibration

Vibration targets vary depending on whether the particular activities of interest are continuous, impulsive or intermittent and whether they occur during the day or night.

The effects of vibration can be divided into two main groups:

- Structural damage of buildings.
- Human comfort, where the occupants or users of buildings are inconvenienced or disturbed by vibration.

Criteria relevant to the response of building occupants to vibration (i.e. human comfort) are

more stringent than those relevant to building damage. The standards used to determine criteria for vibration are identified in table 6.4.

Table 6.4: Standards used for assessing construction vibration

Criteria	Standard
Structural damage	German Standard DIN 4150-3 (1992-02): Structural vibration – Effects of vibration on structures (the German Standard DIN 4150-3)
Human comfort	British Standard 6472: 1992 – Guide to evaluation of human exposure to vibration in buildings (1Hz to 80Hz)

Based on the above standards, the adopted vibration goal for the proposal is a peak particle velocity of 10 mm/s at all receivers.

6.4.4 Potential impacts

Construction – noise

Potential noise impacts have been minimised through the design of the proposal which involves undertaking as much construction work as possible at an off-site facility rather than at Cremorne Point Wharf, including assemblage of pre-fabricated components.

To assess the potential noise and vibration impacts from the proposal, four scenarios were used to undertake the assessment. These scenarios and the equipment to be used for each are outlined in table 6.5. The construction scenarios are intended to be conservative and should be considered to be at the upper end of the expected noise level range. For example, these scenarios have not taken into account absorption of noise by the environment as it travels across the land or water, structures between the source of noise and the receiver that would reduce noise and any of the noise safeguards or management measures proposed at section 6.4.5.

Table 6.5: Construction scenarios

Scenario	Description	Equipment to be used	Items of plant required	Period of operation in any 15 minutes
1	Demolition and removal of the existing pontoon and gangway	Barge	3	10
		Truck	1	5
		Hand tools	3	5
		Hydraulic hammer	1	5
		Angle grinders	1	5
2	Lifting of materials	Barge	3	5
		Crane	1	15
		Hand tools	3	15
3	Installation of new piles	Barge	3	5
		Piling rig	1	5
		Crane	1	15
4	General construction works	Barge	3	5
		Concrete truck	2	5
		Concrete pump	1	5

Scenario	Description	Equipment to be used	Items of plant required	Period of operation in any 15 minutes
		Truck	1	5
		Boat	1	5
		Compressor	1	5
		Hand tools	1	5
		Generator	1	5

Noise levels from each piece of equipment/process to be used during construction have been predicted for daytime and night time periods for the two nearest residential properties on Milson Road, the recreational reserve and the cafe. The detailed results are summarised below and presented in detail at appendix F.

Construction predictions during standard construction hours

Table 6.6 displays the highest predicted noise level at receivers 1 to 4, for the piece of equipment/activity predicted to have the highest noise level for each of the scenarios for works within standard construction hours. During piling activities, exceedances of up to 31 dB(A) are identified at 8 Wulworrah Avenue (Receiver 1), up to 37 dB(A) at 2 Milson Road (Receiver 2), up to 32 dB(A) at the Cremorne Reserve (Receiver 3), and 22 dB(A) at the Sophie's Place cafe (Receiver 4).

Appendix F, figure 4, identifies the properties where it is expected that noise management levels would be exceeded (those properties within the red line) and the properties that would be highly noise affected (those properties within the yellow line). Highly noise affected means where noise levels are above 75 dB(A). Other residential receivers would also be affected by noise however impacts on these receivers would reduce as the distance to the receiver increases. Prior to construction, the community within these areas would be notified of potential noise impacts.

Noise impacts at Sophie's Place cafe would reduce amenity of workers. No seating is provided at the cafe. Patrons typically make a purchase and move on to other parts of Cremorne Reserve. Therefore It is not expected that there would be more than a minor impact on the amenity of cafe patrons.

Table 6.6: Construction noise predictions for noisiest activities during standard construction hours

Scenario	Description	Receiver location	Predicted noise level (dB(A))	Noise management level (dB(A))	LAeq (15min) dB(A) exceedance
1	Demolition and removal of the existing wharf	1	79	49	30
		2	85	49	36
		3	91	65	26
		4	91	70	21
2	Lifting materials of	1	71	49	22
		2	77	49	28
		3	97	65	32
		4	83	70	13

Scenario	Description	Receiver location	Predicted noise level (dB(A))	Noise management level (dB(A))	LAeq (15min) dB(A) exceedance
3	Installation of new piles	1	80	49	31
		2	86	49	37
		3	97	65	32
		4	92	70	22
4	General construction works	1	79	49	30
		2	85	49	36
		3	91	65	26
		4	91	70	21

Construction predictions during the night time period

Table 6.7 displays the highest predicted noise level at the nearest residential receivers (Receivers 1 and 2) for the piece of equipment/activity predicted to have the highest noise level for each of the scenarios for works outside standard construction hours (the night time period between 11pm and 7am). An exceedance of 42 dB(A) (Receiver 1) and 48 dB(A) (Receiver 2) is identified during the hammering of piles (between piling 5am and 7am) for the nearest residential receivers and 33 dB(A) (Receiver 1) and 39 dB(A) (Receiver 2) during lifting activities. Other residential receivers would also be affected by noise however impacts on these receivers would reduce as the distance to the receiver increases.

Cremorne Reserve is typically only used during daylight hours and Sophie's Place cafe generally trades between standard construction hours. Therefore assessment of noise impacts during the night time period for these receivers is not necessary.

Construction during the evening period has not been included as there would only be minor works between the hours of 6pm and 10pm at the early stage of construction.

Table 6.7: Construction noise predictions at nearest residential receiver during the proposed night time construction hours (11pm-7am)

Scenario	Description	Receiver location	Predicted noise level (dB(A))	Noise management level (dB(A))	LAeq (15min) dB(A) exceedance
1	Demolition and removal of the existing wharf	1	N/A*	N/A*	N/A*
		2	N/A*	N/A*	N/A*
2	Lifting of materials	1	71	38	33
		2	77	38	39
3	Installation of new piles	1	80	38	42
		2	86	38	48
4	General construction works	1	N/A*	N/A*	N/A*
		2	N/A*	N/A*	N/A*

* Scenarios 1 and 4, or the use, trucks, angle grinders, electric saws, hand held drilling equipment, and concreting vehicles and equipment would not be undertaken during the night time period.

Construction – sleep disturbance

An assessment of the maximum noise levels was carried out to determine potential sleep disturbance from intricate lifts during the night (scheduled between 11pm to 7am) and piling works (scheduled generally between 11pm and 7am). The assessment indicated that at the nearest residential receiver (2 Milson Road) there would be exceedences of up to 33 dB(A) of OEH's sleep disturbance screening criteria between 11pm and 7am and 51 dB(A) between 5am and 7am.

The ICNG states that where the screening criteria have been exceeded further analysis is required to determine if sleep disturbance is a potential impact from construction. The OEH refers to the guidance of the *NSW Environmental Criteria for Road Traffic Noise* (EPA 1999). The *NSW Environmental Criteria for Road Traffic Noise* provides that maximum internal noise levels below 50 dB(A) to 55 dB(A) are unlikely to cause awakening reactions and that maximum internal noise levels of 65 dB(A) to 70 dB(A) are not likely to significantly affect health and wellbeing.

Maximum noise levels predicted for intricate lifts during the night time period (11pm to 7am) at the facade of the nearest sensitive receiver are up to 80 dB(A) which is approximately 70 dB(A) internally with windows open. Maximum noise levels predicted for piling (proposed to occur during the night time period between 5am and 7am) at the facade of the nearest sensitive receiver are up to 98 dB(A) which is approximately 88 dB(A) internally with windows open. These levels are above those of the *NSW Environmental Criteria for Road Traffic Noise* (EPA 1999) identified above and therefore construction activities at night may cause annoyance and disturbance and may affect health and wellbeing of surrounding residential receivers. However with the implementation of the safeguards and management measures at Section 5.5 it is expected that the actual noise level at the nearest residential receiver would be less.

Other residential receivers may also be affected during sleep however impacts on these receivers would reduce as the distance to the receiver increases. As identified above, appendix F, figure 4, identifies areas for direct and indirect notification.

Impacts on sleep would be intermittent as piling works would be conducted for two hours at the end of the night time period. Similarly, there would be minimal use of cranes (expected to be about 10 lifts throughout the duration of the construction period). To further minimise impacts on sleep and health and wellbeing, there would be at least two respite nights per week and all reasonable and feasible mitigation measures would be implemented with the aim of achieving the noise management level to minimise impact on nearby sensitive receivers (refer to Section 3.3.2).

Construction – vibration

Safe working distances for both cosmetic damage and human comfort are identified in table 6.8. Based on these distances

The nearest residential receiver from vibration causing works is about 30 metres. At this distance the safe working distances for cosmetic damage and human comfort would be satisfied and no further consideration of vibration management would be required.

Table 6.8: Safe working distances for vibration generating works

Plant item	Safe working distance	
	Cosmetic damage	Human comfort
Piling (with hammers up to 900 kg impact)	5 metres	17 metres
Vibration piling equipment	5 metres	15 metres
Auger piling equipment	2 metres	10 metres
Hand held hydraulic hammer	No contact with affected structures	No contact with affected structures

Operation impacts

The new ferry wharf would be located slightly further away from residential receivers. Given there would be no change to the ferry times the proposal is unlikely to have any additional operational noise impacts on residential receivers.

The incidental bumping of ferries on the pontoon as they dock would result in some vibration to the supporting piles. These are existing impacts and are not expected to increase in frequency or magnitude as a result of the proposal.

6.4.5 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Noise and vibration	<ul style="list-style-type: none"> Notification of all potentially affected residents and businesses will be undertaken within 14 days of the proposed night time works in accordance with section 8.8.2 and figure 4 of the noise and vibration impact assessment for the project. These notifications will include the timing and nature of works as well as the expected noise levels, duration and impacts prior to the commencement of construction. Contact details to lodge noise complaints or receive updates would also be provided at this time. 	Project Manager	Pre-construction
Noise and vibration	<ul style="list-style-type: none"> A noise and vibration management plan will be prepared and incorporated into the CEMP. The management plan will include but not be limited to: <ul style="list-style-type: none"> Reasonable and feasible noise control measures to reduce noise levels taking into account the control methods specified in sections 7 and 8 of the noise and vibration impact assessment for the proposal. Identification of nearby sensitive noise receivers in accordance with <i>Interim Construction Noise Guideline</i> (DECC, 2009a). Details of the assessed hours of work and work to be undertaken. Behavioural practices or other management measures to be implemented to minimise noise. A complaints handling process. 	Project Manager	Pre-construction
Noise and vibration	<ul style="list-style-type: none"> Work will be carried out during the recommended standard construction hours identified in the <i>Interim Construction Noise Guideline</i> (DECC, 2009a) as much as practicable. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> Temporary hoarding will be erected around the compound site. 	Project Manager	Construction

Impact	Environmental safeguards	Responsibility	Timing
Noise and vibration	<ul style="list-style-type: none"> Construction personnel will be informed of the location of sensitive receivers, and the need to minimise noise and vibration from the works, through the site induction and regular toolbox talks. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> The use of portable radios, public address systems or other methods of site communication that may impact on residents unnecessarily will be avoided. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> Construction plant and vehicles regularly used on site will be fitted with reverse alarms that are tonal. Site practices that minimise reversing movements will be implemented wherever practicable. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> Plant and equipment will be regularly inspected to ensure they are in good working order and not emitting excessive noise levels. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> Quieter plant and equipment will be selected based on the optimal power and size to most efficiently perform the required task. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> Rubber matting will be installed over material handling areas (such as in the bed of trucks) to minimise noise from materials being dropped. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> Where night time construction works are necessary, there will be one respite night between Monday (from 12am) and Saturday (up to 7am) and no night time construction works on Saturday night or up to midnight on Sunday. 	Project Manager	Construction
Noise and vibration	<ul style="list-style-type: none"> Concrete pumps will be screened, using a solid material such as a hoarding or the like, from surrounding receivers where practicable. 	Project Manager	Construction
Noise and vibration	<p>Noise monitoring using a hand held metering device will be undertaken at the site from time to time during the high noise periods including demolition and piling.</p> <p>The results of monitoring will be used to devise further control methods where required.</p>	Project Manager	Construction

6.5 Flora and fauna issues

This section provides an assessment of the flora and fauna impacts of the proposal, and is supported by the technical papers: *Aquatic Ecology Assessment* (Marine Pollution Research Pty Ltd, 2014) and *Bat Survey* (Biosphere Environmental Consultants Pty Ltd, 2012). These technical papers are provided at Appendix B and H respectively.

6.5.1 Existing environment

Aquatic

Cremorne Point Wharf has been developed alongside Cremorne Reserve which is reclaimed land retained by a concrete and stone seawall. The site is exposed to wind wave action and moderate wash from local passing vessels.

The SREP Sydney Harbour maps dated 2005 indicate the aquatic habitat to be 'wetlands' along most of the Cremorne Point foreshore including within the construction work area.

The Sydney Harbour Foreshores and Waterways Areas DCP maps indicate 'rocky platform' marine habitats at and along the foreshore to the north and south of Cremorne Point Wharf.

Seagrass mapping by Fisheries indicates a small *Zostera* seagrass patch in Shell Cove located more than 500m north of Cremorne Point Wharf.

Aquatic ecology surveys were undertaken in April and June 2010 in and November 2013. The area surveyed included the seabed from the shore and for 50 metres around the combined existing and proposed structures (study area).

The survey identified four main aquatic habitats in the study area:

- Rock rubble reef extending from the toe of the seawall and the natural rocky shore.
- Sandy seabed grading to silty-sand with depth extending offshore from the rock rubble reef.
- The wetted surface of the wharf building and pontoon locator piles.

Based on the aquatic ecology survey, the specific species identified in the area surveyed are shown in table 6.9:

Table 6.9 Aquatic habitats and ecology

Aquatic habitat zones	Species identified
Seawall and natural rocky shore	Variety of intertidal animals dominated by molluscs and Littorinid snails. Barnacle species plus chitons, limpets, several varieties of periwinkle snails and Sydney Rock oysters at the lower parts of the seawall.
Rock rubble reef	Dominated by brown macro-algae taxa; kelp, <i>Ecklonia radiata</i> , and <i>Sargassum</i> species and the kelp understorey supports sponges, encrusting tunicates and frondose bryozoans. There are a variety of molluscs including turban shells and mussels.
Sandy seabed grading to silty-sand.	Small crustaceans, molluscs and worms. <i>Sargassum</i> and kelp supported by isolated rocks just off the rock rubble reef.
Wetted surface areas of the wharf and pontoon piles	Barnacles and oysters in the lower intertidal, fringing and frondose algae, tunicates and mussels in the lower intertidal to shallow subtidal zone, mixed frondose algae plus kelp in mid waters, and mixed encrusting biota (with no algae) in deeper waters to the seabed.

No seagrass beds or individual seagrass plants were located in the study area and none are expected given the degree of disturbance of the seabed in the shallows.

A specific search was made for the listed pest algae species *Caulerpa taxifolia*, which is known from Sydney Harbour, but none was found in the study area.

The FM Act and the EPBC Act list a number of shark and other fish species as threatened

species. Syngnathiformes (seahorses, seadragons, pipefish, pipehorses and seamoths) are protected, under both the EPBC Act and the FM Act.

Of the listed threatened shark species, the Grey Nurse and Great White Shark could potentially visit the location of the proposal in pursuit of mobile prey, however, the location of the proposal does not provide habitat for these shark species. No threatened shark species were observed during the survey. It was considered that assessments of significance were not required for these species.

A targeted search was made for the Black Rock Cod however none were observed. It was concluded that there was no suitable rock habitat, rock crevice or cave habitat for adult Black Cod in the study area.

Of the 31 Syngnathiformes species known from NSW waters, three (White's seahorse *Hippocampus whitei*, Coleman's seahorse *Hippocampus colemani* and the Pygmy Pipehorse *Idiotropiscis* sp.) are endemic to NSW and White's seahorse is common in Sydney Harbour. Targeted searches were carried out for protected Syngnathiformes in the study area. Although no Syngnathiformes were observed during the survey suitable habitat was found to be present within the rocky rubble reef habitat. Although considered unlikely, there is potential for seahorses to be on the pontoon piles. Therefore, Syngnathiformes have potential to occur within the construction work area.

Other threatened aquatic species or populations that are known to occur in Sydney Harbour and may occur in the location of the proposal and its surrounds include various cetaceans (whales and dolphins), marine mammals (seals and sea lions), marine reptiles (turtles and sea snakes) and sea birds (ocean birds and waders). Of the species that may occur in the location of the proposal few would be using the resources to any great extent and would generally be in the area as transients or opportunistic feeders. None were observed during the survey. Assessments of significance were not considered necessary required for these species.

Individuals from the threatened population of Little Penguins (*Eudyptula minor*) at Manly are known to feed throughout Sydney Harbour and could be expected to visit the site from time to time. This population is listed as endangered under the TSC Act. The location of the proposal does not provide nesting or breeding habitat. An assessment of significance was not considered necessary for the Little Penguin.

Commercial fishing was banned in Sydney Harbour in 2006 due to elevated levels of dioxins recorded in fish and crustaceans. There are no commercial fishing operations or aquaculture activities in the vicinity of the proposal.

Terrestrial

The wharf and land to the north is highly urbanised with vast areas of hardstand to the west of a vegetated escarpment on the eastern side of Milson Road. The construction work area is devoid of any trees or grasses. Land to the south of the wharf is generally comprised bushland with rocky outcrops.

A search of the Atlas of NSW Wildlife (10 March 2014) found records of 492 threatened species listed under the TSC Act within a 10 kilometre radius of Cremorne Point Wharf (appendix G), though none of these records were from within the immediate vicinity of the wharf.

An EPBC Act Protected Matters Search Report was generated on 24 January 2014 within a 10 kilometre radius of Cremorne Point Wharf. The report identified the potential for four threatened ecological communities, 75 threatened species and 67 migratory species to occur within the search area.

A survey for threatened microbats was undertaken on 24 February 2012. It was noted that there while there was sufficient bushland foraging habitat for microbats around the headland within Cremorne Reserve, the high amount of night lighting would make occupation unlikely. Microbats were not found to be present in the area around Cremorne Point Wharf during the survey. No assessments of significance under the TSC Act were considered necessary because it is unlikely any threatened microbats would be found on site.

The location of the proposal is unlikely to provide suitable habitat, roosting or food resources

for any of the listed terrestrial species identified. Some of the listed migratory could potentially visit the location of the proposal however, the location of the proposal does not provide habitat for these species. As a result no further assessment was considered to be required for these species.

6.5.2 Potential impacts

Construction impacts

Aquatic

Potential construction impacts of the proposal on aquatic flora and fauna are discussed in table 6.10.

Table 6.10 Potential impacts to aquatic flora and fauna

Potential Impact	Assessment
Loss and gain of marine algae habitat	The removal of 12 piles would result in up to about 11m ² of marine algae habitat. The new piles would provide about 15m ² of marine algae habitat to mitigate this impact. This would have a minor beneficial impact in the long term.
Loss of protected seahorses that may be living on the piles or rock rubble reef that would be displaced during removal of piles and installation of bridge support piles.	Although no seahorses were observed during aquatic surveys, protected seahorses could occur on structures to be removed. The potential to impact protected seahorses would be reduced by a suitably qualified and licensed marine scientist conducting a preliminary inspection of the suitable habitat and relocating any seahorses to adjacent suitable rocky reef habitat away from construction works. Relocating Syngnathiformes requires a licence under s37 of the FM Act. Safeguards and management measures outlined in section 6.7.3 would address these potential impacts.
Loss of rocky reef algae habitat	There would be a loss of up to 18m ² of rocky reef algae habitat through replacement with concrete footings. This loss would be mitigated by removing loose rock that needs to be cleared for the construction of the footings and relocating it to form rock rubble algae reef in front of the existing wharf building.
Increase in water turbidity from disturbance of harbour sediments due to the removal and installation of piles, the construction of footings, operation and anchoring of construction vessels.	Turbidity from vessels movement, pile placement and construction of footings would be localised to the immediate area around the piling and footings work area. During piling it would be confined to bottom waters and would settle rapidly. The benthic assemblage in the vicinity of the piles are expected to comprise organisms that are generally tolerant of occasional turbidity. A silt curtain would be installed around the entire construction work area within the waterway during construction to manage turbidity. During the construction of the footings there is potential for excessive turbidity to cause smothering of the adjacent algae habitat. To effectively manage this impact, an additional silt curtain would be installed around the immediate construction work area for the bridge. The silt curtain would attach to the seafloor. On completion of the construction of the bridge this silt curtain would be removed.

Potential Impact	Assessment
Loss of benthic organisms in sand habitat and algae habitat in rock rubble from pile and anchor placement.	<p>The new piles, placement of construction barge anchors, and vessel movements would displace some shallow sandy habitat and displace benthic organisms. However, the area of disturbance is a small proportion of the total area of soft sediment habitat in the study area. The potential impact would be considered temporary and minor.</p> <p>The placement of anchors and mooring blocks on rocky reef habitat could damage algae habitat. This could be managed through the implementation of suitable mooring, anchoring and work practices.</p>
Potential indirect impacts on the aquatic ecology associated with construction works over water such as materials potentially falling or being placed onto the seabed. There may also be potential indirect impacts associated with accidental spills and the storage of materials (refer section 6.3).	This potential impact can be mitigated appropriately through the adoption of environmental safeguards.
Construction noise affecting behaviour of cetaceans and other marine mammals.	The driving of piles creates impact noise that can adversely affect the behaviour of cetaceans and other marine mammals that are known to penetrate the harbour. Should any marine mammals be known to be present in the vicinity of the piling works piling works would cease until they have left the locality.

The proposal would not comprise any dredging or reclamation activities and would not result in impacts to marine vegetation. Therefore, the proposal would not need to be notified to the Minister for Trade and Investment and would not require a permit under Part 7 of the FM Act.

DPI (Fisheries) were notified of the proposal. Their comments are detailed at section 4.3.1. The need for the proposal to obtain a permit under the FM Act is included at section 7.3 and recommended safeguards and management measures are included within section 6.1.3 and 6.5.3.

The aquatic ecology conservation requirements of the SREP Sydney Harbour and Fisheries NSW Policy and Guidelines (Fisheries 2013) have been considered and the proposal is consistent with its criteria for biodiversity, ecology and environmental protection.

Terrestrial

No vegetation or habitat for terrestrial species would be removed or damaged as a result of the proposal. The proposal would be unlikely to impact on any threatened species, including threatened microbats. Assessments of significance under the TSC Act were not considered necessary.

Operation impacts

Aquatic

The new pontoon would be located about 15 metres further to the south east from the existing pontoon but with a similar alignment. Both existing and proposed pontoons are parallel to the shore, over bare coarse silty-sand habitat and in about the same depth of water. The existing and proposed pontoons are oriented parallel to the shore which means that propeller and jet wash would be directed over deep waters and not towards the shallow in-shore rock and rubble reef. As such it is anticipated that impacts from propeller and jet wash during operation would be negligible.

The inshore half of the proposed gangway will shade about 18m² of rock rubble reef to the south of the wharf building. Given the height of the proposed gangway above the reef and

noting that algae do grow under the front of the existing wharf building, it is likely that there would be sufficient ambient, reflected and refracted light reaching the shaded parts of the reef to continue to support algae growth under the new gangway.

Overall there would be an increase in hard substratum algae and attached biota habitat by about 54m². This would have a beneficial impact by providing increased shelter and feeding habitat for small reef fish and for the larger pelagic fish that prey on these reef fish.

Terrestrial

There would be no additional operational impacts to terrestrial flora or fauna as a result of the proposal.

6.5.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Flora and fauna	<ul style="list-style-type: none"> A spill management plan will be developed and communicated to all staff working on site. 	Project Manager	Pre-construction
Flora and fauna	<ul style="list-style-type: none"> The construction work site area used will be the minimum size necessary to safely undertake the proposal. Exclusion zones will be established to identify the work area and prevent damage to marine habitats outside the work area. 	Project Manager	Construction Pre-construction
Flora and fauna	<ul style="list-style-type: none"> All staff working on the site will be advised of the location of rock rubble habitats. No vessel anchors will be placed in identified rocky reef or marine vegetation habitats (refer to Figure 22 of Appendix B). Anchor cables must be suitably buoyed prior to laying, and kept buoyed once laid, to prevent cable drag and cable swing damage (scalping) to marine vegetation and rock rubble habitat areas. Where this is impractical, contractors will use floating rope. 	Project Manager	Construction
Flora and fauna	<ul style="list-style-type: none"> To minimise disturbance of the seabed, marine vegetation habitats, and the mobilisation of any colonised pest algae <i>Caulerpa taxifolia</i>, vessels will not use excessive power when manoeuvring barges into place over the coarse sand and rock rubble habitat. Scouring damage will also be minimised by 'working the wind and tides', by only moving floating plant into place on high tides and under favourable or no-wind conditions, where practicable. 	Project Manager	Construction
Flora and fauna	<ul style="list-style-type: none"> All the wetted surface areas of demolition materials taken from the waters must be inspected for possible 	Project Manager	Construction

Impact	Environmental safeguards	Responsibility	Timing
	attached <i>Caulerpa taxifolia</i> plants and these must be collected and disposed of into plastic bags then placed into garbage bins on shore as recommended in the <i>NSW Control Plan for the Noxious Marine Alga Caulerpa Taxifolia</i> (NSW Fisheries 2009).		
Flora and fauna	<ul style="list-style-type: none"> All construction related equipment that comes in contact with the seabed (including mooring tackle, cables, ropes and anchors), must be inspected for attached fragments of the declared pest algae species <i>Caulerpa taxifolia</i> and any fragments found must be collected and disposed of into plastic bags then placed into garbage bins on shore in the <i>NSW Control Plan for the Noxious Marine Alga Caulerpa Taxifolia</i> (Department of Industry and Investment 2009). 	Project Manager	Construction
Flora and fauna	<ul style="list-style-type: none"> In order to minimise swimming distances for reef fish from piles being pulled to remaining piles in-shore, the piles to be removed will be systematically removing from seawards towards the shore. 	Project Manager	Construction
Flora and fauna	<ul style="list-style-type: none"> A specialist marine/aquatic ecologist would undertake a pre-construction inspection of the piles and rock rubble reef for Syngnathiformes. In the case that any Syngnathiformes are observed on the piles or rock rubble reef, the specialist marine/aquatic ecologist would relocate these to an adjacent suitable rocky reef habitat away from the construction work site. The marine/aquatic ecologist must hold the appropriate permit under s37 of the FM Act to undertake the handling and relocation of Syngnathiformes. This would be obtained prior to the commencement of pile removal. All personnel working within the waters of the construction site would be informed of the potential to encounter Syngnathiformes. 	Project Manager	Pre-construction Construction Pre-construction Construction
Flora and fauna	<ul style="list-style-type: none"> Loose rock that needs to be cleared for the construction of the footings will be relocated to form a rock rubble algae reef on the sand at the toe of the existing reef in front of the existing wharf building. 	Project Manager	Construction

Impact	Environmental safeguards	Responsibility	Timing
Flora and fauna	<ul style="list-style-type: none"> If any threatened aquatic species are noted at the construction site unexpectedly, all in water construction works should be halted until the species has left. Prior to commencement of pile driving operations, the contractor is to call Sydney Port Control to check whether there have been any sightings of marine mammals and if so their current location. <p>If marine mammals are reported between Clifton Gardens and Sydney Harbour Bridge (or travelling in a direction to place them between these limits in a short time), pile driving operations are to cease or not be undertaken until the marine mammals are reported to be west (and continuing west) of Sydney Harbour Bridge, or back east, well and clear of Clifton Gardens and travelling east.</p>	Project Manager	Construction

Other safeguards and management measures that would address both water quality and flora and fauna impacts are identified in Section 6.1.3.

6.6 Land transport and parking issues

6.6.1 Existing environment

Land transport

The Cremorne Point Wharf is located at the southern end of Milson Road. Milson Road and Cremorne Road are the main traffic thoroughfares through the primarily residential areas of Cremorne Point. These roads are two-way two lane roads parallel to each other that run generally in a north south direction. Cremorne Road is connected to Milson Road via Wharf Road about 200 metres to the north of the Cremorne Point Wharf. Milson Road terminates at the wharf.

Cremorne Point is connected to the suburb of Cremorne via Murdoch Street and other local roads. Military Road, a two-way four lane State road connects Cremorne with the Bradfield Highway. The Military Road/ Murdoch Street intersection at Cremorne is controlled by traffic lights and permits in/out movements in all directions.

Bus stops are located on either side of Milson Road within Cremorne Point and are serviced by a 225 service which operates between Cremorne Point Wharf and the Neutral Bay Ferry Wharf via Military Road with numerous stops along the way throughout the residential areas. The closest bus stop to Cremorne Point Wharf is about 50 metres to the north. A bus turnaround area is located about 20 metres to the north of the wharf.

A footpath aligns the eastern side of Milson Road terminating at the wharf.

Parking

There are two on-street accessible parking spaces directly adjacent to the wharf. There is no other designated commuter parking provided at Cremorne Point Wharf. There are about 40 two hour and four hour time restricted on-street parking spaces more within 200 to 400 metres of the wharf.

6.6.2 Potential impacts

Construction impacts

Land transport

The majority of personnel, materials, plant and equipment would travel between the off-site facility and the construction site by barge or boat. As a result land transport/traffic for construction would be minimised. Traffic generated by construction works would be restricted to about 15 vehicle movements per day comprising sub-contractors and concrete trucks travelling to and from the construction site.

The additional construction traffic expected in the area is considered minor and would be unlikely to affect the capacity of the road network. Any potential impacts associated with construction vehicles at the site would be mitigated through the preparation and implementation of a traffic control plan.

Vehicle access to the southern extent of Milson Road adjacent to the wharf would be restricted by the temporary compound and concrete trucks accessing the site during construction. The indicative location of the temporary compound is a dead end and is not typically used by vehicles. Therefore any impact would be negligible. Buses and other vehicles will be able to utilise the bus turn around area to the north of the wharf as they normally would during this time.

Access to the Sydney Water Pumping Station would be maintained throughout construction.

There would be temporary disruptions to commuters as ferry and water taxi services would not operate from Cremorne Point Wharf for up to six months during the construction period. During this time, ferry commuters would need to find alternative transport options which may increase pressure on buses and the road network. Commuters may choose to use the bus service along Milson Road or Cremorne Road and therefore there would potentially be increased usage of these services during the six month construction phase. TfNSW have confirmed that there is sufficient capacity for these buses to take up additional demand. Alternative transport options are discussed further at section 6.12.2.

A potential increase in pressure on the road network associated with commuters choosing to drive whilst the works are undertaken would be temporary.

Parking

Most workers would travel to and from the site by boat from the off-site facility which would minimise impacts to parking in the vicinity of the proposal. Most plant, equipment and materials would also be transported to the construction work site by barge or boat.

Some vehicles would also require parking at or near the construction work site on occasion, such as concrete trucks required for the in-situ concrete works and some sub-contractors' vehicles. This is not expected to impact on parking availability in the area as this would be offset by ferry commuters not using parking whilst the ferry services are not operating.

The temporary compound would occupy space in front of the wharf entrance. This is not expected to impact on access to the two accessible parking spaces adjacent to the wharf.

Operation impacts

The proposal would improve the boarding efficiency of Cremorne Point Wharf which may increase the demand for this service. This would reduce pressure on other forms of public transport and the capacity of the road network. However, it may increase pressure on the limited parking in the vicinity of the wharf.

6.6.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Land transport and parking	<ul style="list-style-type: none">A traffic control plan will be prepared in accordance with the '<i>Traffic control at work sites manual</i>' (RTA, 2010a) and <i>Australian Standard 1742.3</i> (Manual of uniform traffic control devices).The traffic control plan is to consider	Project manager	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
	vehicle parking for construction workers.		
Land transport and parking	<ul style="list-style-type: none"> The traffic control plan is to be agreed upon by Council. 	Project manager	Pre-construction

Other safeguards and management measures that would address interruptions to commuters during construction are detailed in section 6.12.3.

6.7 Water transport issues

6.7.1 Existing environment

Cremorne Point is used by a variety of water-based transport modes including commuter ferries, and commercial and recreational vessels.

The Cremorne Point Wharf is located about 2.5 kilometres north-east by water from Circular Quay, which is one of Sydney's major transport hubs.

Cremorne Point Wharf is part of the Sydney Ferries' Parramatta River services, which provide ferries connecting various wharves between Parramatta and Circular Quay.

About 40 Ferry services depart from Circular Quay and travel to Cremorne Point each weekday commencing at around 7am and concluding at around 11.30pm the same day. The same number of ferry services depart from Cremorne Point Wharf each weekday commencing at around 6am and concluding at around 12 midnight. The same number of ferries travel from Cremorne Point to Circular Quay each day commencing at around 6.30am and concluding at around 12.30am the following morning.

About 18 ferry services depart from Circular Quay and travel to Cremorne Point Wharf each Saturday commencing at about 7am and concluding at about midnight. The same numbers of ferry services depart from Cremorne Point Wharf and travel to Circular Quay each Saturday commencing from about 7.30am and concluding at about 12.30am the following day.

On Sundays and public holidays, about 13 ferry services depart from Circular Quay and travel to Cremorne Point Wharf commencing from about 9am at Circular Quay and concluding at about 9.30pm. The same number of ferry services depart Cremorne Point Wharf and travel to Circular Quay each Sunday and public holiday commencing at around 9.30am and concluding at around 9.30pm.

Cremorne Point Wharf is a 'priority access wharf', which means that Sydney Ferries has priority to access the wharf based on their timetabling but the wharf can be used by others at other times. The existing commuter ferry wharf is used by a number of water taxis and commercial recreational vessels. These operate on an as needed basis. Some of the commercial operators have their contact details listed at the wharf. Cremorne Point has a single berthing face, however congestion has not been raised as an issue during consultation with TfNSW.

There are no private jetties and vessel moorings within the vicinity of the wharf that would be impacted by the proposal.

6.7.2 Potential impacts

Construction impacts

Ferry services would not operate at Cremorne Point Wharf for the duration of the construction work however the ferry timetable would not be adjusted to reflect this. Therefore, the ferry service for this route would run as normal, with the exception of stopping at Cremorne Point Wharf. Commuters usually relying on Cremorne Point Wharf as part of their journey would need to utilise alternative transport options during the closure of the wharf as discussed at section 6.12.2.

In terms of water-based construction vessels there would be up to about three service barges,

all of which would be brought to the construction site from an off-site facility on a daily basis, and a number of smaller craft used to transport construction workers to the site. This would increase water based traffic within Sydney Harbour and Cremorne Point.

All non-construction related vessels would be prohibited in the construction work site.

Commercial recreational vessels such as water taxis would not be able to pick up or set down passengers at Cremorne Point Wharf for the duration of the construction work. These vessels would need to use alternative wharves such as the Old Cremorne Ferry Wharf, South Mosman Ferry Wharf or Mosman Wharf.

During construction there may be a reduction in commuters using the ferry route due to the relocation of services, increased travel times and complexity of travel routes and disruption to foreshore access.

Operation impacts

The proposal is designed to enhance water transport in the Sydney Harbour by improving access to commuter ferry services. There would be no increase in boating activity generated by the operation of the proposal.

The new pontoon would be located within generally the same position as the existing pontoon. No impacts to any navigation routes or other ferry wharves nearby the Cremorne Point Wharf are anticipated as a result of the operation of the proposal.

Charter and recreational vessels would continue to be able to use Cremorne Point Wharf and therefore there would be no change in terms of use of the wharf.

6.7.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Water transport	<ul style="list-style-type: none"> Commercial, recreational operators and private services that use the existing wharf will be advised of the wharf closure at least two weeks prior to closure. 	Project manager	Pre-construction
Water transport	<ul style="list-style-type: none"> The water-based construction zone will be clearly delineated and marked to prevent non-construction vessels from entering the construction site. 	Project manager	Construction

Other safeguards and management measures that would address interruptions to commuters during construction are detailed in section 6.12.3.

6.8 Landscape character and visual impact

A Landscape Character and Visual Impact Assessment has been prepared by Jane Irwin Landscape Architects in accordance with RMS' *Environmental Impact Assessment-Guidance Note, Guideline for landscape character and visual impact assessment*. The findings of this assessment are discussed below and the full report is provided at appendix I.

The Landscape Character and Visual Impact Assessment assesses a larger envelope (envelope assessment area) in which the wharf will be located. The envelope assessment area is shown in Figure 6-2.

A combination of the sensitivity of an area or a view and the magnitude of the proposal (scale, character, distance) was used to determine the landscape character impacts of the proposal (see figure 6-3 for grading values).

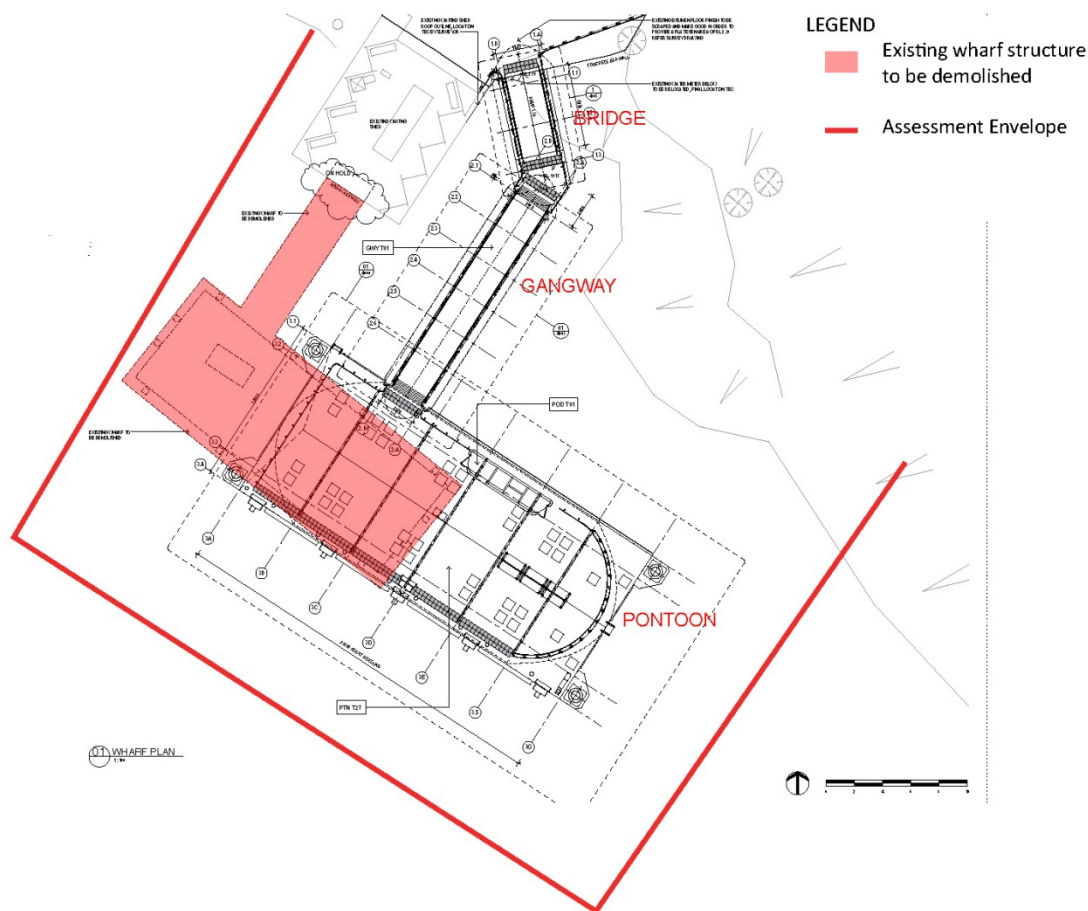


Figure 6-2: Assessment envelope area used to assess the landscape character and visual impact

		Magnitude					
		High	High to Moderate	Moderate	Moderate to Low	Low	Negligible
Sensitivity	High	High Impact	High Impact	Moderate-high	Moderate-high	Moderate	Negligible
	High to Moderate	High Impact	Moderate-high	Moderate-high	Moderate	Moderate	Negligible
	Moderate	Moderate-high	Moderate-high	Moderate	Moderate	Moderate-low	Negligible
	Moderate to Low	Moderate-high	Moderate	Moderate	Moderate-low	Moderate-low	Negligible
	Low	Moderate	Moderate	Moderate-low	Moderate-low	Low Impact	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Figure 6-3: Grading values used to determine landscape character and visual impact

6.8.1 Existing environment

Landscape character

Cremorne Point is a prominent peninsula on the northern side of Sydney Harbour consisting of foreshore reserves fronting residential apartment buildings.

From the water and opposite points, the area is viewed as a layering of landscape foreshore reserves at the water's edge extending up to apartment buildings along the ridge predominately to the north of the wharf.

There is a consistency in the materials, form, and colour. The foreshore reserve is a consistent element at the water level and the slopes and ridge comprise a range of apartment

buildings of a similar scale.

Iconic elements within the surrounding landscape include Woorilla House on the foreshore to the north of the wharf, Sydney Harbour more broadly, and from the point itself the expansive visual connection to the Sydney Harbour Bridge, Sydney Opera House and the CBD skyline.

The location of the wharf towards the centre of the harbour, extending beyond neighbouring points, affords it a high level of prominence in the harbour landscape. The sensitivity of the proposal is highest in the area immediate surrounding the wharf, where there are a limited number of structures along the foreshore but which include a heritage listed building (2 Milson Road).

The landscape character is assessed as having a moderate sensitivity to change.

The existing wharf and surrounds is shown in figures 2-1 to 2-4.

Views and vistas

Key viewpoints for the proposal are listed in table 6.11 and represented in figure 6-4 to figure 6-11 below. These viewpoints are representative of the range of viewpoints within the visual catchment, including those of residential properties, public buildings, public spaces and businesses. Viewpoints 5 and 8 are representative of views from the water.

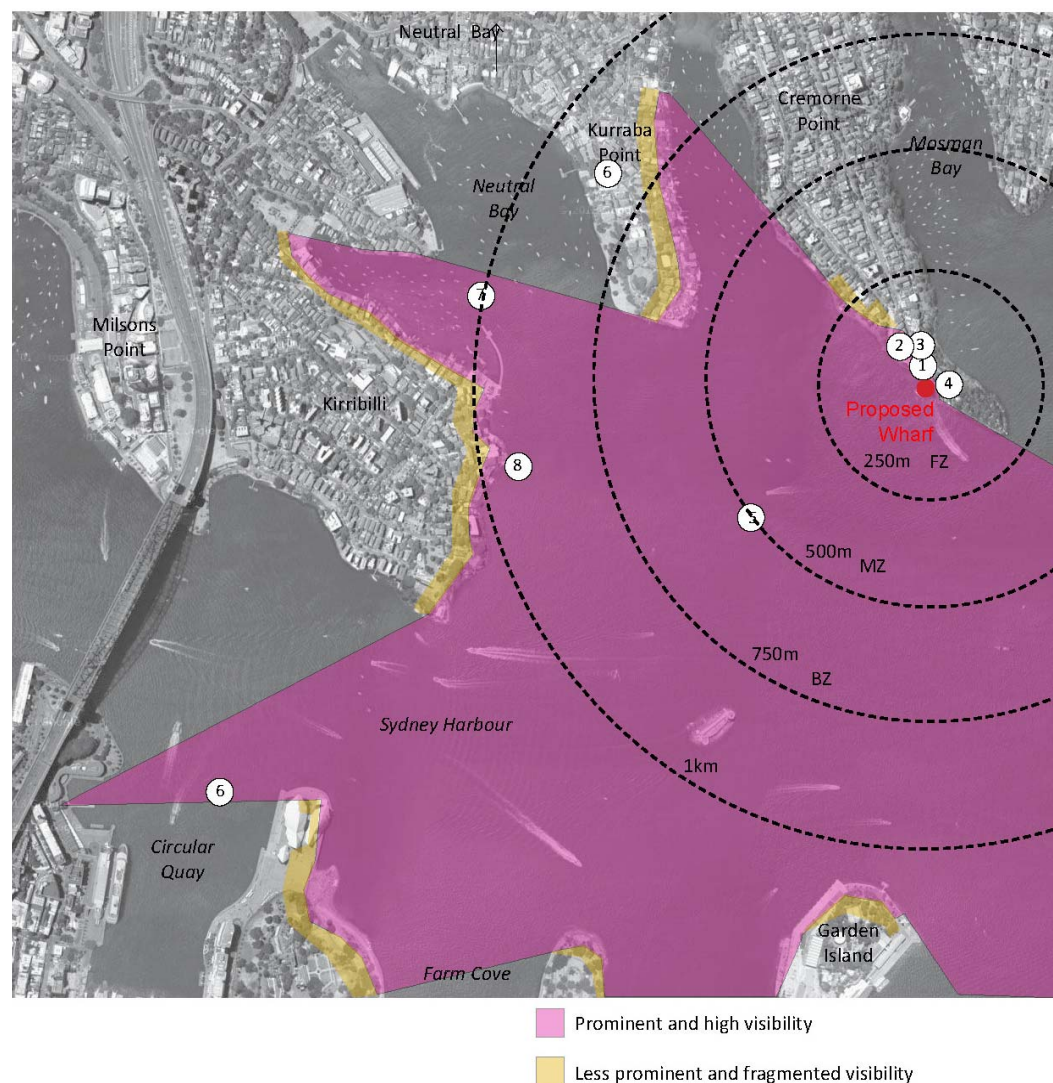


Figure 6-4: Visibility of project and key viewpoints (source: JILA, 2014)



Figure 6-5: Viewpoint 1 - View from foreshore looking north



Figure 6-6: Viewpoint 2 - View from Milson Road looking north



Figure 6-7: Viewpoint 3 - View from upper Cremorne Reserve looking north west



Figure 6-8: Viewpoint 4 - View from Cremorne Reserve looking west



Figure 6-9: Viewpoint 5 (also representative of 7) - View from Sydney Harbour looking /north east towards the wharf



Figure 6-10: Viewpoint 6 - View from Circular Quay/Sydney Opera House looking north east towards wharf



Figure 6-11 Viewpoint 8 – View from Kirribilli Wharf looking east towards wharf

Table 6.11: Identification and description of existing views

Viewpoint	Description of view	Visible elements of proposal
1. View from foreshore looking north	Sydney CBD skyline, eastern suburbs, Sydney Harbour	Pontoon and gangway
2. View from Milson Road looking north	House at 2 Milson Road, eastern suburbs, Sydney Harbour	Part of gangway
3. View from upper Cremorne Reserve looking north west	Eastern suburbs, Sydney harbour	Pontoon and gangway
4. View from Cremorne Reserve looking west	Sydney Harbour Bridge, Sydney Opera House, Sydney CBD skyline, Kurraba Point	Pontoon and part of gangway
5. View from Sydney Harbour looking /north east towards the wharf	Cremorne Point, Bradleys Head, Sydney Harbour	Pontoon
6. View from Circular Quay/Sydney Opera House looking north east towards wharf	Cremorne Point, Bradleys Head, Sydney Harbour	Pontoon
7. View from Neutral Bay looking east	Kurraba Point, Cremorne Point, eastern suburbs, Sydney Harbour	Pontoon
8. View from Kirribilli Wharf looking east towards wharf	Kurraba Point, Cremorne Point, eastern suburbs, Sydney Harbour	Pontoon

6.8.2 Potential impacts

Construction impacts

During construction there would be a temporary decrease in the scenic quality of the local area with the introduction of construction equipment, plant, a compound site, construction vessels in the water, and personnel. Views of Sydney Harbour would be obstructed from the southern end of Milson Road due to the location of hoarding around the compound site. These structures would be about two metres in height and would be likely to be located below the view lines from residents within Wulworra Avenue and from Cremorne Reserve to the east and south of the proposal. Some views from the residence at 2 Milson Road would be temporarily obstructed by these structures during construction. However the dwelling is oriented with its primary aspect to the south west towards Sydney CBD which generally not be obstructed. It is expected that the work would be completed within six months. Impacts during construction would be temporary and minor.

Operation impacts

The design of the proposal was selected based on its ability to meet the objectives of the proposal while minimising potential visual impacts. Factors that have been considered in the proposed design to minimise impacts are discussed in detail at section 2.4. These include locating the new wharf in generally the same location as the existing wharf to minimise view loss, and the use of neutral colours and transparent materials which are low in reflectivity and complement the adjacent features of the land.

During operation, components of the proposal that would be visible include the entry platform, gangway and pontoon. A photomontage of the proposal is shown in figure 3-2.

Landscape Character

The proposal would result in the following changes within the visual landscape:

- The existing covered gangway and pontoon would be removed.
- A new wharf (covered bridge, gangway and pontoon) located to the south of the existing wharf. This would represent a shift in the wharf alignment but with the pontoon located in a similar position as the existing pontoon.
- Change in colour palette and roof form.
- Addition of a large built element along a predominantly unbuilt foreshore edge.

These changes would have a moderate impact on the landscape character of Kurraba Point and Shell Cove as it represents an increase in scale, shift in alignment, and a change in materiality in a location where there is a limited number of structures.

This impact would lessen for other character zones with distance as the internal focus of these other character zones change and the prominence of the proposed wharf reduces.

The positioning of the wharf results in a minor change to the orientation of the gangway and the position of the covered pontoon which now sits about a further 5 metres to the east. This re-positioning does not result in any changes to the impacts on landscape character. Impacts on nearby properties from light spill would be minor. All lights on the wharf would meet Australian Standards which include relevant light spill criteria and would incorporate dimmers and time clocks so that lights would be dimmed soon after the last ferry of the day. The installation of appropriately designed lighting has been included as a safeguard and mitigation measure.

Overall, the magnitude of these changes have been assessed as being moderate to low due to its moderate sensitivity to change (refer to section 6.8.1) and the magnitude of the proposal also being moderate to low.

Views and vistas

The impact of the proposal from each of the key viewpoint locations is detailed in table 6.12 and discussed below.

The removal of the existing covered gangway and pontoon wharf and replacement with a new wharf to the south east of the current location would result in a change in views from some of the surrounding areas.

The highest impact on views is from the area immediately surrounding the wharf, particularly those from within the existing fixed wharf building, and from within Cremorne Reserve looking west to the Sydney CBD and Harbour Bridge.

Views from Milson Road and the foreshore areas directly to the north of the wharf and elevated on the sandstone cutting behind will be improved by the proposed shift in alignment, with more of the bulk of the wharf hidden behind the existing foreshore wharf building to be retained.

Views towards Cremorne Point will be moderately affected as the proposed pontoon shifts further south east across the natural foreshore edge of the Cremorne Reserve.

The replacement of the existing gangway and pontoon with a new wharf to the south of the existing location will open up views from the wharf building and the footpath to the north. It will also result in some view loss from the southern side of the building and from parts of the reserve behind the proposed wharf.

There will not be any view loss from neighbouring residential properties to the north of the wharf as they are elevated above and away from the wharf. The proposed wharf would also be substantially blocked from these view angles by the bulk of the existing wharf building to be retained on the foreshore.

Long range views from surrounding points and on approach across the harbour will have a negligible impact as shift in alignment and scale from the existing wharf to the proposed wharf diminishes over distance.

The proposed wharf would preserve views and vistas between the Sydney Opera House and public places surrounding the wharf.

Overall, the impact on views and vistas have been assessed as being moderate to low.

Table 6.12: Description of view impact

Viewpoint	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
1. View from foreshore looking north	HM	HM	FZ	HM	The proposed pontoon is larger in scale and will extend further to the south east. The greatest view loss will be from the foreshore to the south of the fixed foreshore wharf building and from within the building itself where the angled windows on the south eastern face will be partially blocked by the new wharf. Transparent material selection, reduction of fixed elements on the pontoon have sought to minimise this impact. Tidal fluctuation will also vary the level of view loss. Views from the foreshore to the north of the wharf building will be improved with the shift in alignment of the new structure opening up greater harbour views from this angle.
2. View from Milson Road looking north	L	L	FZ	L	The impact is considered low as views of the proposed wharf are mostly blocked from the existing wharf building and the building at 2 Milson Road.
3. View from upper Cremorne Reserve looking north west	M	L	FZ	ML	The elevated position of this viewpoint means that the proposed changes are visible from some points and hidden from others by the existing wharf building and the building at 2 Milson Road. Views from the north will be opened up as the bulk of the pontoon is hidden by the existing wharf building.
4. View from Cremorne Reserve looking west	M	HM	FZ	HM	The reserve consists of a clearing at the highest point, surrounded by dense vegetation extending down to the water. Filtered views are available from the main reserve area, with clear views to the wharf only available off the main walking track. The proposed new wharf will extend further across the foreshore of the reserve. The use of transparent materials within the proposed structure will reduce the impact on these views.
5. View from Sydney Harbour looking /north east towards the wharf	M	ML	MZ	M	Currently the wharf provides the mediation point between the modified foreshore to the north and the natural reserve at the southern end of the point. The proposed changes will see the proposed pontoon shift further across the natural foreshore of the reserve extending the built area of the foreshore and impacting on the view of the reserve on approach by water.
6. View from Circular Quay/Sydney Opera House looking north east towards wharf	L	L	BZ (over 1.5km)	L	Views from Circular Quay and the Sydney Opera House will have a low impact due to the distance to the proposed wharf and its scale within the broader view of the harbour. The most visible element of the proposed upgrade will be the pontoon. Impact has been reduced through low reflectivity materials.

Viewpoint	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
7. View from Neutral Bay looking east	N	N	BZ	N	The impact on views is considered negligible. Views to the proposed wharf are limited by Kurraba Point.
8. View from Kirribilli Wharf looking east towards wharf	N	N	BZ	N	Views from Kirribilli wharf would have a negligible impact due to the distance from the proposed upgrade and its small scale within the overall view.

N=Negligible; L=Low; ML=Moderate-Low; M=Moderate; HM=High-Moderate; H=High; FZ=Foreground zone (0m-250m from the water); MZ=Middle ground zone (250m-500m); BZ= Background zone (areas greater than 500m from the proposed wharf)

6.8.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Landscape character and visual impact	<ul style="list-style-type: none"> Urban design principles will be integrated throughout the detailed design and construction of the proposal. 	Project Manager	Pre-construction and construction
Landscape character and visual impact	<ul style="list-style-type: none"> The design of the wharf lights will be to Australian Standards. The wharf lighting will be designed to minimise impacts on existing residences through incorporating dimmers and time clocks so that lights are dimmed at the time of the last ferry and by facing lights towards the ground. The wharf lights will be simple in design with minimal fixtures, and resistant to vandalism where possible. 	Project Manager	Construction

6.9 Non-Aboriginal heritage

The Statement of Heritage Impact at appendix E outlines the history of the area and provides an assessment of the heritage significance of the Cremorne Point Wharf and heritage impacts as a result of the proposal. A summary of the findings of this report are provided below.

The Cremorne Point Wharf was initially constructed in 1910 as part of a new transport interchange between ferries and trams, constructed in response to the increasing population in the Cremorne area. The terminus for the tram line was located adjacent to the wharf but was closed and replaced by buses in 1956.

The Cremorne Point Wharf has been at its current location since 1953. The current gangway and pontoon are relatively new having been replaced following being sunk during storms in both 1995 and 2007.

6.9.1 Heritage listings and significance

The Cremorne Point Wharf is not a heritage listed item but is located within the Cremorne Point Heritage Conservation Area listed under the LEP 2013.

Searches of the Heritage Branch's State Heritage Inventory, the LEP 2013, State Government Agencies s170 registers and the SREP Sydney Harbour for listed heritage items were conducted on the 5 December 2013. Table 6.13 below displays the results of these searches for items listed within 500 metres of the proposal. Other heritage items are located further than 500 metres from the proposal and given the separation distance and the modest nature of the proposal, these items would not be impacted by the proposal and no further consideration has been given.

The Cremorne Point Heritage Conservation Area is identified as significant as a consistent early twentieth century residential area with a mix of Federation and 1920s one and two storey housing mixed with inter-war residential flat buildings, built on large allotments with strong orientation to the water; a unique foreshore that predates the residential subdivision which demonstrates the concern for recreation, public access and suburban amenity; and the visual unity derived from its subdivision history that is still apparent.

The wharf itself is not listed as an item of local heritage significance, although the former tram turning loop and ferry interchange, the former tram terminus shed (2 Milson Road), and the low level sewage pumping station (Sydney Water Pumping Station) immediately adjacent to the current wharf are all listed as local heritage items.

Table 6.13: Listed heritage items within, adjacent and in the wider vicinity of the project.

	Heritage Item	Location	Significance	Listing/s	Proximity to proposal
1	Robertsons Point Lighthouse	Robertsons Point	State	North Sydney Local Environmental Plan 2013	215 metres south-east
2	Robertsons Point Lighthouse	Robertsons Point	State	North Sydney Local Environmental Plan 2013	215 metres south-east
3	Sewage pumping station No. 57	Milson Road, Cremorne	Local	North Sydney Local Environmental Plan 2013	Adjacent
4	Former tram turning loop and ferry interchange	Milson Road and Wharf Road	Local	North Sydney Local Environmental Plan 2013	Adjacent
5	Former tram terminus shed	Cnr Milson and Wharf Roads	Local	North Sydney Local Environmental Plan 2013	Adjacent
6	Gloucester Flats	3 Wulworra Avenue	Local	North Sydney Local Environmental Plan 2013	120 metres north
7	Windsor Flats	5 Wulworra Avenue	Local	North Sydney Local Environmental Plan 2013	130 metres north
8	2 storey residence	8 Wulworra Avenue	Local	North Sydney Local Environmental Plan 2013	50 metres north-west
9	Cremorne Reserve (including Robertsons Point)	Cremorne Point	Local	North Sydney Local Environmental Plan 2013	30 metres east

It should be noted that several other historic shipwrecks are known to be located in and nearby Sydney Harbour; however, their exact locations are currently unknown. These include the *Native* (1850), *Robert Saywers* (1854), *Gem* (1880), *Cadet* (1912), *Esther* (1920) *Rodney* (1938), *Siesta* (1942), *Nereus* (1942), *Silver Cloud* (1942) and *Marlean* (1944). However, given the amount vessel movements around the wharf, in addition to natural tidal movement and currents, it is considered highly unlikely that any historic shipwrecks remain submerged or buried within the Cremorne Point Wharf area.

6.9.2 Potential impacts

Construction impacts

Land Based

The replacement of wharf structures and their various components over time is a common pattern identified in the historical development of commuter wharves in Sydney Harbour. In this regard, although the use of the wharf would be disrupted during construction, this is consistent with the ongoing use of the wharf. Construction hoarding, materials and equipment would have a minor impact on the significance of the setting in the short term during construction.

The temporary compound would be located on the former tram turning loop and ferry interchange. The compound would be located on bitumen and would not require any disturbance of the land surface. Therefore any impacts on the heritage significance of the tram turning loop and ferry interchange would be temporary visual impacts. The adjacent Low Level Sewage Pumping Station No. 57 and former tram terminus shed are located outside of the construction work area. The construction work area would be fenced off from these items to ensure that there are no physical impacts to these items through accidental damage. Access to these items would be maintained throughout construction.

Water Based

There is an extremely low risk of impact to historic shipwreck material, as previous dredging would have ensured that the location is clear of historic material.

Safeguards and management measures to minimise land and water based impacts on non-Aboriginal heritage values are identified in section 6.9.3.

Operation impacts

The principal significance of the wharf, embodied by its location and continuity of function including any physical evidence demonstrating its long history of use, would be maintained with the re-opening of the wharf.

The fabric of the wharf structure is not considered to have any intrinsic heritage value on the basis that it was largely rebuilt in 2007. Therefore, the fabric is considered to have a high tolerance for change such that adverse impacts would be avoided whilst the significance of the site would be maintained.

The alterations proposed to the site including the replacement of the existing wharf structure are considered to be acceptable in heritage terms because the location and function of a ferry wharf at the site will be maintained.

With regard to the likely impact on the wider setting, the proposal is not expected to impact on the significance of any other heritage items.

Overall, it is considered that the proposals will safeguard and maintain the heritage significance of Cremorne Point Wharf.

The proposed development is considered to be both reasonable and appropriate in terms of heritage.

6.9.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Non-Aboriginal heritage	<ul style="list-style-type: none">All relevant staff, contractors and subcontractors will be made aware of their statutory obligations for heritage under the <i>Heritage Act 1977</i>, through the site induction and toolbox talks.	Project Manager	Construction
Non-Aboriginal heritage	<ul style="list-style-type: none">All construction staff will be inducted in the <i>RMS Unexpected Archaeological Finds Procedure</i> (2011) and will implement this procedure where necessary.	Project Manager	Construction

Impact	Environmental safeguards	Responsibility	Timing
Non-Aboriginal heritage	<ul style="list-style-type: none"> If, during the course of development works, further suspected non-Aboriginal cultural heritage material, including historic shipwrecks, are discovered, work will cease in that area immediately. The Heritage Branch, Office of Environment and Heritage (02 9873 8500) will be notified and works only recommence when relevant permits and an appropriate management strategy instigated. 	Project Manager	Construction
Non-Aboriginal heritage	<ul style="list-style-type: none"> The temporary compound and other temporary structures must avoid physical impact to the former tram turning circle and ferry interchange, the former tram terminus shed (2 Milson Road), and Low Level Sewage Pumping Station No. 57. The Low Level Sewage Pumping Station No. 57 will be fenced off to prevent accidental damage to the item during construction phase. Information regarding the heritage significance of these items should be communicated in all site inductions. 	Project Manager	Construction

6.10 Aboriginal heritage

6.10.1 Policy setting

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010b) provides a framework to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether an Aboriginal Heritage Impact Permit (AHIP) is required. In the cases where an AHIP is required, Aboriginal community consultation must be undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a).

The RMS' Procedure for *Aboriginal Cultural Heritage Consultation and Investigation* (RMS, 2011) (PACHCI) incorporates all relevant Environment Protection Authority (EPA) and OEH Aboriginal heritage guidelines and requirements in a staged procedure. The due diligence process outlined in section 8 of the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010b) has been considered and it is concluded that an application for an AHIP is not necessary in this case.

In accordance with the PACHCI Stage 1, the RMS Aboriginal Cultural Heritage Assessment (ACHA) (Sydney Region) has considered the proposal and has agreed there is no requirement to proceed to Stage 2 (appendix E), which would involve a desktop assessment, archaeological site survey and Aboriginal consultation.

6.10.2 Existing environment

The Port Jackson area was the traditional country of the coastal Darug speaking Aboriginal people, who were divided into land-owning clan groups, with a subsistence economy based on hunting, fishing and gathering. The area would have had abundant food resources in the sea, wetlands, forests and woodlands and supported a large Aboriginal population.

Large Aboriginal groups such as those who lived about Sydney Harbour were based on kinship, with huge importance placed on extended family groups or clans, their connections to the land and common language. Like other language groups, the Wangal operated on a subsistence economy based on hunting, fishing and gathering, and it is evident from the

archaeological record that this area would have had abundant food resources in the ocean, harbour, forests and woodlands sufficient to support a large Aboriginal population.

Many of the Aboriginal communities living around Sydney Harbour, including the Wangal population, were devastated by the outbreak of smallpox in 1789. It is thought that around half of the Aboriginal population living in Sydney at that time were killed by the disease. Many of the Sydney clans were decimated and moved to other areas intending to escape the disease.

The majority of previously recorded Aboriginal sites in the Cremorne Point area relate to those associated with rock shelters. Rock overhangs in the Cremorne Point area were observed to have collapsed, reducing the potential for the identification of sites.

A search of Aboriginal Heritage Information Management System (AHIMS) was conducted on 13 December 2013 within a 1000 metre radius (plus 50 metre buffer) of the proposal. A total of 22 Aboriginal sites were recorded within this area. None of the identified sites were located within the immediate vicinity of the proposal.

6.10.3 Potential impacts

Potential impacts on Aboriginal heritage relate to previously unknown Aboriginal objects in areas of 'potential'. Areas of potential are usually undisturbed areas of ground.

The Cremorne Point Wharf Project Area has been extensively impacted by prior land use practices. In particular, the construction of the wharf, roads, tram terminus and nearby residences has obliterated much of the natural rock edge adjacent to the harbour, destroying all but the rock along the harbour shore. The most common site types recorded in the area are those that would expect to be recorded along a natural rock ledge adjacent to water, such as rock shelters and middens, however none were observed along the remaining rock overhangs in the vicinity of the wharf Project Area.

The modification of the natural shoreline by the construction of sea wall and wharf makes it extremely unlikely that any in situ Aboriginal material would be discovered by the proposed works.

The closest recorded site to the wharf is located about 50 metres east of the wharf, will be unaffected by the proposed works.

The proposal would therefore not impact any known Aboriginal objects or declared Aboriginal places. Based on the low potential for previously unknown Aboriginal objects to be located within the assessment area, no further Aboriginal assessment is required.

6.10.4 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Aboriginal heritage	<ul style="list-style-type: none">If the scope of the proposal changes, the RMS Aboriginal cultural heritage advisor, Sydney, and the RMS environmental staff must be contacted to reassess any potential impacts on Aboriginal cultural heritage.	Project Manager	Pre-construction

Other safeguards and management measures that would address Aboriginal heritage are identified in section 6.9.3.

6.11 Air quality

6.11.1 Existing environment

The existing air quality near the location of the proposal is primarily influenced by emissions from motor vehicles, commercial operations and residential activities. Air quality is also influenced by the prevailing weather and climatic conditions, bushfires and other natural factors such as pollen.

The two air pollution issues of primary concern in Sydney are photochemical smog and particle pollution. Particle pollution is seen as a brown haze usually present in the cooler months of the year. Particle pollution comprises airborne particles from human-made emissions and other natural particle sources such as sea salt, dust, pollen and bush fires. Photochemical smog is seen as a whitish haze, which in Sydney largely comprises nitrogen oxides from motor vehicles (City of Sydney, 2012).

The nearest OEH air quality monitoring stations to the site are located in Rozelle and Lindfield. These monitoring stations, along with stations at Chullora and Randwick make up the Sydney East region. A review of air quality monitoring data for Sydney East region for the month of October 2013 is generally good to fair, however 11 days between 13 October 2013 and 29 October 2013 rated between poor and hazardous (OEH, 2013b). The poor to hazardous conditions are likely to have been associated with bushfires and controlled back burning that were known to be occurring across the region at the time.

The closest Bureau of Meteorology (BoM) monitoring station to the location of the proposal is at Observatory Hill. Data from the Bureau of Meteorology (BoM, 2013) reports that the average annual rainfall recorded at Observatory Hill is 1214 millimetres.

According to the Bureau of Meteorology (BoM, 2013) the average annual wind speed ranges between about 10.6 km/h (at 9am) to 16.6 km/h (at 3pm). Wind direction and speed varies throughout the day, usually being calmer in the morning. Wind speed and direction also varies throughout the year.

6.11.2 Potential impacts

Construction impacts

During the construction of the proposal temporary impacts on air quality may arise from:

- Minor generation of particles and dust from demolition work.
- Minor emissions (primarily diesel exhaust) from plant and machinery.
- Minor emissions from construction traffic and water vessels.

These impacts are expected to be short term, low intensity and able to be managed through the identified safeguard and management measures.

Operational impacts

The level of operation of the ferry service would not significantly change and no significant additional impacts to air quality are expected from the operation of the proposal.

6.11.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Air emissions during construction	<ul style="list-style-type: none">• Measures to address air quality impacts will be incorporated into the CEMP and implemented throughout the construction period. As a minimum, the following measures will be included:<ul style="list-style-type: none">• Covering of all loaded trucks and vessels.• Machinery to be turned off rather than left to idle while not in use.	Project Manager	Pre-construction and construction

Impact	Environmental safeguards	Responsibility	Timing
	<ul style="list-style-type: none"> Maintenance of all vehicles, including trucks and vessels entering and leaving the site in accordance with the manufacturers' specifications to comply with all relevant regulations. Maintenance of all plant and equipment to ensure good operating condition and exhaust emissions comply with the Protection of the Environment Operations Act 1997. Maintaining the work site in a condition that minimises fugitive emissions such as minor dust. 		

6.12 Social and economic issues

6.12.1 Existing environment

Cremorne is a large predominately residential suburb located within the inner western suburbs of Sydney and forms part of the North Sydney LGA. Cremorne is bound by the suburbs of Mosman to the east, North Sydney to the south-west and Cammeray to the north-west.

Currently there are limited views to the wharf from neighbouring residents. There is about 40 metres separation between the pontoon and the nearest residence at 2 Milson Road. There are no windows located on the eastern and southern elevation of the dwelling facing the wharf. There are a series of windows on the western elevation which are at an oblique angle to any views from the wharf. These windows are also about four metres higher than the pontoon deck. Therefore opportunities for overlooking from the wharf are limited.

The ferry approaches and departs the wharf perpendicular to the foreshore. Ferry movements currently have the ability for passengers to look into the residence at 2 Milson Road on approach to the wharf. The west facing windows are about four metres higher than the ferry deck thus reducing potential privacy concerns.

RMS is also aware of anti-social behaviour by some fisherman at the wharf which contributes to a reduced amenity for nearby residents.

Sydney Ferries provide frequent services to and from Cremorne Point on the Mosman Bay ferry route. This route provides connections between Circular Quay and Mosman Bay including nearby ferry wharves such as Cremorne Point, South Mosman and Old Cremorne Wharf. The Mosman Bay ferry route mainly serves local residents and commuters although there would also be some use by tourists and day-trippers. The service operates from around 6am to 12.30am the following day on weekdays, between 7am and 12.30am the following day on Saturdays, and between 9am and 9.30pm on Sundays and public holidays.

The 2011 Census reported that 145 Cremorne Point residents (13.0%) use the ferry as part of their commute to work (ABS, 2011).

The majority of commuters would walk to the wharf via Milson Road or through Cremorne Reserve. There is a limited amount of on-street car parking within Milson Road as discussed at section 6.6.1.

There is no direct city bound bus service near to the wharf. Residents are able to catch a 225 bus to Neutral Bay and then change on to a city route bus. There a number of city-direct routes that could be taken from Neutral Bay including routes 151, 168, 169, 171, 184, 245 and 246.

The wharf building and pontoon provides a covered waiting area for commuters and includes seating, CCTV, garbage bin, lighting and information boards.

The wharf has one berthing face which can be used by commuter ferries, private vessels, water taxis and commercial operators to pick up and set down passengers, with priority access given to ferries.

The current gradient of the existing gangway is only able to provide DDA or current legislative standards for disabled access for no more than about 50 per cent of all tides.

The waterway surrounding the wharf is open and generally absent of any moored vessels or marinas. Vessels in transit including ferries are frequently within the vicinity of the wharf.

The residential areas to the north east and north west of the wharf have a mixture of detached dwellings and multi storey residential flat buildings.

Sophie's Place cafe, located within the existing wharf building, is the only commercial premises within the vicinity of the proposal. The operating hours of the cafe are as follows:

- Monday to Friday 6.30am - 1.30pm.
- Saturday to Sunday 6.45am – 2.30pm to 3.30pm weather dependant.

Consultation with the operator of the cafe has confirmed that the main trade comes from recreational walkers and users of Cremorne Reserve with peak trade on weekends. Ferry commuters would also make purchases particularly during the morning peak period. Customers normally make a purchase and move on to other areas of Cremorne Reserve.

Fishing is permitted from the existing ferry wharf. It is understood that there are instances of anti-social behaviour and noise caused by fisherman at the wharf as discussed at section 5.1.

There are no commercial fishing operations or aquaculture activities operating in Cremorne Point.

6.12.2 Potential impacts

Construction impacts

The Cremorne Point Wharf would be closed for a period of up to six months during construction of the wharf. Ferries, water taxis and private and commercial water transport services would not operate from the wharf during this time. Ferry times would remain unchanged at all other wharves along the Mosman Bay ferry route during the closure.

Public bus services would continue to operate in the area as usual and patronage would be likely to increase. Passengers could use the existing Sydney bus routes to the city or other destinations from Cremorne Point Wharf. These services frequently operate wheelchair accessible buses.

The closure of the wharf would impact the local community who would otherwise use the ferry services. Passengers who currently walk or drive to the wharf may instead choose to catch a bus from Milson Road. They may also choose to use an alternative wharf. The nearest wharf is Old Cremorne Wharf which is about 1.1 kilometres walk from Cremorne Point Wharf. This walk would be less for majority of commuters who would walk to Old Cremorne Wharf from their place of residence. It is likely that there would be an increase in travel times for commuters as a result of using alternative wharves during the construction period.

The amenity and character of the Cremorne Point foreshore in the vicinity of the wharf including the nearest residence located at 2 Milson Road would be impacted as the site would be a construction zone and would include hoarding to reduce noise, visual clutter and safety issues for the public. This would impact on the general amenity of the area which could discourage people from using this area during construction. This would temporarily change the character of the built and natural environment through changes to the area's visual aesthetics, air quality and noise levels. It is not expected that the use of Cremorne Reserve would decline as a result of reduced amenity given that these impacts are generally localised to the immediate vicinity of the wharf.

Access to the southern extent of Milson Road and the foreshore within the location of the temporary compound would be restricted for pedestrians and vehicles for the duration of the construction period.

Views to and from the wharf would be affected during the construction works. The existing

views of the wharf would be temporarily disrupted by construction vessels and equipment which would be of a greater height and scale than the existing wharf. These impacts are discussed further in section 6.8.2.

Noise exceedances are predicted during the daytime and night time to surrounding residential, commercial and recreational receivers (refer to section 6.4).

Noise from the construction activities may temporarily cause annoyance and disturbance to surrounding residences. The receivers most potentially affected would be the dwelling at 2 Milson Road and residences within Wulworra Avenue from piling works. Noise impacts and likely annoyance to surrounding properties during the works would vary over the construction period depending on the type of work being carried out.

Safeguards have been included at section 6.12.3 to ensure that during construction access to the cafe would be maintained and signage would be installed to advise the public that the cafe will remain open during the construction period. While there is likely to be some reduction in patronage of the cafe as a result of commuters not using the wharf during construction this impact would be temporary and minor given that it is not expected that the use of Cremorne Reserve would decline during construction.

The phone box adjacent to the wharf would continue to be able to be used during the construction period.

The construction site would be lit at night for safety. It is unlikely that there would be any residential properties that would be affected by associated light spill. Nevertheless, lights would be directed away from residential areas to minimise incidental light spill.

Any potential impacts associated with construction vehicles and vessels at the site would be mitigated through the preparation and implementation of a traffic control plan. This is discussed further at section 6.6.2 and 6.7.2.

Operation impacts

Future demand for the Cremorne Point ferry service may increase due to the overall upgrade of Sydney Harbour commuter ferry wharves which aims to improve access, efficiency and amenity of the ferry system. Any increase in patronage of the wharf would be likely to increase the patronage of Sophie's Place cafe.

The proposal would contribute to enhancing water transport in Sydney Harbour by enhancing access to commuter ferry services. The proposal would enhance the role of the harbour as both a working harbour and an effective transport corridor by improving access to water-based public transport facilities.

The existing ferry wharf does not meet the requirements of the DDA or current legislative standards for disabled access. The proposal would provide a continuous path of travel, for people with a disability and other mobility issues, from the footpath to the pontoon for 80 per cent of all tides. The gradient of the gangway would vary according to the tides and the pontoon would be level. The width of the wharf structures would enable two wheelchair users to pass each other whilst travelling in the opposite direction. The pontoon would also enable a wheelchair user to turn 180 degrees in an independent and equitable manner. As a result people with a disability would be able to access and use the ferry wharf in an independent and dignified manner. In doing so the proposal would contribute to improving access to community services, facilities and social networks. It would help facilitate access from the adjoining residential area to a range of cultural sites around the harbour.

Visual impacts of the proposal would be moderate to low. These impacts would be minimised through the high quality design and the selection of appropriate materials to maximise visibility through the wharf structure. Visual impacts and proposed management measures are discussed further in section 6.8.

The new position of the wharf provides a greater separation distance from the nearest residence. The pontoon would be located further away from the eastern and southern elevation of the dwelling facing the wharf at 2 Milson Road and would provide less opportunity for commuters and other users of the wharf such as fisherman to have views to the windows and private areas of the property. Ferry movements will continue to approach the new wharf perpendicular to the foreshore, and as such the ability for passengers to look into the

residence at 2 Milson Road would remain the same as current impacts experienced on approach to the new wharf. Overall, the potential for impacts on privacy are considered to be negligible.

The proposal would contribute to improved commuter experience by providing a practical, functional and robust ferry wharf with appropriate waiting areas, passenger seating, standing and shelter while allowing for the enjoyment of good weather, harbour views and aquatic activity. The wharf is not designed to be a fully weather protected structure. The design has balanced protection from the weather during high wind and rain events while also allowing cross-breezes during extreme heat periods.

The wharf would maintain a single berthing face for ferries, water taxis, commercial and private recreational vessels would continue to be able berth at the wharf. Ferries would have priority access to the wharf.

There may be long term beneficial impacts on the operations of the cafe from the potential increase in ferry patronage associated with an upgraded wharf.

Water safety devices such as a life preserving ring and a ladder would be included on the pontoon for assistance in the case that a person falls into the water.

Fishing would continue to be able to be undertaken at the wharf.

Opportunities for vandalism of the new entry platform, gangway and pontoon would be reduced with the use of appropriate materials, surfaces and designs. Improved security would also reduce the unauthorised and inappropriate use of the wharf and its facilities. These factors would contribute to a greater sense of safety, particularly for night time commuters.

RMS have implemented the 'Clean Safe Wharf Initiative' and would continue to engage with relevant authorities such as Council and police to address issues of noise and anti-social behaviour.

Impacts on nearby properties from light spill would be minor. All lights on the wharf would meet Australian Standards which include relevant light spill criteria and would incorporate dimmers and time clocks so that lights would be dimmed soon after the last ferry of the day. The installation of appropriately designed lighting has been included as a safeguard and mitigation measure.

The proposal would reduce wharf maintenance costs through scales of economy achieved through standardising wharf design, construction materials and fittings throughout Sydney Harbour.

6.12.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Social and economic	<ul style="list-style-type: none"> North Sydney Council and the local community are to be kept informed about the details of the works, construction progress, wharf closure, changes to public transport arrangements, and other impacts during the construction period. 	Project manager	Pre-construction and construction
Social and economic	<ul style="list-style-type: none"> Details of alternative public transport options and contact details for the 131500 transport infoline and website will be clearly displayed at the site leading up to the carrying out of any works at the site and maintained for the duration of works. 	Project manager	Pre-construction and construction
Social and economic	<ul style="list-style-type: none"> An internet site and free call phone number for project enquires will be established for the duration of the works. Contact details will be clearly 	Project manager	Pre-construction and construction

Impact	Environmental safeguards	Responsibility	Timing
	displayed at the site throughout the construction period. Directions will be provided on how to make an enquiry or register a complaint regarding the works.		
Social and economic	<ul style="list-style-type: none"> An enquiry and complaint tracking system will be established. Any enquiries or complaints will be acknowledged within 24 hours of being received 	Project manager	Pre-construction and construction
Social and economic	<ul style="list-style-type: none"> All operational wharf lighting and signage is to comply with the <i>Disability Standards for Accessible Public Transport</i> (2002). 	Project manager	Construction
Social and economic	<ul style="list-style-type: none"> The new wharf will be constructed to be compliant with current legislative standards for the provision of access for a person with a disability. 	Project manager	Construction
Social and economic	<ul style="list-style-type: none"> The construction site will be lit at night for safety. Lights will be downward facing so that light is not directed toward nearby residences. 	Project manager	Construction
Social and economic	<ul style="list-style-type: none"> The temporary compound is to be located so that clear access is provided to Sophies Place cafe. During cafe operating hours, access to Sophies Place cafe is to be maintained. Signage is to be installed in an easily visible location to advise the public that Sophies Place cafe remains open during the construction period. 	Project manager	Construction

6.13 Hazards assessment

6.13.1 Potential impacts

Environmental hazards resulting from the construction of the proposal, and the identification of measures to avoid, mitigate or manage these risks, are addressed throughout chapter 6.

Hazards arising from incidents during construction of the proposal and during operation could also pose a risk to human health, as well as that of the environment. Such potential risks and appropriate safeguards and management measures are discussed below.

Construction impacts

The following hazards and risks would be associated with the proposal during construction:

- Construction materials, wastes and/or objects have the potential to fall from the wharf into Sydney Harbour causing water pollution and risk to human health.
- Construction materials, wastes and/or objects have the potential to fall from construction barges or other construction vessels into Sydney Harbour causing water pollution and risk to human health.
- A spill of hydraulic fluid or fuel used in the construction plant or equipment has the potential to enter the waters of Sydney Harbour.
- Construction workers have the potential to fall from the wharf or vessels into water

potentially resulting in physical injury or drowning.

Operation impacts

The proposal would increase wharf safety measures, which would reduce the potential for incidents impacting on the environment and human health.

6.13.2 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Hazards	<ul style="list-style-type: none"> A life preserving ring and appropriate first aid provisions will be located within the compound and on all barges during the construction period. 	Project Manager	Construction

It is considered that all other potential for adverse hazards and risks are effectively addressed by the application of the individual impact area safeguards recommended throughout chapter 6.

6.14 Waste management

6.14.1 Existing environment

Public waste bins are provided at the existing wharf and are managed as part of existing wharf operations. There is the potential for litter to enter Sydney Harbour from existing wharf activities and from use of Blues Point Reserve.

6.14.2 Potential impacts

Construction impacts

Construction activities would generate various waste streams. Potential wastes include:

- Solid waste from the removal of the existing wharf.
- Waste fuels, oils, liquids and chemicals.
- Packaging wastes such as card board, timber, paper and plastic.
- General garbage and sewage from the construction compound.

Operation impacts

One of the objectives of the Sydney Commuter Ferry Upgrade Program is to increase patronage of the Sydney Harbour ferry network. The proposal would likely lead to an increase in patronage as a result of improved access and generally improving the wharf facility. As a result, increased waste may be generated but incidences of littering is not expected to increase given that waste management is likely to improve with the installation of new garbage receptacles and improved facilities.

6.14.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Waste management	<ul style="list-style-type: none"> Waste disposed of off-site shall be classified in accordance with the <i>Waste Classification Guidelines: Part 1 Classifying Waste</i> (DECCW 2009a) prior to disposal and shall be disposed of at an appropriately licensed facility for that waste. Where necessary (such as to determine the presence of contaminants in waste timber), this shall include sampling and analysis. 	Project manager	Construction

6.15 Climate change

The Intergovernmental Panel on Climate Change has produced climate change projections. In Australia, both the Commonwealth Scientific and Industrial Research Organisation and the BOM have produced regional downscaled projections for Australia from these projections. In 2008 the NSW Government published refined climate change projections for each region in NSW, including the Sydney region. In summary, climate change predictions for Sydney, including the location of the proposal, are:

- More intense extreme rainfall events.
- Higher average temperatures.
- More frequent occurrence of extreme temperatures.

The *NSW Coastal Planning Guideline: Adapting to Sea Level Rise* (DoP, 2010) applies to the proposal. This guideline requires that the following eight criteria be considered when designing development proposals:

1. *Development avoids or minimises exposure to immediate coastal risks (seaward of the immediate hazard line).*
2. *Development provides for the safety of residents, workers or other occupants on-site from risks associated with coastal processes.*
3. *Development does not adversely affect the safety of the public off-site from a change in coastal risks as a result of the development.*
4. *Development does not increase coastal risks to properties adjoining or within the locality of the site.*
5. *Infrastructure, services and utilities on-site maintain their function and achieve their intended design performance.*
6. *Development accommodates natural coastal processes.*
7. *Coastal ecosystems are protected from development impacts.*
8. *Existing public beach, foreshore or waterfront access and amenity is maintained.*

In October 2009 the NSW government released its *NSW Sea Level Rise Policy* (DECCW, 2009a). The policy provided sea level rise planning benchmarks as follows:

- 40 centimetres by 2050.
- 90 centimetres by 2100.

On 8 September 2012, the State government withdrew these benchmarks in order to provide more flexibility in considering local conditions when determining future hazards. Responsibility for adopting sea level rise projections for use in planning was transferred back to local government.

In the absence of an adopted sea level rise benchmark for the locality of the proposal, a desktop analysis using a range of Global Climate Models and a 'best estimate' median result has been undertaken. The results indicate an estimated 50 year sea level rise benchmark of 516mm. This sea level rise allowance has been adopted for the proposal.

The approximate Mean High Water Mark (MHW) for the site is around 1.48m above the zero of Fort Denison Tide Gauge (ZFDTG) (0.555m AHD). This converts to RL0.55. The adopted 50 year sea level rise allowance adopted for the project is therefore RL1.066 in 2064.

Potential impacts

Climate change could potentially affect the proposal through changed average conditions and extreme events.

Construction impacts

Climatic factors would not constrain construction of the proposal except during adverse weather conditions such as prolonged heavy rain or high winds which may occur during the construction period. These may delay the completion of construction.

Construction would contribute to climate change through the generation of greenhouse gases from construction activities. Greenhouse gases would be generated through the use of fossil fuels by construction plant and equipment, transportation of personnel and materials and the embodied carbon in the materials used such as concrete and steel.

The only change to ferry operations as a result of the proposal is the F6 ferry service not stopping at Cremorne Point Wharf during the construction process. As a result there would be no additional greenhouse gas emissions generated from scheduled use of the Cremorne Point Wharf.

Operation impacts

The proposal has minimised its exposure to climate change risks by including a fixed gangway and floating pontoon and which have been designed to provide appropriate clearances of existing tides, storm surge, sea and wave action whilst also considering projected sea level rise over the next 50 years.

The proposal does not include the addition of any fixed structure within the water. The floating pontoon would be able to rise and fall with the tide including any change in sea level. The new piles would provide a freeboard of more than one metre above the adopted 50 year sea level (RL1.066) and is therefore suitably designed to accommodate the adopted sea level rise benchmarks for the proposal.

More extreme and more frequent heat events as a result of climate change may lead to more rapid degradation of the wharf structures. This may result in additional maintenance requirements.

There would be some greenhouse gas emissions emitted during maintenance of the wharf, although maintenance requirements would be less than for the existing wharf structure.

Any climate change impacts of constructing, operating and maintaining the proposal are considered minor.

6.15.1 Safeguards and management measures

It is considered that the potential for adverse impacts to and by climate change are effectively addressed by the design of the proposal and the application of the safeguards summarised in chapter 7.

6.16 Cumulative impacts

The incremental effect of multiple sources of impact (past, present and future) is referred to as 'cumulative impacts' (Contant and Wiggins 1991; Council on Environmental Quality 1978). Consideration of cumulative impacts in the context of environmental assessment is necessary so that impacts associated with the proposal and other activities within the region are examined as a whole.

A search of North Sydney Council's development application tracker and the DPI's development assessment tracking system on 30 January 2014 identified a number of minor developments such as alterations and additions including the installation of new balconies, a swimming pool, windows and doors and garage structures. An application for an additional level to an apartment building has also been lodged. Other applications include internal alterations and additions. These developments are located along Milson Road, Cremorne Road, Kareela Street and Green Street. Some were identified within 200 metres of the site, however they are minor in nature and would not be expected to contribute to any cumulative impacts. There are also numerous developments under assessment or recently approved by North Sydney Council in the wider vicinity.

Ongoing vessel movements within Cremorne Point waters and the surrounding Sydney Harbour area would have the potential to contribute to cumulative impacts during construction of the proposal however, given the isolation of the ferry wharf from other uses on the harbour, cumulative impacts from other uses would be considered to be low.

No major work is planned for any other commuter ferry wharves on the same ferry route as Cremorne Point Wharf during the construction period. However, RMS is planning the progressive upgrade of commuter ferry wharves throughout Sydney Harbour under the

Sydney Commuter Wharf Upgrade Program.

CityRail track works would be undertaken on most Sydney lines during the proposal construction period.

6.16.1 Potential impacts

The proposal forms part of the Sydney Commuter Ferry Wharf Upgrade Program which would create practical, functional and robust ferry commuter wharves within Sydney Harbour. The positive cumulative impacts of the proposal would result in improvements to:

- Safety for commuters.
- Facilities for recreation.
- The public domain and quality of commuter experience.
- Safer travelling conditions.
- Improved travel times.
- Generally improved customer experience due to upgraded facilities.
- Unifying and identifying the harbour wharves and the ferry commuter system.

Given that the proposed developments within 200 metres of the wharf are very minor alterations and additions, cumulative impacts on air quality, amenity (noise and visual), or during the construction period would be minor or negligible. There may be increased pressure on the local road network during this time however this is not expected to have more than a minor cumulative impact on the existing road network.

Given that no major developments have been identified within the vicinity of the proposal cumulative negative impacts during the construction period are expected to be negligible to minor. These impacts are listed below.

Air quality

- There would be a potential minor short term cumulative increase in exhaust emissions from construction projects within the region.

Climate change

- Developments within the region would contribute to climate change through the generation of greenhouse gases from construction activities. Greenhouse gases would be generated through the use of fossil fuels by construction plant and equipment, transportation of personnel and materials and the embodied carbon in the materials used such as concrete and steel. The climate change impacts of constructing, operating and maintaining the proposal are considered minor.

Socio-economic

- Cumulative impacts would be experienced by commuters as other wharves in Sydney Harbour are upgraded in the future as part of the Sydney Commuter Ferry Wharf Upgrade Program. These impacts would be temporary and are considered to be minor when considered in the context of the long-term positive impacts of the proposal and other future wharf upgrades.
- Events in Cremorne Point, other locations serviced by the Mosman Bay ferry route and the Sydney CBD would take place during the construction period. These would potentially increase commuters travelling to these destinations from Cremorne Point, which would place additional pressure on the alternative commuter options in place for the proposal.

6.16.2 Safeguards and management measures

It is considered that the potential for adverse cumulative impact is effectively addressed by the application of the individual impact area safeguards summarised in chapter 6.

6.17 Summary of beneficial effects

The benefits of the proposal include:

- Improved commuter facilities by providing a practical, functional and robust ferry commuter wharf with appropriate waiting and standing areas, passenger seating and shelter while allowing for the enjoyment of good weather, harbour views and aquatic activity.
- Encouraging an increase in commuters using the upgraded wharf services and ferry services once the redevelopment is completed and the wharf operational.
- Improved access for people with a disability.
- Reduced wharf maintenance costs.
- Safeguard and maintain the heritage significance of Cremorne Point Wharf through incorporating a 50 year design life.
- Provision of a wharf that is resilient to projected sea level rise due to climate change.
- Contribute to achieving a consistent thematic design for all upgraded wharves in Sydney Harbour, to unify and identify the harbour wharves and ferry commuter system.
- Reduced vandalism with the use of appropriate materials, surfaces and designs.
- Improved access from the adjoining residential area to a range of cultural sites around the harbour.
- Overall there would be an increase in hard substratum algae and attached biota habitat by about 54m². This would have a beneficial impact by providing increased shelter and feeding habitat for small reef fish and for the larger pelagic fish that prey on these reef fish.
- Improved interrelationship of waterway and foreshore uses through more effective access to water-based public transport.

6.18 Summary of adverse effects

The main adverse effects of the proposal include:

Land surface issues

- Disturbance of sediments on the harbour bed where piles are installed, the bridge is constructed, or where construction vessels anchor, especially in shallow waters.

Water quality

- Potential for water pollution as a result of materials, spills or wastes accidentally entering the waters of Cremorne Point and the broader Sydney Harbour during demolition and/or transportation.
- Increased water turbidity due to the removal and installation of piles and the operation of construction vessels, especially in shallow waters.

Noise and Vibration

- There would be exceedances of the noise criteria by up to 37 dB(A) for residential receivers during the daytime period during construction.
- There would be exceedances of the noise criteria by up to 48 dB(A) for residential receivers during the night time period during construction.
- There is potential for an exceedance OEH's sleep disturbance screening criteria of up to 33 dB(A) during intricate lifts (11pm to 7am) and 51 dB(A) during piling (5am to 7am) which could cause awakening.
- With windows open, there is potential that noise levels at the facade of the nearest sensitive receiver during the night time period would be up to 70 dB(A) during intricate lifts (11pm to 7am) and 88 dB(A) during piling (5am to 7am) and could potentially affect the health and wellbeing of nearby residents.

Landscape character and visual impact

- Impact on landscape character would be moderate to low.
- Impact on views would be moderate to low. Important views would not be impacted.

Flora and fauna

- Loss of organisms living in the rock rubble and sediments of the seabed (ie benthic biota) due to the placement of proposed new piles and construction of bridge footings.
- Disturbance of aquatic habitats from construction vessel propeller wash and piling activities.
- Loss of up to about 18m² of rocky reef habitat in the short term. This loss would be mitigated in the medium to long term by relocating loose rock that needs to be cleared for the construction of the footings and relocating it to form rock rubble algae reef in front of the existing wharf building.

Socio-economic

- Temporary disruptions to commuters as ferry and water taxi services would not operate from Cremorne Point Wharf for up to six months during the construction period. Commuters may choose to use an alternative wharf during this time. This would be likely to result in an increase in commuter travel times.
- Temporary reduction in patronage of the cafe during construction associated with the closure of the ferry wharf.

Land transport and parking

- Additional traffic due to about 15 vehicle movements per day comprising sub-contractors and concrete trucks travelling to and from the construction site.
- Minor temporary changes to public transport use would occur during construction as commuters use other public transport services or switch to private vehicles for up to six months when the wharf is to be closed.

Water transport

- Potentially some temporary reduction in commuters using the Mosman Bay ferry route due to the closure of Cremorne Point Wharf during the construction period.
- Increased water-based traffic within Sydney Harbour due to construction vessels transporting plant, equipment, materials and personnel between an off-site facility within Sydney Harbour, and the construction site.
- Impact to all non-construction related vessels that would be prohibited to enter the area of the construction work site.

Waste management

- Generation of waste through demolition and disposal of existing wharf structures that are unable to be re-used or recycled.

7 Environmental management

This chapter describes how the proposal would be managed to reduce potential environmental impacts throughout detailed design, construction and operation. A framework for managing the potential impacts is provided. A summary of site-specific environmental safeguards is provided and the licence and/or approval requirements required prior to construction are also listed.

7.1 Environmental management plans

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A CEMP would be prepared to describe safeguards and management measures identified. This plan would provide a framework for establishing how these measures would be implemented and who would be responsible for their implementation.

The plan would be prepared prior to construction of the proposal and must be reviewed and certified by RMS, prior to the commencement of any on-site works. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the *'Guideline for the Preparation of Environmental Management Plans'* (DIPNR, 2004).

7.2 Summary of safeguards and management measures

Environmental safeguards outlined in this document would be incorporated into the CEMP and during construction and operation of the proposal, should it proceed. These safeguards would minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in table 7.1.

Table 7.1: Summary of site specific environmental safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing
1	General	<ul style="list-style-type: none"> All environmental safeguards must be incorporated within the following documents: <ul style="list-style-type: none"> Detailed design stage. Contract specifications for the proposal. Contractor's Environmental Management Plan. 	Project manager	Pre-construction
2	General	<ul style="list-style-type: none"> All businesses and residences likely to be affected by the proposed works must be notified at least 5 working days prior to the commencement of the proposed activities. 	Project manager	Pre-construction
3	General	<ul style="list-style-type: none"> Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors. 	Contractor	Pre-construction and during construction as required.
4	Water based land surface	<ul style="list-style-type: none"> Silt and sediment controls will be established prior to any disturbance of the land surface. Controls will be in accordance with edition 4 of 'Managing Urban Stormwater, Soils and Construction' (NSW Government, 2004) (the blue book). Disturbance to the seafloor will be minimised wherever possible. The controls will be maintained throughout the construction work period. 	Project manager	Pre-construction Construction Construction
5	Water based land surface	<ul style="list-style-type: none"> A silt curtain, extending from a minimum of 100 millimetres above the water line and extending to no less than two metres below the surface of the water will be installed around the entire redevelopment work area at Cremorne Point Wharf prior to commencement of works that disturb the seafloor. If excessive turbidity of the water is observed during removal of the first few piles, a second, moveable silt curtain will be installed around the piles being removed during each day of operation. 	Project manager	Pre-construction Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
6	Water based land surface	<ul style="list-style-type: none"> An additional silt curtain will be installed around the immediate construction work area for the bridge. The silt curtain would extend to a minimum of 100 millimetres above the water line and will attach to the seafloor prior to commencement of the construction works for the bridge. On completion of the construction of the bridge this silt curtain can be removed. 	Project manager	Pre-construction of the bridge
7	Water based land surface	<ul style="list-style-type: none"> Visual observations of the effectiveness of the silt curtain are required to be made at least twice each day. Results of observations of the integrity of the silt curtain are required to be recorded in a site notebook maintained specifically for the purpose. The notebook is required to be kept on the site and to be available for inspection by persons authorised by RMS. 	Project manager	Construction
8	Water based land surface	<ul style="list-style-type: none"> In the event that the two inner (closest to the land) bridge support piles would be installed from the water, this will be carried out at or around high tide with the rear of the barge anchored to an existing pontoon pile (which will remain temporarily). This is to prevent the barge from coming into contact with the seafloor or the rock rubble reef. 	Project manager	Construction
9	Water based land surface	<ul style="list-style-type: none"> An acid sulfate soil management plan will be prepared and implemented in the event that acid sulfate soil is exposed to the atmosphere as a result of removing the piles. This will include: <ul style="list-style-type: none"> checking piles for potential acid sulphate soils on removal of piles from water, carrying out pH and the peroxide tests, as relevant, to detect the presence of any potential acid sulfate soils on soils in areas of excavation on the land, removing, containing, and disposing of potential acid sulphate soils in Waste Classification Guidelines: Part 1 Classifying Waste (DECCW 2009). 	Project manager	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
10	Water based land surface	<ul style="list-style-type: none"> • Anchors will be lifted prior to moving construction vessels to minimise disturbance of the harbour bed. 	Project manager	Pre-construction and construction
11	Land surface	<ul style="list-style-type: none"> • Following removal of the temporary compound the area will be restored with all land surfaces rehabilitated. • Council assets would be rehabilitated back to pre-construction state and to Council satisfaction. 	Project manager	Construction
12	Land surface	<ul style="list-style-type: none"> • All of the 'land surface' environmental control measures listed are to be implemented during establishment of the temporary compound and will be set out in the CEMP. • The CEMP will be completed by the Contractor and endorsed by RMS prior to any works commencing on the Site. 	Project manager	Pre-construction
13	Land surface	<ul style="list-style-type: none"> • The installation of the construction work area is to be agreed upon by Council. 	Project manager	Pre-construction
14	Hydrology	<ul style="list-style-type: none"> • Weather forecasts will be checked regularly during construction and where flooding is forecast, all equipment and materials will be removed from the compound site and wharf construction area or appropriately secured. 	Project manager	Pre-construction
15	Water quality	<ul style="list-style-type: none"> • Emergency spill kits would be kept on-site and on all construction barges at all times and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances at the work site. A spill kit would be kept on each barge and at the temporary construction compound site. • Spill kits for the construction barges will be specific for working within the marine environment. • All staff would be made aware of the location of the spill kits and trained in their use. • If a spill occurs, the RMS Contract Manager and RMS environment staff would be notified as soon as practicable. 	Project manager	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		<ul style="list-style-type: none"> A spill/emergency management plan which incorporates these safeguards will be set out within the CEMP. The spill/emergency management plan will also include methods to be used to stop the spill, contain and control the flow, clean up the spill, and record the spill. 		
16	Water quality	<ul style="list-style-type: none"> Equipment barges carrying plant or machinery would be fitted with bunding around equipment which contain chemicals to prevent chemical spills or leakages from entering the water. 	Project manager	Construction
17	Water quality	<ul style="list-style-type: none"> No chemicals or fuels would be stored at the compound site. 	Project manager	Construction
18	Water quality	<ul style="list-style-type: none"> All equipment, materials and wastes transported between an off-site facility, and the construction work site would be secured to avoid spills during transportation. 	Project manager	Construction
19	Water quality	<ul style="list-style-type: none"> Vehicles, vessels and plant will be properly maintained and regularly inspected for fluid leaks. 	Project manager	Construction
20	Water quality	<ul style="list-style-type: none"> No vehicle or vessel wash down or re-fuelling would occur on-site. 	Project manager	Construction
21	Water quality	<ul style="list-style-type: none"> Emergency contacts will be kept in an easily accessible location on the construction work site and on all construction vessels. All crew would be advised of these contact details and procedures. 	Project manager	Construction
22	Water quality	<ul style="list-style-type: none"> In an event of a spill during operation, the incident emergency plan will be implemented in accordance with Sydney Ports Corporation's response to shipping incidents and emergencies outlined in the '<i>NSW State Waters Marine Oil and Chemical Spill Contingency Plan</i>' (Maritime, 2008). 	Project manager	Operation
23	Noise and vibration	<ul style="list-style-type: none"> Notification of all potentially affected residents and businesses will be undertaken within 14 days of the proposed night time works in accordance with section 8.8.2 and figure 4 of the noise and vibration impact assessment for the project. These notifications will include the timing and nature of works as well 	Project Manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		<p>as the expected noise levels, duration and impacts prior to the commencement of construction.</p> <ul style="list-style-type: none"> • Contact details to lodge noise complaints or receive updates would also be provided at this time. 		
24	Noise and vibration	<ul style="list-style-type: none"> • A noise and vibration management plan will be prepared and incorporated into the CEMP. The management plan will include but not be limited to: <ul style="list-style-type: none"> • Reasonable and feasible noise control measures to reduce noise levels taking into account the control methods specified in sections 7 and 8 of the noise and vibration impact assessment for the proposal. • Identification of nearby sensitive noise receivers in accordance with <i>Interim Construction Noise Guideline</i> (DECC, 2009a). • Details of the assessed hours of work and work to be undertaken. • Behavioural practices or other management measures to be implemented to minimise noise. • A complaints handling process. 	Project Manager	Pre-construction
25	Noise and vibration	<ul style="list-style-type: none"> • Work will be carried out during the recommended standard construction hours identified in the <i>Interim Construction Noise Guideline</i> (DECC, 2009a) as much as practicable. 	Project Manager	Construction
26	Noise and vibration	<ul style="list-style-type: none"> • Temporary hoarding will be erected around the compound site. 	Project Manager	Construction
27	Noise and vibration	<ul style="list-style-type: none"> • Construction personnel will be informed of the location of sensitive receivers, and the need to minimise noise and vibration from the works, through the site induction and regular toolbox talks. 	Project Manager	Construction
28	Noise and vibration	<ul style="list-style-type: none"> • The use of portable radios, public address systems or other methods of site communication that may impact on residents unnecessarily will be avoided. 	Project Manager	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
29	Noise and vibration	<ul style="list-style-type: none"> Construction plant and vehicles regularly used on site will be fitted with reverse alarms that are tonal. Site practices that minimise reversing movements will be implemented wherever practicable. 	Project Manager	Construction
30	Noise and vibration	<ul style="list-style-type: none"> Plant and equipment will be regularly inspected to ensure they are in good working order and not emitting excessive noise levels. 	Project Manager	Construction
31	Noise and vibration	<ul style="list-style-type: none"> Quieter plant and equipment will be selected based on the optimal power and size to most efficiently perform the required task. 	Project Manager	Construction
32	Noise and vibration	<ul style="list-style-type: none"> Rubber matting will be installed over material handling areas (such as in the bed of trucks) to minimise noise from materials being dropped. 	Project Manager	Construction
33	Noise and vibration	<ul style="list-style-type: none"> Where night time construction works are necessary, there will be one respite night between Monday (from 12am) and Saturday (up to 7am) and no night time construction works on Saturday night or up to midnight on Sunday. 	Project Manager	Construction
34	Noise and vibration	<ul style="list-style-type: none"> Concrete pumps will be screened, using a solid material such as a hoarding or the like, from surrounding receivers where practicable. 	Project Manager	Construction
35	Noise and vibration	<ul style="list-style-type: none"> Noise monitoring using a hand held metering device will be undertaken at the site from time to time during the high noise periods including demolition and piling. The results of monitoring will be used to devise further control methods where required. 	Project Manager	Construction
36	Flora and fauna	<ul style="list-style-type: none"> A spill management plan will be developed and communicated to all staff working on site. 	Project Manager	Pre-construction
37	Flora and fauna	<ul style="list-style-type: none"> The construction work site area used will be the minimum size necessary to safely undertake the proposal. Exclusion zones will be established to identify the work area and prevent damage to marine habitats outside the work area. 	Project Manager	Construction Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
38	Flora and fauna	<ul style="list-style-type: none"> All staff working on the site will be advised of the location of rock rubble habitats. No vessel anchors will be placed in identified rocky reef or marine vegetation habitats (refer to Figure 22 of Appendix B). Anchor cables must be suitably buoyed prior to laying, and kept buoyed once laid, to prevent cable drag and cable swing damage (scalping) to marine vegetation and rock rubble habitat areas. Where this is impractical, contractors will use floating rope. 	Project Manager	Construction
39	Flora and fauna	<ul style="list-style-type: none"> To minimise disturbance of the seabed, marine vegetation habitats, and the mobilisation of any colonised pest algae <i>Caulerpa taxifolia</i>, vessels will not use excessive power when manoeuvring barges into place over the coarse sand and rock rubble habitat. Scouring damage will also be minimised by 'working the wind and tides', by only moving floating plant into place on high tides and under favourable or no-wind conditions, where practicable. 	Project Manager	Construction
40	Flora and fauna	<ul style="list-style-type: none"> All the wetted surface areas of demolition materials taken from the waters must be inspected for possible attached <i>Caulerpa taxifolia</i> plants and these must be collected and disposed of into plastic bags then placed into garbage bins on shore as recommended in the <i>NSW Control Plan for the Noxious Marine Alga Caulerpa Taxifolia</i> (NSW Fisheries, 2009). 	Project Manager	Construction
41	Flora and fauna	<ul style="list-style-type: none"> All construction related equipment that comes in contact with the seabed (including mooring tackle, cables, ropes and anchors), must be inspected for attached fragments of the declared pest algae species <i>Caulerpa taxifolia</i> and any fragments found must be collected and disposed of into plastic bags then placed into garbage bins on shore in the <i>NSW Control Plan for the Noxious Marine Alga Caulerpa Taxifolia</i> (Department of Industry and Investment, 2009). 	Project Manager	Construction
42	Flora and fauna	<ul style="list-style-type: none"> In order to minimise swimming distances for reef fish from piles being pulled to remaining piles in-shore, the piles to be removed will be 	Project Manager	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		systematically removing from seawards towards the shore.		
43	Flora and fauna	<ul style="list-style-type: none"> A specialist marine/aquatic ecologist would undertake a pre-construction inspection of the piles for Syngnathiformes. In the case that any Syngnathiformes are observed on the piles, the specialist marine/aquatic ecologist would re-locate these to an adjacent suitable rocky reef habitat away from the construction work site. The marine/aquatic ecologist must hold the appropriate permit under s37 of the FM Act to undertake the handling and relocation of Syngnathiformes. This would be obtained prior to the commencement of pile removal. All personnel working within the waters of the construction site would be informed of the potential to encounter Syngnathiformes. 	Project Manager	Pre-construction Construction Pre-construction Construction
44	Flora and fauna	<ul style="list-style-type: none"> Loose rock that needs to be cleared for the construction of the footings will be relocated to form a rock rubble algae reef on the sand at the toe of the existing reef in front of the existing wharf building. 	Project Manager	Construction
45	Flora and fauna	<ul style="list-style-type: none"> If any threatened aquatic species are noted at the construction site unexpectedly, all in water construction works should be halted until the species has left. Prior to commencement of pile driving operations, the contractor is to call Sydney Port Control to check whether there have been any sightings of marine mammals and if so their current location. <p>If marine mammals are reported between Clifton Gardens and Sydney Harbour Bridge (or travelling in a direction to place them between these limits in a short time), pile driving operations are to cease or not be undertaken until the marine mammals are reported to be west (and continuing west) of Sydney Harbour Bridge, or back east, well and clear of Clifton Gardens and travelling east.</p>	Project Manager	Construction
46	Land transport and parking	<ul style="list-style-type: none"> A traffic control plan will be prepared in accordance with the '<i>Traffic control at work sites manual</i>' (RTA, 2010a) and <i>Australian Standard</i> 	Project manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		<p>1742.3 (Manual of uniform traffic control devices).</p> <ul style="list-style-type: none"> The traffic control plan is to consider vehicle parking for construction workers. 		
47	Water transport	<ul style="list-style-type: none"> Commercial, recreational operators and private services that use the existing wharf will be advised of the wharf closure at least two weeks prior to closure. 	Project manager	Pre-construction
48	Water transport	<ul style="list-style-type: none"> The water-based construction zone will be clearly delineated and marked to prevent non-construction vessels from entering the construction site. 	Project manager	Construction
49	Landscape character and visual impact	<ul style="list-style-type: none"> Urban design principles will be integrated throughout the detailed design and construction of the proposal. 	Project Manager	Pre-construction and construction
50	Landscape character and visual impact	<ul style="list-style-type: none"> The design of the wharf lights will be to Australian Standards. The wharf lighting will be designed to minimise impacts on existing residences through incorporating dimmers and time clocks so that lights are dimmed at the time of the last ferry and by facing lights towards the ground. The wharf lights will be simple in design with minimal fixtures, and resistant to vandalism where possible. 	Project Manager	Construction
51	Non-Aboriginal heritage	<ul style="list-style-type: none"> All relevant staff, contractors and subcontractors will be made aware of their statutory obligations for heritage under the <i>Heritage Act 1977</i>, through the site induction and toolbox talks. 	Project Manager	Construction
52	Non-Aboriginal heritage	<ul style="list-style-type: none"> All construction staff will be inducted in the <i>RMS Unexpected Archaeological Finds Procedure</i> (2011) and will implement this procedure where necessary. 	Project Manager	Construction
53	Non-Aboriginal heritage	<ul style="list-style-type: none"> If, during the course of development works, further suspected non-Aboriginal cultural heritage material, including historic shipwrecks, are discovered, work will cease in that area immediately. 	Project Manager	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		<ul style="list-style-type: none"> The Heritage Branch, Office of Environment and Heritage (02 9873 8500) will be notified and works only recommence when relevant permits and an appropriate management strategy instigated. 		
54	Non-Aboriginal heritage	<ul style="list-style-type: none"> The temporary compound and other temporary structures must avoid physical impact to the former tram turning circle and ferry interchange, the former tram terminus shed (2 Milson Road), and Low Level Sewage Pumping Station No. 57. The Low Level Sewage Pumping Station No. 57 will be fenced off to prevent accidental damage to the item during construction phase. Information regarding the heritage significance of these items should be communicated in all site inductions. 	Project Manager	Construction
55	Aboriginal heritage	<ul style="list-style-type: none"> If the scope of the proposal changes, the RMS Aboriginal cultural heritage advisor, Sydney, and the RMS environmental staff must be contacted to reassess any potential impacts on Aboriginal cultural heritage. 	Project Manager	Pre-construction
56	Air emissions during construction	<ul style="list-style-type: none"> Measures to address air quality impacts will be incorporated into the CEMP and implemented throughout the construction period. As a minimum, the following measures will be included: Covering of all loaded trucks and vessels. Machinery to be turned off rather than left to idle while not in use. Maintenance of all vehicles, including trucks and vessels entering and leaving the site in accordance with the manufacturers' specifications to comply with all relevant regulations. Maintenance of all plant and equipment to ensure good operating condition and exhaust emissions comply with the Protection of the Environment Operations Act 1997. Maintaining the work site in a condition that minimises fugitive emissions such as minor dust. 	Project Manager	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
57	Social and economic	<ul style="list-style-type: none"> North Sydney Council and the local community are to be kept informed about the details of the works, construction progress, wharf closure, changes to public transport arrangements, and other impacts during the construction period. 	Project manager	Pre-construction and construction
58	Social and economic	<ul style="list-style-type: none"> Details of alternative public transport options and contact details for the 131500 transport infoline and website will be clearly displayed at the site leading up to the carrying out of any works at the site and maintained for the duration of works. 	Project manager	Pre-construction and construction
59	Social and economic	<ul style="list-style-type: none"> An internet site and free call phone number for project enquires will be established for the duration of the works. Contact details will be clearly displayed at the site throughout the construction period. Directions will be provided on how to make an enquiry or register a complaint regarding the works. 	Project manager	Pre-construction and construction
60	Social and economic	<ul style="list-style-type: none"> An enquiry and complaint tracking system will be established. Any enquiries or complaints will be acknowledged within 24 hours of being received 	Project manager	Pre-construction and construction
61	Social and economic	<ul style="list-style-type: none"> All operational wharf lighting and signage is to comply with the Disability Standards for Accessible Public Transport (2002). 	Project manager	Construction
62	Social and economic	<ul style="list-style-type: none"> The new wharf will be constructed to be compliant with current legislative standards for the provision of access for a person with a disability. 	Project manager	Construction
63	Social and economic	<ul style="list-style-type: none"> The construction site will be lit at night for safety. Lights will be downward facing so that light is not directed toward nearby residences. 	Project manager	Construction
64	Social and economic	<ul style="list-style-type: none"> The temporary compound is to be located so that clear access is provided to Sophies Place cafe. During cafe operating hours, access to Sophies Place cafe is to be maintained. Signage is to be installed in an easily visible location to advise the 	Project manager	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		public that Sophies Place cafe remains open during the construction period.		
65	Hazards	<ul style="list-style-type: none"> A life preserving ring and appropriate first aid provisions will be located within the compound and on all barges during the construction period. 	Project Manager	Construction
66	Waste management	<ul style="list-style-type: none"> Waste disposed of off-site shall be classified in accordance with the <i>Waste Classification Guidelines: Part 1 Classifying Waste</i> (DECCW 2009a) prior to disposal and shall be disposed of at an appropriately licensed facility for that waste. Where necessary (such as to determine the presence of contaminants in waste timber), this shall include sampling and analysis. 	Project manager	Construction

7.3 Licensing and approvals

A permit to harm marine vegetation under section 205 of the FM Act from is required prior to the commencement of construction. This is required for the likely shading of macroalgal communities from the proposed gangway.

An appropriate permit under s37 of the FM Act must be held by the marine/aquatic ecologist to undertake the handling and relocation of Syngnathiformes. Such a permit is already held for the Commuter Wharf Upgrade Program. The applicability and status of this permit would be checked for its validity prior to the commencement of pile removal or bridge footing construction to enable the relocation of Syngnathiformes if required.

A license/short term lease would be required from North Sydney Council for the location of the temporary compound.

8 Justification and conclusion

This chapter provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

8.1 Justification

The proposal is justified because it would improve access for people with a disability to the wharf and commuter experience and safety. The proposal is also justified as it would meet the proposal objectives. The proposal does this in a manner that would have minimum impact on the environment and the community. The following sections consider the justification of the proposal in relation to social and economic factors, biophysical factors and the public interest.

8.1.1 Social factors

Social factors contributing to the justification of the proposal include:

- Improved safety from the location of berthing faces within deeper water and therefore reducing risk of vessels hitting the seafloor.
- Improved commuter experience by providing a practical, functional and robust ferry commuter wharf with appropriate waiting and standing areas, passenger seating and shelter while allowing for the enjoyment of good weather, harbour views and aquatic activity.
- Enhanced water transport in Sydney Harbour by improving access to commuter ferry services.
- Reduced opportunity for vandalism with the use of appropriate materials, surfaces and designs.
- Reduction in the unauthorised and inappropriate use of terminals and facilities through the installation of closed circuit televisions.
- Improve access from the adjoining residential area to a range of cultural sites around the harbour.
- The interrelationship of waterway and foreshore uses would be improved through more effective access to water-based public transport.
- Potential increase in commuters using the wharf and ferry services due to the upgraded facilities and access.
- Safeguard and maintain the heritage significance of Cremorne Point Wharf through incorporating a 50 year design life.

8.1.2 Biophysical factors

Biophysical factors contributing to the justification of the proposal include the upgrade of the wharf so that it is resilient to the projected impacts of sea level rise.

8.1.3 Economic factors

The proposal involves the upgrade of an existing wharf facility to provide improved boarding efficiency, commuter comfort and safety. This would assist in increasing the potential patronage of the ferry service by making it available to more of the community and by improving the service.

The proposal would enhance the role of the harbour as both a working harbour and an effective transport corridor by improving access to water-based public transport facilities.

The proposal would reduce wharf maintenance costs through scales of economy achieved through standardising wharf design, construction materials and fittings throughout Sydney Harbour.

8.1.4 Public interest

The proposal would be in the public interest as it would contribute to improving the overall ferry service as well as the connection of Cremorne Point with Sydney's CBD and other suburbs.

8.2 Objects of the EP&A Act, including the principles of ecologically sustainable development

Object	Comment
5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	The proposal would contribute to improved management, development and conservation of the Cremorne Point Wharf. The proposal would promote the social and economic welfare of the community by improving the commuter experience for patrons using the Cremorne Point Wharf. See chapter 6 for further details.
5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.	The proposal has been coordinated as part of the strategic Sydney Commuter Wharf Upgrade program (see section 2.1).
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	The proposal would not impact on the provision or coordination of communication and/or utility services. Relevant utility providers have been consulted during the development of the proposal.
5(a)(iv) To encourage the provision of land for public purposes.	The proposal would upgrade the existing wharf and it would continue to be used for both Sydney Ferry services and other vessels such as taxis and recreational vessels.
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	The new gangway and refurbished pontoon would result in a wharf that complies with the DDA standards for 80 per cent of all tides.
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	An Aquatic Ecology Assessment has concluded that overall, the proposal would not result in a net direct or indirect losses of aquatic habitat or organisms (appendix B). There would be some disruptions to access to the intertidal zone in the vicinity of the wharf during the construction period however this would not be long term.
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in sections 8.2.1 – 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the proposal.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Consultation has been undertaken with North Sydney Council, TfNSW and the FWPDAC as detailed in section 5.

Object	Comment
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	The community consultation and notification program carried out in the lead up to preparing this REF is detailed in chapter 5 of this REF. There would be ongoing consultation prior to the commencement of construction and throughout the construction period.

8.2.1 The precautionary principle

The precautionary principle upholds that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

When applying the precautionary principle public and private decisions should be guided by:

- Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment.
- An assessment of risk-weighted consequences of various options.

A precondition for the operation of the precautionary principle is that there are threats of serious or irreversible environmental damage. This REF has demonstrated that such threats are not present for the proposal.

Regardless, the proposal has sought to take a precautionary approach to minimise environmental impacts. This has also been applied in the development of safeguards and management measures. Best available technical information, environmental standards and measures have been used to minimise identified environmental risks of the proposal.

Conservative 'worst case' scenarios were considered while assessing the environmental impact of the proposal. For example conservative estimates of the number of construction barges, vessels and vehicles were used for the impact assessment. Worst case construction times were also assessed.

Specialist advice in noise and vibration, heritage, aquatic ecology, landscape character and visual impact were incorporated for a detailed understanding of the existing environment.

Planning for the proposal involved a risk assessment process that evaluated the environmental risks of the Sydney Commuter Wharf Upgrade Program. Measures to avoid the identified risks were then factored into the construction planning for the proposal. These included:

- The decision to use an off-site facility, to undertake as much of the construction work as possible was made to minimise impacts to Cremorne Point, the surrounding residential areas and nearby businesses.
- The decision to transport most personnel, materials, plant and equipment between the off-site facility, and the construction work site by barge/boat was made to reduce environmental impacts such as traffic, parking and noise impacts.

8.2.2 Intergenerational equity

The principle of intergenerational equity upholds that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The proposal would benefit both existing and future generations in the following ways:

- Improved customer experience as a result of upgrading the Cremorne Point Wharf.
- Maintaining the local environment and implementing safeguards and management measures to protect the environmental values of Cremorne Point and Sydney Harbour.
- Providing a facility with a service life of 50 years.

The proposal has integrated short and long-term social, financial and environmental considerations so that any foreseeable impacts are not left to be addressed by future

generations. Issues with potential long term implications such as the consumption of non renewable resources, waste disposal and water quality have been avoided and/or minimised through construction planning and the application of safeguards and management measures described at section 7.2.

8.2.3 Conservation of biological diversity and ecological integrity

The principle of biological diversity upholds that the conservation of biological diversity and ecological integrity should be a fundamental consideration.

The construction planning outcomes and safeguard and management measures described at section 7.2 would minimise the impacts of the proposal on aquatic and terrestrial biodiversity and the ecological integrity of Cremorne Point and its surrounding landscapes.

8.2.4 Improved valuation, pricing and incentive mechanisms

This principle upholds that environmental factors should be included in the valuation of assets and services, such as:

- Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement.
- The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.
- Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Environmental issues have been considered in the strategic planning for the proposal. The preservation and/or improvement of social, economic, heritage and transport values of Cremorne Point Wharf are the primary reasons that justify the need for the proposal. The environmental goals of the proposal have been pursued in the most cost effective way through the construction planning process.

Safeguards and management measures identified at section 6.14.3 for avoiding, reusing, recycling and managing waste during construction and operation would be implemented.

8.3 Conclusion

The proposed redevelopment of the Cremorne Point Wharf is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the project objectives but would still result in some impacts including construction noise, water quality, public transport and parking during construction, aquatic habitats, landscape character and views.

Safeguards and management measures detailed in this REF would ameliorate or minimise these potential impacts. The proposal would also provide improved efficiency for passenger boarding, a better commuter experience for those using the upgraded facility, safer boarding conditions, and improved water safety as well contributing to unifying and standardising wharves in Sydney Harbour. On balance the proposal is considered justified.

The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the TSC Act or FM Act and therefore a Species Impact Statement is not required.

The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance.

The environmental impacts of the proposal are not likely to be significant and therefore it is

not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning and Infrastructure under Part 5.1 of the EP&A Act.

9 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.



Peter Mangels
Senior Planner
RPS Australia East Pty Ltd
27 August 2014

I have examined this review of environmental factors and accept it on behalf of Roads and Maritime Services.

Insert name
Position title, eg Project Manager
Roads and Maritime Services region/area
Date:

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Terms and acronyms used in this REF

Terms and acronyms used in this REF

AHD	Australian Height Datum
AS	Australian Standard
BCA	Building Code of Australia
Berthing	A space for a vessel to dock.
CCTV	Closed circuit television
CEMP	Construction environmental management plan
DDA	<i>Disability Discrimination Act 1992</i>
DPI	Department of Planning and Infrastructure (NSW)
EIA	Environmental impact assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
Fetch	An area where ocean waves are being generated by the wind.
FM Act	<i>Fisheries Management Act 1994</i> (NSW)
FWPDAC	Foreshore and Waterways Planning and Development Advisory Committee
Gangway	A landing used by passengers to board or exit ships/vessels
Heritage Act	<i>Heritage Act 1977</i> (NSW)
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
Jetty	A structure extending into the harbour as part of a wharf.
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LGA	Local government area.
MHWM	Mean high water mark
NES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
NPW Act	<i>National Parks and Wildlife Act 1974</i> (NSW)
PACHCI	<i>Procedure for Aboriginal Cultural Heritage Consultation and Investigation</i>
Piles	Foundations used to support marine structures and offshore platforms.

Pontoon	A floating structure serving as a dock.
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SREP	Sydney Regional Environmental Plan
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i>
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i>
Wharf	A landing place or pier where ships may tie up and load or unload.
ZFDTG	Zero of Fort Denison Tide Gauge

Appendix A

Proposal drawings

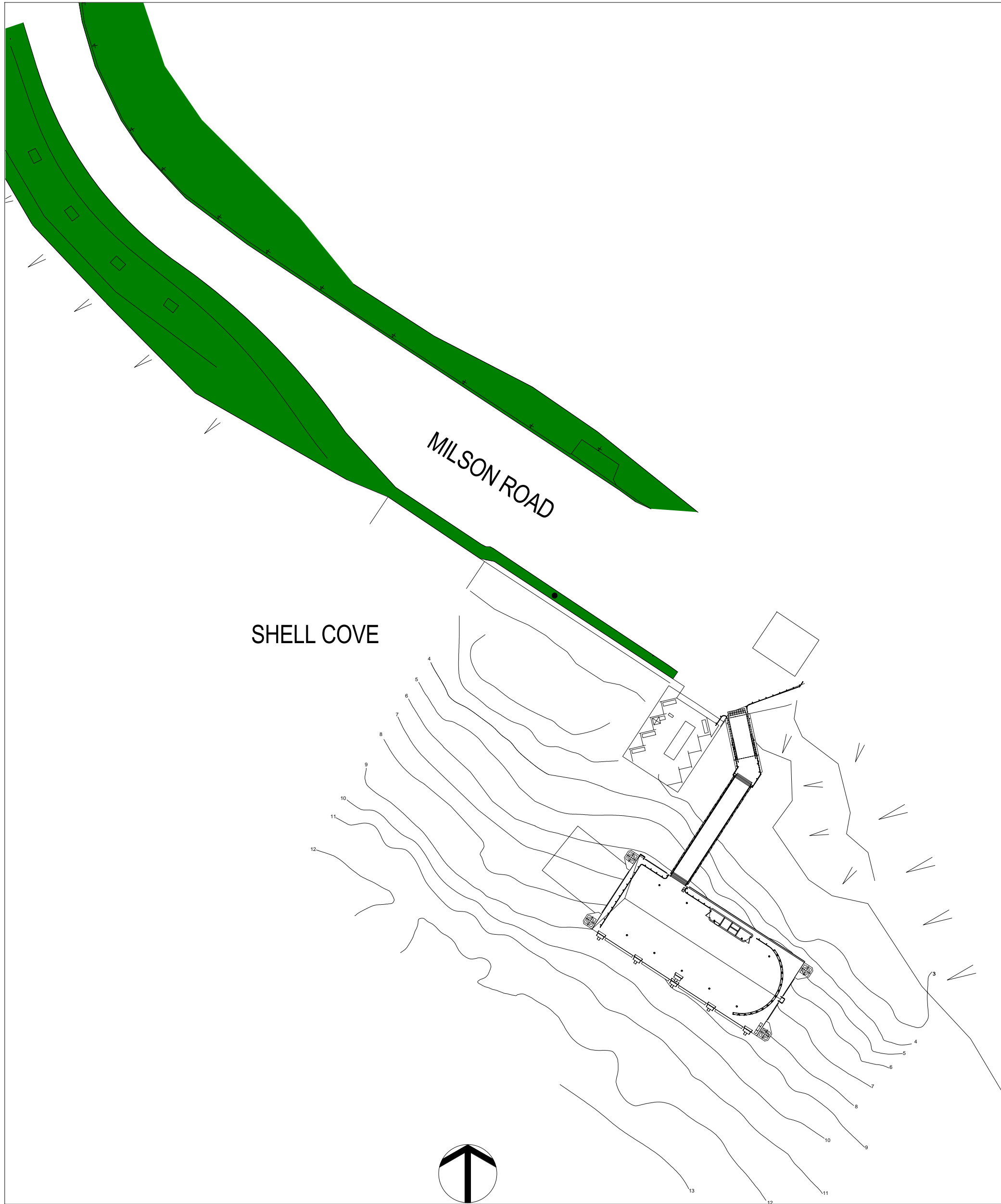


02 CREMORNE POINT WHARF

ARCHITECTURAL DRAWING REGISTER			
Drawing No.	Drawing Name		
AR 03 DW 0001	Title Sheet / Location Plan / Drawing register		
AR 03 DW 1000	Survey/ Demolition Plan		
AR 03 DW 1001	Setout Plan		
AR 03 DW 4000	Pontoon Floor Plan		
AR 03 DW 4001	Pontoon Roof & Reflected Ceiling Plan		
AR 03 DW 4002	Pontoon Elevations & Sections		
AR 03 DW 4003	Gangway - Floor, Roof & Reflected Ceiling Plan		
AR 03 DW 4004	Gangway Sections & Elevations		
AR 03 DW 4005	Bridge - Floor/ Roof Plan, RCP, Elevation & Section		
AR 03 DW 4007	Services Pod - Plans, Elevations & Sections		
AR 03 DW 4100	Section Details - Pontoon - Sheet 1		
AR 03 DW 4200	Section Details - Gangway - Sheet 1		
AR 03 DW 4400	Details - Pod - Sheet 1		
AR 03 DW 6300	Details - Balustrade & Screens - Sheet 1		
AR 03 DW 6301	Details - Balustrade & Screens - Sheet 2		
AR 03 DW 6302	Details - Balustrade & Screens - Sheet 3		

NOTE:

THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE FOLLOWING DOCUMENTS:
- MATERIALS AND FINISHES SCHEDULE AR-00-SP-8000
- ARCHITECTURAL SPECIFICATION AR-00-SP-8100
- ALL CONSULTANT DRAWINGS, SCHEDULES AND SPECIFICATIONS
ANY INCONSISTENCIES BETWEEN DOCUMENTS MUST BE REPORTED TO THE DESIGN MANAGER.



01 LOCATION PLAN

1 : 500

Amendments		
Issue	Description	Date
A	PRELIMINARY ISSUE	13.01.12
B	ISSUED FOR REVIEW	17.01.14

PRELIMINARY

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Client	
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nom architect M. Sheldon 3990

Project Title

Sydney Wharves Upgrade Program - Cremorne Point

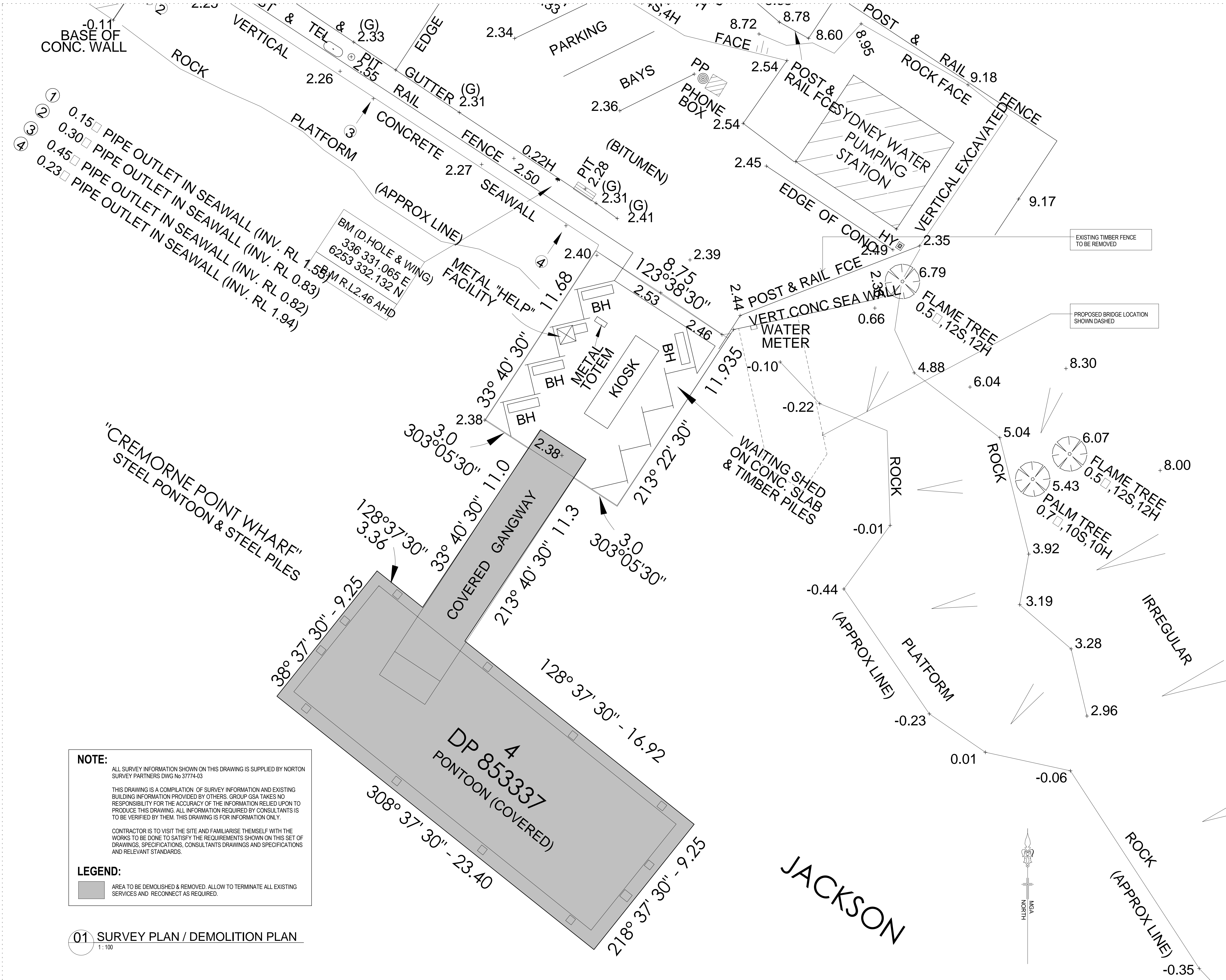
Drawing Title

Title Sheet / Location Plan / Drawing register

Project No	S09-026	Scale	As indicated @A1
Drawing Created (date)	15.11.13		
Drawing Created (by)	KR		
Plotted and checked by	SJ		
Verified	SJ		
Approved	VK		
Discipline	Wharf	Drawing No	Issue
AR	03	DW 0001	A

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Amendments		Date
Issue	Description	
A	ISSUED FOR REVIEW	17.01.14

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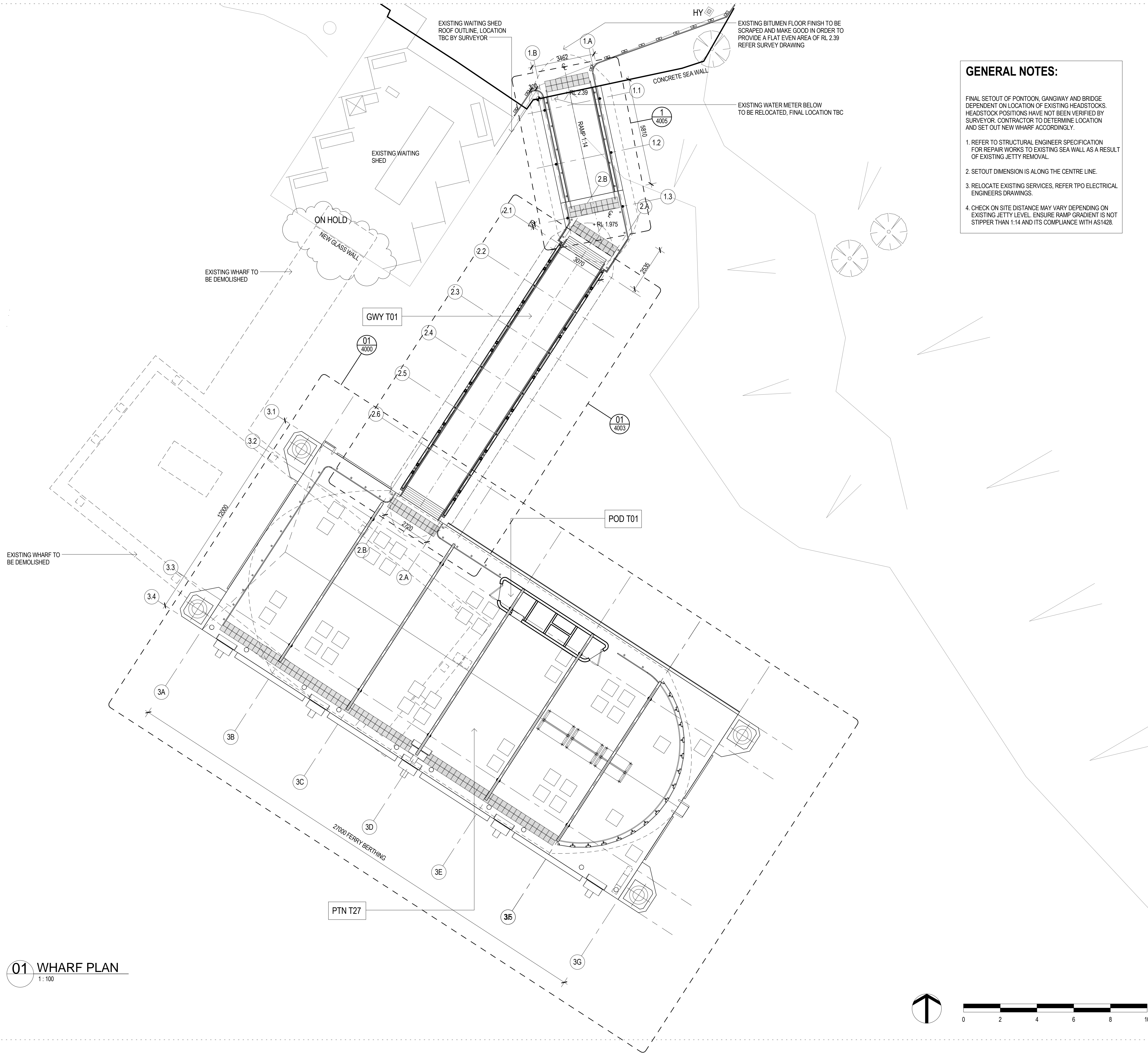
Sydney Wharves Upgrade
Program - Cremorne Point

Survey/ Demolition Plan

Project No	S09-026	Scale	As indicated @A1
Drawing Created (date)	15.11.13		
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Verified	SJ		
Approved	WK		
Discipline	Wharf	Drawing No	Issue
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GENERAL NOTES:

FINAL SETOUT OF PONTOON, GANGWAY AND BRIDGE DEPENDENT ON LOCATION OF EXISTING HEADSTOCKS. HEADSTOCK POSITIONS HAVE NOT BEEN VERIFIED BY SURVEYOR. CONTRACTOR TO DETERMINE LOCATION AND SET OUT NEW WHARF ACCORDINGLY.

1. REFER TO STRUCTURAL ENGINEER SPECIFICATION FOR REPAIR WORKS TO EXISTING SEA WALL AS A RESULT OF EXISTING JETTY REMOVAL.

2. SETOUT DIMENSION IS ALONG THE CENTRE LINE.

3. RELOCATE EXISTING SERVICES, REFER TPO ELECTRICAL ENGINEERS DRAWINGS.

4. CHECK ON SITE DISTANCE MAY VARY DEPENDING ON EXISTING JETTY LEVEL. ENSURE RAMP GRADIENT IS NOT STIPPER THAN 1:14 AND ITS COMPLIANCE WITH AS1428.

LEGEND:

PTN T27 - 27m x 12m STEEL PONTOON WITH STAINLESS STEEL BALUSTRADES, GLASS SCREENS AND CURVED ZINC ROOF SUPPORTED BY STEEL COLUMNS

GWY T01 - 16m SINGLE CARRIAGE ROOFED ALUMINIUM GANGWAY

POD T01 - STEEL FRAMED SERVICES POD WITH ALUCOBOND CLADDING

FLR - FIXED LOCATION READER
SM - SERVICE MAST

PRELIMINARY

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Project Title

Sydney Wharves Upgrade
Program - Cremorne Point

Drawing Title

Setout Plan

Project No S09-026 Scale As indicated @A1

Drawing Created (date) 15.11.13

Drawing Created (by) AH/ES

Plotted and checked by SJ

Verified SJ

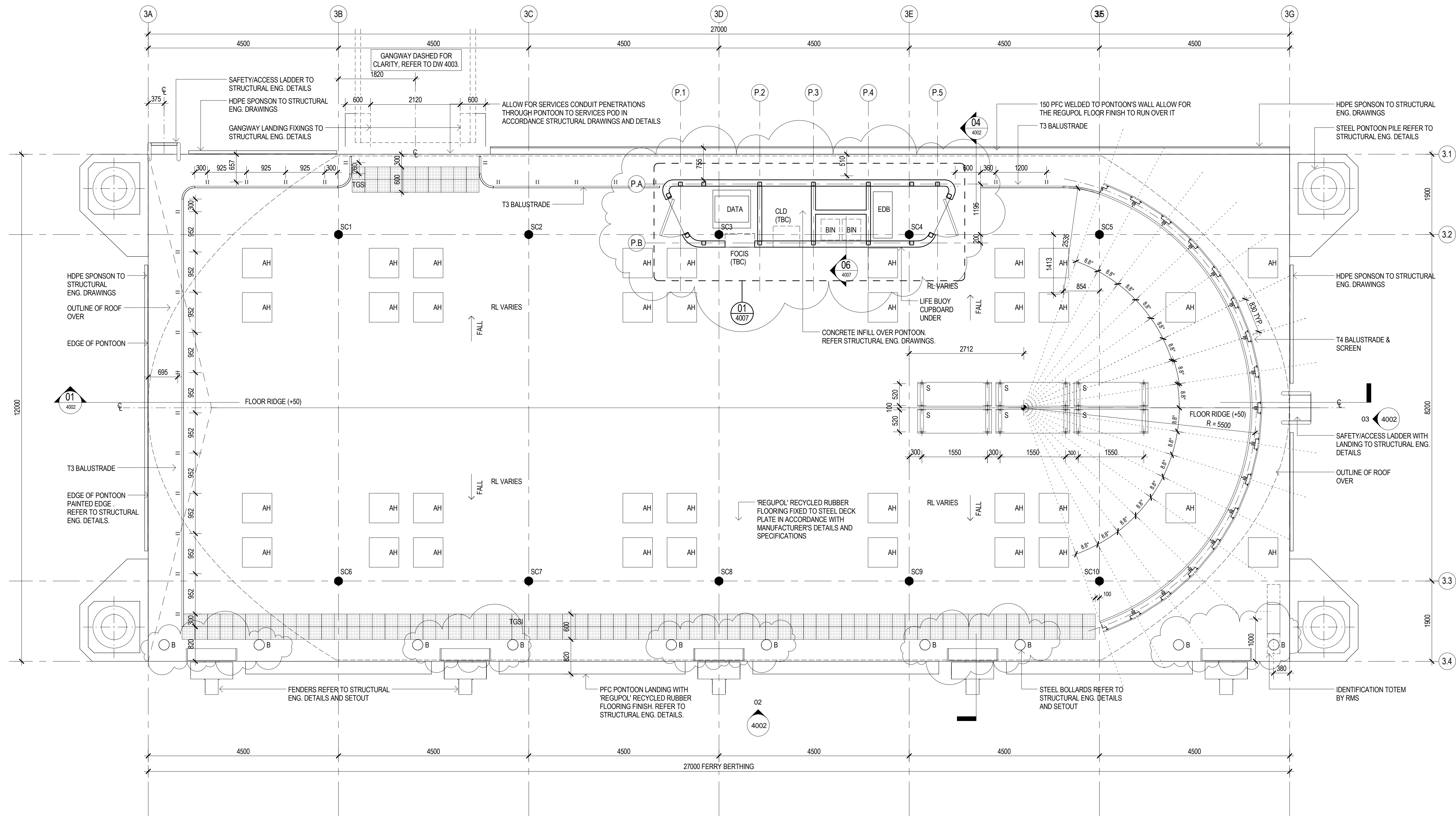
Approved VK

Discipline Wharf Drawing No Issue

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01 FLOOR PLAN
1:50

Issue	Description	Date
01	PONTOON ISSUE FOR AFC	06.12.13
02	SPONSONS UPDATED AS PER STRUCTURAL DRAWINGS	10.12.13
03	BOLLARDS UPDATED AS PER STRUCTURAL DRAWINGS, SERVICES POD LOCATION REVISED, BALUSTRADE RE-ADJUSTED	17.01.14

LEGEND:

AH	ACCESS HATCH
B	BOLLARDS
PC	POD COLUMN
S	SEAT
SC	STRUCTURAL COLUMN
SO	SETOUT POINT
TGSI	TACTILE GROUND SURFACE INDICATOR, REFER TO FINISHES SCHEDULE.

NOTE:

REFER TO STRUCTURAL DRAWINGS FOR SETOUT OF BOLLARDS, FENDERS AND ACCESS HATCHES.

ISSUED FOR CONSTRUCTION

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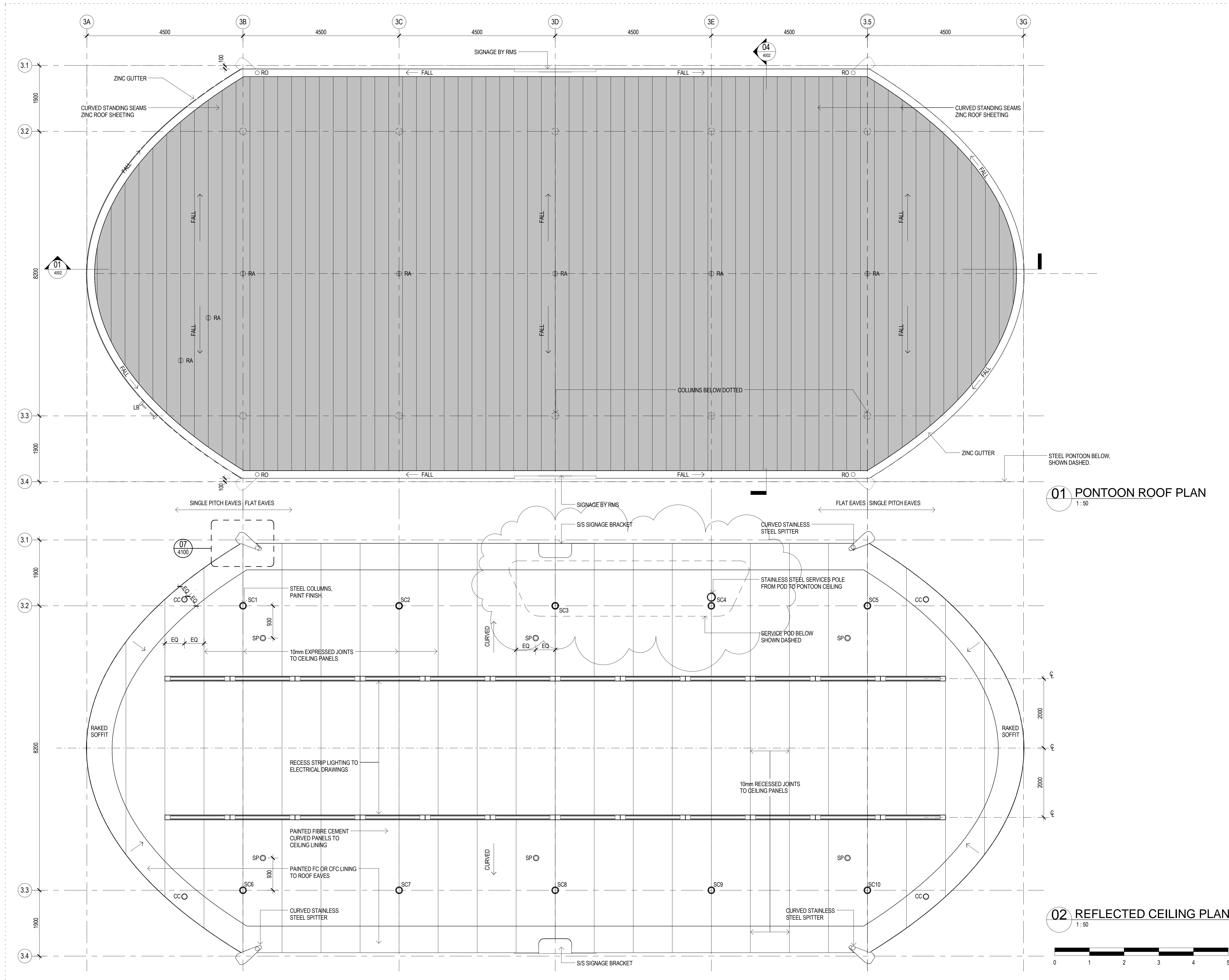
Sydney Wharves Upgrade Program - Cremorne Point

Pontoon Floor Plan

Project No	S09-026	Scale	As indicated @A1
Drawing Created (date)	15.11.13		
Drawing Created (by)	ES		
Plotted and checked by	SJ		
Verified	SJ		
Approved	VK		
Discipline	Wharf	Drawing No	Issue
AR	03	DW 4000	03

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01 PONTOON ROOF PLAN
1:50

02 REFLECTED CEILING PLAN
1:50



Amendments

Issue	Description	Date
01	PONTOON ISSUE FOR AFC	06.12.13
02	SERVICES POD LOCATION REVISED	17.01.14

LEGEND:

LB LADDER BRACKETS, CONTRACTOR TO PROVIDE COMPLIANT ROOF ACCESS DESIGN AND SPECIFICATION.
RA ROOF ANCHORS, CONTRACTOR TO PROVIDE COMPLIANT ROOF ACCESS DESIGN AND SPECIFICATION.
① ROOF OUTLET
RO ROOF OUTLET
SC STRUCTURAL COLUMN
○ CC CCTV - FINAL NUMBER AND LOCATIONS OF CAMERAS TBC.
⊙ SP SPEAKERS - REFER TO ELECTRICAL DRAWINGS.

NOTES:

- REFER TO STRUCTURAL DRAWINGS FOR SETOUT OF BOLLARDS, FENDERS AND ACCESS HATCHES.
- CONTRACTOR TO PROVIDE DESIGN AND INSTALLATION OF COMPLIANT ROOF ACCESS SYSTEM.
- ROOF ANCHORS AND LADDER BRACKETS ARE INDICATIVE ONLY.

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Client
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Transport Services
NSW

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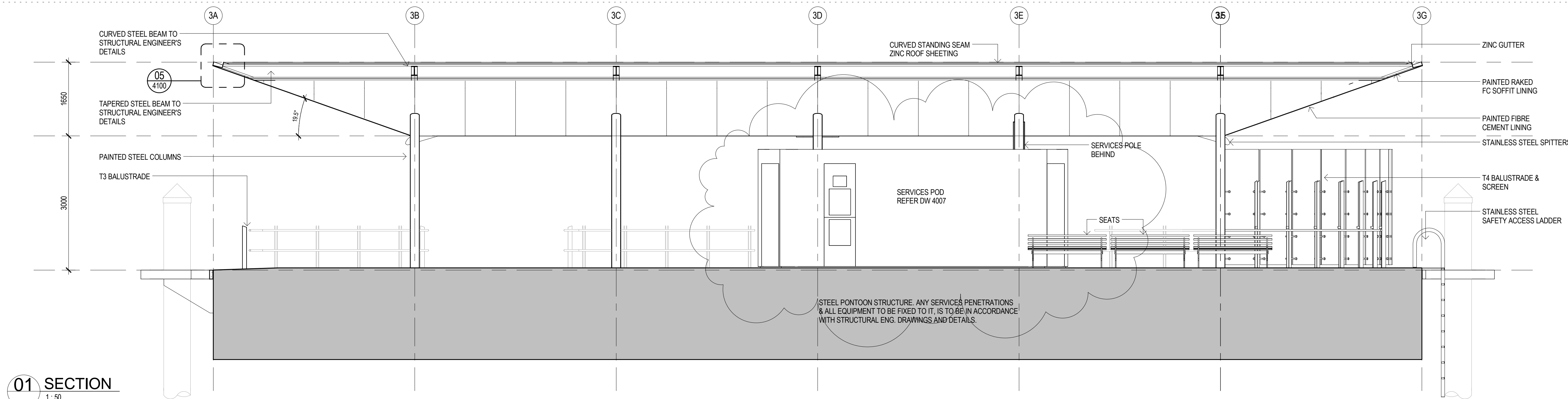
Sydney Wharves Upgrade Program - Cremorne Point

Pontoon Roof & Reflected Ceiling Plan

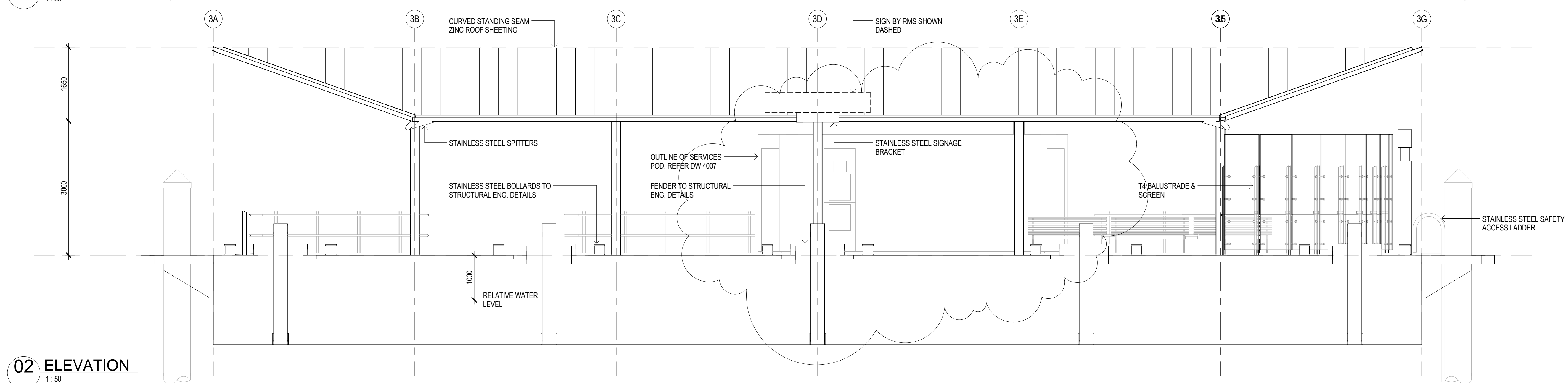
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Approved	WK		
Discipline	Wharf	Drawing No	Issue
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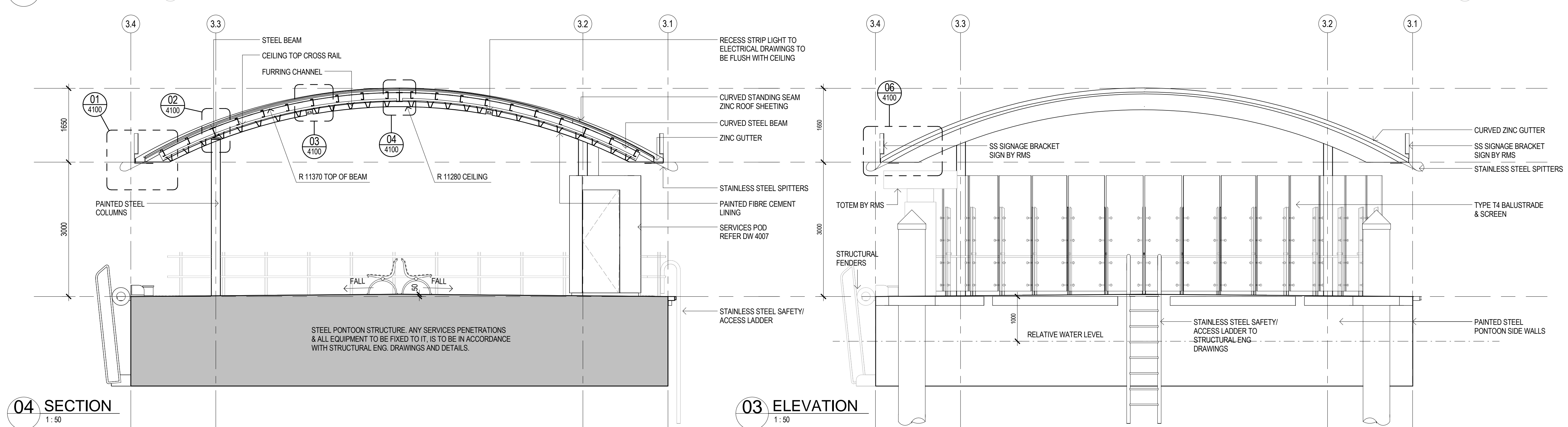
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01 SECTION
1:50



02 ELEVATION
1:50



04 SECTION
1:50

03 ELEVATION
1:50

Amendments		
Issue	Description	Date
01	PONTOON ISSUE FOR AFC	06.12.13
02	SERVICES POD LOCATION REVISED	17.01.14

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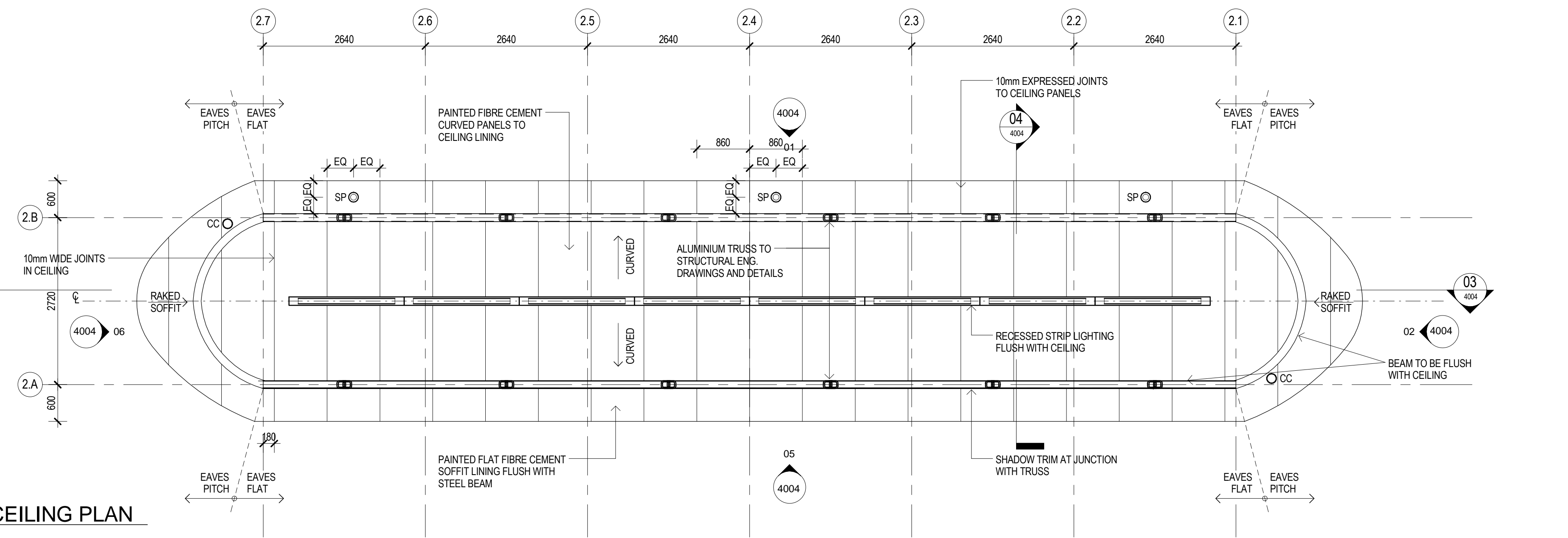
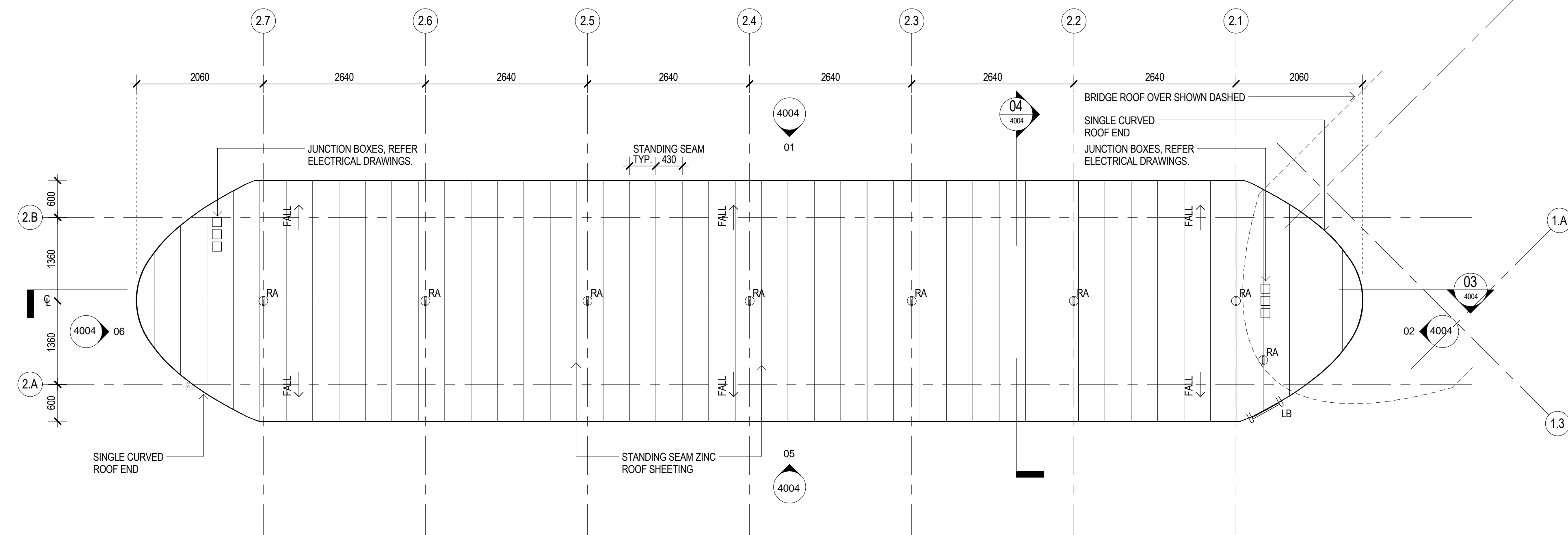
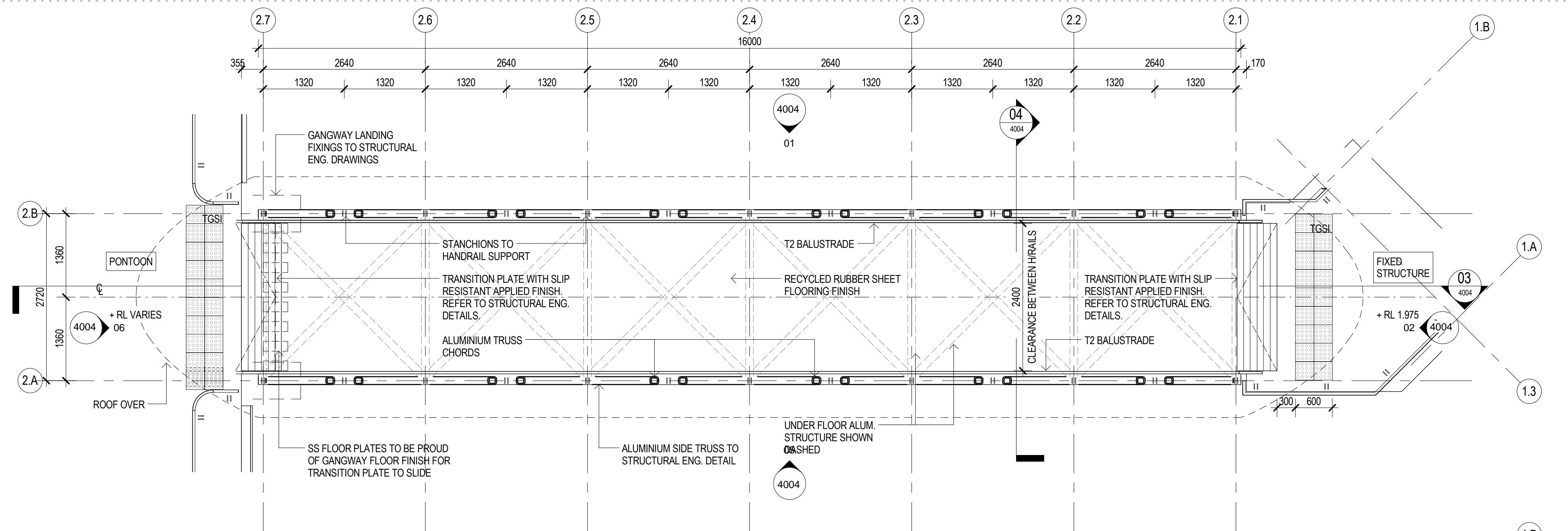
Project Title
**Sydney Wharves Upgrade
Program - Cremorne Point**

Drawing Title
**Pontoon Elevations &
Sections**

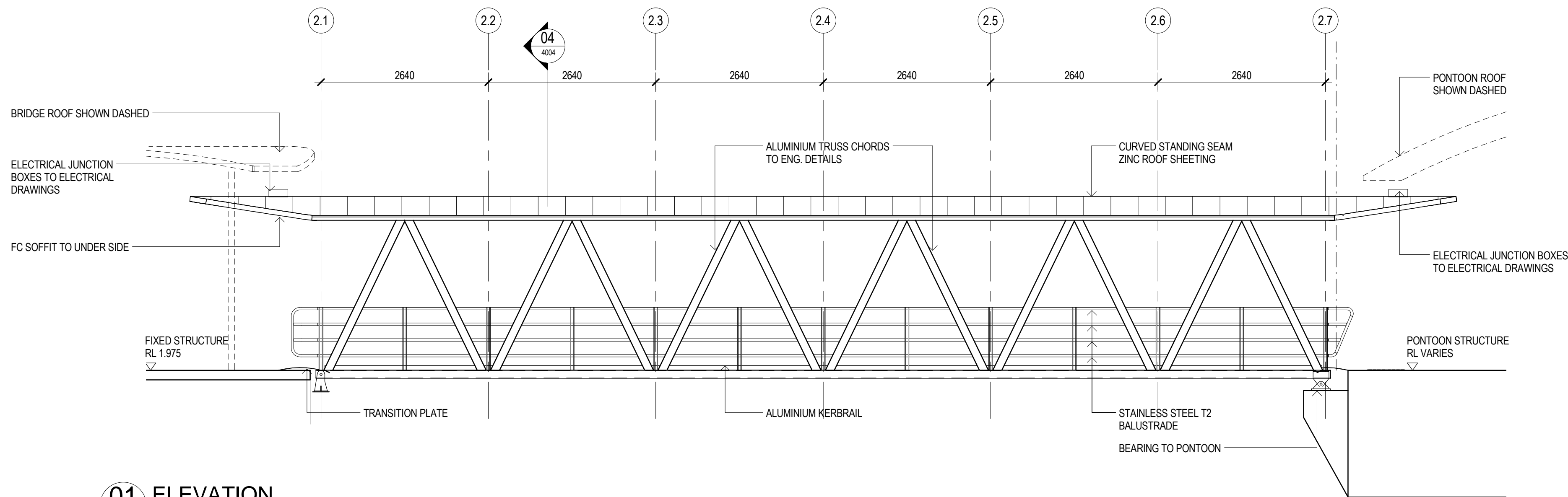
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Drawing Created (date)	15.11.13		
Drawing Created (by)	AH/ES		
Plotted and checked by	SJ		
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Discipline	Wharf	Drawing No	Issue
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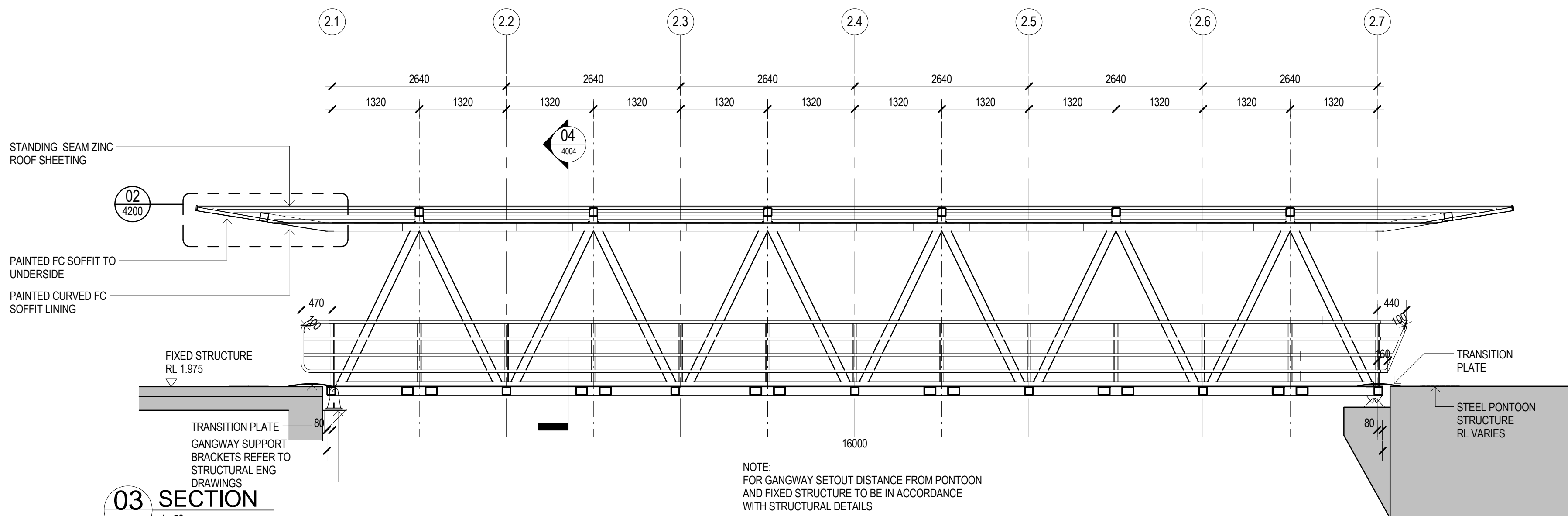


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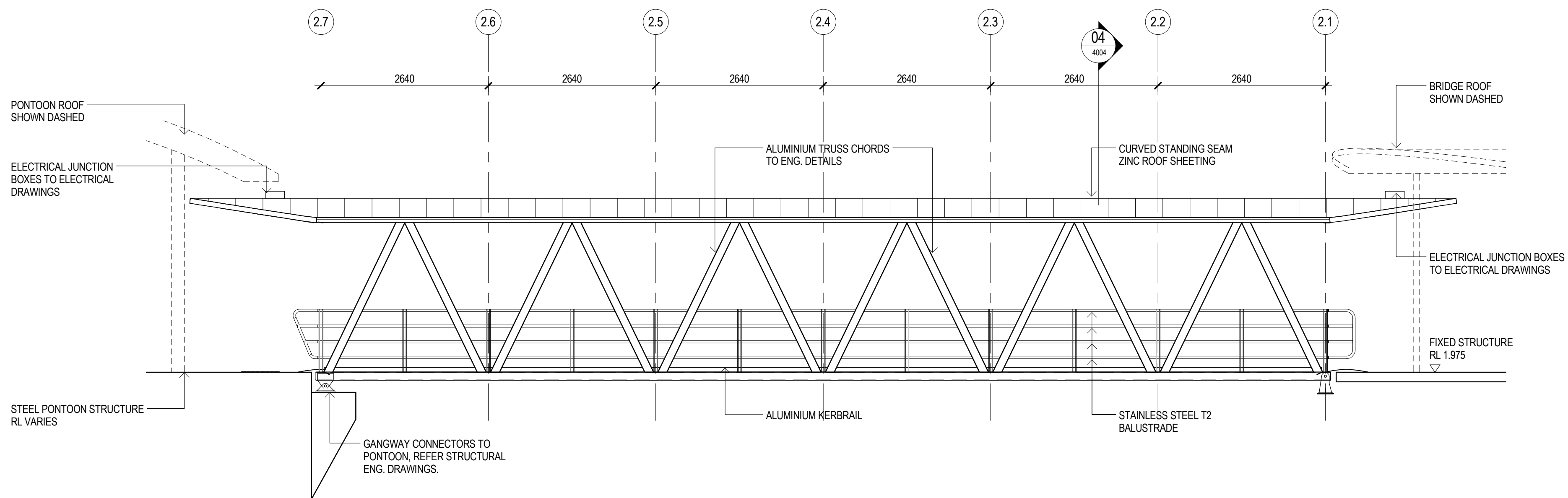
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1:50



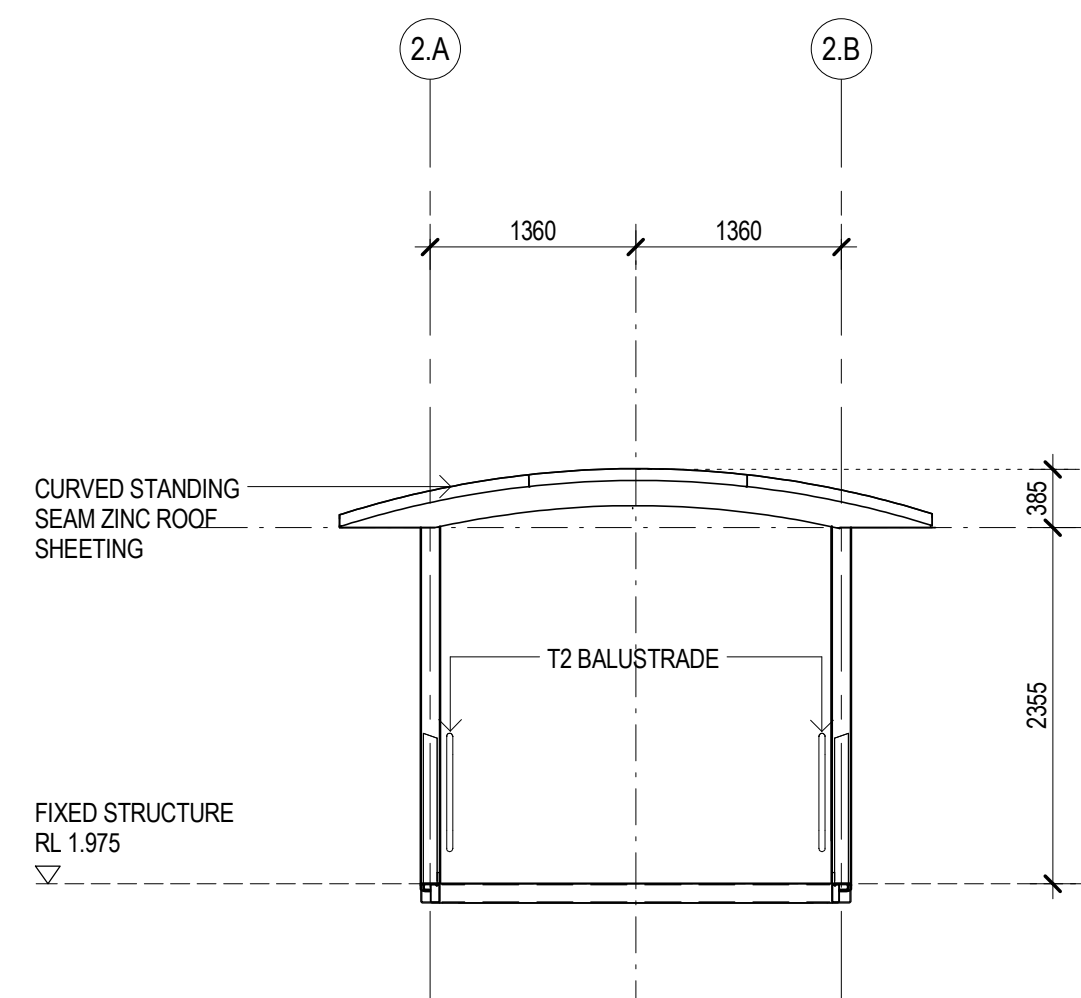
03 SECTION

1:50



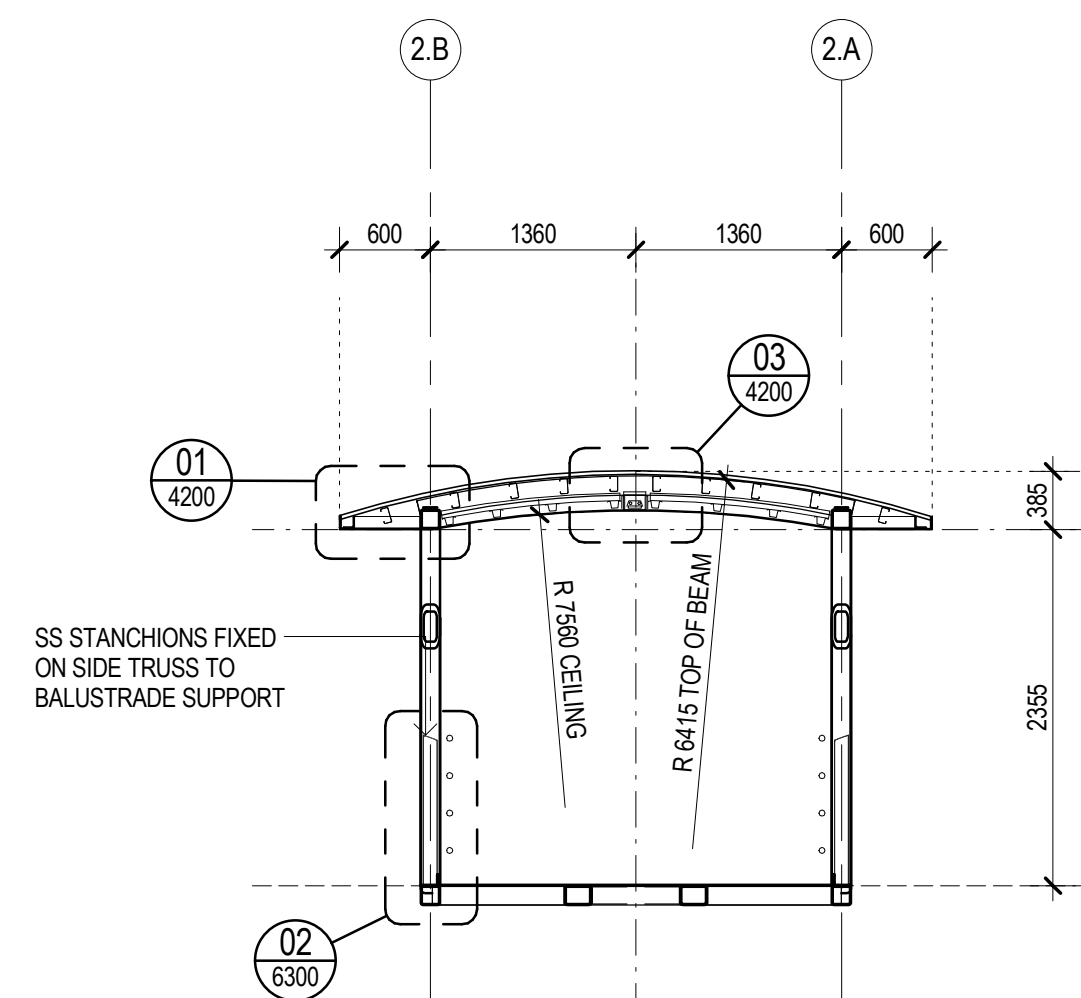
05 ELEVATION

1:50



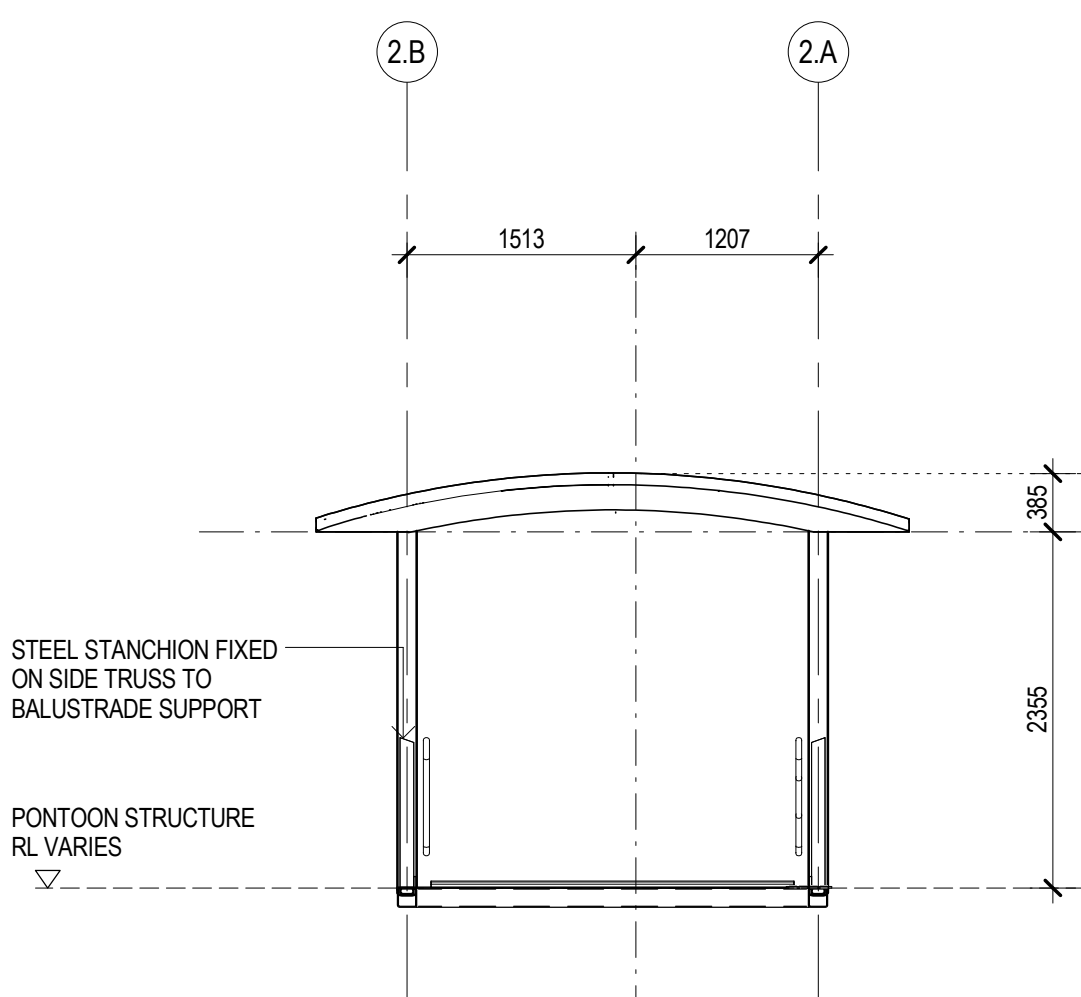
02 ELEVATION FROM FIXED STRUCTURE

1:50



04 SECTION

1:50



06 ELEVATION FROM PONTON

1:50



Amendments		Date
Issue	Description	
A	ISSUED FOR REVIEW	17.01.14

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Project Title
Sydney Wharves Upgrade Program - Cremorne Point

Drawing Title
Gangway Sections & Elevations

Project No **S09-026** Scale As indicated @A1

Drawing Created (date) 15.11.13

Drawing Created (by) CP

Plotted and checked by SJ

Verified SJ

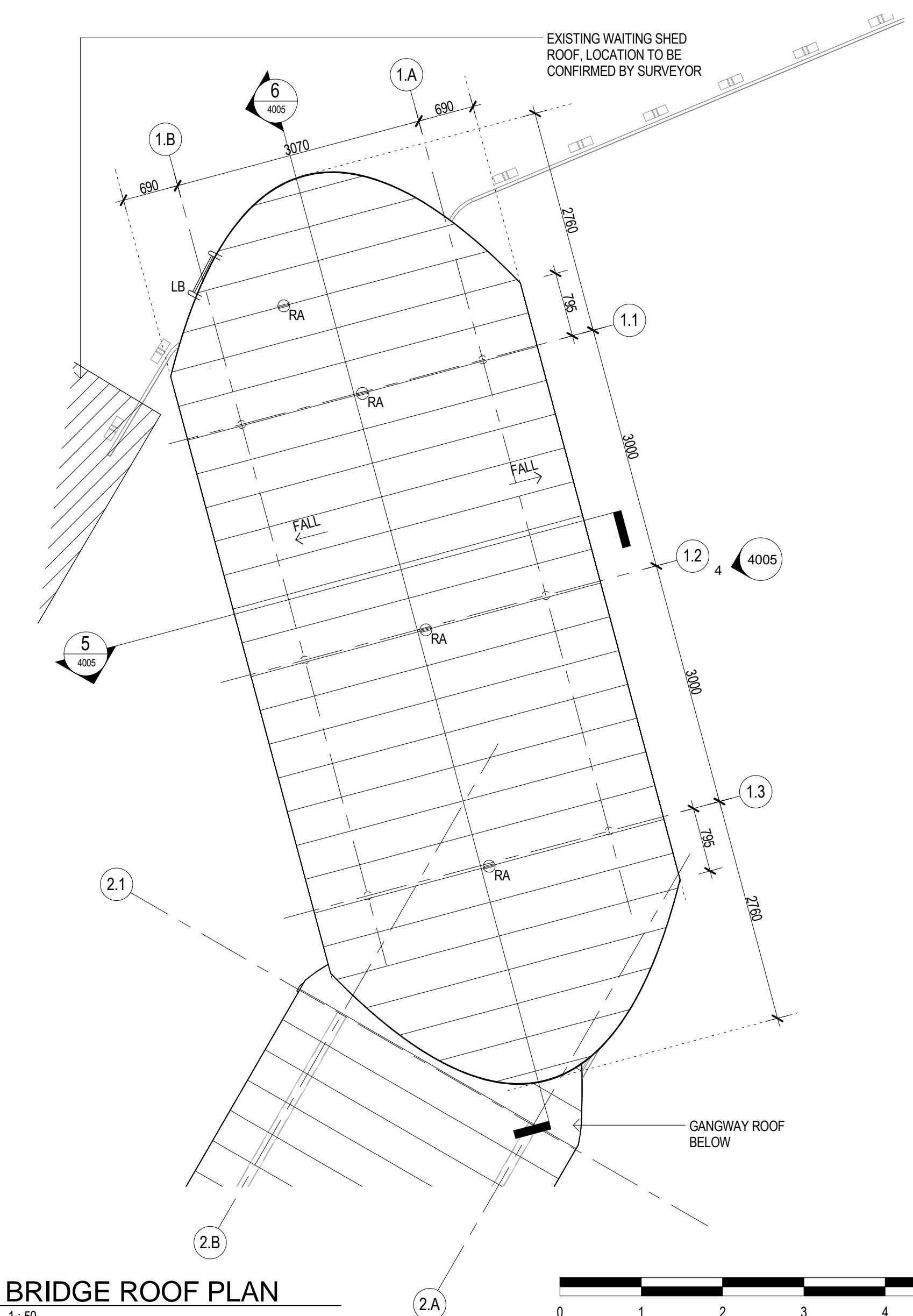
Approved VKK

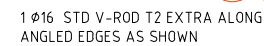
Discipline Wharf Drawing No Issue

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INSITU CONCRETE SLAB PLAN

(NOTE: FOR DIMENSIONS & FINISHED LEVELS OF BRIDGE STRUCTURE REFER ARCHITECT'S DRAWINGS).



DETAIL
SCALE 1:1



ELEVATION
TYPICAL SCREEN SPIGOT FIXING DETAIL
TO EXISTING CONCRETE SLAB

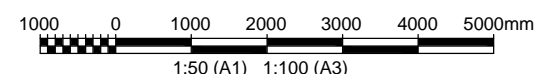
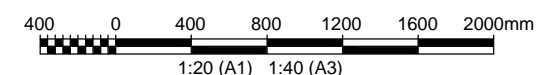
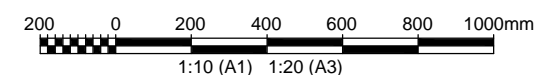
(NOTE: FOR LOCATIONS REFER ARCHITECT'S DRAWINGS)



SECTION
SCALE 1:20

INSITU BAR LAYING SCHEDULE
(IN PLAN)

NOTE: BARS SHOWN ON PLAN ARE EXTRA



Appendix B

Aquatic ecology assessment

UPGRADE OF CREMORNE POINT WHARF

REVIEW OF ENVIRONMENTAL FACTORS

- AQUATIC ECOLOGY ASSESSMENT



Figure 1 Late afternoon view of existing ferry wharf at Cremorne Point.

Report Prepared for Hansen Yuncken Pty Ltd

Marine Pollution Research Pty Ltd
March 2013

MARINE POLLUTION RESEARCH PTY LTD

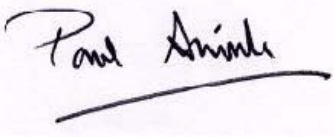
Marine, Estuarine and Freshwater Ecology, Sediment and Water Quality Dynamics

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25 RICHARD ROAD SCOTLAND ISLAND NSW 2105

PO BOX 279 CHURCH POINT NSW 2105

TELEPHONE (02) 9997 6541 E-MAIL panink@iimetro.com.au

REPORT TITLE:	UPGRADE OF CREMORNE POINT WHARF: REVIEW OF ENVIRONMENTAL FACTORS - AQUATIC ECOLOGY ASSESSMENT
CLIENT & CONTACT:	Mr Paul Blair Design Manager Hansen Yuncken Pty Ltd on behalf of NSW Roads & Maritime
MPR REPORT No:	MPR 1019-3
DRAFT REPORT FOR COMMENT:	PDF Version 1 Sent to HY 13 December 2012 PDF Ver 2 prepared February 2014 to incorporate additional surveys. Update report Ver 3 prepared March 2014 for Stage 2 program & including in- water footings construction. Ver 4 (13 Aug 14) to include replacement of inwater footing with six piles.
COMMENTS RECEIVED AND INCORPORATED:	
FINAL REPORT:	
MPR APPROVAL: PAUL ANINK	 13 August 2014

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1.1 The Proposal

Figure 3 is a portion of the Group GSA location plan AR-03-0001, showing the existing and proposed works superimposed over a hydrographic survey of the seabed. Figure 4 is the Group GSA General Arrangement plan (AR-03-DW-1000) of the existing and proposed wharf facility. For the proposed wharf upgrade the existing fixed wharf waiting shed is to be retained and the existing gangway and pontoon are to be replaced with a covered pre-cast concrete bridge supported on six steel piles, a covered gangway (16m long and 3m wide) and a new floating pontoon jetty. The new pontoon will be on a slightly different alignment to the present pontoon wharf (Figure 3), but with similar berthing depths for ferries ($> -9\text{m}$ chart datum which is Indian Spring Low Water ISLW).

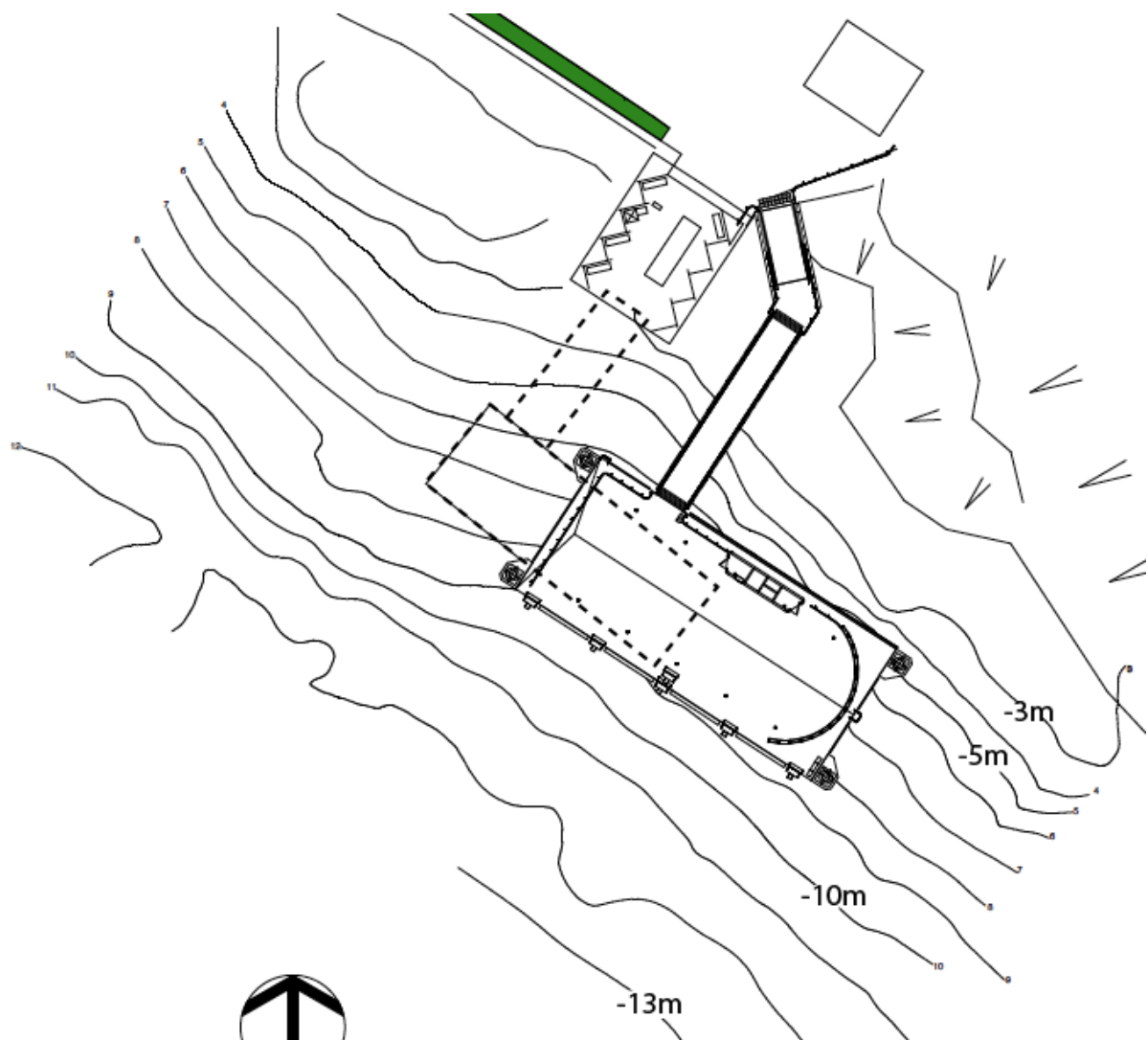


Figure 3 Portion of GSA Location Plan showing depth contours under and around the existing and proposed ferry wharves.

Cremorne Pt Upgrade Aq Ecol Ver 3

1.2 Available Information on Aquatic Habitats

The aquatic ecological community under and around the existing wharf is described as "rocky platform" on the DCP Map 10 for the Harbour Foreshores and Waterways Area Development Control Plan 2005 (Figure 5). Sheet 11 for the SREP (Figure 6) indicates 'wetlands' along the western shore of Cremorne Point including under Cremorne Point Wharf. These 'wetlands' match up with the continuous rocky platform identified in Figure 5 that support kelp beds (see also Figure 2). Seagrass mapping by NSW Department of Primary Industries Fisheries Branch (Fisheries NSW) indicates a small *Zostera* seagrass patch in Shell Cove located more than 500m north of Cremorne Point ferry wharf (Figure 7). With regard to intertidal marine vegetation there are no mangroves or saltmarsh indicated on the vegetation surveys prepared by Allen et al (2007) and Kelleway et al (2007).

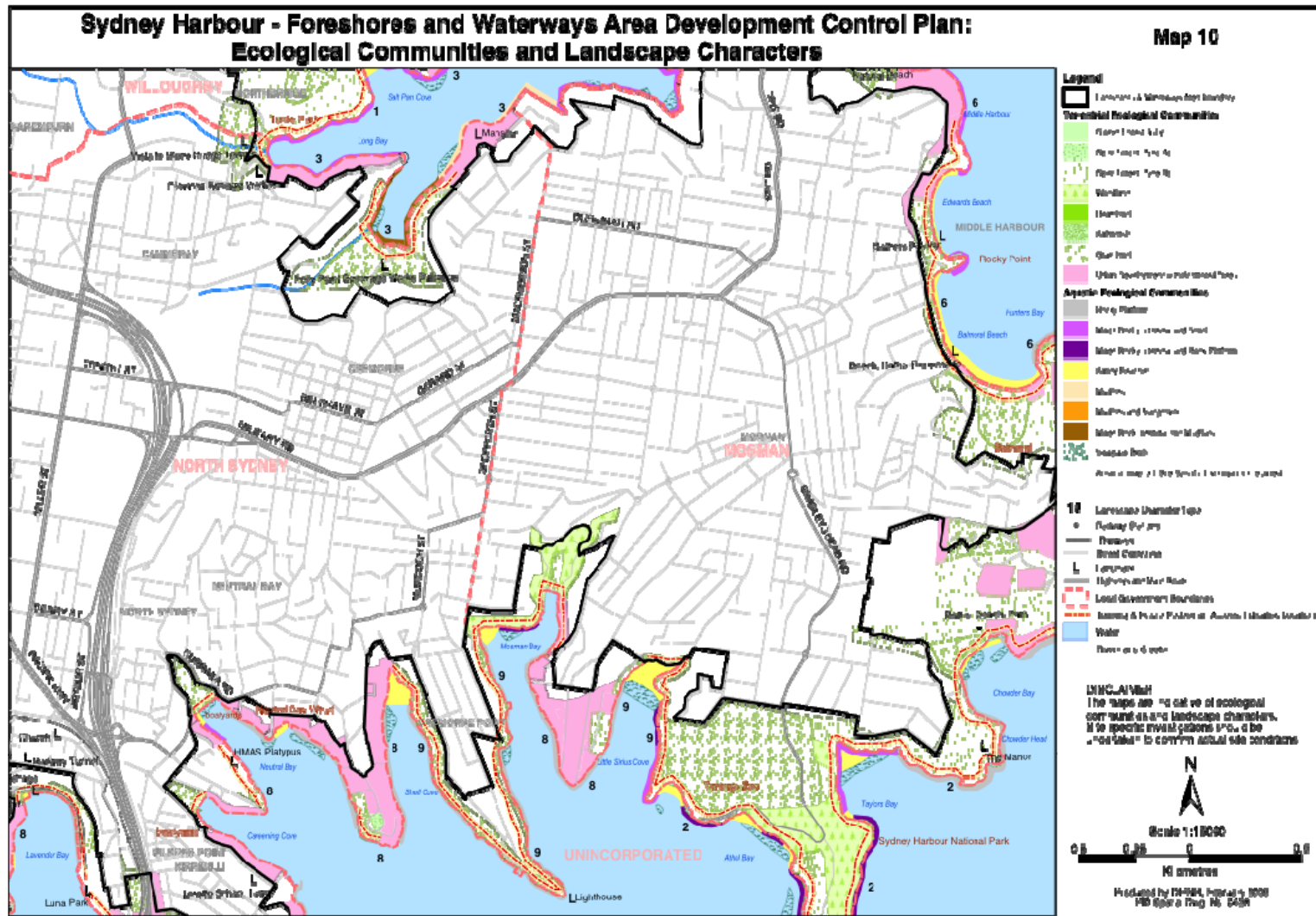


Figure 5 DCP Map 10 indicates “rocky platform” marine habitats at and along the foreshore each side of Cremorne Point Wharf.

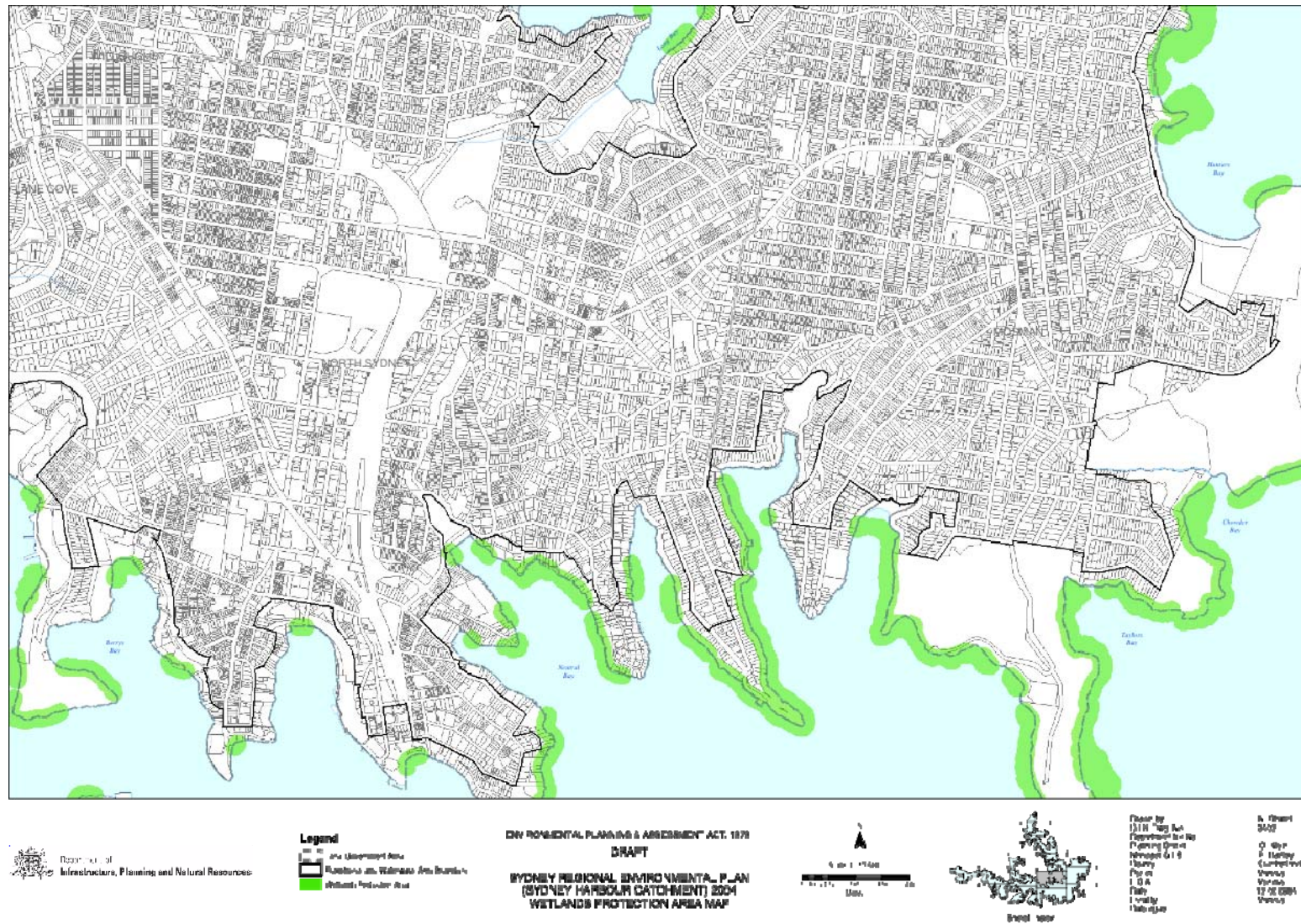


Figure 6 SREP (Sydney Harbour Catchment) Wetlands Protection Area Sheet 11 showing designated ‘wetland’ areas at and to the north and south of Cremorne Point Wharf.

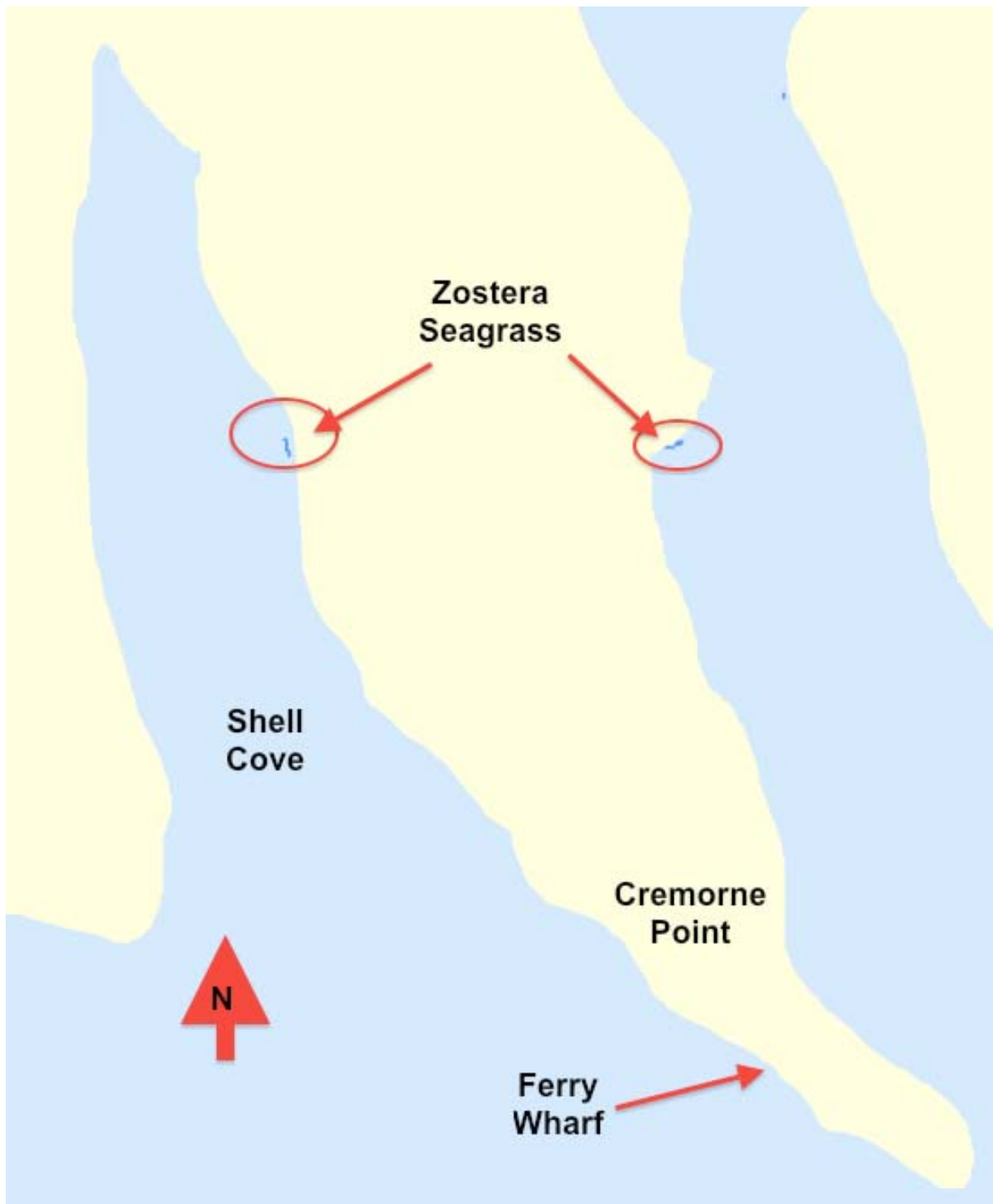


Figure 7 Detail of NSW DPI (Fisheries) estuarine vegetation map 39a showing inshore *Zostera* patches (blue) in Lavender Bay that coincide with the SREP Sheet 11 'wetlands' designations. These *Zostera* patches are located more than 200 m from the Cremorne Point ferry wharf.

2 AQUATIC HABITATS AND ECOLOGY

Aquatic habitats, flora and fauna of conservation significance are protected under both State and Federal legislation. In NSW, threatened species, populations and ecological communities of animals and plants are protected under the *Threatened Species Conservation Act 1995 (TSC)*. Threatened species, populations and ecological communities of fish and marine vegetation are protected under the *Fisheries Management Act 1994 (FMA)*. The *TSC* and *FMA* also list a number of key threatening processes that may threaten the survival of species, populations and ecological communities. The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC)* protects wetlands of international importance, Commonwealth Marine Areas, nationally threatened species and ecological communities and migratory species, nuclear actions and world and national heritage places.

2.1 Threatened Species and Endangered Ecological Communities

The FMA, TSC and EPBC Act require that any proposed activity be assessed with respect to its potential impact on species or ecological communities listed as threatened under the Threatened Species Schedules of the Acts or listed as migratory species under the EPBC Act. Appendix A provides a table of threatened marine species, endangered marine populations and protected marine fish species known, presumed extinct or that could occur in Sydney Harbour. The list is derived from searches of the relevant agency data-bases of listed species; Fisheries NSW *Fish Records Viewer*, Office of Environment and Heritage (OEHS) *Bionet Atlas of NSW Wildlife* and the Commonwealth Department of the Environment *Protected Matters Search Tool*. Note that as per RMS requirements, the minimum search area is a 10km square.

2.1.1 Fish and Sharks

The FMA and EPBC Act list a number of marine and estuarine shark and teleost fish species as Vulnerable Species under Schedule 5 of the Act. Syngnathiformes (seahorses, sea-dragons, pipefish, pipe-horses and sea-moths) are protected under the EPBC Act and the FMA:

- Of the listed sharks, the Green Sawfish is presumed extinct, the two hammerhead sharks are oceanic species and are unlikely to enter Sydney Harbour. The Grey Nurse and Great White sharks are near-shore coastal species and could enter Sydney Harbour from time to time. However such visits would be infrequent and they would generally be only found in the outer harbour when in pursuit of mobile prey species.

They would not make use of any of the habitats available in the locality of Cremorne Point and the likelihood of these species occurring is low.

- Of the listed teleost fish species known from Sydney Harbour only one, the Black Rock Cod *Epinephelus daemelli* could potentially occur in Shell Cove, Cremorne, as its habitat is coastal and estuarine rocky reefs and there rocky reef areas identified along the shoreline under the wharf. Notwithstanding, it is unlikely to occur on the rock rubble reef under the Cremorne Point wharf by virtue of the lack of suitable cave and crevice habitat.
- Of the 31 species of syngnathiformes known from NSW waters, three, (White's seahorse *Hippocampus whitei*, Coleman's Seahorse *Hippocampus colemani* and the pygmy pipehorse *Idiotropiscis sp.*), are endemic to NSW and White's seahorse is common in Sydney Harbour and is known to inhabit jetty and wharf structures in Sydney Harbour upstream to at least Mort Bay, Balmain.
- Seagrass beds in Sydney Harbour that include *Posidonia australis* are listed as an *Endangered Ecological Community* under the FMA. No *Posidonia* plants or beds are found in the inner harbour west of Bradleys Head, Mosman.

2.1.2 Other Listed or Protected Species

With regard to other aquatic species or ecological communities and migratory species listed under the TSC and EPBC Acts, Little Penguins are observed fishing and feeding throughout the harbour and could be expected to visit the site from time to time. These are likely to be members of the Little Penguin colony at North Head, which is listed as an Endangered Ecological Community under the TSC Act.

Various listed cetaceans (whales and dolphins), marine mammals (seals and sea lions), marine reptiles (turtles and sea-snakes) and sea-birds (migratory ocean birds and waders) are known from the outer Sydney Harbour and are known to penetrate the harbour to and beyond the study area, albeit rarely. The Bionet search for Sydney Harbour indicated nine marine species listed under the TSC Act; two Endangered species (the Little Tern and the Southern Right Whale), and seven Vulnerable species (Green Turtle), New Zealand and Australian Fur Seals, Humpback Whale, Goulds Petrel, Sooty Tern and Sooty Oystercatcher. The majority of these species are open water or open coastal species that are generally found on the coastline rocky shores around the harbour entrance or in the outer harbour waters. Both the whale species are known to penetrate well into the harbour, including the open waters of the harbour off Lavender Bay.

Of the species that may occur in the vicinity of the site, none would be utilising the resources of the site to any great extent and would generally be in the locality as transients or opportunistic feeders. The site provides only limited undisturbed intertidal rock reef

habitat for seabird roosting or shore bird feeding and limited undisturbed sites for seal haul-outs. It is concluded that there would not be any threatened species residing within the locality of the wharf and that the wharf and the site do not constitute specific habitat for other threatened aquatic species as listed under the FMA, TSC and EPBC Acts.

2.2 Aquatic Habitats and General Ecology

Diver based aquatic ecology surveys of the site were undertaken in April and June 2010 as part of the Stage one Ferry Wharf Upgrade program, with a follow up dive inspection on 28 November 2013 to assess changes since the original surveys. The survey area for the dive survey (the study site) was defined as intertidal plus shallow in-shore waters and seabed around the area of the existing wharf and at the pontoon to be removed and extending south to encompass the area for the new concrete bridge, out to the seabed area proposed for the floating pontoon and the seabed plus rocky reef for 50 m either side of the ferry wharf.

Repeated transect swims were made in order to determine the main aquatic habitats in the study area and ascertain the presence of seagrass or of the listed pest algae species *Caulerpa taxifolia*. Specific surveys were then made of the vegetated aquatic habitats (both reef-based and on structures) to ascertain the suitability of these habitats to support threatened or protected species identified from the data-base searches. The survey days were all sunny with variable wind wave action and intermittent boat wake disturbance, and the waters were generally clear. The main aquatic habitats of the study area are described as follows:

- The shoreline under the Cremorne Point Wharf and north along the side of the roadway has been reclaimed and covered with tarmac and is generally retained by a vertical sandstone block and concrete seawall. This seawall extends under and for a short length south of the existing wharf structure (see Figures 1,2, 8 and 9). There is a natural rock shoreline extending south from the end of the seawall to Cremorne Point (Figure 8).
- There is a rock and rubble reef at the toe of the sea-wall and off the natural riparian rocky shore that extends offshore to around -3m below chart datum (nominally 0m ISLW).
- There is a sandy seabed grading to silty-sand with depth, offshore from the rock and rubble reef.
- The wetted surface areas of the existing shelter shed support piles and of the pontoon and pontoon fender piles provide the other main aquatic habitat at the site.

Besides the intertidal vertical zonation on the seawalls there are three zoned areas of aquatic habitat on the rock reef; several areas of mid intertidal rock reef to 0 m ISLW, the shallow intertidal/sub-tidal fringe (0m to -1m LAT) and the remaining sub-tidal reef to the sand at around -3m LAT contour under and immediately south of the existing shelter shed and to

the -4m LAT contour from 20 m to the south of the wharf and beyond.

The aquatic ecology of seawall to rock rubble reef depth zones is summarised as follows:

Seawall and natural rocky shore:

- The high wetted portions of the seawall and natural rock shoreline (to around 1.5 m above 0m ISLW) supports a variety of intertidal animals dominated by molluscs; Littorinid snails, (*Nodilittorina unifasciata* in the higher intertidal, and *Bembicium nanum* plus Sydney rock oysters in the mid to low intertidal (Figures 8 and 9).

Inner Intertidal Zone and Sub-tidal fringe:

- The low intertidal part of the seawall and exposed areas of the rock platform and rock rubble reef support a variety of barnacle species, plus chitons, limpets, several varieties of periwinkle snails and Sydney Rock oysters (Figures 8 and 9). The declared pest oyster species (Pacific Oyster) was not observed. The tops of the support piles in this zone are covered in Sydney rock oysters (Figure 20).
- There were no mangroves, saltmarsh or seagrass along the foreshore or in the vicinity of the proposed facilities and the nearest seagrass bed is the isolated *Zostera* bed more than 500 m to the north of the wharf (Figure 7).
- The rock rubble toe in the low intertidal/shallow sub-tidal fringe supports a variety of algae species including red encrusting coralline species, *Dictyota* and red plus brown tufted or frondose species. The shallow sub-tidal fringe also supports encrusting tube worms (*Galeolaria caepitosa*), sea squirts (mainly *Cunjevoi*, *Pyura stolonifera*), barnacles and mussels and additional algae such as *Padina* and *Colpomena* (Figures 10 to 15).

Sub-tidal reef

- The sub-tidal reef comprises exposed and fragmented basement rock plus an almost total cover of rock rubble. The reef extends out at least 12 to 13m into water depths up to - 3 m at and around the existing wharf and extends further to the -4m ISLW depth contour from 20m south of the wharf and further south towards the point. The aquatic biota assemblage is dominated by brown macro-algae taxa; kelp, *Ecklonia radiata*, and *Sargassum* species and the kelp understorey supports sponges, encrusting tunicates and frondose bryozoans (Figures 16 to 19). There are a variety of molluscs including turban shells plus mussels.

Sandy Seabed:

- Beyond the sub-tidal rock rubble reef, the seabed comprises loose shelly-sand inshore and under the existing pontoon grading to silty-sand offshore. This habitat type supports small crustaceans, molluscs and worms as evidenced by the variety of mounds and burrows.
- No seagrass beds or individual plants were located in the site.
- There are isolated rocks scattered along the bottom just off the rock rubble reef, and these support kelp or *Sargassum* species (Figure 19).
- A specific search was made for the listed pest algae species *Caulerpa taxifolia* which is known from Sydney Harbour, but none was found in the site on any of the surveys.
- The wharf support and fender piles and the vertical sides of the pontoon showed similar zonation, with barnacles and oysters in the lower intertidal, fringing and frondose algae, tunicates and mussels in the lower intertidal to shallow subtidal zone, mixed frondose algae plus kelp in mid waters, and mixed encrusting biota (with no algae) in deeper waters to the seabed (Figures 20 and 21).

A specific search was made within and around sub-tidal boulder fields at the site for Black Rock Cod. Whilst the rocky reef area under the existing wharf supported a great variety of reef fish, all are common to reefs in Sydney Harbour. There was no suitable rock crevice or cave habitat for adult Black Cod at the site (i.e. within 20 m either side of the existing wharf), and no specimens of Black Cod were observed during the fieldwork for this study. The rock rubble slope habitat does provide suitable shelter and feeding habitat for juvenile Black Cod, which could be expected to occur as transients in the area from time to time.

Specific searches were also made on both dive occasions for syngnathids, with particular reference to White's seahorse, which is known from the harbour. However, whilst there is abundant suitable habitat on the rock reef and rubble habitat and on some of the piles that support the shelter shed, no syngnathids were found or observed on or around the pontoon or pontoon piles. For the existing pontoon and its locator and fender piles there is no seabed rock rubble around the piles to support permanent seahorse numbers or provide suitable transit shelter areas across the bare sand from the inshore reef and there is also no dense kelp cover on the lower pile habitats, both of which are necessary to provide adequate shelter habitat from predatory fish. It is concluded that it is unlikely that seahorses would reside on the support or locator piles for the Cremorne Point pontoon facility.

Prior to the closure of the Sydney Harbour to commercial fishing, prawn trawling was undertaken in the main river channel well away from the existing facilities. There are now no commercial fishing operations and no aquacultural activities in the immediate locality of the site. Consequently the proposal does not have any impact on commercial fishing operations or aquacultural activities.

With regard to the Fisheries NSW waterway classification scheme as shown in Table 2 of the revised Policy and Guidelines document (NSW Fisheries 2013), Shell Cove is a Class 1 “Major key fish habitat” (KFH) by virtue of it being an estuarine waterway. In regard to the sensitivity classification of the specific habitats within Shell Cove (as defined in Table 1 of Fisheries NSW 2013):

- There are no Type 1 “highly sensitive KFH” at or in the immediate vicinity of the Cremorne Point ferry wharf site, and the closest Type 1 habitat is the *Zostera* patch located more than 500 m north of the wharf as indicated on Figure 7.
- The inshore rock and rock rubble reef habitat under and around the wharf is a Type 2 “moderately sensitive KFH” by virtue of the presence of the macroalgae species *Ecklonia* (kelp) and *Sargassum spp.*
- The un-vegetated silty-sand and shell habitat offshore from the inshore rocky rubble reef habitat (is Type 3 “minimally sensitive” KFH).



Figure 8 South side of wharf showing concrete and sandstone seawall with a natural rocky shore beyond.



Figure 9 Seawall north of the wharf and shelter shed support piles.



Figure 10 Inshore intertidal rock rubble reef on the south side of the ferry wharf.



Figure 11 Inshore intertidal rock rubble reef on the north side of the ferry wharf.

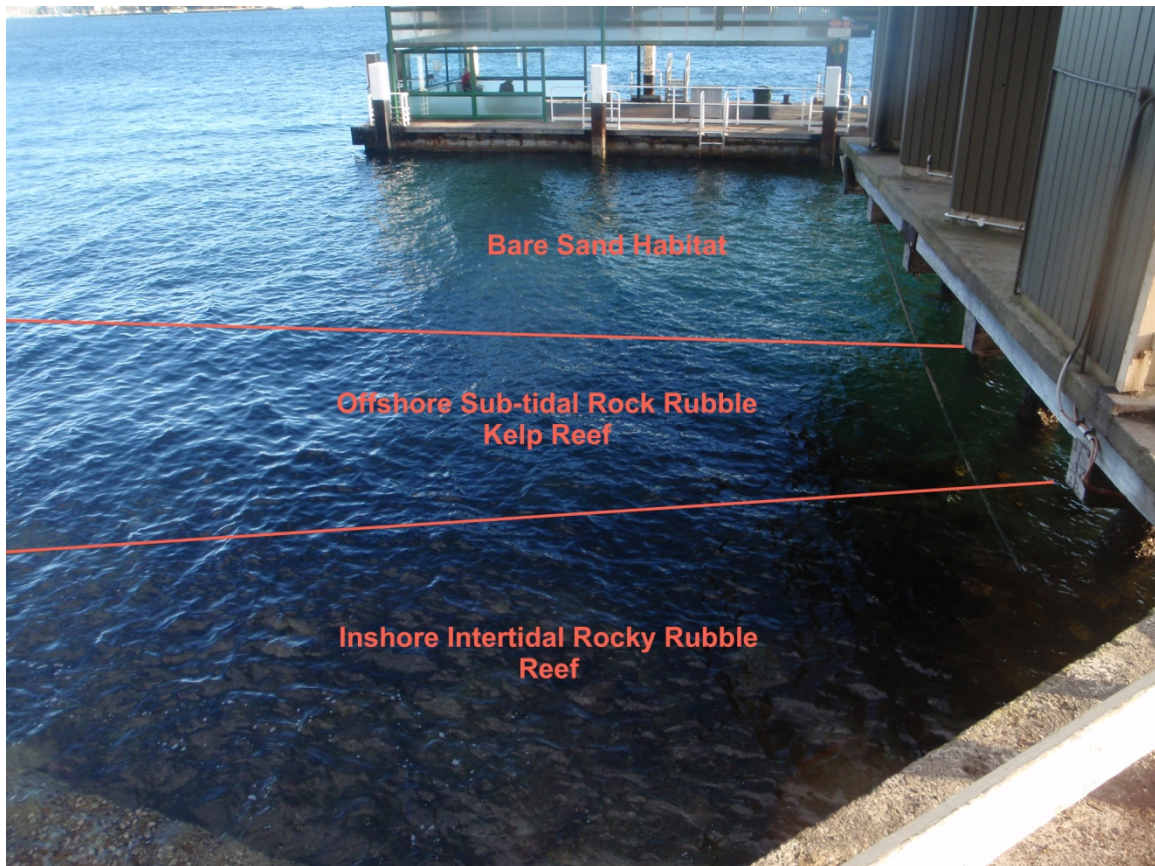


Figure 12 Rock rubble reef zonation under and to the south of the existing shelter shed.

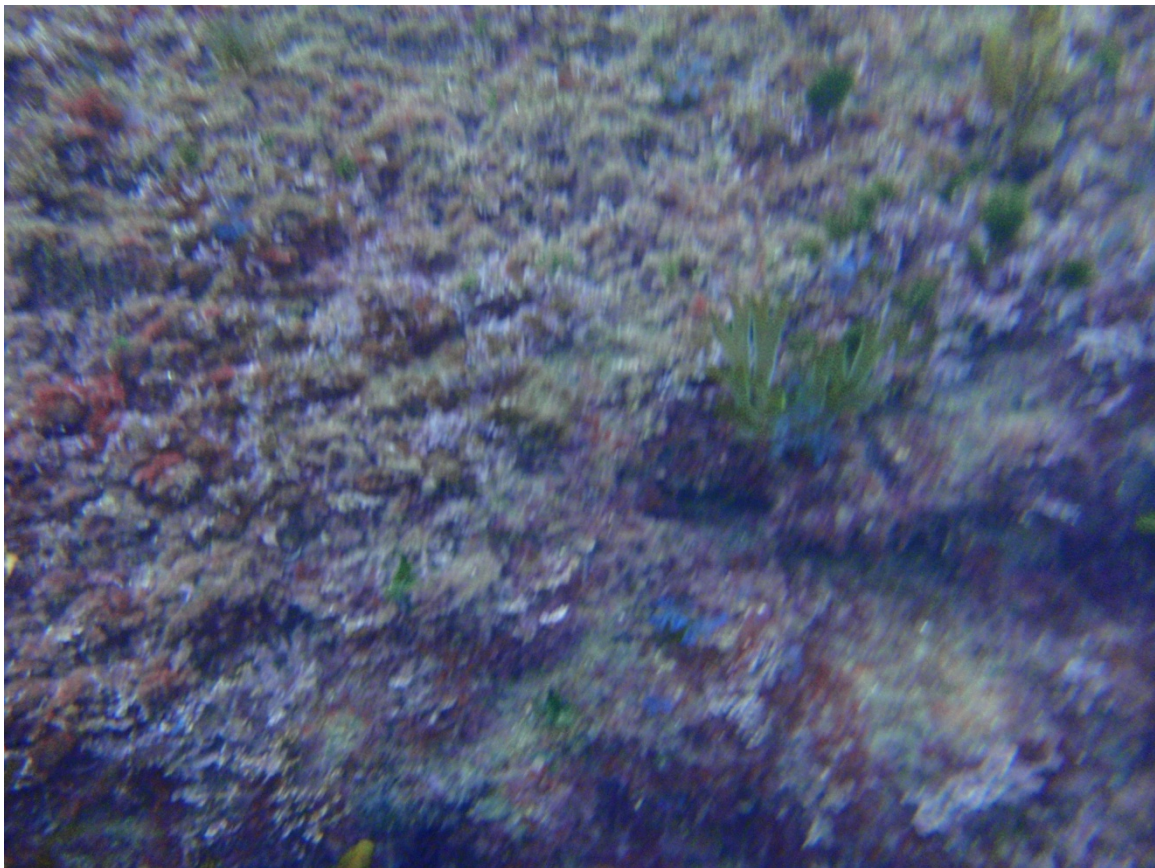


Figure 13 Low intertidal rock with coralline and small frondose algae cover.



Figure 14 Upper edge of rock rubble reef supports mixed encrusting, frondose and brown algae (*Padina sp.*) growth.

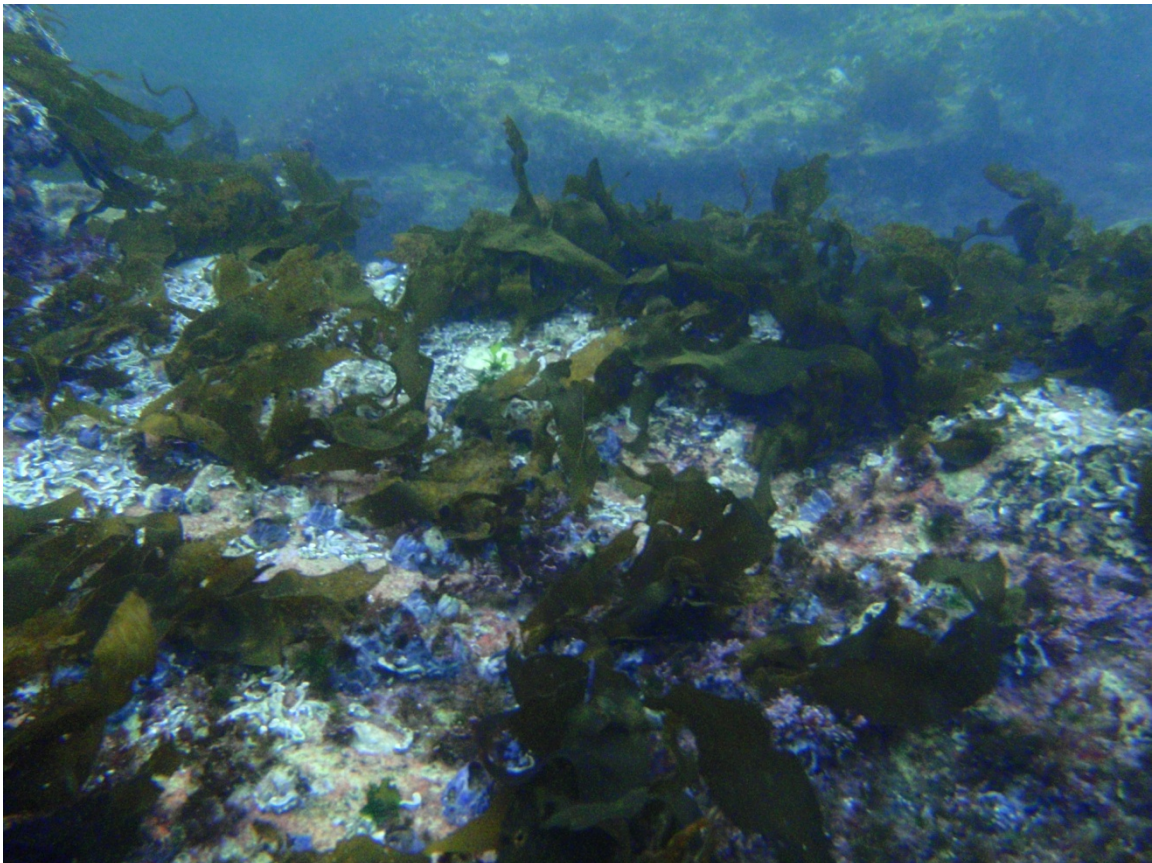


Figure 15 Top of kelp zone on a rock platform site with rock rubble reef in background.

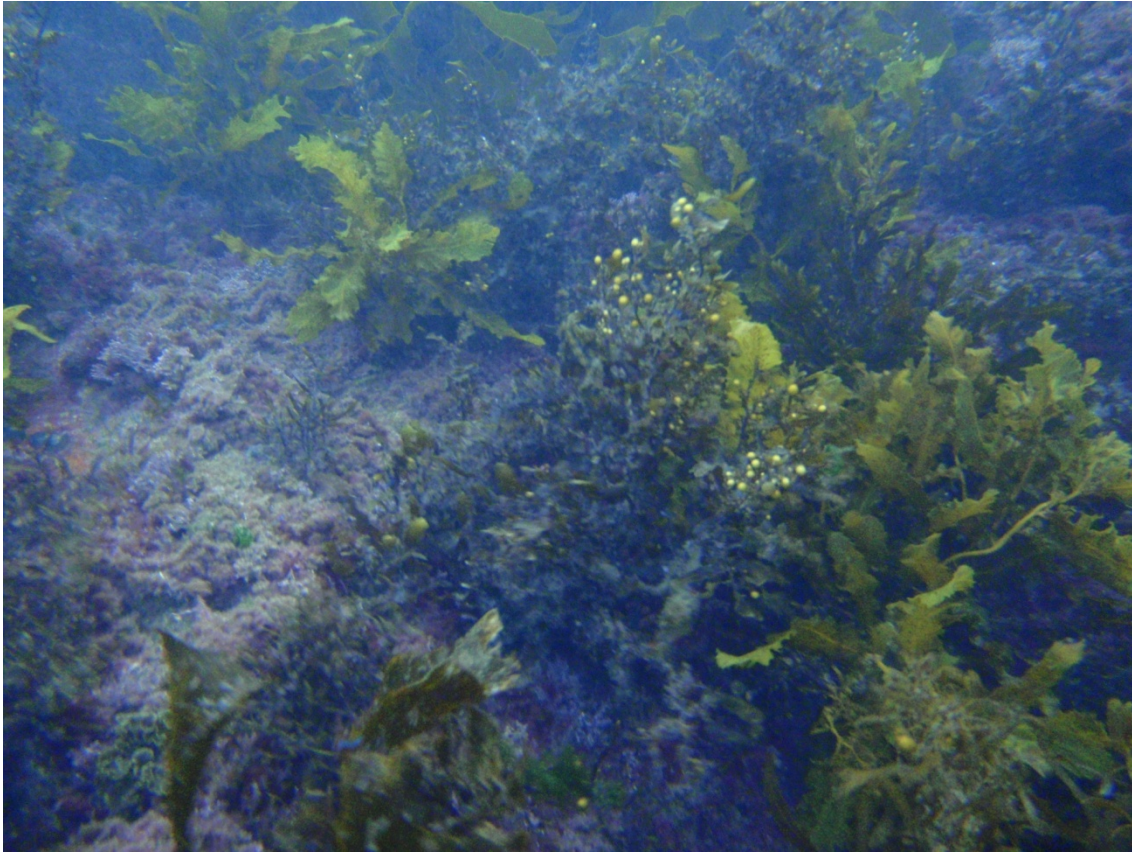


Figure 16 Shallow sub-tidal reef with mixed frondose algae plus kelp and *Sargassum* sp. brown algae cover.

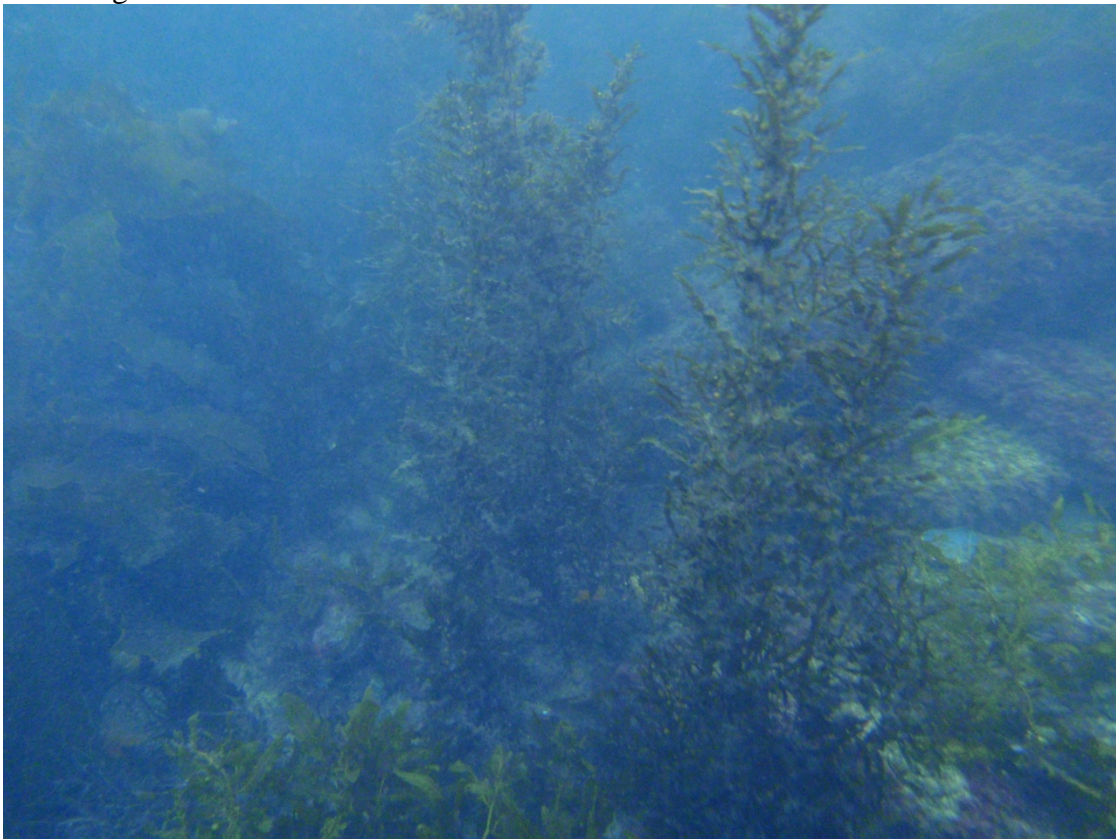


Figure 17 The mid depth rubble reef supports a more or less total cover of brown macroalgae (kelp and *Sargassum*).

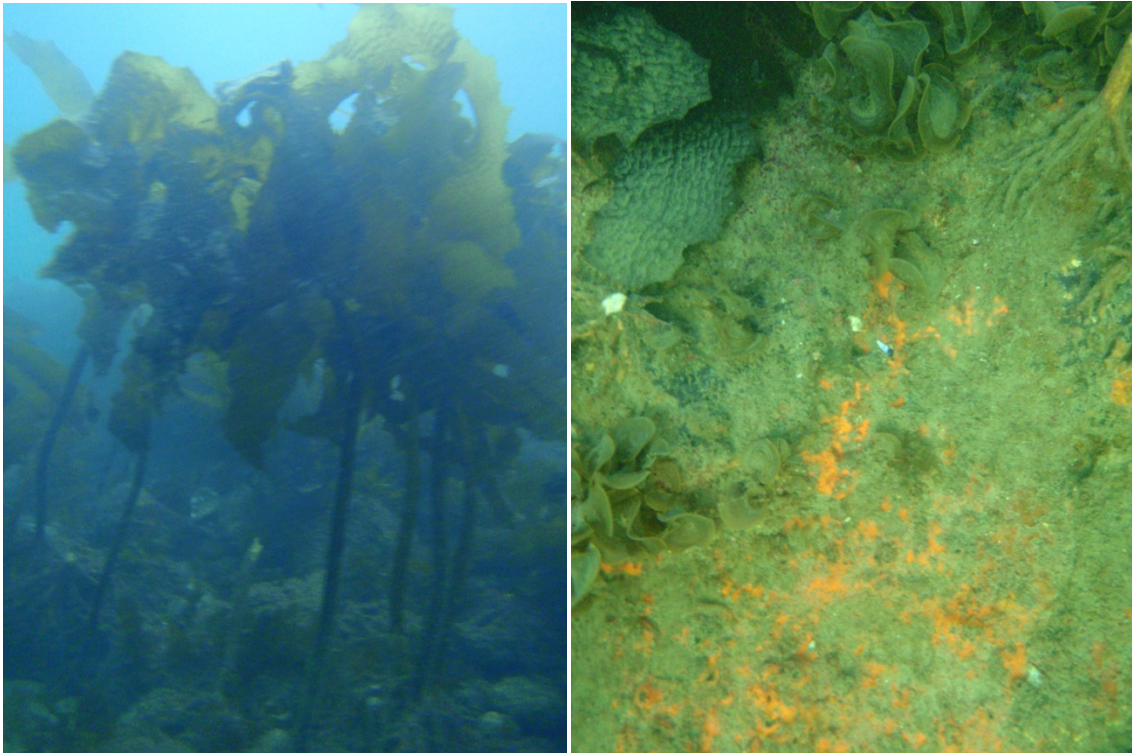


Figure 18 The mid to deep depth rock rubble reef supports an extensive kelp bed (left) and the rock substratum under the kelp canopy supports a variety of encrusting biota including sponges, bryozoans and colonial tunicates.

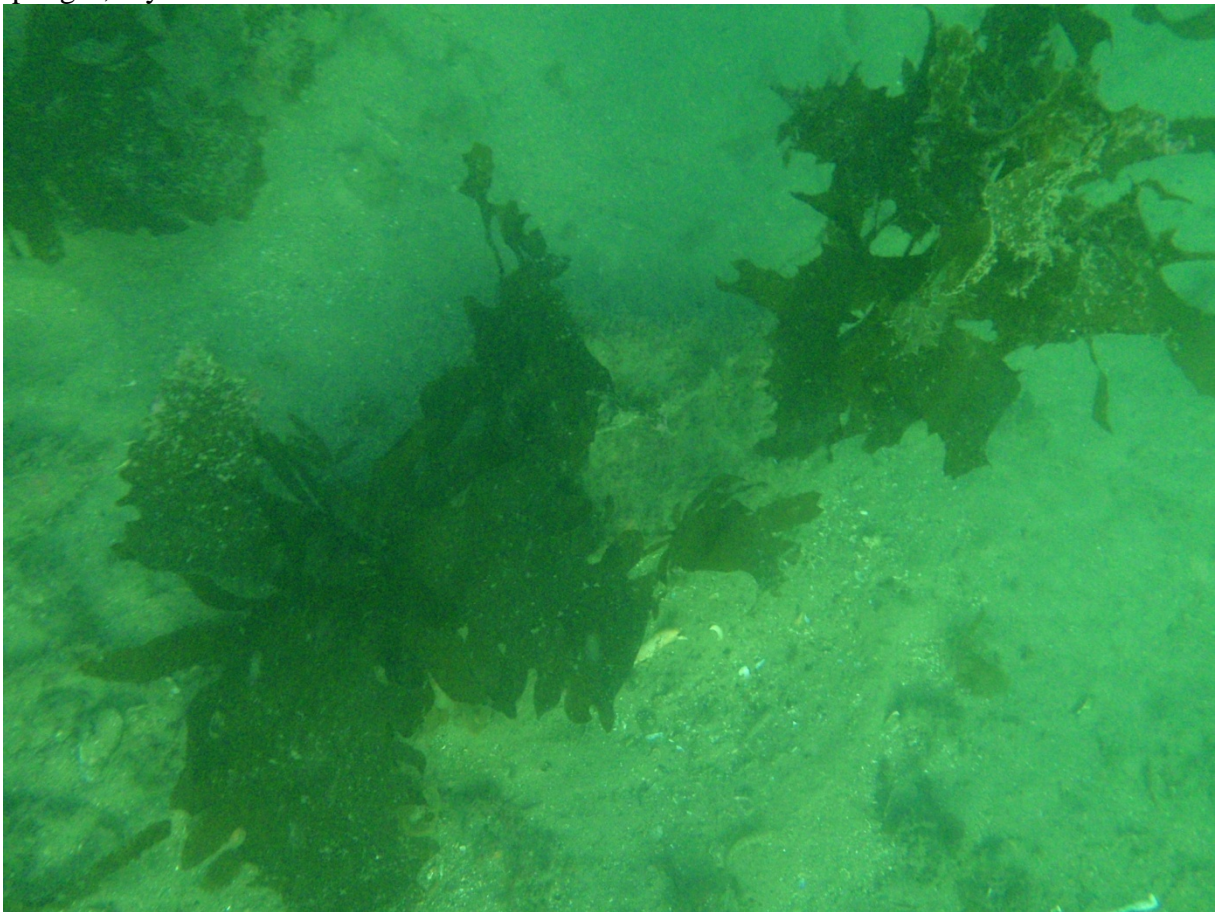


Figure 19 There is sand habitat beyond the rock rubble reef toe and isolated pieces of rubble beyond the toe support individual kelp plants. Photo taken under shelter shed/ramp

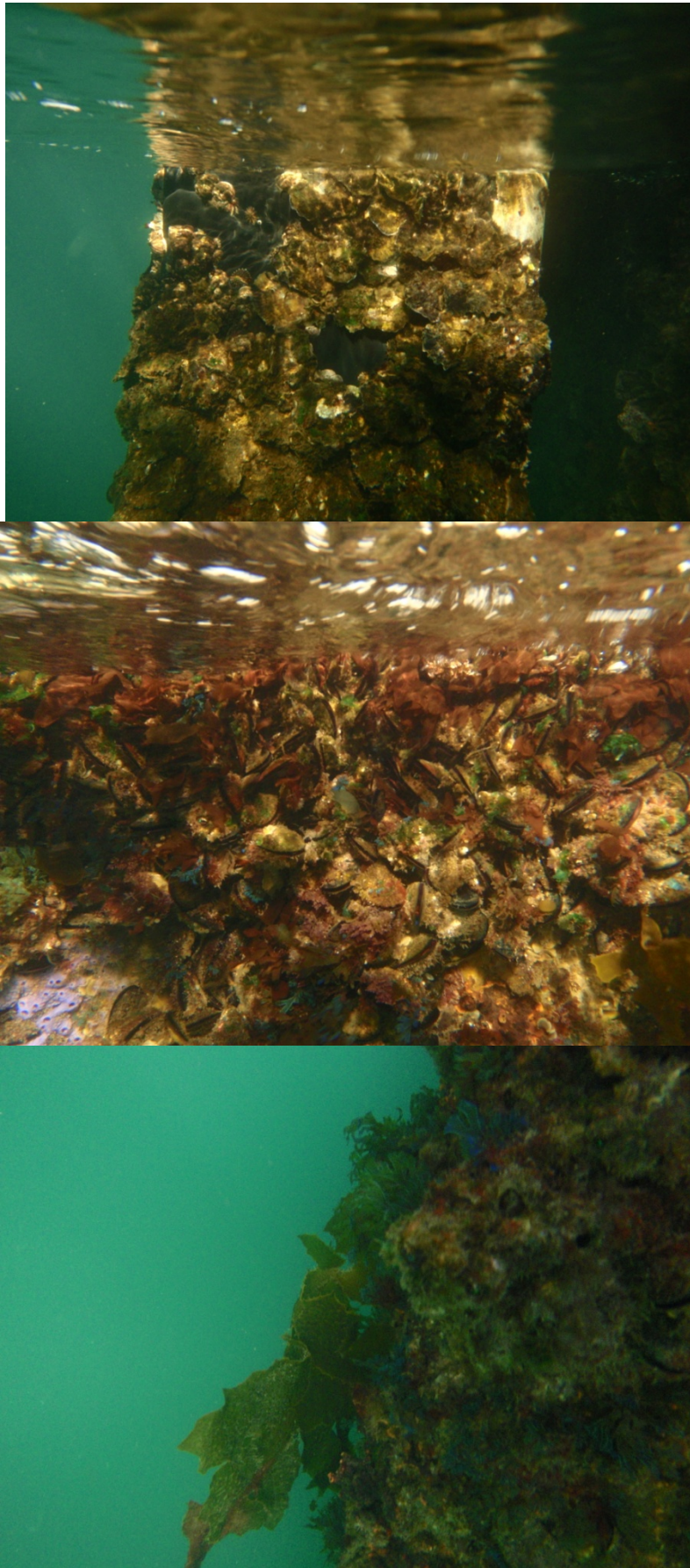


Figure 20 Pile upper surfaces support oysters (top photo) and the pontoon upper surfaces support a complex mix of algae, tunicates and mussels (middle photo).

The pontoon fender piles and the lower vertical surfaces of the pontoon both support a mixed assemblage of tunicates, fringing, frondose and large brown algae (bottom photo).



Figure 21 The deep water surfaces of the pontoon locator and fender piles support a complex assemblage of tunicates, sponges and bryozoans.

3 IMPACT ASSESSMENT AND MITIGATION

With regard to the assessment of possible aquatic impacts, the proposed ferry wharf upgrade (Figure 4) requires:

- Removal of the existing gangway, the 9m by 23m wharf pontoon and the 12 pontoon locator plus fender piles. All the piles to be removed are located in bare sand habitat.
- Placement of six concrete piles in the intertidal to shallow sub-tidal rock rubble area immediately to the south of the existing shelter shed. The habitat area where the piles are to be placed is shown in Figures 8,10 and 12).
- Placement of a pre-cast concrete bridge (3m wide by 6m long) onto the six steel piles.
- Placement of a new 12m by 27m floating pontoon wharf to be held in place by four locator piles (approximately 600mm diameter). The piles will be driven into bare sand habitat.
- Placement of a 16m long aluminium gangway from the concrete bridge to the pontoon and connection of utilities (power, water and communications).

Construction works would require the use of barges and land-based heavy equipment for the removal of the existing pontoon, piles and gangway, for the placement of the bridge support piles and for the placement of the pre-cast bridge sections and of the new pontoon, pontoon locator piles and new gangway. The land-based works will require a temporary works compound placed on the roadway section to the south of the existing waiting shed.

The new concrete bridge and gangway will be located outside the footprint of the existing facility and the bridge and inshore half of the gangway (to 12m offshore) will directly impact some 18m² rock reef algae habitat for the placement of six piles to support the bridge and, once built, the structure will shade some 36m² of shallow to mid depth sub-tidal kelp and *Sargassum* algae habitat. The new pontoon will be partially located over the footprint of the existing ferry wharf pontoon and will not shade any vegetated habitat.

3.1 Management of Construction Impacts

The only in-water demolition work is the removal of the pontoon piles and the in-water construction works are the driving of piles to support the concrete bridge plus driving locator piles for the new pontoon into bare sand habitat.

Pile Removal:

- The removal of 12 piles of nominal 0.3m diameter and with a nominal 1m depth of algae habitat would result in the loss of up to 11.3 m² marine algae habitat. This loss will be offset by the provision of new similar hard substratum wetted surface habitat on the new bridge support and pontoon locator piles. Whilst there are only eight new piles (with wetted sub-tidal areas) required, they will be double the diameter of the existing piles and therefore they will provide up to 15m² pile wetted surface habitat in the shallow (1m) algae zone, which is a net beneficial impact.
- Cryptic species such as the protected Syngnathids (and in particular White's seahorse) are known to shelter amongst the attached biota on pontoons and pontoon locator and fender piles and could be removed or disturbed during pile pulling making them vulnerable to predation by other fish. Whilst there is suitable seahorse habitat in the rock rubble reef in-shore of the piles, there is low seahorse habitat value on the piles themselves and it is considered unlikely that seahorses would be on the pontoon piles at Cremorne Point ferry wharf. None were located during the repeated field surveys for this project. Notwithstanding this conclusion, and given the abundant suitable habitat on the inshore reef, the presence of seahorses on piles during demolition cannot be entirely discounted.

Placement of the New Bridge Structure:

- Placement of the new concrete bridge structure and associated piles will require the removal of loose surface rock to expose basement rock for the placement of the piles. This will result in the direct loss or disturbance of up to 18m² rocky reef algae habitat. The concrete bridge that will be supported by the steel piles will also shade the rocky reef algae habitat and, considering that the works are in shallow waters close to shore it is most likely (i.e., high risk) that the support piles will not recolonise as algae habitat to any great extent. This loss of rocky algae habitat can be mitigated by harvesting the loose rock that needs to be

cleared for the piles and relocating it to form additional rock rubble algae reef of the same area on bare sand habitat at the toe of the existing reef, preferably in front of the existing ferry wharf shelter, in order to gain the maximum benefit of sunlight exposure (see Figure 22). On an area-for-area and like-for-like basis this is a neutral benefit.

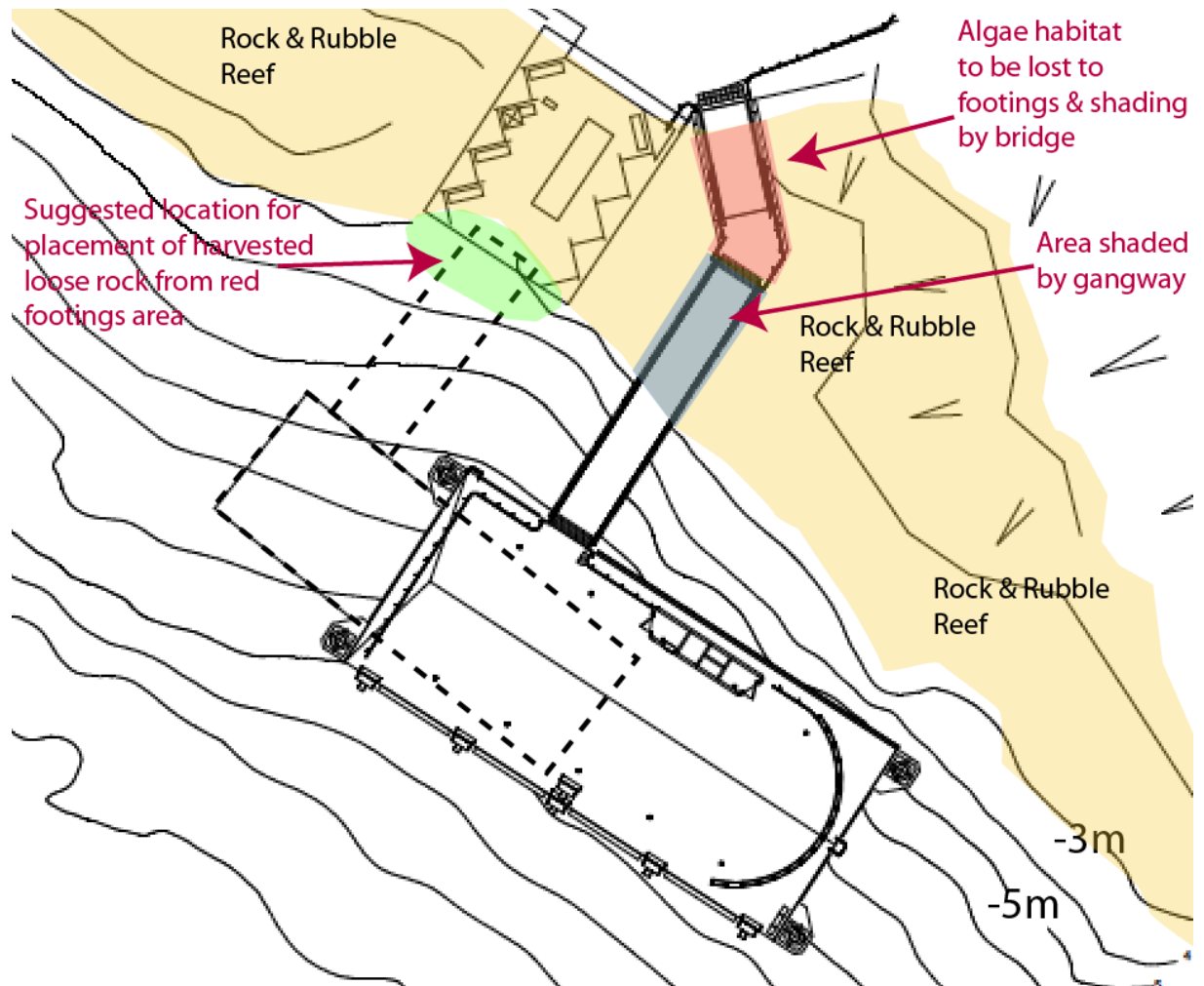


Figure 22 Relationship of proposal to rock and rubble reef showing algae habitats to be lost, potential shaded algae habitats and suggested location for additional rock rubble habitat using harvested rock rubble from bridge support pile site.

- The in-water construction works have the potential to cause excessive turbidity and could result in smothering of adjacent algae habitat. This impact can be limited by the use of silt fences around the piling site that are constructed to contain all sediments within the silt fence and by ensuring that accumulated sediments within the silt fences that are collected are not dispersed over the rocky reef areas. The construction details and in-water silt management for the

bridge support pile site silt curtain would be detailed in the Construction Environmental Management Plan (CEMP).

- Any construction of formwork, concrete pours and the provision of services to the new pontoon from shore that are undertaken over or near the water has the potential for construction materials to be accidentally dropped into the waters. This potential impact can be mitigated to insignificance by the use of best practice construction management procedures that can be written into the project CEMP.
- Use of anchors, mooring blocks and other apparatus for undertaking the construction works and construction related excessive vessel wash and propeller thrust have the potential to damage rock rubble algae. These risks can be mitigated to insignificance by the implementation of suitable mooring, anchoring and work practices as outlined in Section 3.5 below.

Impacts from Pile Driving:

- Placement of the pontoon locator piles will be into bare marine sand habitat, displacing some benthic assemblages residing in the sediments. Given the large expanses of bare sandy sediment habitats throughout the area, this loss is considered trivial. Further, as the number of piles to be removed is larger than the number of piles to be placed there is an overall net increase in available soft substratum habitats resulting from the proposal. This is a beneficial impact.
- Whilst removal and placement of piles creates turbidity, this is not considered a significant problem as turbidity would be localised to the immediate area around the piling work area, would be confined to bottom waters and settle rapidly.
- Notwithstanding, although removal of pontoon piles is not expected to generate sufficient turbidity such that adjacent rocky rubble habitats would be put at risk from smothering, there remains a low risk for cryptic reef fish residing in the inshore rocky rubble habitat. This risk can be mitigated by the use of a silt curtain parallel to the shore between the proposed pile removal works and the inshore rocky rubble reef habitat.
- Placement of piles will not result in the mobilisation of contaminants from the sediments. Inserted pile force sediment downward via the pile friction effect and laterally away via displacement. This means that there is little or no upward mobilisation of the sub-surface sediments that could contain contaminants, as the pile driving action further buries displaced sub-surface sediments.

- Diving of piles creates impact noise that can adversely affect the behaviour of cetaceans and other marine mammals that are known to penetrate the harbour beyond the Harbour Bridge and could conceivably be in the vicinity of the construction pile driving works. Marine mammals, if in the locality, would be conspicuous and, given the harbour situation, they would be well monitored in regard to location, species and numbers, and their presence would be well publicised (including via regular marine VHF radio notices from Sydney Ports Corporation. Accordingly, if there are marine mammals in the vicinity of the piling works the contractors will need to stop piling works until they have left the locality (see Section 3.5 for further details).

Shading Impacts:

- The inshore half of the new gangway will shade some 18m² rock rubble reef south of the shelter shed (see Figures 8,10, 12 and 22). Given the height of the gangway above the reef and noting that algae do grow under the front of the existing shelter shed, it is likely that there would be sufficient ambient, reflected and refracted light reaching the shaded parts of the reef to continue to support algae growth under the new gangway. On balance there is a low shading risk for the outer half of this shaded section (9m²) and a medium shading risk for the inner section (9m²).

Based on the above considerations the following losses and gains in rocky reef plus other hard substratum habitats that support marine algae are expected:

- A loss (11.3m²) and gain (up to 15m²) of hard substratum pile algae habitat.
- A direct loss of inshore rocky reef habitat to pile placement of up to 18m² that can be balanced by utilising the harvested rock rubble to create a similar area of rock algae habitat as indicated in Figure 22.
- A medium shading risk for 9m² of rock reef algae habitat under the inshore quarter of the gangway (which is considered a loss of algae habitat) and a low shading risk for 9m² of rock reef algae habitat under the inside quarter of the gangway over deeper reef algae habitat (considered a neutral impact).
- The new pontoon is larger than the existing pontoon and, based on a nominal vertical wetted surface depth of 0.5m on the existing and new pontoons, there will be a net gain of 54m² in pontoon vertical wetted surface hard substratum habitat area for marine biota. This is considered a beneficial impact.

- The extra hard substratum wetted surface areas would provide 63m² additional good quality algae habitat against the loss of the 18m² intertidal/shallow sub-tidal algae habitat to piles and 9m² to shading, thus meeting the minimum 2:1 compensation requirement, as outlined in the revised Fisheries (2013) guidelines Section 3.3.3.2.
- The net increase in available hard substratum algae and attached biota habitat will in turn provide increased shelter and feeding habitat for small reef fish and for the larger pelagic fish that prey on these reef fish.

3.2 Management of Operational Impacts

With respect to the possible operational impacts from use of the proposed facility on the aquatic ecology of the locality, there is a neutral impact expected from the use of the new facility for ferry services:

- Both pontoon wharves are parallel to the shore, over bare coarse silty-sand habitat with a minimum water depth of -9m ISLW, and ferries will be orientated parallel to the shore which means that propeller wash is directed over deep waters and not towards the shallow in-shore rock and rubble reef.
- With regard to litter arising from use of the wharf, this is an ongoing concern for the present wharf and more generally for all the public ferry wharves in Sydney Harbour. Accordingly, this impact would be minimised by the use of current best practice as applied by Sydney Ferries to resolve this problem.

3.3 Fisheries Management Act Permit and Habitat Protection Requirements

Section 7.1 of the Fisheries NSW Policy and Guidelines (Fisheries NSW 2013) states that there must be *no net loss of fish habitat* and Section 3.3.3 of the Policy and Guidelines notes that under the Fisheries Management Act 1999 (FM Act) Section 220, there are a number of activities available that can be used to mitigate damage to fish habitat:

- *habitat rehabilitation* is defined as repairing damage caused by past activities, and *environmental compensation* is defined as the creation or enhancement of fish habitats or fisheries resources in order to compensate for anticipated adverse or actual environmental effects of proposed developments.

- Habitat rehabilitation can be either passive or active. After the removal of the damaging or inhibiting factor or structure some habitats can be left to passive natural processes to rehabilitate the area.
- Environmental compensation (where required) must consider the representativeness and value of different types of habitats and compensation for Type 1 to 3 key fish habitat must be calculated on a minimum 2:1 basis (Policy and Guidelines Section 3.3.3.2).

For the Cremorne Point ferry wharf upgrade project, the aim of *no net loss of fish habitat* can be achieved by the implementation of appropriate construction mitigation measures and environmental compensation measures as outlined in Section 3.1 above and summarised in Section 3.5 below.

Part 7 of the Fisheries Management Act 1994 (FMA) sets out the conditions under which permits are required for various construction activities, and the conditions under which a permit may be granted are specified in the Fisheries NSW Policy and Guidelines (Fisheries NSW 2013).

With respect to estuarine activities, permits are required for reclamation or dredging works, for the taking or harming of marine vegetation or for relocating fish:

- The present proposal does not include dredging or reclamation.
- There are direct (removal) and indirect (shading) impacts on algae marine vegetation arising from the proposed works and a permit to harm marine vegetation would be required.
- Provided adequate construction safeguards and environmental compensation measures as described in Section 3.1 above and summarised in Section 3.5 below are implemented, the construction works would result in a net increase in macroalgae habitat.
- The project has a Section 37 permit in place to relocate seahorses (if found on the piles to be removed) and there is suitable alternate rocky rubble reef kelp habitat available for relocation.

3.4 Sydney Region Environmental Plan (Sydney Harbour Catchment) 2005

Clause 21 of the SREP (Sydney Harbour Catchment) outlines nine criteria for biodiversity, ecology and environmental protection:

- 17(a) *Need for development to have a neutral or beneficial effect on water quality entering the waterway.*

Provided construction works utilise best management practice for containing water and materials runoff from the site, water quality impacts would be minimal and temporary.

- 17(b) *Need for development to protect and enhance terrestrial and aquatic species, populations and ecological communities and, in particular, should avoid physical damage and shading of aquatic vegetation (such as seagrass, saltmarsh and algal and mangrove communities).*

Whilst the development would result in a loss of 27m² algae habitat to placement of piles and shading of existing algae habitat there would be a net gain of 63m² algae habitat from mitigation and environmental compensation measures.

Marine mammals, reptiles and aquatic or migratory birds may utilise the aquatic resources of the site on a transient or opportunistic basis and would not be impacted, as there is abundant alternate or equivalent habitat in the locality and throughout the harbour. Impact noise disturbance from pile driving activities would be mitigated by ceasing pile driving activities when there are marine mammals in the locality.

No Syngnathid fish were found on the piles to be removed and based on the lack of suitable shelter habitat on and around the piles, none are expected. They are expected to reside in the adjacent (inshore) rocky reef. Accordingly, a final check for syngnathids will be made immediately prior to construction works commencing and if found will be relocated to suitable inshore rock rubble habitat away from the construction zone. Protection of inshore rocky reef syngnathids from turbidity and smothering during footing works will be achieved by the use of silt curtains between the footing works and adjacent rock rubble reef.

- 17(c) *Need for development to avoid indirect impacts on aquatic vegetation as a result of increased access.*

There would be no increased access to the aquatic vegetation at the site arising from the development.

- 17(d) *Need for development to avoid indirect impacts on aquatic vegetation (such as changes to flow, current and wave action and changes to water quality) as a result of increased access.*

By virtue of the openness of the site to the harbour, there are unlikely to be any changes to tidal flow, currents, wave action or water quality

arising from the proposal and thus there would be no indirect impact on aquatic vegetation arising.

17(e) Need for development to protect and reinstate natural intertidal foreshore areas, natural landforms and native vegetation.

There are no natural inter-tidal foreshore areas, natural landforms or native vegetation) at the construction site, as this is a totally reclaimed and paved site. The proposal would have no net impact on the aquatic vegetation on the wetted surface areas of the seawall or of natural intertidal foreshore areas to the south of the construction site and there would be an overall beneficial impact, as the wetted surface areas of the ferry pontoon would provide additional habitat for marine biota including macroalgae.

17(f) Need for development to retain, rehabilitate and restore riparian land.

The total riparian shore at the construction site comprises reclaimed land behind revetment walls (sandstone and concrete). The project does not include any works on natural riparian lands and thus does not affect existing riparian land which is located south of the construction site.

17(g) Need for development on land adjoining wetlands to maintain and enhance the ecological integrity of the wetlands and where possible to provide a vegetative buffer to protect wetlands.

The DCP for the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 indicates that there are designated wetlands at and in the near vicinity of the wharf upgrade development.

Construction of the proposal includes mitigation and environmental compensation measures that together would result in a net gain in marine algae habitat, and the upgrade works can be managed in a manner to protect the adjacent vegetated rocky reef.

17(h) Need to assess the cumulative environmental impact of the development.

Assessment of the cumulative impacts of the proposal on the aquatic environment provided above indicates that as recolonisation of new rubble reef and of new hard substratum habitat occurs there would be a reinstatement of an assemblage of aquatic biota that would be similar but not necessarily the same as that currently at the site. There are no long-term water quality or ecological impacts arising from the proposal. There is an additional beneficial impact from the provision of further hard-substratum macroalgae habitat on the pontoon and pile surfaces. Accordingly, the net impact of the upgrade would be

beneficial compared to the present situation.

17(i) *State whether sediments in the waterway adjacent to the development are contaminated, and what means will minimise their disturbance.*

Whilst there is no information available on the contamination status of the sediments adjacent to the development, the fact that the sediments comprise mainly well-sorted loose clean sand with little or no silt content would indicate a low risk of there being contaminants in the surface sediments at the site. Further, as there would only be pulse (transient) disturbance of sediments arising from piling during construction works and no disturbance from operational use of the upgraded facilities, there are no disturbance impacts expected.

3.5 Recommended Mitigation Measures

The Cremorne Point ferry wharf upgrade project can achieve the aim of *no net loss of fish habitat* by the implementation of appropriate construction mitigation and environmental compensation measures, and all contractors undertaking construction work associated with the upgrade project should ensure that their activities do not cause any harm to marine vegetation habitats (i.e., rock and rubble reef) in the shallow waters along the Shell Cove shoreline out to the -4m depth contour (Figure 22).

Potential impact can be mitigated to insignificance by the use of best practice construction management procedures incorporated into a Construction Environmental Management Plan (CEMP) for the project that includes the following environmental compensation measures and construction precautions:

- The risk of turbidity and smothering of inshore rock and rubble reefs arising from piling operations can be mitigated by the use of a silt curtain parallel to the shore between the proposed pile removal works and the inshore rocky rubble reef habitat, set between the -4m and -5m contours as shown on Figure 22.
- All piles to be removed are to be inspected for syngnathid fish (mainly sea-horses) prior to removal, and any syngnathids found are to be captured and released to appropriate alternative habitat well away from the existing facility some 50m to the south of the existing wharf. This work will be undertaken by appropriately qualified aquatic biologists against a Section 37 permit issued under the FMA (P12/0008-2.0).
- In order to minimise swimming distances for reef fish from piles being pulled to

remaining piles in-shore and eventually to the rock rubble habitat, piles should be systematically removing from seawards towards the shore.

- In the unlikely event that further syngnathid fish are found during the pile pulling operations, they should be collected where this is safe to do so and placed in a large bucket of fresh seawater pending further advice from the relevant expert.
- Excessive turbidity and smothering of adjacent algae habitats arising from the in-water footing and concrete pile construction works will be limited by (a) the use of silt fences around the bridge piles site that are constructed to contain all sediments within the silt fence, and (b) by ensuring that accumulated sediments within the silt fences that are collected are not dispersed over the rocky reef areas. The silt fence construction details and in-water silt management for the bridge piles site silt curtain will be detailed in the Construction Environmental Management Plan (CEMP).
- The loss of rocky algae habitat to placement of inshore piles is to be mitigated by harvesting the loose rock that needs to be cleared off the basement rock for the piles and relocating it to form additional rock rubble algae reef of an equivalent area on bare sand habitat at the toe of the existing reef in front of the existing ferry wharf shelter (see Figure 22). The methods for collecting and placing the harvested rock will be detailed in the project CEMP.
- The potential for construction materials to be accidentally dropped into the waters during the construction of formwork for the footings, the concrete pours and the provision of services to the new pontoon from shore will be mitigated by the use of best practice construction management procedures that will be detailed in the project CEMP.
- Whilst the possibility of listed sharks, cetaceans, other marine mammals and reptiles being at the site during construction activities has been assessed as highly unlikely, if any threatened aquatic species are noted at the construction site unexpectedly, all in-water construction works should be halted until the species has left. To this end the contractor will need to keep a radio listening watch to Sydney Port Control for information about sightings of marine mammals:
 - Prior to commencement of pile driving operations, the contractor is to call Sydney Port Control to check whether there have been any sightings of marine mammals and if so their current location.
 - If marine mammals are reported between Clifton Gardens and Sydney Harbour Birdge (or travelling in a direction to place them between these limits in a short time), pile driving operations are to cease or not be

undertaken until the marine mammals are reported to be west (and continuing west) of Sydney Harbour Bridge, or back east, well and clear of Clifton Gardens and travelling east.

- By virtue of the shallow depths over the inshore rock and rubble reef habitat, no vessel is to be taken over the rock rubble reef habitat as shown on Figure 22.
- There should be no stockpiling of demolition or construction materials on the seabed and all demolition materials are to be removed off-site for appropriate disposal.
- No vessel should be moored with anchors or other bottom tackle located in the rock and rubble reef habitats inshore of the -4m ISLW depth contour (Figure 22).
- Mooring lines or cables should not be laid across the rock and rubble reef habitat if there is any risk of these cables reaching the bottom due to wave action or low tides. If deployed, they should be suitably buoyed prior to laying, and kept buoyed once laid, to prevent cable drag and cable swing damage to marine vegetation growing on the rock and rubble reef. Where this is impractical, contractors should use floating rope.
- In order to minimise wash and prevent bottom scouring of the algae (rock and rubble reef) habitat, towing or pushing vessels should not use excessive power to manoeuvre barges into place over the reef habitat area. Scouring damage can also be minimised by 'working the wind and tides', i.e., only moving floating plant into place on high tides and under favourable or no-wind conditions.

4 CONCLUSIONS

It is concluded that removal of the existing public wharf pontoon and gangway facility and the construction plus use of a new bridge jetty plus gangway and floating pontoon wharf at Cremorne Point, would result in losses of intertidal aquatic habitat and organisms to construction and a long-term gain in available marine vegetation (algae) habitat post-construction:

- Disruption to associated fish assemblages including protected Syngnathids would be negligible.
- Loss of rock and rubble reef algae habitat to placement of footings and to shading would be environmentally compensated for by the harvesting and re-use of reef rock from the footings site to provide high value kelp and *Sargasum* reef habitat, and will be further mitigated by the provision of some 63m² of additional high value vertical pontoon and pile wetted surface areas that would be recolonised by algae-based assemblages.
- Additional possible impacts arising from the proposed construction works and from operation of the new facilities can be satisfactorily mitigated by appropriate best-practice construction, demolition and operational safeguards as outlined in the report.

On balance, there would be a net beneficial impact from the proposed ferry wharf replacement; there would be no net loss of aquatic habitat to construction and in the medium to long term, there would be a beneficial impact for reef fish assemblages utilising the additional marine assemblages attached to the wetted surfaces of the ferry pontoon.

There would not be any additional navigation hazards arising from the proposal and the location and orientation of the new ferry wharf in deep waters offshore parallel to the shore provides ample security against propeller and wash impacts on inshore reef ecosystems.

The Cremorne Point Ferry Wharf replacement project can be satisfactorily managed to satisfy the aquatic ecology conservation requirements of the SREP (Sydney Harbour Catchment) 2005 and the aquatic ecology and fish habitat conservation requirements of the Fisheries Management Act 1994 (FMA) as set out in the Fisheries NSW Policy and Guidelines (NSW Fisheries 2013) to ensure that there would be *no net loss of fish habitat*. The proposed works would require a permit under the FMA to harm marine vegetation.

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**APPENDIX A THREATENED AND PROTECTED SPECIES
AND POPULATIONS**

IN SYDNEY HARBOUR. NSW

SEARCH CENTERED ON

CREMORNE POINT WHARF

WITH 10KM BY 10KM BOUNDARY

Public Report of all Valid Records of Animals in selected area [North: -33.79 West: 151.17
East: 151.28 South: -33.89] returned a total of 10,304 records of 320 species.
Report generated on 11/03/2014 11:53 AM.

Table A1 Listed marine species that have been recorded in the 10km square Bionet Search Area

Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Reptilia	Cheloniidae	<i>Chelonia mydas</i>	Green Turtle	V,P	V	1
Aves	Procellariidae	<i>Ardena pacificus</i>	Wedge-tailed Shearwater	P	J	3
Aves	Procellariidae	<i>Ardena tenuirostris</i>	Short-tailed Shearwater	P	J,K	1
Aves	Procellariidae	<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel	V,P	E	1
Aves	Spheniscidae	<i>Eudyptula minor</i>	Little Penguin	P		51
Aves	Ardeidae	<i>Egretta sacra</i>	Eastern Reef Egret	P	C	1
Aves	Ardeidae	<i>Ixobrychus flavicollis</i>	Black Bittern	V,P		2
Aves	Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	P	C	14
Aves	Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V,P,3		1
Aves	Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	V,P		3
Aves	Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	P	C,J,K	1
Aves	Stercorariidae	<i>Stercorarius longicaudus</i>	Long-tailed Jaeger	P	J	1
Aves	Laridae	<i>Onychoprion fuscata</i>	Sooty Tern	V,P		1
Aves	Laridae	<i>Sterna hirundo</i>	Common Tern	P	C,J,K	2
Aves	Laridae	<i>Sternula albifrons</i>	Little Tern	E1,P	C,J,K	1
Mammalia	Otariidae	<i>Arctocephalus forsteri</i>	New Zealand Fur-seal	V,P		2
Mammalia	Otariidae	<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	V,P		6
Mammalia	Balaenidae	<i>Eubalaena australis</i>	Southern Right Whale	E1,P	E	3
Mammalia	Balaenopteridae	<i>Megaptera novaeangliae</i>	Humpback Whale	V,P	V	1

Appendix C

Correspondence from DPI (NSW
Fisheries)

Peter Mangels

Subject: FW: Cremorne Point Ecologic report
Attachments: AHP Central - lodgement & payment options - Aug 2014.pdf

From: Carla Ganassin [<mailto:carla.ganassin@dpi.nsw.gov.au>]
Sent: Thursday, 21 August 2014 9:07 AM
To: Peter Mangels
Subject: Re: Cremorne Point Ecologic report

Dear Paul

Thank you for referring this Review of Environmental Factors for Cremorne Wharf onto Fisheries NSW for comment.

Fisheries NSW has no objections to these works, provided that:

- A s.205 permit to harm marine vegetation under the *Fisheries Management Act* is obtained from this Department before construction begins. This is for the likely shading of macroalgal communities from the new wharf. Permit application forms are available

from: <http://www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/toolkit#Permit-application-form>. Information on how to lodge and pay for permit applications are attached.

- The mitigation measures outlined in this REF are implemented. In particular the use of a silt curtain, the relocation of algae covered boulders within the footprint of future piling works, and the avoidance of the direct harm of algal habitat from vessels during construction.

Please call if you have any questions about this.

Regards,

Carla Ganassin | Regional Assessment Officer
NSW Department of Primary Industries | Fisheries NSW | Aquatic Ecosystems Unit
Suite 1, Terrace Level, Crown Tower, 200 Crown Street, Wollongong NSW 2500
SEND MAIL TO: Locked Bag 1 | Nelson Bay NSW 2315
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W: www.dpi.nsw.gov.au

Conserve, Share, Provide

On 11 March 2014 13:06, Paul Blair <PBlair@hansenyuncken.com.au> wrote:

Carla

I have attached the Ecologic report and plan for the New Cremorne Point Wharf this is the next in our series of wharf upgrade programme it is similar in design to Neutral + Rose Bay that you provided comment.

Our report does address a number of matters and we would like your comments.

Regards

Paul Blair

Design Manager

Hansen Yuncken Pty Ltd

Sydney Airport Central

L6 15 Bourke Road Mascot NSW 2020

T 02 9770 7600 **F** 02 9770 7601 **M** 0439 620 646



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Appendix D

Consideration of clause 228(2) factors and matters of national environmental significance

Clause 228(2) Checklist

In addition to the requirements of the *Is an EIS required?* guideline as detailed in the REF, the following factors, listed in clause 228(2) of the Environmental Planning and Assessment Regulation 2000, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Factor	Impact
<p>a. Any environmental impact on a community?</p> <p>There would be impacts to public transport during construction of the proposal. The existing wharf would be closed for up to six months and during this time the ferry service would not operate. Commuters would need to utilise alternative public transport potentially increasing travel times or use private transport.</p> <p>There would be construction noise impacts on nearby residents and a commercial receiver associated with construction.</p> <p>The original Cremorne Point Wharf would continue to be available for use by recreational vessels and water taxis in operation. The proposal would result in improved public transport facilities within Sydney Harbour.</p> <p>Impacts would be minimised through implementing the safeguards and management measures identified in chapter 7 of the REF.</p>	<p>High, short term negative impact.</p> <p>High, short term negative impact.</p> <p>Long term neutral impact.</p> <p>Long term positive impact.</p>
<p>b. Any transformation of a locality?</p> <p>Visual and landscape character impacts associated with the proposal would be low to moderate. The location of the proposed wharf would be similar but would extend further south. The new wharf would result in additional structures visible along a predominately undeveloped section of foreshore. Impacts are minimised through the use of neutral colours and transparent materials which are low in reflectivity.</p>	<p>Low to moderate, long term negative impact.</p>
<p>c. Any environmental impact on the ecosystems of the locality?</p> <p>There would be a loss of up to about 18m² of rocky reef habitat in the short term from the construction of the bridge piles. Protected Syngnathiformes would be relocated from these areas to adjacent habitat clear of the construction area. The loss of this habitat would be mitigated in the medium to long term by relocating loose rock that needs to be cleared for the construction of the footings to form rock rubble algae reef in front of the existing wharf building. Refer to section 6.5.</p> <p>Overall, there would be an increase in hard substratum algae and attached biota habitat by about 54m². This would have a beneficial impact by providing increased shelter and feeding habitat for small reef fish and for the larger pelagic fish that prey on these reef fish.</p> <p>There would be a loss of organisms living in the rock rubble and sediments of the seabed (ie benthic biota) due to the placement of proposed new piles and construction of bridge footings.</p> <p>There would be a potential increase in water turbidity in harbour sediments due to the removal and installation of piles, construction of bridge footings and the operation and anchoring of construction vessels.</p>	<p>High, short term negative impact</p> <p>High, long term, positive impact.</p> <p>High, temporary, negative impact.</p> <p>Low, temporary negative impact.</p>

Factor	Impact
<p>d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?</p> <p>There would be a temporary reduction in the aesthetic quality of the locality due to the construction works proposed.</p> <p>Visual and landscape character impacts associated with the proposal would be low to moderate. The location of the proposed pontoon would be similar but would extend further south. The new wharf would result in additional structures visible along a predominately undeveloped section of foreshore. Impacts are minimised through the use of neutral colours and transparent materials which are low in reflectivity.</p> <p>There may be some impacts to the environmental quality of the locality, however, these impacts are considered to be low to moderate and temporary during the construction stage. There would be no long term reduction in environmental quality or value as a result of the proposal.</p>	<p>Low to moderate, temporary negative impact.</p> <p>Low to moderate, long term, negative impact.</p> <p>Low to moderate, temporary negative impact.</p>
<p>e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?</p> <p>The existing wharf is not identified as being an item of heritage significance. There are heritage items within the vicinity of the site. The impact on the significance of these items can be appropriately mitigated with the implementation of the safeguards at section 7.2.</p> <p>Aboriginal sites would not be impacted by the proposal.</p>	<p>Low, short term negative impact.</p> <p>Nil.</p>
<p>f. Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?</p> <p>There would be a loss of up to about 18m² of rocky reef habitat in the short term from the construction of the bridge piles. Protected Any Syngnathiformes would be relocated from the piles to be removed and the area of the footings to adjacent habitat clear of the construction area. The loss of this habitat would be mitigated in the medium to long term by relocating loose rock that needs to be cleared for the construction of the footings to form rock rubble algae reef in front of the existing wharf building. Refer to section 6.5.</p>	<p>High, short term negative impact.</p>
<p>g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?</p> <p>The proposal would not endanger any species of animal, plant or other form of life whether living on land, in water or in the air due to the limited scope of work. Refer to section 6.5.</p>	<p>Nil.</p>
<p>h. Any long-term effects on the environment?</p> <p>The proposal would provide greater amenity for users of the wharf in the long term through the provision of an upgraded and high quality wharf.</p>	<p>Long term positive impact.</p>

Factor	Impact
<p>i. Any degradation of the quality of the environment?</p> <p>Contamination of water from accidental materials falling onto the aquatic habitats, spills, leaks, sediment run off and litter during construction. The potential impact is high however with the implementation of safeguards in sections 6.1 and 6.3 the likelihood of water contamination occurring would be reduced.</p>	<p>Low, short term negative impact.</p>
<p>j. Any risk to the safety of the environment?</p> <p>Construction work at the compound site, on the barge and on the land surface may spill chemicals, oils or lubricants from construction equipment into the water increasing localised turbidity, changes to the pH and contamination.</p>	<p>High, short term negative impact.</p>
<p>k. Any reduction in the range of beneficial uses of the environment?</p> <p>The existing wharf would be closed for up to six months during construction.</p>	<p>High, short term negative impact.</p>
<p>l. Any pollution of the environment?</p> <p>Pollution may result from accidental spills during the construction period. These potential impacts are discussed further in chapter 6 of the REF and mitigation is proposed to minimise the impact.</p>	<p>Short term negative impact.</p>
<p>m. Any environmental problems associated with the disposal of waste?</p> <p>All wastes would be disposed of at an off-site facility. These impacts would be long-term. There would be no significant environmental problems associated with waste disposal.</p>	<p>Long term negative impact.</p>
<p>n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?</p> <p>The proposal would not greatly increase the demands on resources natural or otherwise that are likely to become in short supply. All resources required are readily available.</p>	<p>Nil.</p>
<p>o. Any cumulative environmental effect with other existing or likely future activities?</p> <p>No major negative cumulative impacts have been identified for the proposal. Overall, impacts are expected to be positive in the long-term.</p>	<p>Long-term, positive impact.</p>
<p>p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?</p> <p>The proposal would not impact on coastal process or coastal hazards. These issues are considered in greater detail in section 6.15 of the REF. Sea level rise predictions have been taken into account in the design of the wharf.</p>	<p>Nil.</p>

Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

Factor	Impact
a. Any impact on a World Heritage property? There would be no impact to World Heritage property.	Nil
b. Any impact on a National Heritage place? There would be no impact to National Heritage places.	Nil
c. Any impact on a wetland of international importance? There would be no impact to wetlands of international importance.	Nil
d. Any impact on a listed threatened species or communities? There would be no impact to listed threatened species or communities.	Nil
e. Any impacts on listed migratory species? There would no impact on listed migratory species.	Nil
d. Any impact on a Commonwealth marine area? There would be no impact on any Commonwealth marine area.	Nil
g. Does the proposal involve a nuclear action (including uranium mining)? The proposal would not involve a nuclear action.	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? The proposal would not impact (either directly or indirectly) on Commonwealth land.	Nil

Appendix E

Statement of heritage impact



Sydney Commuter Wharf Upgrade

Statement of Heritage Impact Cremorne Point Wharf, NSW

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In this note, a reference to loss and damage includes past and prospective economic loss, loss of profits, damage to property, injury to any person (including death) costs and expenses incurred in taking measures to prevent, mitigate or rectify any harm, loss of opportunity, legal costs, compensation, interest and any other direct, indirect, consequential or financial or other loss.

Document Status

Version	Purpose of Document	Orig	Review	Review Date
Draft	Draft for internal review	D. Farina	E. Williams	04/03/2014
Final	Following review	D. Farina	E. Williams	06/08/2014

Approval for Issue

Name	Signature	Date
Peter Mangels		6 August 2014

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Executive Summary

RPS has been engaged by Hansen Yuncken Pty Ltd on behalf of NSW Roads and Maritime Services (RMS) to prepare a Statement of Heritage Impact (SoHI) for the proposed redevelopment of the Cremorne Point Wharf under the *Environmental Planning and Assessment Act 1979* (EP&A Act). Both Aboriginal and Historic cultural heritage were considered during the course of this assessment.

The Cremorne Point Wharf project area is located on the western shore of the peninsula within Sydney Harbour at Cremorne Point, within the North Sydney local government area (LGA), approximately three kilometres north-east of the Sydney CBD. The existing wharf structure is situated at the southern end of Milson Road. There has been a commuter wharf at Cremorne Point since 1910, replacing an earlier wharf on the eastern side of the peninsula that was destroyed by storms, however the current wharf was reconstructed in 1953 (NSW Maritime Heritage Database, ud).

The proposed works entail the refurbishment and alterations to the current wharf, which will comprise the addition of a bridge (concrete entry platform), replacement of a covered gangway and modifications to the existing pontoon structure and waterside building. All of the proposed works will be on the site of the existing wharf.

As this SoHI incorporates an Aboriginal due diligence assessment, a search of the Aboriginal Heritage Information Management System (AHIMS) for the area surrounding the Cremorne Point Wharf was conducted on 13 December 2013 by RPS Cultural Heritage Consultant, Deborah Farina. The search indicated 22 Aboriginal sites within a one kilometre radius of Cremorne Point Wharf; the closest recorded site to the wharf was a midden/artefact site located on the eastern side of the peninsula, approximately 50 metres east of the Project Area. Attempts were made to relocate this Aboriginal site without success. The site's location on the opposite side of the peninsula precludes any possibility of it being affected by the proposed works.

Searches of heritage registers were undertaken to establish known heritage items within the vicinity of the wharf. The registers included the Australian Heritage Database, for items of world, National and Commonwealth significance, the State Heritage Inventory for items of state and local significance, as well as items from s170 heritage and conservation registers, and the North Sydney Council Local Environmental Plan 2013. These searches identified one State significant and seven locally significant heritage items in the vicinity of the wharf. Although the wharf is not listed on any heritage registers it is located within the Cremorne Point Heritage Conservation Area and is in the immediate vicinity of three locally significant heritage items, being the former tram turning loop and ferry interchange, the former tram terminus shed, and the low level sewage pumping station. These factors should be taken into consideration during the design and construction phase of this project.

A site inspection was undertaken on Monday, 6 August 2012 by RPS Senior Cultural Heritage Consultant, Joanne McAuley and RPS Cultural Heritage Consultant, Deborah Farina. No new Aboriginal sites or historic heritage items were identified in the vicinity of Cremorne Point Wharf at the time of the site inspection.

In accordance with the Burra Charter (Australia ICOMOS 2013:18-19) 'procedures for undertaking studies and reports', this report has considered the environmental, heritage and archaeological context of the project area, information gained during the site inspection; the significance of the Cremorne Point Wharf; the development proposal; potential heritage impacts; and mitigation measures in order to draw conclusions and provide recommendations intended to guide future decision-making.

The following management recommendations have been formulated with consideration of all available information and have been prepared in accordance with the relevant legislation.

Recommendation 1

When a suitable site is identified for the temporary compound, the Sydney RMS environment officer and Aboriginal Cultural Heritage Advisor will be notified of its location to identify if there are potential impacts to known Aboriginal objects and/or places.

Recommendation 2

Any site compounds, temporary fencing and other temporary structures must avoid physical impact to the former tram turning circle and ferry interchange, the former tram terminus shed, and Low Level Sewage Pumping Station No. 57. It is recommended that Low Level Sewage Pumping Station No. 57 is fenced off to prevent accidental damage to the item during construction phase. Information regarding the heritage significance of these items should be communicated in all site inductions.

Recommendation 3

Should any unexpected finds be uncovered during the course of construction, the mitigation and management measures set out in RMS' *Standard Management Procedure – Unexpected Archaeological Finds* should be followed.

Recommendation 4

In accordance with Clause 14 of the *State Environmental Planning Policy (Infrastructure) 2007* consultation with North Sydney Council should be undertaken in accordance with that clause prior to works.

1.0 Introduction

RPS Sydney cultural heritage team have been engaged by project managers Hansen Yuncken (on behalf of RMS) to prepare a Statement of Heritage Impact (SoHI) for the upgrade of Cremorne Point Wharf as part of RMS's Sydney Harbour Commuter Wharf Upgrade Program.

The purpose of a SoHI is to assess heritage significance and the impact proposed works will have on that significance, to identify measures proposed to mitigate any negative impact, and, where applicable, why more sympathetic options are not viable (Heritage Office and Department of Urban Affairs and Planning 2002:2). When considered along with a policy or plan for conservation and management, an informed decision can be made as to whether to allow the development to proceed. The concept designs provided by Hansen Yuncken have been considered in the preparation of this SoHI.

The SoHI will further contribute to the Review of Environmental Factors being prepared by RPS as part of Sydney Harbour Commuter Wharf Upgrade Program.

1.1 Project Area

Cremorne Point is a suburb in the lower north shore area of Sydney in the state of New South Wales, located approximately three kilometres north-east of the Sydney CBD. The Cremorne Point Wharf is located on a peninsula on the western shore of Cremorne Point in the North Sydney local government area (LGA). The wharf is located at the southern end of Milsons Road (Figure 1).

The first commuter wharf on the current site at Cremorne Point was constructed in c.1910, and reconstructed in 1953. The current wharf is a sheltered waiting area on a fixed structure with a steel gangway down to a large pontoon, also with a shelter structure. The pontoon is secured by a number of steel piles with those located at the front doubling as fender piles. The previous ramp and pontoon were damaged and sunk during recent storms and replacement structures installed (NSW Maritime 2009).

1.2 Proposed Works

The proposal would include the demolition and removal of the existing wharf pontoon and gangway and the construction of a new wharf as follows:

Demolition and removal of the existing pontoon and gangway.

- The existing covered pontoon and gangway including steel piles, glass screens, and associated facilities such as signage, information totem, seating, and closed circuit television system would be demolished and removed to an off-site location by barges.
- The existing waiting shed which connects the gangway to the foreshore is to be retained. The entrance to the gangway at the southern end of the waiting shed will be made good using weatherboard, glass or another building material that is similar in style and colour to the existing materials.

Construction of a new wharf

- Construction of a covered concrete bridge about three metres wide by six metres long connecting the land to a gangway. The bridge would contain a curved zinc roof supported by steel columns and stainless steel balustrades. The bridge would connect to the land adjacent to the north eastern corner of the existing waiting shed and would be oriented at an angle of about 90 degrees to the land. The bridge descends to a platform at a maximum 1:14 gradient. The concrete bridge would be supported by about four piles constructed from a mixture of steel and concrete.
- Construction of a covered aluminium gangway about 16 metres long and about three metres wide. The gangway would connect the bridge with a new floating pontoon. The gangway would be supported by the

bridge and the floating pontoon and its gradient would vary according to the tides. The orientation of the gangway would be at an angle of about 135 degrees to the ramp.

- Construction and installation of a rectangular shaped steel floating pontoon about 12 metres wide by 27 metres long off the gangway. The pontoon would have one berthing face on the southern side. The pontoon would contain a curved zinc roof supported by steel columns, glass and stainless steel balustrades and seating. The floating pontoon would be held in place by four steel piles. The floating pontoon would be at about a 90 degree angle to the gangway.
- Installation of safety and security facilities including lighting, closed circuit television, ladders to the water from the pontoon, a life ring on the pontoon platform, glass weather screen and tactile floor treatments.

Ancillary facilities

- A temporary compound would be established including site sheds, an amenities shed and storage containers for tools and some materials. The location of the temporary compound is to be confirmed and would be subject to local council review and agreement.
- The connection of electrical power to an existing supply to provide power to the wharf for lighting and security.
- The connection of water lines and meter to existing supply to provide water to the wharf for maintenance.
- The proposal would include provision for electronic ticketing systems, which may be implemented in the future but would not be provided as part of this proposal.

The wharf (including the bridge, ramp, gangway and pontoon) would be constructed to be accessible to people with a disability for no less than 80 per cent of the high and low tide levels listed in standard tide charts.

The marshalling and storage of most equipment, plant and materials, and the pre-fabrication of parts, pre-casting of headstocks and fit outs, would be carried out by a contractor at an offsite facility. The construction and demolition materials and equipment would be delivered and removed from the site using barges. A majority of the construction and demolition activity would also be undertaken from the barges on the water with only minor works such as connection to services undertaken from the land. Construction contractors would generally arrive at the site via water with only minimal vehicle access to the site required (up to about 15 vehicle movements per day).

The proposal would require the Cremorne Point Wharf to be closed to all ferries, water taxis and other vessels/watercraft for the duration of construction to enable the works to be carried out and would be re-opened to these vessels on completion of construction.

An overview of the proposal including the approximate location of the temporary compound is shown in Plate 1.



Plate 1 Overview of the proposal. Hansen Yuncken 2014



Plate 2 Photomontage of proposed wharf. Hansen Yuncken 2014



TITLE: FIGURE 1: PROJECT LOCATION LOCATION: CREMORNE POINT

DATUM: (GDA 94)
PROJECTION: MGA ZONE 56

DATE: 29/11/2012
PURPOSE: HERITAGE

LAYOUT REF: Arch
VERSION (PLAN BY) B A4 (DF-NW)

CLIENT: HANSEN YUNCKEN
JOB REF: 112956

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RPS

1.3 Legislative Context

1.3.1 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) protects Aboriginal heritage (places, sites and objects) within NSW. Although there are other Acts protecting and managing cultural heritage in New South Wales (see Appendix 1), the due diligence procedure is only available to projects appropriate to this Act. Protection of Aboriginal heritage is outlined in s86 of the NPW Act, as follows:

- “A person must not harm or desecrate an object that the person knows is an Aboriginal object” s86(1).
- “A person must not harm an Aboriginal object” s86(2).
- “A person must not mark or desecrate an Aboriginal place” s86(4).

Penalties apply for harming an Aboriginal object or place. The penalty for knowingly harming an Aboriginal object (s86[1]) and/or an Aboriginal place (s86[4]) is up to \$550,000 for an individual and/or imprisonment for two years; and in the case of a corporation the penalty is up to \$1.1 million. The penalty for a strict liability offence (s86[2]) is up to \$110,000 for an individual and \$200,000 for a corporation.

Harm under the NPW Act is defined as any act that; destroys defaces or damages the object, moves the object from the land on which it has been situated, causes or permits the object to be harmed. However, it is a defence from prosecution if the proponent can demonstrate 1) that harm was authorised under an Aboriginal Heritage Impact Permit (AHIP) (and the permit was properly followed), or 2) that the proponent exercised due diligence in respect to Aboriginal heritage. The ‘due diligence’ defence (s87[2]), states that if a person or company has exercised due diligence to ascertain that no Aboriginal object was likely to be harmed as a result of the activities proposed for the Project Area (subject area of the proposed activity); then liability from prosecution under the NPW Act will be removed or mitigated if it later transpires that an Aboriginal object was harmed.

Under section 89A of the NPW Act Aboriginal objects (and sites) must be reported to the Director-General (now Chief Executive) of the Office of Environment and Heritage (OEH) within a reasonable time (unless it has previously been recorded and submitted to AHIMS). Penalties of \$11,000 for an individual and \$22,000 for a corporation may apply for each object not reported.

1.3.2 National Parks and Wildlife Regulation 2009

The National Parks and Wildlife Regulation 2009 (“NPW Regulation”) provides a framework for undertaking activities and exercising due diligence in respect to Aboriginal heritage. The NPW Regulation outlines the recognised due diligence codes of practice which are relevant to this report, but it also outlines procedures for AHIP applications and Aboriginal Cultural Heritage Consultation Requirements (ACHCRs); amongst other regulatory processes.

Due Diligence

The aim of a due diligence assessment is to:

- Assist in avoiding unintended harm to Aboriginal objects.
- Provide certainty to land managers and developers about appropriate measures for them to take.
- Encourage a precautionary approach.
- Provide a defence against prosecution if the process is followed.
- Result in more effective conservation outcomes for Aboriginal cultural heritage.

One of the benefits of the due diligence provisions are that they provide a simplified process of investigating the Aboriginal archaeological context of an area to determine if an AHIP is required.

Under the s80A of the NPW Regulation a number of due diligence codes are recognised. This report has been written to meet the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW 2010) ("Due Diligence Code").

The Due Diligence Code sets out a minimum benchmark for acceptable due diligence investigations to be followed. The purpose of the code is set out reasonable and practical steps in order to:

- Identify whether or not Aboriginal objects (and places) are, or are likely to be, present in an area.
- Determine whether or not their activities are likely to harm Aboriginal objects (if present).
- Determine whether an AHIP application is required. (DECCW 2010:2)

Investigations under the code include the following:

- A search of the Aboriginal Heritage Information Management System (AHIMS) database to identify if there are previously recorded Aboriginal objects or places in the Project Area.
- Identification of landscape features including, land within 200 metres of water, dune systems, ridgetops, headlands, land immediately above or below cliff faces and/or rockshelters/caves.
- Desktop assessment including a review of previous archaeological and heritage studies and any other relevant material.
- Visual inspection of the Project Area to identify if there are Aboriginal objects present.
- Assessment as to whether an AHIP is required.

One of the benefits of the due diligence provisions are that they provide a simplified process for investigating the Aboriginal archaeological context of an area without the need for an AHIP. Aboriginal consultation is not required for an investigation under due diligence. However, if the due diligence investigation reveals that the activities proposed for the area are likely to harm objects or likely objects within the landscape, then an AHIP will be required with full consultation.

This report has been prepared in accordance with the Due Diligence Code and also meets the RMS's Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (RMS 2011). The PACHCI incorporates all relevant Environment Protection Authority and OEH Aboriginal heritage guidelines and requirements in a staged procedure.

The due diligence assessment contained within in this report concludes that Aboriginal objects are not likely to be harmed, thus the AHIP procedures have not been triggered thus full Aboriginal consultation following the ACHCRs is not required.

1.3.3 Heritage Act 1977

Historical archaeological relics, buildings, structures, archaeological deposits and features are protected under the *Heritage Act 1977* and may be identified on the State Heritage Register (SHR) or by an active Interim Heritage Order.

The Heritage Council of NSW, constituted under the *Heritage Act 1977*, is appointed by the Minister and is responsible for heritage in NSW. The Council reflects a cross-section of community, government and conservation expertise with the NSW Heritage Division being the operational arm of the Council. The work of the NSW Heritage Division includes:

- Working with communities to help them identify their important places and objects.

- Providing guidance on how to look after heritage items.
- Supporting community heritage projects through funding and advice.
- Maintaining the State Heritage Inventory, an online list of all statutory heritage items in NSW.

The Heritage Division provides guidelines for conducting assessments of heritage significance. The 1996 Heritage Manual includes specific criteria for addressing the significance of an item and this assessment has been completed in accordance with those guidelines. These criteria are addressed more fully in Section 5 of this report.

1.3.4 Environmental Planning and Assessment Act 1979

The *Environmental Planning & Assessment Act 1979* (EP&A Act) regulates a system of environmental planning and assessment for NSW. Land use planning requires that environmental impacts are considered, such as the impact on cultural heritage including Aboriginal heritage. Although the wharf falls under the State Environmental Planning Policy (Infrastructure) 2007 (see below), Part 5 of the EP&A Act states that development without consent is still subject to the assessment requirements under that Part, which includes all matters affecting or likely to affect the environment as a result of the proposed development. To that end, this report assesses the likely heritage impacts (Aboriginal and historic heritage) of the proposed upgrading works to Cremorne Point Wharf.

1.3.4.1 State Environmental Planning Policy (Infrastructure) 2007

The purpose of this policy is to streamline and facilitate the effective delivery of infrastructure around the State. Pursuant to clause 14 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP), where a development is likely to have an impact that is not minor or inconsequential on a local heritage item (other than a local heritage item that is also a State heritage item) or a heritage conservation area, then the public authority or person or company acting on behalf of the public authority must consult with the local council in accordance with the requirements of the ISEPP. Further, clause 68(4) of the ISEPP provides that development for the purposes of a wharf may be carried out by or on behalf of a public authority on any land without consent.

1.3.5 Native Title Act 1993

The Commonwealth Government enacted the *Native Title Act 1993* to formally recognise and protect native title rights in Australia following the decision of the *High Court of Australia in Mabo & Ors v Queensland* (No. 2) (1992) 175 CLR 1 ("Mabo").

Although there is a presumption of native title in any area where an Aboriginal community or group can establish a traditional or customary connection with that area, there are a number of ways that native title is taken to have been extinguished. For example, land that was designated as having freehold title prior to 1 January 1994 extinguishes native title, as does any commercial, agricultural, pastoral or residential lease.

Land that has been utilised for the construction or establishment of public works also extinguishes any native title rights and interests for as long as they are used for that purpose. Other land tenure, such as mining leases, may be subject to native title, depending on when the lease was granted.

Further details on the relevant legislation are provided in Appendix 1.

1.4 Aboriginal Consultation

As mentioned above, due diligence inspection relates to the physical identification of Aboriginal objects. Community consultation is only required once Aboriginal objects have been detected and an Aboriginal

Heritage Impact Permit (AHIP) is deemed necessary. Section 5.2 of the Due Diligence Code specifically states that “Consultation with the Aboriginal community is not a formal requirement of the due diligence process” (DECCW 2010:3), and as no Aboriginal Cultural Heritage Objects, Sites or Places were identified during this process, no Aboriginal Consultation has been undertaken as part of this SoHI.

However, RMS’ PACHCI policy indicates limited consultation earlier than that required by NSW legislation. If a PACHCI Stage 1 assessment indicates potential for Aboriginal objects or places to be impacted by a project then consultation is required with Local Aboriginal Land Councils, Native Title holders and registered community stakeholders. Following an assessment by RMS’ Cultural Heritage Advisor, Barry Gunther, it was concluded that, subject to confirmation of the location of the temporary compound area, there was no potential for impact on Aboriginal objects and places and therefore no consultation with Aboriginal stakeholders was required (see Appendix 2).

1.5 Authorship and Acknowledgement

This report was written by RPS Cultural Heritage Consultant, Deborah Farina, with contributions from RPS Senior Cultural Heritage Consultant Joanne McAuley and Senior Spatial Analyst Natalie Wood and with assistance from RPS Business Support Manager Audrey Churm. The report was reviewed by RPS Senior Cultural Heritage Consultant, Erin Williams.

The RPS team acknowledges the assistance of various organisations and individuals, including but not limited to:

Table 1 Acknowledgements

Name	Position	Organisation
Paul Blair	Design Manager	Hansen Yuncken
Barry Gunther	Cultural Heritage Advisor	RMS
Peter Mangels	REF Project Manager	RPS

2.0 Environmental and Archaeological Context

Statements of Heritage Impact and Aboriginal heritage due diligence assessments require that available knowledge and information relating to the Aboriginal cultural heritage resource is considered. The purpose of reviewing the relevant environmental and heritage information is to assist in identifying whether Aboriginal sites or places are present within the study area.

The reporting of environmental context is also required by OEH as specified in the 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales' (DECCW 2010).

2.1 Local Environment

2.1.1 Geology and soils

The geology of the Cremorne Point area chiefly comprises the Triassic Wianamatta Group and Hawkesbury Sandstone. The Wianamatta Group is made up of (Sydney) sandstone and shale with the exception of areas surrounding watercourses which are made up of quaternary deposits of gravel, sand, silt and clay (Brunker and Rose 1967). Hawkesbury Sandstone is also made up of sandstone and shale, as well as quartz. The presence of sandstone in the project area is important for Aboriginal occupation as sandstone was used for grinding grooves, as a form of shelter (if rock shelters present), and as a medium for engravings and art.

The dominant soil of the project area is the Hawkesbury soil landscape. This features loose, coarse quartz sand topsoil. On crests and ridges this topsoil gives way to earthy, yellowish brown sandy clay loam subsoil at an approximate depth of 20 centimetres. On side-slopes and benches, 10-30 centimetres of topsoil overlies bedrock (Chapman G. A. & C.L. Murphy 1989:44-48). It is not expected that Aboriginal artefacts would be present in clay subsoils and therefore potential archaeological deposits are likely to be limited to the upper 20-30 centimetres of these soil landscapes.

2.1.2 Topography and hydrology

Cremorne Point is a small sandstone peninsula that juts out into the estuarine water of Port Jackson between Shell Cove and Mosman Bay on the north shore of Sydney Harbour. The shoreline of Cremorne Point includes steep cliffs, rock platforms, and small sandy beaches. The Project Area is located at the base of a natural ledge adjacent to Cremorne Reserve.

No watercourses or creek lines run through or in proximity to the Project Area.

2.1.3 Flora and fauna

The purpose of the following summary is to provide an indication of the types of flora and fauna which may have been available to Aboriginal people in the past for sustenance and raw material resources. This section does not replace more detailed ecological studies.

Marine resources played an important role in the diet of the people living in Sydney Harbour. These included a wide range of fish and shellfish, as well as crustacean and marine mammals, as evidenced in the numerous middens around Sydney harbour (Attenbrow 2003:62).

The original vegetation of the Project Area would have been the Sydney Coastal Dry Sclerophyll Forest vegetation community. The Sydney Coastal Dry Sclerophyll Forest is the most diverse of the Sydney dry sclerophyll forests and encompasses a wide range of related forest and woodland communities. The species composition and structure of this community varies according to topography and soil moisture, with the open eucalypt canopy varying between 10 and 25 metres tall depending on associated landforms. Common tree

species found within this community include the Sydney red gum, red bloodwood, Sydney peppermint, brown stringybark, various species of scribbly gum and the old man banksia, as well as the mountain devil, flaky-barbed teatree, broad-leaved geebung and the grass tree. Typical grasses include wiry panic, oat speargrass, heath bog-rush and black bog-rush (Keith 2006:147).

This vegetation community would have provided habitats for a variety of animals, as well as potential food and raw material sources for Aboriginal people. Grass trees, for example, were used by Aboriginal people to manufacture spears and resin, and also as a food source (Nash 2004:5). Various banksia species were collected and used to manufacture needles for basket and mat weaving, while the fruit of the geebung was eaten, and string and fishing lines were soaked in a geebung bark infusion to prevent fraying (Nash 2004:2, 4). Eucalyptus trees were a particularly important resource; leaves were crushed and soaked for medicinal purposes; bowls, dishes and canoes were made from the bark; and spears, boomerangs and shields were crafted from the hard wood (Nash 2004:4-8).

Typical animals which may have been harvested by Aboriginal people include kangaroos, wallabies, sugar gliders, possums, echidnas, a variety of lizards and snakes, birds, as well as rats and mice. The bones of such animals have been recovered from Aboriginal sites excavated in the Sydney region suggesting that they were sources of food (Attenbrow 2003:70-76), although the hides, bones and teeth of some of the larger mammals may also have been used for Aboriginal clothing, ornamentation, or other implements.

2.1.4 Previous land use and disturbance

The Cremorne Point Wharf Project Area has been extensively impacted by prior land use practices. In particular, the construction of the wharf, roads, tram terminus and nearby residences has obliterated much of the natural rock edge adjacent to the harbour, destroying all but the rock along the harbour shore. The most common site types recorded in the area are those that would expect to be recorded along a natural rock ledge adjacent to water, such as rock shelters and middens, however none were observed along the remaining rock overhangs in the vicinity of the wharf Project Area.

2.1.5 Synthesis of environmental context

The Project Area is located on the western shore of the Cremorne peninsula. It lies on Hawkesbury Sandstone and Hawkesbury soil landscapes. The Project Area has been extensively impacted by prior land uses, leaving no natural land surface visible. As a result, there is little to no potential for *in situ* Aboriginal sites in the vicinity of the Project Area.

2.2 Archaeological Context

The Sydney region has been inhabited by Aboriginal people for at least 10,000 years according to available radiocarbon dates. Attenbrow listed 27 separate clans recorded in the Sydney region in historical documents from 1788-1800 (Attenbrow 2003:24-26). Many of these clans were names for the areas they occupied. Most of the clans in the Sydney region belong to the Darug language group, with the exception of some of the clans around Botany Bay, who are thought to belong to the Tharawal language group and the southern rim of the Cumberland Plain west of Georges River, who belonged to the Gundungurra language group. The Darug were usually split between the coastal and hinterland people. Apart from differences in their language, each had their own diet and subsistence patterns and cultural practices. For example, the coastal Darug practiced tooth avulsion during initiation ceremonies, whilst the hinterland Darug did not. However, the language groups that various clans belonged to is still a matter of research and debate (Attenbrow 2003:34).

Cremorne Point lies within an area of Port Jackson area that was the traditional country of the Cammeragal, who inhabited much of the lower North Shore of Port Jackson, and spoke the Guringai language.

The connection between these past Aboriginal clans and the lower north shore is evident in the retention of traditional names (or names with Aboriginal associations) of the headlands, suburbs and other geographical features of the area. Examples of this are the North Sydney suburb of Cammeray, which derives its name from the Cammeraygal group, and the Ku-ring-gai electoral district, local council and national park, which derive their names from the Guringai language group. Some old Parish maps for the area note the Aboriginal names for various places, with one such map showing Cremorne Point as Wulwarra-jeung (see Plate 3).



Plate 3 Detail of Parish of Willoughby, 1889. Parish Map Preservation Project, Land and Property Information

Large Aboriginal groups such as the Guringai were based on kinship, with huge importance placed on extended family groups or clans, their connections to the land and common language. Like other language groups, the Guringai operated a subsistence economy based on hunting, fishing and gathering, and it is evident from the archaeological record that this area would have had abundant food resources in the sea, wetlands, forests and woodlands sufficient to support a large Aboriginal population (Attenbrow 1991).

Habitation areas were chosen to provide comfort and protection from adverse weather, as well as being close to food and water resources. In the Port Jackson area, the usually took the form of rock overhangs in cliff faces (rock shelters). Captain John Hunter of the HMS *Sirius* observed:

"...they generally shelter themselves in such cavities or hollows in the rocks upon the seashore, as may be capable of defending them in the rain... They commonly make a good fire in it before they lay down to rest; by which means the rock all around them is so heated as to retain its warmth like an oven for a considerable time and upon a little grass, which is previously pulled and dried, they lie down and huddle together." (Hunter, in Souter 1994:9).

Large Aboriginal groups such as those who lived about Sydney harbour were based on kinship, with huge importance placed on extended family groups or clans, their connections to the land and common language. Like other language groups, the Wangal operated on a subsistence economy based on hunting, fishing and gathering, and it is evident from the archaeological record that this area would have had abundant food resources in the ocean, harbour, forests and woodlands sufficient to support a large Aboriginal population.

Many of the Aboriginal communities living around Sydney harbour, including the Guringai population, were devastated by the outbreak of smallpox in 1789. It is thought that around half of the Aboriginal population living in Sydney at that time were killed by the disease. Many of the Sydney clans were decimated and moved to other areas intending to escape the disease.

By the 1860s, the presence of Aborigines in the area was infrequent, save for special occasions. Groups of Aboriginal people would make an annual trip back to the area at Christmas time to receive the gift of a

blanket each from the Government. During these visits, the groups would camp in caves at Cremorne Reserve and near Kurraba Road at Neutral Bay.

2.2.2 Previously recorded Aboriginal sites

A search was undertaken of the Aboriginal Heritage Information Management System (AHIMS) on 13 December 2013 in accordance with the Due Diligence Code (DECCW 2010:11). The coordinates searched for the Project Area were GDA Zone 56, Eastings 335330 to 337330 and Northings 6252311 to 6254311, with a buffer of 50 metres. This search revealed that there were 22 previously recorded Aboriginal sites within these coordinates (Table 2).

The search revealed that **no Aboriginal objects or places were present in the Project Area.**

Table 2 Summary of AHIMS sites with the searched coordinates

Site type	Frequency	Per cent
Shelter with midden	7	31%
Rock engraving	4	18%
Midden/artefact scatter	4	18%
Shelter with art	2	9%
Midden	2	9%
Shelter with art and midden	1	5%
Shelter with deposit and midden	1	5%
Non-specified artefact site	1	5%
Total	22	100%

The results of the AHIMS search show that shelters with associated middens were the most common type of site recorded within the searched coordinates. Sites with middens, e.g. middens, shelters with middens, middens with artefacts and shelters with art/middens accounted for 69% of all sites in the searched coordinates. Similarly, rock shelters either with or without art, deposit and/or middens, accounted for 51% of the sites within the searched area. All of the sites recorded are consistent with those expected to be found on rock overhangs or platforms.

2.2.3 Archaeological literature review

A review of previous archaeological and heritage reports has been undertaken to inform this assessment.

It should be noted that much of our knowledge of Aboriginal people and culture prior to European settlement is based on historical accounts. It is therefore important to acknowledge that early historical documents were produced for a number of reasons and thus may contain inaccuracies and/or bias in their reporting of events or other aspects of Aboriginal culture (L'Oste-Brown, Godwin et al. 1998). Nonetheless, some historical documents provide important information and insights into local Aboriginal customs and material culture at the time of non-Indigenous settlement and occupation of region.

The Sydney region has been inhabited by the Aboriginal people for at least 10,000 years according to available radiocarbon dates. Rock shelter sites in the King Tablelands site (Blue Mountains) and Darling Hills Creek (Pennant Hills), both provide dates over 10,000 years old (Stockton and Holland 1974). More recently, McDonald has reported on a date of over 30,000 years for a site in Parramatta, but this information has yet to be published in any detail (Macey 2007). Further south along the NSW coast, sites at Burrill Lake and Bass Point produce dates of 20,000 and 17,000 years ago, respectively (Bowdler 1970, Lampert 1971). All of these sites were occupied when the sea level was lower, about 120 metres below present day. Therefore, these sites would have been inland, surrounded by incising streams and rivers that crossed the exposed

crustal shelf reaching the sea some 20 kilometres from the current coast line. Few other Pleistocene deposits are known. Two sites are known to date to the early Holocene, those of Curracurrang, south of Sydney, a rock shelter and an open campsite at Prince of Wales Hospital, Randwick. Most archaeological sites within the Sydney region are dated to the late Holocene, about the last 2,500 years to present. Researchers believe that the Sydney Basin was not intensively settled until this time after the sea levels had risen and stabilised around 5,000 BP (Attenbrow 1987, Attenbrow 2003). Attenbrow (Attenbrow 2003) identified eight dated sites in the vicinity of Riverstone and Alex Avenue, specifically Power Street Bridge 2 (5957±74 cal. years BP) 4, Rouse Hill RH/CD7 (4690±80 cal. years BP), Parklea OWR7 (4060±90 cal. years BP), Quakers Hill 2 (3450±60 cal. years BP), Plumpton Ridge (2250±80 cal. years BP), Parklea PK.CD1+2 (1070±60 cal. years BP), and Second Ponds Creek (650±100 cal. years BP), all of which were identified as open artefact scatters and indicate the presence of Aboriginal people in this area in the mid to late Holocene (Attenbrow 2003).

It is possible to predict the location of certain site types through the presence of certain environmental variables. Artefact scatters, for example, are nearly always found on flat well drained ground close to potable water. Axe grooves and rock engravings may be present in the landscape where large flat sandstone slabs occur and engraved and applied rock art or cultural deposits may be present where there are rock overhangs in low cliffs. Bora grounds and stone arrangements are fragile sites, and rarely survived colonisation. Scarred trees are not generally present due to the lack of remaining mature forests. Shell middens are common around coasts and estuaries but where the water/land interface and sand dunes have been severely altered, both middens and artefact scatters may still be extant in less disturbed locations set back from the water's edge. Burials may be present in middens, and places of spiritual, cultural or historical significance to Aboriginal people may be present in the sea or on land, but knowledge of these tends to be held orally and requires consultation with relevant Aboriginal knowledge holders and no such sites are known to exist near to the project area. Large engravings or peckings on the flat slabs of Hawkesbury sandstone are a feature of the Port Jackson cultural landscape and these engravings have been commented on by non-Aboriginal people since the arrival of the First Fleet.

The first systematic archaeological excavation in the region occurred in 1964, in a rock-shelter at Balls Head on the northern side of Port Jackson, approximately 3.3 kilometres west of Mosman Bay (Bowdler 1971). The excavated deposits contained layers of shell interspersed with ash from ancient fires. Molluscan species collected were mostly rock oyster and hairy mussel with small amounts of Sydney cockle or bimbula, reflecting Aboriginal utilisation of estuarine ecosystems. Minimal amounts of the edible blue mussel were in the midden, despite its great abundance in the harbour today. A large number of stone artefacts and the skeletal remains of a mature Aboriginal female were also recovered from that site (Bowdler 1971). In addition to the rock-shelter, the headland contained engravings, middens, paintings and axe grooves (Bowdler 1971), which is consistent with the archaeological evidence from the majority of headlands jutting into the harbour. Unfortunately, a radiocarbon date was not obtained from the excavation, but a later excavation at nearby Berry Island gave a date of 1195 years BP (Attenbrow 2003).

Godden Mackay, 1994. 64-66 Cremorne Road, Cremorne Archaeological Excavation.

This investigation was prepared ahead of a proposed redevelopment of the subject property, approximately 800 metres north of the current Project Area. An archaeological assessment had indicated the possible presence of European heritage items on the property. An archaeological test excavation program was developed and undertaken.

As a result of the excavations, a number of sandstone 'floaters' were noted in an alignment consistent with an earlier route of Cremorne Road and following the slope of the land. It was determined that on the balance of probabilities, although the 'floaters' were natural, they would have made an effective track, and that they followed an older alignment of Cremorne Road. Two post holes were also identified adjacent to the track. A

number of nineteenth and twentieth century artefacts, mostly glass and ceramics, were also identified (Godden Mackay 1994).

Australian Museum Business Services (AMBS), 2005. Aboriginal Heritage Study of the Mosman Local Government Area, Volume 4

AMBS was engaged by the NSW National Parks and Wildlife Service, the Metropolitan Local Aboriginal Land Council (MLALC), Mosman Council and the Sydney Harbour Federation Trust to conduct an Aboriginal heritage study of the Mosman area (Australian Museum Business Services 2005). This volume is the public access version of the overall four volume Aboriginal Heritage Study report, and includes a synthesis of previous historical and archaeological assessments that have been conducted in the area, the inspection of known sites (those listed on AHIMS or other heritage registers, or known to the local Aboriginal community), and a systematic pedestrian survey of areas without archaeological sites, but which exhibited high archaeological potential.

These surveys were conducted over 16 days in March and July of 2003 with representatives from the MLALC present. Of a total of 107 archaeological sites in the area, 90 were verified by the AMBS team, including 15 new sites found during the second phase of survey. Additional details and descriptions of the location, content and condition of known or previously recorded sites were recorded along with new sites. A total of 17 sites had either been destroyed, were not accessible to due permission, or could not be relocated.

The report concluded that rock shelters with middens (42.9%), open middens (23.1%), and engravings (13.2%) were the dominant types of sites in the area. Shelters with art/midden, shelters with art and Potential Archaeological Deposits were also present. Based on an analysis of these sites in terms of type, location and content, the report concluded that a relatively systematic level of movement and organisation existed in Mosman, and that geography played a dominant role in this organisation.

2.2.4 Synthesis of archaeological context

Although Port Jackson was once home to hundreds of Aboriginal people, much of the evidence for thousands of years of occupation has been destroyed by urban development and the transformation of the water body into a major harbour. Generally the more developed and modified an area, the less likelihood for Aboriginal sites to remain, although sites have been recorded in highly modified landscapes.

The results of previous archaeological investigations in the Port Jackson area suggest that Aboriginal people who inhabited the area in the past made use of a range of locally available resources including fish, shellfish, local wildlife and stone materials. The majority of previously recorded Aboriginal sites in the Cremorne Point area relate to those associated with rock shelters. Rock overhangs in the Cremorne Point area were observed to have collapsed, reducing the potential for the identification of sites. The modification of the natural shoreline by the construction of sea wall and wharf makes it extremely unlikely that any *in situ* Aboriginal material would be discovered by the proposed works.

Legend

Project Area

AHIMS

- Artefact Scatter
- ◆ Habitation Structure with Midden
- Midden
- ▼ Midden, Artefact Site
- ◆ Midden, Shelter with Deposit
- ▼ Rock Engraving
- Shelter with Art
- Shelter with Art, Shelter with Midden
- ◆ Shelter with Midden



TITLE: FIGURE 2: PROJECT AREA
WITH AHIMS RESULTS

LOCATION: CREMORNE POINT

DATUM: (GDA 94)
PROJECTION: MGA ZONE 56

DATE: 29/11/2012
PURPOSE: HERITAGE

LAYOUT REF:
VERSION (PLAN BY) B A4 (DF-NW)

CLIENT: HANSEN YUNCKEN
JOB REF: 112956

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RPS

3.0 Historical Context

3.1 History of Cremorne Point

The area surrounding the Cremorne Point wharf was originally granted in 1833 to a Scottish watchmaker named James Robertson. His land grant was 36 acres, which encompassed almost the entire Cremorne peninsula. Robertson built a house on the point, which became known as Robertson's Point. The State-listed lighthouse at the end of Cremorne Point is named after the original inhabitant (North Sydney Council 2000).

The land was sold in 1853 to James Milson, who a short time later leased 22 acres at the point to J.R. Clark and Charles H. Woolcott. Clark and Woolcott developed the land into pleasure gardens which became known as Cremorne Gardens after a similar park in London (Plate 4). The gardens provided facilities for a range of recreational activities, such as music, dancing, quoits, archery, merry-go-rounds and refreshments. The entrance fee to the park included transport by ferry from Circular Quay to Cremorne Point. However, the gardens did not succeed and closed six years later. Between the 1860s and 1880s the gardens evolved into a popular location with leisure seekers and weekend holiday makers. The serenity was short lived, as the area's location and geology resulted in the peninsula being pursued for land development and mineral exploration (North Sydney Council 2000).



Plate 4 Cremorne Pleasure Gardens, 1893. Stanton Library

In 1890-1891, the Sydney and Port Hacking Coal Company chose Cremorne to sink a bore for coal exploration. At 2,800 feet, a 10 foot thick seam of coal was detected, however had been turned to cinder by a volcanic dyke. A second bore was sunk in 1892-1893, with another 10 foot seam found at 2,900 feet. The company had been granted a title to mine under the waters of Sydney Harbour in 1878, and having successfully proven coal to be present at Cremorne, looked for a site for its surface operations. Kurraba Point near Neutral Bay, Balls Head and Bradleys Head were all considered, however opposition by local property owners led to the Government rejecting all sites on the north shore. The company eventually moved its operations to Birchgrove (NSW Department of Primary Industries 2007).

The first residential subdivision occurred in Cremorne Point in 1903. Much of the current architecture of Cremorne Point dates from the 1920s and 1930s. As Cremorne was also a tourist destination in the 1920s, many guest houses were constructed during this period to accommodate visitors (North Sydney Council 2000).

The original ferry wharf in the suburb of Cremorne, now known as the Old Cremorne Ferry Wharf, was constructed on the eastern side of Cremorne Peninsula, adjacent to Kareela Road in the late nineteenth century and remains in use today, albeit largely superseded in importance by the Cremorne Point Wharf (Plate 5).



Plate 5 Old Cremorne wharf, c. 1919. Stanton Library

3.1.2 History of the Cremorne Point Wharf

The Cremorne Point Wharf was initially constructed in 1910 as part of a new transport interchange between ferries and trams, constructed in response to the increasing population in the Cremorne area. The Cremorne Point tramline opened on 18 December 1911 from Cremorne Junction with services running through to the Spit, or connecting with other services along Military Road. The terminus at Cremorne Point was cut out of the sandstone cliff on the top of the point, with a turning circle to allow for the new tramline to meet the ferry (Plate 6). The tramline was closed and services replaced by buses from April 1956, but ferries have continued to ply their trade along the waterways, stopping at both Cremorne Point and Old Cremorne.



Plate 6 Tram and Cremorne Point Wharf interchange, c.1950. Stanton Library

Cremorne Point Wharf was initially a pontoon wharf built of timber with a large timber waiting shed located on the shore. In 1953 wharf the was constructed at its current site, approximately 25 metres south of the original timber pontoon wharf, with a smaller floating pontoon extending from the shore to a landing stage. The waiting shed was destroyed by fire in 1976 and rebuilt. The current over-water structure is relatively new, the pontoon landing stage being sunk during storms in both 1995 and 2007.

The current structure is a steel gangway leading down to a large pontoon with a shelter. The pontoon is secured by a number of steel piles with those located at the front doubling as fender piles. The complex also has a shore-side sheltered waiting area on a fixed timber structure.

3.2 Recorded Historic Heritage

Acknowledged heritage items and places are recorded in statutory and non-statutory registers held at the federal, state and local level depending on their level of significance. Internationally significant sites of 'outstanding universal value' are inscribed on the World Heritage List and in turn, such sites are usually recognised through their inclusion on federal and state level registers.

Federal designations include the National Heritage List (NHL) and the Commonwealth Heritage List (CHL), both of which are maintained by the Commonwealth Department of Environment and are available to an online database, the Australian Heritage Database. Places of state significance are included on the State Heritage Register (SHR) maintained by the Heritage Division and available on an online database, the NSW Heritage Inventory database. Places of local significance are included in heritage schedules in Local Environmental Plans (LEPs).

3.2.1 World heritage

There are **no World Heritage Sites** located within the Project Area; however, it is worth noting that the Sydney Opera House World Heritage Site is located at Bennelong Point which is visible from Cremorne Point. In addition, the project area is within a buffer zone for the Opera House as marked in the *Sydney Regional Environment Plan (Sydney Harbour Catchment 2005)*. As such, clause 53(2) of the Harbour REP sets out the objective to protect the World Heritage value of the Opera House, while Clause 58B notes matters to be taken into account in relation to development within that buffer zone.

Clause 58B lists the matters taken into account as the objectives of CI 53(2), the need to preserve views and vistas between the Opera House and public places within the buffer zone, the need to preserve world heritage values of the Opera House and the need to avoid any diminution of visual prominence of the Opera House when viewed from other public places within the buffer zone. With those matters in mind, it is assessed that the scale and location of the proposed redeveloped Cremorne Point Wharf is such that there will be no impact on the universal heritage significance of this World Heritage Site and key views from the site will be unaffected.

3.2.2 National and Commonwealth heritage

A search of the National and Commonwealth Heritage Lists was undertaken on 5 December 2013 which indicated that there are **no items** on the National Heritage List or Commonwealth Heritage List within the vicinity of the Project Area.

3.2.3 State heritage

A search of the State Heritage Register on 5 December 2013 identified **no items of State heritage significance** in Cremorne and no items subject to an interim, or authorised interim heritage order.

3.2.4 Section 170 registers

Under s170 of the *Heritage Act 1977*, State Government Agencies are required to keep a list of heritage items maintained by that agency. These are known as s170 heritage and conservation registers. Online searches of these registers were undertaken on 5 December 2013, with three items identified (see Table 3 below, note duplication of Robertsons Point Lighthouse).

Table 3 Items on an s170 register in the vicinity of the Project Area. Office of Environment and Heritage 2013

Item	Address	Relevant Agency	Significance	Distance from Project Area
Robertsons Point Lighthouse	Robertsons Point	Sydney Ports Corporation	State	215 metres south-east
Robertsons Point Lighthouse	Robertsons Point	NSW Maritime	State	215 metres south-east
Sewage pumping station No. 57	Milson Road, Cremorne	Sydney Water	Local	12 metres east

3.2.5 Historic shipwrecks and underwater cultural heritage

Historic shipwrecks more than 75 years of age are protected in New South Wales by Part 3C of the *Heritage Act 1977*. A search of the NSW Maritime Heritage Online, the statutory database of historic shipwrecks in NSW, indicates that 80 shipwrecks are known to exist in the main Sydney Harbour area, however none are known to be located within Cremorne Point. One ship, the *British Merchant*, caught fire and sank off Cremorne Point in 1860, but was later refloated.

It should be noted that several other historic shipwrecks are known to be located in Sydney Harbour; however, their exact locations are currently unknown. These include the *Native* (1850), *Robert Sayers* (1854), *Gem* (1880), *Cadet* (1912), *Esther* (1920), *Rodney* (1938), *Siesta* (1942), *Nereus* (1942), *Silver Cloud* (1942) and *Marlean* (1944). However, given the amount of dredging throughout Sydney Harbour, movement of sediment caused by intensive shipping in addition to natural tidal movement, it is considered highly unlikely that any historic shipwrecks remain submerged or buried within the Cremorne Point Wharf Project Area. There is subsequently an extremely low risk of impact to historic shipwreck material, as previous dredging would have ensured that the location is clear of historic material.

3.2.6 Local heritage

Searches of the North Sydney Local Environmental Plan 2013 revealed a total of eight local heritage items in the vicinity of the Cremorne Point Wharf Project Area (Table 4). The Project Area is also within a heritage conservation area, being the Cremorne Point Heritage Conservation Area.

Table 4 Locally significant heritage items in the vicinity of the Project Area. North Sydney LEP 2013

Item	Address	Significance	Distance from Project Area
Low level Sewage Pumping Station No. 57	Milson Road, Cremorne Wharf	Local	12 metres east
Former tram turning loop and ferry interchange	Milson Road and Wharf Road	Local	Adjacent
Former tram terminus shed	Cnr Milson and Wharf Roads	Local	Adjacent
Gloucester Flats	3 Wulworra Avenue	Local	120 metres north
Windsor Flats	5 Wulworra Avenue	Local	130 metres north
2 storey residence	8 Wulworra Avenue		50 metres north-west

Cremorne Reserve (including Robertsons Point)	Cremorne Point	Local	30 metres east
Robertsons Point Lighthouse	Cremorne Point	Local	215 metres south east

The Cremorne Point Heritage Conservation Area is identified as significant as a consistent early twentieth century residential area with a mix of Federation and 1920s one and two storey housing mixed with inter-war residential flat buildings, built on large allotments with strong orientation to the water; a unique foreshore that predates the residential subdivision which demonstrates the concern for recreation, public access and suburban amenity; and the visual unity derived from its subdivision history that is still apparent. The character of the conservation area can be interpreted in part by the heritage items identified in Table 4 above.

The listed sites represent a mix of residential dwellings, recreational sites, and local infrastructure. The three residential sites are set above and back from the retaining wall which runs along the north-east side of Milson Road, and views to the wharf are broken by palm trees and other vegetation. As such, these properties are not likely to be impacted by the proposed works. This is further discussed in Section 6.

The wharf itself is not listed as an item of local heritage significance, although the former tram turning loop and ferry interchange, the former tram terminus shed, and the low level sewage pumping station immediately adjacent to the current wharf are all listed as local heritage items.

Although the Cremorne Point Wharf is not listed on any heritage registers, it should be noted that the wharf is within the Cremorne Point Heritage Conservation Area and is in the immediate vicinity of three locally listed heritage items. These factors should be taken into consideration during the design and construction phase of this project.

On 5 December 2013 a search was also undertaken of the Sydney Regional Environmental Plan (SREP) (Sydney Harbour Catchment) 2005 in order to identify any further heritage items. The SREP covers all the waterways of the Harbour, the foreshores and entire catchment. The SREP includes provisions relating to heritage conservation and wetlands protection and provides planning controls for strategic foreshore sites, and lists a number of heritage items of State and Local significance. The SREP lists **no heritage items** at Cremorne Point and consequently no items in or near to the Project Area.

4.0 Visual Inspection

A site inspection was undertaken on 6 August 2012 by RPS Senior Cultural Heritage Consultant Joanne McAuley and RPS Cultural Heritage Consultant Deborah Farina. The following paragraphs include a discussion of the general physical context of the Project Area, and a more detailed discussion of the Cremorne Point Wharf.

4.1 General Physical Context

Cremorne Point Wharf is located on the western side of the Cremorne Point peninsula within the suburb of Cremorne Point. Milson Road appears to have been benched into the original sandstone outcrop, resulting in a steep sandstone cutting between Milson Road and the adjacent residential dwellings on Wulworra Avenue. Cremorne Reserve makes up the headland of Cremorne Point east of the wharf. A footpath providing pedestrian access between Milson Road and Cremorne Reserve runs along the sandstone escarpment parallel to Milson Road; the strip of land between footpath and escarpment was designated a revegetation area at the time of the site inspection.

The wharf is located at the southern end of Milson Road adjacent to the former tram terminus shed which now operates as a bus terminus (Plate 7). The whole of Wharf Road and Milson Road extending from the intersection of Wharf and Cremorne Roads and terminating at the entrance to the wharf is heritage listed as the site of the former tram turning loop and ferry interchange (Plate 8). The s170 listed Sewage Pumping Station No. 57 is located directly opposite the entrance to the wharf (Plate 9). The general character of the surrounding area is residential, with a number of residences located to the north and east of the wharf, and recreational parkland (Cremorne Reserve) on the headland to the south.



Plate 7 Former tram terminus shed, view from gangway of wharf. Two storey residence at 8 Wulworra Avenue is visible behind palm trees. RPS 2012



Plate 8 View south east along Milson Road toward wharf, 8 Wulworra Avenue at centre, former tram terminus shed to the right of bus, low level Sewage Pumping Station No. 57 diagonally opposite the tram terminus shed. In this image the alignment of Milson Road indicates the former tram turning loop and ferry interchange. RPS 2012



Plate 9 Sewage Pumping Station No. 57, view north east from entrance to wharf. RPS 2012

4.2 Cremorne Point Wharf

The existing wharf consists of three specific components comprising a waterside building, a floating covered pontoon and a covered gangway (Plates 10, 11). The existing wharf amenities comprise closed circuit television, lighting, seating, information boards, lifesaving ring, waste bins and a glass weather screen on the northern side of the pontoon.



Plate 10 Cremorne Point Wharf, showing three components (RPS, 2012).



Plate 11 View from covered gangway towards waterside building. RPS 2012

The waterside building is rectangular in shape and extends from the land at an angle of about 45 degrees in a westerly direction. It measures approximately 18 metres in length and 10 metres in width. The waterside building has a timber substructure supported by about 25 timber piles, with a concrete deck, and a timber building with corrugated steel roof. Commuter facilities include a cafe and seating as well as ticketing machines.

The gangway is about 10 metres long and 3.5 metres wide and connects the western end of the timber wharf to the eastern end of the pontoon. It is constructed of a steel frame which supports a timber deck, steel balustrades, and what appears to be a corrugated roof. Due to the design of the existing gangway which influences the gradient for any given tide the current standards for disabled access at the wharf are met for up to 50 per cent of the high and low tide levels listed in standard tide charts. Access from the wharf to vessels is via a moveable ramp which is stored on the pontoon.

The floating pontoon is rectangular in shape, extends from the western end of the gangway for a distance of about 5 metres, and measures approximately 15 metres in width. It is constructed of an aluminium framed concrete deck with a corrugated steel roof, supported by six steel poles. The pontoon is held in position by steel piles.

4.3 Visual Inspection Field Results and Summary

Although the south-east end of Milson Road has a distinct heritage character, the buffer of vegetated sandstone escarpment between the current transport interchange and the historic residences and park land

behind provides a soft visual break between the residential uses and transport interchange. This is partially aided by the modified topography of the area. The current wharf, built between the late 1970s and mid-2000s, does not interrupt the views between the residential or park areas and the city owing to the moderate slope of Milson Road, placing the wharf below the horizontal sight line of many of the heritage items.

5.0 Heritage Significance Assessment

In line with the *Burra Charter*, before making decisions about the future of a heritage item it is first necessary to understand its heritage significance and the values it embodies. The following section contains an assessment of the heritage significance of the existing Cremorne Point Wharf using the NSW state significance heritage criteria as contained within the *Heritage Act 1977* and explained in *Assessing Heritage Significance* (Heritage Office (former) 2001). Consideration is also given to the integrity and intactness of the wharf.

The findings of the following heritage assessment is summarised in a Statement of Significance contained within Section 5.2.

5.1 Significance Assessment

5.1.1 Historical Significance (SHR Criteria A) – An item is important in the course, or pattern, of NSW’s cultural history (or the cultural or natural history of the local area)

The location of Cremorne Point Wharf is historically significant as the site of an early passenger ferry wharf and transport interchange site on the North Shore which has been in continual use since 1910. The transport services and long-term use of the wharf, as with many of the North Shore wharves, have had a considerable impact on the development of the surrounding area with regard to urban and built forms as well as roads and public transport services. Its continuity of use as a transport interchange is evidence of its historical importance.

5.1.2 Associative Significance (SHR Criteria B) – An item has strong or special associations with the life or works of a person, or a group of persons, of importance in NSW’s cultural or natural history

Cremorne Point Wharf has no strong associations sufficient to fulfil this criterion.

5.1.3 Aesthetic Significance (SHR Criteria C) – An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement

The setting of Cremorne Point Wharf within Port Jackson is highly scenic and characterised by the relatively modest scale of the tranquil bay and the well treed escarpments surrounding it. It must be stressed that it is the setting, not the current wharf structure that has aesthetic value.

5.1.4 Social Significance (SHR Criteria D) – An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons

There is no evidence to suggest that Cremorne Point Wharf embodies significant social or spiritual values. Community consultation is usually required to justify social significance.

5.1.5 Research Potential (SHR Criteria E) – An item has potential to yield information that will contribute to an understanding of NSW’s cultural or natural history

Cremorne Point Wharf has little potential to yield scientific and archaeological information that will further contribute to an understanding of NSW cultural, industrial or maritime history. The research/archaeological potential of the existing wharf structure is assessed as low to nil because the existing structure dates from 1970s-2000s. The wharf is not considered to be significant for its research/archaeological potential.

5.1.6 **Rarity (SHR Criteria F) – An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area)**

Cremorne Point Wharf is not considered to be a rare example of this type of ferry wharf on Sydney Harbour. The wharf is similar to other commuter ferry wharves constructed on Sydney Harbour.

5.1.7 **Representativeness (SHR Criteria G) – An item is important in demonstrating the principal characteristics of a class of NSW's (or the local area's) cultural or natural places; or cultural or natural environments**

Cremorne Point Wharf is broadly representative of the ferry wharves found around Sydney Harbour with regard to form, location and materials. It is also representative of the first generation of ferry transport interchanges in the Harbour which have directly influenced the subsequent development of their surrounding localities.

5.1.8 **Integrity and intactness**

With regard to integrity and intactness in heritage terms, the form and fabric of the Cremorne Point Wharf have been compromised because the structure chiefly dates from 2007 following the destruction of the pontoon and wharf in storms. It is considered that the principal attributes of the wharf's heritage significance relate to its continuity of use and its location. The form and fabric of the wharf (the waterside building particularly) are of secondary importance.

5.2 **Statement of Significance**

Cremorne Point Wharf has been an important transport location since the 1910s. Its use predates the development of the Sydney Harbour Bridge which now allows vehicular services to and from the Cremorne Point area.

The establishment of a wharf in the current location had a considerable influence on the early development of the surrounding locality with regard to urban and built form. The highly scenic setting of the Cremorne Point Wharf within Sydney Harbour provides the site with high aesthetic value. This value is further reinforced by the impressive views from the site and encompassing the site featuring sites such as the Sydney CBD skyline and the Sydney Harbour Bridge.

The heritage significance of the Cremorne Point Wharf is embodied only by its location and its continuity of function including any physical evidence demonstrating its long history of use. Furthermore, its highly scenic visual setting is also considered to contribute to the heritage significance of the site. The fabric of the wharf largely dates from 2007 and is considered to be of negligible heritage significance.

5.3 **Summary of Contribution of Elements**

In determining the likely impact of the proposal on the heritage significance of Cremorne Point Wharf, an assessment of the relative significance of the fabric and features which make up the site is useful. The gradings of significance employed adhere to Heritage Division standards as set out in 'Assessing Heritage Significance' (2001). Similarly, it is helpful to clearly identify those components and attributes of the site which embody heritage significance. The table below ranks the relative significance and integrity of the component parts of Cremorne Point Wharf (Table 5).

Table 5 Relative heritage significance of the components and attributes of Cremorne Point Wharf

Wharf component/attribute	Integrity of fabric	Assessed significance
Wharf approaches	Low integrity	Low local significance

Wharf component/attribute	Integrity of fabric	Assessed significance
Waterside building	Low integrity	Negligible local significance
Timber wharf decking	Low integrity	Negligible local significance
Timber wharf piles and substructure	Low integrity	Negligible local significance
Ramp	Nil	Nil
Steel piles and pontoon	Nil	Nil
Location/landscape setting	N/A	High local significance
Function	N/A	High local significance

6.0 Statement of Heritage Impact

The purpose of this Statement of Heritage Impact is to assess the likely impacts of the proposed redevelopment works on the Aboriginal and Historic heritage significance of Cremorne Point Wharf.

This assessment will also consider visual impact in relation to identified heritage assets. The likely visual impact of the proposals is considered in detail by the landscape and visual impact assessment report produced by Jane Irwin Landscape Architecture (2014) that will be appended to the forthcoming Review of Environmental Factors, along with this report.

In accordance with the New South Wales Government Guidelines for SoHI, this section considers the potential impact of the proposed works on the local heritage significance of the Cremorne Point Wharf, its curtilage and heritage items within the wider context of the proposed development site. Section 7 includes recommended measures proposed to manage and safeguard the heritage significance of Cremorne Point Wharf.

6.1 Summary of Proposed Changes

The then NSW Maritime (now RMS) functional and performance brief for the proposed changes to the Cremorne Point Wharf is very specific for operational purposes. In order to increase passenger comfort and safety, the design must also consider the *Disability Discrimination Act 1992* and current legislative standards for disabled access. These requirements have been met and perceived constraints resolved within the current design.

The following plans have been reviewed in carrying out this assessment (refer Appendix 3):

- AR 03 DW 0001 A – Location Plan.
- AR 03 DW 1000 A – Survey/Demolition Plan.
- AR 03 DW 1001 A – Setout Plan.
- AR 03 DW 4000 03 – Pontoon Floor Plan.
- AR 03 DW 4001 02 – Pontoon Roof & Reflected Ceiling Plan.
- AR 03 DW 4002 02 – Pontoon Elevations & Sections.
- AR 03 DW 4003 A – Gangway – Floor, Roof & Reflected Ceiling Plan.
- AR 03 DW 4004 A – Gangway Sections & Elevations.
- AR 03 DW 4005 A – Bridge – Floor/Roof Plan, RCP, Elevation & Section.

The proposal includes the removal of the existing wharf structure in its entirety and its replacement with a new wharf structure in the same location comprising three main components: a bridge linking the wharf to the Point, a gangway and a new covered pontoon. A detailed description of the works is contained within Section 1.2.

In addition to the redevelopment of the wharf structure, a temporary compound will be established during the works which will include site sheds, an amenities shed and storage containers. The location of the compound has yet to be determined and its position would be agreed with Council.

6.2 Alternatives and Options Considered

6.2.1 Methodology for selection of preferred option

In 2006 the former NSW Maritime took control of all ferry commuter wharves in Sydney Harbour and proceeded to undertake maintenance and upgrade works and to develop a program of substantial works for the years ahead. The upgrade of each wharf was prioritised based on a comprehensive risk assessment and a review workshop. Cremorne Point Wharf was scheduled for upgrade in 2013/2014 and subsequently such works are currently proposed as detailed in this REF.

Commuter ferry wharves are not easily relocated due to the considerable impacts that result to adjacent public transport and vessel movements within Sydney Harbour, including changes to navigational lanes and routes. For this reason commuter ferry wharves are generally upgraded or redeveloped in or near their existing locations. These considerations assisted with identification of the three options described above.

The preferred option was selected as it was found to best meet the project objectives and the following additional criteria:

- Strategic need for the proposal.
- Requirement to minimise the impacts of the proposal on the surrounding environment.
- Safety.
- Cost.

Following selection of the preferred option, design refinements were made and approval was sought from Sydney Ferries on the concept design.

6.2.2 Identification of options

Three options were identified for the proposal. These were:

- Option 1 – The do nothing (base case) option.

The do nothing (base case) option would involve no active measures, outside of routine maintenance, to improve the existing wharf. The existing wharf would continue to be used for ferry commuter services.

- Option 2 – Refurbishment and reuse of the existing wharf.

Option 2 would involve retaining the existing wharf and the addition of a new ferry wharf connected to the existing wharf. The new wharf would be accessible to people with a disability and consistent with the unifying visual theme developed for wharfs to be replaced and upgraded throughout Sydney Harbour.

- Option 3 – Demolition of the existing wharf and gangway and replacement with a new pontoon and gangway which improves accessibility of the wharf.

Option 3 would involve the demolition and removal of the existing wharf and all associated structures and the construction of a new wharf that would be accessible to people with a disability.

6.2.3 Analysis of options

Each of the options was analysed against the project objectives and the criteria described above. A summary of the analysis including the advantages and disadvantages of each of the options considered for the proposal is outlined below.

Option 1 – the do nothing (base case) option

The do nothing option would not improve the commuter wharf facilities as per the objectives of the proposed activity. Nor would it improve the level of accessibility to the wharf in accordance with the requirements of the DDA, the *Disability Standards for Accessible Public Transport* (2002) or the *Disability (Access to Premises - Buildings) Standards* (2010) (the wharf is currently accessible for no more than 50% of all tides).

There would be no improvement in commuter comfort, safety or security.

Initially, this option would not cost anything however it is likely that maintenance of the wharf would cost more than the other options as the wharf would deteriorate over time.

This option would result in views to and from the harbour being maintained. It would also have the least environmental impacts of the three options as there would be no additional structures and no disturbance of the land surface. As with the other two options, this option would maintain the heritage significance of the wharf.

As this option would not achieve each of the proposal objectives or the objectives of the RMS Sydney Commuter Wharf Upgrade Program, particularly in regard to accessibility, it was not pursued further.

Options 2 and 3

Option 2 would enable the reuse of existing materials and structures however would not improve accessibility to the ferry wharf for people with a disability.

Option 2 would have increased impacts on views from surrounding residences and the public domain than Option 3 given the larger scale of two wharves combined.

Both Options 2 and 3 would reduce public safety risk and impacts associated with vessels manoeuvring within a shallow waterway. This would be achieved by locating the berthing face further offshore within deeper water which would reduce the likelihood of vessels hitting the seafloor. Therefore, this would meet the relevant objective for this proposal.

Option 3 would better meet the project objectives and has the following benefits:

- Improved accessibility of the ferry wharf for people with a disability. Compliance with requirements of the DDA and current legislative standards for disabled access for 80 per cent of the high and low tide levels listed in standard tide charts. Therefore these options would meet objectives for access for those with disabilities.
- Views to and from the bay would be largely maintained.
- Improvements to the public domain and the quality of commuter facilities. Therefore, meeting objectives for upgrading facilities.
- Standardisation of wharf structures throughout Sydney Harbour, which would improve maintenance timeframes and costs as well as unifying and identifying the harbour wharves and ferry commuter system. Therefore, meeting objectives to facilitate cost effective maintenance.

6.3 Preferred Option

Option 3 is the preferred option as it was found to best meet the objectives for the commuter wharf program, objectives for the proposal, and the criteria identified in section 6.2.1. In particular, it would provide access for people with a disability while minimising impacts on the environment.

6.4 Impact of Proposed Works on Heritage Significance of Cremorne Point Wharf

As discussed in the significance assessment contained within Section 5.0, the site of the Cremorne Point Wharf is considered to have heritage significance for its location as the site of the original Cremorne Point Wharf and continuous function as a wharf site. The highly scenic setting to the wharf also forms part of its heritage significance. The fabric of the wharf structure is not considered to have any intrinsic heritage value on the basis that it was largely rebuilt in 2007. Therefore, the fabric is considered to have a high tolerance for change such that adverse impacts would be avoided whilst the significance of the site would be maintained.

Good conservation practice dictates that physical changes to heritage components of high or exceptional significance should be avoided. Furthermore, any physical changes to components that are of moderate or low significance should be carefully considered and be designed in such a way as to be sympathetic to the original form, scale and location. The *Burra Charter* advocates a cautious approach to change: “do as much as necessary to care for the place and to make it useable, but otherwise change it as little as possible so that its cultural significance is retained” (Australia ICOMOS 2013).

The heritage significance of Cremorne Point Wharf is associated with its function and location, and as such the alterations proposed to the site including the replacement of the existing wharf structure are considered to be acceptable in heritage terms because the location and function of a ferry wharf at the site will be maintained.

The proposed form, design and materials of the new wharf structure at Cremorne Point Wharf follows the agreed design approach/aesthetic for the upgrading of the commuter wharves throughout the harbour. This includes the curved footprint of the main pontoon, the curved, standing seam zinc roof of the main pontoon and gangway and the stainless steel columns and supports for the glass balustrades. The proposal indicates that the new pontoon structure will be lightweight and open in appearance and that the materials (zinc roof finish and steel balustrades) will sit comfortably in the waterside context.

It is therefore assessed that there will be negligible heritage impacts of the replacement wharf to the heritage significance of the wharf.

6.5 Impact of Proposed Works on Adjacent Heritage Items and Places

The proposals will not have a physical impact on any Aboriginal or Historic heritage sites within the wider townscape context of Cremorne Point Wharf. With regard to the likely impact on this wider setting, the proposed works to the wharf will not affect identified heritage items within the surrounding townscape.

However, it should be noted that temporary structures necessary during the construction of the new wharf also do not impact upon adjacent heritage items. Of particular note are the former tram turning loop and ferry interchange and former tram terminus shed adjacent to the wharf, and the Low Level Sewage Pumping Station No. 57, located approximately 12 metres east of the wharf. Any site compounds, temporary fencing and other temporary structures will need to avoid physical impact on any of these features, and it is recommended that temporary fencing be erected as necessary in order to safeguard any accidental damage, while maintaining access and operations to continue unhindered.

Information regarding the heritage significance of these items should be included in all site inductions.

6.6 Visual Impact

A detailed Landscape Character and Visual Assessment report was undertaken in 2014 by Jane Irwin Landscape Architects. The report concluded that the overall impact on the landscape character by the

construction of the new Cremorne Point Wharf would be moderate to low, largely owing to the increased scale of the new wharf (Jane Irwin Landscape Architecture 2013:11).

Given the findings of the Landscape Character and Visual Assessment report, it is not considered that the visual impact of the proposed Cremorne Point Wharf will adversely affect the heritage values of heritage items in the vicinity of the Project Area.

6.7 Summary of Heritage Impact

In considering the heritage impact of the proposals, it is important to clarify at the outset those physical components and attributes which embody or form part of the heritage significance of a site. At Cremorne Point Wharf the location and continuity of use of the wharf are of principal significance whereas the heritage significance of the wharf structure and fabric is considered to be negligible. The negligible significance of the fabric means that it is considered to have a high tolerance for change, including wholesale replacement, such that the heritage significance of the site would be maintained and not adversely affected provided the use of the site as a ferry wharf continues. The replacement of wharf structures and their various components over time is a common pattern identified in the historical development of commuter wharves in Sydney Harbour.

The introduction of a new wharf structure in the same location as the existing/original wharf structure and the maintenance of the use will safeguard the heritage significance of the site. The form and design of the proposed wharf structure made up of a bridge connecting to a covered gangway and pontoon follows the consistent design approach being taken to the upgrading of the commuter wharves throughout the harbour. As such, the function of the site will remain highly legible. The form and materials of the new wharf will provide visual interest and sit comfortably in the waterside setting. The zinc roof covering in particular will ensure that the new structure does not read as a discordant feature within the harbour but rather, one that sits well into the setting.

Overall, it is considered that the proposals will safeguard and maintain the heritage significance of Cremorne Point Wharf.

7.0 Management and Mitigation Recommendations

7.1 Conclusion

This report has considered the significance of the Cremorne Point Wharf and the nature and scale of likely heritage impacts as a result of the development proposal.

This heritage impact assessment concludes that the proposals will safeguard the heritage significance of the Cremorne Point Wharf which is wholly embodied in its location and function. As such, the proposals will have a negligible impact on the heritage significance of the site because the proposals will maintain the existing wharf location and safeguard its long term use.

7.2 Recommendations

The following management recommendations and mitigation measures have been formulated with consideration of all available information in accordance with relevant legislation:

Recommendation 1

When a suitable site is identified for the temporary compound, the Sydney RMS environment officer and Aboriginal Cultural Heritage Advisor will be notified of its location to identify if there are potential impacts to known Aboriginal objects and/or places.

Recommendation 2

Any site compounds, temporary fencing and other temporary structures must avoid physical impact to the former tram turning circle and ferry interchange, the former tram terminus shed, and Low Level Sewage Pumping Station No. 57. It is recommended that Low Level Sewage Pumping Station No. 57 is fenced off to prevent accidental damage to the item during construction phase. Information regarding the heritage significance of these items should be communicated in all site inductions.

Recommendation 3

Should any unexpected finds be uncovered during the course of construction, the mitigation and management measures set out in RMS' *Standard Management Procedure – Unexpected Archaeological Finds* should be followed.

Recommendation 4

In accordance with Clause 14 of the *State Environmental Planning Policy (Infrastructure) 2007* consultation with North Sydney Council should be undertaken in accordance with that clause prior to works.

8.0 References

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Appendix I

AHIMS Results

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 119759 Cremorne Pt

Client Service ID : 119986

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-6-0272	Robertson's Point Cremorne	GDA	56	336129	6253645	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	597
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-0273	Cremorne Point Shell Cove	GDA	56	335999	6253655	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-0274	Cremorne Point Crows Nest	GDA	56	336249	6253720	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2061	Red Shield Cave;	AGD	56	335910	6253430	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1809
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2063	Little Sirius Pt. 3;	AGD	56	336792	6253460	Open site	Valid	Shell : -, Artefact : -	Midden,Open Camp Site	1809,2025
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2064	Little Sirius Pt. 2;Mosman;	AGD	56	336790	6253460	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809,2025
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2065	Little Sirius Pt. 1;Mosman;	AGD	56	336782	6253460	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809,2025
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2068	Shell Cove 2	GDA	56	335784	6254190	Open site	Valid	Shell : -, Artefact : -	Midden	1809
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2069	Shell Cove 1	GDA	56	335844	6254100	Open site	Valid	Shell : -, Artefact : -	Midden	1809
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2071	Cremorne Pt. 1	GDA	56	336464	6253305	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2121	Cremorne Pt. 3;	AGD	56	336170	6253490	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-2130	Athol Bay Cave;Mosman;Taronga Park Zoo;	AGD	56	337250	6253390	Closed site	Valid	Shell : -, Artefact : -, Art (Pigment or Engraved) : -	Shelter with Art,Shelter with Midden	2025
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							
45-6-0641	Crows Nest;Neutral Bay;	AGD	56	335516	6253982	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	<u>Contact</u>	<u>Recorders</u>	<u>Permits</u>							

Report generated by AHIMS Web Service on 13/12/2013 for Deborah Farina for the following area at Datum :GDA, Zone : 56, Eastings : 335330 - 337330, Northings : 6252311 - 6254311 with a Buffer of 50 meters. Additional Info : As part of a due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 22

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : 119759 Cremorne Pt

Client Service ID : 119986

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-6-2143	Cremorne Point West (duplicate copy 45-6-0273 and 45-2-0274)	GDA	56	335770	6253800	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809,1911
	Contact	Recorders	W.D Campbell,Aboriginal Heritage Office					Permits		
45-6-2168	RSYS midden;	AGD	56	335190	6253050	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	
	Contact	Recorders	Michael Guider					Permits		
45-6-0658	Crows Nest;Avenue Rd;	AGD	56	336611	6254095	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	2025
	Contact	Recorders	Margrit Koettig,W.D Campbell					Permits		
45-6-1701	Little Sirius Cove Midden;	AGD	56	336837	6253788	Closed site	Valid	Artefact : -, Shell : -	Midden,Shelter with Deposit	1293,2025
	Contact	Recorders	Val Attenbrow,A.K Morris					Permits		
45-6-1702	Sirius Park Midden;	AGD	56	336850	6253973	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	1293,1809,2025
	Contact	Recorders	Val Attenbrow,A.K Morris					Permits		
45-6-2080	Cremorne Pt 2	GDA	56	336374	6253380	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	1809
	Contact	Recorders	Michael Guider,Aboriginal Heritage Office					Permits		
45-6-2816	Little Fish Park Midden	AGD	56	336858	6254073	Open site	Valid	Habitation Structure : 1, Shell : 1		
	Contact T Russell	Recorders	Matthew Kelleher					Permits		
45-6-1959	Taronga Zoo Cave;Mosman;	AGD	56	336980	6253650	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	2025
	Contact	Recorders	Michael Guider					Permits		
45-6-2963	Shell Cove Rd NSW NSC-070	GDA	56	335604	6254130	Open site	Valid	Artefact : -		
	Contact	Recorders	Phil Hunt,Aboriginal Heritage Office					Permits		

Report generated by AHIMS Web Service on 13/12/2013 for Deborah Farina for the following area at Datum :GDA, Zone : 56, Eastings : 335330 - 337330, Northings : 6252311 - 6254311 with a Buffer of 50 meters. Additional Info : As part of a due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 22

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Appendix 2

PACHCI Letter



06/11/2013

Deborah Farina
RPS Australia Pacific
Level 9, 17 York St, Sydney
NSW 2000

Dear Deborah

Re: Preliminary assessment results for the Cremorne Point Wharf demolition and removal of existing wharf and gangway and construction of new wharf proposal based on Stage 1 of the Procedure for Aboriginal cultural heritage consultation and investigation (the procedure).

The project, as described in the Stage 1 assessment checklist, was assessed as being unlikely to have an impact on Aboriginal cultural heritage. The assessment is based on the following due diligence considerations:

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search did not indicate any known Aboriginal objects or places in the immediate study area.
- The Aboriginal cultural heritage potential of the study area appears to be severely reduced due to past disturbance.
- The proposed compound site is in a heavily disturbed area.
- **Note:** The location of the temporary compound is to be confirmed, and is subject to council review and agreement. This PACHI Stage 1 clearance is subject to the current supplied location. If the current compound location is rejected by council, or varies in any way to the proposal, a new Aboriginal Cultural Heritage Investigation will need to be done for the new compound location.

Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes, you must contact me and your regional environmental staff to reassess any potential impacts on Aboriginal cultural heritage.

If any potential Aboriginal objects (including skeletal remains) are discovered during the course of the project, all works in the vicinity of the find must cease. Follow the steps outlined in the Roads and Maritime Services' *Unexpected Archaeological Finds Procedure*.

For further assistance in this matter and do not hesitate to contact me.

Yours sincerely

Mark Lester
Aboriginal Cultural Heritage Officer – Sydney Region

Roads and Maritime Services

Appendix 3

Copies of Drawings received from RMS

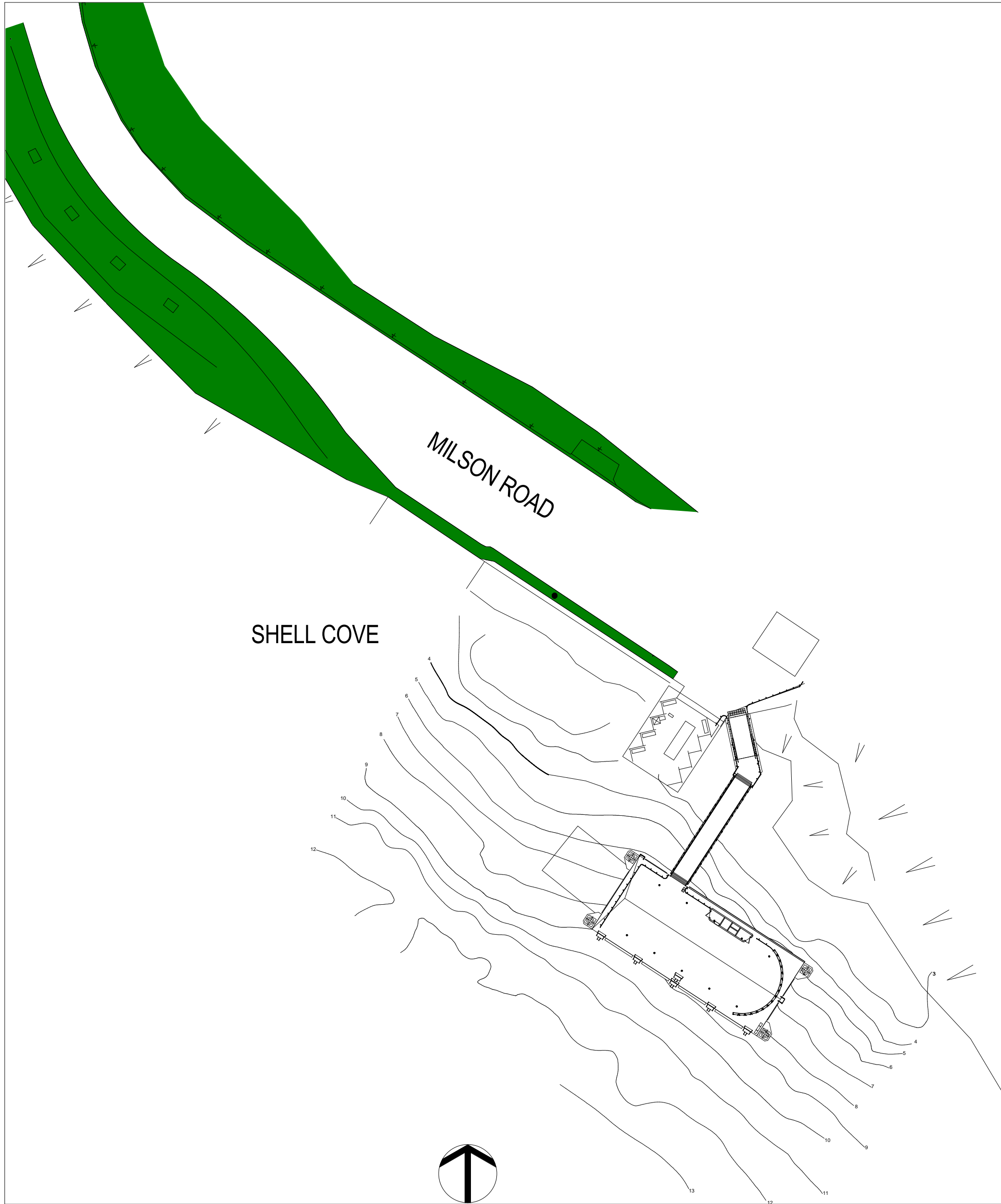


02 CREMORNE POINT WHARF

ARCHITECTURAL DRAWING REGISTER			
Drawing No.	Drawing Name		
AR 03 DW 0001	Title Sheet / Location Plan / Drawing register		
AR 03 DW 1000	Survey/ Demolition Plan		
AR 03 DW 1001	Setout Plan		
AR 03 DW 4000	Pontoon Floor Plan		
AR 03 DW 4001	Pontoon Roof & Reflected Ceiling Plan		
AR 03 DW 4002	Pontoon Elevations & Sections		
AR 03 DW 4003	Gangway - Floor, Roof & Reflected Ceiling Plan		
AR 03 DW 4004	Gangway Sections & Elevations		
AR 03 DW 4005	Bridge - Floor/ Roof Plan, RCP, Elevation & Section		
AR 03 DW 4007	Services Pod - Plans, Elevations & Sections		
AR 03 DW 4100	Section Details - Pontoon - Sheet 1		
AR 03 DW 4200	Section Details - Gangway - Sheet 1		
AR 03 DW 4400	Details - Pod - Sheet 1		
AR 03 DW 6300	Details - Balustrade & Screens - Sheet 1		
AR 03 DW 6301	Details - Balustrade & Screens - Sheet 2		
AR 03 DW 6302	Details - Balustrade & Screens - Sheet 3		

NOTE:

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- MATERIALS AND FINISHES SCHEDULE AR-00-SP-8000
- ARCHITECTURAL SPECIFICATION AR-00-SP-8100
- ALL CONSULTANT DRAWINGS, SCHEDULES AND SPECIFICATIONS
ANY INCONSISTENCIES BETWEEN DOCUMENTS MUST BE REPORTED TO THE DESIGN MANAGER.



01 LOCATION PLAN

1 : 500

Amendments		
Issue	Description	Date
A	PRELIMINARY ISSUE	13.01.12
B	ISSUED FOR REVIEW	17.01.14

PRELIMINARY

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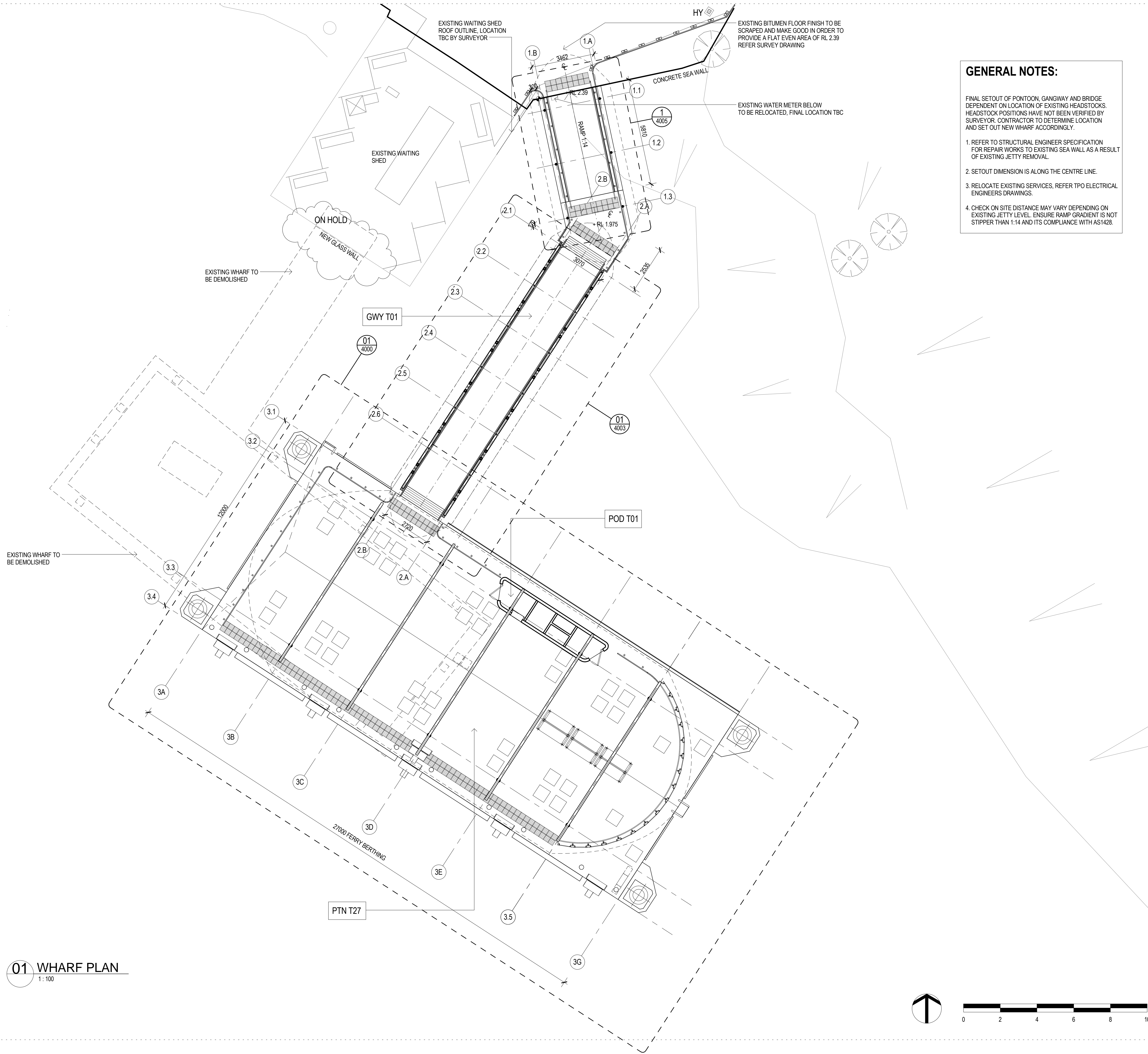
Sydney Wharves Upgrade Program - Cremorne Point

Title Sheet / Location Plan / Drawing register

Project No	S09-026	Scale	As indicated @A1
Drawing Created (date)	15.11.13		
Drawing Created (by)	KR		
Plotted and checked by	SJ		
Verified	SJ		
Approved	VK		
Discipline	Wharf	Drawing No	Issue
AR	03	DW 0001	A

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01 WHARF PLAN
1:100

GENERAL NOTES:

- FINAL SETOUT OF PONTOON, GANGWAY AND BRIDGE DEPENDENT ON LOCATION OF EXISTING HEADSTOCKS. HEADSTOCK POSITIONS HAVE NOT BEEN VERIFIED BY SURVEYOR. CONTRACTOR TO DETERMINE LOCATION AND SET OUT NEW WHARF ACCORDINGLY.
1. REFER TO STRUCTURAL ENGINEER SPECIFICATION FOR REPAIR WORKS TO EXISTING SEA WALL AS A RESULT OF EXISTING JETTY REMOVAL.
 2. SETOUT DIMENSION IS ALONG THE CENTRE LINE.
 3. RELOCATE EXISTING SERVICES, REFER TPO ELECTRICAL ENGINEERS DRAWINGS.
 4. CHECK ON SITE DISTANCE MAY VARY DEPENDING ON EXISTING JETTY LEVEL. ENSURE RAMP GRADIENT IS NOT STIPPER THAN 1:14 AND ITS COMPLIANCE WITH AS1428.

LEGEND:

- PTN T27 - 27m x 12m STEEL PONTOON WITH STAINLESS STEEL BALUSTRADES, GLASS SCREENS AND CURVED ZINC ROOF SUPPORTED BY STEEL COLUMNS
- GWY T01 - 16m SINGLE CARRIAGE ROOFED ALUMINIUM GANGWAY
- POD T01 - STEEL FRAMED SERVICES POD WITH ALUCOBOND CLADDING
- FLR - FIXED LOCATION READER
SM - SERVICE MAST

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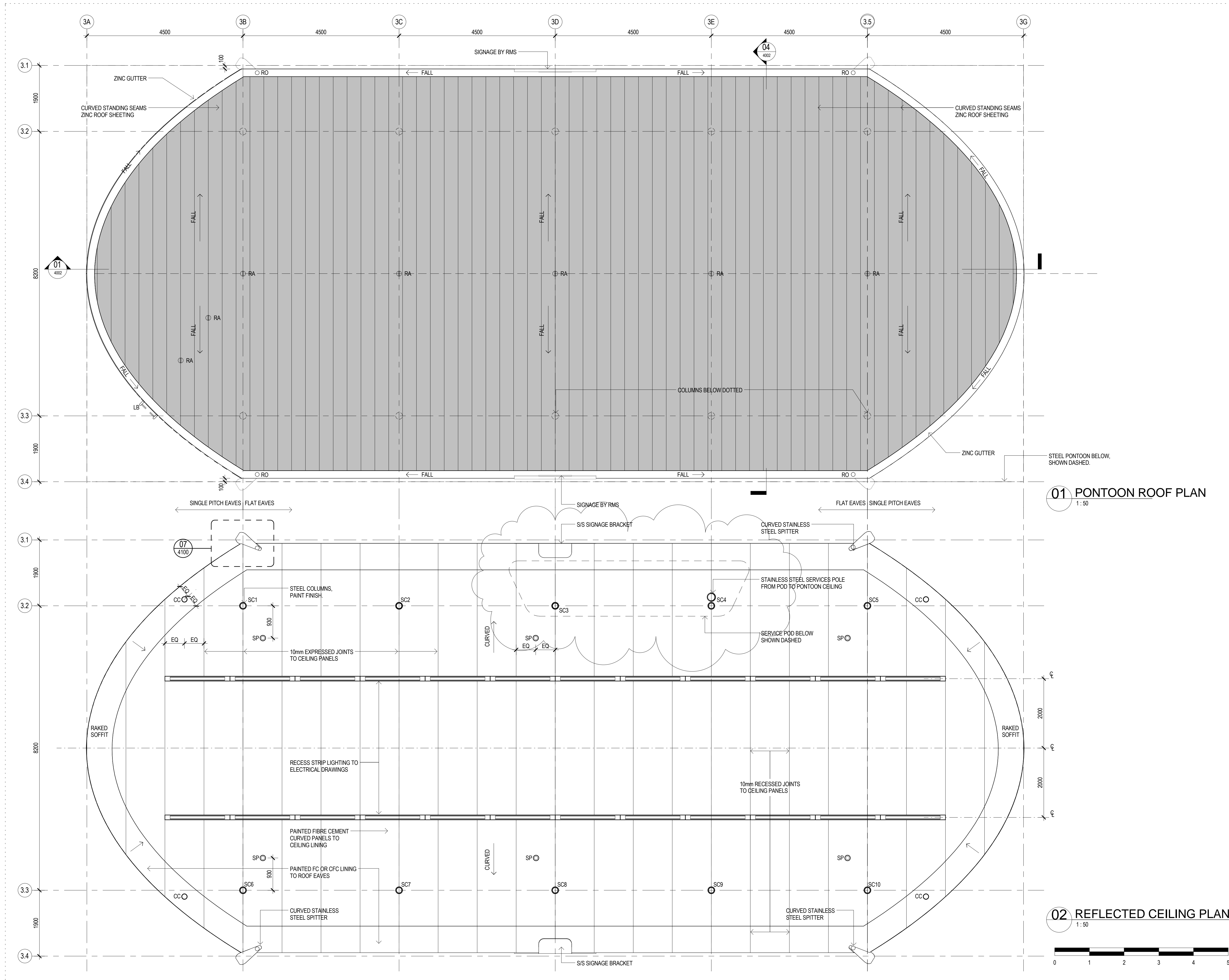
Drawing Title
Setout Plan

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01 PONTOON ROOF PLAN
1:50

02 REFLECTED CEILING PLAN
1:50



Amendments		
Issue	Description	Date
01	PONTOON ISSUE FOR AFC	06.12.13
02	SERVICES POD LOCATION REVISED	17.01.14

LEGEND:	
LB	LADDER BRACKETS, CONTRACTOR TO PROVIDE COMPLIANT ROOF ACCESS DESIGN AND SPECIFICATION.
RA	ROOF ANCHORS, CONTRACTOR TO PROVIDE COMPLIANT ROOF ACCESS DESIGN AND SPECIFICATION.
①	ROOF OUTLET
RO	STRUCTURAL COLUMN
SC	
○ CC	CCTV - FINAL NUMBER AND LOCATIONS OF CAMERAS TBC.
⊙ SP	SPEAKERS - REFER TO ELECTRICAL DRAWINGS.

NOTES:	
1.	REFER TO STRUCTURAL DRAWINGS FOR SETOUT OF BOLLARDS, FENDERS AND ACCESS HATCHES.
2.	CONTRACTOR TO PROVIDE DESIGN AND INSTALLATION OF COMPLIANT ROOF ACCESS SYSTEM.
3.	ROOF ANCHORS AND LADDER BRACKETS ARE INDICATIVE ONLY.

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Project Title
**Sydney Wharves Upgrade
Program - Cremorne Point**

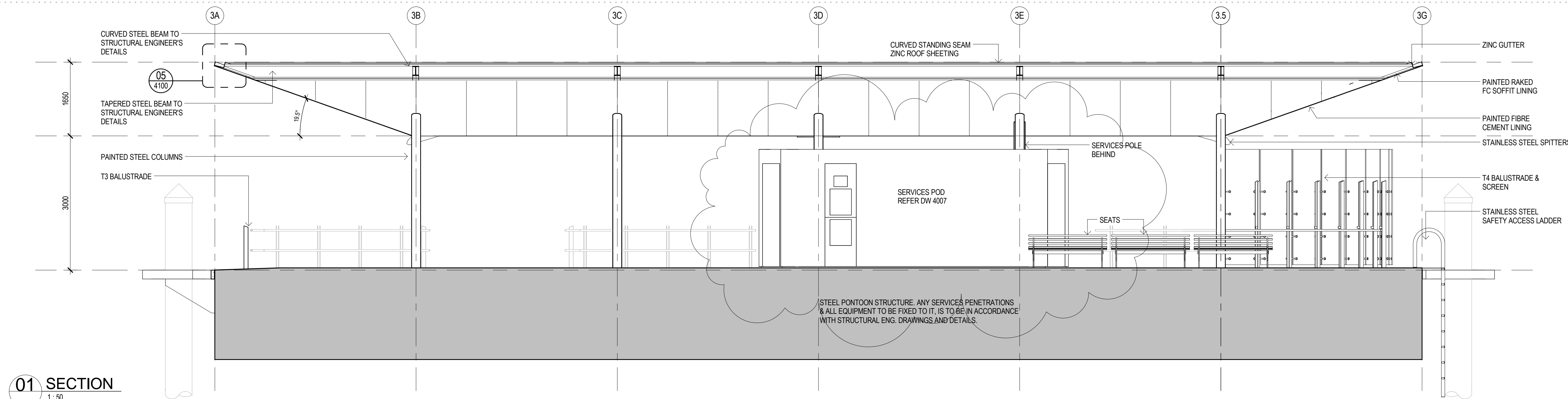
Drawing Title
**Pontoon Roof & Reflected
Ceiling Plan**

Project No	S09-026	Scale	As indicated @A1
Drawing Created (date)	15.11.13		
Drawing Created (by)	AH/ES		
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Verified	SJ		
Approved	WK		
Discipline	Wharf	Drawing No	Issue

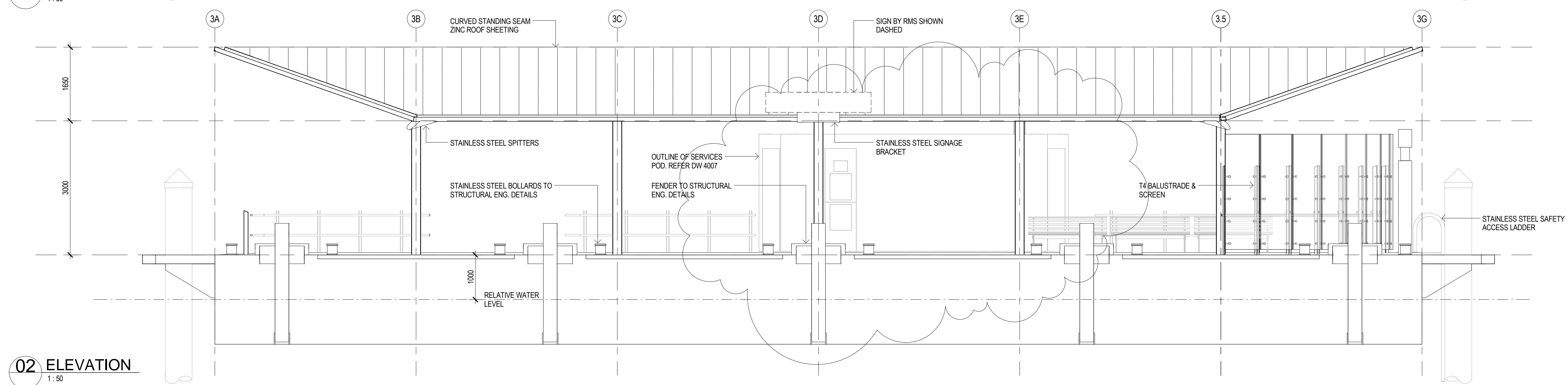
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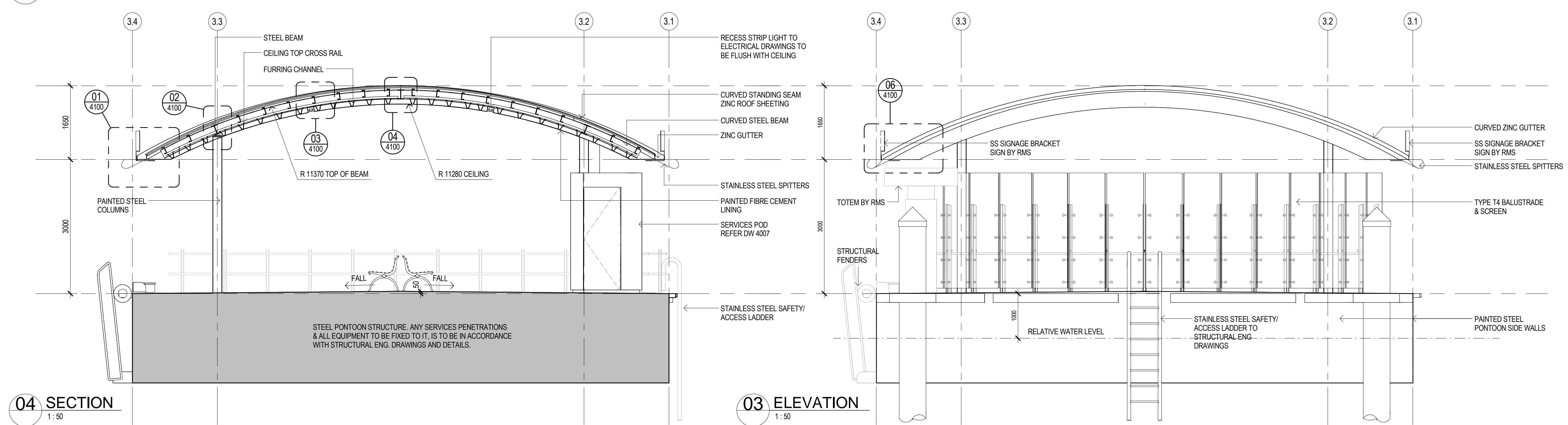
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01 SECTION
1:50



02 ELEVATION
1:50



04 SECTION
1:50

03 ELEVATION
1:50

Amendments		
Issue	Description	Date
01	PONTOON ISSUE FOR AFC	06.12.13
02	SERVICES POD LOCATION REVISED	17.01.14

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CONSTRUCTION

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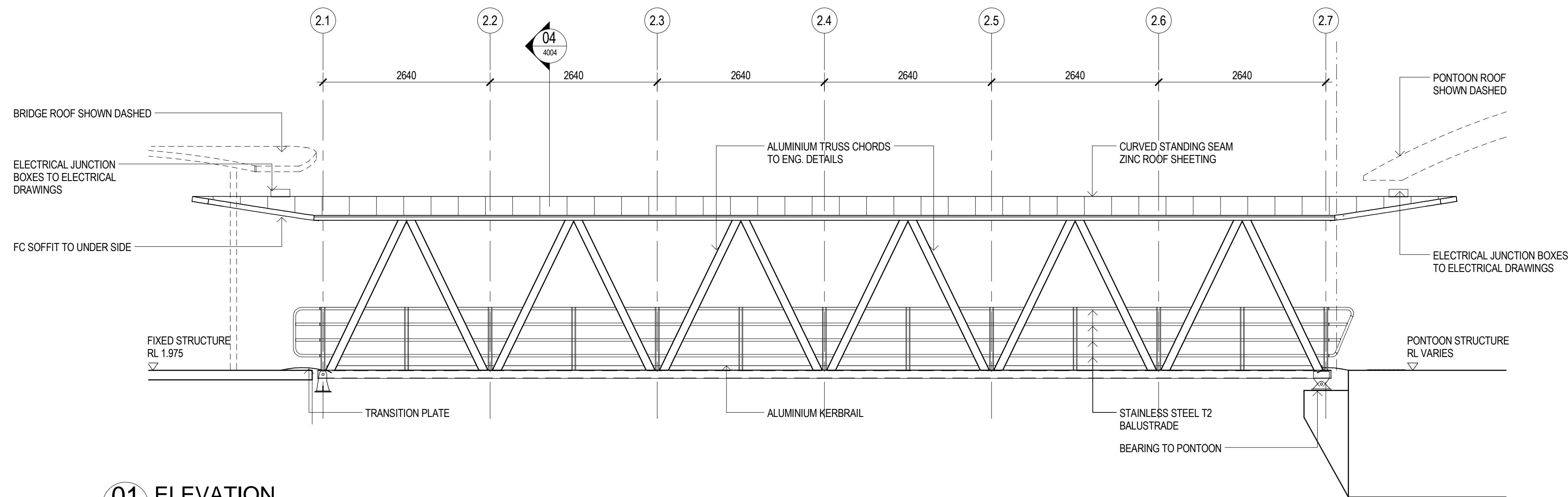
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Drawing Title
Pontoon Elevations & Sections

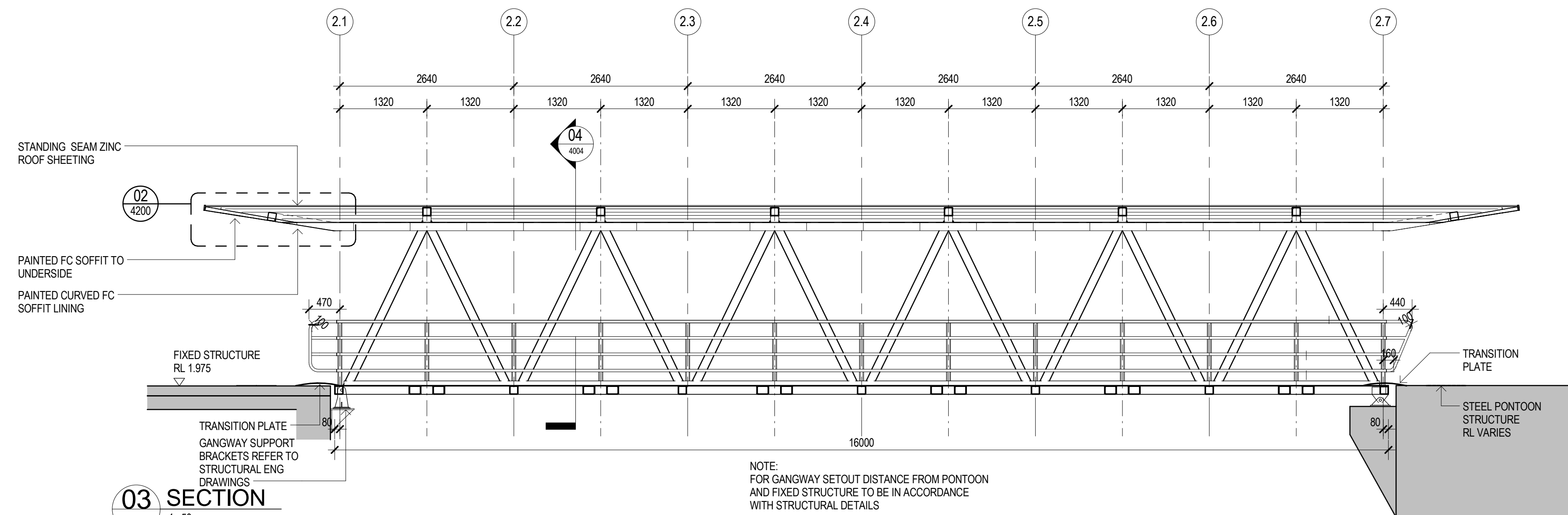
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Drawing Created (date)	15.11.13		
Drawing Created (by)	AH/ES		
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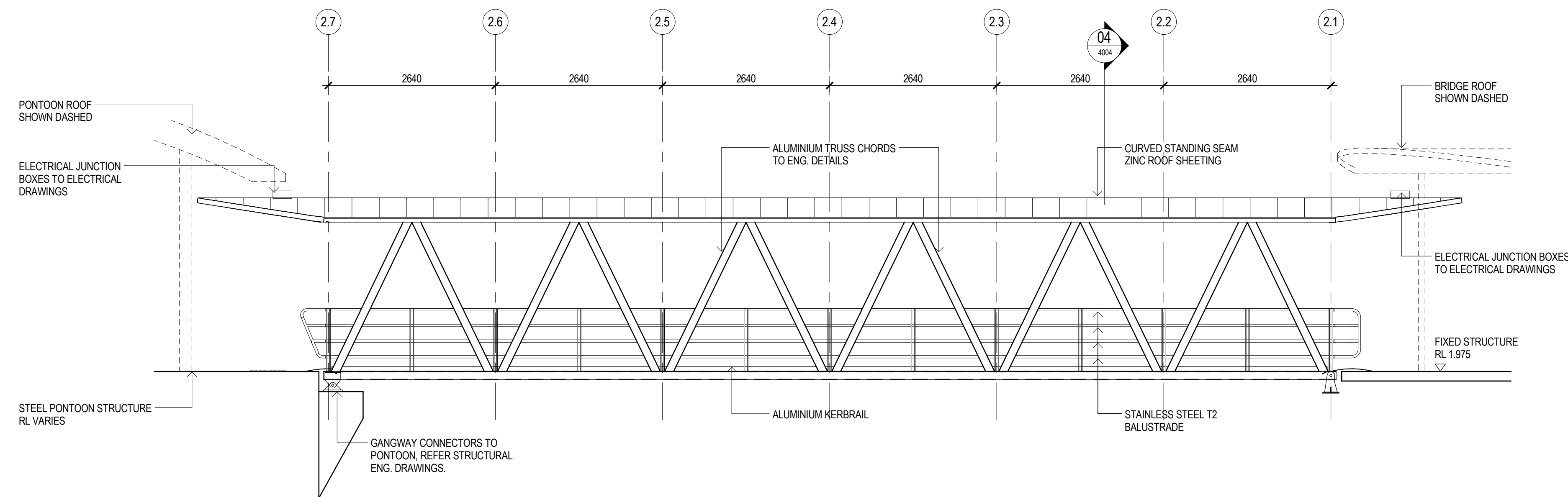
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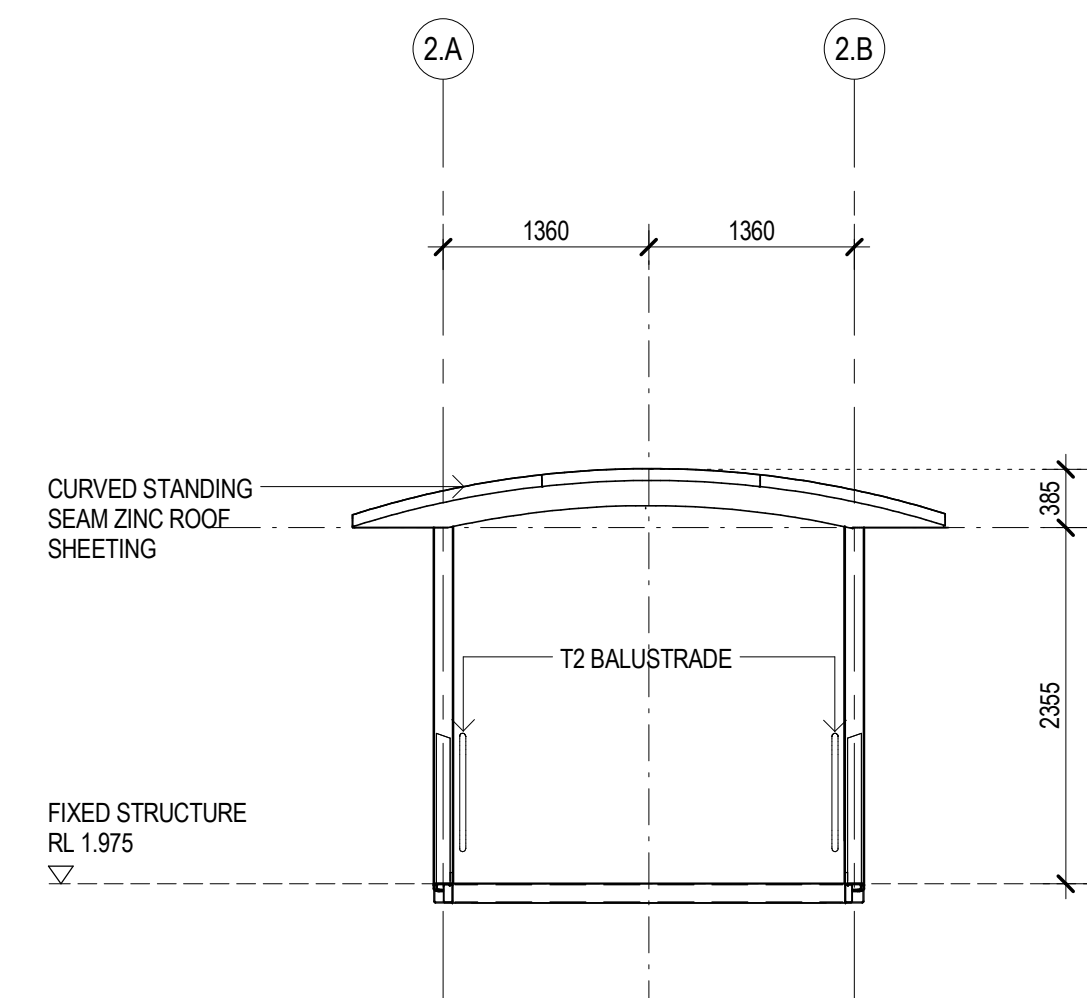
01 ELEVATION
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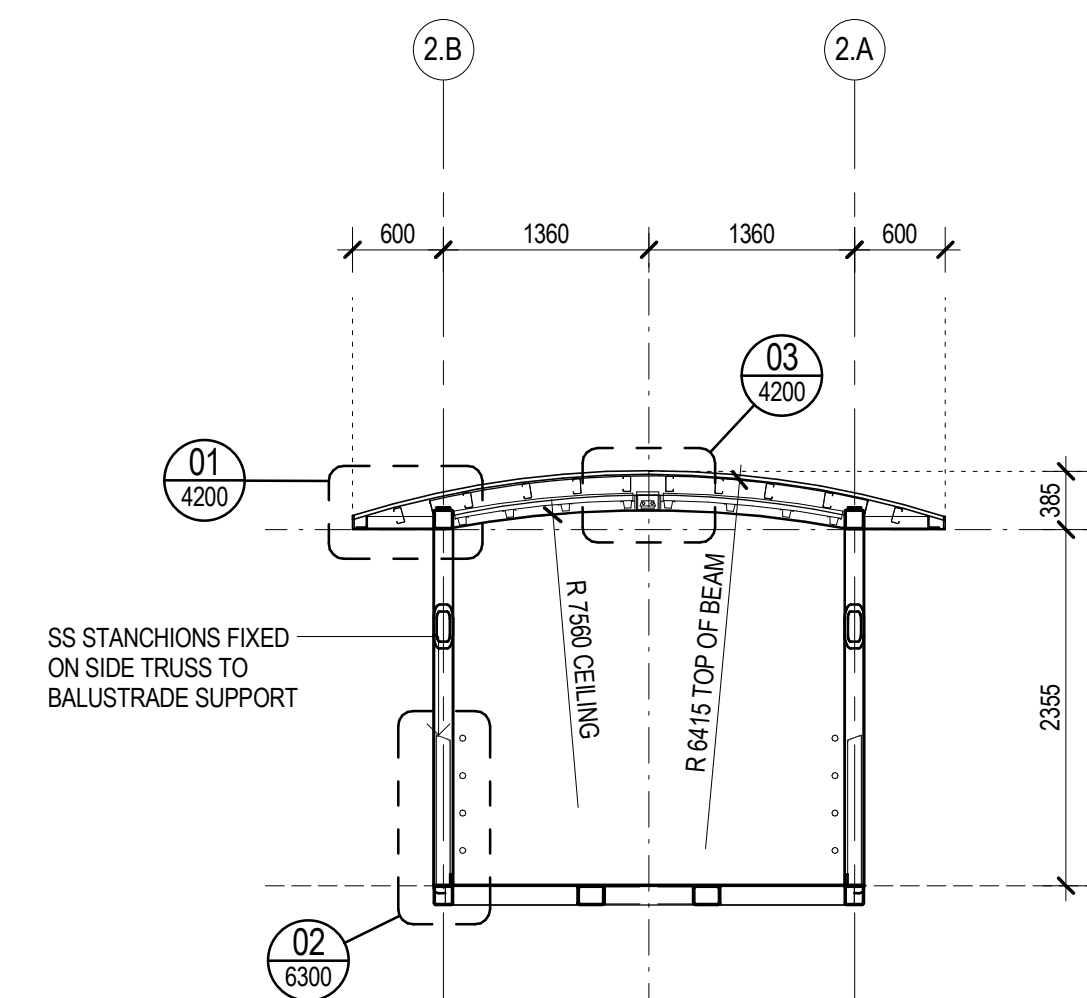
03 SECTION
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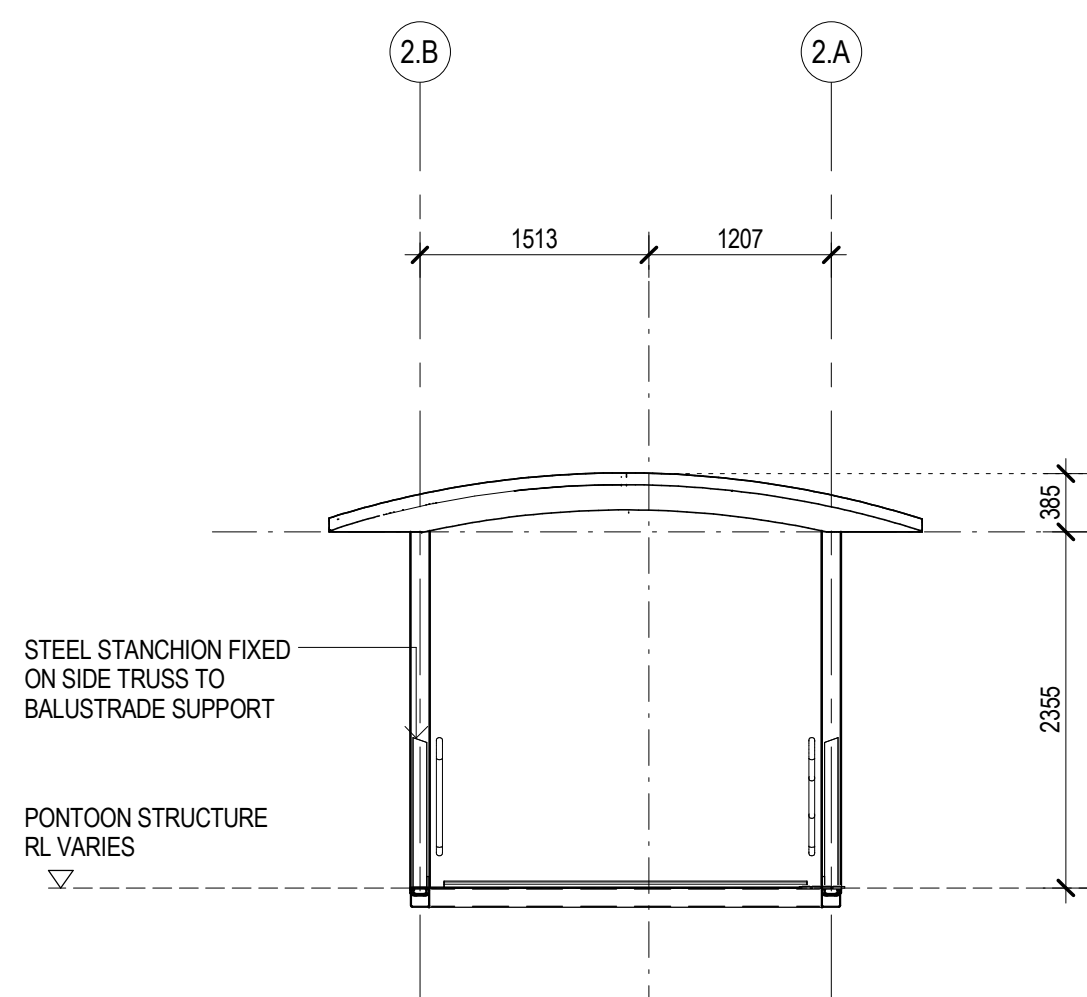
05 ELEVATION
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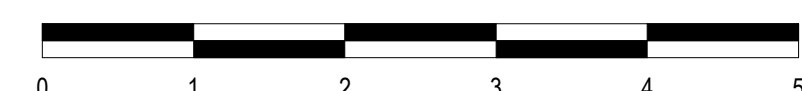
02 ELEVATION FROM FIXED STRUCTURE
1:50



04 SECTION
1:50



06 ELEVATION FROM PONTOON
1:50



Amendments		Date
Issue	Description	
A	ISSUED FOR REVIEW	17.01.14

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Project Title
Sydney Wharves Upgrade Program - Cremorne Point

Drawing Title
Gangway Sections & Elevations

Project No **S09-026** Scale As indicated @A1

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Drawing Created (by) CP

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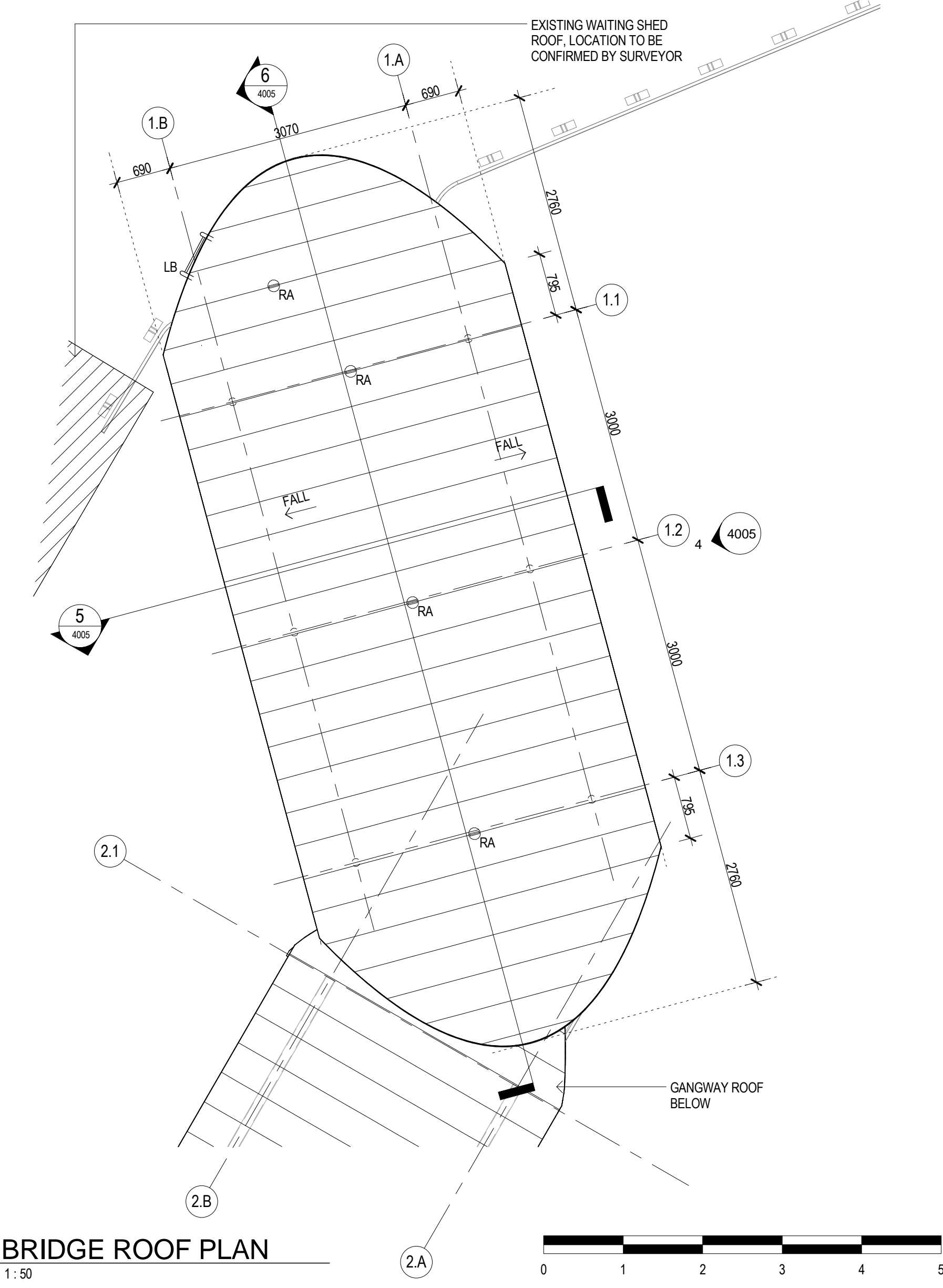
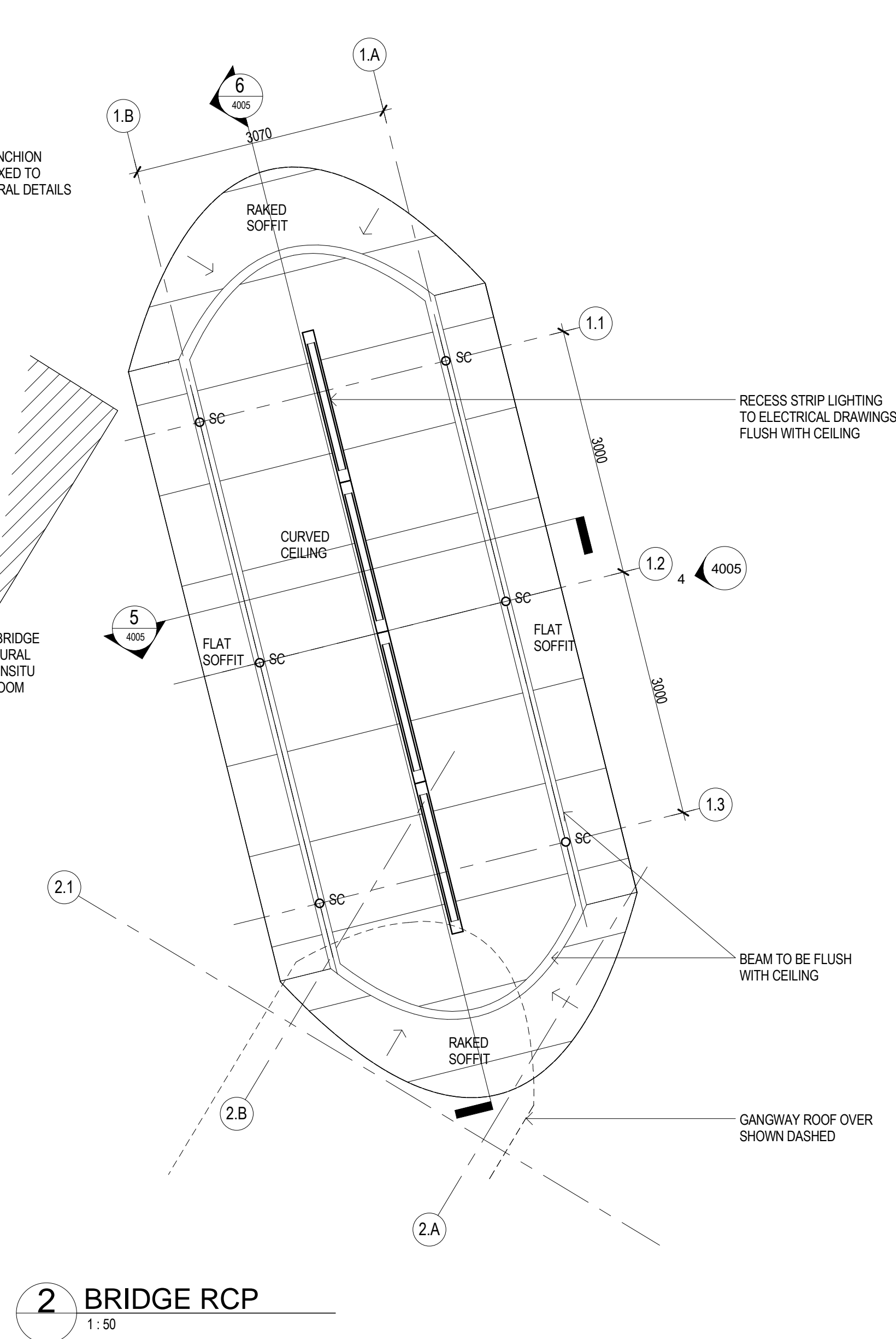
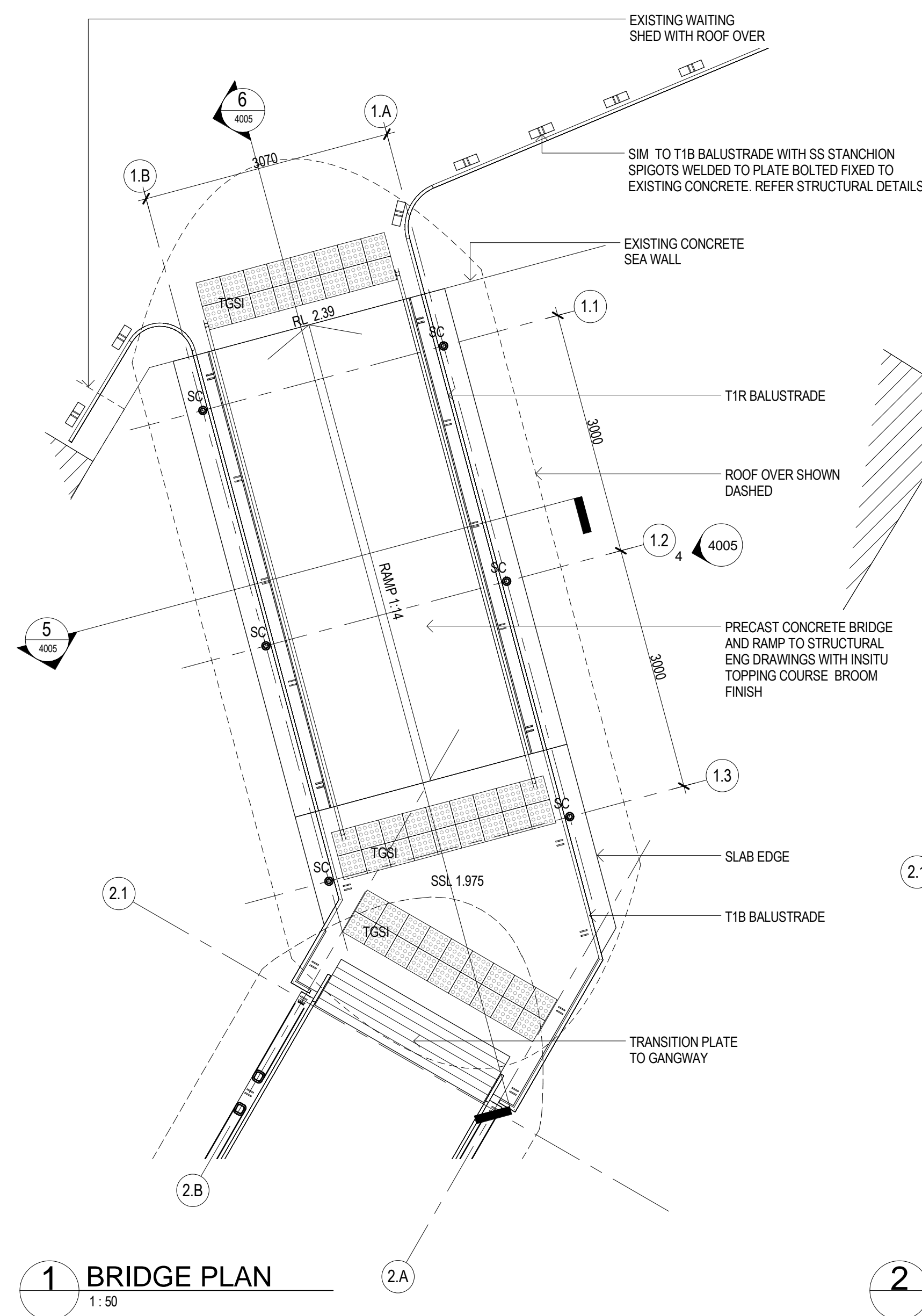
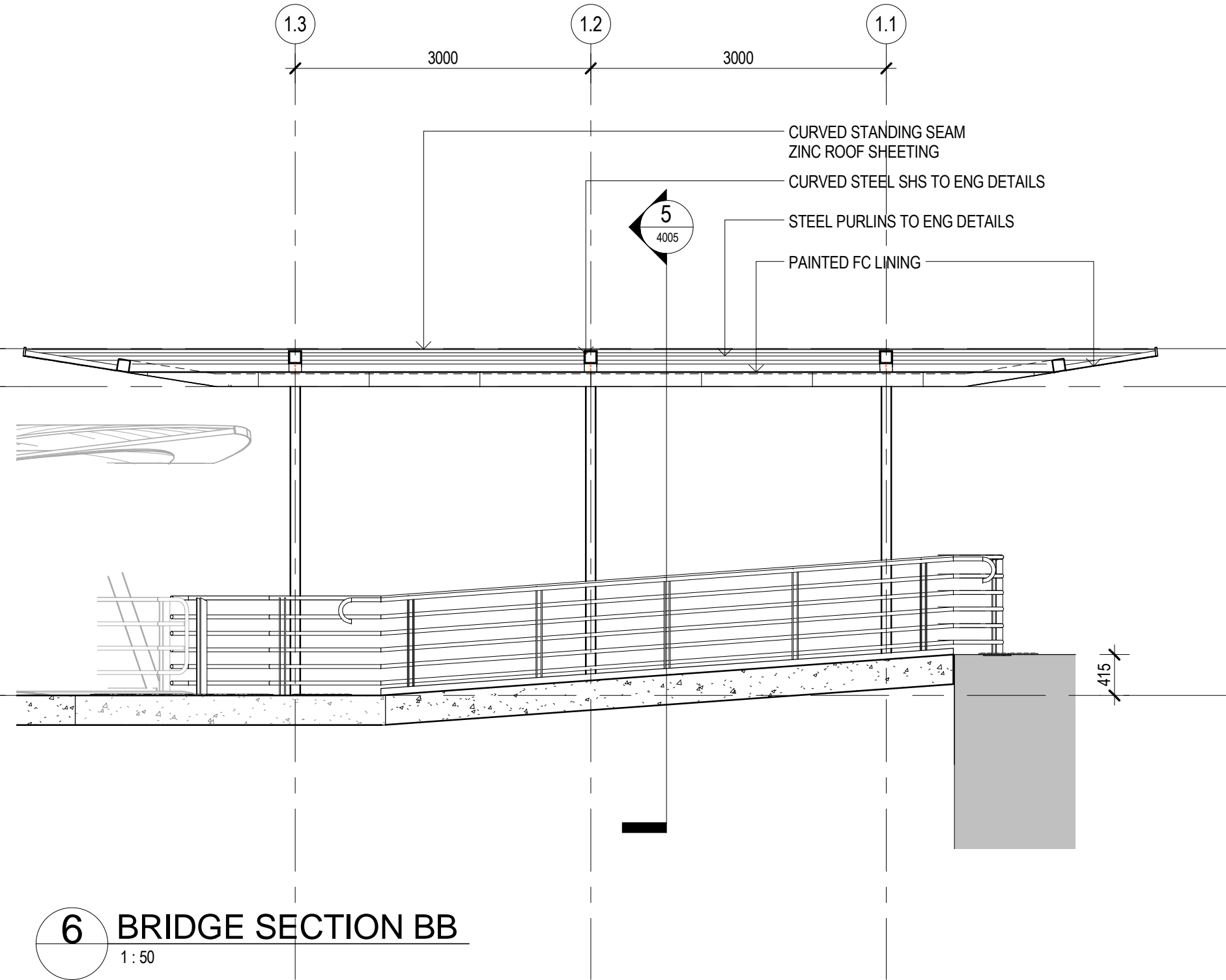
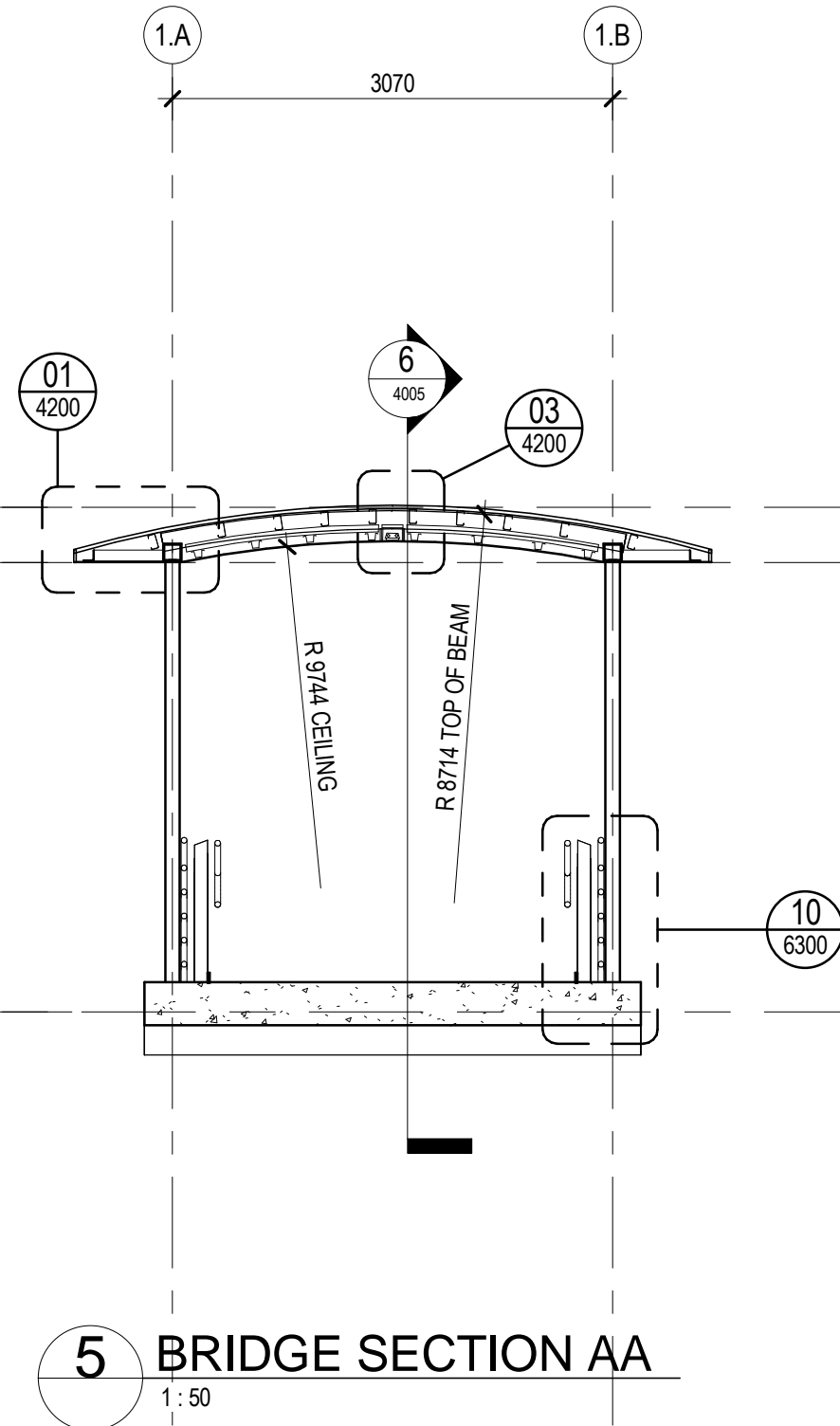
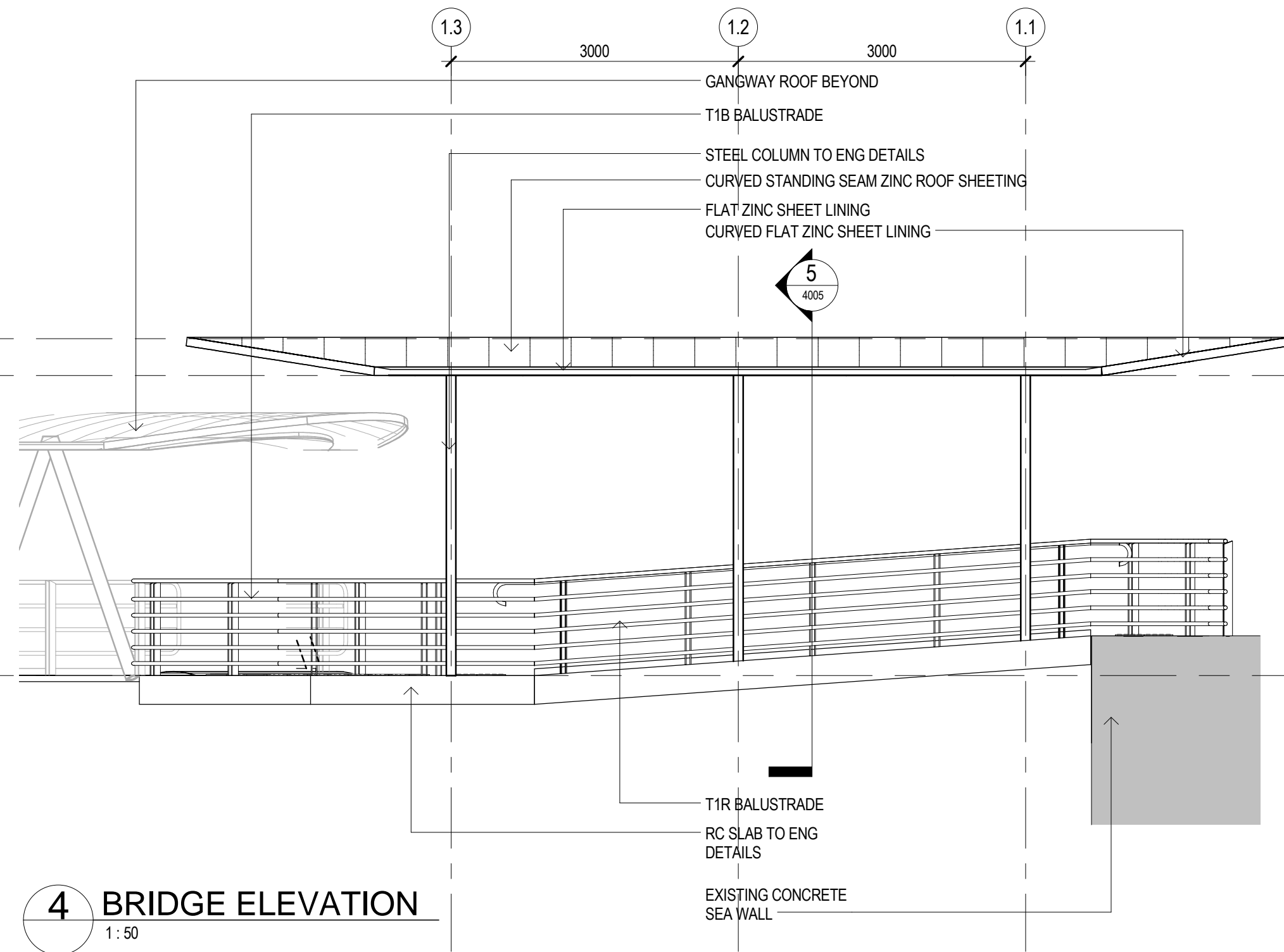
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Project Title
Sydney Wharves Upgrade Program - Cremorne Point

Drawing Title
Bridge - Floor/ Roof Plan, RCP, Elevation & Section

Project No **S09-026** Scale 1:50 @A1
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Drawing Created (by) Author
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Verified Checker
Approved Approver
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Appendix F

Noise and vibration assessment

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VICTOR FATTORETTO

DIRECTORS

MATTHEW SHIELDS
BEN WHITE



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Cremorne Point Wharf - Noise and Vibration Impact Assessment

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DOCUMENT CONTROL REGISTER

Project Number	2010366.1
Project Name	Sydney Harbour Ferries Wharf Upgrade
Document Title	Cremorne Point Wharf - Noise and Vibration Impact Assessment
Document Reference	2010366.1/0503A/R1/BW
Issue Type	Email
Attention To	Hansen Yuncken Pty Ltd Mr Daniel Yarrow

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	24/02/2014	2010366.1/2402A/R0/BW	JL	TT	BW
1	25/03/2014	2010366.1/2402A/R0/BW	JL	TT	BW

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1 INTRODUCTION

This document presents the acoustic impact assessment for noise and vibration associated with the proposed Cremorne Point Wharf Upgrade proposal. The document assesses the noise and vibration associated with the proposed construction and operational activities which are required as part of the Wharf upgrade, including the potential for noise and vibration impact to receivers within close proximity to the site. The report:

1. Details suitable vibration criteria based on the relevant Australian and international standards for construction vibration including the British Standard BS 6472:1992 *“Guide to Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)”* and German Standard DIN 4150-3 (1999-02): *“Structural Vibration – Effects of Vibration on Structures”*.
2. Assesses construction noise impact to surrounding residential receivers in conjunction with the relevant construction noise manuals including the Australian Standards and the Interim Construction Noise Guidelines (DECCW, 2009).
3. Other receivers assessed in this report include the recreation area within close proximity to the site.
4. Conducts an assessment of potential noise impact from the operation of the future wharf.
5. Formulates a strategy for construction activities to comply with the relevant noise and vibration standards including a suitable monitoring regime to be implemented when potentially high noise and vibration generating activities are being used and recommends noise and vibration controls for the relevant plant and equipment to be used on the site.

2 PROJECT DESCRIPTION AND POTENTIALLY AFFECTED PROPERTIES

The proposal would include the demolition and removal of the existing wharf pontoon and gangway and the construction of a new wharf as follows:

Demolition and removal of the existing pontoon and gangway.

- The existing covered pontoon and gangway including steel piles, glass screens, and associated facilities such as signage, information totem, seating, and closed circuit television (CCTV) system would be demolished and removed to an off-site location by barges.
- The existing waiting shed which connects the gangway to the foreshore is to be retained. The entrance to the gangway at the southern end of the waiting shed will be made good using weatherboard, glass or another building material that is similar in style and colour to the existing materials.

Construction of a new wharf

- Construction of a covered concrete bridge about three metres wide by six metres long connecting the land to a gangway. The bridge would contain a curved zinc roof supported by steel columns and stainless steel balustrades. The bridge would connect to the land adjacent to the north eastern corner of the existing waiting shed and would be oriented at an angle of about 90 degrees to the land. The bridge descends to a platform at a maximum 1:14 gradient. The concrete bridge would be supported by about four piles constructed from a mixture of steel and concrete.
- Construction of a covered aluminium gangway about 16 metres long and about three metres wide. The gangway would connect the bridge with a new floating pontoon. The gangway would be supported by the bridge and the floating pontoon and its gradient would vary according to the tides. The orientation of the gangway would be at an angle of about 135 degrees to the ramp.
- Construction and installation of a rectangular shaped steel floating pontoon about 12 metres wide by 27 metres long off the gangway. The pontoon would have one berthing face on the southern side. The pontoon would contain a curved zinc roof supported by steel columns, glass and stainless steel balustrades and seating. The floating pontoon would be held in place by four steel piles. The floating pontoon would be at about a 90 degree angle to the gangway.
- Installation of safety and security facilities including lighting, closed circuit television (CCTV), ladders to the water from the pontoon, a life ring on the pontoon platform, glass weather screen and tactile floor treatments.

Ancillary facilities

- A temporary compound would be established including site sheds, an amenities shed and storage containers for tools and some materials. The location of the temporary compound is to be confirmed and would be subject to local council review and agreement.
- The connection of electrical power to an existing supply to provide power to the wharf for lighting and security.
- The connection of water lines and meter to existing supply to provide water to the wharf for maintenance.
- The proposal would include provision for electronic ticketing systems, which may be implemented in the future but would not be provided as part of this proposal.

The wharf (including the bridge, ramp, gangway and pontoon) would be constructed to be accessible to people with a disability for no less than 80 per cent of the high and low tide levels listed in standard tide charts.

The marshalling and storage of most equipment, plant and materials, and the pre-fabrication of parts, pre-casting of headstocks and fit outs, would be carried out by a contractor at an offsite facility. The construction and demolition materials and equipment would be delivered/removed from the site using barges. A majority of the construction and demolition activity would also be undertaken from the barges on the water with only minor works such as connection to services undertaken from the land. Construction contractors would generally arrive at the site via water with only minimal vehicle access to the site required (up to about 15 vehicle movements per day).

The proposal would require the Cremorne Point Wharf to be closed to all ferries, water taxis and other vessels/watercraft for the duration of construction to enable the works to be carried out and would be re-opened to these vessels on completion of construction.

An overview of the proposal including the approximate location of the temporary compound is shown in Figure 1.

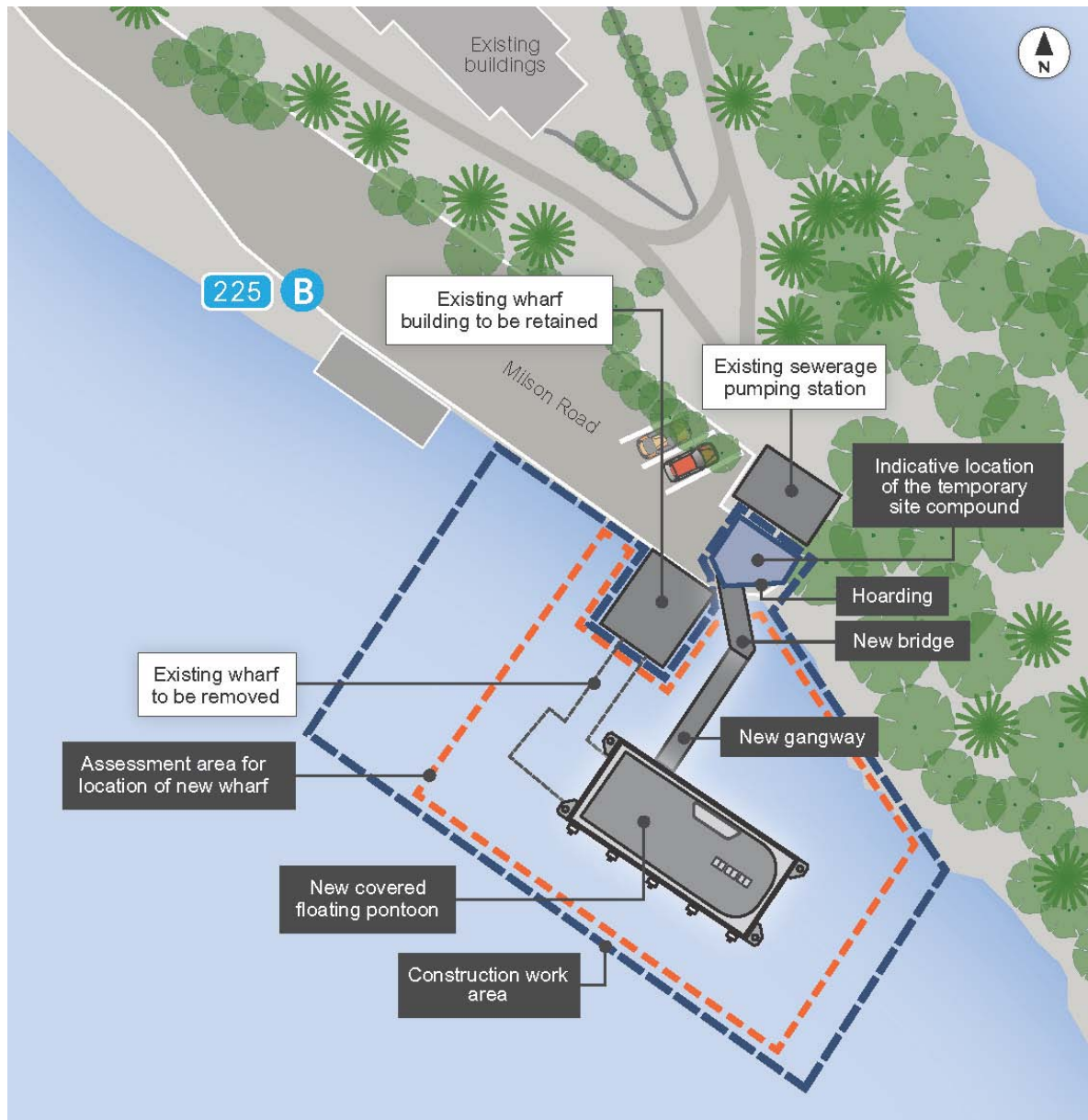


Figure 1 - Overview of the proposal and indicative location of temporary compound

Based on the site location of the Cremorne Point Wharf upgrade project, the nearest potentially affected receivers include:

1. Residential receivers located north of the site as detailed in the figure below and include the potentially worst affected property on Milson Road. Other residential receivers within the surrounding proximity have not been assessed in detail (including the residential receivers on the adjacent headland of Kurraba Point) as the residences assessed represent the potentially worst affected residential receivers.
2. The recreational area located to the east of the site.
3. Commercial receiver (cafe) within the existing wharf which will operate during construction.

Figure 2 below details the location of the Cremorne Point Wharf upgrade site, location of potentially affected receivers and the location of the noise monitor to assess existing noise levels within the vicinity of the site.

The noise logger was located at a position which was selected as a representative location that was both possible and practical to be installed and represents the background noise levels at surrounding receivers.



Figure 2 – Site Location, Receivers and Noise Monitoring Location

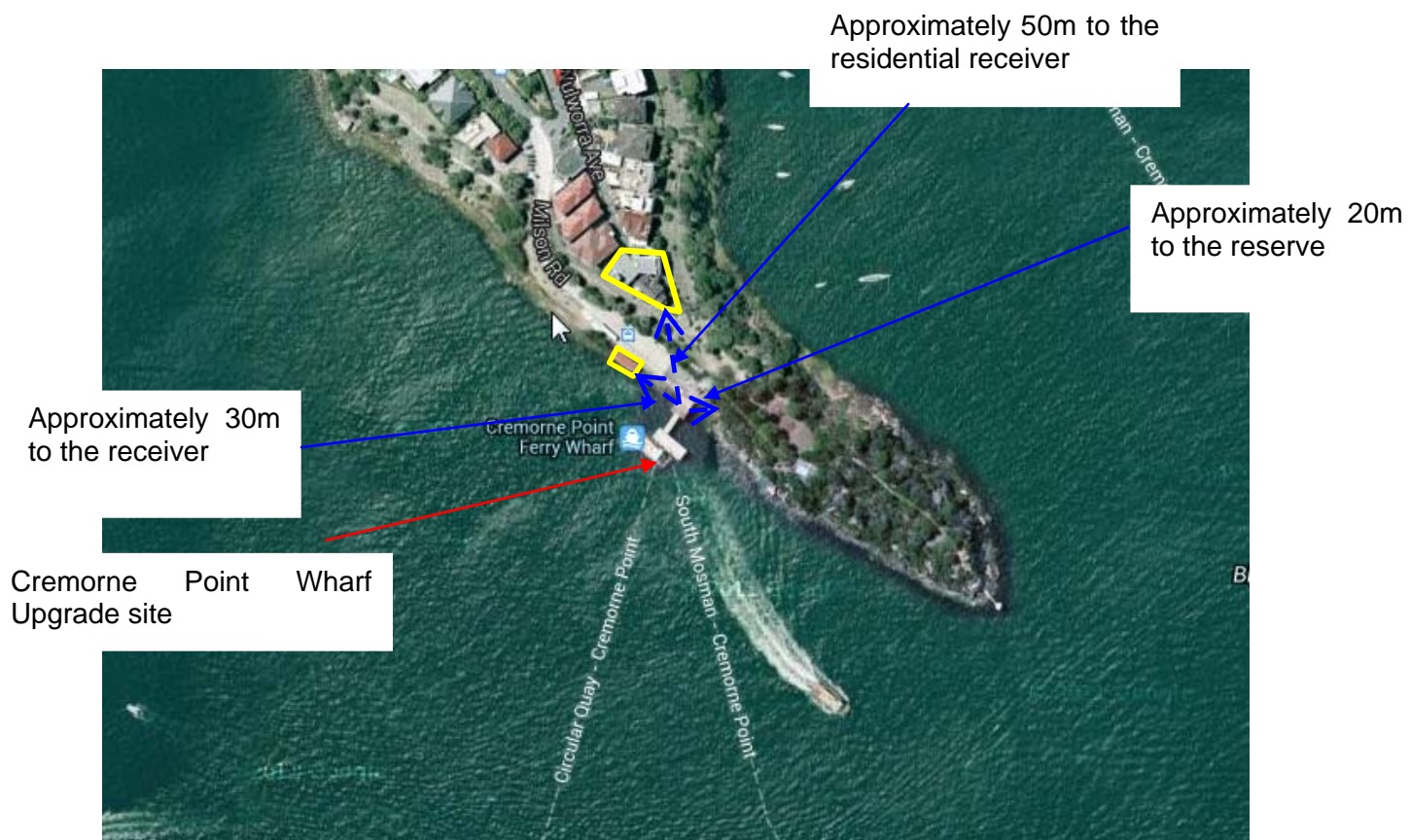


Figure 3 – Site Location and approximate receiver distances

Details of noise impacts to the surrounding receivers including the community notifications to be undertaken based on the potential for noise levels to exceed the relevant criteria is including in Section 8.8.1 of this report.

2.1 SITE WORKS

The proposed design and construction methodology of the wharf has been conducted such that much of the construction work can be undertaken off-site which will minimise the amount of construction activity at the Cremorne Point Wharf and consequently minimise the duration of noise emission at the site.

A temporary compound site would be established including site sheds, an amenities shed and storage containers for tools and some materials. The indicative location of the compound site is detailed in the figure below.

The proposed construction works are scheduled to last approximately six months with the piling activities expected to last up to about two weeks.

3 CONSTRUCTION NOISE CRITERIA

The determination of construction noise criteria has utilised the *Interim Construction Noise Guideline* (DECCW, 2009) and the requirements for construction noise are presented in this section of the report.

3.1 CONSTRUCTION NOISE GUIDELINE

The NSW Department of Climate Change and Water (now the Environmental Protection Authority) have developed a specific construction noise guideline in the aid of reducing the impact of construction associated noise.

The guideline reflects on feasible and reasonable mitigation strategies, management controls and community consultation in the effort to reach realistic compromises between construction sites and potential noise affected receivers.

3.1.1 Interim Construction Noise Guideline – Quantitative Assessment Method

The guideline refers to a Quantitative assessment method in which construction noise is assessed on a case by case basis with regard to various activities to be conducted on site. This assessment includes the prediction of noise levels at surrounding receivers which is included in this report.

In addition, the guideline specifies goals to minimise noise from construction related activities. These noise goals are presented within the table below.

Table 1 – DECCW Recommended Construction Noise Goals

Governing Body	Receiver Type	External sound level Goal, L _{eq} 15 min dB(A)
OEH	Residential	Daytime - Background + 10 dB(A) ¹
		Evening and Night time - Background + 5 dB(A) ¹
		75 dB(A) ²
	Active Recreation Areas	65 dB(A)

1: Where the predicted or measured LA_{eq} (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise (DECCW, 2009).

2: Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided (DECCW, 2009).

These criteria aim to maintain comfort levels within surrounding residential dwellings and other non residential receivers. Additionally, noise mitigation techniques as discussed in this report should be used if noise emissions exceed the above criteria. All work is to be carried out in accordance with AS 2436:1981 “*Guide to noise control on construction, maintenance and demolition sites*”.

3.1.2 Sleep Disturbance

The Interim Construction Noise Guideline states that where construction works are planned to extend over more than two consecutive nights, the impact assessment should cover the maximum noise level from the proposed works. The resulting sleep disturbance criteria is summarised in the Section below.

3.2 ACOUSTIC SURVEY

As part of this assessment an acoustic survey of the existing acoustic environment within the vicinity of the proposed Cremorne Point Wharf site has been conducted.

The acoustic survey included acoustic monitoring using an unattended noise logger which is detailed in this section of the report and the data is included in Appendix B.

3.3 ENVIRONMENTAL NOISE LEVELS

Environmental noise constantly varies in level, due to fluctuations in local noise sources including road traffic. Accordingly, a 15 minute measurement interval is normally utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In the case of environmental noise three principle measurement parameters are used, namely L_{10} , L_{90} and L_{eq} .

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source depends on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of industrial noise.

3.3.1 Unattended noise monitoring

Unattended noise monitoring conducted as part of this assessment is detailed in this section of the report. The results of unattended noise logging are included in Appendix B.

3.3.1.1 Unattended Monitoring Period

Unattended noise monitoring was conducted within the vicinity of the Cremorne Point Wharf at a secure location as detailed in Figure 2 in this report. The location is representative of the potentially worse case residential receivers, during the period of 6th to 12th February 2014, in order to measure the existing background noise levels.

3.3.1.2 Monitoring Equipment

Unattended noise measurements were obtained using an Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The noise monitor was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator. No significant drift was detected. All measurements were taken on A-weighted fast response mode. Periods of adverse weather conditions during the measurement period have not been used in this assessment.

3.3.2 Existing Noise Levels

Background noise levels during day time are dominated by general vehicular traffic movements on surrounding roadways and noise from the harbour. Table 2 summarises the recorded background noise levels monitored at the site.

Table 2 – Measured Background Noise Levels

Location	Description	Day Noise Level 7am to 6pm (dB(A))	Evening Noise Level 6pm to 10pm (dB(A))	Night Noise Level 10pm to 7am (dB(A))
Residential receivers – As detailed in Figure 2 of this report	Background L _{90,15min}	39	37	33

The acoustic survey results are considered representative and suitable for identifying construction noise levels at the nearest residential receivers.

3.4 CONSTRUCTION NOISE GOALS

Based on the construction noise guidelines detailed in this report and the noise monitoring within the vicinity of the site the following table details the construction noise goals for the proposed Cremorne Point Wharf upgrade site.

Table 3 – Construction Noise Goals

Location	Time Period	Description	Noise Level (dB(A))
Surrounding residential receivers (Based on recorded noise levels)	Day	Leq,15min	49 dB(A) ¹ 75 dB(A) ²
	Evening	Leq,15min	42 dB(A) ¹
	Night	Leq,15min	38 dB(A) ¹
Recreational Reserve	All periods	Leq,15min	65 dB(A) ¹
Commercial Receivers	All periods	Leq,15min	70 dB(A)

1: Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise (DECCW, 2009).

2: Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided (DECCW, 2009).

3.5 SLEEP DISTURBANCE

The Interim Construction Noise Guideline states that where construction works are planned to extend over more than two consecutive nights, the impact assessment should cover the maximum noise level from the proposed works. The resulting sleep disturbance criteria is summarised in the table below.

For the purpose of this assessment and based on industry expectations and previous experience on construction projects 8 dB(A) could be added to the predicted LAeq(15minute) noise levels in order to give a conservative estimate of the LA1(1 minute) noise emission levels. Sleep disturbance predictions have been provided based on proposed out of hours work activities during night time hours.

Table 4 – Construction Noise Goals for Sleep Disturbance

Location	Time Period	Description	Noise Level (dB(A))
Surrounding residential receivers (Based on recorded noise levels)	Night Time Periods	L _{1,(1 minute)}	48 dB(A)

The OEH's current approach to assessing potential sleep disturbance (*Application Notes to Industrial Noise Policy*) is to apply an initial screening criterion of background noise level plus 15 dBA and to undertake further analysis if the screening criterion cannot be achieved. The sleep disturbance screening criterion applies outside bedroom windows during the night-time period.

Where the screening criterion cannot be met, the additional analysis should consider the number of potential sleep disturbance events during the night, the level of exceedance and the noise levels from other events.

4 CONSTRUCTION VIBRATION CRITERIA

Construction vibration criteria associated with works on the Cremorne Point Wharf when measured at the potentially affected receivers should consider the following sets of vibration criteria to ensure no architectural or structural damage to surrounding buildings and human comfort is maintained. These standards have been selected as they are widely used in the assessment of vibration associated with construction activities within Australia, namely:

- German Standard DIN 4150-3 (1999-02): *“Structural Vibration – Effects of Vibration on Structures”*, and
- British Standard BS 6472:1992 *“Guide to Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)”*.

The criteria and the application of these Standards are discussed in separate sections below.

4.1 GERMAN STANDARD DIN 4150-3 (1999-02)

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in the Table below.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 5 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

TYPE OF STRUCTURE	PEAK PARTICLE VELOCITY (mms^{-1})			
	At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
	< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1 Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2 Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3 Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (eg buildings that are under a preservation order)	3	3 to 8	8 to 10	8

4.2 BRITISH STANDARD BS 6472:1992

British Standard BS 6472:1992 develops criteria relating to levels of building vibration that may be expected to give rise to “*adverse comment*”, in the frequency range most applicable to impacts associated with construction, which is 1 to 80Hz. These threshold values are used as criteria for assessing the loss of amenity and are presented below in Table 6.

Table 6 – BS 6472:1992 Criteria to Avoid “Adverse Comment”

Type of Occupancy	Time of Day	Peak Particle Velocity (mms^{-1}) between 1Hz to 80Hz Likely to Cause “Adverse Comment”			
		Continuous Vibration		Intermittent Vibration and Impulsive Vibration Excitation with Several Occurrences per day	
		Vertical	Horizontal	Vertical	Horizontal
Residential	Day	0.3 to 0.6	0.8 to 0.6	8.4 to 12.6	24 to 36
	Night	0.2	0.6	2.8	8
Offices	Day	0.6	1.6	18	51
	Night	0.6	1.6	18	51
Workshops	Day	1.2	3.2	18	51
	Night	1.2	3.2	18	51

The limits indicate that people in buildings are significantly less susceptible to horizontal vibration than to vertical vibration. Furthermore, Section 4.1 of BS 6472 notes that situations can exist where vibration magnitudes above those generally corresponding to minimal “*adverse comment*” levels can be tolerated, particularly for temporary disturbances and infrequent and intermittent events such as those associated with construction projects.

4.3 PROJECT CRITERIA

Based on the criteria detailed within the standards above the project vibration goal for the surrounding receivers includes the following criteria for cosmetic damage criteria:

1. Residential Receivers - Peak particle velocity of 10mm/s.

The vibration criteria above is based on the vibration limits detailed in the Sections above including the spectrum criteria detailed within the German Standard DIN 4150-3 (1999-02) and specifically the potentially worst affected frequencies of 10-50Hz.

4.4 GROUND BORNE VIBRATION

The required safe working distances for a number of potentially high vibration generating activities associated with the wharf upgrade are included in the table below. The distances detailed below are the distances at which compliance with the vibration criteria detailed in section 5.3 of this report will be achieved.

The safe working distances will vary at the site depending on a number of site conditions (including geotechnical conditions), plant types and operating capacities. The distances detailed below are those required to ensure compliance with both the human response and cosmetic damage criteria. The specific site conditions and vibration impact can be determined on the site once works commence and safe work distances may be able to be revised.

Table 7 – Recommended Safe Working Distances for vibration

EQUIPMENT /PROCESS	SAFE WORKING DISTANCE FOR COSMETIC DAMAGE	SAFE WORKING DISTANCE FOR HUMAN COMFORT
Piling, up to 900kg impact hammers	5m	17m
Vibration Piling equipment	5m	15m
Auger Piling	2m	10m
Hand Held Hammering	No contact with affected structures	No contact with affected structures

Note: Vibration can be conducted within the distances detailed above providing attended measurements are conducted of the potentially high vibration generating activities above and suitable management strategies are put in place based on site conditions.

Based on the expected vibration levels detailed in the table above it is not expected that vibration will negatively impact the surrounding receivers.

4.5 POTENTIALLY AFFECTED RECEIVERS

There are a number of potentially affected heritage receivers within the vicinity of the site including the following:

- Low level Sewage Pumping Station No. 57 – 12 metres east
- Former tram turning loop and ferry interchange - Adjacent
- Former tram terminus shed - Adjacent
- Gloucester Flats - 120 metres north
- Windsor Flats - 130 metres north
- 2 storey residence - 50 metres north-west
- Cremorne Reserve (including Robertsons Point) - 30 metres east
- Robertsons Point Lighthouse - 215 metres south east

5 CONSTRUCTION HOURS AND DURATION

RMS plans to carry out the proposal over a period of up to about six months (weather permitting), starting in late July 2014.

Construction would normally be limited to between the following standard work times:

- 7am to 6pm Monday to Friday.
- 8am to 1pm Saturday.

No work would be undertaken on Sundays or public holidays. However, work outside of standard hours would also be required in order to carry out piling activities and intricate lifts from the barge mounted crane, due to requirements for still water. Activities that are likely to be undertaken outside of standard work hours are outlined below.

Details of the propose construction activities can be found in the Review of Environmental Factors prepared by RPS.

Respite nights

There would be no intricate lifting or piling activities during the night time period on Saturday night, Sunday night (prior to midnight) or public holidays (prior to midnight). There will also be one respite night between Monday 12am and Saturday 7am resulting in at least two respite nights per week including Saturday night.

6 NOISE AND VIBRATION ASSESSMENT

An assessment of the principal sources of noise and vibration emission has been undertaken to identify the activities that may produce noise and/or vibration impacts so that appropriate ameliorative measures can be formulated.

Typical acoustic/vibration controls for specific equipment are discussed in this section of the report.

6.1 AUSTRALIAN STANDARD AS2436:1981 “GUIDE TO NOISE CONTROL ON CONSTRUCTION, MAINTENANCE AND DEMOLITION SITES

The Australian Standard AS2436 states that where all reasonable and available measures have been taken to reduce construction noise, mitigation strategies may be put in place to reduce noise levels to within a reasonable and acceptable level. The standard has been detailed in this report for the purpose of information and the Interim Construction Noise Guideline will be used for the assessment of noise impact. The standard provides comments regarding noise management which may be relevant.

For the control and regulation of noise from construction sites AS2436:1981 “*Guide to noise control on construction, maintenance and demolition sites*” nominates the following:

- a) That reasonable suitable noise criterion is established,
- b) That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes to locations of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours, and
- c) The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the demolition, excavation and construction site.

6.2 DETERMINATION OF CONSTRUCTION NOISE AND VIBRATION IMPACT

Using the noise levels presented in Table 8 below, the resultant noise potentially impacting surrounding receivers can be determined.

Based on the source of the site the expected noise levels at surrounding receivers can be predicted based on distance, barrier and working conditions (i.e. period which the activity is continuously being conducted).

6.3 SOUND POWER AND VIBRATION LEVELS

Noise impact will be determined from all processes and equipment, which are involved in the activities outlined below by defining the levels of sound, which they generate.

The A-weighted sound power levels for all the component parts of the above-described activities are outlined in the tables below.

Table 8 - Sound Power Levels and Potential Vibration Impacts

EQUIPMENT /PROCESS	SOUND POWER LEVEL - dB(A)	POTENTIAL VIBRATION LEVELS
Excavator (without hammer)	98	Up to 3mm/s @ 5m
Vibration Piling equipment	105	Up to 5mm/s @ 5m
Driven Piling equipment	115*	Up to 5mm/s @ 10m
Piling Boring equipment	100	Up to 3mm/s @ 5m
Crane	105	Minimal vibration impact
Truck	96	Minimal vibration impact
Barge	95	Minimal vibration impact
Boat	100	Minimal vibration impact
Angle Grinders	114	Minimal vibration impact
Electric Saw	111	Minimal vibration impact
Hand Held Drilling	94	Minimal vibration impact
Hand Held Hammering	110	Minimal vibration impact
Concrete Vibrator	100	Minimal vibration impact
Cement Mixing Truck	105	Minimal vibration impact
Concrete Pumps	107	Minimal vibration impact

The noise levels presented in the above table are derived from the following sources, namely:

1. On-site measurements
2. Table D2 of Australian Standard 2436-1981
3. Data held by this office from other similar studies.

*Note: Noise from driven piles is based on recorded noise levels from other wharf upgrades, including Neutral Bay. Details of the recorded noise levels are included in Appendix C.

6.4 VIBRATION IMPACT

Due to the distances and locations of the proposed activities to be undertaken there is no expected vibrations from works which will negatively impact surrounding receivers. This has been confirmed based on the continuous vibration monitoring which has been conducted at Neutral Bay and Rose Bay which confirms the construction activities will not generate levels of vibration which will exceed criteria detailed in this report.

In the event activities are found to be in excess of vibration criteria as measured by the monitoring at a representative location to the surrounding residential receivers a site investigation will be conducted and proposed vibration mitigation methods explored and detailed.

7 CONSTRUCTION SCENARIOS

While noise levels would be influenced by the dominant plant and equipment in operation at any one time, consideration has been given to four typical construction scenarios as outlined in Table 9.

Table 9 – Construction Scenarios

CONSTRUCTION PERIOD	EQUIPMENT TO BE USED	ITEMS OF PLANT REQUIRED	PERIOD OF OPERATION IN ANY 15 MINUTES
Removal of structure/demolition	Barge	3	10
	Truck	1	5
	Hand Tools	3	5
	Hydraulic Hammers	1	5
	Angle Grinders	1	5
Lifting of materials	Barge	3	5
	Crane	1	15
	Hand Tools	3	15
Installation of new Piles	Barge	3	5
	Piling Rig	1	5
	Crane	1	15
General construction works such as concreting	Barge	3	5
	Concrete Truck	2	5
	Concrete Pump	1	5
	Truck	1	5
	Boat	1	5
	Compressor	1	5
	Hand Tools	1	5
	Generator	1	5

7.1 PREDICTED CONSTRUCTION NOISE LEVELS AT RESIDENTIAL RECEIVERS

This section of the report details the predicted noise levels from the proposed activities detailed in the Table 9 above. Noise levels have been calculated at the potentially worst affected residential receivers. Calculations include distance, time and barrier corrections where applicable.

Figure 4, identifies the properties where it is expected that noise management levels would be exceeded (those properties within the red line) and the properties that would be highly noise affected (those properties within the yellow line). Highly noise affected means where noise levels are above 75 dB(A). Other residential receivers would also be affected by noise however impacts on these receivers would reduce as the distance to the receiver increases.

Table 10 – Calculated Construction Noise Levels at Residential Receivers to the North (50m)

EQUIPMENT /PROCESS	SOUND POWER LEVEL - dB(A)	CALCULATED NOISE LEVEL AT WORST AFFECTED RESIDENTIAL RECEIVER L_{Aeq} (15min)	NOISE LEVEL CRITERIA DAY/EVENING/NIGHT dB(A) L_{eq} (15min)	EXCEEDANCE DAY/EVEN/NIGHT dB(A)
Excavator (without hammer)	98	59 dB(A)	49/42/38	10/17/21
Vibration Piling equipment	105	66 dB(A)	49/42/38	17/24/28
Driven Piling equipment	115	80 dB(A)	49/42/38	31/38/42
Piling Boring equipment	100	61 dB(A)	49/42/38	12/19/23
Crane	105	66 dB(A)	49/42/38	17/24/28
Boat	100	61 dB(A)	49/42/38	12/19/23
Barge	95	56 dB(A)	49/42/38	7/14/18
Truck	96	55 dB(A)	49/*/*	6/-/-
Angle Grinders	114	79 dB(A)	49/*/*	30/-/-
Electric Saw	111	75 dB(A)	49/*/*	26/-/-
Hand Held Drilling	94	55 dB(A)	49/*/*	6/-/-
Hand Held Hammering	110	71 dB(A)	49/42/38	22/29/33
Concrete Vibrator	100	61 dB(A)	49/*/*	12/-/-
Cement Mixing Truck	105	66 dB(A)	49/*/*	17/-/-
Concrete Pumps	107	68 dB(A)	49/*/*	19/-/-

Note: * denotes activities which will not be operational out side of normal construction hours.

Table 11 – Calculated Construction Noise Levels at Residential Receivers to the West (30m)

EQUIPMENT /PROCESS	SOUND POWER LEVEL - dB(A)	CALCULATED NOISE LEVEL AT WORST AFFECTED RESIDENTIAL RECEIVER L_{Aeq} (15min)	NOISE LEVEL CRITERIA DAY/EVENING/NIGHT dB(A) L_{eq} (15min)	EXCEEDANCE DAY/EVEN/NIGHT dB(A)
Excavator (without hammer)	98	65 dB(A)	49/42/38	16/23/27
Vibration Piling equipment	105	72 dB(A)	49/42/38	23/30/34
Driven Piling equipment	115	86 dB(A)	49/42/38	37/44/48
Piling Boring equipment	100	67 dB(A)	49/42/38	18/25/29
Crane	105	72 dB(A)	49/42/38	23/30/34
Boat	100	67 dB(A)	49/42/38	18/25/29
Barge	95	62 dB(A)	49/42/38	13/20/24
Truck	96	61 dB(A)	49/*/*	12/-/-
Angle Grinders	114	85 dB(A)	49/*/*	36/-/-
Electric Saw	111	81 dB(A)	49/*/*	32/-/-
Hand Held Drilling	94	61 dB(A)	49/*/*	12/-/-
Hand Held Hammering	110	77 dB(A)	49/42/38	28/35/39
Concrete Vibrator	100	67 dB(A)	49/*/*	18/-/-
Cement Mixing Truck	105	72 dB(A)	49/*/*	23/-/-
Concrete Pumps	107	74 dB(A)	49/*/*	25/-/-

Note: * denotes activities which will not be operational out side of normal construction hours.

7.2 PREDICTED CONSTRUCTION NOISE LEVELS AT THE RECREATIONAL RESERVE

This section of the report details the predicted noise levels from the proposed activities detailed in the Table 9 above. Noise levels have been calculated at the active recreation area which is approximately 20m from the site. Calculations include distance, time and barrier corrections where applicable.

Table 12 – Calculated Construction Noise Levels at the Active Reserve

EQUIPMENT /PROCESS	SOUND POWER LEVEL - dB(A)	CALCULATED NOISE LEVEL AT THE RECREATION AREA L_{Aeq} (15min)	NOISE LEVEL CRITERIA DAY dB(A) L_{eq} (15min)	EXCEEDANCE DAY/EVEN/NIGHT dB(A)
Excavator (without hammer)	98	75 dB(A)	65	10
Vibration Piling equipment	105	86 dB(A) #	65	21
Driven Piling equipment	115	97 dB(A) #	65	32
Piling Boring equipment	100	80 dB(A) #	65	15
Crane	105	81 dB(A)	65	16
Boat	100	70 dB(A)	65	5
Barge	95	66 dB(A)	65	1
Truck	96	73 dB(A)	65	8
Angle Grinders	114	91 dB(A) #	65	26
Electric Saw	111	90 dB(A) #	65	25
Hand Held Drilling	94	65 dB(A)	65	-
Hand Held Hammering	110	97 dB(A)	65	32
Concrete Vibrator	100	73 dB(A)	65	8
Cement Mixing Truck	105	81 dB(A)	65	16
Concrete Pumps	107	83 dB(A)	65	18

Due to the distance separation between the reserve vibration generated from the works on the wharf upgrade site will not negatively impact on the facility.

Due to the limited exceedences all management controls will be undertaken to reduce noise impact, however the expected noise impact on the reserve will not impact on the amenity for the users of the reserve.

7.3 PREDICTED CONSTRUCTION NOISE LEVELS AT THE WHARF CAFÉ

This section of the report details the predicted noise levels from the proposed activities detailed in the Table 9 above. Noise levels have been calculated at the Wharf Café receiver which is within the existing wharf. Calculations include distance, time and barrier corrections where applicable.

Table 13 – Calculated Construction Noise Levels at the Wharf Café

EQUIPMENT /PROCESS	SOUND POWER LEVEL - dB(A)	CALCULATED NOISE LEVEL AT THE WHARF CAFÉ RECEIVER L_{Aeq} (15min)	NOISE LEVEL CRITERIA DAY dB(A) L_{eq} (15min)	EXCEEDANCE DAY/EVEN/NIGHT dB(A)
Excavator (without hammer)	98	71 dB(A)	70	1
Vibration Piling equipment	105	78 dB(A)	70	8
Driven Piling equipment	115	92 dB(A)	70	22
Piling Boring equipment	100	73 dB(A)	70	3
Crane	105	78 dB(A)	70	8
Boat	100	72 dB(A)	70	2
Barge	95	68 dB(A)	70	-
Truck	96	67 dB(A)	70	-
Angle Grinders	114	91 dB(A)	70	21
Electric Saw	111	87 dB(A)	70	17
Hand Held Drilling	94	67 dB(A)	70	-
Hand Held Hammering	110	83 dB(A)	70	13
Concrete Vibrator	100	78 dB(A)	70	8
Cement Mixing Truck	105	78 dB(A)	70	8
Concrete Pumps	107	80 dB(A)	70	10

Due to the potential for high noise levels from construction noise impacting on the existing Wharf Café it is recommended that screening of construction activities be undertaken for general construction works.

7.4 SLEEP DISTURBANCE

The NSW Environmental Criteria for Road Traffic Noise guidelines which the ICNG refers to states that maximum internal noise levels below 50 -55 dB(A) are unlikely to cause wakening reactions, and that one or two noise events per night with maximum internal noise levels of 65 -70 dB(A) are not likely to affect health and wellbeing significantly.

As the proposed activities will only occur during periods when there is unfavourable conditions night works will be limited to be undertaken on the least number of nights possible. To ensure that the potential impact on sleep disturbance and health and wellbeing are minimised to an acceptable level the following recommendations are to be implemented for the proposal:

- All night time works are to be kept to a minimum and only undertaken when there are no other feasible or reasonable alternatives.
- Construction works will not occur over three consecutive night time periods regardless of the weather conditions.

These measures, as well as all other noise control measures within Section 8 are to be implemented where appropriate and reasonable.

The predicted sleep disturbance noise levels for the proposed equipment to be operational during extended hour's periods are detailed in the table below.

Table 14 – Calculated Construction Noise Levels at Residential Receivers for Sleep Disturbance

EQUIPMENT /PROCESS	SOUND POWER LEVEL - dB(A)	CALCULATED NOISE LEVEL AT WORST AFFECTED RESIDENTIAL RECEIVER L_{A1} (1 min)	NOISE LEVEL CRITERIA SLEEP DISTURBANCE dB(A) L₁	EXCEEDANCE NIGHT dB(A)
Excavator (without hammer)	98	69 dB(A)	47	22
Vibration Piling equipment	105	78 dB(A)	47	31
Driven Piling equipment	115	98 dB(A)	47	51
Piling Boring equipment	100	71 dB(A)	47	24
Crane	105	78 dB(A)	47	31
Boat	100	65 dB(A)	47	18
Hand Held Hammering	110	80 dB(A)	47	33

The predicted maximum noise levels in the event of construction activities to be conducted during night time hours is 98 dB(A) for piling and up to 80 dB(A) for other construction activities externally to residential properties which is approximately 88 dB(A) and 70 dB(A) respectively, internally with windows open.

The predicted noise level using the sleep disturbance criteria indicates that the noise from construction activities may cause annoyance and disturbance to surrounding residences for limited periods due to sleep disturbance events. Based on the criteria detailed within the guidelines, noise from construction activities at night has the potential to affect the health and wellbeing of surrounding residential receivers.

7.5 OTHER SURROUNDING RECEIVERS

There is potential for other surrounding receivers, other than those detailed in the detailed assessment above, to be affected from construction noise activities. This assessment details the potential for noise impact to the potentially worst affected receivers as well as identify those receivers which may be affected from construction noise as detailed in Figure 4 below.

7.6 NOISE AND VIBRATION MANAGEMENT FOR CREMORNE POINT WHARF

This section of the report presents the required noise strategies to ensure noise levels when measured at a receiver within close proximity to surrounding receivers with the noise level criteria presented in this report. The table below presents the construction activities and discusses the required management/treatments required to be conducted.

Table 15 – Recommended Noise and vibration Controls

EQUIPMENT /PROCESS	Receiver	Discussion
Piling	Residential Receivers	<p>Due to the potential for high noise levels to the surrounding residential receivers, feasible and reasonable noise mitigation would be required. Noise impacts will be assessed at the site and potential mitigation strategies will include those detailed in section 8 of this report.</p> <p>Due to the potential for high noise levels from construction noise impacting on the surrounding residential receivers it is recommended that all night time works are kept to a minimum and only undertaken when there are no other feasible or reasonable alternatives.</p> <p>Construction works will not occur over more than three consecutive night time periods regardless of the weather conditions.</p>
	Wharf Café	During all periods screening from high noise emitting equipment using a hoarding or the like should be conducted.
Construction activities	Residential Receivers	<p>Due to the approximate distance of 16m from the wharf to the surrounding residential receivers specified items of equipment will be identified and noise mitigation treatments specified as required including screening of hammering and sawing with hoardings.</p> <p>Due to the potential for high noise levels from construction noise impacting on the surrounding residential receivers it is recommended that all night time works are kept to a minimum and only undertaken when there are no other feasible or reasonable alternatives.</p> <p>Construction works will not occur over three consecutive night time periods regardless of the weather conditions.</p>
	Wharf Café	During all periods screening from high noise emitting equipment using a hoarding or the like should be conducted.

Table 15 (Continued) – Recommended Noise and vibration Controls

Truck (including the loading of materials into trucks)	Residential Receivers	Trucks to be managed such that time waiting on the street is kept to a minimum
	Wharf Café	No additional controls beyond those required for residential receivers are required
Concrete Pumps	Residential Receivers	Concrete pumps to be screened from surrounding residential receivers if feasible and reasonable.
	Wharf Café	Concrete pumps to be screened from surrounding receivers if feasible and reasonable.

Note: No additional acoustic mitigation is recommended above those detailed in the table above for the active recreation reserve.

In the event noise mitigation methods are implemented ongoing acoustic noise measurements at the surrounding receivers will be undertaken. In the event noise levels are required to be reduced future additional mitigation methods will be implemented.

8 NOISE AND VIBRATION CONTROL METHODS

The determination of appropriate noise control measures will be dependant on the particular activities and construction appliances. This section provides an outline of potential available methods.

8.1 SELECTION OF ALTERNATE APPLIANCE OR PROCESS

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or equipment. For example; piling, particularly vibration piling on certain areas of the site may potentially generate high levels of noise. Using an alternative construction methodology (if possible) would reduce resultant noise impacts.

8.2 SILENCING DEVICES

Where construction process or appliances are noisy, the use of silencing devices may be possible. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts.

8.3 MATERIAL HANDLING

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

8.4 TREATMENT OF SPECIFIC EQUIPMENT

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

8.5 ESTABLISHMENT OF SITE PRACTICES

This involves the formulation of work practices to reduce noise generation. A noise plan will be developed for this project outlining work procedures and methods for minimising noise.

8.6 REGULAR NOISE CHECKS OF EQUIPMENT

To determine the requirement for silencing devices on machinery it is proposed to undertake fortnightly noise check. Noise levels of all machines on site will be measured and if they are found to be higher than nominated for that equipment type, items such as mufflers and engine shrouds will be examined to ensure they are in good working order.

A record of these measurements will be kept on a form similar to that shown in Appendix 1. This measure is expected to maintain noise at constant levels, and prevent any increases.

8.7 COMBINATION OF METHODS

In some cases it may be necessary that two or more control measures be implemented to minimise noise.

8.8 SCREENING OF OPERATIONS

Screening of operations will be required for activities which exceed noise levels, such as piling. Screening should be conducted using a solid material such as a hoarding or the like. Any screening would be required to comply with the relevant safety and operational standards.

8.8.1 Noise and Vibration Monitoring

Noise and vibration monitoring will be undertaken to determine the effectiveness of measures which are being implemented. The results of monitoring can be used to devise further control measures. The monitoring regime for the site includes the following:

1. Vibration – Due the proximity of receivers from the wharf vibration monitoring is proposed for the potentially high vibration generating activities such as piling and demolition of structure at a representative location to the residential receivers at the worst affected residential receivers.
2. Noise Monitoring – Continuous noise monitoring will be conducted at the Cremorne Point site during the high noise periods of the proposed works including demolition and piling periods community interaction and complaints handling

8.8.2 Establishment of Direct Communication with Affected Parties

In order for any construction noise management programme to work effectively, continuous communication is required between all parties, which may be potentially impacted upon including the construction contractor and neighbours. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented;
- Increase understanding of all acoustic issues related to the project and options available;
- Identify group concerns generated by the project, so that they can be addressed; and
- Ensure that concerned individuals or groups are aware of and have access to the Hansen Yunken Complaints Register which will be used to address any construction noise related problems should they arise.

To ensure that this process is effective, regular information regarding the proposed works and period when they will be required to be conducted should be provided to surrounding receivers.

The community notification is to be conducted within the areas detailed below, including direct communication using phone calls or door knocking and letter drops or mail outs.

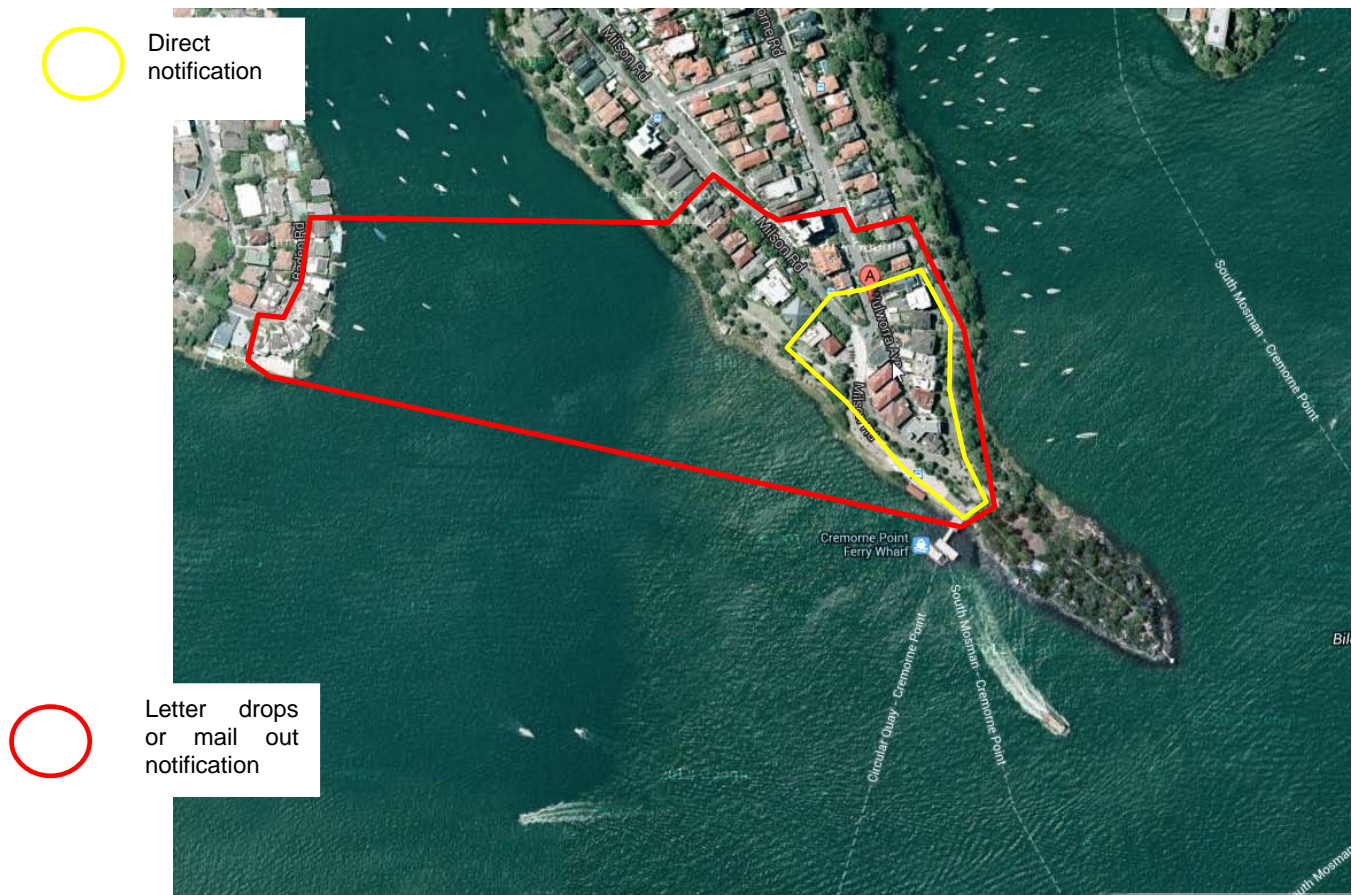


Figure 4 – Community Notification Area

The notifications above have been based on the following:

1. Residence where noise levels may exceed criteria – the red line - note these areas outside the red will not have likely exceedences within the construction noise criteria. Areas within these areas will be notified with a letter drop.
2. Residence which may have exceedences – The Yellow Line - with the 75 LMax noise level have been identified within the yellow area and will be have direct notification.

8.8.3 Dealing with complaints

Should any complaints about noise or vibration occur measures shall be undertaken to investigate the complaint, determine whether criteria has been exceeded and identify the required changes to work practices. In the case of exceedances of the vibration limits all work potentially producing vibration shall cease until the exceedance is investigated.

The effectiveness of any changes to work practices shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are minimised.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and location of the complainant (if provided);
- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;
- Required remedial action, if required;
- Validation of the remedial action by a consultant or as detailed in this report; and
- Summary of feedback to the complainant.

A permanent register of complaints should be held.

All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

Where non-compliances or noise complaints are raised the following methodology will be implemented.

1. Determine the offending plant/equipment/process
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers, vibration separation etc where practical.
4. Selecting alternative equipment/processes where possible

9 OPERATIONAL NOISE AND VIBRATION IMPACT ASSESSMENT

9.1 CREMORNE POINT WHARF

The position of the proposed new wharf is located at similar distance from shore than the existing wharf and the ferry berthing direction is consistent with the existing wharf conditions. Since the proposed ferry times are not expected to change and the distance between the wharf and the nearest residences is similar, a detailed assessment of the operational noise impacts is not considered necessary.

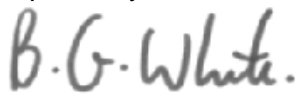
The resulting noise level impact from the proposed wharf upgrade will be similar to those currently experienced.

10 CONCLUSION

This document presents a discussion of the processes, which will be followed in order to manage noise and vibration associated with demolition and construction activities which will be required to be conducted as part of the Cremorne Point Wharf Upgrade Project and the potential for noise and vibration impact to receivers within proximity of the site.

The report details required management controls to ensure noise and vibration complies with the relevant criteria and a monitoring regime to monitor noise and vibration impacts to potential receivers.

Prepared by



ACOUSTIC LOGIC CONSULTANCY PTY LTD
Ben White

REFERENCES

1. British Standard BS 6472:1992 *“Guide to Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)”* and German Standard DIN 4150-3 (1999-02): *“Structural Vibration – Effects of Vibration on Structures”*.
2. Australian Standard AS2436:1981 *“Guide to noise control on construction, maintenance and demolition sites”*,
3. Regulation 49 of the Occupational Health and Safety Regulation
4. Office of Environment and Heritage (OEH) Construction Noise Guideline
5. German Standard DIN 4150-3 (1999-02): *“Structural Vibration – Effects of Vibration on Structures”*; and
6. British Standard BS 6472:1992 *“Guide to Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)”*.

APPENDIX A

CONSTRUCTION APPLIANCE COMPLIANCE CERTIFICATE

Hansen Yunken Constructions

Cremorne Point Wharf Project

Construction Appliance Compliance Certificate

Month _____

Year _____

Plant Item _____

Allowable Noise Level _____

Measured Noise Level _____

Complies

Yes

☐

No

☐

Issuing Engineer _____

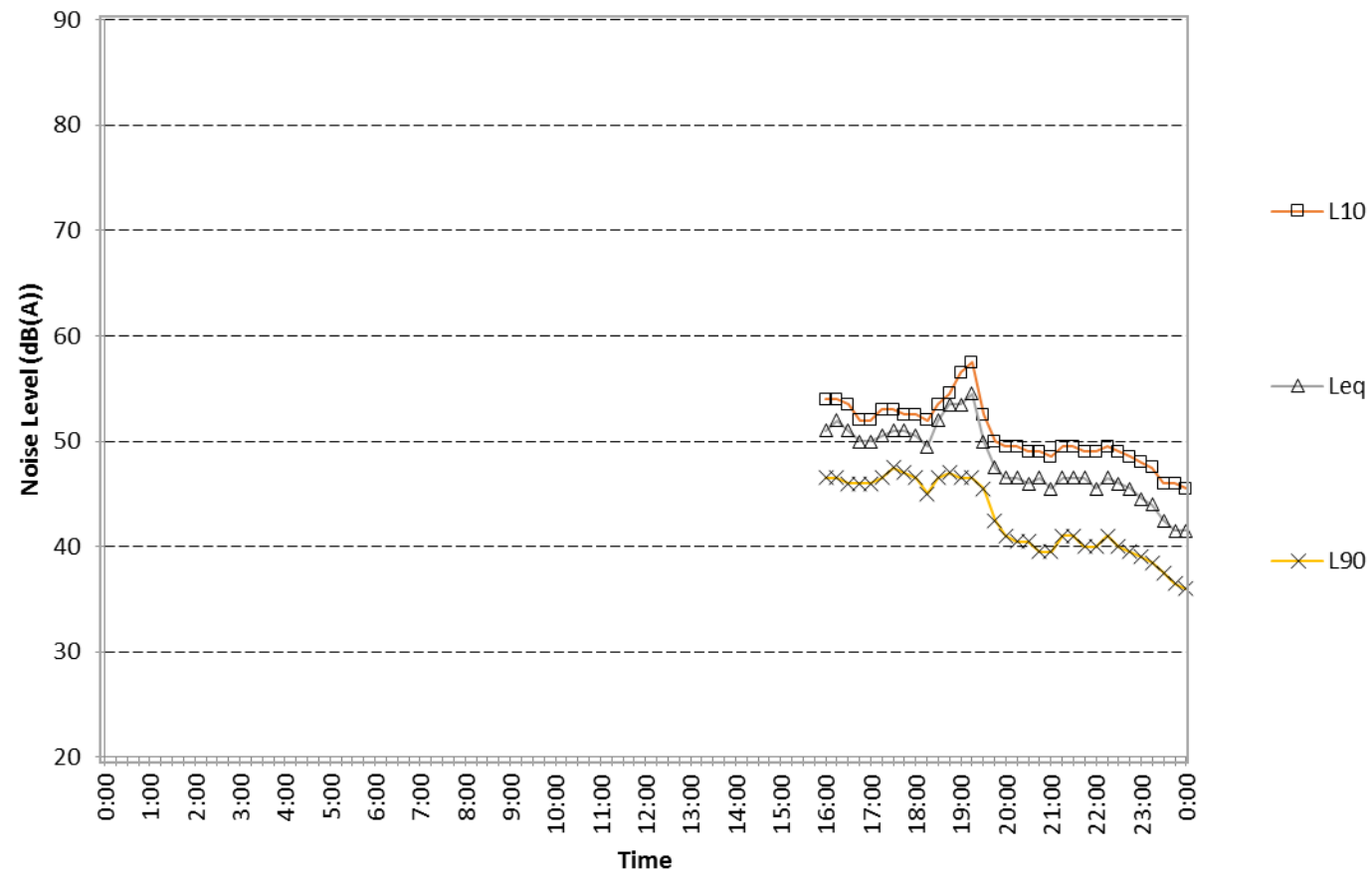
Sub-Contractor _____

Project Manager _____

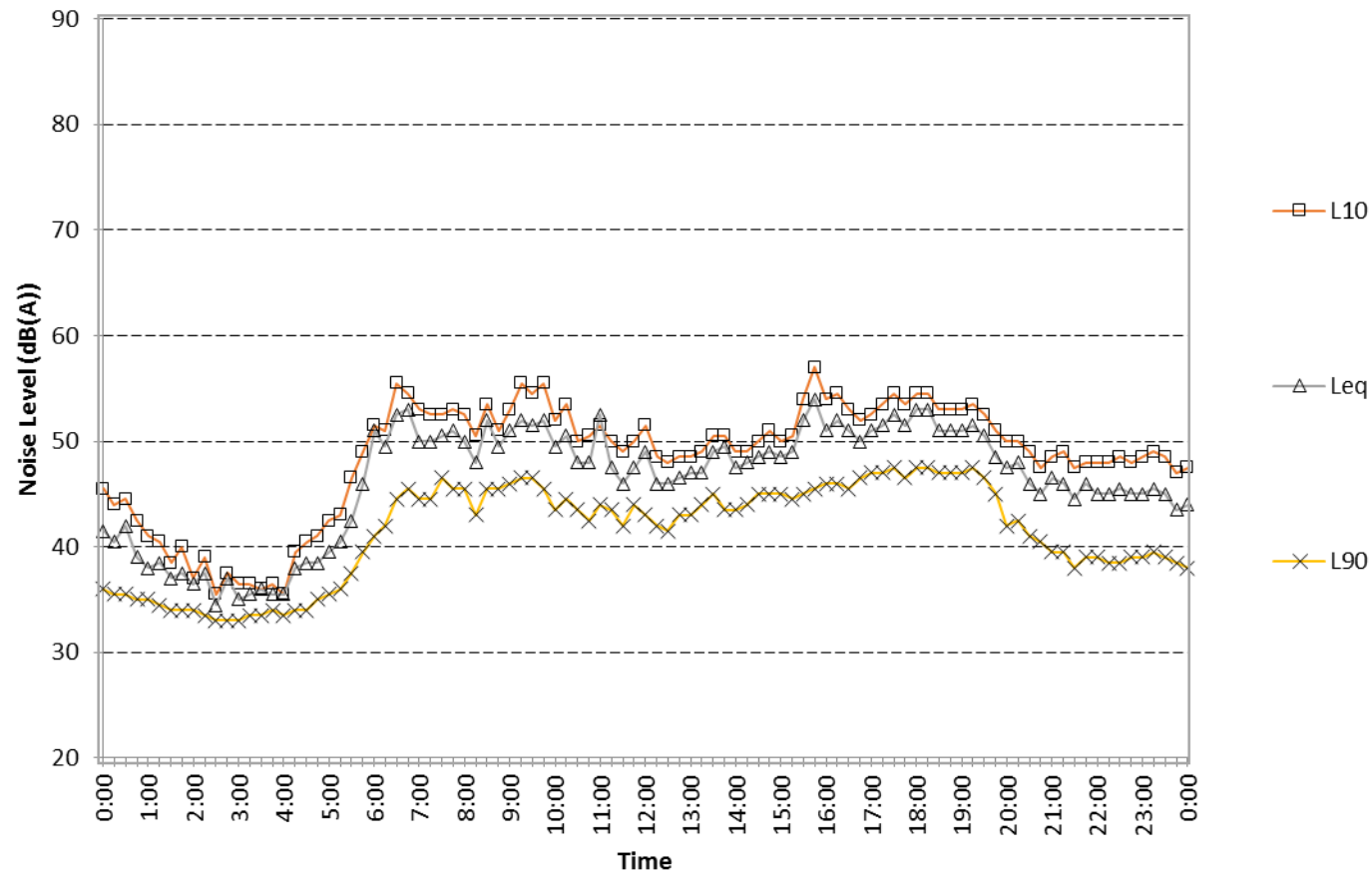
APPENDIX B

Noise Monitoring Data

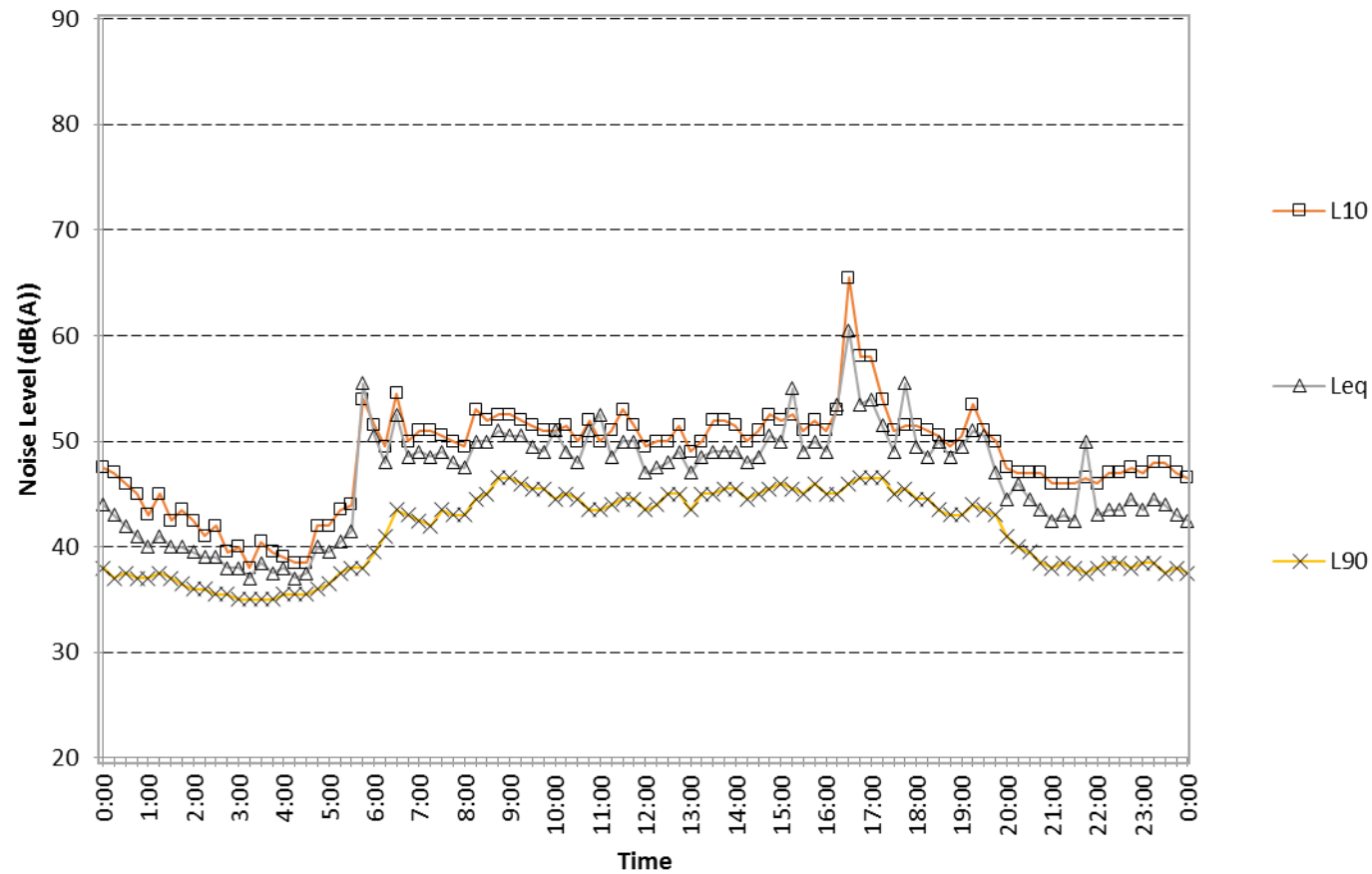
Cremorne
Thursday February 6, 2015



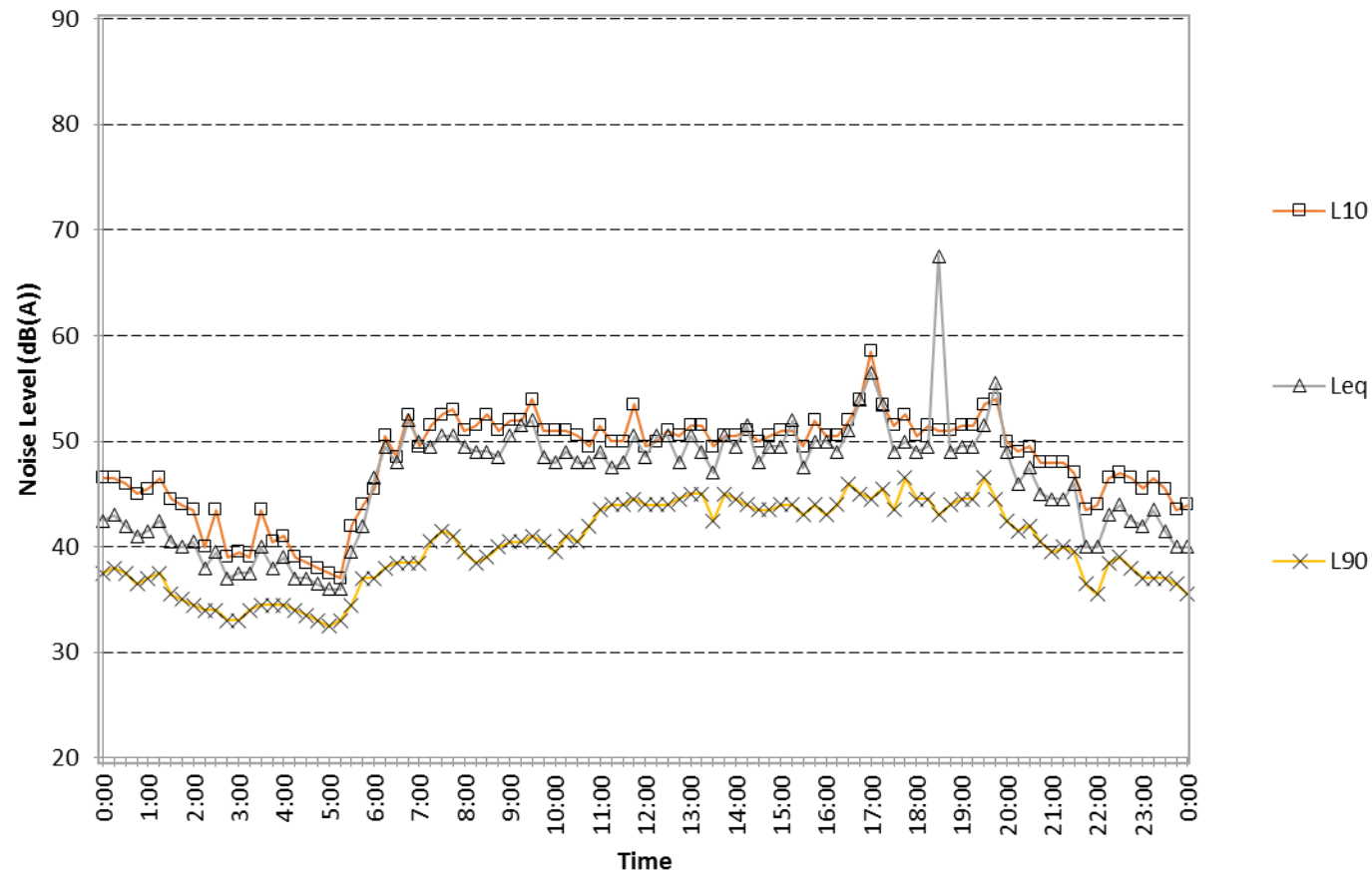
Cremorne
Friday February 7, 2014



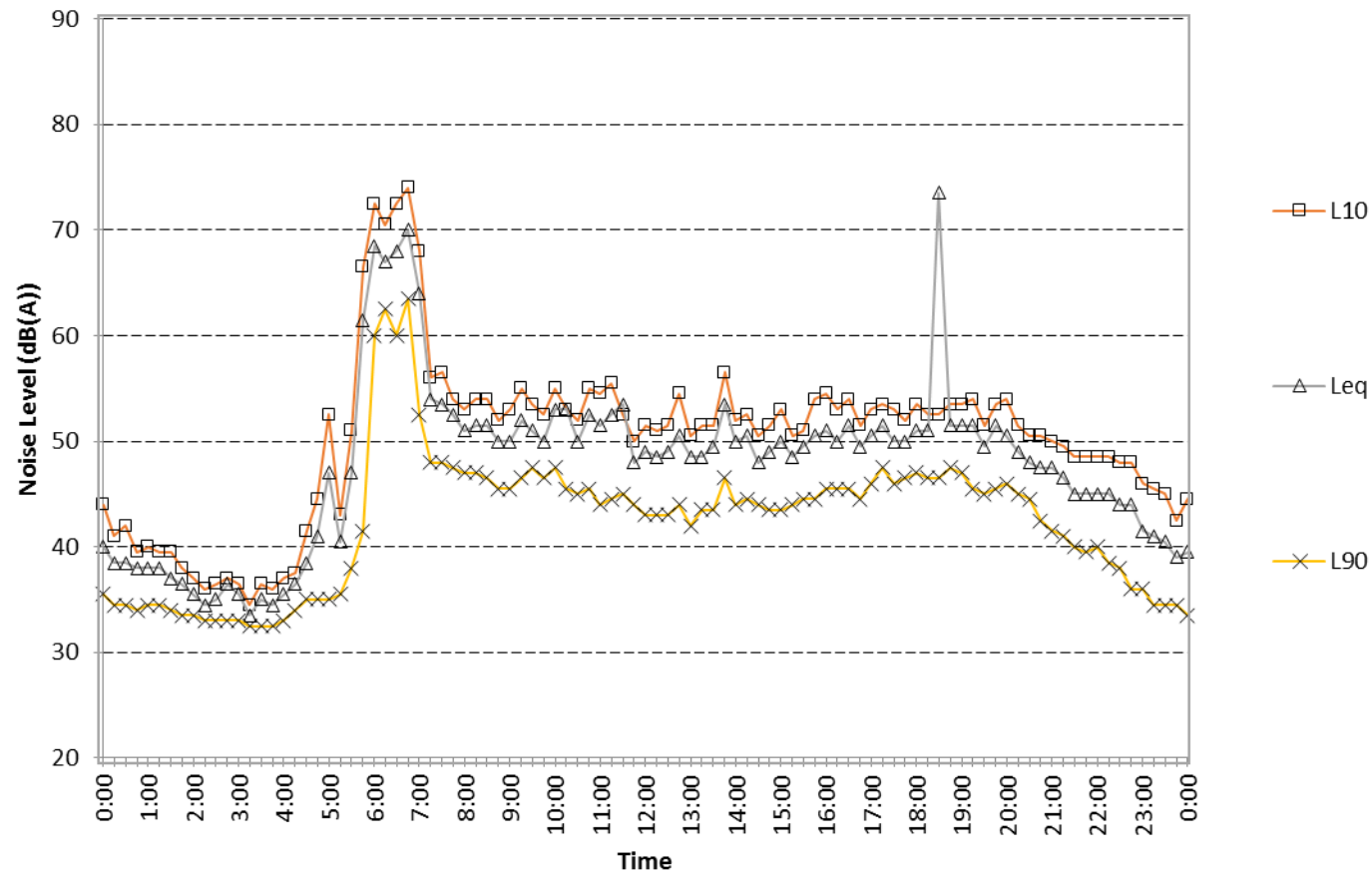
Cremorne
Saturday February 8, 2014



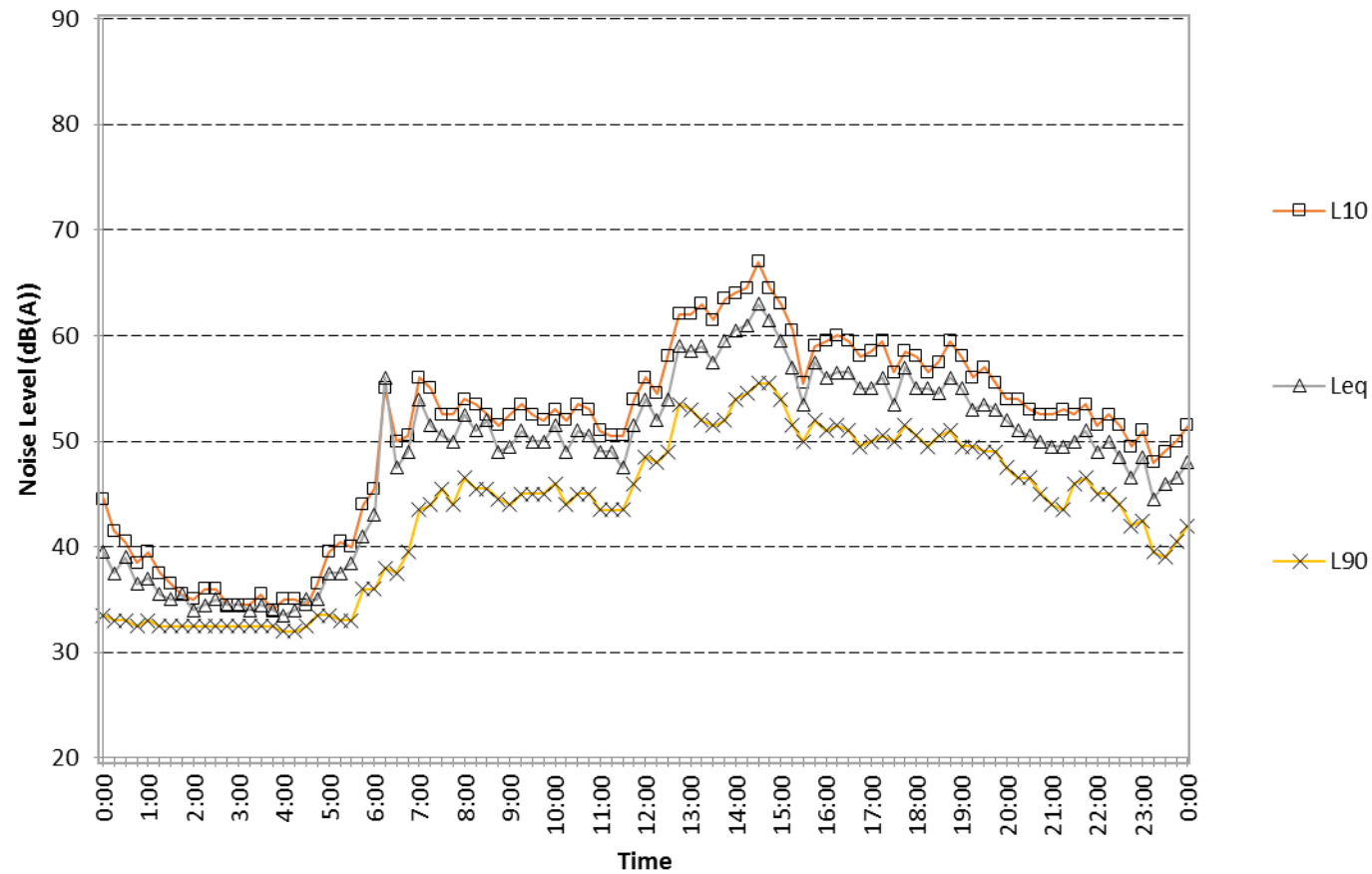
Cremorne
Sunday February 9, 2014



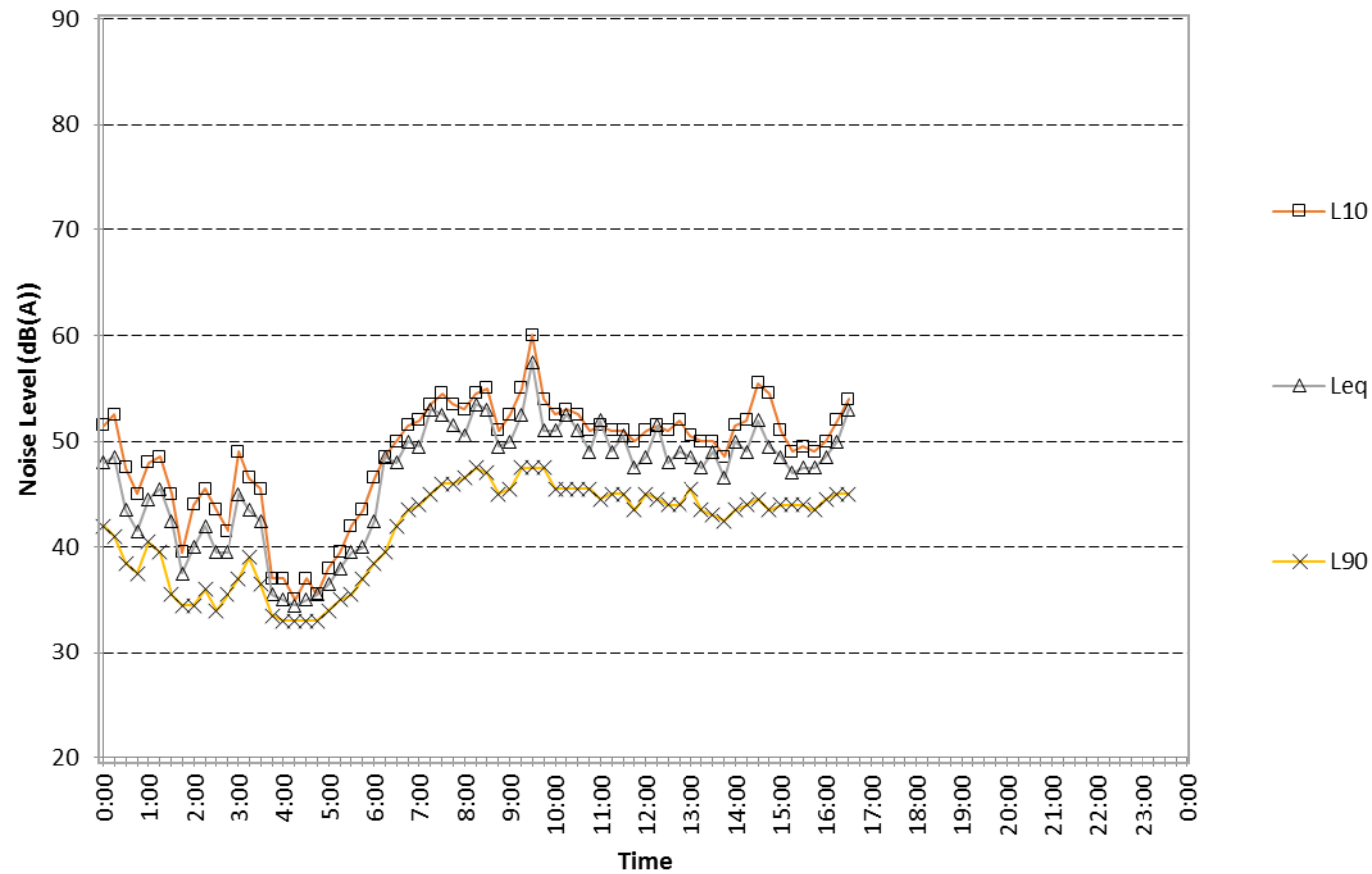
Cremorne
Sunday February 10, 2014



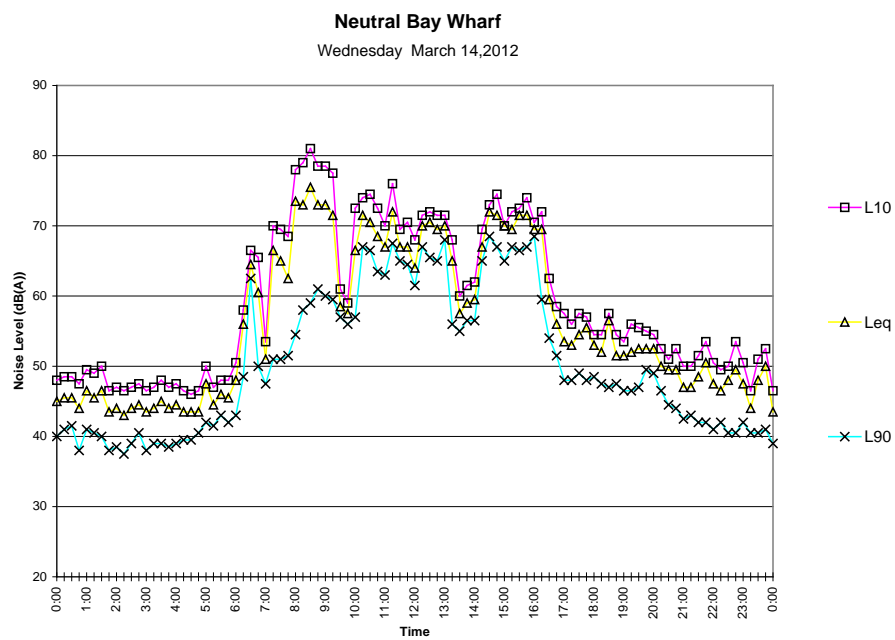
Cremorne
Monday February 11, 2014



Cremorne
Tuesday February 12, 2014



Appendix C



The noise levels above are the graph for noise logging at Neutral Bay wharf on atypical day which piling was conducted. Based on the above recordings the noise level of piling is approximately 115 dB(A) SWL.

Appendix G

Threatened species search results

Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodial comprehensive inventory, and may contain errors and omissions.

Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded). Copyright the State of NSW through the Office of Environment and Heritage.

Search criteria : Public Report of all Valid Records of Threatened (listed on TSC Act 1995) or Protected 151.28 South: -33.89] returned a total of 10,901 records of 492 species.

Report generated on 10/03/2014 11:22 AM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic
Animalia	Amphibia	Myobatrachida e	3001	<i>Adelotus brevis</i>	
Animalia	Amphibia	Myobatrachida e	3134	<i>Crinia signifera</i>	
Animalia	Amphibia	Myobatrachida e	3112	<i>Limnodynastes ornatus</i>	
Animalia	Amphibia	Myobatrachida e	3061	<i>Limnodynastes peronii</i>	
Animalia	Amphibia	Myobatrachida e	3063	<i>Limnodynastes tasmaniensis</i>	
Animalia	Amphibia	Myobatrachida e	3103	<i>Paracrinia haswelli</i>	
Animalia	Amphibia	Myobatrachida e	3116	<i>Pseudophryne australis</i>	
Animalia	Amphibia	Myobatrachida e	3117	<i>Pseudophryne bibronii</i>	
Animalia	Amphibia	Hylidae	3166	<i>Litoria aurea</i>	
Animalia	Amphibia	Hylidae	3171	<i>Litoria caerulea</i>	
Animalia	Amphibia	Hylidae	3183	<i>Litoria fallax</i>	
Animalia	Amphibia	Hylidae	3204	<i>Litoria peronii</i>	
Animalia	Reptilia	Cheloniidae	2007	<i>Chelonia mydas</i>	
Animalia	Reptilia	Cheloniidae	T110	<i>Cheloniidae sp.</i>	
Animalia	Reptilia	Chelidae	2017	<i>Chelodina (Chelodina) longicollis</i>	
Animalia	Reptilia	Gekkonidae	2077	<i>Diplodactylus vittatus</i>	
Animalia	Reptilia	Gekkonidae	2118	<i>Oedura lesueurii</i>	
Animalia	Reptilia	Gekkonidae	2129	<i>Phyllurus platurus</i>	
Animalia	Reptilia	Gekkonidae	2138	<i>Underwoodisaurus milii</i>	
Animalia	Reptilia	Pygopodidae	2170	<i>Lialis burtonis</i>	
Animalia	Reptilia	Pygopodidae	2174	<i>Pygopus lepidopodus</i>	
Animalia	Reptilia	Scincidae	2331	<i>Cryptoblepharus virgatus</i>	
Animalia	Reptilia	Scincidae	2375	<i>Ctenotus robustus</i>	
Animalia	Reptilia	Scincidae	2386	<i>Ctenotus taeniolatus</i>	
Animalia	Reptilia	Scincidae	2866	<i>Cyclodomorphus michaeli</i>	

Animalia	Reptilia	Scincidae	2408	<i>Egernia cunninghami</i>
Animalia	Reptilia	Scincidae	2557	<i>Eulamprus quoyii</i>
Animalia	Reptilia	Scincidae	2559	<i>Eulamprus tenuis</i>
Animalia	Reptilia	Scincidae	2450	<i>Lampropholis delicata</i>
Animalia	Reptilia	Scincidae	2451	<i>Lampropholis guichenoti</i>
Animalia	Reptilia	Scincidae	T117	<i>Lampropholis sp.</i>
Animalia	Reptilia	Scincidae	2307	<i>Lygisaurus foliorum</i>
Animalia	Reptilia	Scincidae	2542	<i>Saiphos equalis</i>
Animalia	Reptilia	Scincidae	2452	<i>Saproscincus mustelinus</i>
Animalia	Reptilia	Scincidae	2583	<i>Tiliqua rugosa</i>
Animalia	Reptilia	Scincidae	2580	<i>Tiliqua scincoides</i>
Animalia	Reptilia	Agamidae	2252	<i>Physignathus lesueurii</i>
Animalia	Reptilia	Agamidae	5075	<i>Physignathus lesueurii</i> <i>lesueurii</i>
Animalia	Reptilia	Varanidae	2283	<i>Varanus varius</i>
Animalia	Reptilia	Typhlopidae	2588	<i>Ramphotyphlops</i> <i>bituberculatus</i>
Animalia	Reptilia	Typhlopidae	2603	<i>Ramphotyphlops</i> <i>proximus</i>
Animalia	Reptilia	Boidae	2625	<i>Morelia spilota</i>
Animalia	Reptilia	Boidae	5096	<i>Morelia spilota spilota</i>
Animalia	Reptilia	Colubridae	2630	<i>Boiga irregularis</i>
Animalia	Reptilia	Colubridae	2633	<i>Dendrelaphis punctulatus</i>
Animalia	Reptilia	Elapidae	2647	<i>Cacophis squamulosus</i>
Animalia	Reptilia	Elapidae	2669	<i>Furina diadema</i>
Animalia	Reptilia	Elapidae	2674	<i>Hemiaspis signata</i>
Animalia	Reptilia	Elapidae	2754	<i>Hydrophis elegans</i>
Animalia	Reptilia	Elapidae	2681	<i>Notechis scutatus</i>
Animalia	Reptilia	Elapidae	2726	<i>Parasuta dwyeri</i>
Animalia	Reptilia	Elapidae	2693	<i>Pseudechis porphyriacus</i>
Animalia	Reptilia	Elapidae	2734	<i>Vermicella annulata</i>
Animalia	Aves	Megapodiidae	0008	<i>Alectura lathamii</i>
Animalia	Aves	Phasianidae	0009	<i>Coturnix pectoralis</i>
Animalia	Aves	Phasianidae	0011	<i>Coturnix ypsilophora</i>
Animalia	Aves	Anseranatidae	0199	<i>Anseranas semipalmata</i>
Animalia	Aves	Anatidae	0210	<i>Anas castanea</i>
Animalia	Aves	Anatidae	0211	<i>Anas gracilis</i>
Animalia	Aves	Anatidae	0208	<i>Anas superciliosa</i>

Animalia	Aves	Anatidae	0202	<i>Chenonetta jubata</i>
Animalia	Aves	Anatidae	0203	<i>Cygnus atratus</i>
Animalia	Aves	Anatidae	0204	<i>Dendrocygna arcuata</i>
Animalia	Aves	Phaethontidae	0108	<i>Phaethon lepturus</i>
Animalia	Aves	Podicipedidae	0062	<i>Poliocephalus poliocephalus</i>
Animalia	Aves	Columbidae	0033	<i>Chalcophaps indica</i>
Animalia	Aves	Columbidae	0028	<i>Columba leucomela</i>
Animalia	Aves	Columbidae	0032	<i>Geopelia humeralis</i>
Animalia	Aves	Columbidae	9931	<i>Geopelia striata</i>
Animalia	Aves	Columbidae	0044	<i>Leucosarcia picata</i>
Animalia	Aves	Columbidae	0027	<i>Lopholaimus antarcticus</i>
Animalia	Aves	Columbidae	0029	<i>Macropygia amboinensis</i>
Animalia	Aves	Columbidae	0043	<i>Ocyphaps lophotes</i>
Animalia	Aves	Columbidae	0023	<i>Ptilinopus superbus</i>
Animalia	Aves	Podargidae	0313	<i>Podargus strigoides</i>
Animalia	Aves	Caprimulgidae	0330	<i>Eurostopodus mystacalis</i>
Animalia	Aves	Apodidae	0335	<i>Apus pacificus</i>
Animalia	Aves	Apodidae	0334	<i>Hirundapus caudacutus</i>
Animalia	Aves	Oceanitidae	0065	<i>Pelagodroma marina</i>
Animalia	Aves	Diomedeidae	0086	<i>Diomedea exulans</i>
Animalia	Aves	Diomedeidae	0089	<i>Thalassarche chlororhynchos</i>
Animalia	Aves	Diomedeidae	0090	<i>Thalassarche chrysostoma</i>
Animalia	Aves	Procellariidae	0072	<i>Ardenna carneipes</i>
Animalia	Aves	Procellariidae	0069	<i>Ardenna pacificus</i>
Animalia	Aves	Procellariidae	0071	<i>Ardenna tenuirostris</i>
Animalia	Aves	Procellariidae	8684	<i>Pterodroma leucoptera leucoptera</i>
Animalia	Aves	Procellariidae	0075	<i>Pterodroma macroptera</i>
Animalia	Aves	Procellariidae	0076	<i>Pterodroma mollis</i>
Animalia	Aves	Procellariidae	0068	<i>Puffinus gavia</i>
Animalia	Aves	Spheniscidae	0005	<i>Eudyptula minor</i>
Animalia	Aves	Sulidae	0104	<i>Morus serrator</i>
Animalia	Aves	Anhingidae	8731	<i>Anhinga novaehollandiae</i>
Animalia	Aves	Phalacrocoracidae	0100	<i>Microcarbo melanoleucos</i>
Animalia	Aves	Phalacrocoracidae	0096	<i>Phalacrocorax carbo</i>

Animalia	Aves	Phalacrocoracidae	0097	<i>Phalacrocorax sulcirostris</i>
Animalia	Aves	Phalacrocoracidae	0099	<i>Phalacrocorax varius</i>
Animalia	Aves	Pelecanidae	0106	<i>Pelecanus conspicillatus</i>
Animalia	Aves	Ardeidae	0977	<i>Ardea ibis</i>
Animalia	Aves	Ardeidae	0189	<i>Ardea pacifica</i>
Animalia	Aves	Ardeidae	0193	<i>Butorides striatus</i>
Animalia	Aves	Ardeidae	0188	<i>Egretta novaehollandiae</i>
Animalia	Aves	Ardeidae	0191	<i>Egretta sacra</i>
Animalia	Aves	Ardeidae	8703	<i>Ixobrychus dubius</i>
Animalia	Aves	Ardeidae	0196	<i>Ixobrychus flavicollis</i>
Animalia	Aves	Ardeidae	0192	<i>Nycticorax caledonicus</i>
Animalia	Aves	Threskiornithidae	0181	<i>Platalea regia</i>
Animalia	Aves	Threskiornithidae	0179	<i>Threskiornis molucca</i>
Animalia	Aves	Threskiornithidae	0180	<i>Threskiornis spinicollis</i>
Animalia	Aves	Accipitridae	0222	<i>Accipiter cirrocephalus</i>
Animalia	Aves	Accipitridae	0221	<i>Accipiter fasciatus</i>
Animalia	Aves	Accipitridae	0220	<i>Accipiter novaehollandiae</i>
Animalia	Aves	Accipitridae	0224	<i>Aquila audax</i>
Animalia	Aves	Accipitridae	0234	<i>Aviceda subcristata</i>
Animalia	Aves	Accipitridae	0232	<i>Elanus axillaris</i>
Animalia	Aves	Accipitridae	0223	<i>Erythrotriorchis radiatus</i>
Animalia	Aves	Accipitridae	0226	<i>Haliaeetus leucogaster</i>
Animalia	Aves	Accipitridae	0228	<i>Haliastur sphenurus</i>
Animalia	Aves	Accipitridae	0225	<i>Hieraetus morphnoides</i>
Animalia	Aves	Accipitridae	8739	<i>Pandion cristatus</i>
Animalia	Aves	Falconidae	0239	<i>Falco berigora</i>
Animalia	Aves	Falconidae	0240	<i>Falco cenchroides</i>
Animalia	Aves	Falconidae	0235	<i>Falco longipennis</i>
Animalia	Aves	Falconidae	0237	<i>Falco peregrinus</i>
Animalia	Aves	Rallidae	0059	<i>Fulica atra</i>
Animalia	Aves	Rallidae	0056	<i>Gallinula tenebrosa</i>
Animalia	Aves	Rallidae	0046	<i>Gallirallus philippensis</i>
Animalia	Aves	Rallidae	0045	<i>Lewinia pectoralis</i>
Animalia	Aves	Rallidae	0051	<i>Porzana tabuensis</i>
Animalia	Aves	Burhinidae	0174	<i>Burhinus grallarius</i>
Animalia	Aves	Haematopodidae	0131	<i>Haematopus fuliginosus</i>

Animalia	Aves	Haematopodidae	0130	<i>Haematopus longirostris</i>
Animalia	Aves	Recurvirostridae	0146	<i>Himantopus himantopus</i>
Animalia	Aves	Charadriidae	0139	<i>Charadrius mongolus</i>
Animalia	Aves	Charadriidae	0143	<i>Charadrius ruficapillus</i>
Animalia	Aves	Charadriidae	0133	<i>Vanellus miles</i>
Animalia	Aves	Charadriidae	0135	<i>Vanellus tricolor</i>
Animalia	Aves	Scolopacidae	0157	<i>Actitis hypoleucos</i>
Animalia	Aves	Scolopacidae	0153	<i>Limosa lapponica</i>
Animalia	Aves	Scolopacidae	0156	<i>Tringa incana</i>
Animalia	Aves	Turnicidae	0014	<i>Turnix varius</i>
Animalia	Aves	Stercorariidae	0933	<i>Stercorarius longicaudus</i>
Animalia	Aves	Stercorariidae	0128	<i>Stercorarius parasiticus</i>
Animalia	Aves	Stercorariidae	0945	<i>Stercorarius pomarinus</i>
Animalia	Aves	Laridae	0125	<i>Chroicocephalus novaehollandiae</i>
Animalia	Aves	Laridae	0112	<i>Hydroprogne caspia</i>
Animalia	Aves	Laridae	0981	<i>Larus dominicanus</i>
Animalia	Aves	Laridae	0126	<i>Larus pacificus</i>
Animalia	Aves	Laridae	0885	<i>Leucophaeus pipixcan</i>
Animalia	Aves	Laridae	0120	<i>Onychoprion fuscata</i>
Animalia	Aves	Laridae	0953	<i>Sterna hirundo</i>
Animalia	Aves	Laridae	0114	<i>Sterna striata</i>
Animalia	Aves	Laridae	0117	<i>Sternula albifrons</i>
Animalia	Aves	Laridae	0115	<i>Thalasseus bergii</i>
Animalia	Aves	Cacatuidae	0269	<i>Cacatua galerita</i>
Animalia	Aves	Cacatuidae	0271	<i>Cacatua sanguinea</i>
Animalia	Aves	Cacatuidae	T187	<i>Cacatua sp.</i>
Animalia	Aves	Cacatuidae	0267	<i>Calyptorhynchus funereus</i>
Animalia	Aves	Cacatuidae	0265	<i>^Calyptorhynchus lathami</i>
Animalia	Aves	Cacatuidae	0273	<i>Eolophus roseicapillus</i>
Animalia	Aves	Cacatuidae	0274	<i>Nymphicus hollandicus</i>
Animalia	Aves	Psittacidae	0281	<i>Alisterus scapularis</i>
Animalia	Aves	Psittacidae	0280	<i>Aprosmictus erythropterus</i>
Animalia	Aves	Psittacidae	0294	<i>Barnardius zonarius</i>
Animalia	Aves	Psittacidae	0258	<i>Glossopsitta concinna</i>
Animalia	Aves	Psittacidae	0260	<i>Glossopsitta pusilla</i>
Animalia	Aves	Psittacidae	0309	<i>^^Lathamus discolor</i>
Animalia	Aves	Psittacidae	0310	<i>Melopsittacus undulatus</i>

Animalia	Aves	Psittacidae	0282	<i>Platycercus elegans</i>
Animalia	Aves	Psittacidae	0283	<i>Platycercus elegans adelaidae</i>
Animalia	Aves	Psittacidae	0288	<i>Platycercus eximius</i>
Animalia	Aves	Psittacidae	0295	<i>Psephotus haematonotus</i>
Animalia	Aves	Psittacidae	0256	<i>Trichoglossus chlorolepidotus</i>
Animalia	Aves	Psittacidae	9947	<i>Trichoglossus haematodus</i>
Animalia	Aves	Psittacidae	8882	<i>Trichoglossus haematodus moluccanus</i>
Animalia	Aves	Centropodidae	0349	<i>Centropus phasianinus</i>
Animalia	Aves	Cuculidae	0338	<i>Cacomantis flabelliformis</i>
Animalia	Aves	Cuculidae	0337	<i>Cacomantis pallidus</i>
Animalia	Aves	Cuculidae	0339	<i>Cacomantis variolosus</i>
Animalia	Aves	Cuculidae	0342	<i>Chalcites basalis</i>
Animalia	Aves	Cuculidae	0343	<i>Chalcites lucidus</i>
Animalia	Aves	Cuculidae	0341	<i>Chalcites osculans</i>
Animalia	Aves	Cuculidae	0347	<i>Eudynamys orientalis</i>
Animalia	Aves	Cuculidae	8930	<i>Eudynamys orientalis cyanocephala</i>
Animalia	Aves	Cuculidae	0348	<i>Scythrops novaehollandiae</i>
Animalia	Aves	Strigidae	0246	<i>^^Ninox connivens</i>
Animalia	Aves	Strigidae	9922	<i>Ninox novaeseelandiae</i>
Animalia	Aves	Strigidae	0248	<i>^^Ninox strenua</i>
Animalia	Aves	Tytonidae	9923	<i>Tyto javanica</i>
Animalia	Aves	Alcedinidae	0319	<i>Ceyx azureus</i>
Animalia	Aves	Alcedinidae	0322	<i>Dacelo novaeguineae</i>
Animalia	Aves	Alcedinidae	0326	<i>Todiramphus sanctus</i>
Animalia	Aves	Coraciidae	0318	<i>Eurystomus orientalis</i>
Animalia	Aves	Pittidae	0352	<i>Pitta versicolor</i>
Animalia	Aves	Climacteridae	0558	<i>Cormobates leucophaea</i>
Animalia	Aves	Ptilonorhynchidae	0679	<i>Ptilonorhynchus violaceus</i>
Animalia	Aves	Maluridae	0529	<i>Malurus cyaneus</i>
Animalia	Aves	Maluridae	0536	<i>Malurus lamberti</i>
Animalia	Aves	Acanthizidae	0470	<i>Acanthiza lineata</i>
Animalia	Aves	Acanthizidae	0471	<i>Acanthiza nana</i>
Animalia	Aves	Acanthizidae	0475	<i>Acanthiza pusilla</i>
Animalia	Aves	Acanthizidae	0454	<i>Gerygone mouki</i>

Animalia	Aves	Acanthizidae	0453	<i>Gerygone olivacea</i>
Animalia	Aves	Acanthizidae	0505	<i>Origma solitaria</i>
Animalia	Aves	Acanthizidae	0493	<i>Sericornis citreogularis</i>
Animalia	Aves	Acanthizidae	0488	<i>Sericornis frontalis</i>
Animalia	Aves	Acanthizidae	0465	<i>Smicrornis brevirostris</i>
Animalia	Aves	Pardalotidae	0565	<i>Pardalotus punctatus</i>
Animalia	Aves	Pardalotidae	0976	<i>Pardalotus striatus</i>
Animalia	Aves	Meliphagidae	0591	<i>Acanthorhynchus tenuirostris</i>
Animalia	Aves	Meliphagidae	0638	<i>Anthochaera carunculata</i>
Animalia	Aves	Meliphagidae	0710	<i>Anthochaera chrysoptera</i>
Animalia	Aves	Meliphagidae	0603	<i>Anthochaera phrygia</i>
Animalia	Aves	Meliphagidae	0614	<i>Lichenostomus chrysops</i>
Animalia	Aves	Meliphagidae	0619	<i>Lichenostomus melanops</i>
Animalia	Aves	Meliphagidae	0625	<i>Lichenostomus penicillatus</i>
Animalia	Aves	Meliphagidae	0634	<i>Manorina melanocephala</i>
Animalia	Aves	Meliphagidae	0605	<i>Meliphaga lewinii</i>
Animalia	Aves	Meliphagidae	0578	<i>Melithreptus lunatus</i>
Animalia	Aves	Meliphagidae	0586	<i>Myzomela sanguinolenta</i>
Animalia	Aves	Meliphagidae	0646	<i>Philemon citreogularis</i>
Animalia	Aves	Meliphagidae	0645	<i>Philemon corniculatus</i>
Animalia	Aves	Meliphagidae	0632	<i>Phylidonyris niger</i>
Animalia	Aves	Meliphagidae	0631	<i>Phylidonyris novaehollandiae</i>
Animalia	Aves	Psophodidae	0421	<i>Psophodes olivaceus</i>
Animalia	Aves	Neosittidae	0549	<i>Daphoenositta chrysoptera</i>
Animalia	Aves	Campephagidae	0424	<i>Coracina novaehollandiae</i>
Animalia	Aves	Campephagidae	0430	<i>Lalage sueurii</i>
Animalia	Aves	Pachycephalidae	0416	<i>Falcunculus frontatus frontatus</i>
Animalia	Aves	Pachycephalidae	0398	<i>Pachycephala pectoralis</i>
Animalia	Aves	Pachycephalidae	0401	<i>Pachycephala rufiventris</i>
Animalia	Aves	Oriolidae	0671	<i>Oriolus sagittatus</i>
Animalia	Aves	Oriolidae	0432	<i>Sphecotheres vieilloti</i>

Animalia	Aves	Artamidae	0547	<i>Artamus cyanopterus</i>
Animalia	Aves	Artamidae	0700	<i>Cracticus nigrogularis</i>
Animalia	Aves	Artamidae	0705	<i>Cracticus tibicen</i>
Animalia	Aves	Artamidae	0702	<i>Cracticus torquatus</i>
Animalia	Aves	Artamidae	0694	<i>Strepera graculina</i>
Animalia	Aves	Dicruridae	0673	<i>Dicrurus bracteatus</i>
Animalia	Aves	Rhipiduridae	0361	<i>Rhipidura albiscapa</i>
Animalia	Aves	Rhipiduridae	0364	<i>Rhipidura leucophrys</i>
Animalia	Aves	Rhipiduridae	0362	<i>Rhipidura rufifrons</i>
Animalia	Aves	Corvidae	0930	<i>Corvus coronoides</i>
Animalia	Aves	Monarchidae	0415	<i>Grallina cyanoleuca</i>
Animalia	Aves	Monarchidae	0373	<i>Monarcha melanopsis</i>
Animalia	Aves	Monarchidae	0366	<i>Myiagra cyanoleuca</i>
Animalia	Aves	Monarchidae	0365	<i>Myiagra rubecula</i>
Animalia	Aves	Monarchidae	0375	<i>Symposiachrus trivirgatus</i>
Animalia	Aves	Petroicidae	0392	<i>Eopsaltria australis</i>
Animalia	Aves	Petroicidae	0377	<i>Microeca fascinans</i>
Animalia	Aves	Petroicidae	0380	<i>Petroica boodang</i>
Animalia	Aves	Petroicidae	0384	<i>Petroica rosea</i>
Animalia	Aves	Acrocephalidae	0524	<i>Acrocephalus australis</i>
Animalia	Aves	Timaliidae	0574	<i>Zosterops lateralis</i>
Animalia	Aves	Hirundinidae	0357	<i>Hirundo neoxena</i>
Animalia	Aves	Hirundinidae	0359	<i>Petrochelidon nigricans</i>
Animalia	Aves	Turdidae	0780	<i>Zoothera heinei</i>
Animalia	Aves	Nectariniidae	0564	<i>Dicaeum hirundinaceum</i>
Animalia	Aves	Estrildidae	0662	<i>Neochmia temporalis</i>
Animalia	Aves	Motacillidae	0647	<i>Anthus novaeseelandiae</i>
Animalia	Mammalia	Tachyglossidae	1003	<i>Tachyglossus aculeatus</i>
Animalia	Mammalia	Dasyuridae	1674	<i>Antechinus stuartii</i>
Animalia	Mammalia	Dasyuridae	1008	<i>Dasyurus maculatus</i>
Animalia	Mammalia	Dasyuridae	1009	<i>Dasyurus viverrinus</i>
Animalia	Mammalia	Peramelidae	T081	<i>Isoodon/Perameles sp.</i>
Animalia	Mammalia	Peramelidae	1097	<i>Perameles nasuta</i>
Animalia	Mammalia	Burramyidae	1150	<i>Cercartetus nanus</i>
Animalia	Mammalia	Petauridae	1138	<i>Petaurus breviceps</i>
Animalia	Mammalia	Pseudocheiridae	1129	<i>Pseudocheirus peregrinus</i>
Animalia	Mammalia	Acrobatidae	1147	<i>Acrobates pygmaeus</i>
Animalia	Mammalia	Phalangeridae	T082	<i>Trichosurus sp.</i>

Animalia	Mammalia	Phalangeridae	1113	<i>Trichosurus vulpecula</i>
Animalia	Mammalia	Potoroidae	1187	<i>Aepyprymnus rufescens</i>
Animalia	Mammalia	Macropodidae	1242	<i>Wallabia bicolor</i>
Animalia	Mammalia	Pteropodidae	1282	<i>Pteropus alecto</i>
Animalia	Mammalia	Pteropodidae	1280	<i>Pteropus poliocephalus</i>
Animalia	Mammalia	Pteropodidae	1281	<i>Pteropus scapulatus</i>
Animalia	Mammalia	Molossidae	T091	<i>Mormopterus sp.</i>
Animalia	Mammalia	Molossidae	1324	<i>Tadarida australis</i>
Animalia	Mammalia	Vespertilionidae	1349	<i>Chalinolobus gouldii</i>
Animalia	Mammalia	Vespertilionidae	1834	<i>Miniopterus schreibersii oceanensis</i>
Animalia	Mammalia	Vespertilionidae	1357	<i>Myotis macropus</i>
Animalia	Mammalia	Vespertilionidae	1365	<i>Scotorepens orion</i>
Animalia	Mammalia	Vespertilionidae	1022	<i>Vespadelus darlingtoni</i>
Animalia	Mammalia	Vespertilionidae	1379	<i>Vespadelus vulturnus</i>
Animalia	Mammalia	Muridae	1415	<i>Hydromys chrysogaster</i>
Animalia	Mammalia	Muridae	1395	<i>Rattus fuscipes</i>
Animalia	Mammalia	Muridae	T094	<i>Rattus sp.</i>
Animalia	Mammalia	Otariidae	1543	<i>Arctocephalus forsteri</i>
Animalia	Mammalia	Otariidae	1882	<i>Arctocephalus pusillus doriferus</i>
Animalia	Mammalia	Otariidae	T099	<i>Arctocephalus sp.</i>
Animalia	Mammalia	Otariidae	1539	<i>Neophoca cinerea</i>
Animalia	Mammalia	Otariidae	9040	<i>Seal sp.</i>
Animalia	Mammalia	Phocidae	1549	<i>Hydrurga leptonyx</i>
Animalia	Mammalia	Phocidae	1546	<i>Mirounga leonina</i>
Animalia	Mammalia	Balaenidae	1561	<i>Eubalaena australis</i>
Animalia	Mammalia	Balaenopteridae	1570	<i>Balaenoptera acutorostrata</i>
Animalia	Mammalia	Balaenopteridae	1575	<i>Megaptera novaeangliae</i>
Animalia	Mammalia	Delphinidae	1616	<i>Delphinus delphis</i>
Animalia	Mammalia	Delphinidae	1621	<i>Stenella attenuata</i>
Animalia	Mammalia	Delphinidae	1900	<i>Tursiops truncatus</i>
Plantae	Flora	Adiantaceae	7997	<i>Adiantum aethiopicum</i>
Plantae	Flora	Adiantaceae	10516	<i>Adiantum atroviride</i>

Plantae	Flora	Adiantaceae	7998	<i>Adiantum diaphanum</i>
Plantae	Flora	Adiantaceae	7999	<i>Adiantum formosum</i>
Plantae	Flora	Adiantaceae	8000	<i>Adiantum hispidulum</i>
Plantae	Flora	Adiantaceae	11226	<i>Adiantum hispidulum</i> var. <i>hispidulum</i>
Plantae	Flora	Adiantaceae	12633	<i>Adiantum hispidulum</i> var. <i>hypoglaucum</i>
Plantae	Flora	Apiaceae	1094	<i>Actinotus helianthi</i>
Plantae	Flora	Arecaceae	6458	<i>Archontophoenix</i> <i>cunninghamiana</i>
Plantae	Flora	Arecaceae	1218	<i>Howea forsteriana</i>
Plantae	Flora	Arecaceae	1221	<i>Livistona australis</i>
Plantae	Flora	Aspleniaceae	8031	<i>Asplenium australasicum</i>
Plantae	Flora	Asteraceae	1363	<i>Cassinia aureonitens</i>
Plantae	Flora	Asteraceae	8634	<i>Craspedia variabilis</i>
Plantae	Flora	Blandfordiaceae	3528	<i>Blandfordia grandiflora</i>
Plantae	Flora	Blandfordiaceae	3529	<i>Blandfordia nobilis</i>
Plantae	Flora	Casuarinaceae	8321	^^ <i>Allocasuarina</i> <i>portuensis</i>
Plantae	Flora	Casuarinaceae	9006	<i>Casuarina</i> <i>cunninghamiana</i> subsp. <i>cunninghamiana</i>
Plantae	Flora	Cunoniaceae	2272	<i>Ceratopetalum</i> <i>gummiferum</i>
Plantae	Flora	Cyatheaceae	8074	<i>Cyathea australis</i>
Plantae	Flora	Cyatheaceae	8076	<i>Cyathea cooperi</i>
Plantae	Flora	Cyatheaceae	8079	<i>Cyathea leichhardtiana</i>
Plantae	Flora	Cyperaceae	2341	<i>Caustis flexuosa</i>
Plantae	Flora	Cyperaceae	2342	<i>Caustis pentandra</i>
Plantae	Flora	Cyperaceae	2343	<i>Caustis recurvata</i>
Plantae	Flora	Cyperaceae	9315	<i>Caustis recurvata</i> var. <i>recurvata</i>
Plantae	Flora	Cyperaceae	2442	<i>Gahnia sieberiana</i>
Plantae	Flora	Dicksoniaceae	8082	<i>Dicksonia antarctica</i>
Plantae	Flora	Doryanthaceae	1019	<i>Doryanthes excelsa</i>
Plantae	Flora	Elaeocarpaceae	6205	<i>Tetratheca glandulosa</i>
Plantae	Flora	Elaeocarpaceae	6206	<i>Tetratheca juncea</i>
Plantae	Flora	Ericaceae	7752	<i>Epacris purpurascens</i> var. <i>purpurascens</i>

Plantae	Flora	Ericaceae	12949	<i>Sprengelia incarnata</i> f. 'incarnata'
Plantae	Flora	Ericaceae	12950	<i>Sprengelia incarnata</i> var. <i>brevistylis</i>
Plantae	Flora	Euphorbiaceae	9501	<i>Amperea xiphoclada</i> var. <i>pedicellata</i>
Plantae	Flora	Euphorbiaceae	9851	<i>Chamaesyce</i> <i>psammogeton</i>
Plantae	Flora	Fabaceae (Faboideae)	3007	<i>Pultenaea parviflora</i>
Plantae	Flora	Fabaceae (Mimosoideae)	3728	<i>Acacia bynoeana</i>
Plantae	Flora	Fabaceae (Mimosoideae)	7229	<i>Acacia gordonii</i>
Plantae	Flora	Fabaceae (Mimosoideae)	3860	<i>Acacia pubescens</i>
Plantae	Flora	Fabaceae (Mimosoideae)	9672	<i>Acacia terminalis</i> subsp. <i>terminalis</i>
Plantae	Flora	Gleicheniaceae	11076	<i>Dicranopteris linearis</i> var. <i>linearis</i>
Plantae	Flora	Gleicheniaceae	11175	<i>Sticherus flabellatus</i> var. <i>flabellatus</i>
Plantae	Flora	Grammitidaceae	9471	^^ <i>Grammitis stenophylla</i>
Fungi	Flora	Hygrophoraceae	F007	<i>Hygrocybe collucera</i>
Fungi	Flora	Hygrophoraceae	F008	<i>Hygrocybe griseoramosa</i>
Plantae	Flora	Lamiaceae	3418	^^ <i>Prostanthera marifolia</i>
Plantae	Flora	Myrtaceae	4007	^^ <i>Callistemon</i> <i>linearifolius</i>
Plantae	Flora	Myrtaceae	4067	<i>Eucalyptus camfieldii</i>
Plantae	Flora	Myrtaceae	9720	<i>Eucalyptus fracta</i>
Plantae	Flora	Myrtaceae	4134	<i>Eucalyptus nicholii</i>
Plantae	Flora	Myrtaceae	4163	<i>Eucalyptus pulverulenta</i>
Plantae	Flora	Myrtaceae	4204	<i>Kunzea ambigua</i>
Plantae	Flora	Myrtaceae	4207	<i>Kunzea capitata</i>
Plantae	Flora	Myrtaceae	6809	<i>Melaleuca biconvexa</i>
Plantae	Flora	Myrtaceae	4248	<i>Melaleuca deanei</i>
Plantae	Flora	Myrtaceae	4293	<i>Syzygium paniculatum</i>
Plantae	Flora	Myrtaceae	9670	<i>Triplarina imbricata</i>

Plantae	Flora	Orchidaceae	4351	<i>Acianthus caudatus</i>
Plantae	Flora	Orchidaceae	4352	<i>Acianthus exsertus</i>
Plantae	Flora	Orchidaceae	4353	<i>Acianthus fornicatus</i>
Plantae	Flora	Orchidaceae	9088	<i>Acianthus pusillus</i>
Plantae	Flora	Orchidaceae	ACIA	<i>Acianthus</i> spp.
Plantae	Flora	Orchidaceae	9014	<i>Arthrochilus prolixus</i>
Plantae	Flora	Orchidaceae	4373	<i>Caladenia carnea</i>
Plantae	Flora	Orchidaceae	6703	<i>Caladenia catenata</i>
Plantae	Flora	Orchidaceae	4380	<i>Caladenia filamentosa</i>
Plantae	Flora	Orchidaceae	4386	<i>Caladenia tessellata</i>
Plantae	Flora	Orchidaceae	4388	<i>Calanthe triplicata</i>
Plantae	Flora	Orchidaceae	4389	<i>Caleana major</i>
Plantae	Flora	Orchidaceae	4390	<i>Calochilus campestris</i>
Plantae	Flora	Orchidaceae	4391	<i>Calochilus gracillimus</i>
Plantae	Flora	Orchidaceae	4394	<i>Calochilus paludosus</i>
Plantae	Flora	Orchidaceae	4395	<i>Calochilus robertsonii</i>
Plantae	Flora	Orchidaceae	14091	<i>Cestichis reflexa</i>
Plantae	Flora	Orchidaceae	4402	<i>Chiloglottis reflexa</i>
Plantae	Flora	Orchidaceae	4404	<i>Corybas aconitiflorus</i>
Plantae	Flora	Orchidaceae	4407	<i>Corybas fimbriatus</i>
Plantae	Flora	Orchidaceae	4410	<i>Corybas pruinosus</i>
Plantae	Flora	Orchidaceae	4414	<i>Cryptostylis erecta</i>
Plantae	Flora	Orchidaceae	CRYT	<i>Cryptostylis</i> spp.
Plantae	Flora	Orchidaceae	4417	<i>Cryptostylis subulata</i>
Plantae	Flora	Orchidaceae	11228	<i>Cyanicula caerulea</i>
Plantae	Flora	Orchidaceae	4419	<i>Cymbidium suave</i>
Plantae	Flora	Orchidaceae	6889	<i>Cyrtostylis reniformis</i>
Plantae	Flora	Orchidaceae	6945	<i>Dendrobium bowmanii</i>
Plantae	Flora	Orchidaceae	4424	<i>Dendrobium gracilicaule</i>
Plantae	Flora	Orchidaceae	4425	<i>Dendrobium kingianum</i>
Plantae	Flora	Orchidaceae	4426	<i>Dendrobium linguiforme</i>
Plantae	Flora	Orchidaceae	4432	<i>Dendrobium speciosum</i>
Plantae	Flora	Orchidaceae	11984	<i>Dendrobium speciosum</i> var. <i>speciosum</i>
Plantae	Flora	Orchidaceae	7887	<i>Dipodium punctatum</i>
Plantae	Flora	Orchidaceae	9155	<i>Dipodium roseum</i>
Plantae	Flora	Orchidaceae	DIPO	<i>Dipodium</i> spp.
Plantae	Flora	Orchidaceae	7888	<i>Dipodium variegatum</i>
Plantae	Flora	Orchidaceae	4460	<i>Eriochilus cucullatus</i>
Plantae	Flora	Orchidaceae	8949	<i>Erythrorchis cassythoides</i>
Plantae	Flora	Orchidaceae	4463	<i>Gastrodia sesamoides</i>

Plantae	Flora	Orchidaceae	9197	<i>Genoplesium archeri</i>
Plantae	Flora	Orchidaceae	8872	<i>Genoplesium fimbriatum</i>
Plantae	Flora	Orchidaceae	9200	<i>Genoplesium pumilum</i>
Plantae	Flora	Orchidaceae	4465	<i>Glossodia major</i>
Plantae	Flora	Orchidaceae	4466	<i>Glossodia minor</i>
Plantae	Flora	Orchidaceae	4472	<i>Lyperanthus suaveolens</i>
Plantae	Flora	Orchidaceae	7622	<i>Microtis parviflora</i>
Plantae	Flora	Orchidaceae	7101	<i>Microtis rara</i>
Plantae	Flora	Orchidaceae	4473	<i>Microtis unifolia</i>
Plantae	Flora	Orchidaceae	4476	<i>Orthoceras strictum</i>
Plantae	Flora	Orchidaceae	4478	<i>Paracaleana minor</i>
Plantae	Flora	Orchidaceae	4497	<i>Prasophyllum elatum</i>
Plantae	Flora	Orchidaceae	4504	<i>^Prasophyllum fuscum</i>
Plantae	Flora	Orchidaceae	4524	<i>Prasophyllum striatum</i>
Plantae	Flora	Orchidaceae	4535	<i>Pterostylis acuminata</i>
Plantae	Flora	Orchidaceae	4539	<i>Pterostylis baptistii</i>
Plantae	Flora	Orchidaceae	4544	<i>Pterostylis concinna</i>
Plantae	Flora	Orchidaceae	4545	<i>Pterostylis curta</i>
Plantae	Flora	Orchidaceae	4546	<i>Pterostylis daintreana</i>
Plantae	Flora	Orchidaceae	4547	<i>Pterostylis decurva</i>
Plantae	Flora	Orchidaceae	4554	<i>Pterostylis grandiflora</i>
Plantae	Flora	Orchidaceae	4562	<i>Pterostylis nutans</i>
Plantae	Flora	Orchidaceae	4566	<i>Pterostylis parviflora</i>
Plantae	Flora	Orchidaceae	4571	<i>Pterostylis reflexa</i>
Plantae	Flora	Orchidaceae	4573	<i>Pterostylis rufa</i>
Plantae	Flora	Orchidaceae	PTER	<i>Pterostylis spp.</i>
Plantae	Flora	Orchidaceae	10853	<i>Pyrorchis nigricans</i>
Plantae	Flora	Orchidaceae	4578	<i>Rimacola elliptica</i>
Plantae	Flora	Orchidaceae	4584	<i>^Sarcochilus hartmannii</i>
Plantae	Flora	Orchidaceae	11877	<i>Spiranthes australis</i>
Plantae	Flora	Orchidaceae	4592	<i>Thelymitra carnea</i>
Plantae	Flora	Orchidaceae	8968	<i>Thelymitra ixioides</i> var. <i>ixioides</i>
Plantae	Flora	Orchidaceae	4602	<i>Thelymitra pauciflora</i>
Plantae	Flora	Orchidaceae	4604	<i>Thelymitra venosa</i>
Plantae	Flora	Osmundaceae	8151	<i>Todea barbara</i>
Plantae	Flora	Poaceae	4895	<i>Dichanthium setosum</i>
Plantae	Flora	Polypodiaceae	8159	<i>Platyterium bifurcatum</i>
Plantae	Flora	Proteaceae	5349	<i>Banksia spinulosa</i>
Plantae	Flora	Proteaceae	7488	<i>Banksia spinulosa</i> var. <i>spinulosa</i>



Plantae	Flora	Proteaceae	5365	^^ <i>Grevillea caleyi</i>
Plantae	Flora	Proteaceae	5382	<i>Grevillea longifolia</i>
Plantae	Flora	Proteaceae	5433	<i>Isopogon anemonifolius</i>
Plantae	Flora	Proteaceae	6839	<i>Isopogon anethifolius</i>
Plantae	Flora	Proteaceae	5445	<i>Lomatia silaifolia</i>
Plantae	Flora	Proteaceae	5458	^^ <i>Persoonia hirsuta</i>
Plantae	Flora	Proteaceae	5460	<i>Persoonia lanceolata</i>
Plantae	Flora	Proteaceae	9823	<i>Persoonia laurina</i> subsp. <i>laurina</i>
Plantae	Flora	Proteaceae	9502	<i>Persoonia laxa</i>
Plantae	Flora	Proteaceae	5462	<i>Persoonia levis</i>
Plantae	Flora	Proteaceae	5463	<i>Persoonia linearis</i>
Plantae	Flora	Proteaceae	9000	<i>Persoonia mollis</i> subsp. <i>mollis</i>
Plantae	Flora	Proteaceae	5467	<i>Persoonia nutans</i>
Plantae	Flora	Proteaceae	5468	<i>Persoonia oblongata</i>
Plantae	Flora	Proteaceae	5469	<i>Persoonia pinifolia</i>
Plantae	Flora	Proteaceae	5478	<i>Petrophile pedunculata</i>
Plantae	Flora	Proteaceae	5479	<i>Petrophile pulchella</i>
Plantae	Flora	Proteaceae	5480	<i>Petrophile sessilis</i>
Plantae	Flora	Proteaceae	5488	<i>Telopea speciosissima</i>
Plantae	Flora	Proteaceae	5490	<i>Xylomelum pyriforme</i>
Plantae	Flora	Psilotaceae	8170	<i>Tmesipteris truncata</i>
Plantae	Flora	Rutaceae	10885	<i>Asterolasia buxifolia</i>
Plantae	Flora	Rutaceae	12364	<i>Boronia barkeriana</i> subsp. <i>barkeriana</i>
Plantae	Flora	Rutaceae	12355	<i>Boronia barkeriana</i> subsp. <i>gymnopetala</i>
Plantae	Flora	Rutaceae	5740	<i>Boronia floribunda</i>
Plantae	Flora	Rutaceae	5741	<i>Boronia fraseri</i>
Plantae	Flora	Rutaceae	5744	<i>Boronia ledifolia</i>
Plantae	Flora	Rutaceae	5746	<i>Boronia mollis</i>
Plantae	Flora	Rutaceae	5749	<i>Boronia parviflora</i>
Plantae	Flora	Rutaceae	5750	<i>Boronia pinnata</i>
Plantae	Flora	Rutaceae	5754	<i>Boronia rigens</i>
Plantae	Flora	Rutaceae	5756	<i>Boronia rubiginosa</i>
Plantae	Flora	Rutaceae	5759	<i>Boronia serrulata</i>
Plantae	Flora	Rutaceae	7210	<i>Boronia thujona</i>
Plantae	Flora	Rutaceae	11069	<i>Crowea exalata</i> subsp. <i>exalata</i>
Plantae	Flora	Rutaceae	5775	<i>Crowea saligna</i>
Plantae	Flora	Rutaceae	5776	<i>Eriostemon australasius</i>
Plantae	Flora	Rutaceae	8374	<i>Phebalium squamulosum</i> subsp. <i>squamulosum</i>

Plantae	Flora	Rutaceae	10577	<i>Philotheca buxifolia</i>
Plantae	Flora	Rutaceae	10578	<i>Philotheca buxifolia</i> <i>subsp. buxifolia</i>
Plantae	Flora	Rutaceae	10579	<i>Philotheca buxifolia</i> <i>subsp. obovata</i>
Plantae	Flora	Rutaceae	10990	<i>Philotheca reichenbachii</i>
Plantae	Flora	Rutaceae	5831	<i>Philotheca salsolifolia</i>
Plantae	Flora	Rutaceae	10596	<i>Philotheca salsolifolia</i> <i>subsp. salsolifolia</i>
Plantae	Flora	Rutaceae	10599	<i>Philotheca scabra subsp.</i> <i>scabra</i>
Plantae	Flora	Santalaceae	5871	<i>Thesium australe</i>
Plantae	Flora	Sterculiaceae	6140	<i>Lasiopetalum joyceae</i>
Plantae	Flora	Thymelaeaceae	6965	<i>Pimelea curviflora var.</i> <i>curviflora</i>
Plantae	Flora	Thymelaeaceae	6190	<i>Pimelea spicata</i>
Plantae	Flora	Xanthorrhoeaceae	6315	<i>Xanthorrhoea arborea</i>
Plantae	Flora	Xanthorrhoeaceae	6319	<i>Xanthorrhoea media</i>
Plantae	Flora	Xanthorrhoeaceae	7919	<i>Xanthorrhoea minor</i> <i>subsp. minor</i>
Plantae	Flora	Xanthorrhoeaceae	6321	<i>Xanthorrhoea resinosa</i>
Plantae	Flora	Xanthorrhoeaceae	XANT	<i>Xanthorrhoea spp.</i>
Plantae	Flora	Zamiaceae	6327	<i>Macrozamia communis</i>

ans. The data are only indicative and cannot be considered a

d to 0.1°; ^^ rounded to 0.01°).

ed Entities in selected area [North: -33.79 West: 151.17 East:







Common Name	NSW status	Comm. status	Records	Info
Tusked Frog	P		1	
Common Eastern Froglet	P		25	
Ornate Burrowing Frog	P		1	
Brown-striped Frog	P		22	
Spotted Grass Frog	P		1	
Haswell's Froglet	P		1	
Red-crowned Toadlet	V,P		68	
Bibron's Toadlet	P		2	
Green and Golden Bell Frog	E1,P	V	2	
Green Tree Frog	P		1	
Eastern Dwarf Tree Frog	P		1	
Peron's Tree Frog	P		2	
Green Turtle	V,P	V	1	
unidentified sea turtle	P		1	
Eastern Snake-necked Turtle	P		5	
Wood Gecko	P		12	
Lesueur's Velvet Gecko	P		5	
Broad-tailed Gecko	P		18	
Thick-tailed Gecko	P		12	
Burton's Snake-lizard	P		17	
Common Scaly-foot	P		17	
Cream-striped Shinning-skink	P		11	
Robust Ctenotus	P		8	
Copper-tailed Skink	P		6	
Mainland She-oak Skink	P		1	

Cunningham's Skink	P	3
Eastern Water-skink	P	28
Barred-sided Skink	P	8
Dark-flecked Garden Sunskink	P	26
Pale-flecked Garden Sunskink	P	37
unidentified grass skink	P	2
Tree-base Litter-skink	P	4
Three-toed Skink	P	11
Weasel Skink	P	6
Shingle-back	P	3
Eastern Blue-tongue	P	95
Eastern Water Dragon	P	48
Eastern Water Dragon	P	28
Lace Monitor	P	2
Prong-snouted Blind Snake	P	1
Proximus Blind Snake	P	1
Carpet & Diamond Pythons	P	1
Diamond Python	P	3
Brown Tree Snake	P	1
Common Tree Snake	P	17
Golden-crowned Snake	P	25
Red-naped Snake	P	4
Black-bellied Swamp Snake	P	1
Elegant Seasnake	P	1
Tiger Snake	P	1
Dwyer's Snake	P	1
Red-bellied Black Snake	P	14
Bandy-bandy	P	6
Australian Brush-turkey	P	120
Stubble Quail	P	3
Brown Quail	P	4
Magpie Goose	V,P	1
Chestnut Teal	P	14
Grey Teal	P	2
Pacific Black Duck	P	172



Australian Wood Duck	P		55	
Black Swan	P		3	
Wandering Whistling-Duck	P		1	
White-tailed Tropicbird	P	C,J	2	
Hoary-headed Grebe	P		1	
Emerald Dove	P		1	
White-headed Pigeon	P		6	
Bar-shouldered Dove	P		2	
Peaceful Dove	P		2	
Wonga Pigeon	P		1	
Topknot Pigeon	P		6	
Brown Cuckoo-Dove	P		1	
Crested Pigeon	P		131	
Superb Fruit-Dove	V,P		10	
Tawny Frogmouth	P		115	
White-throated Nightjar	P		1	
Fork-tailed Swift	P	C,J,K	6	
White-throated Needletail	P	C,J,K	9	
White-faced Storm-Petrel	P		2	
Wandering Albatross	E1,P	E,J	1	
Yellow-nosed Albatross	P		1	
Grey-headed Albatross	P	E	1	
Flesh-footed Shearwater	V,P	J,K	1	
Wedge-tailed Shearwater	P	J	5	
Short-tailed Shearwater	P	J,K	1	
Gould's Petrel	V,P	E	1	
Great-winged Petrel	P		3	
Soft-plumaged Petrel	P		1	
Fluttering Shearwater	P		1	
Little Penguin	P		65	
Australasian Gannet	P		3	
Australasian Darter	P		48	
Little Pied Cormorant	P		67	
Great Cormorant	P		24	

Little Black Cormorant	P		228	
Pied Cormorant	P		78	
Australian Pelican	P		97	
Cattle Egret	P	C,J	1	
White-necked Heron	P		8	
Striated Heron	P		11	
White-faced Heron	P		135	
Eastern Reef Egret	P	C	1	
Australian Little Bittern	P		1	
Black Bittern	V,P		2	
Nankeen Night Heron	P		2	
Royal Spoonbill	P		2	
Australian White Ibis	P		245	
Straw-necked Ibis	P		1	
Collared Sparrowhawk	P		2	
Brown Goshawk	P		14	
Grey Goshawk	P		1	
Wedge-tailed Eagle	P		1	
Pacific Baza	P		4	
Black-shouldered Kite	P		6	
Red Goshawk	E4A,P,2	V	1	
White-bellied Sea-Eagle	P	C	29	
Whistling Kite	P		8	
Little Eagle	V,P		1	
Eastern Osprey	V,P,3		2	
Brown Falcon	P		1	
Nankeen Kestrel	P		16	
Australian Hobby	P		3	
Peregrine Falcon	P		30	
Eurasian Coot	P		1	
Dusky Moorhen	P		21	
Buff-banded Rail	P		3	
Lewin's Rail	P		1	
Spotless Crake	P		1	
Bush Stone-curlew	E1,P		2	
Sooty Oystercatcher	V,P		4	




Pied Oystercatcher	E1,P		1	
Black-winged Stilt	P		1	
Lesser Sand-plover	V,P	C,J,K	1	
Red-capped Plover	P		7	
Masked Lapwing	P		279	
Banded Lapwing	P		2	
Common Sandpiper	P	C,J,K	1	
Bar-tailed Godwit	P	C,J,K	1	
Wandering Tattler	P	J	1	
Painted Button-quail	P		1	
Long-tailed Jaeger	P	J	1	
Arctic Jaeger	P	J,K	2	
Pomarine Jaeger	P	C,J	1	
Silver Gull	P		1308	
Caspian Tern	P	C,J	1	
Kelp Gull	P		1	
Pacific Gull	P		1	
Franklin's Gull	P		2	
Sooty Tern	V,P		3	
Common Tern	P	C,J,K	6	
White-fronted Tern	P		1	
Little Tern	E1,P	C,J,K	1	
Crested Tern	P		41	
Sulphur-crested Cockatoo	P		189	
Little Corella	P		10	
	P		1	
Yellow-tailed Black-Cockatoo	P		64	
Glossy Black-Cockatoo	V,P,2		2	
Galah	P		39	
Cockatiel	P		1	
Australian King-Parrot	P		160	
Red-winged Parrot	P		3	
Australian Ringneck	P		6	
Musk Lorikeet	P		6	
Little Lorikeet	V,P		2	
Swift Parrot	E1,P,3	E	4	
Budgerigar	P		1	



Crimson Rosella	P	71
[Adelaide Rosella]	P	1
Eastern Rosella	P	52
Red-rumped Parrot	P	3
Scaly-breasted Lorikeet	P	2
Rainbow Lorikeet	P	306
	P	2
Pheasant Coucal	P	2
Fan-tailed Cuckoo	P	13
Pallid Cuckoo	P	3
Brush Cuckoo	P	1
Horsfield's Bronze-Cuckoo	P	1
Shining Bronze-Cuckoo	P	6
Black-eared Cuckoo	P	1
Eastern Koel	P	132
	P	1
Channel-billed Cuckoo	P	154
Barking Owl	V,P,3	1
Southern Boobook	P	57
Powerful Owl	V,P,3	59
Eastern Barn Owl	P	3
Azure Kingfisher	P	1
Laughing Kookaburra	P	375
Sacred Kingfisher	P	18
Dollarbird	P	13
Noisy Pitta	P	1
White-throated Treecreeper	P	2
Satin Bowerbird	P	8
Superb Fairy-wren	P	93
Variegated Fairy-wren	P	26
Striated Thornbill	P	2
Yellow Thornbill	P	3
Brown Thornbill	P	16
Brown Gerygone	P	11



























White-throated Gerygone	P	1
Rockwarbler	P	4
Yellow-throated Scrubwren	P	1
White-browed Scrubwren	P	161
Weebill	P	1
Spotted Pardalote	P	26
Striated Pardalote	P	3
Eastern Spinebill	P	46
Red Wattlebird	P	56
Little Wattlebird	P	20
Regent Honeyeater	E4A,P	E 3
Yellow-faced Honeyeater	P	12
Yellow-tufted Honeyeater	P	2
White-plumed Honeyeater	P	10
Noisy Miner	P	257
Lewin's Honeyeater	P	2
White-naped Honeyeater	P	1
Scarlet Honeyeater	P	1
Little Friarbird	P	1
Noisy Friarbird	P	2
White-cheeked Honeyeater	P	3
New Holland Honeyeater	P	124
Eastern Whipbird	P	157
Varied Sittella	V,P	1
Black-faced Cuckoo-shrike	P	33
White-winged Triller	P	1
Eastern Shrike-tit	P	1
Golden Whistler	P	9
Rufous Whistler	P	3
Olive-backed Oriole	P	6
Australasian Figbird	P	37







Dusky Woodswallow	P	1	
Pied Butcherbird	P	2	
Australian Magpie	P	205	
Grey Butcherbird	P	289	
Pied Currawong	P	209	
Spangled Drongo	P	24	
Grey Fantail	P	13	
Willie Wagtail	P	111	
Rufous Fantail	P	17	
Australian Raven	P	125	
Magpie-lark	P	115	
Black-faced Monarch	P	8	
Satin Flycatcher	P	4	
Leaden Flycatcher	P	1	
Spectacled Monarch	P	3	
Eastern Yellow Robin	P	16	
Jacky Winter	P	1	
Scarlet Robin	V,P	1	
Rose Robin	P	3	
Australian Reed-Warbler	P	1	
Silvereye	P	235	
Welcome Swallow	P	213	
Tree Martin	P	10	
Russet-tailed Thrush	P	1	
Mistletoebird	P	4	
Red-browed Finch	P	11	
Australian Pipit	P	1	
Short-beaked Echidna	P	2	
Brown Antechinus	P	4	
Spotted-tailed Quoll	V,P	E 2	
Eastern Quoll	E1,P	1	
unidentified Bandicoot	P	2	
Long-nosed Bandicoot	P	5	
Eastern Pygmy-possum	V,P	1	
Sugar Glider	P	4	
Common Ringtail Possum	P	171	
Feathertail Glider	P	1	
brushtail possum	P	7	






Common Brushtail Possum	P		136	
Rufous Bettong	V,P		1	
Swamp Wallaby	P		3	
Black Flying-fox	P		15	
Grey-headed Flying-fox	V,P	V	430	
Little Red Flying-fox	P		2	
mastiff-bat	P		1	
White-striped Freetail-bat	P		2	
Gould's Wattled Bat	P		9	
Eastern Bentwing-bat	V,P		35	
Southern Myotis	V,P		199	
Eastern Broad-nosed Bat	P		1	
Large Forest Bat	P		1	
Little Forest Bat	P		1	
Water-rat	P		17	
Bush Rat	P		3	
rat	P		12	
New Zealand Fur-seal	V,P		2	
Australian Fur-seal	V,P		8	
Unidentified Fur-seal	P		7	
Australian Sea-lion	P		1	
Unidentified Seal	P		3	
Leopard Seal	P		8	
Southern Elephant Seal	P		1	
Southern Right Whale	E1,P	E	4	
Dwarf Minke Whale	P		2	
Humpback Whale	V,P	V	2	
Common Dolphin	P		7	
Spotted Dolphin	P		1	
Bottlenose Dolphin	P		3	
Common Maidenhair	P		21	
	P		1	



Filmy Maidenhair	P		1	
Giant Maidenhair	P		1	
Rough Maidenhair	P		1	
Rough Maidenhair	P		1	
	P		1	
Flannel Flower	P		24	
Bangalow Palm	P		9	
Kentia Palm	P		1	
Cabbage Palm	P		21	
Bird's Nest Fern	P		9	
	P		1	
Common Billy-buttons	P		1	
Christmas Bells	P		1	
Christmas Bells	P		7	
Nielsen Park She-oak	E1,P,3	E	68	
River Oak	P		4	
Christmas Bush	P		35	
Rough Treefern	P		14	
Straw Treefern	P		22	
Prickly Treefern	P		1	
Curly Wig	P		15	
Thick Twist Rush	P		12	
	P		2	
	P		1	
Red-fruit Saw-sedge	P		16	
Soft Treefern	P		3	
Gymea Lily	P		2	
	V,P		11	
Black-eyed Susan	V,P	V	3	
	V,P		4	

	P		5	
	P		1	
	E4,P	X	1	
Sand Spurge	E1,P		2	
	E1,P	V	1	
Bynoe's Wattle	E1,P	V	12	
	E1,P	E	1	
Downy Wattle	V,P	V	1	
Sunshine Wattle	E1,P	E	80	
	P		3	
Umbrella Fern	P		12	
Narrow-leaf Finger Fern	E1,P,3		1	
	E1,P		1	
	E1,P		1	
Seaforth Mintbush	E4A,P,3	CE	7	
Netted Bottle Brush	V,P,3		1	
Camfield's Stringybark	V,P	V	11	  
Broken Back Ironbark	V,P		1	
Narrow-leaved Black Peppermint	V,P	V	6	
Silver-leafed Gum	V,P	V	1	
Tick Bush	P		51	
	P		18	
Biconvex Paperbark	V,P	V	1	   
Deane's Paperbark	V,P	V	2	
Magenta Lilly Pilly	E1,P	V	15	
Creek Triplarina	E1,P	E	1	

Mayfly Orchid	P	5	
Mosquito Orchid	P	5	
Pixie Caps	P	5	
Gnat Orchid	P	1	
Mosquito Orchid	P	1	
	P	2	
Pink Fingers	P	1	
White Caladenia	P	8	
Daddy Longlegs	P	1	
Thick Lip Spider Orchid	E1,P,2	V	6 
Christmas Orchid	P	1	
Large Duck Orchid	P	5	
Copper Beard Orchid	P	4	
Slender Beard Orchid	P	1	
Red Beard Orchid	P	2	
Purplish Beard Orchid	P	2	
	P	1	
	P	1	
Spurred Helmet Orchid	P	1	
Fringed Helmet Orchid	P	1	
Toothed Helmet Orchid	P	2	
Tartan Tongue Orchid	P	10	
	P	2	
Large Tongue Orchid	P	6	
Blue Caladenia	P	2	
Snake Orchid	P	1	
Gnat Orchid	P	1	
	P	1	
	P	1	
Pink Rock Orchid	P	1	
Tongue Orchid	P	6	
Rock Lily	P	1	
Rock Orchid	P	1	
	P	2	
	P	1	
	P	1	
	P	3	
Parson's Bands	P	1	
Climbing Orchid	P	3	
Cinnamon Bells	P	1	

Variable Midge Orchid	P		1	
Fringed Midge Orchid	P		2	
Green Midge Orchid	P		1	
Waxlip Orchid	P		2	
Small Waxlip Orchid	P		3	
Brown Beaks	P		2	
Slender Onion Orchid	P		4	
Scented Onion Orchid	P		2	
Common Onion Orchid	P		4	
Bird's-mouth Orchid	P		5	
Small Duck Orchid	P		1	
Tall Leek Orchid	P		6	
Slaty Leek Orchid	E4A,P,2	V	1	
Streaked Leek Orchid	P		1	
Pointed Greenhood	P		2	
King Greenhood	P		1	
Trim Greenhood	P		2	
Blunt Greenhood	P		2	
	P		4	
Summer Grasshood	P		1	
Cobra Greenhood	P		6	
Nodding Greenhood	P		2	
Tiny Greenhood	P		1	
Small Autumn Greenhood	P		1	
Rusty Hood	P		1	
Greenhood	P		1	
	P		3	
Green Rock Orchid	P		5	
Hartman's Sarcocylus	V,P,2	V	1	
Ladies' Tresses	P		2	
Tiny Sun Orchid	P		3	
Dotted Sun Orchid	P		4	
Slender Sun Orchid	P		1	
Large Veined Sun Orchid	P		1	
King Fern	P		12	
Bluegrass	V,P	V	1	
Elkhorn Fern	P		3	
Hairpin Banksia	P		3	
	P		7	

Caley's Grevillea	E1,P,3	E	6	
	P		4	
Broad-leaf Drumsticks	P		6	
Narrow-leaf Drumsticks	P		9	
Crinkle Bush	P		19	
Hairy Geebung	E1,P,3	E	4	
Lance Leaf Geebung	P		21	
	P		2	
	E4,P	X	1	
Broad-leaved Geebung	P		21	
Narrow-leaved Geebung	P		12	
	P		2	
Nodding Geebung	E1,P	E	1	
	P		1	
Pine-leaved Geebung	P		16	
	P		3	
Conesticks	P		11	
	P		2	
Waratah	P		1	
Woody Pear	P		11	
	P		3	
	E1,P		1	
	P		1	
	P		1	
Pale-pink Boronia	P		2	
	P		2	
Sydney Boronia	P		8	
Soft Boronia	P		1	
Swamp Boronia	P		3	
	P		5	
Stiff Boronia	P		3	
	P		1	
Rose Boronia	P		7	
	P		1	
	P		1	
	P		48	
	P		6	
	P		9	

	P		8	
	P		8	
	P		7	
	P		2	
	P		15	
	P		3	
	P		2	
Austral Toadflax	V,P	V	1	
	V,P	V	1	
	V,P	V	5	
Spiked Rice-flower	E1,P	E	2	
	P		14	
	P		5	
	P		2	
	P		8	
	P		6	
Burrawang	P		4	



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 24/01/14 11:19:03

[Summary](#)

[Details](#)

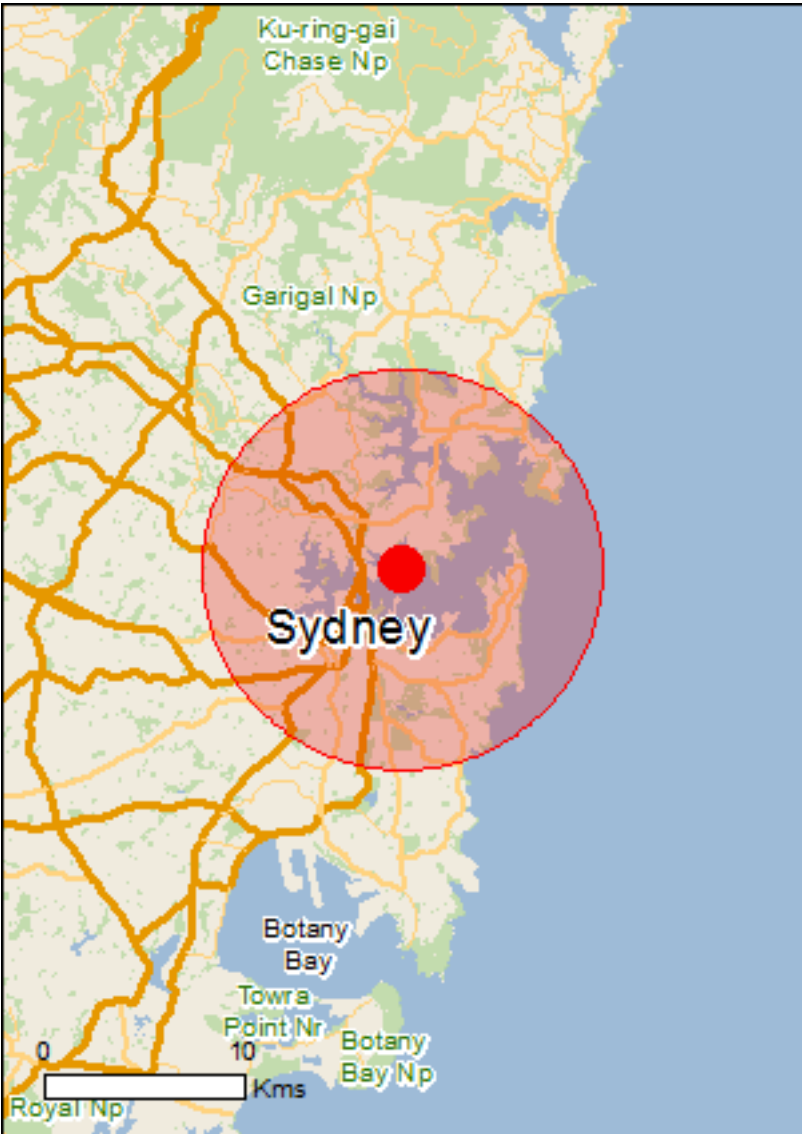
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

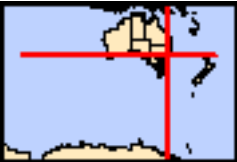
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

[Buffer: 10.0Km](#)



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	6
National Heritage Places:	15
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	75
Listed Migratory Species:	67

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As [heritage values](#) of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	55
Commonwealth Heritage Places:	74
Listed Marine Species:	86
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	1595
State and Territory Reserves:	3
Regional Forest Agreements:	None
Invasive Species:	50
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
Australian Convict Sites (Cockatoo Island Convict Site Buffer Zone)	NSW	Declared property
Australian Convict Sites (Cockatoo Island Convict Site)	NSW	Declared property
Australian Convict Sites (Hyde Park Barracks Buffer Zone)	NSW	Declared property
Australian Convict Sites (Hyde Park Barracks)	NSW	Declared property
Sydney Opera House	NSW	Declared property
Sydney Opera House - Buffer Zone	NSW	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Indigenous		
Cyprus Hellene Club - Australian Hall	NSW	Listed place
Historic		
Independent Theatre	NSW	Indicative place
Bondi Beach	NSW	Listed place
Cockatoo Island	NSW	Listed place
First Government House Site	NSW	Listed place
Hyde Park Barracks	NSW	Listed place
North Head - Sydney	NSW	Listed place
Sydney Harbour Bridge	NSW	Listed place
Sydney Opera House	NSW	Listed place
Australia's 3 Little Italys - Norton Street Precinct	NSW	Nominated place
Callan Park Conservation Area and Buildings	NSW	Nominated place
Colonial Sydney	NSW	Nominated place
Kelly's Bush	NSW	Nominated place
National Trust Urban Conservation Areas of Kur-ring-gai	NSW	Nominated place
Bondi Surf Pavilion	NSW	Within listed place

Wetlands of International Importance (RAMSAR)		[Resource Information]
Name	Proximity	
Towra point nature reserve	Within 10km of Ramsar	

Listed Threatened Ecological Communities	[Resource Information]
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For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Eastern Suburbs Banksia Scrub of the Sydney Region	Endangered	Community known to occur within area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
Turpentine-Ironbark Forest in the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area

Name	Status	Type of Presence
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area
Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans gibsoni Gibson's Albatross [82271]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence
within area		
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta salvini Salvin's Albatross [82343]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Isoodon obesulus obesulus Southern Brown Bandicoot (Eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat likely to occur within area
Acacia terminalis subsp. terminalis MS Sunshine Wattle [64829]	Endangered	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within area
Allocasuarina portuensis Nielsen Park She-oak [21937]	Endangered	Species or species habitat known to occur within area
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Darwinia biflora [14619]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat likely to occur within area
Grevillea caleyi Caley's Grevillea [9683]	Endangered	Species or species habitat likely to occur within area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat may occur within area
Microtis angusii Angus's Onion Orchid [64530]	Endangered	Species or species habitat likely to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat may occur within area
Persoonia hirsuta Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat may occur within area
Prostanthera marifolia Seaforth Mintbush [7555]	Critically Endangered	Species or species habitat known to occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Pocket-less Brush Cherry, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Tetratheca glandulosa Glandular Pink-bell [2350]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Triplarina imbricata [64543]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely

Name	Threatened	Type of Presence
Puffinus leucomelas Streaked Shearwater [66541]		to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Breeding likely to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]	Vulnerable	Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]	Endangered*	Species or species habitat known to occur within area
Xanthomyza phrygia Regent Honeyeater [430]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur

Name	Threatened	Type of Presence
Ardea ibis Cattle Egret [59542]		within area Species or species habitat likely to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew [847]		Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Airservices Australia
Commonwealth Land - Australian & Overseas Telecommunications Corporation
Commonwealth Land - Australian Broadcasting Commission
Commonwealth Land - Australian Broadcasting Corporation
Commonwealth Land - Australian National University
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Australian Telecommunications Corporation
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Commonwealth Trading Bank of Australia
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Director of Defence Service Homes
Commonwealth Land - Reserve Bank of Australia
Commonwealth Land - Telstra Corporation Limited
Defence - COCKATOO ISLAND DOCKYARD
Defence - DEFENCE PLAZA SYDNEY
Defence - DEGAUSSING RANGE
Defence - DSTO PYRMONT - (SEE SITE 1177)
Defence - ENDEAVOUR HOUSE - COOGEE
Defence - FLEET BASE WHARVES
Defence - FOREST LODGE (SYDNEY) TRG DEP
Defence - GARDEN ISLAND
Defence - HMAS KUTTABUL (AC 30/5 Lot4 DP218946)
Defence - HMAS PENGUIN
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL
Defence - HMAS WATERHEN
Defence - HMAS WATSON
Defence - JENNER BUILDING
Defence - KENSINGTON DEPOT
Defence - KISMET/HMAS KUTTABUL-POTTS PT
Defence - LADY GOWRIE HOUSE
Defence - LEICHHARDT STORES DEPOT
Defence - MARITIME COMD CTRE-POTTS POINT ; BOMERAH/TARANA
Defence - MARITIME HEADQUARTERS
Defence - MATERIAL RESEARCH LAB
Defence - MILLER'S POINT TRAINING DEPOT

Name
Defence - NFI CHOWDER BAY (fuel depot)
Defence - NORTH SYDNEY - HYDRO OFFICE
Defence - OXFORD ST SYDNEY
Defence - PARKVIEW BUILDING - SYDNEY
Defence - RANDWICK (CARRINGTON RD)
Defence - RANDWICK BARRACKS
Defence - RANDWICK FRENCHMANS TRG
Defence - SPECTACLE ISLAND
Defence - SYDNEY UNIVERSITY REGIMENT - DARLINGTON
Defence - TRAINING SHIP CONDAMINE
Defence - TRESCO
Defence - VAUCLUSE TRAINING DEPOT
Defence - VICTORIA BARRACKS - PADDINGTON
Defence - WILLOUGHBY TRG DEP
Defence - WOOLLOOMOOLOO CARPARK
Defence - ZETLAND NAVY SUPPLY CENTRE

Commonwealth Heritage Places		[Resource Information]
Name	State	Status
Historic		
Annandale Post Office	NSW	Indicative Place
Garden Island - Captain Cook Dock Precinct	NSW	Indicative Place
Admiralty House Garden and Fortifications	NSW	Listed place
Admiralty House and Lodge	NSW	Listed place
Army Cottage with return verandah	NSW	Listed place
Barracks Block	NSW	Listed place
Barracks Group HMAS Watson	NSW	Listed place
Batteries A83 and C9A	NSW	Listed place
Battery B42	NSW	Listed place
Battery for Five Guns	NSW	Listed place
Biloela Group	NSW	Listed place
Bondi Beach Post Office	NSW	Listed place
Building VB1 and Parade Ground	NSW	Listed place
Building VB2 Guard House	NSW	Listed place
Buildings 31 and 32	NSW	Listed place
Buildings MQVB16 and VB56	NSW	Listed place
Buildings VB13, 15, 16 & 17	NSW	Listed place
Buildings VB41, 45 & 53	NSW	Listed place
Buildings VB60 and VB62	NSW	Listed place
Buildings VB69, 75 & 76 including Garden	NSW	Listed place
Buildings VB83, 84, 85, 87 & 89	NSW	Listed place
Buildings VB90, 91, 91A & 92	NSW	Listed place
Chain and Anchor Store (former)	NSW	Listed place
Chowder Bay Barracks Group	NSW	Listed place
Cliff House	NSW	Listed place
Cockatoo Island Industrial Conservation Area	NSW	Listed place
Commonwealth Avenue Defence Housing	NSW	Listed place
Cottage at Macquarie Lighthouse	NSW	Listed place
Customs Marine Centre	NSW	Listed place
Defence site - Georges Heights and Middle Head	NSW	Listed place
Factory	NSW	Listed place
Fitzroy Dock	NSW	Listed place
Garden Island Precinct	NSW	Listed place
Gazebo	NSW	Listed place
General Post Office	NSW	Listed place
Golf Clubhouse (former)	NSW	Listed place
HMAS Penguin	NSW	Listed place
Headquarters 8th Brigade Precinct	NSW	Listed place
Headquarters Training Command Precinct	NSW	Listed place
Kirribilli House	NSW	Listed place
Kirribilli House Garden & Grounds	NSW	Listed place
Macquarie Lighthouse	NSW	Listed place
Macquarie Lighthouse Group	NSW	Listed place
Macquarie Lighthouse Surrounding Wall	NSW	Listed place
Marine Biological Station (former)	NSW	Listed place
Mess Hall (former)	NSW	Listed place

Name	State	Status
Military Guard Room	NSW	Listed place
Military Road Framework - Defence Land	NSW	Listed place
Naval Store	NSW	Listed place
Navy Refuelling Depot and Caretakers House	NSW	Listed place
North Head Artillery Barracks	NSW	Listed place
North Sydney Post Office	NSW	Listed place
Office Building	NSW	Listed place
Officers Mess, HQ Training Command	NSW	Listed place
Paddington Post Office	NSW	Listed place
Power House / Pump House	NSW	Listed place
Prison Barracks Precinct	NSW	Listed place
Pyrmont Post Office	NSW	Listed place
Reserve Bank	NSW	Listed place
Residences Group	NSW	Listed place
Rigging Shed and Chapel	NSW	Listed place
School of Musketry and Officers Mess, Randwick Army Barracks	NSW	Listed place
Shark Point Battery	NSW	Listed place
Snapper Island	NSW	Listed place
Spectacle Island Explosives Complex	NSW	Listed place
Sutherland Dock	NSW	Listed place
Sydney Customs House (former)	NSW	Listed place
Ten Terminal Regiment Headquarters and AusAid Training Centre	NSW	Listed place
Thirty Terminal Squadron Precinct	NSW	Listed place
Underground Grain Silos	NSW	Listed place
Victoria Barracks Perimeter Wall and Gates	NSW	Listed place
Victoria Barracks Precinct	NSW	Listed place
Victoria Barracks Squash Courts	NSW	Listed place
Woolwich Dock	NSW	Listed place

Listed Marine Species		[<u>Resource Information</u>]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]		Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]		Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis		
Red-necked Stint [860]		Species or species habitat known to occur

Name	Threatened	Type of Presence
Calidris tenuirostris Great Knot [862]		within area Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew [847]		Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur

Name	Threatened	Type of Presence
		within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area

Name	Status	Type of Presence
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Places on the RNE	[Resource Information]
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Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Bundock Street Banksia Scrub	NSW	Indicative Place
Glebe Island Dyke Exposures	NSW	Indicative Place
North Sydney Harbour Aquatic Reserve	NSW	Indicative Place
Parramatta and Lane Cove Rivers Landscapes	NSW	Indicative Place
Bantry Bay Reserve Area (former)	NSW	Registered
Bondi Northern Cliffline	NSW	Registered
Lane Cove Bushland Park	NSW	Registered
Manly Dam and Surrounds	NSW	Registered
North Head	NSW	Registered
North Head Military Reserve	NSW	Registered
St Peters Brickpit Geological Site	NSW	Registered
Sydney Harbour National Park (1980 Boundary)	NSW	Registered
Indigenous		
Aboriginal Boat Carvings	NSW	Indicative Place
Berry Island Reserve	NSW	Registered
The Block	NSW	Registered
Historic		
ABC Gore Hill	NSW	Identified Place
AWA Building (former)	NSW	Indicative Place
Aberdeen House	NSW	Indicative Place
Angus and Son Building	NSW	Indicative Place
Art Room at Newington College	NSW	Indicative Place
Artney	NSW	Indicative Place
BBC Hardware	NSW	Indicative Place
Balls Head Coal Loader	NSW	Indicative Place
Balmoral Baths	NSW	Indicative Place
Balmoral Shark Proof Pool	NSW	Indicative Place
Bancroft Avenue Urban Conservation Precinct	NSW	Indicative Place
Bathurst House	NSW	Indicative Place
Blackwood	NSW	Indicative Place
Bland / Nicholson Streets Group	NSW	Indicative Place
Bligh / Camperdown Terrace Conservation Area	NSW	Indicative Place
Bondi Beach Post Office	NSW	Indicative Place
Bondi Post Office	NSW	Indicative Place
Botany Swamps	NSW	Indicative Place
Bronte Beach Baths	NSW	Indicative Place
Bronte House Gardens	NSW	Indicative Place
Buckle House (former)	NSW	Indicative Place
Burns Bay Sewerage Aqueduct	NSW	Indicative Place
Cammeray Conservation Area	NSW	Indicative Place
Campbell Parade Streetscape	NSW	Indicative Place
Canada House	NSW	Indicative Place
Careening Cove Conservation Area	NSW	Indicative Place
Carrum Carrum	NSW	Indicative Place
Century House	NSW	Indicative Place

Name	State	Status
Chamberlain Hotel	NSW	Indicative Place
Chatswood Rifle Range (former)	NSW	Indicative Place
Chatswood Septic Tanks (former)	NSW	Indicative Place
Chatswood Urban Conservation Area	NSW	Indicative Place
Christian Brothers High School (former)	NSW	Indicative Place
Clem Morath Pool	NSW	Indicative Place
Clive Park Rock Pool	NSW	Indicative Place
Clovelly Bay Enclosure & Baths	NSW	Indicative Place
Coles Fosseys 1915 Building (former)	NSW	Indicative Place
Coles Fosseys 1935 Building (former)	NSW	Indicative Place
Commercial Terrace	NSW	Indicative Place
Constables Cottage	NSW	Indicative Place
Coogee Bay Hotel	NSW	Indicative Place
Coolooba	NSW	Indicative Place
Cooper Street Conservation Area	NSW	Indicative Place
Cremorne Conservation Area	NSW	Indicative Place
Cremorne Point Conservation Area	NSW	Indicative Place
Criterion Hotel	NSW	Indicative Place
Crown Lodge	NSW	Indicative Place
Crows Nest Road Conservation Area	NSW	Indicative Place
Darrell Lea Shop (Facade)	NSW	Indicative Place
Douglass Lane	NSW	Indicative Place
Drummoyne Avenue Group	NSW	Indicative Place
Drummoyne Fire Station	NSW	Indicative Place
Dry Stone Wall and Water Channel	NSW	Indicative Place
Dudley House	NSW	Indicative Place
Dunaverty	NSW	Indicative Place
Dungowan	NSW	Indicative Place
East Lindfield Urban Conservation Precinct	NSW	Indicative Place
Edgecliff Post Office	NSW	Indicative Place
Edward Street Conservation Area	NSW	Indicative Place
Egyptian Room Scottish Royal Arch Masonic Temple	NSW	Indicative Place
Elismere & Studley Royal	NSW	Indicative Place
Enmore Post Office (former)	NSW	Indicative Place
Evening Star Hotel	NSW	Indicative Place
Eventide including Front Fence	NSW	Indicative Place
Fairlight Pool	NSW	Indicative Place
Fairmont	NSW	Indicative Place
Fayworth House	NSW	Indicative Place
Ferndale	NSW	Indicative Place
Fire Station (former)	NSW	Indicative Place
Firs Estate and Cottage	NSW	Indicative Place
Flat Rock Creek Bridge	NSW	Indicative Place
Florence Bartley Library	NSW	Indicative Place
Foley Bros Warehouses (former)	NSW	Indicative Place
Forbes Terrace	NSW	Indicative Place
Garden Island - Captain Cook Dock Precinct	NSW	Indicative Place
Gates and Fence of North Sydney Demonstration School	NSW	Indicative Place
George Bosch Chambers	NSW	Indicative Place
Georgian Style Gable Roofed Cottage	NSW	Indicative Place
Gilbert Park	NSW	Indicative Place
Giles Baths & Bath-House	NSW	Indicative Place
Gladesville Bridge	NSW	Indicative Place
Golden Barley Hotel	NSW	Indicative Place
Gower	NSW	Indicative Place
Greenwich Baths	NSW	Indicative Place
Griffiths Building	NSW	Indicative Place
Hammerhead Crane	NSW	Indicative Place
Haven Amphitheatre	NSW	Indicative Place
Hawthornden	NSW	Indicative Place
Haymarket Post Office	NSW	Indicative Place
Highbury	NSW	Indicative Place
Hollis Park and Environs / Urban Conservation Area	NSW	Indicative Place
Holtermann Estate Conservation Area (A)	NSW	Indicative Place
Holtermann Estate Conservation Area (B)	NSW	Indicative Place
Holtermann Estate Conservation Area (C)	NSW	Indicative Place

Name	State	Status
Holtermann Estate Conservation Area (D)	NSW	Indicative Place
Home Yardage Building	NSW	Indicative Place
Honda	NSW	Indicative Place
Horaceville	NSW	Indicative Place
House	NSW	Indicative Place
House	NSW	Indicative Place
House	NSW	Indicative Place
House	NSW	Indicative Place
House and Garden	NSW	Indicative Place
Houses	NSW	Indicative Place
IBM Centre (former)	NSW	Indicative Place
Iver	NSW	Indicative Place
John Sands Building (former)	NSW	Indicative Place
Kenilworth	NSW	Indicative Place
Kindersley House	NSW	Indicative Place
King George Hotel (former)	NSW	Indicative Place
Kings Theatre (former)	NSW	Indicative Place
Kurraba Point Conservation Area	NSW	Indicative Place
Lane Cove House	NSW	Indicative Place
Langwarren	NSW	Indicative Place
Laurelbank	NSW	Indicative Place
Lavender Bay Conservation Area	NSW	Indicative Place
Leamington	NSW	Indicative Place
Leamington	NSW	Indicative Place
Legion House	NSW	Indicative Place
Leichhardt Fire Station	NSW	Indicative Place
Lincoln Building	NSW	Indicative Place
Lindfield Urban Conservation Precinct	NSW	Indicative Place
Little Sirius Cove Enclosure Remnants	NSW	Indicative Place
Longueville Pool	NSW	Indicative Place
Lower Kirribilli Conservation Area	NSW	Indicative Place
Man O'War Steps & Jetty	NSW	Indicative Place
Manly Fire Station	NSW	Indicative Place
Manly Public Baths Remnants	NSW	Indicative Place
Manly Reservoir R64	NSW	Indicative Place
Manufacturers House	NSW	Indicative Place
Marist Brothers Provincialate of Sydney	NSW	Indicative Place
Mascot Fire Station	NSW	Indicative Place
McCallum Pool	NSW	Indicative Place
McIvers Baths	NSW	Indicative Place
McLaren Street Conservation Area	NSW	Indicative Place
McMahons Point North Conservation Area	NSW	Indicative Place
McMahons Point South Conservation Area	NSW	Indicative Place
Middle Harbour Submarine Sewerage Syphon	NSW	Indicative Place
Middle Head and Georges Heights	NSW	Indicative Place
Milson Park	NSW	Indicative Place
Milson Road Group	NSW	Indicative Place
Mobarik	NSW	Indicative Place
Montague Road Conservation Area	NSW	Indicative Place
Mosman Reservoir	NSW	Indicative Place
National Building	NSW	Indicative Place
Neilsen Park Pool & Associated Structures	NSW	Indicative Place
Neptune Engineering including Bay Foreshores	NSW	Indicative Place
Neutral Bay Fire Station	NSW	Indicative Place
Newmarket Hotel	NSW	Indicative Place
North Sydney Fire Station (former)	NSW	Indicative Place
North Sydney Sewerage Sewer Aqueduct	NSW	Indicative Place
Northbridge Pool	NSW	Indicative Place
Painters and Dockers Union Hall	NSW	Indicative Place
Pair of Semi-Detached Dwelling	NSW	Indicative Place
Park Avenue Urban Conservation Precinct	NSW	Indicative Place
Park Lane Mansions	NSW	Indicative Place
Park and Oaks Avenues Conservation Area	NSW	Indicative Place
Parsley Bay Swimming Enclosure	NSW	Indicative Place
Peckham	NSW	Indicative Place
Pitt Street Gardens	NSW	Indicative Place

Name	State	Status
Plateau Conservation Area	NSW	Indicative Place
Prince Alfred Park	NSW	Indicative Place
Pyrmont Point	NSW	Indicative Place
Qantas House (former)	NSW	Indicative Place
Raben Footwear	NSW	Indicative Place
Randwick Fire Station	NSW	Indicative Place
Redleaf Pool	NSW	Indicative Place
Reservoir No 120 and Reservoir No 121	NSW	Indicative Place
Residence	NSW	Indicative Place
Rockleigh Grange	NSW	Indicative Place
Rose Bay Post Office	NSW	Indicative Place
Roseville	NSW	Indicative Place
Roseville Baths Remnants	NSW	Indicative Place
Roseville Bush Trail	NSW	Indicative Place
Roseville Chase Urban Conservation Precinct	NSW	Indicative Place
Ross Jones Memorial Pools	NSW	Indicative Place
Royal Alexander Hospital for Children (former) Garden Remnants	NSW	Indicative Place
Royal Navy Logistics Store	NSW	Indicative Place
Rozelle Railway Goodsline Viaduct	NSW	Indicative Place
Sewer Vent Shaft	NSW	Indicative Place
Shalimar, Including Garden, Fence and Gates	NSW	Indicative Place
Sheffield House	NSW	Indicative Place
Shirley Road Urban Conservation Precinct	NSW	Indicative Place
Shone Ejector Station (former)	NSW	Indicative Place
Simpson House	NSW	Indicative Place
Sir John Young Hotel	NSW	Indicative Place
Sirius Hoe	NSW	Indicative Place
Slipway and Wharf	NSW	Indicative Place
St Josephs Convent Group	NSW	Indicative Place
St Judes Rectory Garden	NSW	Indicative Place
St Leonards Catholic Church	NSW	Indicative Place
St Leonards Park & North Sydney Oval	NSW	Indicative Place
St Marks Catholic Church	NSW	Indicative Place
St Marks Catholic Church Group	NSW	Indicative Place
St Marks Community Hall	NSW	Indicative Place
St Marks Presbytery	NSW	Indicative Place
St Peters Anglican Church	NSW	Indicative Place
St Peters Presbyterian School Hall	NSW	Indicative Place
St Thomas Anglican Church Memorial Hall	NSW	Indicative Place
Stanmore House	NSW	Indicative Place
Stone Retaining Wall and Gateposts to Rose Hall	NSW	Indicative Place
Sugarloaf Bay Catchment and Headlands	NSW	Indicative Place
Summerfield Terrace	NSW	Indicative Place
Sydney Harbour Entrance	NSW	Indicative Place
Sydney Harbour Landscape Area	NSW	Indicative Place
Sydney Hospital Nightingale Wing	NSW	Indicative Place
Tambourine Bay Baths	NSW	Indicative Place
Tarella	NSW	Indicative Place
Terrace	NSW	Indicative Place
Terrace	NSW	Indicative Place
Terrace	NSW	Indicative Place
Terrace Houses	NSW	Indicative Place
The Bear Pits Moore Park Zoo	NSW	Indicative Place
The Cedars	NSW	Indicative Place
The House of the Seven Lanterns	NSW	Indicative Place
The Pressure Tunnel	NSW	Indicative Place
The Scotland Australia Cairn	NSW	Indicative Place
The Towers - Residence	NSW	Indicative Place
Trethaway House	NSW	Indicative Place
Tudor Lodge	NSW	Indicative Place
Union / Bank / Thomas Streets Conservation Area	NSW	Indicative Place
University of Technology Kuring-gai Campus	NSW	Indicative Place
Upper Middle Harbour Area	NSW	Indicative Place
Victorian Regency Terrace	NSW	Indicative Place
Victorian Rustic Gothic Cottage	NSW	Indicative Place

Name	State	Status
Victorian, Wooden Ridgeline, Semi-detached House	NSW	Indicative Place
Walker / Ridge Streets Conservation Area	NSW	Indicative Place
War Memorial 1914-18	NSW	Indicative Place
Warehouse	NSW	Indicative Place
Warren Ball Avenue Victorian Terrace Houses	NSW	Indicative Place
Water Police Station (former)	NSW	Indicative Place
Waterside Workers Federation Building	NSW	Indicative Place
Watsons Bay Baths	NSW	Indicative Place
Waverley Post Office	NSW	Indicative Place
Waverley Tramway Depot Tramshed Remains	NSW	Indicative Place
Ways Terrace Group	NSW	Indicative Place
West End Hotel	NSW	Indicative Place
West Lindfield Urban Conservation Precinct	NSW	Indicative Place
Westgate Post Office	NSW	Indicative Place
Whaling Road Conservation Area	NSW	Indicative Place
White Bay Power Station	NSW	Indicative Place
Whitehaven	NSW	Indicative Place
William Croft Building (former)	NSW	Indicative Place
Wollstonecraft Conservation Area	NSW	Indicative Place
Woollahra Fire Station	NSW	Indicative Place
Woollahra Post Office	NSW	Indicative Place
Worrall Theatre Complex & St Lukes Chapel	NSW	Indicative Place
Wylies Baths	NSW	Indicative Place
Ythanbank	NSW	Indicative Place
Alexandra Canal	NSW	Interim List
HMAS Platypus	NSW	Interim List
ANZ Bank	NSW	Registered
ANZ Bank	NSW	Registered
ANZ Bank (former)	NSW	Registered
ANZ Bank (former)	NSW	Registered
ASN Hotel (former)	NSW	Registered
Accountants House	NSW	Registered
Administration Building A Sydney Technical College	NSW	Registered
Admiralty House Garden and Fortifications	NSW	Registered
Admiralty House and Lodge	NSW	Registered
Agar Steps & Adjacent Trees	NSW	Registered
Agar Steps Houses	NSW	Registered
Agincourt Hotel	NSW	Registered
Albion Place Group	NSW	Registered
Alcee	NSW	Registered
Alfred Street Entrance Luna Park	NSW	Registered
Alfreds Terrace	NSW	Registered
Alicia	NSW	Registered
All Saints Anglican Church	NSW	Registered
All Saints Anglican Church	NSW	Registered
All Saints Rectory	NSW	Registered
All Souls Anglican Church, Rectory & Minor Church Buildings	NSW	Registered
Alroy	NSW	Registered
American Express Tower (former)	NSW	Registered
Ammunition Store (former)	NSW	Registered
Angel Hotel (former)	NSW	Registered
Annabel Lea	NSW	Registered
Annandale Council Chambers (former)	NSW	Registered
Annandale North Public School	NSW	Registered
Annandale Post Office	NSW	Registered
Annandale Public School and Infants Building	NSW	Registered
Annandale Uniting Church	NSW	Registered
Anzac Memorial	NSW	Registered
Arabela Terrace	NSW	Registered
Araluen	NSW	Registered
Araluen House	NSW	Registered
Archbishops House (former)	NSW	Registered
Archibald Fountain	NSW	Registered
Archina and Ascot and Surrounds	NSW	Registered
Ardath	NSW	Registered
Arden Lea	NSW	Registered

Name	State	Status
Argyle Cut and Argyle Street Space	NSW	Registered
Argyle House	NSW	Registered
Argyle Place Park	NSW	Registered
Argyle Place Precinct	NSW	Registered
Argyle Precinct	NSW	Registered
Argyle Stores	NSW	Registered
Argyle Sub-Station	NSW	Registered
Argyle Terrace	NSW	Registered
Army Cottage with return verandah	NSW	Registered
Art Gallery of NSW	NSW	Registered
Ascham School Precinct	NSW	Registered
Ashton Park	NSW	Registered
Aston Lodge Group	NSW	Registered
Astor Apartment Building	NSW	Registered
Australasian Steam Navigation Company Building	NSW	Registered
Australian Consolidated Industries Building (former)	NSW	Registered
Australian Financial Press Building	NSW	Registered
Australian Gaslight Company Showroom Building (former)	NSW	Registered
Australian Hotel	NSW	Registered
Australian Hotel (former)	NSW	Registered
Australian Joint Stock Bank (former)	NSW	Registered
Australian Museum	NSW	Registered
Australian Workers Union Building	NSW	Registered
Avonmore Terrace	NSW	Registered
BMA House	NSW	Registered
Babworth House	NSW	Registered
Bakery (former)	NSW	Registered
Bakery House and Loft (former)	NSW	Registered
Balmain Civic Group	NSW	Registered
Balmain Cooperative Society Building (former)	NSW	Registered
Balmain Courthouse, Police Station and Post Office	NSW	Registered
Balmain Public School	NSW	Registered
Balmain Volunteer	NSW	Registered
Balmoral Beach Conservation Area	NSW	Registered
Banco Court Building	NSW	Registered
Banking House and Westpac Bank	NSW	Registered
Banksia and Witchagil	NSW	Registered
Bantry Bay Public Magazine	NSW	Registered
Barford and Garden	NSW	Registered
Barham (excluding later additions)	NSW	Registered
Barrack House	NSW	Registered
Barracks Block	NSW	Registered
Barracks Group HMAS Watson	NSW	Registered
Bathurst	NSW	Registered
Batteries A83 and C9A	NSW	Registered
Battery B42	NSW	Registered
Battery for Five Guns	NSW	Registered
Bayfield	NSW	Registered
Beares Stairs	NSW	Registered
Belgrave Terrace (former)	NSW	Registered
Belvedere	NSW	Registered
Beneficial House	NSW	Registered
Bentham	NSW	Registered
Bettington and Merriman Streets Group	NSW	Registered
Biloela Group	NSW	Registered
Birtley Towers	NSW	Registered
Bishopscourt	NSW	Registered
Blackfriars Public School (former)	NSW	Registered
Blacksmith and Machine Shop	NSW	Registered
Blair Athol	NSW	Registered
Blenerne	NSW	Registered
Blenheim House	NSW	Registered
Bomera	NSW	Registered
Bondi Beach	NSW	Registered
Bondi Beach Pool Group	NSW	Registered
Bondi Surf Pavilion	NSW	Registered

Name	State	Status
Boomerang	NSW	Registered
Booth House (former)	NSW	Registered
Bossley Terrace	NSW	Registered
Botany Building	NSW	Registered
Bourke Street Public School	NSW	Registered
Bradleys Head Fortification Complex	NSW	Registered
Briarbank	NSW	Registered
Bristol Arms Hotel	NSW	Registered
Bronte House and surrounds	NSW	Registered
Brooklyn Hotel	NSW	Registered
Broughton House	NSW	Registered
Bryson House	NSW	Registered
Building VB1 and Parade Ground	NSW	Registered
Building VB2 Guard House	NSW	Registered
Buildings	NSW	Registered
Buildings 31 and 32	NSW	Registered
Buildings MQVB16 and VB56	NSW	Registered
Buildings VB13, 15, 16 & 17	NSW	Registered
Buildings VB41, 45 & 53	NSW	Registered
Buildings VB60 and VB62	NSW	Registered
Buildings VB69, 75 & 76 including Garden	NSW	Registered
Buildings VB83, 84, 85, 87 & 89	NSW	Registered
Buildings VB90, 91, 91A & 92	NSW	Registered
Burns Philp Building (former)	NSW	Registered
Busbys Bore or The Tunnel	NSW	Registered
Byrock and Uralla	NSW	Registered
CBC Bank Facade (former)	NSW	Registered
CSR Cooperage Building (former)	NSW	Registered
CSR Gate House (former)	NSW	Registered
CSR Laboratory B Building (former)	NSW	Registered
CSR Main Office Building (former)	NSW	Registered
CSR Managers House (former)	NSW	Registered
CSR Store House (former)	NSW	Registered
CSR Tablet House (former)	NSW	Registered
Cadmans Cottage Space	NSW	Registered
Cadmans Cottage including Grounds and Trees	NSW	Registered
Caerleon	NSW	Registered
Cahill Expressway Space	NSW	Registered
Callan Park Conservation Area	NSW	Registered
Callan Park House	NSW	Registered
Callooa and Garden	NSW	Registered
Cambridge	NSW	Registered
Cambridge Street Precinct	NSW	Registered
Camelot	NSW	Registered
Campbell Street Group	NSW	Registered
Campbells Cove Space	NSW	Registered
Campbells Storehouse	NSW	Registered
Capitol Theatre	NSW	Registered
Captain Arthur Phillip Fountain	NSW	Registered
Carabella Street Group	NSW	Registered
Carey Cottage	NSW	Registered
Carla Zampatti Building	NSW	Registered
Carleith	NSW	Registered
Carlson Terrace	NSW	Registered
Carmelita and Bethania	NSW	Registered
Carthona and Grounds	NSW	Registered
Cast Iron Drinking Fountain	NSW	Registered
Castlereagh Street Group	NSW	Registered
Cathedral and Forbes Streets Group	NSW	Registered
Cathedral and Judge Streets Group	NSW	Registered
Cathedral and Riley Streets Group	NSW	Registered
Catholic Convent of the Sacred Heart	NSW	Registered
Centennial Park	NSW	Registered
Centennial Park Gates	NSW	Registered
Centennial Parklands	NSW	Registered
Central Police Courts	NSW	Registered

Name	State	Status
Central Railway Station	NSW	Registered
Chain and Anchor Store (former)	NSW	Registered
Chamber of Commerce Building (former)	NSW	Registered
Charles Parsons and Company Building (former)	NSW	Registered
Chatswood South Uniting Church & Grounds	NSW	Registered
Cheong House	NSW	Registered
Chief Mechanical Engineers Office (former)	NSW	Registered
Chief Secretarys Building	NSW	Registered
Chinese Christian Church	NSW	Registered
Chowder Bay Barracks Group	NSW	Registered
Christ Church Anglican Church, Gates & Grounds	NSW	Registered
Christ Church Anglican Rectory	NSW	Registered
Christ Church St Laurence Anglican Church	NSW	Registered
Christ Church St Laurence Group	NSW	Registered
Christ Church St Laurence Rectory	NSW	Registered
Christ Church St Laurence School and Hall (former)	NSW	Registered
Cintra	NSW	Registered
Circular Quay West / Campbells Storehouse Space	NSW	Registered
City Ford	NSW	Registered
City House	NSW	Registered
City Mutual Life Assurance Building	NSW	Registered
City South Telephone Exchange	NSW	Registered
City Tattersalls Club	NSW	Registered
Cleland Bond Store	NSW	Registered
Cleveland House	NSW	Registered
Cleveland Street Public School	NSW	Registered
Cleverton	NSW	Registered
Cliff House	NSW	Registered
Cliff Tunnel and Chamber	NSW	Registered
Cliffbrook House, Stables & Stone Walls	NSW	Registered
Clifton (including Front Fence)	NSW	Registered
Clifton Villa	NSW	Registered
Clivedon	NSW	Registered
Cloncorrick	NSW	Registered
Clyde Bank	NSW	Registered
Cockatoo Island Industrial Conservation Area	NSW	Registered
College Street Group	NSW	Registered
Collins Street Terraces	NSW	Registered
Colonial Mutual Building Facade	NSW	Registered
Commercial Bank of Sydney Facade (former)	NSW	Registered
Commercial Building	NSW	Registered
Commercial Building (former)	NSW	Registered
Commercial Building (former)	NSW	Registered
Commercial Buildings	NSW	Registered
Commercial Buildings	NSW	Registered
Commercial Buildings	NSW	Registered
Commercial High School (former)	NSW	Registered
Commercial Stores (former)	NSW	Registered
Commercial Terrace	NSW	Registered
Commercial Terrace	NSW	Registered
Commercial Terrace	NSW	Registered
Commercial Terrace	NSW	Registered
Commercial Terrace Houses	NSW	Registered
Commercial and Residential Buildings	NSW	Registered
Commonwealth Avenue Defence Housing	NSW	Registered
Commonwealth Bank	NSW	Registered
Commonwealth Bank	NSW	Registered
Commonwealth Bank	NSW	Registered
Commonwealth Bank (former)	NSW	Registered
Commonwealth Bank and Gallipoli Club	NSW	Registered
Commonwealth Trading Bank Building	NSW	Registered
Comus Villa	NSW	Registered
Coney Island Luna Park	NSW	Registered
Congregational Church	NSW	Registered
Congregational Manse	NSW	Registered
Conservatorium of Music	NSW	Registered

Name	State	Status
Convicts Dungeon (former)	NSW	Registered
Cooper Park	NSW	Registered
Coorabel	NSW	Registered
Copy of Choragic Monument of Lysicrates	NSW	Registered
Coralynn	NSW	Registered
Corio	NSW	Registered
Corn Exchange and Fruit Market (former)	NSW	Registered
Corner Shop	NSW	Registered
Corona & Hygeia Victorian Terraces	NSW	Registered
Coroners Court (former)	NSW	Registered
Corporation Building	NSW	Registered
Cottage	NSW	Registered
Cottage	NSW	Registered
Cottage	NSW	Registered
Cottage	NSW	Registered
Cottage	NSW	Registered
Cottage	NSW	Registered
Cottage	NSW	Registered
Cottage	NSW	Registered
Cottage No 1	NSW	Registered
Cottage No 2	NSW	Registered
Cottage No 3	NSW	Registered
Cottage No 4	NSW	Registered
Cottage at Macquarie Lighthouse	NSW	Registered
Cottages and Gardens	NSW	Registered
Council Terrace Houses	NSW	Registered
Courthouse & Police Station	NSW	Registered
Cranbrook Avenue Group	NSW	Registered
Cranbrook Group	NSW	Registered
Cranbrook Group	NSW	Registered
Cranbrook School Sports Pavilion	NSW	Registered
Crater Cove Huts	NSW	Registered
Crown Street Public School	NSW	Registered
Crows Nest Fire Station	NSW	Registered
Croxted	NSW	Registered
Crystal Palace Luna Park	NSW	Registered
Culwalla Chambers	NSW	Registered
Culwalla Chambers Group	NSW	Registered
Cumberland Street Group	NSW	Registered
Cunningham Monument	NSW	Registered
Curators Residence (former)	NSW	Registered
Customs House Hotel	NSW	Registered
Customs Marine Centre	NSW	Registered
Cyprus Hellene Club and Australian Hall	NSW	Registered
Daceyville Garden Suburb Urban Conservation Area	NSW	Registered
Daily Telegraph Building (former)	NSW	Registered
Daking House	NSW	Registered
Dalgety Terrace	NSW	Registered
Dalgetys Bond Store (former)	NSW	Registered
Danchen House (former)	NSW	Registered
Darley Street Group	NSW	Registered
Darlinghurst Courthouse	NSW	Registered
Darlinghurst Fire Station	NSW	Registered
Darlinghurst Gaol (former)	NSW	Registered
Darlinghurst Police Station and Residence	NSW	Registered
Darlinghurst Public School (1883 Section)	NSW	Registered
Darlington Conservation Area	NSW	Registered
David Jones Department Store	NSW	Registered
Dawes Point Park and Reserve	NSW	Registered
Dawn Fraser Swimming Pool	NSW	Registered
Defence Site - Georges Heights and Middle Head	NSW	Registered
Delphin House	NSW	Registered
Department Store Group	NSW	Registered
Domain Lodge and Gate Piers	NSW	Registered
Don Bank	NSW	Registered
Door and Surrounds School of Rural Studies	NSW	Registered

Name	State	Status
Dowling Street Group	NSW	Registered
Drill Hall (former)	NSW	Registered
Drummoyne Telephone Exchange	NSW	Registered
Duke of Edinburgh Hotel	NSW	Registered
Dunara	NSW	Registered
Dundee Arms (former)	NSW	Registered
Dunheved	NSW	Registered
Dunkirk Hotel	NSW	Registered
Duplex	NSW	Registered
Duplex	NSW	Registered
Duplex	NSW	Registered
Duplex	NSW	Registered
Durham Hall	NSW	Registered
Dymocks Building	NSW	Registered
ES&A Bank (former)	NSW	Registered
Eaton Street Group	NSW	Registered
Edina	NSW	Registered
Edinburgh Castle Hotel	NSW	Registered
Education Department Building	NSW	Registered
Edwardian Buildings Group	NSW	Registered
Edwardian Commercial Group	NSW	Registered
Edwin Davey & Sons Flour Mill	NSW	Registered
Elder Smith Goldsborough Mort and Company No 3 Woolstore	NSW	Registered
Elder Smith Goldsbrough Mort No 1 Woolstore	NSW	Registered
Electricity Substation	NSW	Registered
Elizabeth Bay House	NSW	Registered
Ellesmere	NSW	Registered
Elsetta	NSW	Registered
Engehurst	NSW	Registered
Entrance Face and Towers Luna Park	NSW	Registered
Entrance Gates (original work)	NSW	Registered
Erskine Street Watch House Group	NSW	Registered
Erskineville Public School	NSW	Registered
Esher	NSW	Registered
Essex	NSW	Registered
Esslemont and Grounds	NSW	Registered
Eumalga including Stone Wall, Gates and Posts	NSW	Registered
Eurodux	NSW	Registered
Eurondella	NSW	Registered
Euthella	NSW	Registered
Eveleigh Railway Workshops	NSW	Registered
Everleigh Glendoon	NSW	Registered
Exchange Hotel	NSW	Registered
Factory	NSW	Registered
Fairhaven	NSW	Registered
Fairwater	NSW	Registered
Fairy Bower Pool	NSW	Registered
Family Hotel (former)	NSW	Registered
Farmers and Graziers No 2 Woolstore (former)	NSW	Registered
Farmers and Graziers Woolstore No1	NSW	Registered
Father Michael Rohan Memorial School	NSW	Registered
Federation Monument	NSW	Registered
Fence, Gates and Lodge	NSW	Registered
Fenton and Garden	NSW	Registered
Fernbank	NSW	Registered
Fernleigh Castle	NSW	Registered
Festival Records Building	NSW	Registered
Fig Tree House	NSW	Registered
Fig and Coral Trees Luna Park	NSW	Registered
Figurehead of Windsor Castle	NSW	Registered
Figurehead of the Ship Consuela	NSW	Registered
Fiona & Gates	NSW	Registered
Fire Brigade Amenities Building	NSW	Registered
Fire Brigade Headquarters	NSW	Registered
Fire Engine House (former)	NSW	Registered

Name	State	Status
Fire Station	NSW	Registered
First Government House Site	NSW	Registered
Fishermans Cottage Group	NSW	Registered
Fitzroy Dock	NSW	Registered
Fitzroy Terrace	NSW	Registered
Five Storey Building	NSW	Registered
Flats	NSW	Registered
Flinders Street Group	NSW	Registered
Former Shops and Residences	NSW	Registered
Fort Denison	NSW	Registered
Fort Street School (former) (western addition)	NSW	Registered
Fortuna	NSW	Registered
Four Dwellings and former Shop	NSW	Registered
Frazer Fountain	NSW	Registered
G A Zink and Sons Building	NSW	Registered
Garden Island Precinct	NSW	Registered
Garden Palace Gates (original work)	NSW	Registered
Gardeners Cottage	NSW	Registered
Garibaldi Inn (former)	NSW	Registered
Gate Lodge (former)	NSW	Registered
Gates Glenrock Ascham School	NSW	Registered
Gates and Gate Lodge	NSW	Registered
Gazebo	NSW	Registered
General Post Office	NSW	Registered
Genoa	NSW	Registered
Gents Lavatory and Stone Walls	NSW	Registered
Geological and Mining Museum	NSW	Registered
George Patterson House	NSW	Registered
George Street / Kendall Lane Precinct	NSW	Registered
George Street Business Precinct	NSW	Registered
Georgian Cottage	NSW	Registered
Georgian House and Barn	NSW	Registered
Georgian Terrace	NSW	Registered
Georgian Terrace	NSW	Registered
Georgian Townhouses	NSW	Registered
Georgian Warehouse (former)	NSW	Registered
Ginahgulla	NSW	Registered
Gladswood House	NSW	Registered
Glasgow Arms Hotel	NSW	Registered
Glebe Conservation Area	NSW	Registered
Glebe Courthouse	NSW	Registered
Glebe Island Bridge	NSW	Registered
Glebe Post Office	NSW	Registered
Glebe Town Hall	NSW	Registered
Glen Mahr	NSW	Registered
Glencairn	NSW	Registered
Glenrock	NSW	Registered
Glenrock	NSW	Registered
Glenview	NSW	Registered
Gloucester Street North Precinct	NSW	Registered
Gloucester Street North, Gloucester Walk and Escarpment Space	NSW	Registered
Glover Cottages	NSW	Registered
Goat Island Ammunition Store Group	NSW	Registered
Goat Island Precinct	NSW	Registered
Goldring House	NSW	Registered
Golf Clubhouse (former)	NSW	Registered
Goodmans Buildings	NSW	Registered
Gore Hill Memorial Cemetery	NSW	Registered
Government House	NSW	Registered
Government House, Associated Buildings and Garden	NSW	Registered
Gowing Brothers Building	NSW	Registered
Grace Brothers Ltd Building	NSW	Registered
Grace Brothers Store (former)	NSW	Registered
Grace Building	NSW	Registered
Grafton Bond Store (former)	NSW	Registered

[illegible]

Name	State	Status
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House	NSW	Registered
House and Gardens	NSW	Registered
House and Grounds	NSW	Registered
House and Grounds	NSW	Registered
House and Stables	NSW	Registered
House, Stone Stables and Fences at rear	NSW	Registered
Houses	NSW	Registered
Houses	NSW	Registered
Houses	NSW	Registered
Houses	NSW	Registered
Houses	NSW	Registered
Houses	NSW	Registered
Houses and Terraces	NSW	Registered
Houses and Terraces	NSW	Registered
Housing Board Building	NSW	Registered
Hudson House Facade (former)	NSW	Registered
Hunter Baillie Memorial Presbyterian Church	NSW	Registered
Hunter River Steamship Company Office (former)	NSW	Registered
Hunters Hill Conservation Area	NSW	Registered
Hunters Hill Post Office	NSW	Registered
Huntleys Point House	NSW	Registered
Hurworth	NSW	Registered
Hyde Park Barracks	NSW	Registered
Hydraulic Pumping Station	NSW	Registered
IOOF Hall	NSW	Registered
Industrial Therapy Unit	NSW	Registered
Innisfallen Castle and Grounds	NSW	Registered
Innisfree	NSW	Registered
Institute Building	NSW	Registered
Iolanthe	NSW	Registered
Iona	NSW	Registered
Isere	NSW	Registered
Italianate House	NSW	Registered
Italianate Terrace	NSW	Registered
Italianate Terrace	NSW	Registered
Ivanhoe	NSW	Registered
J A D Gibson and Company (facade)	NSW	Registered
J H Geddes Woolstore (former)	NSW	Registered
Jenner	NSW	Registered
Jenner Garden	NSW	Registered
Jobbins Terrace	NSW	Registered
John Storey Memorial Clinic (former)	NSW	Registered
John Street Terrace Group	NSW	Registered
Johnstons Creek Sewer Aqueduct	NSW	Registered
Juniper Hall	NSW	Registered
Kaoota	NSW	Registered
Kareela	NSW	Registered
Kareela	NSW	Registered
Kellett Street Group	NSW	Registered
Kellys Bush	NSW	Registered
Kent Street Terrace Group East Side	NSW	Registered

Name	State	Status
Kent Street Terrace Group West Side	NSW	Registered
Kent Street Warehouse Group	NSW	Registered
Kent Street Warehouse Group 2	NSW	Registered
Kien Hay Centre	NSW	Registered
King George V Memorial Hospital	NSW	Registered
King Street Conservation Area	NSW	Registered
Kiola	NSW	Registered
Kirkbride Block	NSW	Registered
Kirribilli House	NSW	Registered
Kirribilli House Garden & Grounds	NSW	Registered
Kirribilli Neighbourhood Centre	NSW	Registered
Kyarra	NSW	Registered
Kyle House	NSW	Registered
LEP House Facade	NSW	Registered
Labrena	NSW	Registered
Lady Members Stand	NSW	Registered
Lands Department Building	NSW	Registered
Lantana	NSW	Registered
Latona Terrace	NSW	Registered
Leichhardt Civic Precinct	NSW	Registered
Leichhardt Post Office	NSW	Registered
Leichhardt Public School Buildings	NSW	Registered
Leichhardt Town Hall	NSW	Registered
Lennox Street Terraces	NSW	Registered
Letraset House	NSW	Registered
Lewis Wolfe Levy Fountain	NSW	Registered
Lilyvale	NSW	Registered
Lilyville	NSW	Registered
Lindesay	NSW	Registered
Linsley Terrace	NSW	Registered
Lisgar House	NSW	Registered
Lismore Hotel (former)	NSW	Registered
Liverpool Street Group	NSW	Registered
Longs Lane Precinct	NSW	Registered
Loombah	NSW	Registered
Lord Nelson Hotel	NSW	Registered
Lord Wolseley Hotel	NSW	Registered
Loreto Convent	NSW	Registered
Low Level Sewage Pumping Station No 2	NSW	Registered
Lower Fort Street West Side Group	NSW	Registered
Lower Fort Street East Side Group	NSW	Registered
Lugano	NSW	Registered
Luna Park Precinct	NSW	Registered
Lyndcote	NSW	Registered
Lyndhurst	NSW	Registered
Lyndhurst	NSW	Registered
MMI Building	NSW	Registered
MWS&DB Building (1939) (former)	NSW	Registered
Macknade House (former)	NSW	Registered
Macleay Museum Building	NSW	Registered
Macquarie House	NSW	Registered
Macquarie Lighthouse	NSW	Registered
Macquarie Lighthouse Group	NSW	Registered
Macquarie Lighthouse Surrounding Wall	NSW	Registered
Macquarie Place Buildings Group	NSW	Registered
Macquarie Place Park & Structures	NSW	Registered
Macquaries Obelisk	NSW	Registered
Macquaries Wall and Gateway	NSW	Registered
Main Building - East Range and Great Hall	NSW	Registered
Main Building Additions & Quadrangle	NSW	Registered
Main Gates (former)	NSW	Registered
Manly Beach and Surrounds	NSW	Registered
Marathon Terrace	NSW	Registered
Marcus Clark Building (former)	NSW	Registered
Marine Biological Station (former)	NSW	Registered
Marist Brothers High School (former)	NSW	Registered

Name	State	Status
Maritime Services Board Building (former)	NSW	Registered
Mark Foys Building (former)	NSW	Registered
Martin Place GPO Precinct	NSW	Registered
Martin Place Urban Conservation Area	NSW	Registered
Maruna	NSW	Registered
Marveen Duplex	NSW	Registered
Masonic Club	NSW	Registered
Maybanke Kindergarten	NSW	Registered
McCafferys Building	NSW	Registered
McComas and Price Williams Wool Press	NSW	Registered
Medical Centre	NSW	Registered
Medical School	NSW	Registered
Melba	NSW	Registered
Members Stand	NSW	Registered
Members Stand Royal Randwick Racecourse	NSW	Registered
Memorial to World War One	NSW	Registered
Mens Lavatory	NSW	Registered
Mercantile Hotel	NSW	Registered
Merimbah	NSW	Registered
Mermaid Baths	NSW	Registered
Merriman Street Precinct	NSW	Registered
Merryfield Hotel Group	NSW	Registered
Meryla	NSW	Registered
Mess Hall (former)	NSW	Registered
Methodist Church (former)	NSW	Registered
Methodist Parsonage (former)	NSW	Registered
Mia Mia	NSW	Registered
Middle Head Fortifications	NSW	Registered
Milestone Obelisk	NSW	Registered
Military Guard Room	NSW	Registered
Military Road Framework - Defence Land	NSW	Registered
Military Road Framework - Sydney Harbour National Park	NSW	Registered
Millers Point Post Office	NSW	Registered
Millinery House	NSW	Registered
Milsons Point Public School (former)	NSW	Registered
Milthorpe	NSW	Registered
Milton Terrace	NSW	Registered
Minerva Cinema formerly The Metro	NSW	Registered
Mint Building, Wing of Rum Hospital (former)	NSW	Registered
Mirvac Trust Building	NSW	Registered
Mona	NSW	Registered
Montefalco	NSW	Registered
Moocooboolah	NSW	Registered
Moon House	NSW	Registered
Moore Park Road Group Terraces and Houses	NSW	Registered
Moore Stairs	NSW	Registered
Moorefield House	NSW	Registered
Morella	NSW	Registered
Morts Dock Historic Site	NSW	Registered
Mortuary Terminal (former)	NSW	Registered
Mr John and Merivale Building	NSW	Registered
Mrs Quirks Cottage	NSW	Registered
Muirbank	NSW	Registered
Myall	NSW	Registered
NSW Department of Labour & Industry Building (former)	NSW	Registered
NSW Government Railway Administrative Building	NSW	Registered
NSW Permanent Building Society Building (former)	NSW	Registered
NSW Sports Club Five Storey Building	NSW	Registered
NSW Sports Club Four Storey Building	NSW	Registered
Nalpa	NSW	Registered
National Bank	NSW	Registered
National Bank (former)	NSW	Registered
National Trust Centre	NSW	Registered
Naval Store	NSW	Registered
Navy Refuelling Depot and Caretakers House	NSW	Registered
New Metcalfe Bond	NSW	Registered

Name	State	Status
New Metcalfe Bond / George Street Precinct	NSW	Registered
New Quarantine Cemetery	NSW	Registered
New South Wales Club House (former)	NSW	Registered
New York Hotel	NSW	Registered
Newmarket House	NSW	Registered
Newmarket Precinct	NSW	Registered
Newtown Courthouse & former Police Station	NSW	Registered
Newtown Courthouse Group	NSW	Registered
Newtown Post Office	NSW	Registered
Newtown Public School and War Memorial	NSW	Registered
Newtown Telephone Exchange	NSW	Registered
Newtown Uniting Church Group	NSW	Registered
Nicholson Street Public School	NSW	Registered
North Head Artillery Barracks	NSW	Registered
North Head Fortifications	NSW	Registered
North Head Quarantine Station & Reserve (former)	NSW	Registered
North Sydney Courthouse	NSW	Registered
North Sydney Olympic Pool Complex	NSW	Registered
North Sydney Post Office Group	NSW	Registered
North Sydney Technical High School (former)	NSW	Registered
North Sydney Telephone Exchange	NSW	Registered
Norths Factory	NSW	Registered
Norwood	NSW	Registered
Novar	NSW	Registered
Nugal Hall	NSW	Registered
Nutcote and Garden	NSW	Registered
Oatlands	NSW	Registered
Obelisk	NSW	Registered
Observatory Park	NSW	Registered
Observer Hotel	NSW	Registered
Obyin, Including Stone Walls	NSW	Registered
Ocean View and Grounds	NSW	Registered
Office Building	NSW	Registered
Officers Mess, HQ Training Command	NSW	Registered
Old Training Block, Fort Street School (former)	NSW	Registered
Opera House Gate Royal Botanic Gardens	NSW	Registered
Oreldalodge	NSW	Registered
Orient Hotel	NSW	Registered
Original Public School & Eulbertie	NSW	Registered
Osborne House	NSW	Registered
Oxford Square Group	NSW	Registered
Ozanam House and Marist Chapel	NSW	Registered
PMG Stores Building (former)	NSW	Registered
Pacific Highway Group	NSW	Registered
Paddington Conservation Area	NSW	Registered
Paddington Police Station (former)	NSW	Registered
Paddington Post Office	NSW	Registered
Paddington Public School 1870 and 1892 Buildings	NSW	Registered
Paddington Public School Group	NSW	Registered
Paddington Reservoir	NSW	Registered
Paddington Town Hall	NSW	Registered
Pair of Joined Houses	NSW	Registered
Pair of Neo Classic Town Houses	NSW	Registered
Pair of Semi-detached Houses	NSW	Registered
Pair of Stone Houses	NSW	Registered
Pair of Stone Houses	NSW	Registered
Pair of Stone Terraces	NSW	Registered
Palisade Hotel	NSW	Registered
Palisade Hotel and adjoining Terraces	NSW	Registered
Pangas House	NSW	Registered
Paragon Hotel (former)	NSW	Registered
Paraza	NSW	Registered
Parker Galleries	NSW	Registered
Parliament House	NSW	Registered
Passy	NSW	Registered
Paterson, Reid and Bruce Ltd Building	NSW	Registered

Name	State	Status
Peniarth	NSW	Registered
Perpetual Trustee Company Building	NSW	Registered
Petersham Park	NSW	Registered
Petersham Railway Station (former)	NSW	Registered
Physics Building	NSW	Registered
Pilgrim House	NSW	Registered
Pinnacle House	NSW	Registered
Pitt / King Street Group	NSW	Registered
Pitt Son and Badgery Wool Store	NSW	Registered
Pitt Street Group	NSW	Registered
Pitt Street Uniting Church	NSW	Registered
Playfair, George, Hickson Space	NSW	Registered
Plaza Theatre (former)	NSW	Registered
Police Station	NSW	Registered
Police Station (former)	NSW	Registered
Police Station (former)	NSW	Registered
Police Station (former)	NSW	Registered
Power House / Pump House	NSW	Registered
Powerhouse Museum (Stage One)	NSW	Registered
Powerhouse Museum (Stage Two)	NSW	Registered
Premises	NSW	Registered
Presbyterian Church	NSW	Registered
Presbyterian Church (former)	NSW	Registered
Presbyterian Church Group	NSW	Registered
Presbyterian Hall	NSW	Registered
Presbyterian Manse	NSW	Registered
Presbyterian Manse (former)	NSW	Registered
President Lincoln Hotel (former)	NSW	Registered
Prevost House	NSW	Registered
Prince of Wales Hospital Gates and Fence	NSW	Registered
Prince of Wales Hospital Group	NSW	Registered
Prince of Wales Hospital Main Block (former)	NSW	Registered
Prince of Wales Hospital Outpatients Building (former)	NSW	Registered
Prison Barracks Precinct	NSW	Registered
Pymont / Ultimo Centre	NSW	Registered
Pymont Bridge	NSW	Registered
Pymont Bridge Hotel	NSW	Registered
Pymont Bridge Road Hotel	NSW	Registered
Pymont Conservation Area	NSW	Registered
Pymont Fire Station	NSW	Registered
Pymont Point Carriageway Dividing Fence	NSW	Registered
Pymont Point Escarpment Face	NSW	Registered
Pymont Point Escarpment Palisade Fence and Stone Gateposts	NSW	Registered
Pymont Point Railway Cutting & Tunnel	NSW	Registered
Pymont Post Office	NSW	Registered
Pymont Power Station Building A	NSW	Registered
Pymont Public School (former)	NSW	Registered
Pymont Square Group	NSW	Registered
Pymont and Murray Streets Residential Group	NSW	Registered
Quarrymans Hotel	NSW	Registered
Quedgley	NSW	Registered
Queen Street Group	NSW	Registered
Queen Victoria Building	NSW	Registered
Queens Place Group	NSW	Registered
Queenscliff Rock Pool	NSW	Registered
Queensland Insurance Building	NSW	Registered
Radio Signal Station - Middle Head	NSW	Registered
Railway Institute Building	NSW	Registered
Railway Square Post Office (former)	NSW	Registered
Railway Viaduct	NSW	Registered
Randwick Police Station	NSW	Registered
Randwick Post Office	NSW	Registered
Randwick Town Hall	NSW	Registered
Rawson Institute for Seamen (former)	NSW	Registered
Rawson Place Group	NSW	Registered

Name	State	Status
Rectory and Stone Walls (former)	NSW	Registered
Rectory of St Marks Church, Stables & Garden	NSW	Registered
Red Cross House	NSW	Registered
Redfern Courthouse	NSW	Registered
Redfern Post Office	NSW	Registered
Redleaf	NSW	Registered
Regency Townhouses	NSW	Registered
Registrar Generals Department Building	NSW	Registered
Registry Office	NSW	Registered
Reinga	NSW	Registered
Reserve Bank	NSW	Registered
Reservoir Fence and Steps	NSW	Registered
Residence and Shop	NSW	Registered
Residences Group	NSW	Registered
Retail Traders Association of NSW Building (former)	NSW	Registered
Retail and Commercial Building	NSW	Registered
Retail and Commercial Building	NSW	Registered
Retail and Commercial Building	NSW	Registered
Reussdale	NSW	Registered
Reynolds Cottage and Shop	NSW	Registered
Richard Johnson Memorial	NSW	Registered
Richmond	NSW	Registered
Richmond Villa	NSW	Registered
Rigging Shed and Chapel	NSW	Registered
Ritz Cinema	NSW	Registered
Robert Burns Statue	NSW	Registered
Robert Reid and Company Warehouse	NSW	Registered
Roberts House	NSW	Registered
Rocklands	NSW	Registered
Rockwall	NSW	Registered
Rona	NSW	Registered
Rosamond	NSW	Registered
Rose Bay Police Station	NSW	Registered
Rosemont	NSW	Registered
Roslyndale	NSW	Registered
Royal Agricultural Society Showground Conservation Area	NSW	Registered
Royal Australian College of Physicians Building	NSW	Registered
Royal Australian Naval House	NSW	Registered
Royal Automobile Club	NSW	Registered
Royal Botanic Gardens and Domain	NSW	Registered
Royal College of Radiologists Building	NSW	Registered
Royal Edward Victualling Yard Group	NSW	Registered
Royal Exchange Assurance Building (former)	NSW	Registered
Royal George Hotel (former)	NSW	Registered
Royal Hotel	NSW	Registered
Royal Hotel	NSW	Registered
Royal Pacific Hotel	NSW	Registered
Royal Prince Alfred Hospital	NSW	Registered
Rozelle Public School	NSW	Registered
Runnymede	NSW	Registered
Rydal	NSW	Registered
SILF Company Building	NSW	Registered
Sacred Heart Monastery & Chapel excluding 1921 & c1960 additions	NSW	Registered
Saintonge	NSW	Registered
Salvation Army Womens Hostel Facade (former)	NSW	Registered
Sanderslaben	NSW	Registered
Sandstone Cottage	NSW	Registered
Sarahville	NSW	Registered
School of Mechanical and Automotive Engineering	NSW	Registered
School of Musketry and Officers' Mess, Randwick Army Barracks	NSW	Registered
Schute, Bell, Badgery & Lumby Store	NSW	Registered
Science Road Bridge	NSW	Registered
Science Road Precinct	NSW	Registered
Scottish Hospital	NSW	Registered
Scout Hall	NSW	Registered

Name	State	Status
Seaforth House	NSW	Registered
Semi detached Houses	NSW	Registered
Semidetached Villas	NSW	Registered
Sergeant Majors Row Terraces	NSW	Registered
Shark Point Battery	NSW	Registered
Shelbourne Hotel	NSW	Registered
Shelter House	NSW	Registered
Ship Inn Hotel (former)	NSW	Registered
Shipping Agents Office (former)	NSW	Registered
Shipwrights Arms Hotel (former)	NSW	Registered
Shop	NSW	Registered
Shop	NSW	Registered
Shop & House	NSW	Registered
Shops	NSW	Registered
Shops Residences and Offices	NSW	Registered
Shops and Hotel Group	NSW	Registered
Shops and Offices	NSW	Registered
Sierra Lucena	NSW	Registered
Sir John Robertson Memorial	NSW	Registered
Sir John Robertson Statue	NSW	Registered
Sirius Anchor and Cannon	NSW	Registered
Sirius House	NSW	Registered
Skinners Family Hotel (former)	NSW	Registered
Smith Copeland Warehouse (former)	NSW	Registered
Snapper Island	NSW	Registered
Societe Generale House	NSW	Registered
Soul Pattinson and Company Building	NSW	Registered
South Head Signal Station	NSW	Registered
Spectacle Island Explosives Complex	NSW	Registered
Sport House including Original Interiors	NSW	Registered
Sportsgirl Building	NSW	Registered
St Andrews Anglican Cathedral and Chapter House	NSW	Registered
St Andrews College	NSW	Registered
St Andrews Congregational Church and Hall	NSW	Registered
St Andrews Presbyterian Church	NSW	Registered
St Andrews Presbyterian Church (former)	NSW	Registered
St Augustines Church and Former Church	NSW	Registered
St Bedes Church, School & Presbytery	NSW	Registered
St Benedicts Catholic Church	NSW	Registered
St Benedicts Convent and Hall	NSW	Registered
St Benedicts Precinct	NSW	Registered
St Brigids Catholic Church	NSW	Registered
St Brigids Catholic Church & School	NSW	Registered
St Francis Xaviers Catholic Church	NSW	Registered
St Francis Xaviers Church School Hall	NSW	Registered
St Francis Xaviers Presbytery	NSW	Registered
St Georges Free Presbyterian Church	NSW	Registered
St Georges Hall	NSW	Registered
St Ignatius College Riverview Main Building	NSW	Registered
St Ives	NSW	Registered
St James Anglican Church	NSW	Registered
St John House	NSW	Registered
St Johns Anglican Church	NSW	Registered
St Johns Anglican Church Group	NSW	Registered
St Johns Anglican Parish Hall	NSW	Registered
St Johns College	NSW	Registered
St Johns Rectory	NSW	Registered
St Johns Rectory (former)	NSW	Registered
St Johns Road Group	NSW	Registered
St Johns Uniting Church	NSW	Registered
St Johns Uniting Church Group	NSW	Registered
St Johns Uniting Church Manse	NSW	Registered
St Johns Uniting Church Manse / Schoolhouse	NSW	Registered
St Judes Anglican Church & Cemetery	NSW	Registered
St Judes Anglican Church Group	NSW	Registered
St Judes Rectory and Curates Residence	NSW	Registered

Name	State	Status
St Kevins	NSW	Registered
St Marks Anglican Church	NSW	Registered
St Marks Anglican Church	NSW	Registered
St Marks Anglican Church Group	NSW	Registered
St Marks Cottage	NSW	Registered
St Mary the Virgin Anglican Church	NSW	Registered
St Marys Cathedral	NSW	Registered
St Marys Catholic Church	NSW	Registered
St Marys Catholic Church	NSW	Registered
St Matthias Anglican Church	NSW	Registered
St Matthias Church Group	NSW	Registered
St Matthias Church Hall	NSW	Registered
St Michaels Anglican Church	NSW	Registered
St Michaels Anglican Church, Hall & Rectory	NSW	Registered
St Michaels Church Group	NSW	Registered
St Patricks Catholic Church	NSW	Registered
St Patricks Convent	NSW	Registered
St Patricks Convent Chapel	NSW	Registered
St Patricks Hall and School	NSW	Registered
St Patricks Seminary and Grounds (former)	NSW	Registered
St Pauls College	NSW	Registered
St Pauls Presbyterian Church (former)	NSW	Registered
St Peter Chanel Catholic Church	NSW	Registered
St Peters Anglican Church & Graveyard	NSW	Registered
St Peters Anglican Church (former)	NSW	Registered
St Peters Anglican Church and Adjacent Bush	NSW	Registered
St Peters Presbyterian Church	NSW	Registered
St Peters Presbyterian Church and Manse	NSW	Registered
St Peters Presbyterian Manse	NSW	Registered
St Peters Presbyterian Schoolhouse	NSW	Registered
St Peters Rectory (former)	NSW	Registered
St Philips Anglican Church	NSW	Registered
St Saviours Anglican Church	NSW	Registered
St Stephens Anglican Church & Cemetery	NSW	Registered
St Thomas Anglican Church	NSW	Registered
St Thomas Anglican Church Group	NSW	Registered
St Thomas Anglican Church Rectory	NSW	Registered
St Thomas Kindergarten Hall	NSW	Registered
Stafford Terrace (part)	NSW	Registered
Star Hotel	NSW	Registered
State Library of NSW	NSW	Registered
State Library of NSW Forecourt	NSW	Registered
State Theatre	NSW	Registered
Station House	NSW	Registered
Statue of Albert the Good	NSW	Registered
Statue of Captain James Cook RN	NSW	Registered
Statue of Dunmore Lang	NSW	Registered
Statue of King Edward VII	NSW	Registered
Stone Cottage and Adjacent Stone Wall	NSW	Registered
Stone Pillar	NSW	Registered
Stone Wall	NSW	Registered
Stone Wall, Entrance Gate and Sentry Box	NSW	Registered
Stoneleigh	NSW	Registered
Stoneleigh	NSW	Registered
Stoneleigh House	NSW	Registered
Strand Arcade and street facade	NSW	Registered
Strickland House & Grounds	NSW	Registered
Sugar House	NSW	Registered
Sunnyside	NSW	Registered
Sunnyside and Grounds	NSW	Registered
Superintendents Residence	NSW	Registered
Superintendents Residence (former)	NSW	Registered
Supreme Court Building	NSW	Registered
Supreme Court Group	NSW	Registered
Surry Hotel (former)	NSW	Registered
Susannah Place Terrace	NSW	Registered

[illegible]

Name	State	Status
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
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Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses	NSW	Registered
Terrace Houses (former)	NSW	Registered
Terrace Houses Group	NSW	Registered
Terrace Houses Group	NSW	Registered
Terrace Houses including Front Fences	NSW	Registered
Terrace and Commercial Building	NSW	Registered
Terrace and Town House Group	NSW	Registered
Terrace and Townhouses	NSW	Registered
Terrace of Three Shops	NSW	Registered
Terraced Houses	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces	NSW	Registered
Terraces including Front Fences	NSW	Registered
Terraces Facade	NSW	Registered
Terraces Facade	NSW	Registered
Terraces and Retaining Wall	NSW	Registered
Terraces and Shop	NSW	Registered
Terraces and Street Trees	NSW	Registered
Terraces and Townhouses	NSW	Registered
Terraces and Townhouses	NSW	Registered
Thames Street Ferry Wharf and Shelter	NSW	Registered
The Abbey and Stone Walls	NSW	Registered
The Barn (Scout Hall)	NSW	Registered
The Big Stable	NSW	Registered
The Bungalow	NSW	Registered
The Bushells Building	NSW	Registered
The Chalet	NSW	Registered
The Cobbles	NSW	Registered
The Counting House	NSW	Registered
The Dower House	NSW	Registered
The Duncan House	NSW	Registered
The Eagles	NSW	Registered
The Fishwick House	NSW	Registered

Name	State	Status
The Garrison Church	NSW	Registered
The Gladstone	NSW	Registered
The Grange	NSW	Registered
The Great Synagogue	NSW	Registered
The Grove Group	NSW	Registered
The Haven	NSW	Registered
The Herbarium	NSW	Registered
The Hermitage	NSW	Registered
The Hub	NSW	Registered
The Jacaranda Including Outbuilding	NSW	Registered
The Judges House	NSW	Registered
The Lodge	NSW	Registered
The Mansions Terrace (Facade only)	NSW	Registered
The Rocks Conservation Area	NSW	Registered
The Scout Hall and Garden of Remembrance	NSW	Registered
The Swifts	NSW	Registered
The Sydney Eye Hospital (former)	NSW	Registered
The Womens College	NSW	Registered
Thirty Terminal Squadron Precinct	NSW	Registered
Three Terrace Buildings	NSW	Registered
Three Terrace Houses	NSW	Registered
Three Victorian Residences	NSW	Registered
Three Weatherboard Cottages	NSW	Registered
Timber Cottage	NSW	Registered
Timber Cottage	NSW	Registered
Timber House	NSW	Registered
Tower House and Stone Perimeter Walls	NSW	Registered
Town Hall	NSW	Registered
Town Hall	NSW	Registered
Town Hall Group	NSW	Registered
Town House	NSW	Registered
Town House	NSW	Registered
Townhouse	NSW	Registered
Townhouses	NSW	Registered
Towns Store	NSW	Registered
Traffic Court Group (former)	NSW	Registered
Traffic Court No 1 (former)	NSW	Registered
Traffic Court No 2 (former)	NSW	Registered
Tranby	NSW	Registered
Transport House	NSW	Registered
Treago	NSW	Registered
Treasury Building & Premiers Office	NSW	Registered
Tresco including Grounds and Trees	NSW	Registered
Trocadero Hall	NSW	Registered
Trust Building	NSW	Registered
Tucker and Company Warehouse	NSW	Registered
Tusculum	NSW	Registered
Twin Residences	NSW	Registered
Two Adjoining Terrace Houses	NSW	Registered
Two Fig Trees	NSW	Registered
Two Storey Georgian House	NSW	Registered
Two Storey House	NSW	Registered
Two Storey House	NSW	Registered
Two Terrace Houses	NSW	Registered
Two Terraces	NSW	Registered
Ultimo Conservation Area	NSW	Registered
Ultimo Post Office (former)	NSW	Registered
Ultimo Sewage Pumping Station	NSW	Registered
Ultimo Uniting Church Group	NSW	Registered
Undercliff Cottage (former)	NSW	Registered
Underground Grain Silos	NSW	Registered
Union Bank (former)	NSW	Registered
Union Bond Store	NSW	Registered
Uniting Church (former)	NSW	Registered
Uniting Church Group	NSW	Registered
Unwins Coach House	NSW	Registered

Name	State	Status
Unwins Store	NSW	Registered
Vailele	NSW	Registered
Vaucluse House & Grounds	NSW	Registered
Venice	NSW	Registered
Ventnor	NSW	Registered
Veredelaise	NSW	Registered
Victoria / Brougham Streets Precinct	NSW	Registered
Victoria Barracks Perimeter Wall and Gates	NSW	Registered
Victoria Barracks Precinct	NSW	Registered
Victoria Barracks Squash Courts	NSW	Registered
Victoria Lodge	NSW	Registered
Victorian Cottage	NSW	Registered
Victorian Shops	NSW	Registered
Victorian Timber Cottage	NSW	Registered
Victorian Weatherboard Cottage	NSW	Registered
Vienna	NSW	Registered
View Terrace Facade	NSW	Registered
Vine House	NSW	Registered
Vinetta	NSW	Registered
Visitors Accommodation (former)	NSW	Registered
Vulcan Hotel	NSW	Registered
Waimea Avenue Group	NSW	Registered
Wainload	NSW	Registered
Wairoa	NSW	Registered
Waite and Bull Building	NSW	Registered
Waiwera and St Claire	NSW	Registered
Wales House	NSW	Registered
Walker Street Group	NSW	Registered
Wally Weekes Pool	NSW	Registered
Walsh Bay Wharves	NSW	Registered
Walshale	NSW	Registered
Walter Burley Griffin Incinerator	NSW	Registered
Walton and Herberton	NSW	Registered
Wandella	NSW	Registered
War Memorial Hospital Group	NSW	Registered
Ward 14 and15	NSW	Registered
Warehouse	NSW	Registered
Warehouse	NSW	Registered
Warehouse	NSW	Registered
Warehouse (former)	NSW	Registered
Warehouse (former)	NSW	Registered
Warehouse (former)	NSW	Registered
Warehouse (former)	NSW	Registered
Warehouse (former)	NSW	Registered
Warehouse Facade	NSW	Registered
Warehouse Group	NSW	Registered
Warehouse and Factory Facade (former)	NSW	Registered
Warehouses	NSW	Registered
Warehouses	NSW	Registered
Warehouses (former)	NSW	Registered
Warehouses (former)	NSW	Registered
Warehouses (former)	NSW	Registered
Warrawillah	NSW	Registered
Watch House	NSW	Registered
Watch House (former)	NSW	Registered
Waterloo Public School	NSW	Registered
Watsons Bay Church Group	NSW	Registered
Waverley Cemetery	NSW	Registered
Ways Terrace	NSW	Registered
Wentworth Mausoleum	NSW	Registered
Wesleyan Chapel (former)	NSW	Registered
Westpac Bank	NSW	Registered
Westpac Bank	NSW	Registered
Westpac Bank (former) facade	NSW	Registered
Westpac Bank Archives (former)	NSW	Registered
Wharf 19, 20 & 21	NSW	Registered

Name	State	Status
Wharf Road Precinct	NSW	Registered
White City	NSW	Registered
Whitehall	NSW	Registered
Whites Creek Sewer Aqueduct	NSW	Registered
Wild Cat Luna Park	NSW	Registered
Wilona House	NSW	Registered
Winden	NSW	Registered
Windermere	NSW	Registered
Windermere Chambers	NSW	Registered
Windmill Street North Side Group	NSW	Registered
Windmill Street Southside Group	NSW	Registered
Windradine	NSW	Registered
Winery Warehouse	NSW	Registered
Winsbury Terrace	NSW	Registered
Wiston Gardens Houses Group	NSW	Registered
Wongonui & Wlangaroa	NSW	Registered
Woodbank	NSW	Registered
Woods Avenue Group	NSW	Registered
Woodstock	NSW	Registered
Woodstock	NSW	Registered
Woodville	NSW	Registered
Woolbrokers Arms Hotel	NSW	Registered
Woollahra Public School 1877 Building	NSW	Registered
Woollahra Public School 1899 Building	NSW	Registered
Woolloomooloo Finger Wharf	NSW	Registered
Woolshed Inn	NSW	Registered
Woolstores No 1 Group	NSW	Registered
Woolstores No 2 Group	NSW	Registered
Woolwich Dock	NSW	Registered
Working Mens Institute	NSW	Registered
Wurley Court	NSW	Registered
Wyaldara	NSW	Registered
Wybalena	NSW	Registered
Wybalena	NSW	Registered
Wyoming	NSW	Registered
YMCA Building Facade (former)	NSW	Registered
Yandra	NSW	Registered
York Street Group	NSW	Registered
Young Princess Hotel (former)	NSW	Registered
Ysabel	NSW	Registered

State and Territory Reserves	[Resource Information]
Name	State
Garigal	NSW
Lane Cove	NSW
Sydney Harbour	NSW

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis		
Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur

Name	Status	Type of Presence
within area		
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Bufo marinus Cane Toad [1772]		Species or species habitat likely to occur within area
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species

Name	Status	Type of Presence
Rattus norvegicus Brown Rat, Norway Rat [83]		habitat likely to occur within area Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom,		Species or species

Name	Status	Type of Presence
Common Broom, French Broom, Soft Broom [20126] Genista sp. X Genista monspessulana Broom [67538]		habitat likely to occur within area Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Nationally Important Wetlands		[Resource Information]
Name	State	
Botany Wetlands	NSW	

Coordinates

-33.84791 151.23071

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Department of Environment, Climate Change and Water, New South Wales](#)
- [-Department of Sustainability and Environment, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment and Natural Resources, South Australia](#)
- [-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [-Environmental and Resource Management, Queensland](#)
- [-Department of Environment and Conservation, Western Australia](#)
- [-Department of the Environment, Climate Change, Energy and Water](#)
- [-Birds Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-SA Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

Appendix H

Bat survey



Biosphere Environmental Consultants Pty Ltd

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Bat Survey ***Miniopterus schreibersii oceanensis*** **Cremorne Point Wharf**

Introduction

Eastern Bent-wing Bats are a listed threatened species. These bats have two known roost sites in the North Sydney precinct on Sydney Harbour: at Balls Head and at Primrose Park. The bats are occasionally recorded at other sites around the harbour and these records are presumed to be foraging bats that have dispersed from the known roosting sites (Hoye and Spence 2004). However, other minor roost sites are likely to be present that have not been recorded.

Methods and Results

In January 2012 Biosphere Environmental Consultants Pty Ltd were engaged to undertake a rapid assessment of the possible presence of Eastern Bent-wing Bats at or near a number of Sydney ferry wharves, including Cremorne Point Wharf.

On the late afternoon of the 24th of February 2012, Dr Arthur White visited the Cremorne Point area with the aim of pre-determining the most likely sites where Eastern Bent-wing Bats could be detected. In general, the bats prefer reasonably densely treed sites where there is little or no night lighting.

Cremorne Point is a long, narrow finger of sandstone that projects southwards into the harbor. The point is steeply sided and vegetated along all sides (Cremorne Reserve), with a slightly larger reserve of bushland at the extremity of the point. The higher land has been totally developed for low-rise residential use. There are night-lit walkways through the bushland areas around the point and around the wharf area which is on the south-western end of the point.

Cremorne Point Wharf, including the approaches to the wharf, and Cremorne Reserve (eastern and western sides) were traversed on foot before nightfall and the wooded areas nearby were scanned using a hand-held Anabat detector (White 2011). After nightfall, each site was surveyed another three times at various intervals during the night to determine the presence of Eastern Bent-wing Bats. Recording were taken at each site and later analysed using Anabat 5.0 software to determine the species identity of the bat calls recorded. The recording details are presented in Table 1 below:

Table 1
Anabat recording Sites and Times

Location	Times	Micro-Bats Detected
Cremorne Point Wharf	7.05-7.15	Nil
	8.10-8.20	Nil
	9.05-9.15	Nil
	10.00-10.00	Nil
	11.00-11.10	Nil
Cremorne Reserve East	7.25-7.35	Nil
	8.35-8.45	Nil
	9.15-9.25	Nil
Cremorne Reserve West	7.40-7.55	Nil
	8.50-9.00	Nil
	9.30-9.45	Nil

Discussion

No microbats bats were detected at Cremorne Point. There was sufficient bushland foraging habitat around the headland but the site suffers from extensive night light pollution. Light coming from the residential areas, from street lights and walkway lights and from across the harbor from the city meant that there were no dark areas on the headland that microbats could use in safety.

Conclusion

Bentwing bats do not appear to be present in the area around Cremorne Point and are not present at the Cremorne Point Wharf.

Dr Arthur White
26 February 2012

References

Hoye, G.A., and Spence, J. 2004. The large Bent-wing bat *Miniopterus schreibersii* in urban environments: a survivor? Pp 138-147, in *Urban Wildlife: more than meets the eye*, edited by D. Lunney and S. Burgin. Royal Zoological Society of New South Wales, Mosman, New South Wales, Australia.

White, A.W. 2011. Roosting dynamics of Eastern Bent-wing Bats *Miniopterus schreibersii oceanensis* in disused military areas in eastern Sydney. In "The Biology and Conservation of Australasian Bats". Eds. B. Law, P. Eby, D. Lunney and L. Lumsden. Royal Zoological Society of New South Wales, Mosman. Pp 471-480.

Appendix I

Landscape character and visual impact statement

CREMORNE POINT WHARF LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT



Prepared for NSW Department of Roads and Maritime Services
August 2014

By Jane Irwin Landscape Architecture

