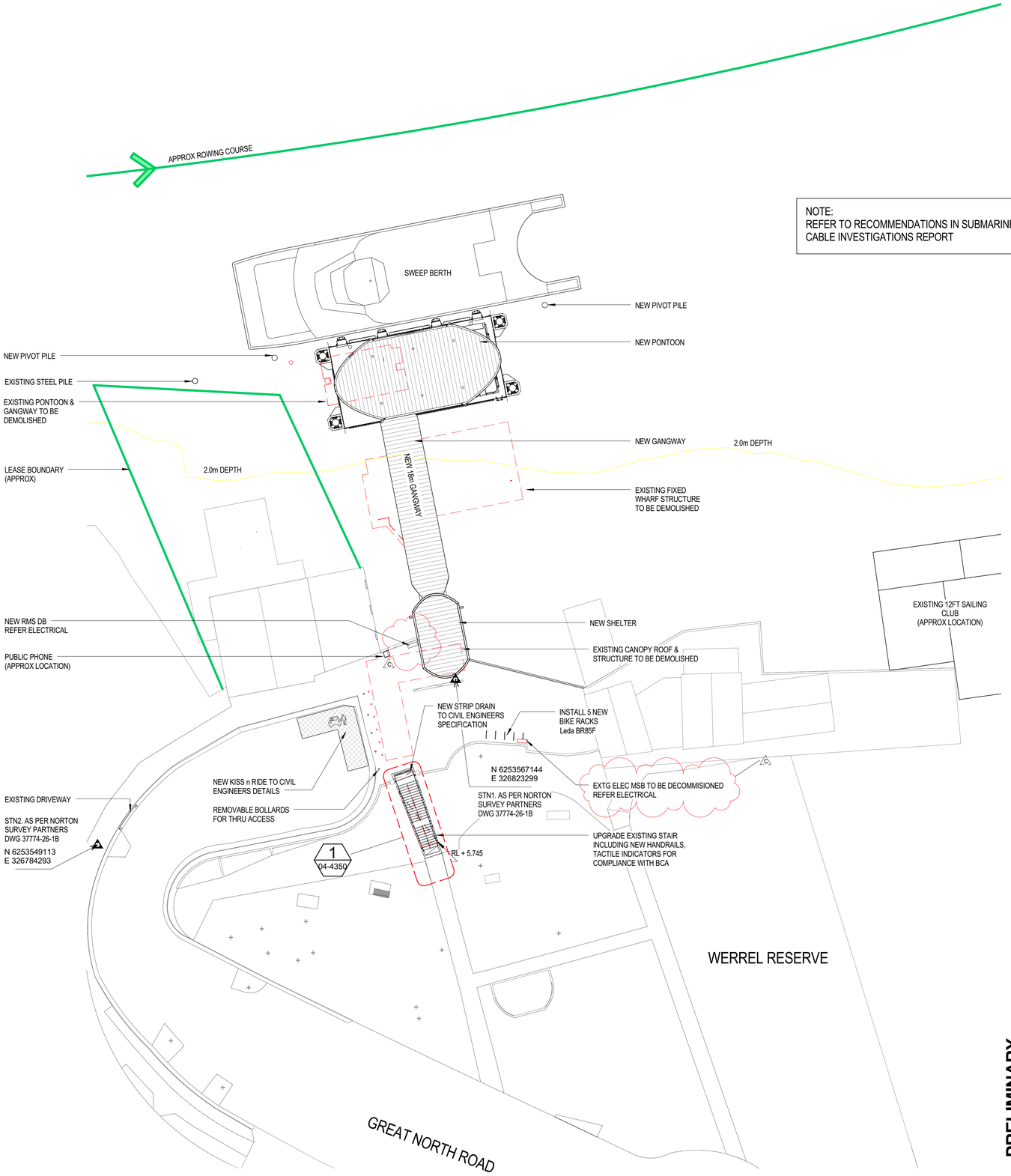
Appendix A

Proposal drawings

2 Site Plan - Existing
1 : 200



1 Site Plan - Proposed
04-3000 1 : 250

NOTE:
REFER TO RECOMMENDATIONS IN SUBMARINE CABLE INVESTIGATIONS REPORT

10 0 10 20 30 40 50
SCALE 1:1 @ A1 mm

mail@conradgargett.com.au ABN 49 325 121 350
NOMINATED ARCHITECT: BRUCE WOLFE NSW Reg 6969
DO NOT SCALE DRAWING & VERIFY ALL DIMENSIONS AND LEVELS ON SITE

REV	DESCRIPTION	DATE	APPD
A	Issue for Construction	20.07.17	
B	Civil Updates	24.08.17	
C	Elec Update	04.09.17	

CONRAD GARGETT | ANCHER MORTLOCK WOOLLEY

TRANSPORT AUTHORITY
NSW GOVERNMENT Transport Roads & Maritime Services

CLIENT
hansen yuncken

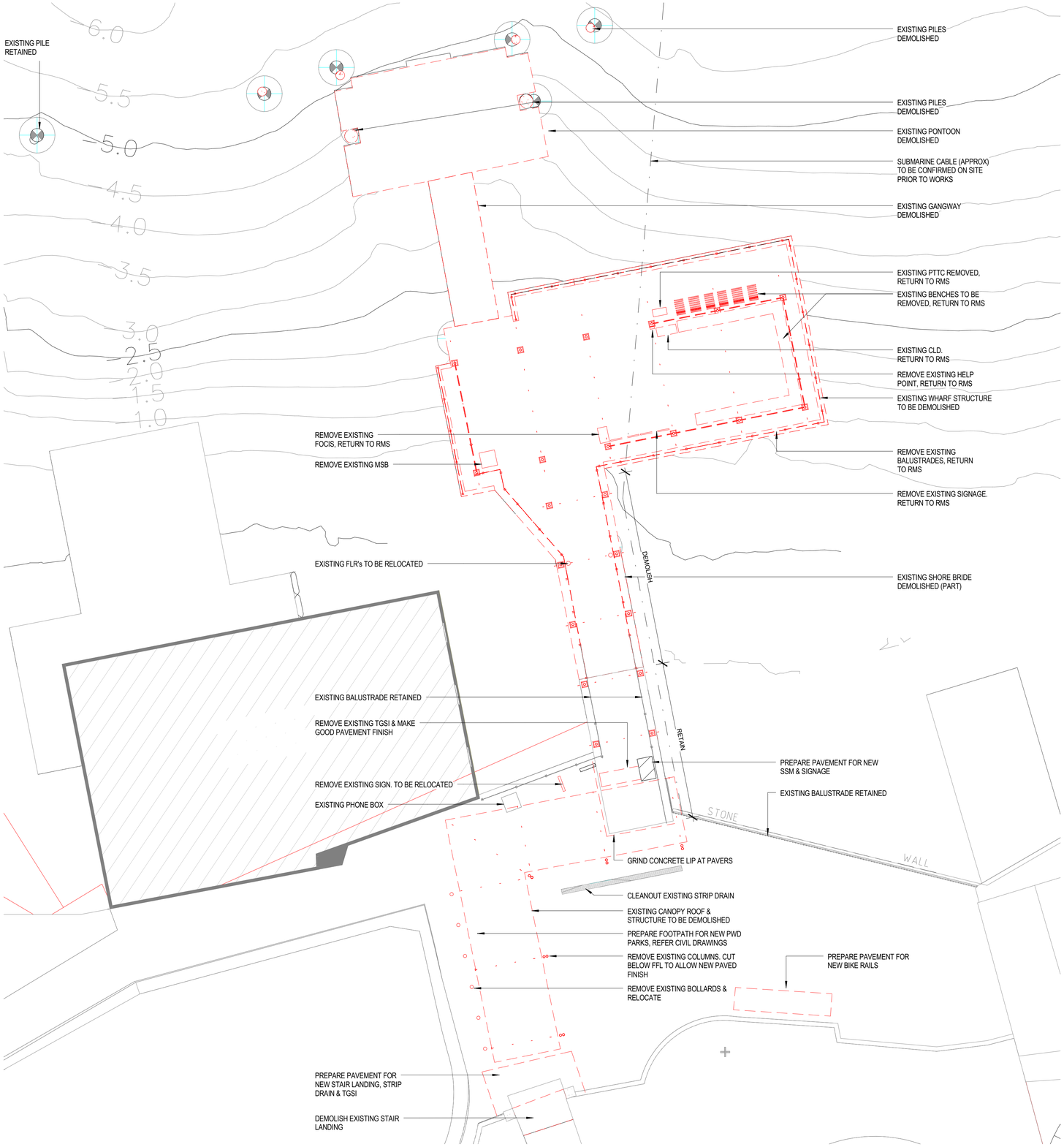
PROJECT
Ferry Wharves Upgrade Program 2 - Abbotsford Wharf

DRAWING
Proposed Site Plan

PRELIMINARY

NORTH

PROJECT No: 14214
STATUS CDR
A1 SCALE As indicated
DRAWING No: AR-04-1000
REV: C



1 Demolition - Floor Plan
04-3000 1 : 100

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SCALE 1:1 @ A1 mm

mail@conradgargett.com.au ABN 49 325 121 350
NOMINATED ARCHITECT: BRUCE WOLFE NSW Reg 6969
DO NOT SCALE DRAWING & VERIFY ALL DIMENSIONS AND LEVELS ON SITE

REV	DESCRIPTION	DATE	APPD
A	Issue for Construction	20.07.17	

CONRAD GARGETT | ANCHER MORTLOCK WOOLLEY

TRANSPORT AUTHORITY
NSW GOVERNMENT Transport Roads & Maritime Services

CLIENT
hansen yuncken

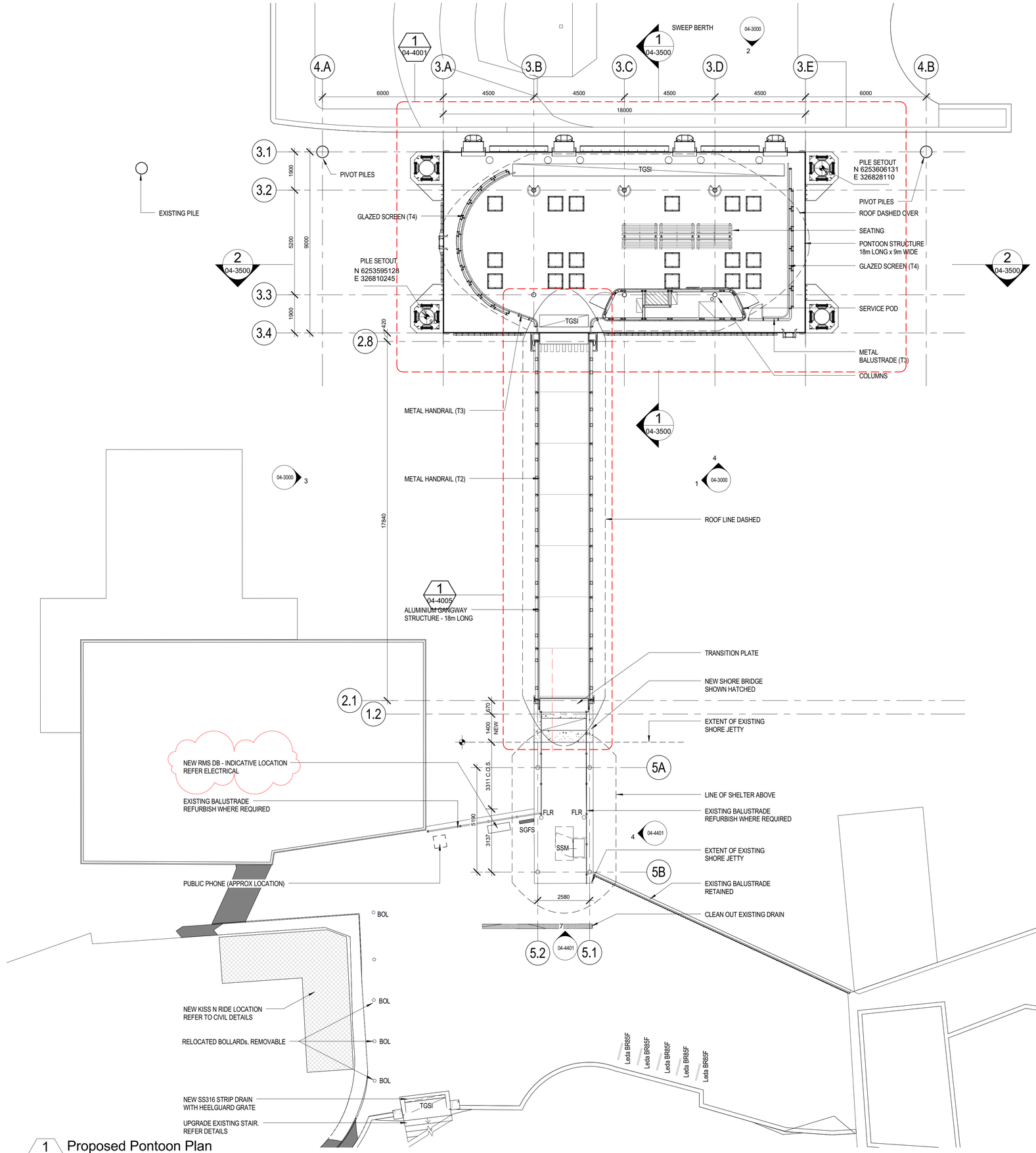
PROJECT
Ferry Wharves Upgrade Program 2 - Abbotsford Wharf

DRAWING
Demolition - Floor Plan

PRELIMINARY

NORTH

PROJECT No:	STATUS	A1 SCALE
14214	CDR	1 : 100
DRAWING No:		REV:
AR-04-1011		A



1 04-3000 **Proposed Pontoon Plan** 1 : 100

NOTE:
REFER TO RECOMMENDATIONS IN SUBMARINE CABLE INVESTIGATIONS REPORT

NOTE:
PRIOR TO UNDERTAKING WORKS ONSITE CONFIRM NORTHING AND EASTINGS SETOUT TO ENSURE DESIGN INTENT.

Legend - Keynote

BOL	BOLLARD
FLR	FIXED LOCATION READER (OPAL)
Leda BR85F	BIKE RACK, Leda BR85F
SGFS	SIGN, EXTERNAL FREESTANDING
SSM	SELF SERVICE MACHINE
TGSI	TACTILE GROUND SURFACE INDICATOR - REFER SCHEDULE

10 0 10 20 30 40 50
SCALE 1:1 @ A1 mm

mail@conradgargett.com.au ABN 49 325 121 350
NOMINATED ARCHITECT: BRUCE WOLFE NSW Reg 6969
DO NOT SCALE DRAWING & VERIFY ALL DIMENSIONS AND LEVELS ON SITE

REV	DESCRIPTION	DATE	APPD
A	Issue for Construction	20.07.17	
B	Elec Update	04.09.17	

CONRAD GARGETT | ANCHER MORTLOCK WOOLLEY

TRANSPORT AUTHORITY
NSW GOVERNMENT Transport Roads & Maritime Services

CLIENT
hansen yuncken

PROJECT
Ferry Wharves Upgrade Program 2 - Abbotsford Wharf

DRAWING
Proposed Wharf Setout Plan

PRELIMINARY

NORTH

PROJECT No:	STATUS	A1 SCALE
14214	CDR	1 : 100
DRAWING No:		REV:
AR-04-2100		B

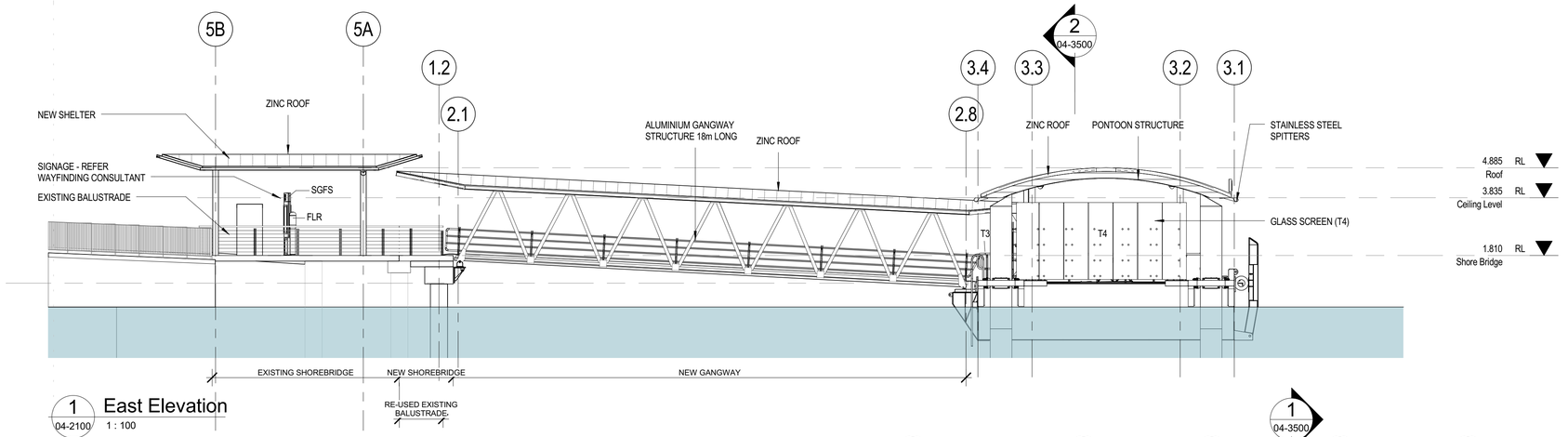
NOTE: SIGNAGE INDICATIVE.
TO BE CONFIRMED BY
WAYFINDING CONSULTANT

Legend - Keynote	
CHW	CHAIR, WAITING - REFER SCHEDULE
FLR	FIXED LOCATION READER (OPAL)
LAD	LADDER
SGFS	SIGN, EXTERNAL FREESTANDING
T3	BALUSTRADE TYPE 3 - REFER DETAILS
T4	BALUSTRADE TYPE 4 - REFER DETAILS

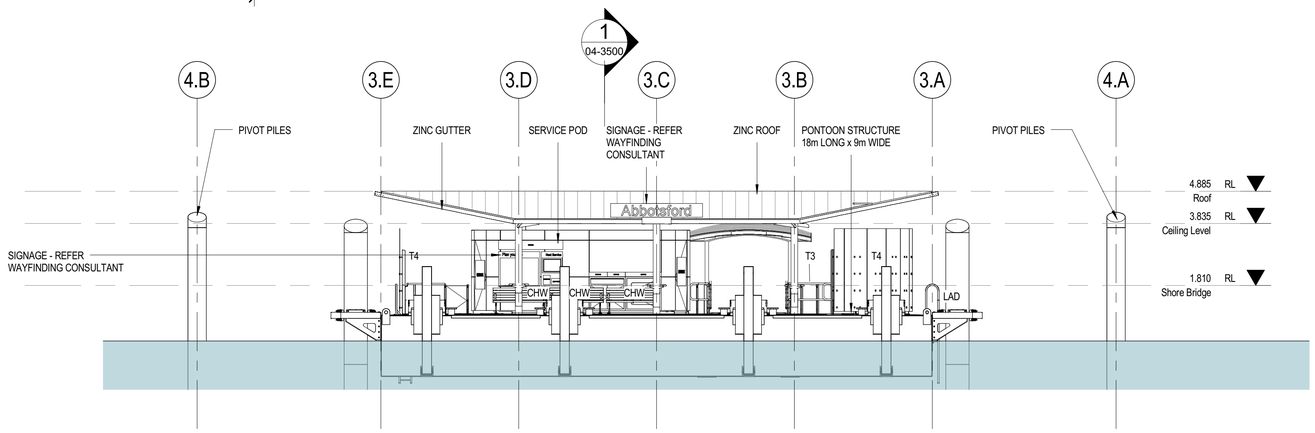
10 0 10 20 30 40 50
SCALE 1:1 @ A1 mm

mail@conradgargett.com.au ABN 49 325 121 350
NOMINATED ARCHITECT: BRUCE WOLFE NSW Reg 6969
DO NOT SCALE DRAWING & VERIFY ALL DIMENSIONS AND LEVELS ON SITE

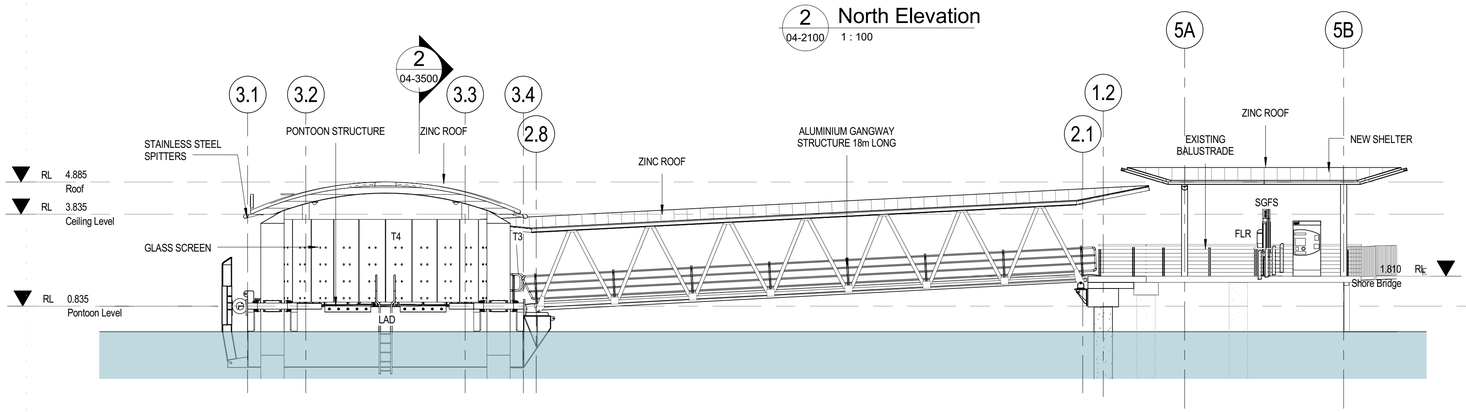
REV	DESCRIPTION	DATE	APPD
A	Issue for Construction	20.07.17	



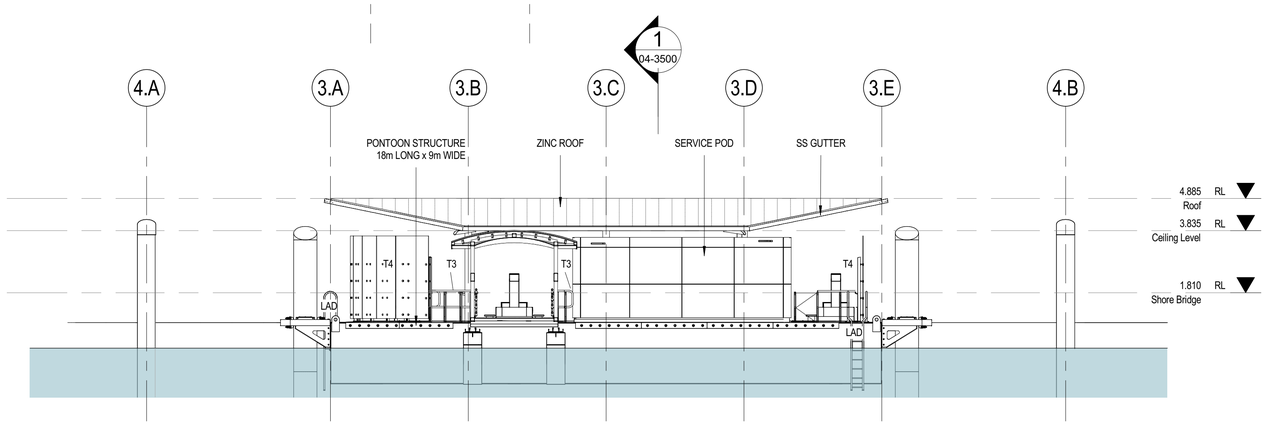
1 East Elevation
04-2100 1 : 100



2 North Elevation
04-2100 1 : 100



3 West Elevation
04-2100 1 : 100



4 South Elevation
04-2100 1 : 100

PRELIMINARY

CONRAD GARGETT | ANCHER MORTLOCK WOOLLEY

TRANSPORT AUTHORITY
NSW GOVERNMENT Transport Roads & Maritime Services

CLIENT
hansen yuncken

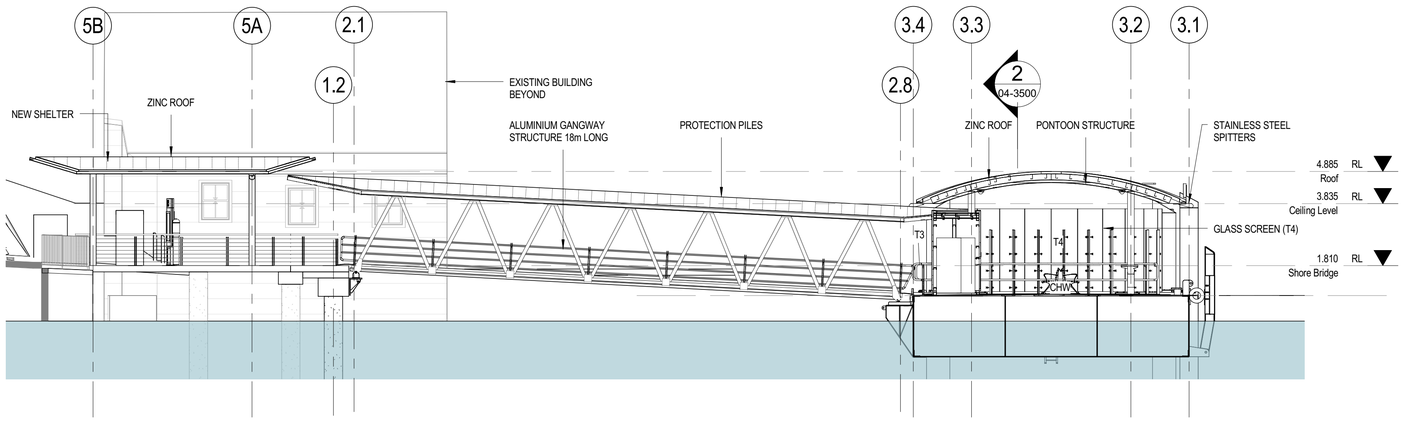
PROJECT
Ferry Wharves Upgrade Program 2 - Abbotsford Wharf

DRAWING
Elevations

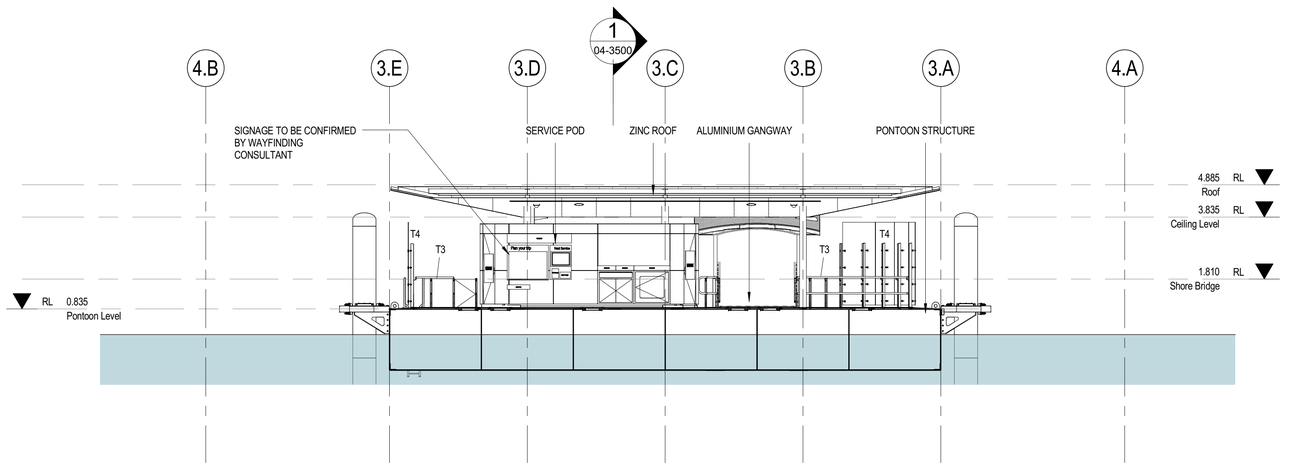
PROJECT No:	STATUS	A1 SCALE
14214	CDR	1 : 100
DRAWING No:		REV:
AR-04-3000		A

NOTE: SIGNAGE INDICATIVE.
TO BE CONFIRMED BY
WAYFINDING CONSULTANT

Legend - Keynote	
CHW	CHAIR, WAITING - REFER SCHEDULE
T3	BALUSTRADE TYPE 3 - REFER DETAILS
T4	BALUSTRADE TYPE 4 - REFER DETAILS



1 Long Section
04-2100 1 : 100



2 Pontoon Section
04-2100 1 : 100

10 0 10 20 30 40 50
SCALE 1:1 @ A1 mm

mail@conradgargett.com.au ABN 49 325 121 350
NOMINATED ARCHITECT: BRUCE WOLFE NSW Reg 6969
DO NOT SCALE DRAWING & VERIFY ALL DIMENSIONS AND LEVELS ON SITE

REV	DESCRIPTION	DATE	APPD
A	Issue for Construction	20.07.17	

CONRAD GARGETT | ANCHER MORTLOCK WOOLLEY

TRANSPORT AUTHORITY
NSW GOVERNMENT Transport Roads & Maritime Services

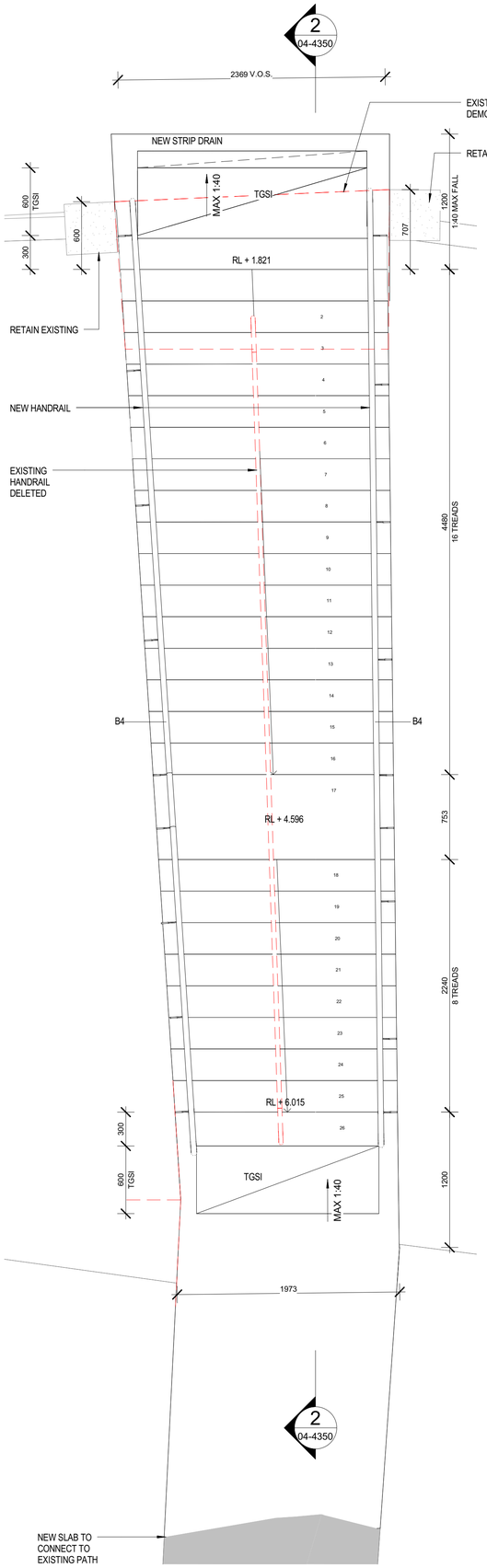
CLIENT
hansen yuncken

PRELIMINARY

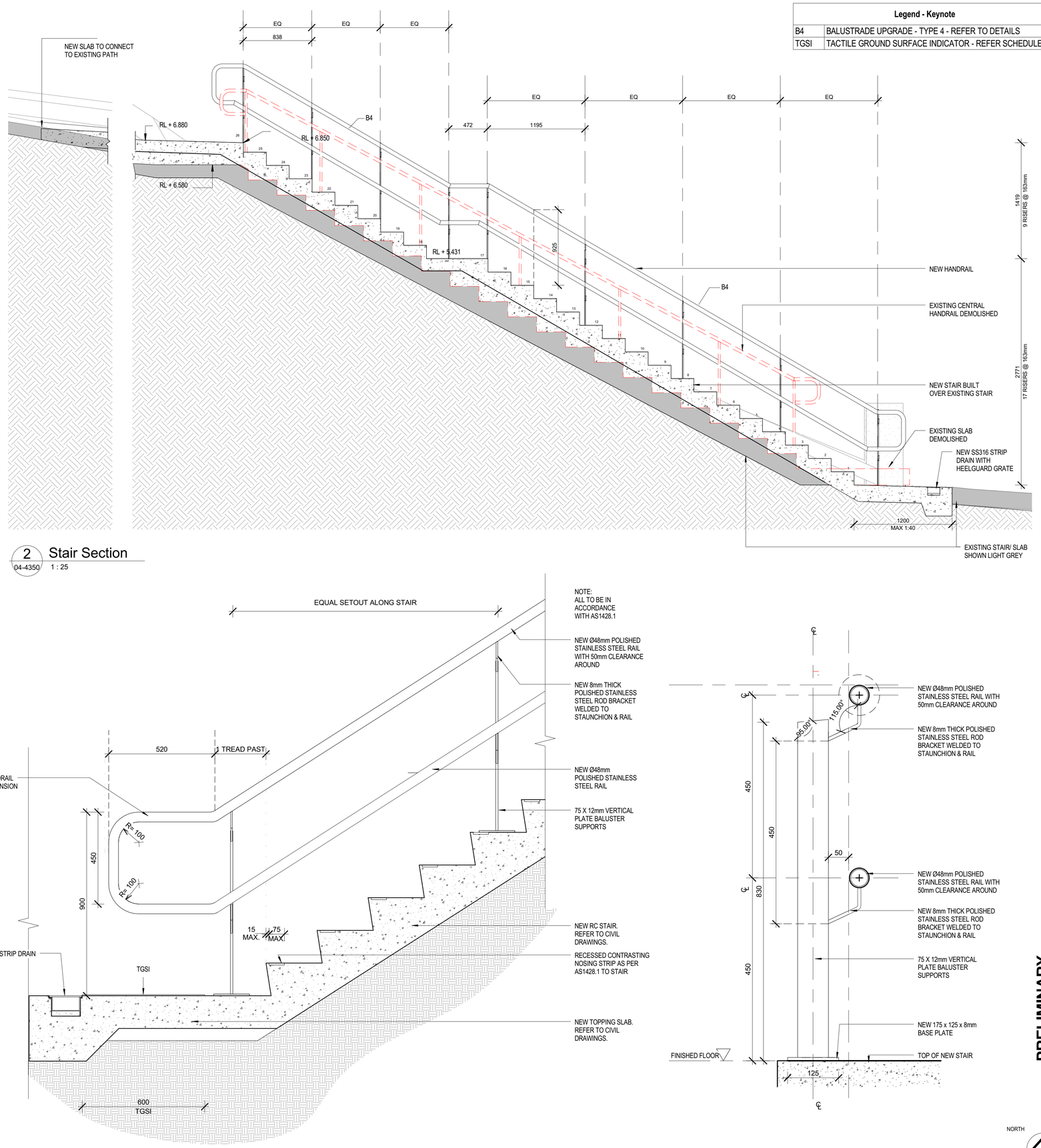
PROJECT
Ferry Wharves Upgrade Program 2 - Abbotsford Wharf

DRAWING
Sections

PROJECT No:	STATUS	A1 SCALE
14214	CDR	1 : 100
DRAWING No:		REV:
AR-04-3500		A



1 Stair Plan
04-1000 1 : 25



2 Stair Section
04-4350 1 : 25

3 New Stair Balustrade (B4) - Elevation
1 : 10

4 New Stair Balustrade (B4) - Detail
1 : 5

Legend - Keynote	
B4	BALUSTRADE UPGRADE - TYPE 4 - REFER TO DETAILS
TGSI	TACTILE GROUND SURFACE INDICATOR - REFER SCHEDULE

10 0 10 20 30 40 50
SCALE 1:1 @ A1 mm

mail@conradgargett.com.au ABN 49 325 121 350
NOMINATED ARCHITECT: BRUCE WOLFE NSW Reg 6969
DO NOT SCALE DRAWING & VERIFY ALL DIMENSIONS AND LEVELS ON SITE

REV	DESCRIPTION	DATE	APPD
A	Issue for Construction	20.07.17	

CONRAD GARGETT | ANCHER MORTLOCK WOOLLEY

TRANSPORT AUTHORITY
NSW GOVERNMENT Transport Roads & Maritime Services

CLIENT
hansen yuncken

PROJECT
Ferry Wharves Upgrade Program 2 - Abbotsford Wharf

DRAWING
Stair Details

PRELIMINARY

NORTH

PROJECT No:	STATUS	A1 SCALE
14214	CDR	As indicated
DRAWING No:		REV:
AR-04-4350		A

Appendix B

Consideration of clause 228(2) factors

Consideration of matters of national environmental significance

Clause 228(2) checklist

In addition to the requirements of the *Is an EIS required?* (DUAP 1995/1996) guideline and the *Marinas and Related Facilities EIS Guideline* (DUAP 1996) 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.

a. Any environmental impact on a community?

Impact	Level of impact
During construction of the proposal, the following impacts are anticipated: • Impact from construction related noise to surrounding receivers. • Impacts to traffic and transport due to temporary closure of the wharf.	High, short-term negative impact.
Operation of the wharf would have improved public transport facilities at Abbotsford.	Moderate, short-term negative impact.
Impacts would be minimised through implementing the safeguards and management measures identified in section 7.1 of the REF	Long-term, positive impact.

b. Any transformation of a locality?

Impact	Level of impact
The proposal would have a low to moderate impact to visual and landscape character. Impacts have been reduced through design of the wharf, including retention of the wharf in its heritage listed location.	Minor to moderate, long-term negative impact.

c. Any environmental impact on the ecosystems of the locality?

Impact	Level of impact
The assessment of aquatic ecology indicates there would be a minor impact to marine biodiversity during construction. This would be offset by hard-substratum habitat generated by the installation of piles. Further impact to aquatic ecology would be mitigated through implementing the safeguards and management measures identified in section 7.1 of the REF.	Moderate, short-term negative impact.

d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?

Impact	Level of impact
There would be temporary aesthetic impacts during construction of the proposal.	Moderate, short-term impact.
Landscape character and visual impacts have been assessed as low to moderate. Impacts have been reduced through design of the wharf, including retention of the wharf in its heritage listed location.	Minor to moderate, long-term impact.
Impacts to environmental quality and value have been assessed as low to moderate, and would be limited to short-term impacts during construction of the proposal. No long-term impacts to environmental quality and value are anticipated.	Minor to moderate, short-term impact.

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?

Impact	Level of impact
The existing wharf is a locally listed heritage item, as is Werrell Reserve and the Abbotsford Point Boatshed and sandstone kerbing, adjacent to the wharf.	
The proposal would alter the form and structure of the wharf, however the heritage listing predominantly relates to the location of the wharf, with previous modifications removing the heritage fabric.	Minor, short-term negative impact.
No listed Aboriginal sites would be impacted by the proposal.	No impact.

f. Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)?

Impact	Level of impact
The results of the biodiversity assessment in section 6.2 indicate there would be no impacts to any habitat of protected fauna as a result of the proposal.	No impact.

g. Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?

Impact	Level of impact
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.	No impact.

h. Any long-term effects on the environment?

Impact	Level of impact
The proposal would not result in any long-term negative effects on the environment.	No impact.
The proposal would result in improvements in user amenity for the wharf.	Long-term, positive impact.

i. Any degradation of the quality of the environment?

Impact	Level of impact
The proposal would result in localised sediment disturbance during piling activities, which would result in temporary impacts to water quality.	Minor, short-term negative impact.
There is potential for accidental spills / leaks of fuel, oil or other chemicals to impact water quality during construction.	Minor, short-term negative impact.
Impacts would be minor with implementation of the safeguards and management measures identified in section 7.1 of the REF.	

j. Any risk to the safety of the environment?

Impact	Level of impact
Construction related activities pose potential risks to the safety of the environment through spills / leaks of fuel, oil or other chemicals.	Minor, short-term negative impact.]
Impacts would be minor with implementation of the safeguards and management measures identified in section 7.1 of the REF.	

k. Any reduction in the range of beneficial uses of the environment?

Impact	Level of impact
The proposal would result in temporary closure of the wharf, setup of a maritime exclusion zone, and partial use of Werrell Reserve. This would impact on potential beneficial uses of the environment of these areas during construction.	High, short-term negative impact.

l. Any pollution of the environment?

Impact	Level of impact
Construction related activities may result in pollution of the environment through spills / leaks of fuel, oil or other chemicals.	Minor, short-term negative impact.
Impacts would be minor with implementation of the safeguards and management measures identified in section 7.1 of the REF.	

m. Any environmental problems associated with the disposal of waste?

Impact	Level of impact
All wastes generated by the proposal would be disposed of at an off-site facility which is licenced to receive such waste. There would be no significant environmental problems associated with waste disposal.	Minor, short-term negative impact.

n. Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?

Impact	Level of impact
All resources required by the proposal are readily available and are not likely to become in short supply.	No impact.

o. Any cumulative environmental effect with other existing or likely future activities?

Impact	Level of impact
Assessment of cumulative impacts for the proposal is provided in section 6.12. No significant cumulative impacts have been identified for the proposal. The proposal design includes an allowance for sea level rise.	No impact.

p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?

Impact	Level of impact
Consideration of coastal processes and coastal hazards is detailed in section 6.1. No impacts to these issues are anticipated for the proposal.	No impact.

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 the Environment.

a. Any impact on a World Heritage property?

Impact	Level of impact
There would be no impact on World Heritage property.	No impact.

b. Any impact on a National Heritage place?

Impact	Level of impact
There would be no impact on National Heritage place	No impact.

c. Any impact on a wetland of international importance?

Impact	Level of impact
There would be no impact on wetlands of international importance	No impact.

d. Any impact on a listed threatened species or ecological communities?

Impact	Level of impact
There would be no impact on listed threatened species or ecological communities	No impact.

e. Any impacts on listed migratory species?

Impact	Level of impact
There would be no impact on listed migratory species.	No impact.

f. Any impact on a Commonwealth marine area?

Impact	Level of impact
There would be no impact on Commonwealth marine area.	No impact.

g. Does the proposal involve a nuclear action (including uranium mining)?

Impact	Level of impact
The proposal does not involve a nuclear action.	No impact.

Additionally, any impact (direct or indirect) on Commonwealth land?

Impact	Level of impact
There would be no impact (direct or indirect) on Commonwealth land.	No impact.

Appendix C

Statutory consultation checklists and published community updates

ISEPP consultation

Council related infrastructure or services

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Stormwater	Are the works likely to have a *substantial* impact on the stormwater management services which are provided by council?	No		ISEPP cl.13(1)(a)
Traffic	Are the works likely to generate traffic to an extent that will *strain* the existing road system in a local government area?	No		ISEPP cl.13(1)(b)
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a *substantial* impact on the capacity of any part of the system?	No		ISEPP cl.13(1)(c)
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a *substantial* volume of water?	No		ISEPP cl.13(1)(d)
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a *minor or inconsequential* disruption to pedestrian or vehicular flow?	Yes	City of Canada Bay Council	ISEPP cl.13(1)(e)
Road & footpath excavation	Will the works involve more than *minor or inconsequential* excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	Yes	City of Canada Bay Council	ISEPP cl.13(1)(f)

Local heritage items

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the item/area are more than *minor or inconsequential*?	Yes	City of Canada Bay Council	ISEPP cl.14

Flood liable land

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a *minor* extent?	No		ISEPP cl. 15

Public authorities other than councils

Issue	Potential impact	Yes / No	If 'yes' consult with	ISEPP clause
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the *National Parks and Wildlife Act 1974*?	No		ISEPP cl.16(2)(a)
Marine parks	Are the works adjacent to a declared marine park under the *Marine Parks Act 1997*?	No		ISEPP cl.16(2)(b)
Aquatic reserves	Are the works adjacent to a declared aquatic reserve under the *Fisheries Management Act 1994*?	No		ISEPP cl.16(2)(c)
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998*?	Yes	Department of Planning and Environment	ISEPP cl.16(2)(d)
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No		ISEPP cl.16(2)(f)

Sydney Harbour SREP consultation

Issue	Potential impact	Yes / No	If 'yes' consult with	SREP clause
Provision of services	Do the works require the provision of services (including water, sewerage or stormwater systems)?	No		SREP cl.31(2)(a)(ii)
Advertising	Do the works include advertisements or advertising structures?	No		SREP cl.31(2)(a)(i) & Schedule 2
Aviation	Do the works include aviation facilities?	No		SREP cl.31(2)(a)(i) & Schedule 2
Boat launching	Do the works include boat launching facilities?	No		SREP cl.31(2)(a)(i) & Schedule 2
Boat lifts	Do the works include boat lifts?	No		SREP cl.31(2)(a)(i) & Schedule 2
Boat repair	Do the works include boat repair facilities?	No		SREP cl.31(2)(a)(i) & Schedule 2
Boat sheds	Do the works include a boat shed or sheds?	No		SREP cl.31(2)(a)(i) & Schedule 2
Charter and tourism boating facilities	Do the works include charter and tourism boating facilities?	No		SREP cl.31(2)(a)(i) & Schedule 2
Marinas	Do the works include a commercial or private marina?	No		SREP cl.31(2)(a)(i) & Schedule 2
Commercial port facilities	Do the works include commercial port facilities?	No		SREP cl.31(2)(a)(i) & Schedule 2
Commercial or retail use of land	Do the works include the commercial or retail use of land below or partly below mean high water mark?	No		SREP cl.31(2)(a)(i) & Schedule 2
Dredging	Do the works involve any dredging?	No		SREP cl.31(2)(a)(i) & Schedule 2
Flora and fauna enclosures	Do the works include any flora and/or fauna enclosures?	No		SREP cl.31(2)(a)(i) & Schedule 2

Issue	Potential impact	Yes / No	If 'yes' consult with	SREP clause
Houseboats	Do the works include a houseboat or houseboats?	No		SREP cl.31(2)(a)(i) & Schedule 2
Inclinators	Do the works include an inclinator?	No		SREP cl.31(2)(a)(i) & Schedule 2
Private landing facilities	Do the works include private landing facilities (including jetties, wharves and pontoons)?	No		SREP cl.31(2)(a)(i) & Schedule 2
Public boardwalks	Do the works include a public boardwalk?	No		SREP cl.31(2)(a)(i) & Schedule 2
Public water recreational facilities	Do the works include any public water recreational facilities?	Yes		SREP cl.31(2)(a)(i) & Schedule 2
Public water transport facilities	Do the works include public water transport facilities?	Yes		SREP cl.31(2)(a)(i) & Schedule 2
Reclamation works	Do the works require any reclamation?	No		SREP cl.31(2)(a)(i) & Schedule 2
Recreational or club facilities	Do the works include any recreational or club facilities?	No		SREP cl.31(2)(a)(i) & Schedule 2
Residential	Do the works include any residential use of land below or partly below mean high water mark?	No		SREP cl.31(2)(a)(i) & Schedule 2
Retaining walls	Do the works include retaining walls?	No		SREP cl.31(2)(a)(i) & Schedule 2
Sea walls	Do the works include sea walls?	No		SREP cl.31(2)(a)(i) & Schedule 2
Skids	Do the works include skids (ie an inclined ramp used for the manual launching of small craft but not including a slipway)?	No		SREP cl.31(2)(a)(i) & Schedule 2
Swimming enclosures	Do the works include a swimming enclosure?	No		SREP cl.31(2)(a)(i) & Schedule 2

Issue	Potential impact	Yes / No	If 'yes' consult with	SREP clause
Water based restaurants and entertainment facilities	Do the works include water-based restaurants and/or entertainment facilities? (ie a vessel or structure that floats on, or is fixed in, the waterway, that is used as a club or restaurant or for entertainment (on a commercial basis) and that has a direct structural connection between the foreshore and the waterway).	No		SREP cl.31(2)(a)(i) & Schedule 2
Stairs	Do the works include waterfront access stairs?	No		SREP cl.31(2)(a)(i) & Schedule 2
Demolition	Do the works include demolition – including demolition in relation to heritage items?	Yes	Foreshores and Waterways Development Advisory Committee	SREP cl.31(2)(a)(i) & Schedule 2

Organisation	Name and Position
Transport for NSW	
Planning and Programs Division	Adrian Garnero - Principal Manager, Product Development
Transport Services Division	Andrew Fell-Marston Arnab Roy - Transport Planner Daniel Cavallo - Principal Mgr, Integrated Service Planning John Broady - Bus Service Planner Michael Cain - Senior Project Manager Trish McClure - Principal Mgr, Interchanges & Transport Congestion
Policy and Regulations Division	Andrew Mogg - Principal Mgr, Waterways Access & Reform Gai Le Bransky - Principal Mgr, Accessible & Inclusive Transport
Customer Experience Division	Alex Nicholson - Manager, Customer Environments Sarah McKay - Senior Project Officer, Customer Environments
Operator	
Harbour City Ferries (HCF)	Leon Maltby - Service Transformation Project Manager Matt Lloyd – River & OH Customer Operations Manager

Organisation	Name and Position
Other stakeholders	
NSW Government	The Hon. Tanya Plibersek MP, Member for Sydney
City of Canada Bay Council	The Asset Manager and Transport Planners
Local Police	Leichhardt Local Area Command NSW Police Marine Area Command
Local Emergency Services	Volunteer Marine Rescue Council of NSW Marine Rescue NSW
Community Groups	BikeNorth Yellow Water Taxis H2O Taxis Sydney Water Taxis Aussie Water Taxis Brooklyn Water Taxis VIP Water Taxis Sydney Cove Water Taxis Majestic Water Taxis Rosman Ferries (NOAKES Group) Dragon Boat Club (Dragon Sports Association Inc.) Commercial Vessel Association Boat Owners Association of NSW NSW Maritime - Commercial Vessels Advisory Group NSW Maritime - Recreational Vessels Advisory Group Scuba Clubs Association of NSW Recreational Fishing Alliance of NSW Sydney Rowing Club NSW Rowing Association Seaplane Pilots Association Australia Yachting NSW Paddle NSW NSW Water Ski Association
Roads and Maritime	
Environment and Heritage	Nicholas Francesconi – Roads and Maritime Environment
Urban Design	Jenny Burge – Roads and Maritime Urban Design
Wharf Booking System	Ann Waddington - Principal Manager Product Services Ed Dicker
Maritime Boating Operations: Sydney Harbour	Dan Duemmer - Manager Operations Sydney Harbour
Maintenance	Steve Hazelwood – Roads and Maritime Maintenance

Abbotsford Wharf upgrade

Community update 1

APRIL 2015

The existing Abbotsford Wharf

As part of the Transport Access Program - an ongoing initiative to deliver modern, safe and accessible transport infrastructure - Transport for NSW has announced its latest proposal to deliver a new wharf at Rhodes and accessibility upgrades and interchange improvements at eight ferry wharves, including Birchgrove, Cockatoo Island, Chiswick, Abbotsford, Cabarita, Meadowbank, Rydalmere and Parramatta.

Transport Access Program

Transport for NSW is improving Sydney's ferry services for customers. New and upgraded wharves and interchanges are being delivered as part of the NSW Transport Access Program. This program has already delivered new facilities at Milsons Point, Neutral Bay, Rose Bay, Balmain (Thames Street) and Huntleys Point, Cremorne Point, Mosman Bay and Drummoyne. Wharf upgrades are currently in progress at Balmain East, Sydney Olympic Park, McMahons Point and Pyrmont.

Customer benefits

The Transport Access Program will provide the following benefits:

- Improved customer amenity such as better protection from the wind, rain and sun, seating and waiting areas
- Improved safety for customers
- Improved access for mobility impaired customers and customers with prams
- Quicker and more efficient boarding and disembarking
- Increased wharf capacity for future growth of ferry services
- More efficient interchanges with other modes of transport, both public and private, and better way finding signage.

Community feedback session

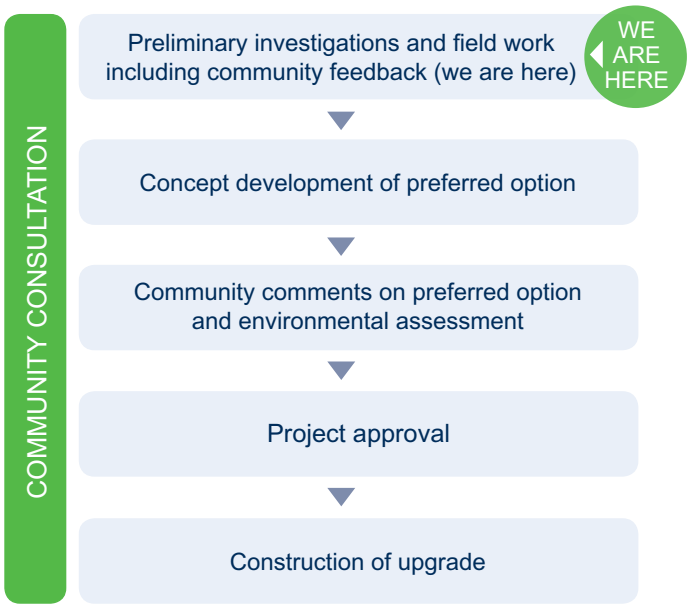
We would like to know more about how you travel to the ferry, when you use the service, your views about the current facilities and priorities for improvement. You are welcome to drop in any time between 5pm and 7pm at:

Venue: **2nd Abbotsford Sea Scouts hall at Werrell Reserve, near Abbotsford Wharf.**

Date: **Tuesday 5 May, 2015.**

Visit our website (details below) to find out more about the Wharf Upgrade Program and complete our online survey. The closing date for this initial round of general feedback is Tuesday 19 May, 2015. Further consultation will be held on the preferred design for the wharf and interchange upgrade later in the year.

What happens next?



Contact the team

More information is available on the Roads and Maritime Services website **rms.nsw.gov.au/wharfupgrades**. If you would like to contact the wharf upgrade project team, send written comments, or register your contact details with us for further updates you can:

Phone: **1800 770 973**
Email: **WharfUpgradeProgram@rms.nsw.gov.au**
Visit: **rms.nsw.gov.au/wharfupgrades**
Or mail comments to: **Wharf Upgrade Program, Locked Bag 928, North Sydney 2059**

Translating and Interpreting Service

If you need an interpreter, please call the Translating and Interpreting Service (TIS National) on **131 450** and ask them to telephone Roads and Maritime Services on 1800 770 973.

Arabic
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Greek
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Vietnamese
Nếu cần thông ngôn viên, xin quý vị gọi cho Dịch Vụ Thông Phiên Dịch (TIS Toàn Quốc) qua số **131 450** và nhờ họ gọi cho Roads and Maritime Services qua số 1800 770 973.

RMS 15.146

NSW GOVERNMENT | Transport for NSW

Abbotsford Wharf upgrade

An artist's impression of the proposed new Abbotsford Wharf viewed from the water

COMMUNITY UPDATE 2 MAY 2017

The NSW Government is upgrading Abbotsford Wharf as part of the Transport Access Program. Planning for the new wharf is currently underway and as part of the planning process we would like to hear your feedback on the proposed concept design.

BACKGROUND

Transport for NSW is improving Sydney's ferry services for customers. New and upgraded wharves are being delivered as part of the NSW Government's Transport Access Program. This program has most recently delivered upgraded facilities at Cremorne Point, Mosman Bay, Balmain East, Pyrmont, Meadowbank and McMahons Point, and work to upgrade Chiswick Wharf began in February.

THE NEW ABBOTSFORD WHARF

The upgraded wharf is designed to provide customers with an improved public transport experience.

The new wharf would incorporate a new floating pontoon connected to a fixed entry bridge by an aluminium gangway. The pontoon would have a curved roof, new seating and glass weather protection panels. The gangway and entry bridge would be uncovered.

Proposed landside upgrades would include new disabled parking, Kiss and Ride parking and bicycle racks. The existing stairs leading from Werrell Reserve to the wharf would be upgraded as part of the work to improve access to the wharf.

The upgrade would provide:

- protection from the wind, rain and sun
- improved seating and waiting areas
- improved access for mobility impaired customers and customers with prams
- quicker and more efficient ferry boarding and disembarking
- effective wayfinding signage and lighting.

Consultation to hear community and stakeholder feedback about the wharf upgrade was carried out in April and May 2015. The concept design for the wharf has been developed taking in consideration feedback and the local operational and environmental conditions. We look forward to hearing your feedback on the proposed concept designs by Tuesday 6 June.

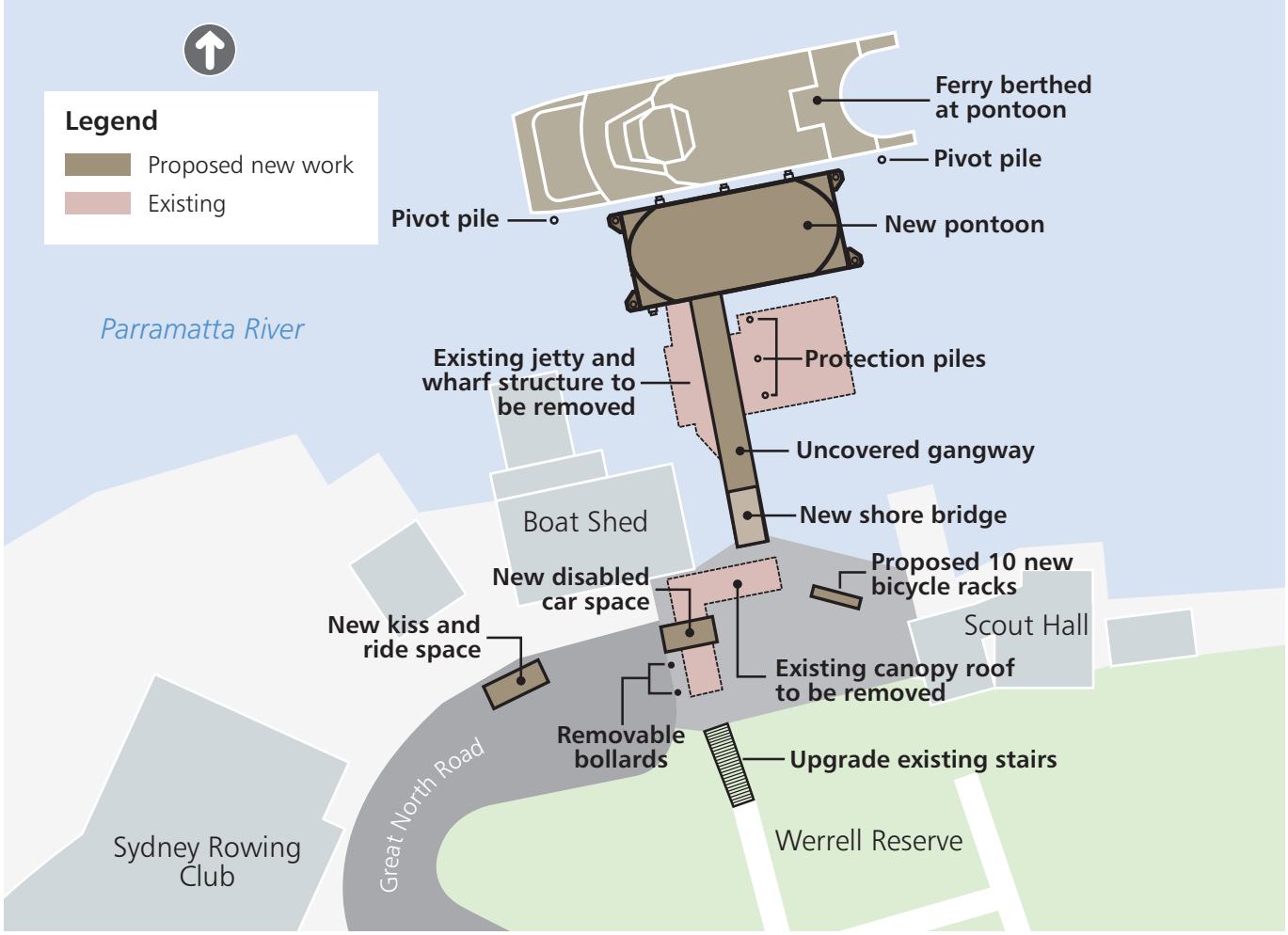
WHAT TO EXPECT DURING THE UPGRADE

The timing for work to upgrade the wharf will be advised when the planning process and design development is complete. Construction would take about five months, weather and maritime conditions permitting.

As planning progresses construction details for the proposed upgrade would be considered in the Review of Environmental Factors, which would be put on public display for comment before start of work. It is expected that:

- Abbotsford Wharf would be closed during the upgrade and alternative transport arrangements will be confirmed as the project progresses
- some night work would be required when the water is at its calmest
- a temporary construction compound would be established on land
- construction workers and equipment would usually be transported to and from the site by water.

PLAN OF PROPOSED NEW ABBOTSFORD WHARF



The existing Abbotsford wharf bridge

The existing stairs leading down to the wharf will be upgraded

The existing wharf viewed from the water

NEXT STEPS

Feedback from consultation on the proposed concept design will be included in the Review of Environmental Factors. This document will be publicly displayed for comment before start of work is finalised. Construction timing and alternative transport arrangements will be confirmed as the project progresses.

Concept design developed taking into consideration, future ferry services, improved accessibility and local operational and environmental conditions

↓

Consultation on the proposed concept design — **We are here**

↓

Feedback received during consultation is considered in the preparation of final design and the Review of Environmental Factors, which considers and assesses the potential environmental impacts associated with the wharf upgrade

↓

The Review of Environmental Factors is put on public display for comment

↓

Any submissions received are considered and included in a submissions report

↓

On determination of the Review of Environmental Factors Submissions Report planning for construction will start

↓

Timing for the start of work will be advised when the planning process is complete and the Review of Environment Factors is finalised

COMMUNITY INFORMATION SESSION

We invite you to come along to a community information and feedback session at the Sydney Rowing Club Wharf Side Room, 613 Great North Road, Abbotsford on Thursday 25 May 2017. Members of the project team will be available to provide information about the project. You are welcome to drop in any time between 5pm and 7pm at:

Venue: **Sydney Rowing Club**
Wharf Side Room
613 Great North Road
Abbotsford

Date: **Thursday 25 May 2017**

CONTACT THE TEAM

If you would like further information about the Abbotsford Wharf upgrade you can

Phone: **1800 770 973**

Email: **wharfupgradeprogram @rms.nsw.gov.au**

Visit the Roads and Maritime Services website: **rms.nsw.gov.au/wharfupgrades**

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ISO CERTIFICATION · CO2 MANUFACTURED CARBON NEUTRAL · FOREST MANAGEMENT · ECO BLEACHING PROCESS · AUSTRALIAN MADE · RECYCLED CONTENT

May 2017
RMS 17.211

Appendix D

Aquatic ecology assessment and terrestrial ecological database searches

Abbotsford Wharf Upgrade

Aquatic Ecology Assessment

Prepared for
Hansen Yuncken Pty Ltd

25 August 2017

DOCUMENT TRACKING

Item	Detail
Project Name	Abbotsford Wharf Upgrade - Aquatic Ecology Assessment
Project Number	15WOL-1718
Project Manager	Ian Dixon 02 4201 2208 Suite 204, Level 2, 62 Moore Street, Austinmer NSW 2515
Prepared by	Ian Dixon
Reviewed by	Miles Yeates
Approved by	Peter Hancock
Status	FINAL
Version Control	1 – Draft, 30 June 2016 2 – Draft, 17 July 2017. Addresses reviewer comments. 3 – Draft, 8 August 2017. Added shelter to gangway. Updated Table 1. Minor editorial changes. 4 – Final, 25 August 2017. Revised quantity of proposed piles, landside design and impact calculations.
Last saved on	25 August 2017
Cover photo	Abbotsford Wharf. Photo Ian Dixon, May 2017

This report should be cited as 'Eco Logical Australia 2017. *Abbotsford Wharf Upgrade - Aquatic Ecology Assessment*. Prepared for Hansen Yuncken.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Hansen Yuncken and WSP.

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Abbreviations

Abbreviation	Description
BC Act	NSW *Biodiversity and Conservation Act 2016*
DDA	Disability Discrimination Act
DPI	NSW Department of Primary Industries
ELA	Eco Logical Australia Pty Ltd
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
KFH	Key fish habitat
TSC Act	NSW *Threatened Species Conservation Act 1995*

Executive summary

The New South Wales (NSW) Government has proposed the replacement of Abbotsford Wharf to improve passenger access and amenity, and accommodate expected increases in demand. NSW Roads and Maritime Services (Roads and Maritime) has engaged Hansen Yuncken Pty Ltd to prepare detailed construction design and an associated Review of Environmental Factors (REF). Eco Logical Australia (ELA) Pty Ltd has prepared this Aquatic Ecology Assessment as a technical appendix to the REF.

The aim of this aquatic assessment is to understand the biota and habitat occurring near the proposed work. With this understanding we determine if any significant impact would occur on threatened species, communities or populations due to the proposed development, as defined in section 5A of the NSW *Environmental Planning and Assessment Act 1979*; and if a permit to *Harm Marine Vegetation* is required under s205 of the NSW *Fisheries Management Act 1994* (FM Act).

The proposed wharf upgrade (the proposal) would require:

- Removal of the existing wharf, including landside canopy
- Retention of about three metres of existing jetty
- An 18 metre long by three metre covered aluminium gangway extending north west from retained jetty section
- An 18 metre long by nine metre wide pile-founded floating covered and glazed steel pontoon
- Two new pivot piles to help with berthing
- A covered entry portal, of about six metres by three metres.
- Upgrade of the existing staircase and supporting hand rails
- New kiss-and-ride parking zone

A desktop search using online databases was used to determine the likely threatened species, communities and populations present in Sydney Harbour, its major tidal tributaries plus a 10 km buffer from shore. These were considered further for the region surrounding the wharf. An underwater survey, using snorkelling and boat-mounted video camera drops/tows was completed within at least 20 m of the proposed work.

The proposal would directly and indirectly impact a small area of ‘subtidal sand, rubble and macroalgae’ and ‘subtidal soft silty-sand sediment, unvegetated with moderate infauna cover’, classed as type 2 and type 3 key fish habitat in DPI Fisheries’ Policy and Guidelines for Fish Habitat Conservation and Management (2013 update). Direct impact would be from the installation of piles. Potential indirect impact would be shading from the proposed pontoon and gangway. No marine vegetation (mangroves, saltmarsh, seagrass or macroalgae) would be directly or indirectly harmed. No bank excavation or other dredging or reclamation is required. Therefore, a permit under Part 7 of the FM Act is **NOT** required. Furthermore, there is **NOT** likely to be significant impact on threatened species, populations and ecological communities or their habitat, as there are no threatened species or communities dependent on the site.

The maximum loss of 280 m^2 of type 2 and type 3 key fish habitat would be offset by 291 m^2 of hard substrate on the newly installed piles and pontoon. These would become type 3 habitat over time, as they become encrusted with sessile invertebrates and plants, meeting the Fisheries Policy of ‘no net loss’ of key fish habitat, but short of 2:1 habitat compensation if offsets are required.

Recommendations to mitigate further impact to nearby habitat are outlined in this report, including implementation of Construction Environmental Management Plan to address pollution, contamination and unnecessary disturbance during construction. Other measures include establishing no-go zones near macroalgae and mooring controls. No sensitive fauna (seahorses) are expected to occur.

1 Introduction

The New South Wales (NSW) Government is progressively upgrading the ferry wharves across Sydney to improve ferry services for customers. The upgraded wharves are being delivered as part of the NSW Government's Transport Access Program - an initiative to deliver modern, safe and accessible transport infrastructure. The proposed upgrade of Abbotsford Wharf aims to improve passenger access and amenity and allow ferry services to meet expected future demand.

NSW Roads and Maritime Services (Roads and Maritime) has engaged Hansen Yuncken Pty Ltd to prepare detailed construction design and an associated review of environmental factors (REF, prepared by WSP). Eco Logical Australia (ELA) Pty Ltd has prepared this Aquatic Ecology Assessment as a technical appendix to the REF.

The aim of the aquatic assessment is to gain an understanding of the biota and habitat occurring near the proposed work. With this understanding, we determine if any significant impact would occur to threatened species, communities or populations from the proposed development as defined in section 5A of the NSW *Environmental Planning and Assessment Act 1979*; and if a permit to *Harm Marine Vegetation* is required under s205 of the NSW *Fisheries Management Act 1994* (FM Act). The following tasks were undertaken to address these aims:

- A desktop review of existing literature and site data to confirm the presence of known and likely species and habitats in a given study area
- Aquatic survey during optimum conditions (calm seas with high water clarity)
- Mapping, photography and the identification of aquatic flora and key fish habitat (eg seagrasses, mangroves, saltmarsh, macroalgae beds)
- Assessment of the density and condition of aquatic flora and key fish habitat, including verification of any threatened or protected species, populations or ecological communities, pest species or presence of 'critical habitat' that may occur locally in the marine environment
- Provide recommendations to mitigate impact and assist management of construction and operational outcomes.

This assessment acts as a standalone report for review by the NSW Department of Primary Industries (DPI) Fisheries, giving consideration to their Policy and Guidelines for Fish Habitat Conservation and Management (2013 update, Fairfull 2013).

1.1 The Abbotsford Wharf proposal

The upgrade of Abbotsford Wharf (the proposal) would replace the existing wharf structure with the following features (**Figure 1** and **Figure 2**):

- Removal of the existing wharf, including landside canopy
- Retention of about three metres of existing jetty
- An 18 metre long by three metre covered aluminium gangway extending north west from retained jetty section, supported by two new piles
- An 18 metre long by nine metre wide pile-founded floating covered and glazed steel pontoon
- Two new pivot piles to help with berthing
- A covered entry portal, of about six metres by three metres
- Upgrade of the existing staircase and supporting hand rails
- New kiss-and-ride parking zone

Construction is expected to start in spring 2017 and take about four to five months to complete. Additional construction detail is provided in **Section 5**.

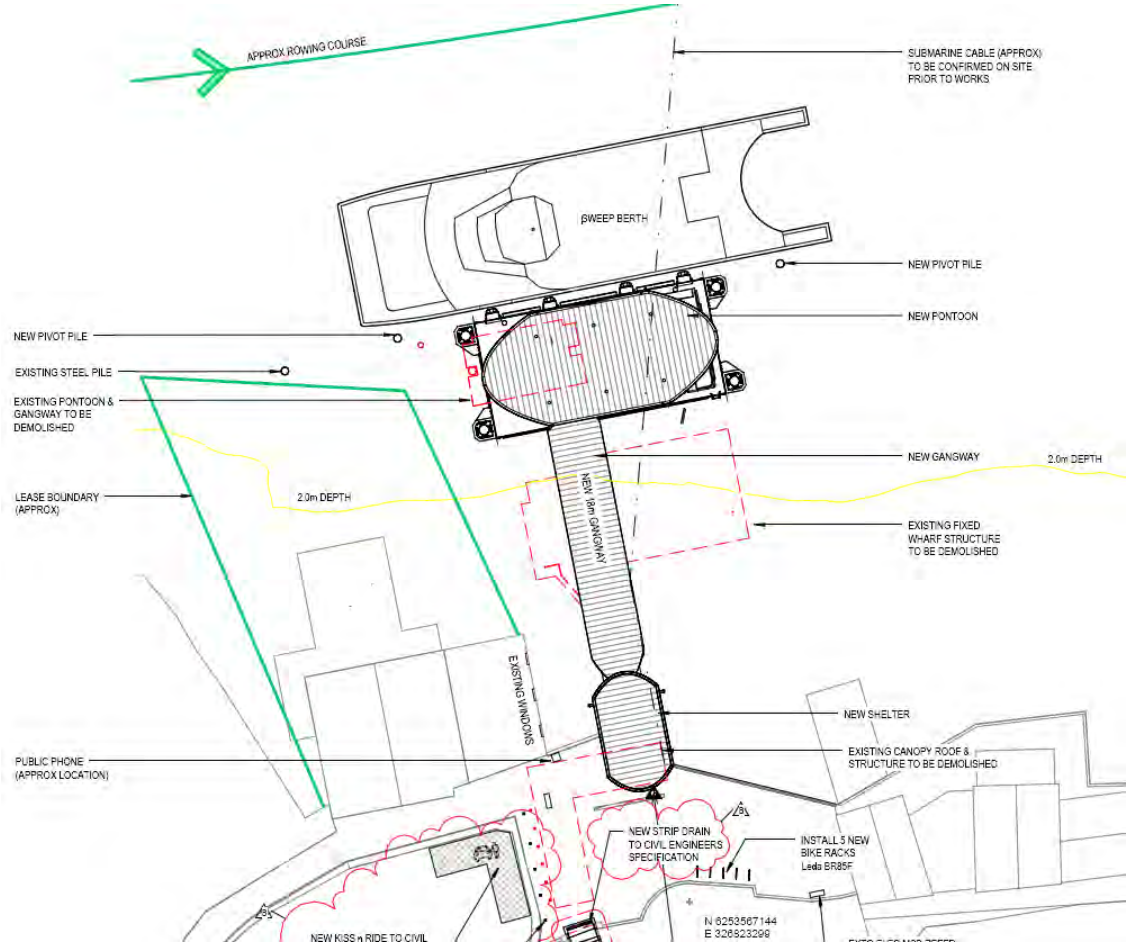

Figure 1: Abbotsford Wharf concept design with landside work (Drawing AR-04-1000, Rev B)

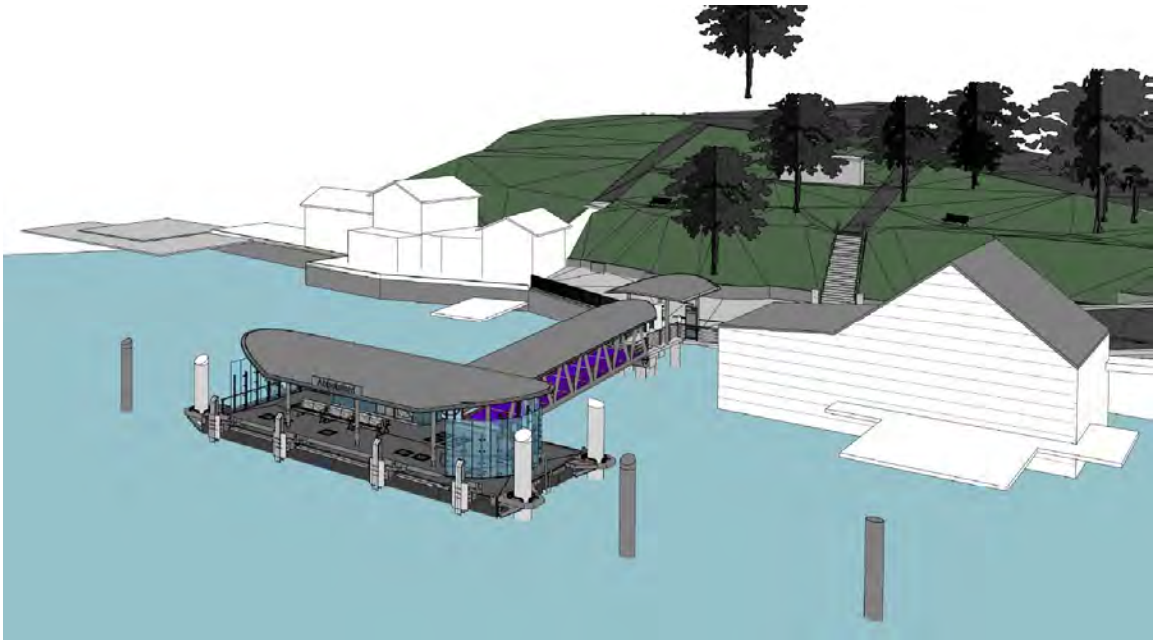

Figure 2: 3D representation for Abbotsford Wharf

2 Legislative context

2.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the EPBC Act, the Commonwealth Environment Minister needs to approve any development that is likely to have a significant impact on Matters of National Environmental Significance (MNES). Should such an impact, as defined in the EPBC Act Policy Statement 1.1 – Significant Impact Guidelines (DEWHA 2009), be likely, the preparation and submission of a Referral is required. MNES relevant to this study includes threatened ecological communities, flora and fauna species and migratory species that are listed under the Act. The proposed work would not cause a significant impact.

2.2 NSW Environmental Planning and Assessment Act 1979 (EP&A Act)

All development in NSW is assessed in accordance with the provisions of the EP&A Act and the EP&A Regulation. The EP&A Act provides a system for environmental planning and assessment, including approvals and environmental impact assessment requirements for proposed developments. Implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils.

2.3 NSW Threatened Species Conservation Act 1995 (TSC Act) and NSW Biodiversity Conservation Act 2016 (BC Act)

This report has been prepared during the transition of the TSC Act to the BC Act (active 25th Aug 2017). Under the TSC Act, an assessment of significance (7-part test) that addresses the requirements of Section 5A of the EP&A Act must be completed to determine the significance of impacts. Under the BC Act, an assessment of significance (5-part test) is required to address Section 7.3 of the BC Act.

There are unlikely to be any threatened species, populations or communities in the study area, therefore, no impact is expected. The proposal does not trigger the need for further tests of significance under the TSC Act or BC Act.

2.4 NSW Fisheries Management Act 1994

The FM Act is the principle piece of legislation protecting aquatic habitat in NSW. The act aims to conserve fish stocks, key fish habitat, aquatic vegetation, and threatened species, populations and communities. Threatened aquatic species, populations and communities are listed under Schedules 4, 4A and 5 of the FM Act, while key threatening processes are listed under Schedule 6. As a public authority, Roads and Maritime must give the Minister written notice of the proposed work under Section 199 if they occur in areas mapped as key fish habitat (KFH) and have:

- a direct or indirect impact to marine vegetation
- require dredging or excavation of the bed or bank
- block fish passage
- involve land reclamation.

The area around Abbotsford Wharf is mapped as KFH, but the development would not require dredging, block fish passage, or involve land reclamation. There would be no impact to marine vegetation, so a permit to *Harm Marine Vegetation* under Part 7 of the FM Act is not required.

2.5 Water Management Act 2000

The *Water Management Act 2000* (WM Act) aims to provide for the sustainable and integrated management of water sources for NSW. The Act requires developments on waterfront land to be ecologically sustainable, and recognises the benefits of aquatic ecosystems to agriculture, fisheries, and recreation.

Approvals under Section 91 are required for controlled activities on waterfront land. Under the WM Act, a controlled activity means:

(a) the erection of a building or the carrying out of a work (within the meaning of the Environmental Planning and Assessment Act 1979),
(b) the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise,
(c) the deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise, or
(d) the carrying out of any other activity that affects the quantity or flow of water in a water source.

Section 91E(1) of the WM Act identifies that it is an offence to carry out a controlled activity in, on or under waterfront land without gaining a controlled activity approval. However, under Clause 38 of the *Water Management (General) Regulation 2011* (WM Reg) public authorities are exempt from Section 91E(1) of the WM Act, and therefore do not require any approvals for controlled activities on waterfront land.

2.6 Sydney Regional Environmental Plan (SREP, Sydney Harbour Catchment) 2005

The proposal is located within the Sydney Harbour Catchment and is subject to the SREP (Sydney Harbour Catchment) 2005. The SREP lists matters that Roads and Maritime is to consider before carrying out any activity determined under Part 5 of the EP&A Act. Relevant Clauses to this aquatic ecology assessment are:

- Clause 21: biodiversity, ecology and environment protection
- Clauses 61–63: wetland protection.

3 Methods

3.1 Desktop assessment

Online database searches were used to confirm the presence of recorded species in the region. This was then used to infer what is likely to be present in the study area. The desktop search covered Port Jackson (Sydney Harbour including tidal areas of Parramatta River and Lane Cove River) plus a 10 km buffer. The desktop search grid is about 50 x 30 km using the coordinates:

- Latitude: -33.6974792526866, Longitude: 150.915584274089
- Latitude: -33.6974792526866, Longitude: 151.474105513707
- Latitude: -33.9762150862402, Longitude: 151.474105513707
- Latitude: -33.9762150862402, Longitude: 150.915584274089

Only species known to use estuarine/marine water or intertidal foreshores were considered in this aquatic assessment. Databases accessed include:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) – Protected Matters Search Tool
- NSW *Threatened Species Conservation Act 1995* (TSC Act) – Threatened Species Search Tool (BioNet)
- NSW *Fisheries Management Act 1994* – Listed protected and threatened species and populations, including species profiles, 'Primefact' publications and expected distribution maps (Riches et al 2016)
- Online Zoological Collections of Australian Museums (OZCAM) – individual species searches to determine likelihood of occurrence of threatened species.

3.2 Field survey

The site was visited between 11 am and 4 pm on 30th May 2017 by three ELA ecologists, including one senior aquatic ecologist. The survey area covered at least twenty meters from the edge of proposed work, plus farther areas where necessary to validate habitat extent. Weather conditions were calm with minimal swell. Underwater visibility was about two metres. The survey used a combination of methods: snorkelling in shallow water less than three metres deep; and boat-mounted video camera drops/tows in water greater than three meters deep.

Maximum depth in the survey area was about eight metres. A triple camera setup angled down, front and left, allowed for live streaming of habitat features to an on-board monitor (colour/infrared). Video was recorded to allow post-field examination of high definition footage. GPS mapping of transects ensured all habitat types were adequately surveyed. Habitat types were mapped in the field using a Getac Windows tablet running ArcPad. Georeferenced high definition footage was later reviewed to check habitat extent and condition. Aquatic flora and key fish habitat mapped in the field were merged into a final map using ArcMap Version 10.2.

4 Aquatic habitats and ecology

4.1 Previous aquatic habitat mapping

Map 6 of the 'Sydney Harbour - Foreshores and Waterways Area Development Control Plan 2005: Ecological Communities and Landscape Characters', identifies the study area as 'Mixed Rocky Intertidal and Rock Platform', with riparian lands mapped as 'Urban Development with Scattered Trees and Grassland' (**Figure 3**).

Sheet 3 of the 'Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005: Wetlands Protection Area', identifies the site as a 'Wetlands Protection Area' (**Figure 4**). This triggers Clause 61 of the SREP (Sydney Harbour Catchment) 2005, and the proposal is to address five objectives that protect and improve wetland habitat.

The State-wide mapping of estuarine macrophytes (mangroves, saltmarsh and seagrass) by DPI Fisheries identifies the nearest patch of seagrass (*Zostera/Halophila*) as being about 150 m south-west of the wharf, and the nearest mangroves 140 m east (Creese et al 2009, **Figure 5**). There are no local records of the threatened *Posidonia* population.

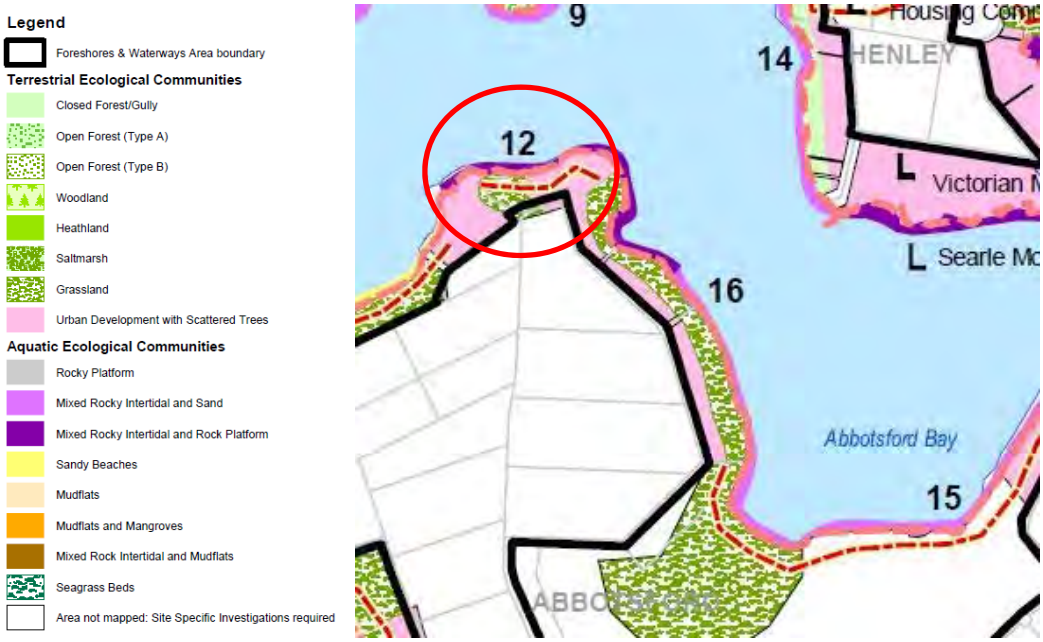

Figure 3: Sydney Harbour - Foreshores and Waterways Area Development Control Plan: Ecological Communities and Landscape Characters (map sheet 6)

Source: http://www.planning.nsw.gov.au/Policy-and-Legislation/Environment-and-Heritage/Sharing-Sydney-Harbour

Figure 4: Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005: Wetlands Protection Area (map sheet 3)

Source: http://www.planning.nsw.gov.au/Policy-and-Legislation/Environment-and-Heritage/Sharing-Sydney-Harbour

Figure 5: DPI Fisheries mapping of estuarine macrophytes (Creese et al 2009)

Source: http://www.dpi.nsw.gov.au/content/research/areas/aquatic-ecosystems/estuarine-habitats-maps. Aerial image SIX Maps.

4.2 Aquatic habitats at Abbotsford Wharf

Aquatic habitat in the study area has been modified by land reclamation, a large stone seawall, the existing wharf substructure and pile, a submarine cable and disturbance by regular boat traffic. Six distinct zones were mapped during the field survey (**Figure 6**):

- *Seawall, piles and other structures* (**Figure 7**). Foreshore habitat is highly modified by a vertical sandstone seawall and concrete pipe culvert, which prevents establishment of saltmarsh and mangroves. The entire wall is exposed at low tide and is generally bare of sessile fauna and encrusting growth, except a small number of *Saccostrea commercialis* (Sydney Rock Oyster) and various barnacles along the eastern end. Other sandstone structures occur around the boat shed to the west, with patches of dense oyster growth on footings and walls.

  The existing wharf is supported by numerous hard-habitat concrete piles beneath the bridge, elevated wharf and pontoon, plus additional berthing piles. The intertidal portions of these structures are partially bare, with patches of dense *Chamaesipho tasmanica* (Honeycomb Barnacle) and scattered oysters. The subtidal portion of these piles supports a denser cover of aquatic biota, especially bryozoans, and other encrusting organisms. The pontoon also provides a hard surface habitat along its edges, underside and ladder, with encrusting growth dominated by bryozoans, turfing algae and *Ulva lactuca* (Sea Lettuce).

  Other hard habitat occurs around boat launching/mooring facilities on adjacent properties.

- *Intertidal bedrock* (**Figure 8**). At the base of the seawall a bedrock platform extends a few meters into the water. The rock does not support brown or red macroalgae, but has a fine cover in parts of green filamentous algae. Like the adjacent seawall, sessile marine fauna is uncommon. Other hard debris is scattered nearby (concrete mooring, sandstone blocks).

- *Intertidal bare sand with minimal infauna* (**Figure 8**). A small unvegetated beach occurs either side of the concrete bridge. No infauna burrows were observed. The seawall prevents dry sand dunes and wrack deposition along the beach, with any floating material rebounded into the subtidal zone.

- *Subtidal bare sand* (**Figure 8**). Coarse sediments and shell fragments occupy the shallowest subtidal area. No seagrass or creeping alga occur. Bioturbation (reworking of marine sediment) from infauna is evident west of the wharf bridge where shell fragments are sparse.

- *Subtidal sand, rubble and macroalgae* (**Figure 9**). At depths 0–0.75 m the subtidal sand becomes dominated by larger pebble-cobble-bounder sized rubble. This provides hard habitat for brown macroalgae. A moderate cover of short *Phyllospora comosa* (crayweed) and *Ecklonia radiata* (kelp) occurs in this zone. The proposal would not negatively impact this habitat.

- *Subtidal bare soft silty-sand* (**Figure 10**). In deeper water, around 1–6 m depth, benthic habitat is homogenous surrounding the wharf and pontoon. The silty-sand substrate is unvegetated. A layer of biofilm covers the sediment in most areas. Infauna abundance is moderate, evident from patchy bivalves and bioturbation (reworking of marine sediment). The noxious marine alga *Caulerpa taxifolia* was not observed in the study area.

DPI Fisheries identify three types of key fish habitat (KFH) in their Policy and Guidelines for Fish Habitat Conservation and Management (Fairfull 2013, **Appendix B**). KFH types are mapped in **Figure 6**, comprising:

- Type 1 (highly sensitive aquatic habitat) – none present within the study area
- Type 2 (moderately sensitive key fish habitat) – habitat is represented on site as 'subtidal sand with rock rubble with scattered macroalgae'
- Type 3 (minimally sensitive key fish habitat) – majority of site and all of impact area is represented by unvegetated intertidal and subtidal substrate.

No threatened species, populations or communities were observed in the study area, or are expected to use the site (see **Section 4.3** and likelihood of occurrence assessment in **Appendix A**). Seahorses and their relatives (syngnathiformes) were not observed, and are unlikely to occur this far up the Parramatta River estuary.

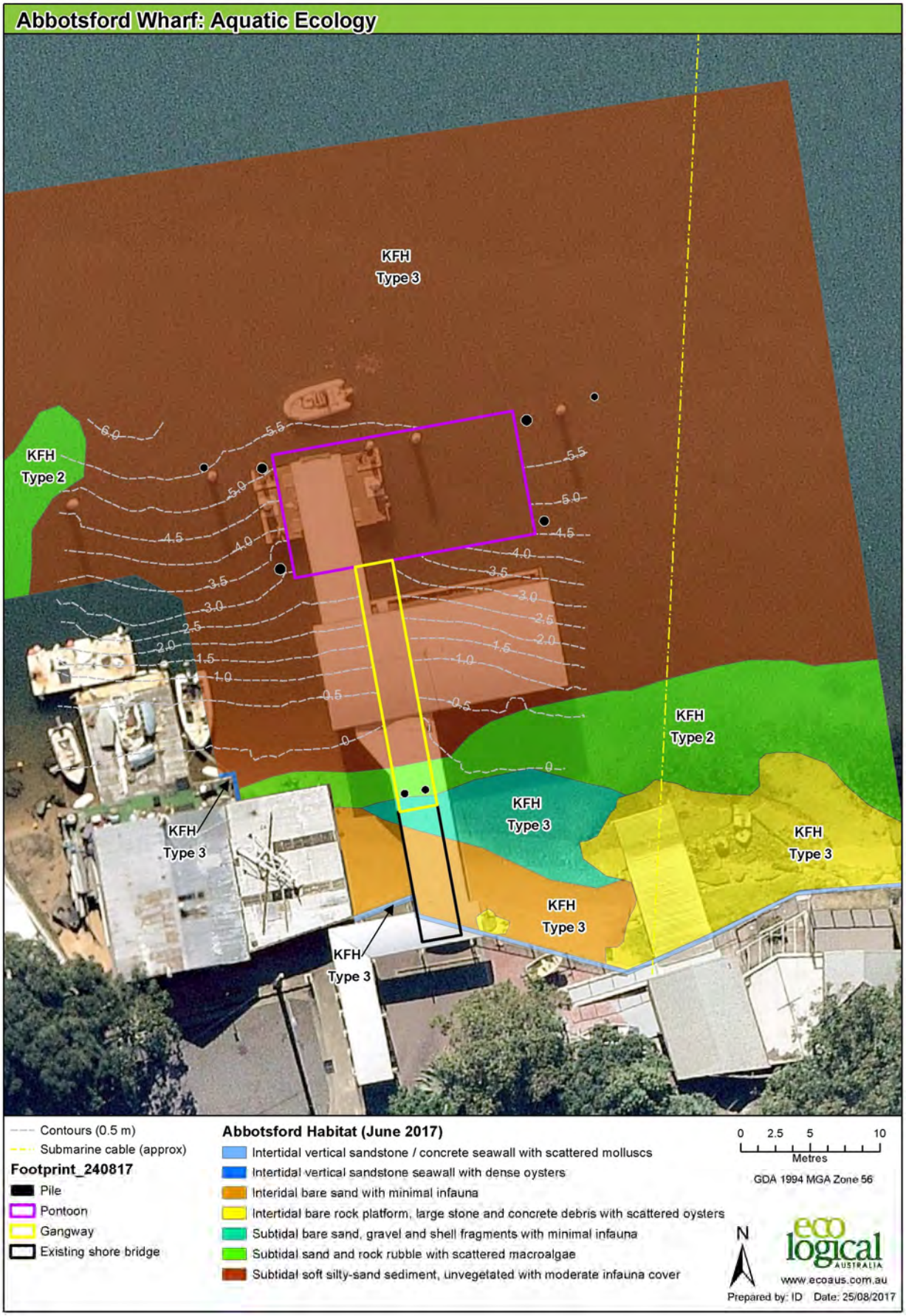

Figure 6: Field survey of key fish habitat (KFH)

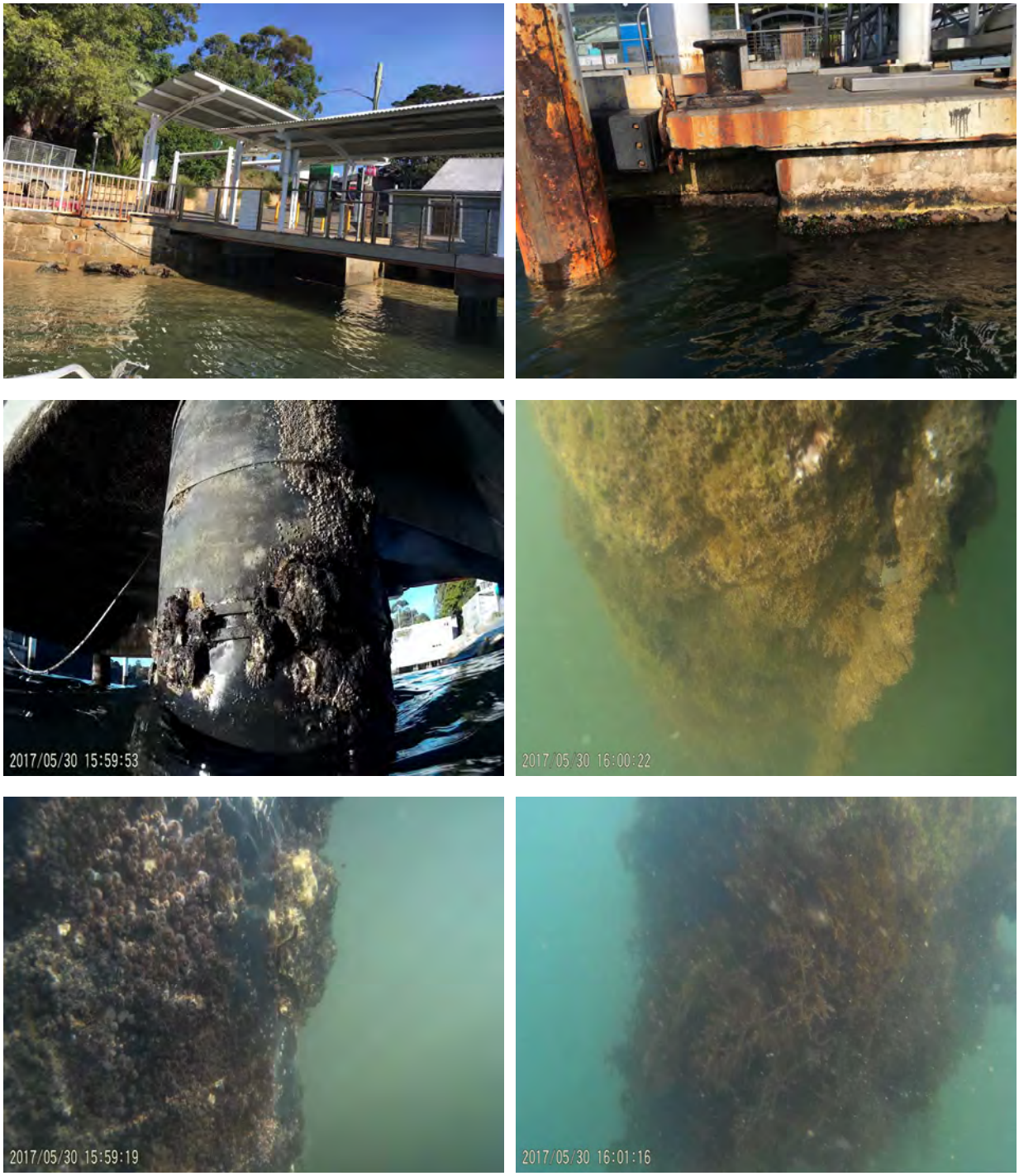

Figure 7: Seawall, piles and other structures

Figure 8: Bedrock and bare sand with minimal infauna

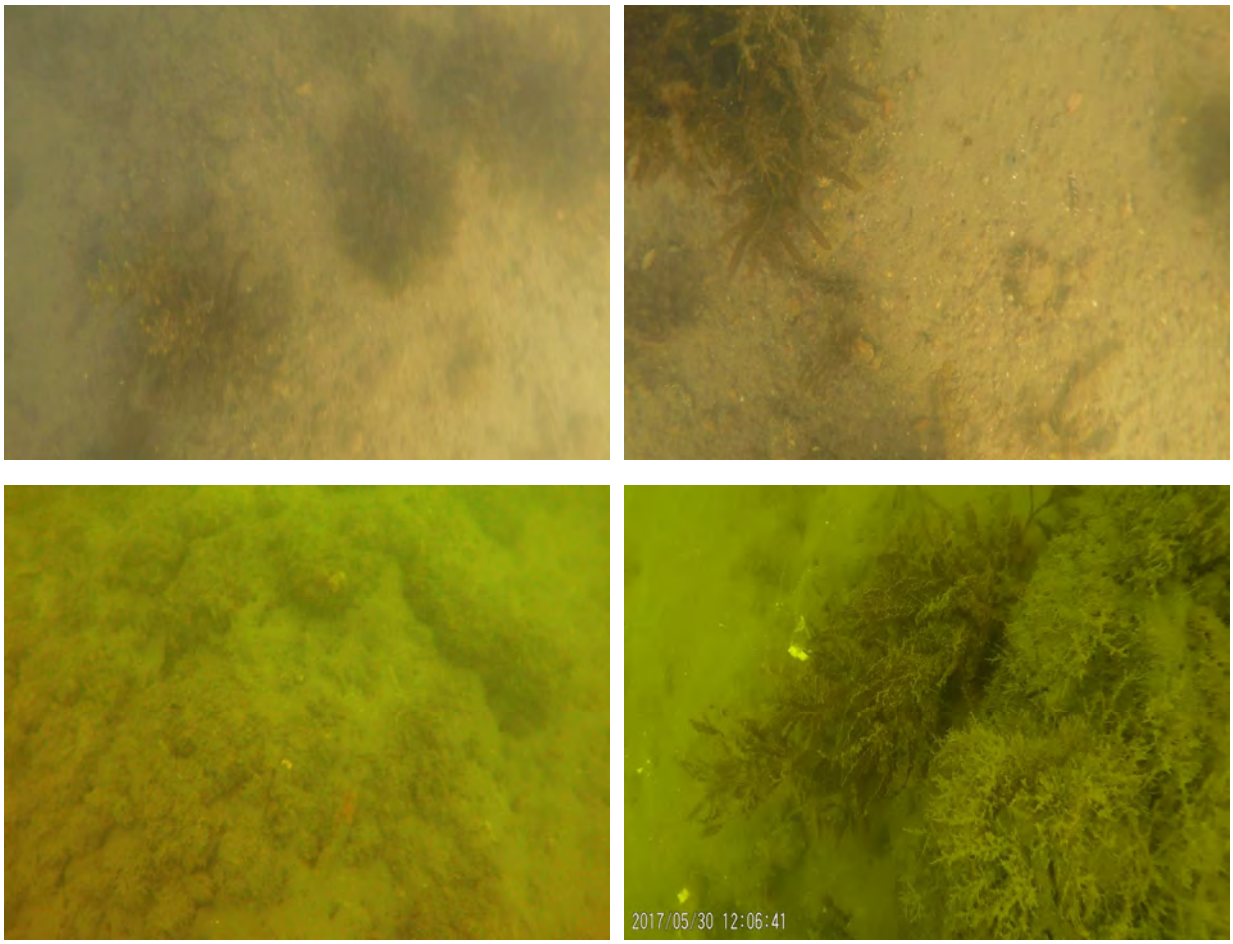

Figure 9: Subtidal sand, rubble and macroalgae

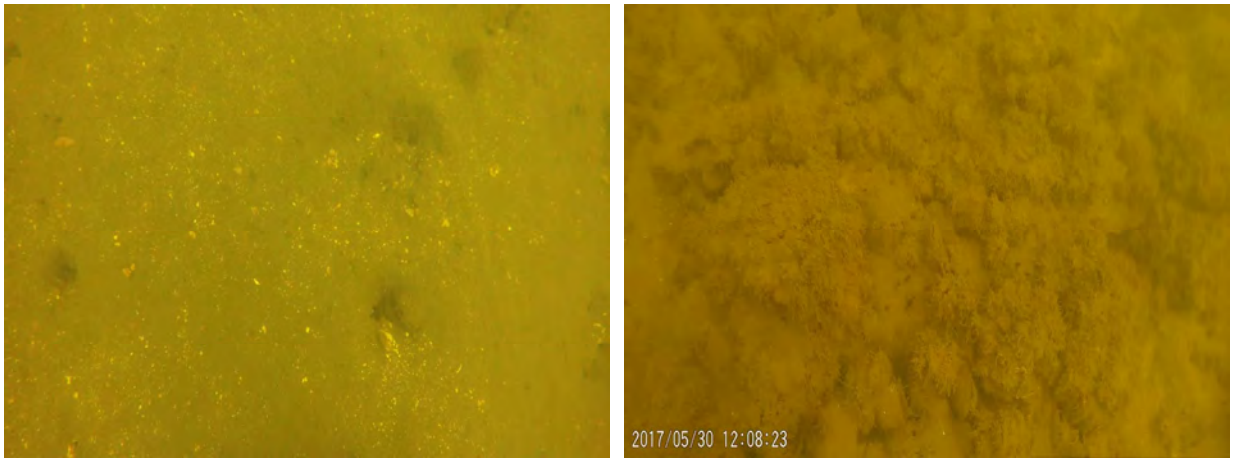

Figure 10: Subtidal bare soft silty-sand with moderate abundance of benthic fauna

4.3 Presence or likelihood of threatened and protected species and populations

Threatened species, populations or communities listed under the FM Act, TSC Act (BC Act) and EPBC Act that are known or expected to occur in the region are listed in **Appendix A**. Within the study area, there is no valuable or specific habitat capable of supporting threatened aquatic/estuarine species, populations or communities. It is possible some species may opportunistically pass through the area given the connectivity to the broader harbour and coastal habitats, but they are unlikely to depend on habitat within the site for their survival.

4.3.1 Fish, sharks and marine vegetation

Protected fauna listed under the FM Act were assessed for their likelihood of occurrence. Listed marine or estuarine species include one shark, six fishes and a taxonomic order of syngnathiformes (seahorses, seadragons, pipefish, pipehorses, ghostpipefish and seamoths). The species assessed included:

- The Herbst's Nurse Shark, which only occurs in deep water (150–600 m) and would not be present in the study area.
- Listed fishes known to occur around offshore rocky reefs, which are absent in the study area.
- Estuary cod occurs in a range of habitats, from turbid shallow estuarine waters (juveniles) to the base of drop-offs and deeper water (adults). Sydney is the southern extent of Estuary cod, with no records in the harbour or similar habitats nearby.
- Syngnathiformes occur in the harbour, and are known to use a variety of habitats, such as macroalgae attached to wharf/jetty piles, seagrass beds and unvegetated shallows. Since 1980, no records occur upstream of a line between Birchgrove and Greenwich, possibly due to poor water quality, habitat degradation or the freshwater influence from Parramatta and Lane Cove Rivers driving the salinity gradient lower than 17.5 parts per thousand (modelled by Lee et al 2011). Suitable habitat does not occur in the study area, therefore, management of syngnathids is not required.

Threatened fish are unlikely to occur in the study area because there is no suitable habitat. The species identified in our desktop assessment as possibly occurring within the search grid either require freshwater, rocky reefs, caves, rocky overhangs or deep water. None of these habitat features occur around the wharf, so these species would not occur here.

Threatened sharks and rays may opportunistically pass through the area while exploring or chasing prey, but this is unlikely given their preferences for deeper water. They are unlikely to stay around the wharf for prolonged periods, nor to depend on it as structural, sheltering or foraging habitat. Regular boat traffic may deter large fauna from regularly using the area.

Threatened flora and vegetation communities/populations were not observed in the study area, because:

- Saltmarsh cannot establish itself on the steep rocky intertidal area
- *Posidonia australis* requires soft sediments with adequate light, with turbidity possibly preventing its establishment.

Marine vegetation is protected under the FM Act and includes seagrasses, mangroves and macroalgae (seaweeds). Seagrass requires soft sediments and adequate light penetration through the water column. In Sydney Harbour, this zone is usually less than three metres deep. Soft sediments in the study area occur at an appropriate depth, but water turbidity may restrict seagrass establishment. Mangroves occur in the harbour in protected bays and tidal waterways with soft intertidal sediment, and none were recorded as being present in the study area. Macroalgae occurs in the harbour along rocky fringes and deeper hard substrate reefs. Brown macroalgae (kelp and crayweed) occurs in the study area attached to small rocks and other hard surfaces in shallow water. The proposal is unlikely to negatively harm any marine vegetation. Removal of the existing wharf would allow more sunlight to reach some macroalgae habitat, giving a positive impact to their growth.

4.3.2 Other listed or protected species

Threatened aquatic mammals (whales, dolphins, dugongs and seals) are known to occur in the harbour and/or along the coast. Large mammals are unlikely to use habitat this close to shore and this far upstream. Dugongs are more typical in tropical and subtropical waters and forage on seagrass beds, which are absent at the site. There are no records of dugongs in the harbour, suggesting that if they do venture down the east coast they may prefer more expansive beds such as those in Botany Bay. No seal sightings are recorded west of Cockatoo Island, and they are unlikely to venture this far upstream.

Threatened aquatic reptiles (turtles) are more common along coastal waters than in the harbour. It is possible they explore the greater area, but would not depend on the site for feeding habitat or nesting.

Threatened shore, wetland, migratory, and pelagic birds are unlikely to occur in the study area, given the small intertidal area and steep seawall. They would also avoid areas with concentrated human activities. Aerial foragers may follow a coastal route, fly over open water or hunt over decomposing wrack. Given the enormous scale of similar habitat nearby, the proposal would have a negligible effect on food resources or obstacles to flight.

5 Impact assessment and mitigation

This section considers the impact from building and operating the new Abbotsford Wharf based on the work described in **Section 1.1**.

Installation of steel piles within the waterway

- Steel locator piles for the wharf would be installed into bedrock. These piles would be transported by barge or road from the offsite facility. The installation of the piles would be carried out around high tide.
- Constructing pile foundation systems in bedrock consists of three components:
  - **Phase 1 – drilling piles into rock in calm water**

    Drilling would take three to four hours per pile plus setup time and pack up time. Each 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.
  - **Phase 2 – hammering piles to refusal in calm water**

    The piles hammered (using a weight of about 30 tonnes) to refusal (when five or more blows will not budge the pile). 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 (about 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.
  - **Phase 3 – cutting, welding and plugging of piles with concrete**

    The steel piles would then be cut, welded and plugged with concrete.
- It is expected to take fifteen nights over a four week period to complete the piling. This would allow for respite from noise and a contingency for unfavourable conditions from weather, seas, swell, wind, and boat wash.

Construction of new gangway and pontoon

- Install the prefabricated sections of the floating pontoon and attach to the installed piles. The pontoon would be constructed offsite, towed to site and lifted into position using the barge-mounted crane.
- Install the pivot point and then attach and build out the prefabricate sections of gangway. This would likely be via barge crane.
- Install the supporting infrastructure including barriers and handrails, safety and security facilities, cabling and ducting, lighting, CCTV, ladders, lifebuoys, glass shelter weather screens, and tactile flooring.

5.1 Assessment of construction impact

Two impact types are likely to occur during wharf installation:

- Noise generation and disturbance from piling
- Disturbance from construction vessels, such as boat/propeller wash, temporary mooring and accidental spills.

Pile impact

A total of eight new piles would be installed and screwed into the bedrock. Each pile would be between 0.6–0.9 m in diameter, creating a combined total benthic impact area of about 4 m^2. This impact would mostly be in type 3 KFH consisting of unvegetated soft silty-sand sediment with minimal infauna, plus two piles in subtidal sand, rubble and macroalgae (type 2 KFH).

Any sediment pluming that occurs during pile removal and installation would be contained by a silt curtain. As the piling is through bedrock and coarse sands, and would be performed during calm conditions, drill cuttings and suspended sediments are likely to settle locally in a similar habitat type. Finer sediments would disperse further, depending on tidal dynamics, but would be contained within a silt curtain surrounding the work site. Hammering of piles is unlikely to create sediment plumes, with rock/sand being pushed downwards and outwards.

Underwater noise from hammering piles has the potential to cause disturbance or physical impact to marine fauna such as seals, turtles, dolphins and whales in the area. However, these species are unlikely to be in the area and are would not be impacted. Fish in the vicinity would be impacted by excessive underwater noise, ranging from mortality to interruption of communication, depending on species anatomy (eg fish with swim bladders closer to the ear are more sensitive to acoustic impact than species with swim bladders more distant from the ear). Although fish would be able to escape beneath the silt curtain, some impact is expected. The estimates on number or type of fish is not part of this impact assessment.

Construction vessel impact

There would be little direct or indirect impact caused by construction vessels if best practice construction environmental management procedures are in place and effective. However, potential impact may include chemical/material spills from machinery, propeller scouring in shallow water, and anchor/mooring impact from barges. Such risks would increase with unfavourable swell and weather conditions.

Scouring of benthic sediments, either from propeller operation, dragging anchor or mooring chain, or water movement from shallow barge operation, could cause bed sediment particles to become entrained in the water, increasing turbidity. The increased sediment load would reduce light penetration through the water column, and sediment particles may settle on aquatic plants. However, any reduction in photosynthesis would be minor, as the amount of sediment that is moved would be small. Any sediment that settled on kelp would eventually be washed off by the tidal movement of water.

Sediment movement could also smother infauna burrows. Again, it is unlikely that large volume of sediment would be moved, and that the thin layer of silt or sand that does settle on infauna burrows would not cause significant damage.

Chemical spills are unlikely, but may occur during refuelling or if there is a hydraulic fluid leak. Spilt petrochemicals have the potential to wash up on shore, or disperse in the water. This could kill or impair fish and infauna, as well as sessile organisms attached to rocks or piles. Precautions to prevent chemical spills should be outlined in the construction management plan. These should include the use of a floating bund around the barge and refuelling vessel, and if the precautions are adhered to there would be negligible impact to aquatic fauna.

Vessels may also be a vector for movement of marine pests, especially if ships are not from the local area. For example, machinery and vessels used on other sites where the noxious alga *Caulerpa taxifolia* was present could introduce the weed if hygiene procedures aren't followed. To ensure that this

doesn't happen, barges moving from areas where Caulerpa is present should be inspected before entering the site. If Caulerpa becomes established around the wharf, then ferries using the wharf in the future would potentially become vectors for the further spread of this weed through Sydney Harbour.

5.2 Assessment of operational impact

Three impact types are likely to occur during wharf operation:

- Boat traffic using the facility
- Shading impact on benthic habitat from the pontoon and gangway
- Creation of new aquatic habitat

Boat traffic impact

The impact likely to occur in marine habitats during operation are typically those associated with boat wash, disturbance of sediments, and an increase in pollutants and litter. Given the location and existing high intensity use the following impacts are considered minor in nature:

- Boat wash would not impact the foreshore, which is stabilised by a large stone seawall.
- Propeller/thrust disturbance to sediments is unlikely given the berth clearance of 5.5–10.5 m and coarse sediments in the landing zone.
- Pollutants expelled from ferries would be the same as existing conditions across the harbour. The site is exposed to tidal exchange that would disperse marine paint and engine oils from the immediate source location, thus helping with dilution.
- Litter from visitors to the wharf would be reduced due to improved bins, signage, fencing and glazed screens.

Shading impact

Indirect impact caused by shading from the pontoon are unlikely due to the lack of marine vegetation. Any macroalgae currently near the proposed gangway connection to the shore bridge is already shaded by the existing structure. Removal of the wharf would allow more light to the only area currently vegetated (subtidal sand and rock rubble with scattered macroalgae, **Figure 6**). Macroalgae establishment is expected to increase in this area, and is therefore a positive impact across about 50 m^2.

Creation of hard substrates

Once installed, the piles would create new areas of vertical hard substrate, which can provide areas for the attachment of sessile marine organisms and structural habitat for small fish (likely type 3 KFH). All new piles would be exposed to partial sunlight, potentially allowing for macroalgae to become established. Therefore, the proposal would provide a positive impact to aquatic ecology.

5.3 Fisheries Management Act habitat protection and permit requirements

DPI Fisheries' Policy and Guidelines for Fish Habitat Conservation and Management (Fairfull 2013) outline requirements for assessing impact of waterfront development to ensure the sustainable management, and 'no net loss', of key fish habitats in NSW. Part 7 of the FM Act addresses the protection of aquatic habitats and work that requires a permit.

Threatened species, populations or communities

No threatened species, populations or communities listed under the FM Act are likely to occur in the study area, or be directly or indirectly harmed by the proposed work (see **Section 4.3** and **Appendix A**). As such, an assessment of significance is not required.

Protected vegetation

The proposed work would not directly or indirectly harm marine vegetation. See **Table 1** for detail. Removal of the existing pontoon would increase light penetration to about 50 m^2 of macroalgae habitat, which is a positive impact.

Protected fauna

Protected fauna is unlikely to occur in the study area (see **Section 4.3** for detail). Syngnathiformes (seahorses and their relatives) were not observed and are unlikely to reside in the study area. This is determined by lack of records west of Cockatoo Island, increased freshwater influence from the Parramatta River and minimal suitable habitat.

Critical habitat

The study area does not have habitat that is critical to any threatened species, and is not within or near the critical habitats for Grey Nurse Shark (Part 7A of the FM Act), so would have no impact on the species.

Commercial Fisheries

No aquaculture (oyster) leases are located in Port Jackson. Commercial fishing is not permitted in Port Jackson. As such, the proposal would not impact commercial fisheries.

Key threatening processes

Key threatening processes have the potential to adversely affect threatened species, populations or ecological communities, or could cause species, populations or ecological communities that are not threatened to become threatened. The following processes (Part 7A of the FM Act) are relevant to an aquatic impact assessment, but would not occur due to the location and design of the proposed development:

- current shark meshing program in NSW waters
- hook and line fishing in areas important for the survival of threatened fish species
- human-caused climate change
- instream structures and other mechanisms that alter natural flow
- introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW
- the introduction of fish to fresh waters within a river catchment outside their natural range
- the removal of large woody debris from NSW rivers and streams
- the degradation of native riparian vegetation along NSW water courses.

Part 7 permits or consultation

The proposal would not directly or indirectly harm marine vegetation. Removing the concrete wharf would increase light to the only area with macroalgae, or the potential for macroalgae. Therefore, a

s205 permit to *Harm Marine Vegetation* is not required. No other protected marine vegetation (saltmarsh, seagrass or mangroves) occur in the study area.

The proposal does not require any dredging or reclamation. Pile installation does not meet the definition of reclamation under Part 7 of the FM Act. A portion of the concrete shore bridge would be retained, and no bank excavations are required. The proposal would not reclaim 'water land'. As such, the public authority (Roads and Maritime) is not carrying out dredging or reclamation and does not need to notify the Minister of Primary Industries under s199 of the FM Act.

During construction, a small number of fish may be temporarily trapped by the silt curtain. However, DPI Fisheries advise that a s219 permit to *Obstruct Fish Passage* would not be required in this situation (pers comm. Carla Ganassin, Fisheries Manager, 9 June 2017).

No seahorses are expected to occur, therefore, no handling, relocation or s37 permit is required.

No net loss of key fish habitat

Significant environmental impact (direct and indirect) are to be offset by environmental compensation. Compensation to offset fisheries resource or habitat losses is considered only after it is demonstrated that the proposed loss is unavoidable, in the best interests of the community in general and is in accordance with the FM Act, Regulations and Fisheries policies and guidelines. Habitat replacement (as a compensation measure) needs to account for indirect as well as direct impact of development to ensure that there is 'no net loss' of key fish habitats.

The proposal would result in a direct (3 m^2) and indirect (115 m^2) impact to type 3 KFH, and direct (1 m^2) impact to type 2 KFH (**Table 1**) due to direct damage from pile installation, partial to absolute shading of unvegetated substrate beneath the pontoon, and partial shading from the gangway. Calculation of shading impact excludes those areas already shaded by the existing structure. Also, removal of the existing piles and pontoon would result in the loss of 168 m^2 of wetted surface area. In total, 291 m^2 of habitat would be impacted to some extent, which is a very minor impact on the available habitat in the study area and surrounds.

The direct and indirect 'loss' of KFH would be compensated by the creation of hard substrate vertical piles, which would provide structure for sessile, shade-tolerant marine organisms. Using wetted pile heights ranging between 0.5–6.0 m, the new hard pile substrate provided is about 75 m^2. The ~1.0 m wetted sides of the pontoon and the shaded underside (total 216 m^2), would also provide structural habitat (although upside-down pontoon habitat in Sydney Harbour may aid dispersal of exotic species, Glasby and Connell 2001). In total, the structures would provide 296 m^2 of marine habitat.

Therefore, the maximum 'loss' (mostly indirect shading impact) of 280 m^2 of type 2 and type 3 KFH would be offset by 291 m^2 of hard substrate, meeting of the Fisheries Policy of 'no net loss' of KFH, but short of the 2:1 habitat compensation ratio if offsets are required.

Table 1: Impact to key fish habitat (KFH)

Habitat (KFH type)	Available in study area (m^2)	Impact type	Loss (m^2)	Gain (m^2)
Intertidal harbour wall (type 3)	15.31	-	-	-
Existing piles (wetted surface area) (type 3)	98.58	15 of the 18 removed	89.35	-
New piles (wetted surface area) (type 3)	-	8 added	-	74.74
Existing pontoon (wetted surface area) (type 3)	78.5	1 removed	78.5	-
New pontoon (wetted surface area) (type 3)	-	1 added	-	216.00
Intertidal bedrock (type 3)	204.62	-	-	-
Intertidal bare sand with minimal infauna (type 3)	114.47	-	-	-
Subtidal bare sand (type 3)	82.58	Indirect - shading	0*	-
Subtidal sand, rubble and macroalgae (type 2)	324.80	Indirect - shading	0*	-
Subtidal bare soft silty-sand (type 3)	2471.25	Indirect - shading	115.00*	-
		Direct - piling	3.11	-
Subtidal sand, rubble and macroalgae (type 2)	324.80	Indirect - shading	0*	-
		Direct - piling	0.57	-
Total	**3709.41**		**280.46**	**290.74**

* Loss calculation excludes areas shaded by both existing and proposed structures.

5.4 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

Clause 21 of the SREP provides nine matters to be taken into consideration in relation to biodiversity, ecology and environment protection:

21(a) Development should have a neutral or beneficial effect on the quality of water entering the waterways.

During construction, potential impact to water quality would be controlled by implementation of a Construction Environmental Management Plan (CEMP). During operation, the proposed wharf would not alter water quality entering the harbour.

21(b) Development should 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).

No seagrass, saltmarsh or mangrove communities occur on site. Scattered macroalgae occurs south of the existing wharf, which would receive more light once it is removed. The proposal would not shade any marine vegetation further than the existing conditions.

21(c) Development should promote ecological connectivity between neighbouring areas of aquatic vegetation (such as seagrass, saltmarsh and algal and mangrove communities).

Removal of the wharf would allow a greater area of shallow benthic habitat to be exposed to light. This may promote the extension or introduction of subtidal marine vegetation to the area.

21(d) Development should 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.

The proposed piles and ferry activity would influence localised hydrology by creating back-eddies, wash and turbulence. As the area is already subject to high energy boat wash and wave reflection off the seawall, it is unlikely the proposal would alter the localised hydrology to an extent that impact the survival or reproduction of aquatic flora.

21(e) Development should protect and reinstate natural intertidal foreshore areas, natural landforms and native vegetation.

An existing stone seawall prevents establishment of any natural intertidal foreshore, landforms or vegetation. The proposal cannot alter this situation due to adjacent onshore land use.

21(f) Development should retain, rehabilitate and restore riparian land.

The proposal does not interfere with any riparian vegetation.

21(g) Development on land adjoining wetlands should maintain and enhance the ecological integrity of the wetlands and, where possible, should provide a vegetative buffer to protect the wetlands.

The proposal adjoins and is within a designated wetland identified on the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 – Wetlands Protection Map. The proposal does not alter the net amount of habitat in the wetland.

21(h) The cumulative environmental impact of development.

The foreshore and aquatic habitat is highly modified due to a seawall, heavy boat traffic and commuter ferry wharf. The proposal would replace the existing wharf, which would result in similar impact as the existing wharf. The cumulative environmental impact is low-moderate given the existing conditions and small area of impact. Direct and indirect impact would be offset by the creation of alternative hard pile habitat and surrounding fluvial microhabitat in a relatively exposed area.

21(i) Whether sediments in the waterway adjacent to the development are contaminated, and what means will minimise their disturbance.

A number of chemicals of potential concern (COPCs) are likely in the study area. During construction, disturbance would arise from drilling rock prior to pile screwing and driving. These

coarse sediments are unlikely to contain contaminates, which are usually associated with finer particles deposited or chemically altered under anoxic conditions. Fine-scale sediment plumes potentially carrying COPCs would be confined near the site during construction using a floating boom and silt curtain. During ferry operation, craft would dock in an area similar to the existing berthing area (from 5.5 m depth) which would result in a small amount of sediment upwelling. Smaller craft would be permitted on the southern side of the pontoon (2.5–4.5 m depth). Boats here would be travelling slow and have minor draft, thereby limiting seabed disturbance.

Clause 63 of the SREP provides seven matters to be taken into consideration in relation to wetland protection:

63 (2a) The development should have a neutral or beneficial effect on the quality of water entering the waterways.

See Clause 21(a) above.

63 (2b) The environmental effects of the development, including effects on:

(i) the growth of native plant communities.

The proposal would not directly or indirect harm marine vegetation.

(ii) the survival of native wildlife populations.

The proposal would not alter habitat to an extent that risks the survival of native wildlife. Submerged structures would provide habitat for aquatic fauna.

(iii) the provision and quality of habitats for both indigenous and migratory species.

The foreshore is highly modified by a seawall with only a small intertidal beach for wetland fauna (eg wader birds). The work would not change the current habitat status.

(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.

The proposal would have little effect on the existing surface and groundwater characteristics. The structure would not alter tidal dynamics to a point that influences wetland habitat.

63 (2c) Whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the environment.

A CEMP and no-go zones would be implemented during construction to prevent environmental impact from sedimentation and pollution.

63 (2d) Whether carrying out the development would be consistent with the principles set out in The NSW Wetlands Management Policy.

The Policy lists five principles for wetland protection (Clauses 61 a-e). The proposed pontoon is located in a similar area to the existing pontoon berth. Removal of the existing wharf (ie waiting area between the land and pontoon) would allow more light to reach benthic habitat and nearby

macroalgae. This design would increase longitudinal connectivity of near-shore wetland habitat. A CEMP would be implemented during construction to minimise impact to shallow habitat (eg use of floating mooring lines). As such, the proposal aims meets the Policy's principles by (a) protecting adjacent wetland habitat during construction and operation, (b) promoting wetland recovery by reducing shading impact near sensitive areas, (c) providing hard pile surfaces to maintain habitat connectivity, (d) retaining scenic values by retaining underwater habitat connectivity (note the 'wetland' isn't easily viewable), and (e) avoiding unnecessary impact to habitat to allow ecosystem functions to be maintained.

63 (2e) Whether the development adequately preserves and enhances local native vegetation.

The proposal would not harm marine or riparian vegetation. Submerged structures would provide habitat for aquatic vegetation.

63 (2f) Whether the development adequately demonstrates:

(i) how the direct and indirect impacts of the development will preserve and enhance wetlands

Impact would be similar to the existing wharf structure and operation and would not risk the preservation or enhancement of the adjacent wetland.

(ii) how the development will preserve and enhance the continuity and integrity of the wetlands

The proposed wharf would not disconnect or harm the value of any wetland habitat. New piles would provide a hard surface for marine organisms, which would create refuge habitat along the relatively exposed seawall and shallow subtidal zone (the 'wetland').

(iii) how soil erosion and siltation will be minimised both while the development is being carried out and after completed.

A CEMP would be implemented during construction. A floating boom suspending a silt curtain would be used to prevent the spread of sediment during pile drilling. During operation, ferries would berth in a similar location to the existing pontoon. Only small craft would be permitted in shallower water.

(iv) how appropriate onsite measures are to be implemented to ensure that the intertidal zone is kept free from pollutants arising from the development

A CEMP would be implemented during construction to minimise the risk of pollution. Pollutants expelled from ferry activity would be the same as current conditions. The intertidal zone is sandy beach and steep seawall and is not a depositional site for dissolved or fine-scale contaminants, where only course sand and shell can settle.

(v) that the nutrient levels in the wetlands do not increase as a consequence of the development.

The proposal does not include activities that alter nutrient concentrations in the water or sediment.

(vi) that stands of vegetation (both terrestrial and aquatic) are protected or rehabilitated.

No saltmarsh or mangroves occur on site or in the adjacent 'wetland'. Work would not impact riparian vegetation. No submerged vegetation would be harmed. New piles would provide a hard surface for marine organisms. Removal of the wharf would allow more light to reach macroalgae beds and potential areas for macroalgae establishment.

vii) that the development minimises physical damage to aquatic ecological communities.

The work would shade type 3 ‘minimally sensitive’ key fish habitat. No marine vegetation would be harmed.

(viii) that the development does not cause physical damage to aquatic ecological communities.

A small area of sandy-silt and sessile organisms would be physically harmed by new piles. Given the scale of similar habitat nearby, this damage is negligible.

63 (2g) 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.

The surrounding habitat is highly modified by a seawall. The proposal would not markedly alter the existing habitat in the long term. The CEMP should aim to protect adjacent habitat during construction.

5.5 Recommended mitigation measures

Although the work would not directly or indirectly harm marine vegetation, the following mitigation measures are recommended to minimise the risk of impact during construction and operation. These are adapted from guidelines issued by DPI Fisheries for instream and foreshore work. At a minimum, the construction contractor or representative should:

- Develop a Construction Environmental Management Plan (CEMP) to address pollution, contamination and unnecessary disturbance which could arise during construction, such as:
  - sediment and rock debris control
  - oil/fuel/chemical storage and spill management
  - machinery and engine maintenance schedule to reduce oil/fuel leakage
  - low impact barge positioning to prevent propeller scouring and thrust wash onto sensitive habitats
  - minimise footprint and establish no-go zones in sensitive habitats (see below)
  - accidental waste/material overboard response (eg construction materials dropped into the harbour)
  - biological hygiene (eg prevent spread of noxious species on and off the site)
  - aquatic fauna management (see below)
  - other measure listed below.

- Establish no-go zones to avoid damage to adjacent habitats. For most of the construction period, the no-go zone generally includes the base of the stone seawall in the intertidal zone and nearshore rocky macroalgae habitat, but may temporarily exclude those areas for one off drilling or piling. Construction vessels should also avoid beaching on the shallow subtidal sand, rubble and macroalgae habitat area (**Figure 6**).

- Work involving movement of barges, drilling and pile driving should occur during calm conditions. The site is susceptible to periods of swell from boating activity across the channel. Tidal movement may limit shallow access and cause drift of the silt curtain.

- No anchors or mooring blocks/lines should be placed on the shallow rocky macroalgae habitat. All lines should be suspended off the seafloor to minimise drag across benthic communities.

- Use a floating boom with silt curtain to contain sediment plumes during drilling and pile hammering. This should be wrapped from shore to shore, containing all site activity.

- All waste material should be disposed of on land and not reused in the construction.

- Syngnathids (seahorses and their relatives) are unlikely to occur and do not need specific management.

- The noxious marine alga *Caulerpa taxifolia* was not overserved in the study area. Care should be take not to introduce this species to the area by using contaminated vessels and machinery. For example, a drill head or anchor used at another site with *Caulerpa* should be thoroughly cleaned of plant propagules and sediment before being used at another location. Fragments of *Caulerpa* can remain viable for up to three days out of the water. Best hygiene practices are outlined in the NSW Control Plan for the Noxious Marine Alga *Caulerpa taxifolia* (NSW I&I 2009).

- Although large marine mammals are not expected to occur, gentle start-up hammering is recommended to allow undetected aquatic fauna to leave the area and avoid hearing damage. Work should be stopped if large fauna are observed nearby.

6 Conclusions

No clearing of native vegetation is required. There is **NOT** likely to be a significant impact on threatened species, populations, ecological communities or their habitats; and a Species Impact Statement is **NOT** required, nor is a referral to a Commonwealth body. The assessment in this report demonstrates that no marine vegetation would be directly or indirectly harmed, therefore, a permit under Part 7 of the FM Act to *Harm Marine Vegetation* is not required.

In regard to the DPI Fisheries Policy and Guidelines for Fish Habitat Conservation and Management (2013 update), the maximum loss of 280 m^2 of type 2 and type 3 key fish habitat would be offset by 291 m^2 of hard substrate habitat, meeting the Fisheries Policy of 'no net loss' of key fish habitat, but short of the 2:1 habitat compensation ratio if offsets are required.

In regard to the wetlands protection, biodiversity, ecology and environment protection requirements of the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005, the proposal would not alter marine vegetation or wetland habitat in the long-term, due to replacement of similar habitat structures. The proposed pontoon is located in a similar area to the existing structure. Removal of the wharf (waiting area between land and pontoon) would increase light availability to macroalgae and habitat suited to macroalgae.

7 References

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Appendix A: Threatened species likelihood of occurrence and impact

If a species has suitable habitat present on site **AND** is likely to use this habitat **AND** the species or its habitat would be directly or indirect impacted, **THEN** an Assessment of Significance is required. Such species, if any, are highlighted in the table below. This list excludes terrestrial species that do not use estuarine/marine water or tidal foreshores.

Type	Species name	Common name	BC/FM Act Status	EPBC Status	Use of site	Is an impact assessment required?
Fish	*Epinephelus daemelii*	Black Rockcod	V	V	No suitable habitat present, eg rock overhangs, crevices or caves	No
	Macquaria australasica	Macquarie Perch	E1	E	No records in catchment	No
	Prototroctes maraena	Australian Grayling	E	V		No
Shark	*Carcharias taurus*	Grey Nurse Shark	E4A	CE	Unlikely close to shore	No
	Carcharodon carcharias	Great White Shark	V	V		No
	Lamna nasus	Porbeagle, Mackerel Shark		Bonn		No
	Rhincodon typus	Whale Shark		V,Bonn		No
Ray	*Manta alfredi*	Reef Manta Ray		Bonn	May pass through, but poor foraging habitat	No
	Manta birostris	Giant Manta Ray		Bonn		No
	Pristis zijsron	Green Sawfish	E4	V	Presumed extinct in NSW	No
Turtle	*Caretta caretta*	Loggerhead Turtle	E1	E	Unlikely, may briefly explore area	No
	Chelonia mydas	Green Turtle	V	V		No
	Dermochelys coriacea	Leatherback Turtle	E1	E		No
	Eretmochelys imbricata	Hawksbill Turtle		V,Bonn		No
	Natator depressus	Flatback Turtle		V,Bonn		No
Whale	*Balaenoptera bonaerensis*	Antarctic Minke Whale		Bonn	Unlikely close to shore	No
	Balaenoptera edeni	Bryde's Whale		Bonn		No
	Balaenoptera musculus	Blue Whale	E1	E		No
	Caperea marginata	Pygmy Right Whale		Bonn		No
	Eubalaena australis	Southern Right Whale	E1	E		No
	Megaptera novaeangliae	Humpback Whale	V	V		No

Type	Species name	Common name	BC/FM Act Status	EPBC Status	Use of site	Is an impact assessment required?
	Physeter macrocephalus	Sperm Whale	V			No
Dolphin	*Lagenorhynchus obscurus*	Dusky Dolphin		Bonn	Unlikely close to shore	No
	Orcinus orca	Killer Whale, Orca		Bonn		No
	Sousa chinensis	Indo-Pacific Humpback Dolphin		Bonn		No
Marine mammal	*Dugong dugon*	Dugong	E1	Bonn	Unlikely, no seagrass	No
Seal	*Arctocephalus forsteri*	New Zealand Fur-seal	V		May briefly explore area	No
	Arctocephalus pusillus doriferus	Australian Fur-seal	V			No
Frog	*Litoria aurea*	Green and Golden Bell Frog	E1	V	No habitat	No
Bird	*Actitis hypoleucos*	Common Sandpiper		C,J,K	Poor and/or only small amount of habitat available for foraging or roosting. Some species only occur offshore. Site is exposed to humans. Larger, better habitat in region. Unlikely to use the site.	No
	Anseranas semipalmata	Magpie Goose	V			No
	Apus pacificus	Fork-tailed Swift		C,J,K		No
	Arenaria interpres	Ruddy Turnstone		C,J,K		No
	Botaurus poiciloptilus	Australasian Bittern	E1	E		No
	Calidris acuminata	Sharp-tailed Sandpiper		C,J,K		No
	Calidris alba	Sanderling	V	C,J,K		No
	Calidris canutus	Red Knot		C,J,K		No
	Calidris ferruginea	Curlew Sandpiper	E1	CE,C,J,K		No
	Calidris melanotos	Pectoral Sandpiper		J,K		No
	Calidris ruficollis	Red-necked Stint		C,J,K		No
	Calidris subminuta	Long-toed Stint		C,J,K		No
	Calidris tenuirostris	Great Knot	V	C,J,K		No
	Calonectris leucomelas	Streaked Shearwater		C,J,K		No
	Charadrius bicinctus	Double-banded Plover		Bonn		No
	Charadrius leschenaultii	Greater Sand-plover	V	C,J,K		No
	Charadrius mongolus	Lesser Sand-plover	V	C,J,K		No
	Charadrius veredus	Oriental Plover		J,K		No
	Diomedea antipodensis	Antipodean Albatross	V	V		No
	Diomedea dabbenena	Tristan Albatross		Bonn		No

Type	Species name	Common name	BC/FM Act Status	EPBC Status	Use of site	Is an impact assessment required?
	Diomedea exulans	Wandering Albatross	E1	V,J		No
	Diomedea gibsoni	Gibson's Albatross	V	V		No
	Diomedea sanfordi	Northern Royal Albatross		E,Bonn		No
	Ephippiorhynchus asiaticus	Black-necked Stork	E1			No
	Epthianura albifrons	White-fronted Chat	E2,V			No
	Esacus magnirostris	Beach Stone-curlew	E4A			No
	Eudyptula minor	Little Penguin in the Manly Point Area	E2			No
	Fregetta grallaria grallaria	White-bellied Storm-Petrel		V		No
	Gallinago hardwickii	Latham's Snipe		C,J,K		No
	Gallinago megala	Swinhoe's Snipe		Bonn,C		No
	Gallinago stenura	Pin-tailed Snipe		Bonn,C		No
	Gygis alba	White Tern	V			No
	Haematopus fuliginosus	Sooty Oystercatcher	V			No
	Haematopus longirostris	Pied Oystercatcher	E1			No
	Heteroscelus brevipes	Grey-tailed Tattler		J		No
	Heteroscelus incanus	Wandering Tattler		J		No
	Hirundapus caudacutus	White-throated Needletail		C,J,K		No
	Ixobrychus flavicollis	Black Bittern	V			No
	Limicola falcinellus	Broad-billed Sandpiper	V	C,J,K		No
	Limosa lapponica	Bar-tailed Godwit		C,J,K		No
	Limosa limosa	Black-tailed Godwit	V	C,J,K		No
	Macronectes giganteus	Southern Giant Petrel	E1	E		No
	Macronectes halli	Northern Giant-Petrel	V	V		No
	Monarcha melanopsis	Black-faced Monarch		Bonn		No
	Monarcha trivirgatus	Spectacled Monarch		Bonn		No
	Numenius madagascariensis	Eastern Curlew		CE,C,J,K		No
	Numenius minutus	Little Curlew		C,J,K		No
	Numenius phaeopus	Whimbrel		C,J,K		No

Type	Species name	Common name	BC/FM Act Status	EPBC Status	Use of site	Is an impact assessment required?
	Onychoprion fuscata	Sooty Tern	V			No
	Pachyptila turtur subantarctica	Fairy Prion (southern)		V		No
	Pandion cristatus	Eastern Osprey	V			No
	Pandion haliaetus	Eastern Osprey		Bonn		No
	Philomachus pugnax	Ruff		C,J,K		No
	Phoebetria fusca	Sooty Albatross	V	V		No
	Pluvialis fulva	Pacific Golden Plover		C,J,K		No
	Pluvialis squatarola	Grey Plover		C,J,K		No
	Pterodroma leucoptera leucoptera	Gould's Petrel	V	E		No
	Pterodroma neglecta neglecta	Kermadec Petrel	V	V		No
	Pterodroma solandri	Providence Petrel	V	J		No
	Puffinus carneipes	Flesh-footed Shearwater		J,K		No
	Rostratula australis	Australian Painted Snipe	E1	E		No
	Sternula albifrons	Little Tern	E1	Bonn,C,J,K		No
	Sternula nereis nereis	Australian Fairy Tern		V		No
	Thalassarche bulleri	Buller's Albatross		V,Bonn		No
	Thalassarche cauta	Shy Albatross	V	V		No
	Thalassarche cauta steadi	White-capped Albatross		V		No
	Thalassarche eremita	Chatham Albatross		E,Bonn		No
	Thalassarche impavida	Campbell Albatross		E,Bonn		No
	Thalassarche melanophris	Black-browed Albatross	V	V		No
	Thalassarche salvini	Salvin's Albatross		V,Bonn		No
	Tringa nebularia	Common Greenshank		C,J,K		No
	Tringa stagnatilis	Marsh Sandpiper		C,J,K		No
	Xenus cinereus	Terek Sandpiper	V	C,J,K		No
Seagrass	Posidonia australis - Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie populations	Posidonia australis	E2		No plants observed	No
	Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Posidonia australis		E		No

Type	Species name	Common name	BC/FM Act Status	EPBC Status	Use of site	Is an impact assessment required?
Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	Coastal Saltmarsh	E1	V	No plants observed	No
	Wilsonia backhousei	Narrow-leafed Wilsonia	V			No

BC (TSC) Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable
FM Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable
EPBC Act: Bonn = Listed migratory species under Bonn Convention, CD = Conservation Dependent, CE = Critically Endangered, E = Endangered, V = Vulnerable, X = Extinct

Appendix B: Key fish habitat types

NSW key fish habitat types and associated sensitivity classification (from Fairfull 2013).

TYPE 1 - Highly sensitive key fish habitat:

- *Posidonia australis* (strapweed)
- *Zostera, Heterozostera, Halophila and Ruppia* species of seagrass beds >5m^2 in area
- Coastal saltmarsh >5m^2 in area
- Coral communities
- Coastal lakes and lagoons that have a natural opening and closing regime (i.e. are not permanently open or artificially opened or are subject to one off unauthorised openings)
- Marine park, an aquatic reserve or intertidal protected area
- SEPP 14 coastal wetlands, wetlands recognised under international agreements (e.g. Ramsar, JAMBA, CAMBA, ROKAMBA wetlands), wetlands listed in the Directory of Important Wetlands of Australia[2]
- Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in two dimensions, snags greater than 300 mm in diameter or 3 metres in length, or native aquatic plants
- Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act
- Mound springs

TYPE 2 – Moderately sensitive key fish habitat:

- *Zostera*, *Heterozostera, Halophila* and *Ruppia* species of seagrass beds <5m^2 in area
- Mangroves
- Coastal saltmarsh <5m^2 in area
- Marine macroalgae such as *Ecklonia* and *Sargassum* species
- Estuarine and marine rocky reefs
- Coastal lakes and lagoons that are permanently open or subject to artificial opening via agreed management arrangements (e.g. managed in line with an entrance management plan)
- Aquatic habitat within 100 m of a marine park, an aquatic reserve or intertidal protected area
- Stable intertidal sand/mud flats, coastal and estuarine sandy beaches with large populations of in-fauna
- Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in TYPE 1
- Weir pools and dams up to full supply level where the weir or dam is across a natural waterway

TYPE 3 – Minimally sensitive key fish habitat may include:

- Unstable or unvegetated sand or mud substrate, coastal and estuarine sandy beaches with minimal or no in-fauna
- Coastal and freshwater habitats not included in TYPES 1 or 2
- Ephemeral aquatic habitat not supporting native aquatic or wetland vegetation

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Data from the BioNet BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Entities in selected area [North: -33.74 West: 151.02 East: 151.22 South: -33.94] returned a total of 224,129 records of 3,339 species.
Report generated on 28/08/2017 2:41 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3116	*Pseudophryne australis*		Red-crowned Toadlet	V,P		67	
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	12606	
Animalia	Reptilia	Varanidae	2287	*Varanus rosenbergi*		Rosenberg's Goanna	V,P		4	
Animalia	Aves	Anatidae	0200	*Nettapus coromandelianus*		Cotton Pygmy-Goose	E1,P		4	
Animalia	Aves	Anatidae	0214	*Stictonetta naevosa*		Freckled Duck	V,P		2	
Animalia	Aves	Columbidae	0023	*Ptilinopus superbus*		Superb Fruit-Dove	V,P		19	
Animalia	Aves	Diomedeidae	0086	*Diomedea exulans*		Wandering Albatross	E1,P	E,J	2	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		1	
Animalia	Aves	Ardeidae	0197	*Botaurus poiciloptilus*		Australasian Bittern	E1,P	E	10	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		11	
Animalia	Aves	Accipitridae	0218	*Circus assimilis*		Spotted Harrier	V,P		2	
Animalia	Aves	Accipitridae	0223	*^Erythrotriorchis radiatus*		Red Goshawk	E4A,P,2	V	1	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P	C	285	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		11	
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*		Square-tailed Kite	V,P,3		2	
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*		Eastern Osprey	V,P,3		6	
Animalia	Aves	Falconidae	0238	*Falco subniger*		Black Falcon	V,P		1	
Animalia	Aves	Burhinidae	0174	*Burhinus grallarius*		Bush Stone-curlew	E1,P		6	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*		Pied Oystercatcher	E1,P		2	
Animalia	Aves	Charadriidae	0141	*Charadrius leschenaultii*		Greater Sand-plover	V,P	V,C,J,K	1	
Animalia	Aves	Rostratulidae	0170	*Rostratula australis*		Australian Painted Snipe	E1,P	E	2	
Animalia	Aves	Scolopacidae	0161	*Calidris ferruginea*		Curlew Sandpiper	E1,P	CE,C,J,K	355	
Animalia	Aves	Scolopacidae	0165	*Calidris tenuirostris*		Great Knot	V,P	CE,C,J,K	1	
Animalia	Aves	Scolopacidae	0167	*Limicola falcinellus*		Broad-billed Sandpiper	V,P	C,J,K	1	
Animalia	Aves	Scolopacidae	0152	*Limosa limosa*		Black-tailed Godwit	V,P	C,J,K	13	
Animalia	Aves	Scolopacidae	0160	*Xenus cinereus*		Terek Sandpiper	V,P	C,J,K	2	
Animalia	Aves	Laridae	0117	*Sternula albifrons*		Little Tern	E1,P	C,J,K	9	
Animalia	Aves	Cacatuidae	0268	*^^Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3		55	
Animalia	Aves	Cacatuidae	0268	*^^Callocephalon fimbriatum*		Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V,P,3		53	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		8	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		11	
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*		Swift Parrot	E1,P,3	CE	14	
Animalia	Aves	Psittacidae	0302	*^^Neophema pulchella*		Turquoise Parrot	V,P,3		1	
Animalia	Aves	Strigidae	0246	*^^Ninox connivens*		Barking Owl	V,P,3		13	
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*		Powerful Owl	V,P,3		570	
Animalia	Aves	Tytonidae	0252	*^^Tyto longimembris*		Eastern Grass Owl	V,P,3		1	
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*		Masked Owl	V,P,3		2	
Animalia	Aves	Tytonidae	9924	*^^Tyto tenebricosa*		Sooty Owl	V,P,3		2	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	10	
Animalia	Aves	Meliphagidae	0448	*Epthianura albifrons*		White-fronted Chat	V,P		237	
Animalia	Aves	Meliphagidae	0448	*Epthianura albifrons*		White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E2,V,P		237	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		3	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		50	
Animalia	Aves	Petroicidae	0380	*Petroica boodang*		Scarlet Robin	V,P		3	
Animalia	Aves	Petroicidae	0382	*Petroica phoenicea*		Flame Robin	V,P		2	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	7	
Animalia	Mammalia	Peramelidae	1710	*Isoodon obesulus obesulus*		Southern Brown Bandicoot (eastern)	E1,P	E	1	
Animalia	Mammalia	Peramelidae	1097	*Perameles nasuta*		Long-nosed Bandicoot population in inner western Sydney	E2,P		25	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	V,P	V	1	
Animalia	Mammalia	Burramyidae	1150	*Cercartetus nanus*		Eastern Pygmy-possum	V,P		7	
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*		Yellow-bellied Glider	V,P		1	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	1473	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*		Yellow-bellied Sheathtail-bat	V,P		7	
Animalia	Mammalia	Molossidae	1329	*Mormopterus norfolkensis*		Eastern Freetail-bat	V,P		20	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*		Eastern False Pipistrelle	V,P		4	
Animalia	Mammalia	Vespertilionidae	1346	*Miniopterus australis*		Little Bentwing-bat	V,P		3	
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*		Eastern Bentwing-bat	V,P		173	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*		Southern Myotis	V,P		27	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*		Greater Broad-nosed Bat	V,P		1	
Animalia	Mammalia	Otariidae	1543	*Arctocephalus forsteri*		New Zealand Fur-seal	V,P		1	

Animalia	Mammalia	Otariidae	1882	*Arctocephalus pusillus doriferus*	Australian Fur-seal	V,P		1
Animalia	Mammalia	Balaenidae	1561	*Eubalaena australis*	Southern Right Whale	E1,P	E	1
Plantae	Flora	Campanulaceae	1937	*Wahlenbergia multicaulis*	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		67
Plantae	Flora	Convolvulaceae	2234	*Wilsonia backhousei*	Narrow-leafed Wilsonia	V,P		98
Plantae	Flora	Dilleniaceae	11422	*Hibbertia puberula*		E1,P		2
Plantae	Flora	Dilleniaceae	14733	*^Hibbertia spanantha*	Julian's Hibbertia	E4A,P,2	CE	1
Plantae	Flora	Elaeocarpaceae	6205	*Tetratheca glandulosa*		V,P		51
Plantae	Flora	Elaeocarpaceae	6206	*Tetratheca juncea*	Black-eyed Susan	V,P	V	15
Plantae	Flora	Ericaceae	7752	*Epacris purpurascens var. purpurascens*		V,P		72
Plantae	Flora	Fabaceae (Faboideae)	2853	*Dillwynia tenuifolia*		V,P		2
Plantae	Flora	Fabaceae (Faboideae)	3008	*Pultenaea pedunculata*	Matted Bush-pea	E1,P		1
Plantae	Flora	Fabaceae (Mimosoideae)	3728	*Acacia bynoeana*	Bynoe's Wattle	E1,P	V	9
Plantae	Flora	Fabaceae (Mimosoideae)	3741	*Acacia clunies-rossiae*	Kanangra Wattle	V,P		1
Plantae	Flora	Fabaceae (Mimosoideae)	7229	*Acacia gordonii*		E1,P	E	1
Plantae	Flora	Fabaceae (Mimosoideae)	3860	*Acacia pubescens*	Downy Wattle	V,P	V	791
Plantae	Flora	Fabaceae (Mimosoideae)	9672	*Acacia terminalis subsp. terminalis*	Sunshine Wattle	E1,P	E	9
Plantae	Flora	Grammitidaceae	9471	*^^Grammitis stenophylla*	Narrow-leaf Finger Fern	E1,P,3		1
Plantae	Flora	Haloragaceae	3257	*Haloragodendron lucasii*		E1,P	E	15
Fungi	Flora	Hygrophoraceae	F006	*Camarophyllopsis kearneyi*		E1,P		1
Fungi	Flora	Hygrophoraceae	F003	*Hygrocybe anomala var. ianthinomarginata*		V,P		1
Fungi	Flora	Hygrophoraceae	F004	*Hygrocybe aurantipes*		V,P		1
Fungi	Flora	Hygrophoraceae	F001	*Hygrocybe austropratensis*		E1,P		1
Fungi	Flora	Hygrophoraceae	F007	*Hygrocybe collucera*		E1,P		1
Fungi	Flora	Hygrophoraceae	F008	*Hygrocybe griseoramosa*		E1,P		1
Fungi	Flora	Hygrophoraceae	F005	*Hygrocybe lanecovensis*		E1,P		1
Fungi	Flora	Hygrophoraceae	F002	*Hygrocybe reesiae*		V,P		1
Fungi	Flora	Hygrophoraceae	F015	*Hygrocybe rubronivea*		V,P		1
Plantae	Flora	Lamiaceae	3418	*^^Prostanthera marifolia*	Seaforth Mintbush	E4A,P,3	CE	8
Plantae	Flora	Malvaceae	6140	*Lasiopetalum joyceae*		V,P	V	1
Plantae	Flora	Myrtaceae	4007	*^^Callistemon linearifolius*	Netted Bottle Brush	V,P,3		10
Plantae	Flora	Myrtaceae	4024	*Darwinia biflora*		V,P	V	234
Plantae	Flora	Myrtaceae	4031	*Darwinia peduncularis*		V,P		1
Plantae	Flora	Myrtaceae	4067	*Eucalyptus camfieldii*	Camfield's Stringybark	V,P	V	24
Plantae	Flora	Myrtaceae	9720	*Eucalyptus fracta*	Broken Back Ironbark	V,P		1
Plantae	Flora	Myrtaceae	4134	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	V,P	V	13
Plantae	Flora	Myrtaceae	4163	*Eucalyptus pulverulenta*	Silver-leafed Gum	V,P	V	1
Plantae	Flora	Myrtaceae	8907	*Eucalyptus scoparia*	Wallangarra White Gum	E1,P	V	1
Plantae	Flora	Myrtaceae	8314	*Leptospermum deanei*		V,P	V	16
Plantae	Flora	Myrtaceae	6809	*Melaleuca biconvexa*	Biconvex Paperbark	V,P	V	1
Plantae	Flora	Myrtaceae	4248	*Melaleuca deanei*	Deane's Paperbark	V,P	V	38
Plantae	Flora	Myrtaceae	4293	*Syzygium paniculatum*	Magenta Lilly Pilly	E1,P	V	31
Plantae	Flora	Orchidaceae	4386	*^Caladenia tessellata*	Thick Lip Spider Orchid	E1,P,2	V	6
Plantae	Flora	Orchidaceae	4464	*^Genoplesium baueri*	Bauer's Midge Orchid	E1,P,2	E	12
Plantae	Flora	Orchidaceae	9615	*^Pterostylis saxicola*	Sydney Plains Greenhood	E1,P,2	E	1
Plantae	Flora	Orchidaceae	4584	*^Sarcochilus hartmannii*	Hartman's Sarcochilus	V,P,2	V	1
Plantae	Flora	Poaceae	4875	*Deyeuxia appressa*		E1,P	E	3
Plantae	Flora	Poaceae	4895	*Dichanthium setosum*	Bluegrass	V,P	V	1
Plantae	Flora	Proteaceae	8293	*^^Grevillea beadleana*	Beadle's Grevillea	E1,P,3	E	1
Plantae	Flora	Proteaceae	5365	*^^Grevillea caleyi*	Caley's Grevillea	E4A,P,3	E	5
Plantae	Flora	Proteaceae	10009	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V,P	V	1
Plantae	Flora	Proteaceae	5458	*^^Persoonia hirsuta*	Hairy Geebung	E1,P,3	E	8
Plantae	Flora	Rhamnaceae	5591	*Pomaderris prunifolia*	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		17
Plantae	Flora	Thymelaeaceae	6965	*Pimelea curviflora var. curviflora*		V,P	V	14
Plantae	Flora	Zannichelliaceae	6339	*Zannichellia palustris*		E1,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.

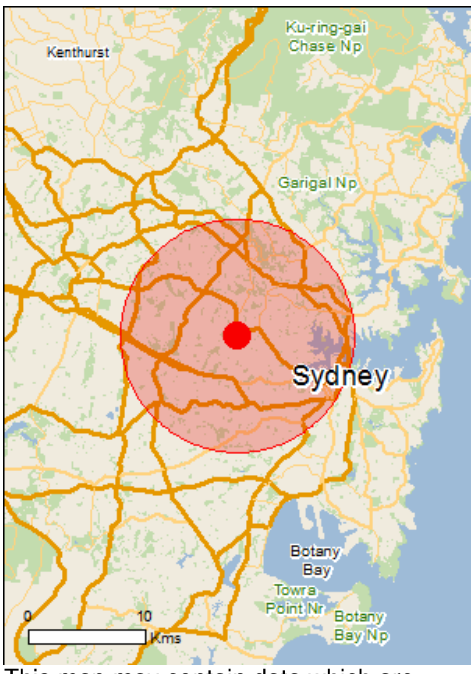
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 28/08/17 14:33:15

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



Coordinates
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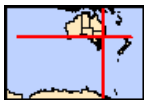

Summary

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:	6
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	82
Listed Migratory Species:	62

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. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

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:	40
Commonwealth Heritage Places:	23
Listed Marine Species:	96
Whales and Other Cetaceans:	10
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.

State and Territory Reserves:	6
Regional Forest Agreements:	None
Invasive Species:	50
Nationally Important Wetlands:	2
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	Buffer zone
Australian Convict Sites (Hyde Park Barracks Buffer Zone)	NSW	Buffer zone
Sydney Opera House - Buffer Zone	NSW	Buffer zone
Australian Convict Sites (Cockatoo Island Convict Site)	NSW	Declared property
Australian Convict Sites (Hyde Park Barracks)	NSW	Declared property
Sydney Opera House	NSW	Declared property

National Heritage Properties [Resource Information]

Name	State	Status
Indigenous		
Cyprus Hellene Club - Australian Hall	NSW	Listed place
Historic		
Cockatoo Island	NSW	Listed place
First Government House Site	NSW	Listed place
Hyde Park Barracks	NSW	Listed place
Sydney Harbour Bridge	NSW	Listed place
Sydney Opera House	NSW	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]

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
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community may occur within area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically 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

Name	Status	Type of Presence
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	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
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
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, 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

Name	Status	Type of Presence
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	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 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 impavida Campbell Albatross, Campbell Black-browed 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
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area
Frogs		

Name	Status	Type of Presence
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 known 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 likely to 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 likely to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	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
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
Other		
Pommerhelix duralensis Dural Land Snail [85268]	Endangered	Species or species habitat likely to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat known to occur within area
Acacia terminalis subsp. terminalis MS Sunshine Wattle (Sydney region) [88882]	Endangered	Species or species habitat known to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat may occur within

Name	Status	Type of Presence
		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
Deyeuxia appressa [7438]	Endangered	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
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat known to occur within area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat likely to occur within area
Leptospermum deanei Deane's Tea-tree [21777]	Vulnerable	Species or species habitat likely to occur within area
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 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
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 likely to occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur

Name	Status	Type of Presence
		within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat 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
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to 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		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Macronectes giganteus Southern Giant-Petrel, 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
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	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
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to 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]		Foraging, feeding or related behaviour may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	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
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	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		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to 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 known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	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]		Foraging, feeding or related behaviour known

Name	Threatened	Type of Presence
		to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Foraging, feeding or related behaviour known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour 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]		Foraging, feeding or related behaviour known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Foraging, feeding or related behaviour known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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 - Australia Post
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 Scientific & Industrial Research Organisation
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 - Director of War Service Homes
Commonwealth Land - Reserve Bank of Australia
Commonwealth Land - Telstra Corporation Limited
Commonwealth Land - War Service Homes Commissioner
Defence - 21 CONST REGT - HABERFIELD DEPOT
Defence - COCKATOO ISLAND DOCKYARD
Defence - CONCORD OFFICE ACCN
Defence - DEFENCE PLAZA SYDNEY
Defence - DSTO PYRMONT - (SEE SITE 1177)
Defence - FOREST LODGE (SYDNEY) TRG DEP
Defence - GLADESVILLE TRAINING DEPOT
Defence - HMAS PLATYPUS - SPDU FOR DISPOSAL
Defence - HMAS WATERHEN
Defence - LEICHHARDT STORES DEPOT
Defence - LIDCOMBE MULTI-USER DEPOT
Defence - MILLER'S POINT TRAINING DEPOT
Defence - NEWINGTON
Defence - NORTH SYDNEY - HYDRO OFFICE
Defence - OXFORD ST SYDNEY
Defence - PARKVIEW BUILDING - SYDNEY
Defence - SPECTACLE ISLAND
Defence - SYDNEY UNIVERSITY REGIMENT - DARLINGTON
Defence - TIMOR BARRACKS - DUNDAS

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Admiralty House Garden and Fortifications	NSW	Listed place
Admiralty House and Lodge	NSW	Listed place
Barracks Block	NSW	Listed place
Biloela Group	NSW	Listed place
Cockatoo Island Industrial Conservation Area	NSW	Listed place
Customs Marine Centre	NSW	Listed place
Fitzroy Dock	NSW	Listed place
General Post Office	NSW	Listed place
Kirribilli House Garden & Grounds	NSW	Listed place
Marrickville Post Office	NSW	Listed place
Mess Hall (former)	NSW	Listed place
Military Guard Room	NSW	Listed place
North Sydney Post Office	NSW	Listed place
Power House / Pump House	NSW	Listed place
Prison Barracks Precinct	NSW	Listed place

Name	State	Status
Pyrmont Post Office	NSW	Listed place
Reserve Bank	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
Underground Grain Silos	NSW	Listed place
Woolwich Dock	NSW	Listed place

Listed Marine Species

[Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
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 may occur within area
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	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]		Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Foraging, feeding or related behaviour known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Foraging, feeding or related behaviour known

Name	Threatened	Type of Presence
		to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Foraging, feeding or related behaviour known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Foraging, feeding or related behaviour known to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		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 epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	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
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Foraging, feeding or related behaviour known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Foraging, feeding or related behaviour known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
Macronectes giganteus Southern Giant-Petrel, 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 known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to 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, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pachyptila turtur Fairy Prion [1066]		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]		Foraging, feeding or related behaviour known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Recurvirostra novaehollandiae Red-necked Avocet [871]		Foraging, feeding or related behaviour known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		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
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	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, Campbell Black-browed 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 sp. nov. Pacific Albatross [66511]	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
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour 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

Name	Threatened	Type of Presence
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
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, Peacock 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
Stigmatopora olivacea a pipefish [74966]		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

Name	Threatened	Type of Presence
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, 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
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat 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	Species or species habitat 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 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]		Foraging, feeding or related behaviour 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 likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		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

Name	Status	Type of Presence
		area
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

State and Territory Reserves [Resource Information]

Name	State
Lane Cove	NSW
Newington	NSW
Parramatta River	NSW
Sydney Harbour	NSW
Wallumatta	NSW
Wolli Creek	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 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

Name	Status	Type of Presence
		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		
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 habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		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

Name	Status	Type of Presence
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, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		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]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		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 densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
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
Bicentennial Park	NSW
Newington Wetlands	NSW

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 and National Heritage properties, Wetlands of International and National 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.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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.

Coordinates

-33.84393 151.12836

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:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian 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, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-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.

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Appendix E

Noise and vibration assessment

HANSEN YUNCKEN

ABBOTSFORD WHARF UPGRADE

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT

SEPTEMBER 2017

wsp

ABBOTSFORD WHARF UPGRADE

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT

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OUR REF: 2271407A-170913-TDN-ABBOTSFORD CNVIA FINAL
SEPTEMBER 2017

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EXECUTIVE SUMMARY

WSP Australia Pty Ltd (WSP) has been engaged by Hansen Yuncken Pty Ltd (Hansen Yuncken) to undertake a construction noise and vibration assessment for the proposed Abbotsford Wharf upgrade. Construction is expected to start in early 2018 and take approximately four months to complete. The proposal will include:

- Removal of the existing wharf and piles, including landside canopy
- Retention of about three metres of existing jetty
- An 18 metre long by three metre covered aluminium gangway extending north west from retained jetty section
- An 18 metre long by nine metre wide floating covered and glazed steel pontoon, held in position by four piles.
- Two new piled pivot piles to help with berthing
- A covered entry portal, of about six metres by three metres.
- New kiss-and-ride parking zone
- Upgrade of the existing stairs and supporting hand rails

The assessment was based on predicting the construction noise and vibration impacts to a number of representative sensitive receivers as a result of the construction of the proposal. Potentially sensitive receivers for both noise and vibration have been categorised as residential, commercial, active recreational area, educational institutions and community centres, and heritage structures. The receivers surrounding the proposal have been categorised into five Noise Catchment Areas (NCAs) based on a similar noise environments within these areas.

Work is expected to occur in five construction scenarios; during standard hours with the exclusion of lifting and piling work which is required to take place during the night-time when the water is calm and the harbour is least busy.

The report predicts the noise and vibration impacts that may occur as a result of construction of the proposal. There would be no significant noise impacts from construction traffic due to the proposal and therefore these aspects have not been assessed.

CONSTRUCTION NOISE IMPACTS

Existing background noise levels were measured at two representative locations. Noise management levels (NMLs) were derived for residential and non-residential sensitive land uses using the Interim Construction Noise Guideline (ICNG) (EPA, 2009) in accordance with the Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime, 2016) based on the background noise monitoring.

Noise levels from each scenario were predicted using the Roads and Maritime Construction Noise Estimator at each representative receiver based on equipment data approved by Roads and Maritime. The results were compared with the NML for each assessment time period for each construction scenario. The assessment indicated that:

- For construction work during standard hours, exceedances above NMLs are expected for receivers at NCA02, NCA03 and NCA04.
- For construction work that takes place outside of standard hours, between 11pm and 7am, exceedances above NMLs are expected for receivers at all NCAs for all scenarios.
- Sleep disturbance for residential receivers is considered likely in NCA03 for all night-time work as a result of construction work being carried out with direct line of sight to receivers.

The standard CNVG construction noise management measures are recommended for implementation. In addition, several specific mitigation measures have been recommended for implementation based on the most significant items of plant and noise generating scenarios.

In order to address any residual impacts after the implementation of the standard and specific mitigation measures, the CNVG additional mitigation measures have been identified.

CONSTRUCTION VIBRATION IMPACTS

Prediction of vibration emissions have shown exceedance to the nominated vibration screening limit for cosmetic damage at the nearest sensitive receiver, located approximately 10 metres (NCA03) from the construction footprints during pile hammering (typical piling vibration levels). Mitigation measures to manage vibration impacts have been provided.

1 INTRODUCTION

WSP Australia Pty Ltd (WSP) has been engaged by Hansen Yuncken Pty Ltd (Hansen Yuncken) on behalf of Roads and Maritime Services (Roads and Maritime) to carry out a construction noise and vibration impact assessment for the proposed Abbotsford Wharf upgrade.

This document assesses any noise and vibration impacts associated with the upgrade construction work with reference to the Construction Noise and Vibration Guideline (CNVG, Roads and Maritime, 2016).

1.1 PROJECT DESCRIPTION

The proposal will involve improving access to Abbottsford ferry wharf by replacing the existing structure with a gangway and pontoon. The proposal is needed to allow for more efficient passenger services.

Key features of the proposal include:

- Removal of the existing wharf and piles, including landside canopy
- Retention of about three metres of existing jetty
- An 18 metre long by three metre covered aluminium gangway extending north west from retained jetty section
- An 18 metre long by nine metre wide floating covered and glazed steel pontoon, held in position by four piles.
- Two new piled pivot piles to help with berthing
- A covered entry portal, of about six metres by three metres.
- New kiss-and-ride parking zone
- Upgrade of the existing stairs and supporting hand rails

Construction work is expected to commence in early 2018 and take about four months to complete.

Piling, lifting and installation of the pontoons and gangways are required to be carried out at night-time (between 11pm and 7am) outside of standard construction hours when water is calmest and the harbour traffic is minimal.

Roads and Maritime propose to carry out all other work associated with the proposal during the standard working hours of:

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

The cul-de-sac at the northern end of Great North Road, Abbotsford, proposed for kiss and ride parking zone is currently operating as a drop off point for the ferry wharf. It is envisaged that the provision of the kiss and ride zone will not increase the traffic volumes entering the site. Therefore, no further assessment relating to the operational noise impacts from road traffic due to the kiss and ride parking zone is required.

1.2 PROJECT LOCATION

The proposal site is located at the northern end of Great North Road, Abbotsford. The wharf forms part of the F3 Ferry Service that operates between Circular Quay and Parramatta. The proposal site and noise monitoring locations are presented in Figure 1-1.

Figure 1-1 Proposal site location and noise monitoring location (Source: NSW SIX maps)

2 SENSITIVE RECEIVERS

The proposal has the potential to impact properties that are considered sensitive to construction noise and vibration. A land use survey and description of noise sensitive receivers have been obtained from desktop review and onsite observations. The identification of sensitive receivers next to the proposal depends on the occupancy type and nature of usage within the affected properties.

Identified sensitive receivers surrounding the proposal were categorised as follows:

- Residential
- Non-residential noise sensitive receivers:
  - Commercial
  - Educational institutions
  - Hospitals
  - Active recreational areas
  - Community centre
- Potential vibration sensitive receiver
  - Abbotsford Point Boat Shed (APBS), a locally listed heritage item on the City of Canada Bay Local Environmental Plan 2013.

The receivers surrounding the proposal were organised into Noise Catchment Areas (NCAs) geographically based on similar noise environments within these areas. The NCAs are described in Table 2.1 and a map of the NCAs and receiver locations is presented Figure 2-1.

Table 2.1 Noise catchment areas

NCA	MINIMUM DISTANCE TO PROPOSAL LOCATION (m)	DESCRIPTION
NCA01	950 (residential) 1000 (commercial)	Multi-storey, medium density residential receivers east of the proposal boundary at Chiswick. Outdoor active recreation area; Blackwall Point Reserve and Chambers Reserve along Bortfield Drive and Campbell Park and Lysaght Park along Bibby Street. Commercial receivers located within the Chiswick suburb.
NCA02	520 (residential) 830 (educational) 900 (community centre)	Multi-storey, medium density residential receivers east of the proposal boundary at Henley. Outdoor active recreation area; Gladesville Skatepark between Crown Street and Huntleys Points Road. Educational institution and Community Centre at Crown Street.
NCA03	100 (residential) 40 (commercial) 10 (heritage structure) 33 (community centre) 1000 (educational)	Multi-storey, medium density residential receivers west of the proposed project boundary at Abbotsford. Outdoor active recreation area; Abbotsford Point and Warrell Reserve along Teviot Avenue, Battersea Park along Battersea Street and Henry Lawson Park along St Albans Street. Commercial receivers located within the Abbotsford suburb. Heritage structure, APBS and community centre located at the northern end of Great North Road. Educational institution on Great North Road.

NCA	MINIMUM DISTANCE TO PROPOSAL LOCATION (m)	DESCRIPTION
NCA04	320 (residential) 350 (commercial)	Multi-storey, medium density residential receivers north of the proposal boundary at Gladesville. Outdoor active recreation receivers; Banjo Paterson Cottage along Punt Road. Gladesville Hospital located at Suttor Street. Commercial receiver at the end of Punt Road.
NCA05	830 (residential) 750 (commercial)	Multi-story, medium density residential receivers west of the proposal boundary at Cabarita. Outdoor active recreation receivers; Cabarita Park along Cabarita Road. Commercial receivers within the Cabarita and Breakfast Point suburb.

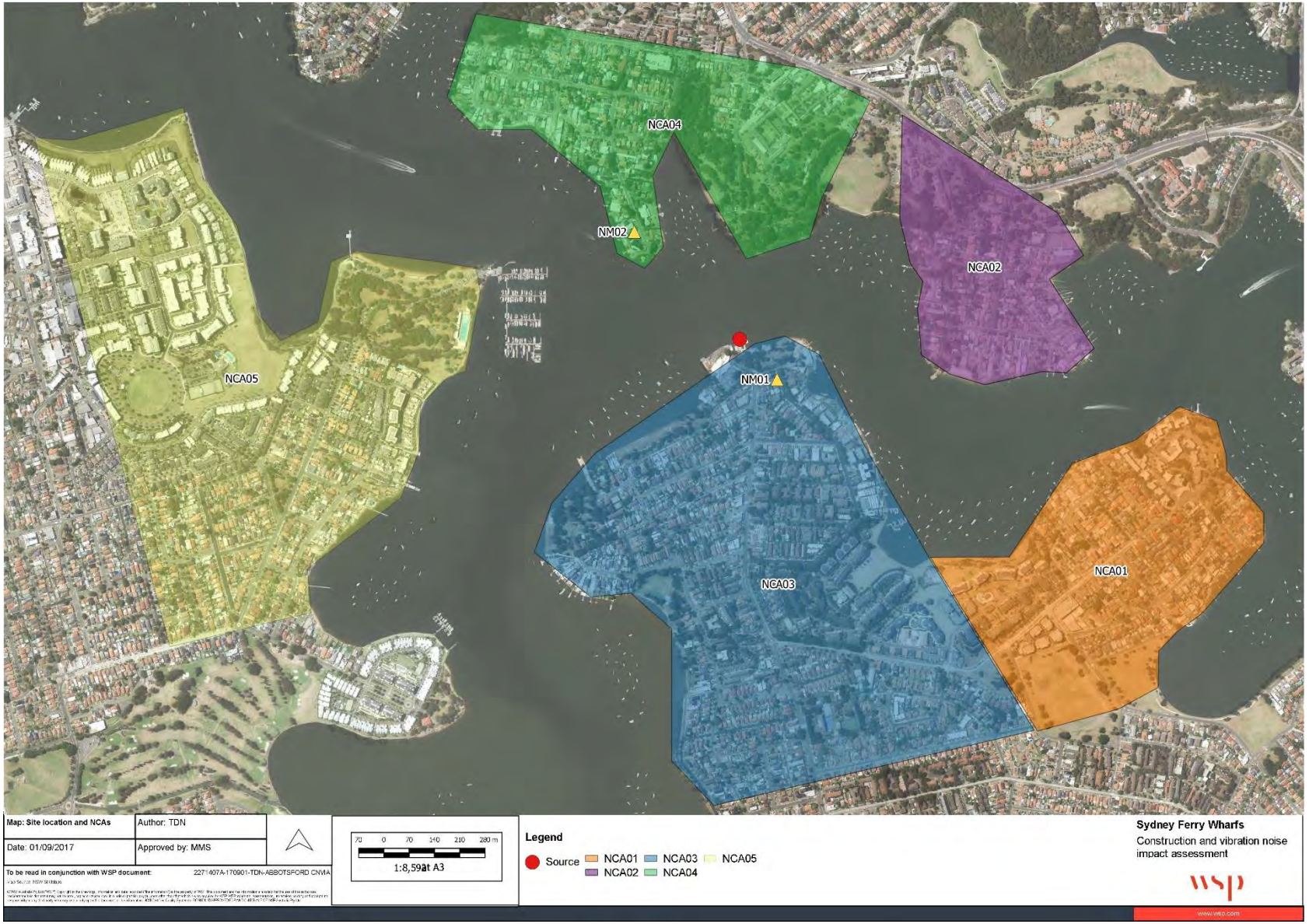


Figure 2-1 Site overview and NCA locations

3 NOISE MONITORING

This section provides an overview of the existing noise environment surrounding the site. The prevailing background and ambient noise levels surrounding the proposal site were determined through a combination of unattended and operator attended noise surveys in accordance with the Australian Standard 1055-1997- *Acoustics-Description and Measurement of Environmental Noise* (AS1055) and NSW Industrial Noise Policy (INP, EPA 2000).

WSP have carried out attended noise surveys during the daytime, and unattended noise surveys during the daytime, evening and night-time periods.

3.1 NOISE MONITORING LOCATIONS

The noise monitoring locations relevant to this assessment are detailed in Table 3.1 and are shown in Figure 2-1.

Table 3.1 Noise monitoring location

NOISE MONITORING LOCATION	SURVEY METHOD	ADDRESS
NM01	Unattended measurement Attended measurement	67 Walton Crescent, Abbotsford
NM02	Unattended measurement Attended measurement	79 Wharf Road, Gladesville

3.2 INSTRUMENTATION AND QUALITY CONTROL

Noise measurements were carried out in accordance with Australian Standard 1055-1997- *Acoustics-Description and Measurement of Environmental Noise* (AS1055) and NSW Industrial Noise Policy (INP, EPA 2000).

The monitoring equipment was fitted with windshields and were field calibrated before and after monitoring. No significant drifts in calibration (± 1.0 dB) were noted. The weather conditions at the time of monitoring were recorded at Sydney Observatory Hill (Bureau of Meteorology station number 066062) and Sydney Olympic Park (Bureau of Meteorology station number 066212), which is located approximately seven kilometres east of the proposal and five kilometres west of the proposal, respectively.

Monitoring data were excluded during periods of weather that adversely affected the monitoring data; where wind speeds were greater than 5 metres per second and during significant rainfall, as recorded at the nearest meteorological station. Monitoring data were also excluded where extraneous noise was identified to be adversely affecting the long-term average.

All the monitoring equipment has a current certified calibration certificate (National Association of Testing Authorities, NATA) at the time of use. Details of all equipment used to conduct the noise survey are presented in Table 3.2.

Table 3.2 Noise monitoring equipment

LOCATION	SURVEY METHOD	MANUFACTURER AND MODEL NO.	SERIAL NO.
NM01	Unattended measurement	ARL EL-316	16-207-023
NM02	Unattended measurement	ARL EL-316	16-207-008
NM01 & NM02	Attended measurement	Norsonic 140	1406502

3.3 UNATTENDED NOISE SURVEY

The results of unattended noise monitoring for background noise levels in the vicinity of the Abbotsford wharf site were carried out by WSP between the 21 and 28 August 2017. The results are detailed in Table 3.3 and detailed daily plot of data are presented in Appendix A (NM01) and Appendix B (NM02).

Table 3.3 Summary of unattended noise monitoring results

LOCATION	NOISE LEVEL (RBL[1], dBA)		
	DAYTIME[2]	EVENING[2]	NIGHT-TIME[2]
NM01	37	35	31
NM02	37	36	31

1: RBL – rating background level. The overall single-figure background level representing each assessment period (daytime/evening/night-time) as defined in the Industrial Noise Policy (INP, EPA 2000).

2: Time periods defined as – Day: 7am to 6pm Monday to Saturday, 8am to 6pm Sunday; Evening: 6pm to 10pm; Night: 10pm to 7am Monday to Saturday, 10pm to 8am Sunday.

3.4 OPERATOR ATTENDED NOISE SURVEY

WSP carried out operator attended measurements to characterise the noise environment and identify the contributors to the acoustic environment. Attended measurements were carried out at NM01 and NM02 on the 21 August 2017.

During the surveys, the weather was noted as being dry with light wind and suitable for noise monitoring.

The results of the attended ambient noise surveys and observations for noise contributors are detailed in Table 3.4.

The existing ambient noise environment surrounding the proposal varied in nature. The primary contribution to the ambient noise levels for receivers located along the bay area was noted to be from car and plane pass-by.

Table 3.4 Summary of attended noise logging results

LOCATION	PERIOD – TIME	$L_{eq(15MIN)}$ dBA	$L_{90(15MIN)}$ dBA	OBSERVATIONS
NM01	Daytime – 1:30pm	46	35	Car pass-by up to 59 dBA Birds up to 54 dBA Plane pass-by up to 55 dBA Truck pass-by up to 64dBA
NM02	Daytime – 3:00pm	53	39	Car pass-by up to 56 dBA Birds up to 56 dBA Plane pass-by up to 73 dBA

4 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT CRITERIA

The CNVG defines the assessment method and suggests noise management measures based on the length of the work, number of people affected and the time the work occur.

As the project duration would be greater than six weeks and there are likely to be many receivers above the NML (as defined in the CNVG), the quantitative assessment method has been used within this section as previously discussed with and approved by Roads and Maritime.

It is expected that during construction, equipment and material deliveries are carried out by waterside transportation and a small number of light vehicles to limit any traffic impacts on Great North Road, Abbotsford. As traffic noise generation will not be considered acoustically significant, construction traffic noise has not been assessed further.

4.1 CONSTRUCTION NOISE ASSESSMENT PERIODS

The CNVG assessment time periods applicable to the proposal are presented in Table 4.1.

Table 4.1 CNVG assessment periods

NAME	TIME PERIODS
Standard Hours (SH)	Monday to Friday – 7am to 6pm Saturday – 8am to 1pm Sunday/Public Holiday – Nil
Out of hours work (OOHW)[1]	Monday to Friday – 10pm to 7am

1: Defined as Out of hours work Period 2 of the CNVG

4.2 CONSTRUCTION NOISE MANAGEMENT LEVELS

The CNVG specifies that construction NMLs are defined using the method specified in the Interim Construction Noise Guideline (ICNG, EPA 2009). They are based on the measured rating background level (RBL) as defined in the INP plus an additional allowance of 10 dB during standard hours and 5 dB outside of standard hours. The ICNG also states that where construction noise levels are above 75 dBA at residential receivers during standard hours, they are considered 'highly noise affected' and require additional considerations to mitigate potential impacts.

Table 4.2 presents the construction NMLs for each assessment period for residential receivers in each NCA. The NMLs have been calculated from the measured RBL in each NCA as shown in Table 3.3.

Table 4.2 Noise management levels at residential receivers

NCA	NOISE MONITORING LOCATION	NML $L_{eq(15MIN)}$ dBA[1]		
		SH	OOHW	HIGHLY NOISE AFFECTED
		DAY[1]	NIGHT[1]	
NCA01	NM01	47	36	75
NCA02	NM02	47	36	75
NCA03	NM01	47	36	75
NCA04	NM02	47	36	75
NCA05	NM01	47	36	75

1: Time periods as defined in Table 4.1.

Table 4.3 lists the NMLs that have been adopted for non-residential sensitive receivers. The NMLs apply when the premises are in use during any assessment period.

Table 4.3 Noise management levels at non-residential receivers

LAND USE	NML $L_{eq(15\ MIN)}$ dBA
Commercial[1]	70
Education institutions	55[2]
Hospitals	55[2]
Active recreation	65
Community centres	55[3]

1: The external noise levels should be assessed at the most affected occupied point on the premises

2: A 10 dB correction has been applied to the internal noise levels to reflect external noise levels as indicated on the ICNG

3: Calculated based on the recommended maximum internal levels in AS2107:2016 on intended use of centre, internal noise levels of 45 dBA.

4.3 SLEEP DISTURBANCE

Some of the proposed construction work would be required to take place during the night-time periods (11pm to 7am) as these works require calmer water conditions to undertake installation from the water. Work carried out during the night has the potential to lower sleep quality of the residents adjacent to the construction footprints due to peak noise events. The potential sleep impacts include decrease ability to fall asleep, waking up during sleep and waking up too early.

Section 4.3 of the ICNG discusses the method for quantifying and assessing sleep disturbance (sleep awakening). This guidance references further information in the NSW Road Noise Policy (RNP, NSW EPA, 2013) that discusses criteria for the assessment of sleep disturbance.

The RNP suggests a screening level of $L_{1(1min)}$ dBA, equivalent to the RBL + 15 dB. Where this level is exceeded, further analysis should be carried out. In addition, Section 5.4 of the RNP also states that:

- Maximum internal noise levels below 50-55 dBA would be unlikely to result in people's sleep being disturbed
- If the noise exceeds 65-70 dBA once or twice each night-time the disturbance would be unlikely to have any notable health or wellbeing effects.

The guidance within the RNP indicates that internal noise levels of 50-55 dBA are unlikely to cause sleep awakenings. Therefore, at levels above 55 dBA, sleep disturbance would be considered likely. Assuming that receivers may have windows partially open for ventilation, a 10 dB outside to inside correction has been adopted as indicated in the ICNG. Based on the above, the noise level L_{max} 65 dBA (external) has been adopted as sleep disturbance screening criterion for assessment purposes. Feasible and reasonable safeguards should be considered where there are night-time predicted exceedances above this limit.

It should be noted that this assessment method (sleep disturbance criteria based on guidance for sleep awakening) may not capture the full extent of impacts during the early and late stage of sleep (difficulty falling asleep and waking up early). However, this assessment method would provide an indication of the potential sleep disturbance when works occur in the night-time period. The night-time impacts due to construction works are quantified and managed through the $L_{eq(15\ min)}$ assessment.

4.4 CONSTRUCTION VIBRATION CRITERIA

Construction vibration can lead to:

- Cosmetic and structural building damage
- Loss of amenity due to perceptible vibration, termed human comfort.

Importantly, cosmetic damage is regarded as minor in nature; it is readily repairable and does not affect a building's structural integrity. Damage of this nature is typically described as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks, and separation of partitions or intermediate walls from load bearing walls. If there is no significant risk of cosmetic damage then structural damage is not considered a significant risk and is not further assessed.

4.4.1 COSMETIC BUILDING DAMAGE

The CNVG presents safe working distances based on the British Standard BS 7358-2: *Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration*. This provides guidance on the 'evaluation and measurement of vibration in buildings' and defines guidance for categorising building damage in terms of 'cosmetic', 'minor' and 'major'; providing limits for each. The cosmetic damage limits are presented in Table 4.4.

Table 4.4 BS 7385 Cosmetic damage criteria

GROUP	TYPE OF STRUCTURE	PEAK COMPONENT PARTICLE VELOCITY, mm/s [1]		
		4–15 Hz	15–40 Hz	40 Hz and above
1	Reinforced or framed structures Industrial or heavy commercial buildings	50		
2	Un-reinforced or light framed structures Residential or light commercial buildings	15 – 20[2]	20 – 50	50

1: Values referred to are at the base of the building, on the side of the building facing the source of vibration (where feasible).
2: At frequencies below 4Hz, a maximum displacement of 0.6mm (zero to peak) should not be exceeded.

These peak vibration limits are set so that the risk of 'cosmetic' damage is minimal. They have been set at the lowest level above which damage has been credibly demonstrated. The limits also assume that the equipment causing the vibration is only used intermittently, however if the equipment is used continuously, then the limits may need to be reduced by up to 50 per cent. For 'minor' or 'major' vibrational damage to occur, the standard states that vibration need to be two times and four times (respectively for group 1 and group 2) the values shown in Table 4.4.

4.4.2 HERITAGE STRUCTURES

Building structures classified as being of heritage significance (as outlined in Section 2, APBS) are to be considered on a case by case basis. A heritage listed structure may not necessarily be sensitive to vibration and it would require detail survey to confirm structure integrity (whether it can be classified as structurally unsound). For a regularly maintained structure, it is unlikely that it would be more sensitive than other structure of similar construction. Where a historic structure is deemed to be sensitive to damage from vibration following inspection by qualified structural and / or civil engineers, more conservative superficial cosmetic damage criterion based on peak component particle velocity (PPV) (German Standard DIN 4150-3: 1999 *Structural Vibration – Part 3: Effects of vibration on structures* or equivalent) should be considered.

A conservative vibration damage screening (trigger) PPV level of 7.5 mm/s is recommended for the heritage item listed in the proposal and has been established with reference to the minor cosmetic damage criteria in British Standard BS 7385 Part 2-1993. The vibration levels specified in this standard are designed to minimise the risk of threshold or cosmetic surface cracks, and are set well below the levels that have potential to cause damage to the main structure.

Buildings that are potentially at risk of threshold or cosmetic damage criteria would be identified by the contractor prior to the commencement of construction works. A Construction Noise and Vibration Management Plan (CNVMP, or similar) should include vibration management at these locations including building condition surveys before the commencement of construction activities and after construction is completed. Where a historic building is deemed to be sensitive to damage from vibration (structurally unsound), a conservative superficial cosmetic damage criterion of PPV 3mm/s peak component particle velocity (based on DIN 4150-3:1999) may be applicable.

4.4.3 HUMAN COMFORT (AMENITY)

Vibration generated by construction work are generally considered as 'intermittent'; where sources operate intermittently, but which would produce continuous vibration if operated continuously. Additionally, impact piling characteristic is classified as impulsive and has the potential to affect human comfort.

The limits (vibration dose values) above which there is considered to be a risk that the amenity and comfort of people occupying buildings would be affected by construction work are taken from Assessing Vibration: A Technical Guideline (EPA, 2006). The guideline expresses the human comfort criteria in both vibration dose value and also provides criteria in different units as detailed Appendix C1 of the guideline. The criteria for continuous and impulsive vibration for applicable receiver groups are shown in Table 4.5 and Table 4.6 as peak velocity (mm/s).

Table 4.5 Vibration limits for human exposure from continuous vibration

LOCATION	ASSESSMENT PERIOD	PEAK VELOCITY (mm/s)	
		PREFERRED VALUES	MAXIMUM VALUES
Residences	Daytime	0.28	0.56
	Night-time	0.20	0.40
Offices, schools, educational institutions, and places of worship	Day or night-time	0.56	1.1

Table 4.6 Vibration limits for human exposure from impulsive vibration

LOCATION	ASSESSMENT PERIOD	PEAK VELOCITY (mm/s)	
		PREFERRED VALUES	MAXIMUM VALUES
Residences	Daytime	8.6	17.0
	Night-time	2.8	5.6
Offices, schools, educational institutions, and places of worship	Day or night-time	18.0	36.0

5 PROPOSED CONSTRUCTION METHOD

The following section provides the proposed construction working hours, nominated equipment and corresponding sound power level (SWL) of each construction stage.

5.1 CONSTRUCTION STAGES, DURATION AND WORKING HOURS

The proposal would be constructed in stages with the stages occurring at different times of the day depending on the activity. Table 5.1 presents the assessed construction scenarios, the working times and durations as supplied by the client.

Table 5.1 Construction stages and duration

SCENARIO REFERENCE	CONSTRUCTION STAGE	PERIOD	DURATION
S01	General construction (including concrete pour for stair upgrade)	Standard hours	4 months (2 days – concrete pour)
S02	Demolition and removal of piles	Standard hours	2 weeks
S03	Pile installation (drilling)	Night time (11pm - 7am)	15 nights over 3 weeks
S04	Pile installation (hammering)	Night time (5am – 7am)	5 nights over 3 weeks
S05	Lifting pre-fabricated units including the pontoon and gangway	Night time (11pm - 7am)	5 nights over 5 months

The new kiss and ride zone and signage installation, part of the land side work, is proposed to be carried out during the daytime and is expected to have minimal noise and vibration impact (likely equipment would be hand tools). As such, this work has not been as a construction scenario.

5.2 CONSTRUCTION WORK SCENARIOS AND EQUIPMENT

The construction scenarios and equipment noise levels provided are based on discussion and supplied material from Roads and Maritime. The nominated equipment of the associated construction work scenarios and the activity SWLs are detailed in Table 5.2.

Table 5.2 Construction equipment and sound power levels

SCENARIO REFERENCE			S01	S02	S03	S04	S05
EQUIPMENT	SOUND POWER LEVEL, dBA	TYPICAL USAGE PER 15 MINUTE					
Angle grinders[1, 2]	114	25%		1			
Barge[3]	95	50%		1			
Boat[3]	100	100%	1	1	1	1	1
Compressor[4]	109	100%	1				1
Crane[2]	104	100%		1	1	1	1
Daymaker[4]	98	100%			2	2	2
Generator[3]	103	100%	1	1	1	1	1
Hand tools (electric)[2]	110	25%	1	1			1
Piling rig (Boring)[4]	111	100%			1		
Piling rig (Impact)[1, 3]	115	50%				1	
SCENARIO TOTAL SWL, dBA			**111**	**117**	**113**	**119**	**112**
SCENARIO TOTAL MAXIMUM NOISE LEVELS L_{MAX}, dBA			**116**	**122**	**118**	**132[5]**	**117**

1: To account for the annoying characteristics of the plant, a +5 dB correction has been added to the overall scenario noise level in accordance with the ICNG.

2: Noise level extracted from Australian Standard 2436-2010 *"Guide to noise and vibration control on construction, demolition and maintenance sites"*

3: Noise levels provided based on a previous study of the proposal and approved by Roads and Maritime

4: Noise level extracted from Noise estimator calculator provided by Roads and Maritime

5: Noise level extracted from British Standard 5228-1: 2009 *"Code of practice for noise and vibration control on construction and open sites – Part 1: Noise"*

6 ASSESSMENT OF CONSTRUCTION NOISE IMPACTS

The construction noise impact has been assessed according to the detailed assessment method as set out in Section 6.2 of the CNVG. The Construction Noise Estimator provided by Roads and Maritime has been used to determine the predicted noise levels at the nominated NCAs.

6.1 PREDICTED CONSTRUCTION NOISE LEVELS

The predicted noise levels for each work scenario are presented in Table 6.1 outlining the noise level within each NCA and receiver types. The predicted noise levels have been assessed at the closest affected receiver within each NCAs. As some construction work is expected to take place outside of standard hours, Table 6.1 also presents the corresponding NMLs for the standard hours and out of hours of each receiver types within the nominated NCAs.

The formatting within the table indicates the following:

- The orange shaded cells show exceedances of the daytime period
- The blue shaded cells show exceedances of the night-time period

Table 6.1 Predicted construction noise levels

NCA	NML			PREDICTED HIGHEST NOISE LEVEL PER SCENARIO ($L_{eq(15MIN)}$, dBA)[2]				
	HNA[1]	D[1]	N[1]	S01	S02	S03	S04	S05
Residential receivers								
NCA01	75	47	36	38	44	40	46	39
NCA02	75	47	36	45	51	47	53	46
NCA03	75	47	36	60	66	62	68	61
NCA04	75	47	36	50	56	52	58	51
NCA05	75	47	36	39	45	41	47	40
Commercial receivers								
NCA01	n/a	70	n/a	38	44	-	-	-
NCA03	n/a	70	n/a	60	66	-	-	-
NCA04	n/a	70	n/a	50	56	-	-	-
NCA05	n/a	70	n/a	39	45	-	-	-
Active recreational receivers								
NCA01	n/a	65	n/a	38	44	-	-	-
NCA02	n/a	65	n/a	45	51	-	-	-
NCA03	n/a	65	n/a	60	66	-	-	-
NCA04	n/a	65	n/a	50	56	-	-	-
NCA05	n/a	65	n/a	39	45	-	-	-

NCA	NML			PREDICTED HIGHEST NOISE LEVEL PER SCENARIO ($L_{eq(15MIN)}$, dBA)[2]				
	HNA[1]	D[1]	N[1]	S01	S02	S03	S04	S05
Hospitals								
NCA02	n/a	55	n/a	45	51	-	-	-
Educational institution								
NCA02	n/a	55	n/a	45	51	-	-	-
NCA03	n/a	55	n/a	60	66	-	-	-
Community centre								
NCA02	n/a	55	n/a	45	51	-	-	-

1: HNA – Highly noise affected, D – daytime, N – Night-time

6.1.1 RESIDENTIAL RECEIVERS

The assessment of construction noise impacts within the residential receivers indicate that:

- At NCA01, exceedances above the night-time NMLs are predicted up to 4 dB for piling installation (drilling, S03), 10 dB for piling installation (hammering, S04) and 3 dB for lifting pre-fabricated units (S05).
- At NCA02, exceedances above the day-time NMLs are predicted up to 4 dB for demolition and removal of piles (S02).
- At NCA02, exceedances above the night-time NMLs are predicted up to 11 dB for piling installation (drilling, S03), 17 dB for piling installation (hammering, S04) and 10 dB for lifting pre-fabricated units (S05).
- At NCA03, exceedances above the day-time NMLs are predicted up to 13 dB for general construction (S01) and 19 dB for demolition and removal of piles (S02)
- At NCA03, exceedances above the night-time NMLs are predicted up to 26 dB for piling installation (drilling, S03), 32 dB for piling installation (hammering, S04) and 25 dB for lifting pre-fabricated units (S05).
- At NCA04, exceedances above the day-time NMLs are predicted up to 3 dB for general construction (S01) and 9 dB for demolition and removal of piles (S02)
- At NCA04, exceedances above the night-time NMLs are predicted up to 16 dB for piling installation (drilling, S03), 22 dB for piling installation (hammering, S04) and 15 dB for lifting pre-fabricated units (S05).
- At NCA05, exceedances above the night-time NMLs are predicted up to 15 dB for piling installation (drilling, S03), 11 dB for piling installation (hammering, S04) and 4 dB for lifting pre-fabricated units (S05).

In summary, exceedances of NMLs are generally expected for receivers immediately next to the footprint. Multi-storey receivers with clear line of sight to the work site on Great North Road, Abbotsford, are likely to have the highest impacts from the proposed construction work.

The construction scenario with the highest predicted exceedances is for the installation of new piles (hammering, S04). This is due to use of high noise level plant being used during the night period, when background noise levels are lowest.

As a result of the predicted exceedances, noise mitigation and management measures have been outlined in Section 8 to reduce the noise impact.

6.1.2 NON-RESIDENTIAL RECEIVERS

The predicted noise levels in each NCA indicates that the potential noise impacts at non-residential receivers would be as follows:

- Active recreational area within NCA03 exceeds the NML for demolition and removal of piles (S02) by up to 1 dB.
- Educational institution within NCA03 exceed the NML for general construction (S01) and demolition and removal of piles (S02) by up to 5 dB and 11 dB respectively.
- Piling installation (drilling, S03), piling installation (hammering, S04), lifting pre-fabricated units (S05) have been proposed to take place during the night and the recreational areas would not be in use at these times, so the NMLs do not apply.

6.2 SLEEP DISTURBANCE ASSESSMENT

Some construction activities would be required to take place out of hours for safe working reasons. The activities proposed for night-time construction work are detailed in Section 5.1.

An assessment for sleep disturbance has been carried out based on the maximum noise (L_{max}, dBA) from construction plant. The maximum noise level from the equipment was assumed to be 5 dB more than the $L_{eq,15min}$ noise level based on previous observations.

The predicted maximum noise events with the potential to cause sleep disturbance are presented in Table 6.2. The blue shaded cells show locations where the potential for sleep disturbance has been identified.

Table 6.2 Predicted sleep disturbance noise impacts

NCA	L_{MAX}, dBA	PREDICTED NOISE LEVEL (L_{MAX}, dBA)				
	SLEEP DISTURBANCE SCREENING	S01	S02	S03	S04	S05
NCA01	65	-	-	45	51	44
NCA02	65	-	-	52	58	51
NCA03	65	-	-	67	73	66
NCA04	65	-	-	57	63	56
NCA05	65	-	-	46	52	45

The predicted maximum Table 6.2 indicates that sleep disturbance for residential receivers may occur at receivers adjacent to the construction footprints in NCA03 along Great North Road, Abbotsford. The works carried out before midnight (12am) may have an impact on residents falling asleep.

The pile installation (hammering, S04) is expected to occur at night during the 5am to 7am period and would potentially result in maximum noise level events occurring multiple times during this period when the activity is being carried out in NCA03. This also presents a potential impact to sleep quality with residents being woken up earlier than usual.

The potential for work to generate maximum noise level events should be considered as part of the construction noise management strategy. Noise mitigation measures are discussed further in Section 8.

7 ASSESSMENT OF CONSTRUCTION VIBRATION IMPACTS

Certain construction activities would require the use of vibration intensive equipment that may affect the range of receivers discussed in Section 2. The vibration intensive plant nominated as part of the work are pile boring and pile hammering equipment (S03 and S04).

Table 7.1 provides the minimum distance of the sensitive receiver buildings to the limits of the footprint.

Table 7.1 Distances of receiver within NCA to the approximate site area

NCA	MINIMUM DISTANCES (M)				
	RESIDENTIAL	COMMERCIAL	HERITAGE STRUCTURE	EDUCATIONAL INSTITUTION	COMMUNITY CENTRE
NCA01	950	1000	-	-	-
NCA02	520	-	-	830	900
NCA03	100	40	10	1000	33
NCA04	320	350	-	-	-
NCA05	830	750	-	-	-

7.1 SAFE WORKING DISTANCES FOR VIBRATION INTENSIVE PLANT

Table 7.2 presents the indicative safe working distances for the nominated construction plant to minimise the risk of structural damage and human comfort for sensitive receivers referenced from the CNVG.

The safe working distances are based on the typical distance from receivers' work is permitted to be carried out to meet the limits set out in Section 4.4. The distances are indicative only and results may vary depending on the activity, equipment, local ground, and receiver conditions.

Table 7.2 Recommended safe working distances for vibration intensive plant

PLANT ITEM	RATING/ DESCRIPTION	SAFE WORKING DISTANCE		
		Cosmetic Damage[1,3]	Human Response[2]	Cosmetic Damage for Reinforced Heritage structure [5]
Pile boring	≤ 800mm	2 m (nominal)	4 m	10 m
Driven piles	Typical driven pile[4]	20 m	30-50 m	25 m

1: Referenced from British Standard BS 7385 Part 2-1993 *Evaluation and measurement for vibration in buildings Part 2*

2: Referenced from EPA's Assessing Vibration: a technical guideline (EPA, 2006)

3: Referred to 15mm/s PPV vibration limit

4: Reference driven piling taken from FTA Noise and vibration manual

5: Calculated based on typical driven pile vibration level compliance with the nominated screening limit of 7.5mm/s PPV (Section 4.4.2)

As indicated in Table 7.2 receivers in NCA03 within 20 meters of the construction footprint may exceed the nominated cosmetic damage criteria, including the heritage structure, APBS, during pile driving.

A vibration level prediction has been undertaken to provide an indication of the vibration levels due to hammer piling at the nearest receivers from the footprints.

7.2 PREDICTION METHODOLOGY

Ground vibration is attenuated by a variety of factors as it propagates away from the source. The main factors are geometric spreading and internal damping of the rock or soil. Clay based soil is characterised as being relatively more effective in terms of soil vibration damping attenuation than sand, silt and mud.

Reference vibration levels have been based on previously published and measured data for similar equipment types from the U.S. Department of Transportation Federal Transit Administration: *Transit Noise and Vibration Impact Assessment* (FTA, 2006) using typical and maximum values[1].

To calculate geometric spreading at distances, the following equation is used:

$$V_{pp} = V_{pp(ref)} \times \left(\frac{r_{(ref)}}{r}\right)^{n}$$

Where V_{pp} is the vibration level at a distance, r, from the source, and $V_{pp(ref)}$ is the vibration level of the source at a reference distance, $r_{(ref)}$. The parameter n is used to account for the attenuation rate and it varies for different soil classifications.

To allow for different propagation losses, n is varied. n is generally selected based on soil type and typically varies between 0.5 and 2.0. In the initial empirical studies n was set to 1.5.

However due to large variation in measured vibration levels, determining n value which varies by both vibration source and soil type is difficult. Usually in the case of prediction, unknowns about the soil type and input vibration levels in the soil are far more significant than variation in gamma between vibration equipment for short to medium range distances (up to approximately 80–100 m). For this study the n value has be set to 1.5.

7.3 PREDICTED VIBRATION LEVELS

Using the methodology described in Section 7.1, the hammering piling vibration levels were predicted at various distances from the activity. Figure 7-1 shows the predicted vibration levels vibration limits nominated in Section 4.4.

Based on the predicted vibration levels, the following were observed:

- Compliance with the preferred vibration limits of 2.8 mm/s (PPV) for human comfort occurs at 25 metres for typical vibration levels produced by hammer piling activity and 50 metres for maximum vibration levels.
- Compliance with the cosmetic damage criteria of 15 mm/s (PPV) are expected at approximately 10 metres for typical vibration levels and 20 metres for maximum vibration levels based on the predicted level.
- Compliance with the cosmetic damage screening limit for reinforced heritage structure of 7.5 mm/s (PPV) occurs at 15 meters for typical vibration levels produced by hammer piling activity and 25 metres for maximum vibration levels.

[1] *A conversion to metric system (m) from imperial measurement unit (ft) have been applied for the purpose of this assessment.*

— Compliance with the cosmetic damage screening limit for un-reinforced heritage structure of 3 mm/s (PPV) occurs at 25 meters for typical vibration levels produced by hammer piling activity and 50 metres for maximum vibration levels.

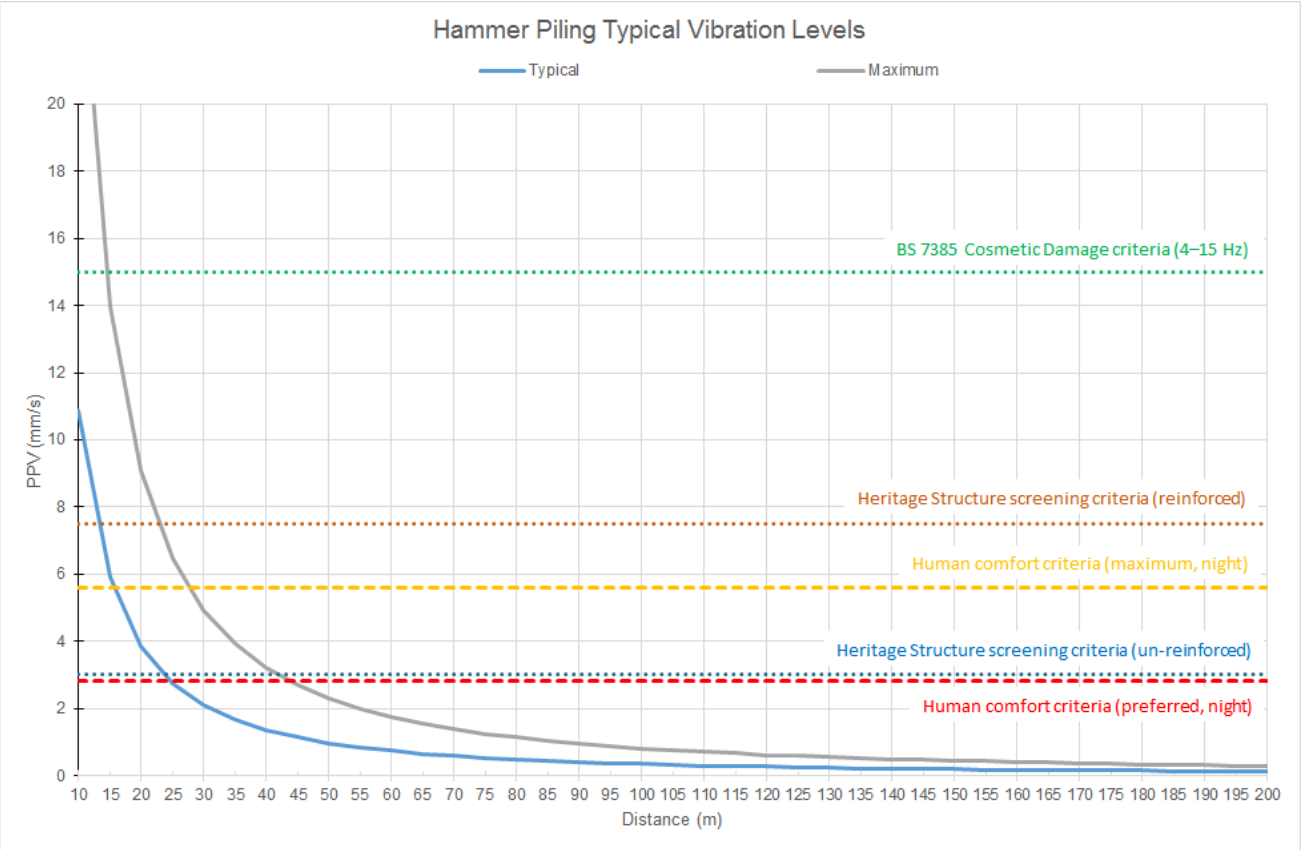


Figure 7-1 Indicative vibration levels for hammer piling

The closest heritage item is the APBS, located approximately 10 metres to the closest pile. Based on the predicted vibration levels, the vibration levels may exceed the nominated cosmetic damage screening limit for reinforced and un-reinforced heritage structure during the hammer piling activity.

The APBS is unlikely to be occupied at the time of the proposed hammer piling activity. As such, exceedance of human comfort criteria is not expected. The proposed hours of pile driving activity are detailed in Section 8.1.

Compliance with the nominated cosmetic damage criteria and human comfort criteria is predicted for community centre and commercial receivers located at 33 metres and 40 metres from the footprints. These receivers may perceive some vibration from hammer piling activity.

7.4 DISCUSSION OF THE PREDICTED VIBRATION LEVELS ON HERITAGE STRUCTURE

An assessment of predicted vibration levels in Section 2 identified one structure of heritage significance (APBS) located within the safe working distances for the hammer piling activity. It should be noted that the predicted vibration level presented in Figure 7-1 are based on a standard geometric loss spreading model of a generic plant vibration reference levels, therefore these levels are conservative and should be used for guidance only.

In addition, the provided onerous screening criteria for heritage structures (upper limit of 7.5 mm/s based on BS 7385 and lower limit of 3 mm/s based on DIN 4150, PPV) have been assumed for the APBS as the exact condition of the structure has not been confirmed at the time of the assessment. Exceedances of the nominated upper screening level

(reinforced heritage structure based on BS 7385) are usually taken as a 95% probability of no effect. Exceedance of the nominated lower screening level (un-reinforced heritage structure based on DIN 4150-3) does not necessarily lead to damage; should they be significantly exceeded, however, further investigations are necessary. Thus, the predicted exceedance at this stage of the project implies that, although low, there is a risk of cosmetic damage at the structure.

Depending on factors such as the damping of the structure, vibration duration and frequency range, the transmitted vibration during construction may cause dynamic magnification to the building structure if the resonance frequency is close to an excitation frequency of the building. It is therefore important that a specific site law based on site measurements is obtained prior to any vibration intensive works within the safe working distances (including the identified heritage structure, the APBS). The vibration site law survey (to determine transfer function and site specific vibration vs distance decay) is recommended in conjunction with vibration monitoring and condition survey of the building structure.

As a result of the predicted exceedances of the nominated vibration screening criteria, mitigation and management measures have been outlined in Section 8 to manage any potential vibration impact.

8 CONSTRUCTION SAFEGUARDS AND MANAGEMENT MEASURES

This section describes the noise and vibration safeguards and management measures that should be considered as part of Roads and Maritime's commitments for the construction of the proposal. The construction noise and vibration impact assessments and mitigation should be reviewed in more detail as the project progresses and more information regarding the construction program becomes available.

This section describes the required noise and vibration safeguards and management measures as per the CNVG that should be considered as part of Roads and Maritime's commitments for the construction of the proposal. The measures provided in this section will be dependent upon the equipment selected for use.

As part of the preparation for commencing the construction work, a construction noise and vibration management plan (CNVMP) should be prepared with reference to Practice Noise (vi) of the Environmental Noise Management Manual (RMS, 2001).

8.1 MITIGATION MEASURES

As a result of the predicted exceedance of the NMLs, reasonable feasible mitigation measures to minimise noise levels from the construction work have been investigated. The CNVG provides standard actions and mitigation measures for implementation on road construction projects. A copy of the measures is provided in Appendix C.

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

Piling work for the proposal has an estimated duration of about three weeks to complete (about fifteen nights in total). 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.

Substituting areas of the piling methodology to minimise the noise impact was previously considered. Installing piles involves drilling pile cases to the required depths, before undertaking hammering (the noisiest activity) to secure the piles into bedrock until refusal. By substituting hammering for drilling, except for when required for the final placement, the level of noise generated for piling as a task has reduced.

Timings for piling activities are noted below, with the noisiest activity (hammering the piles) restricted to the last two hours of the night-time period to minimise the impact. During these hammering activities, it is anticipated that each pile would be hammered for one minute (about 10 hits with the hammer within one minute). For each pile the activity is likely to occur about five times over a period of one hour. Of the fifteen nights of piling work, about five of these would be used for hammering in piles.

Summary of hours of night works for piling drilling activities:

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

Summary of hours of night work for piling hammering activities:

1 Setup for hammering from 4am to 5am

2 Hammering of piles from 5am to 7am.

Further minimisation of noise is provided through reviewing plant and equipment to be used on site, to ensure equipment is in good working order and not emitting excessive noise. Quieter plant and equipment would be selected for noisy tasks wherever possible, reviewing the optimal power and size required to most efficiently perform the required task.

The use of temporary barriers for water based work is typically not practical due to limited space to erect noise barriers around large noise sources, including sources on pontoons or jetties such as a piling rig. Noise monitoring, using a hand-held sound level meter would therefore be undertaken during periods associated with high noise impacts to verify the noise emissions.

As required by the CNVG, after feasible and reasonable mitigation measures have been implemented, additional mitigation measures as outlined in Section 8.3 should be considered.

8.2 VIBRATION MITIGATION MEASURES

Feasible and reasonable safeguards should be introduced when using pile hammering equipment within the specified distances of the sensitive receivers. As a result, the follow steps are recommended:

- A building condition survey should also be completed before and after the construction work at any potentially affected receivers to identify the sensitivity of the structure and existing damage. A subsequent building condition survey should also be completed at the completion of construction of the proposal to validate the implementation of mitigation measures.
- Trial works should be scheduled on commencement of the piling works. These works should commence at distance farthest away from the receivers first and gradually move closer to the receiver whilst conducting an attended vibration monitoring at the representative receiver (i.e. at APBS). This is to establish an accurate site law and acceptable working distances specific to the plant items and site conditions. The measured vibration levels will also be used to confirm the site control vibration level for the activity.
- Where work is required within the identified safe working distances of the receiver structures, implementation of additional vibration mitigation measures as outlined in Section 8.3 should be considered.

8.3 ADDITIONAL MITIGATION MEASURES

8.3.1 ADDITIONAL NOISE MITIGATION MEASURES

Additional mitigation measures should be considered after the application of reasonable and feasible noise mitigation measures.

The following additional mitigation measures (as detailed in Appendix C of CNVG) should be considered where exceedance of construction noise levels would be present after implementation of the standard measures outlined in Appendix C and to be included as part of the above noise management plan.

The most onerous additional mitigation measures that apply for each NCA and construction scenario are presented in Table 8.1.

Appendix E provides a map of NCAs and the required mitigation measures due to OOHW exceedances of the proposed construction activities. The presented maps of affected areas and associated additional mitigation measures are calculated based on predicted exceedances of the nominated NMLs.

Definitions of the abbreviations of the additional mitigation measures are provided in Table 8.2 and defined in Appendix D.

It should be noted that the due to the short duration of the noise intensive works (over 2 hours period each night) as such alternative accommodation (AA) is not considered reasonable. All other mitigation measures described in the CNVG for exceedance above 30 dB within OOHW would still apply.

Table 8.1 Additional mitigation measures - Airborne

NCA	ADDITIONAL MITIGATION MEASURES (AIRBORNE)[1]				
	Day		Night		
	S01[2]	S02	S03	S04	S05
NCA01	-	-	N	V, N, R2, DR	N
NCA02	-	-	V, N, R2, DR	V, IB, N, PC, SN, R2, DR	V, N, R2, DR
NCA03	N, V	N, V	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
NCA04	-	-	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR	V, IB, N, PC, SN, R2, DR
NCA05	-	-	V, N, R2, DR	V, N, R2, DR	N

1: Abbreviation outlined in Table 8.2 and defined in Appendix D.

2: No additional mitigation is required for exceedance of the standard hours below 10 dB of the NMLs.

Table 8.2 CNVG Abbreviation measures

ABBREVIATION	MEASURES
N	Notification (letterbox drop or equivalent)
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite Period 1
R2	Respite Period 2
DR	Duration respite
V	Verification

8.3.2 ADDITIONAL VIBRATION MITIGATION MEASURES

The predicted vibration levels in Section 7.3 indicate exceedance of the nominated screening limit for cosmetic damage of heritage structure from hammer piling (S04) activity. As such, additional mitigation measures should be considered. These mitigation measures are outlined in Table 8.3 and discussed further below.

Table 8.3 Additional mitigation measures - Vibration

NCA	MINIMUM DISTANCES (M)	ADDITIONAL MITIGATION MEASURES (VIBRATION)
		Night
		S04
NCA03	10	IB, N, PC, RP2, SN, CS, VM,

1: Abbreviation outlined in Table 8.2 and defined in Appendix D.

Methodology for individual briefings (IB), notification (N), phone calls (PC), respite periods (RP) and specific notification (SN) is detailed in the additional noise mitigation sections above. Condition surveys (CS) and vibration monitoring (VM) would as also be undertaken, discussed further below.

Condition surveys (CS)

Building condition surveys should also be completed both before and after the construction work at any potentially affected receivers to assess the condition of the structure before and after construction and validate the mitigation implemented.

Vibration Monitoring (VM)

When construction works are within the safe working distances, a vibration monitoring system should be installed with set warning and halt levels to notify plant operators during work activity (via flashing light, audible alarm, SMS, etc) to ensure that levels remain below the nominated control vibration levels (Section 4.4). Vibration monitoring should be undertaken at the closest point on the structure to the works. Where exceedances are detected, the relevant works will stop and alternative methods and/or mitigation measures will be investigated.

9 CONCLUSION

WSP has undertaken a construction noise and vibration assessment for the proposed Abbotsford Wharf upgrade.

Five construction scenarios have been assessed for five noise catchment areas surrounding the proposal site. The key findings of this assessment include:

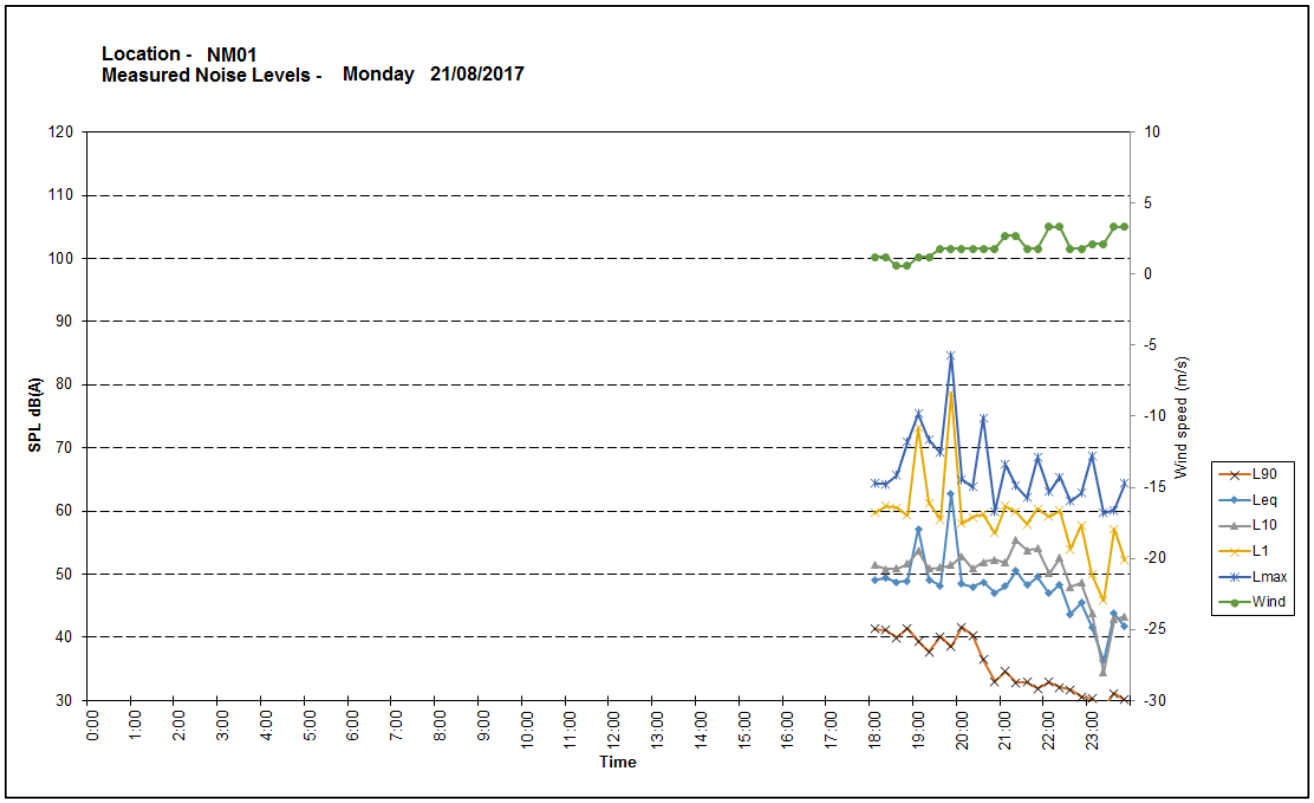
- NMLs were derived for residential and non-residential sensitive land uses using the ICNG in accordance with the CNVG based on the background noise monitoring
- NML exceedances predicted at residential receivers for:
  - construction work during standard hours at NCA01, NCA02 and NCA03 for general construction (S01) and demolition and removal of piles (S02).
  - out of hours construction work are predicted at all NCAs for all other scenarios, including drilling, hammering and lifting pre-fabricated units (S03, S04 and S05).
- The standard CNVG construction noise management measures and additional mitigation measures are recommended for the receivers within NCAs with predicted exceedances.
- NML exceedances predicted at other receivers for construction work during standard hours at NCA03 (active recreational areas and commercial receivers).
- Sleep disturbance impacts have been predicted at NCA03 for all scenarios occurring during the night-time. The proposed works may also have impacts on the sleep quality (difficulty falling asleep and waking up early) for these receivers.
- Exceedance of the vibration screening level for cosmetic damage due to ground-borne vibration has been identified at one sensitive receivers (the Abbotsford Point Boat Shed) located approximately 10 metres from the construction footprints during the pile hammering (typical vibration levels). Additional mitigation measures have been provided to manage and decrease risk of vibration impacts to this receiver.

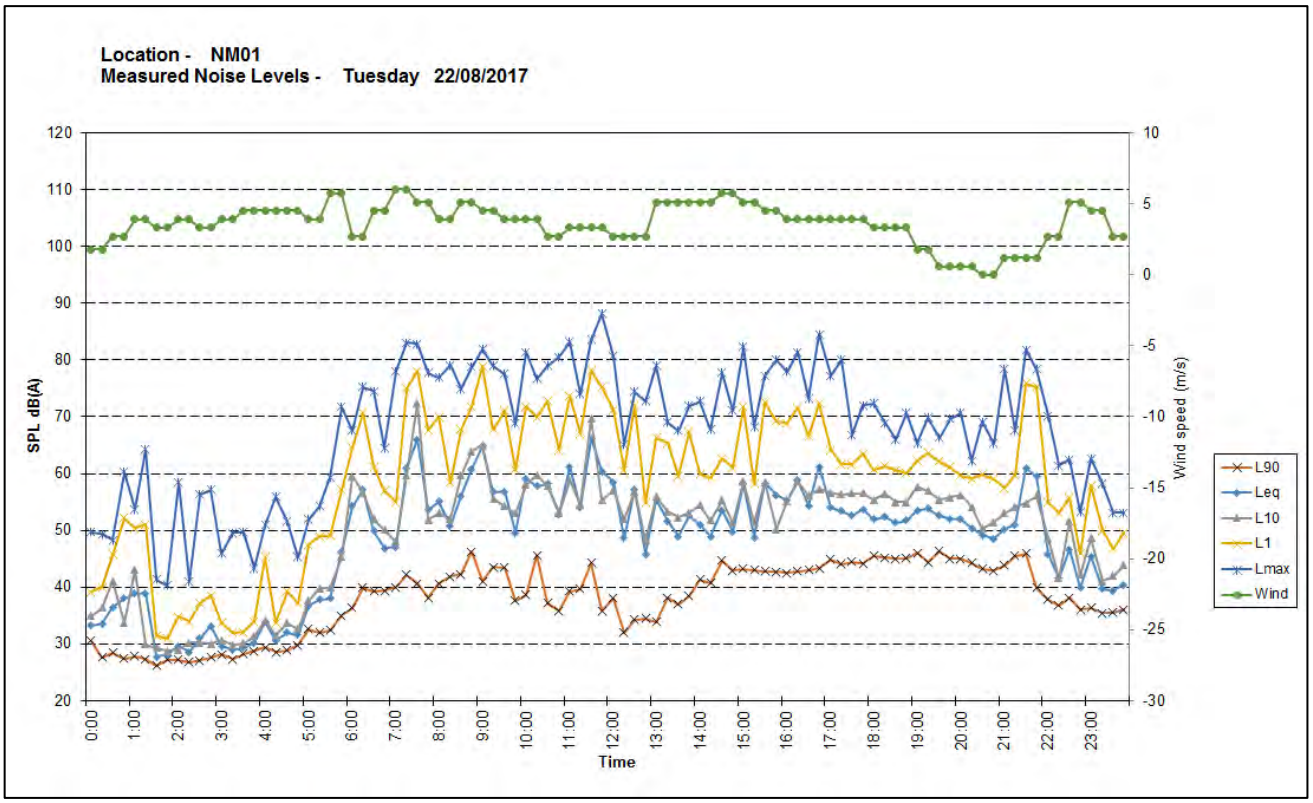
APPENDIX A

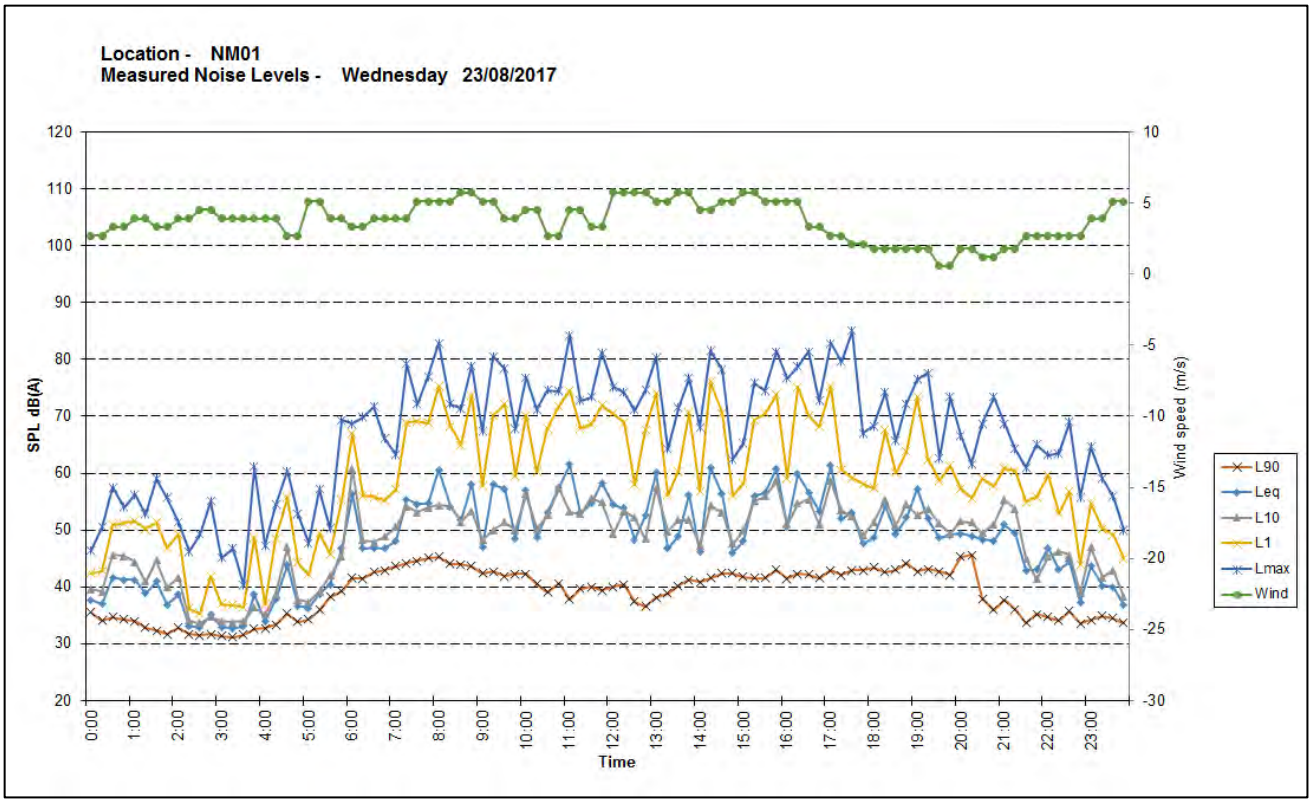
NOISE MONITORING GRAPHS – NM01

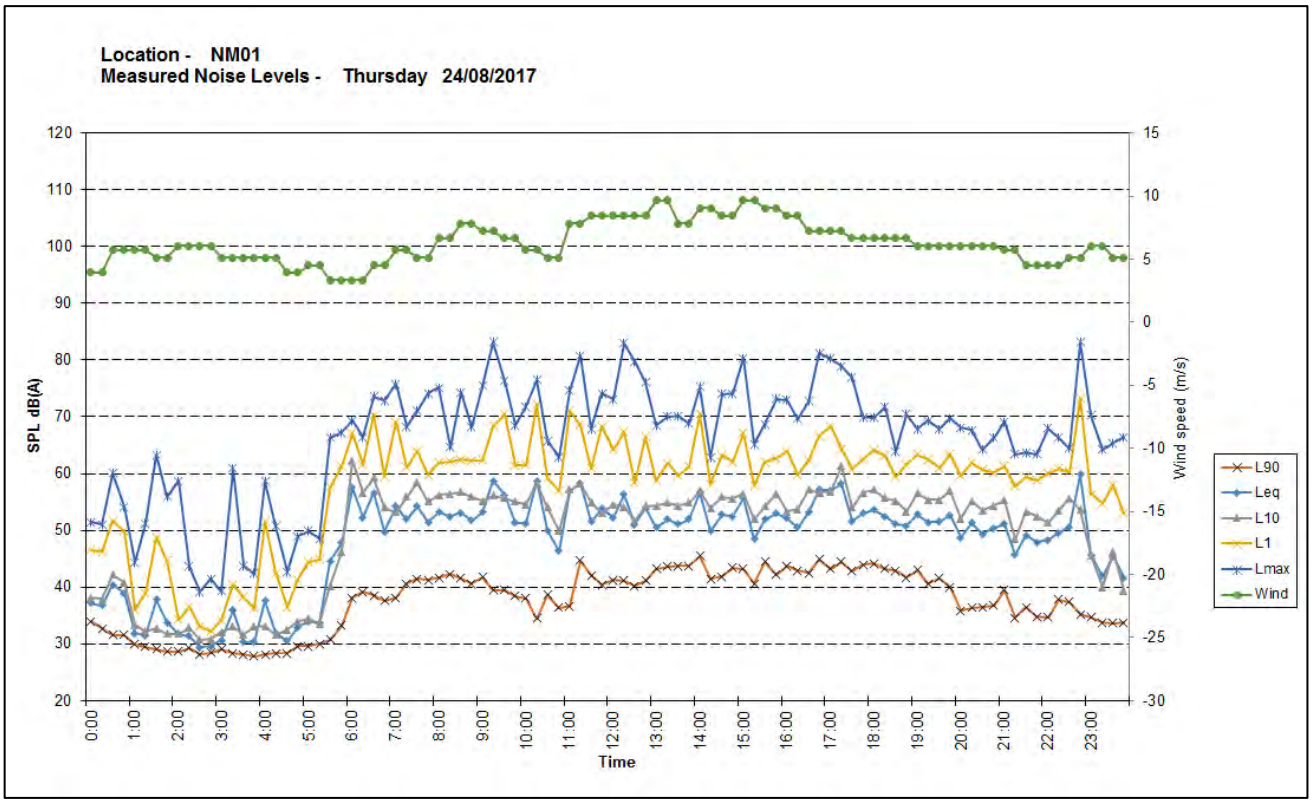
Note 1: Greyed area display measurements excluded due to weather

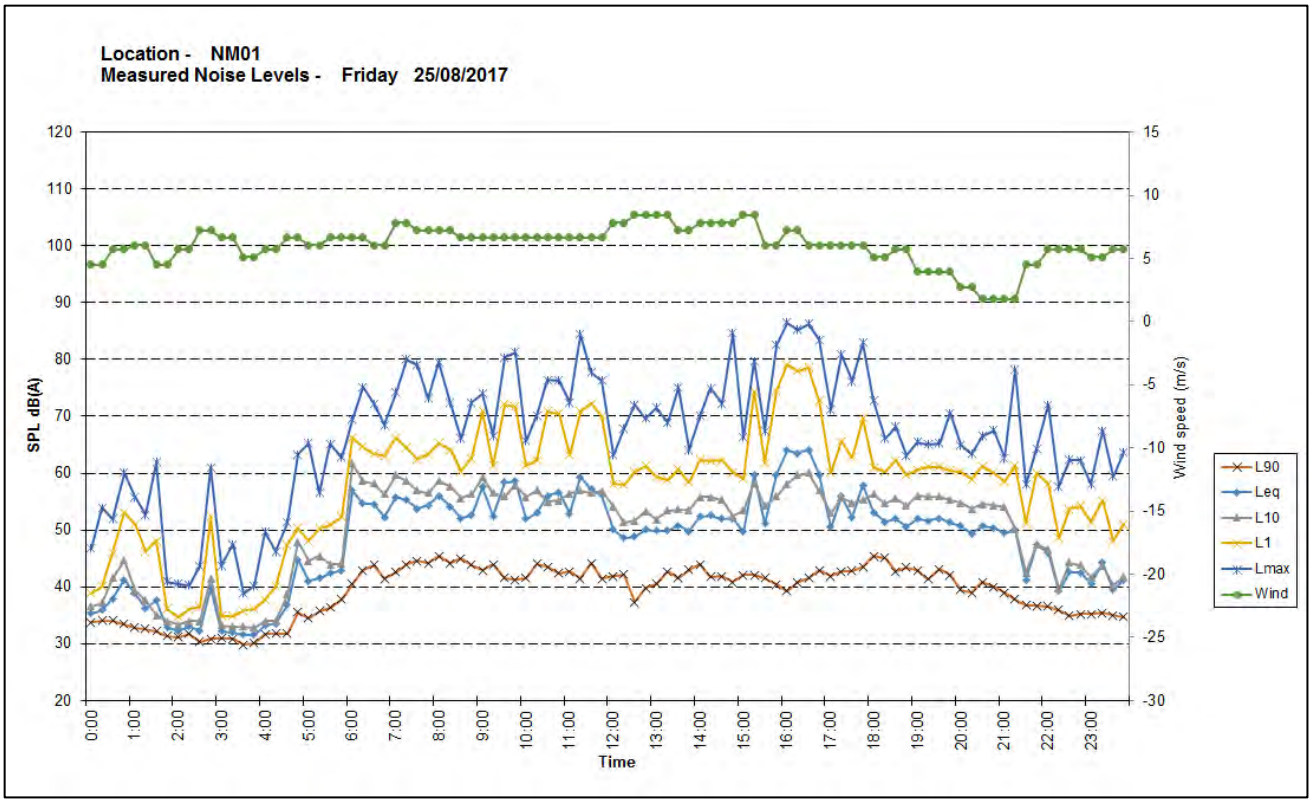
Note 2: The presented wind speed data have been obtained from Sydney Observatory Hill Station (Station ID: 66062)

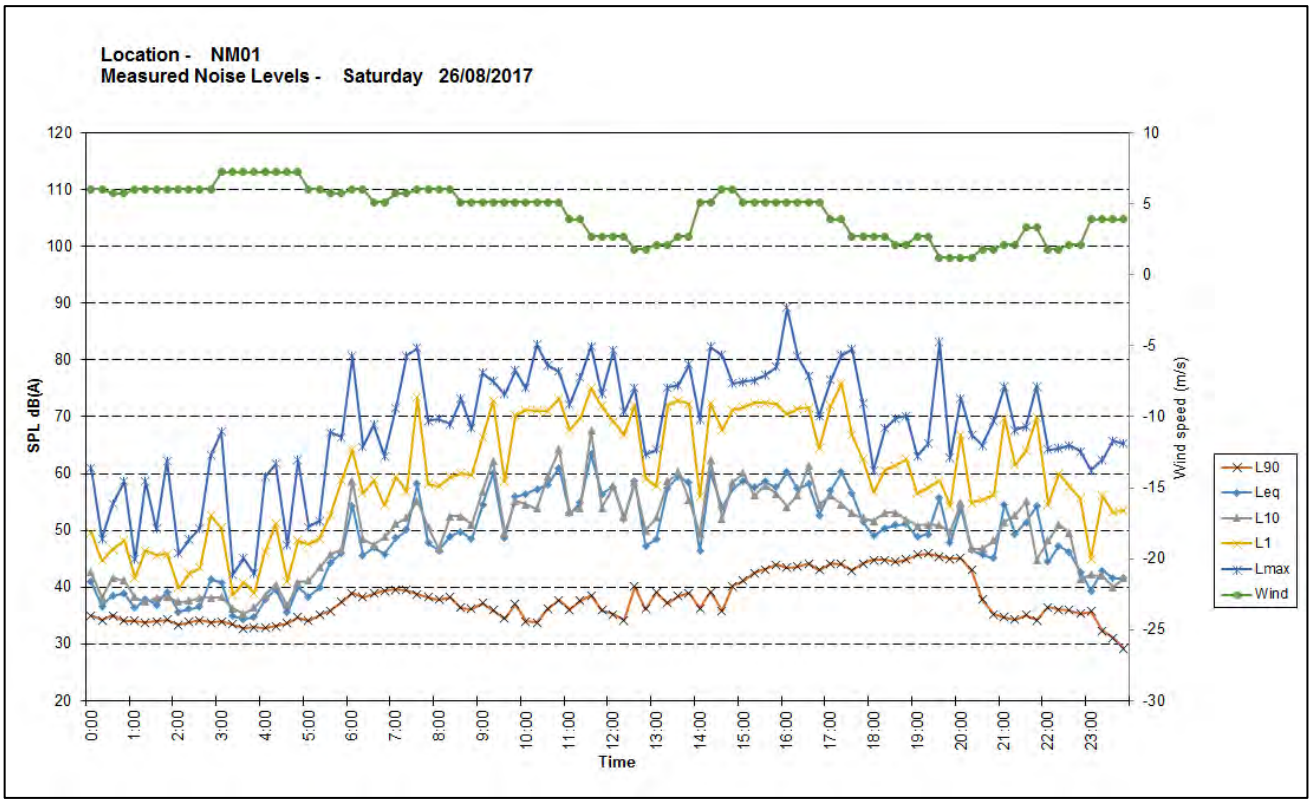


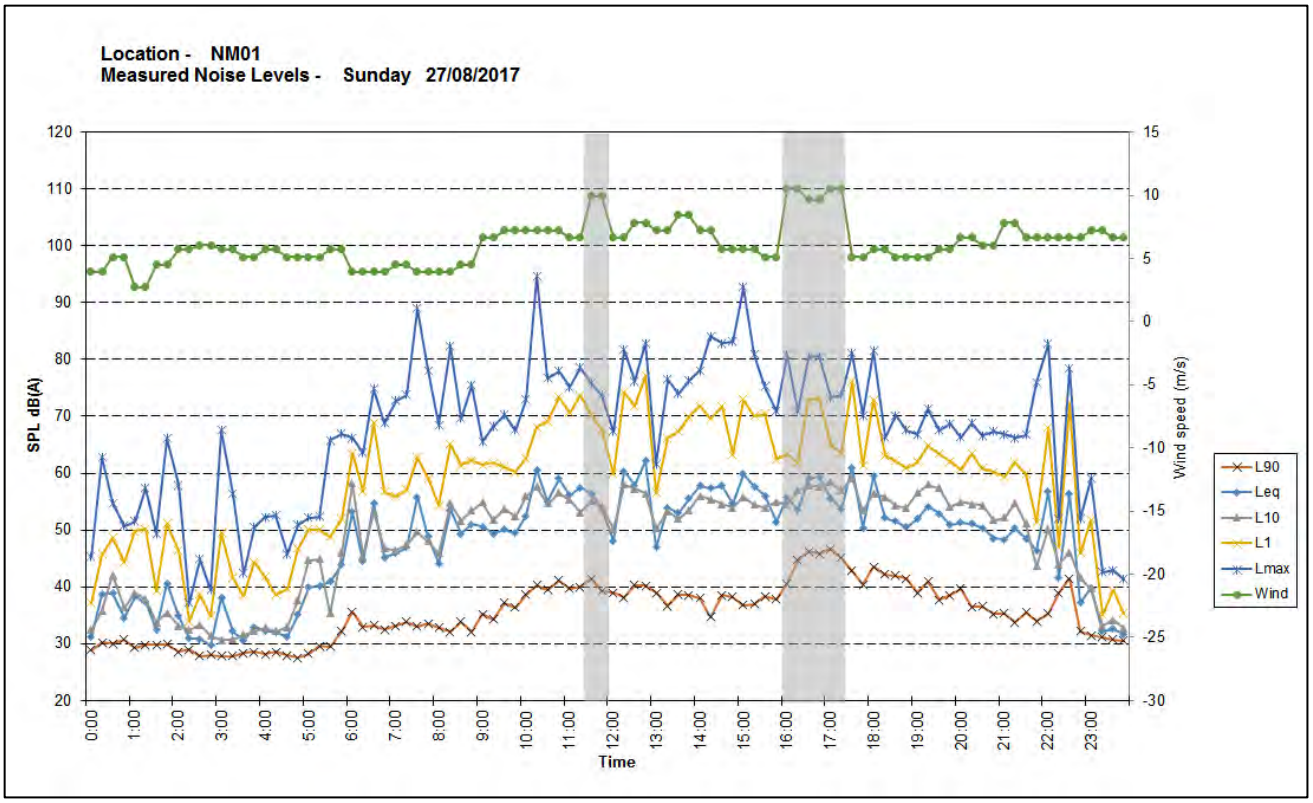

Location - NM01
Measured Noise Levels - Tuesday 22/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind

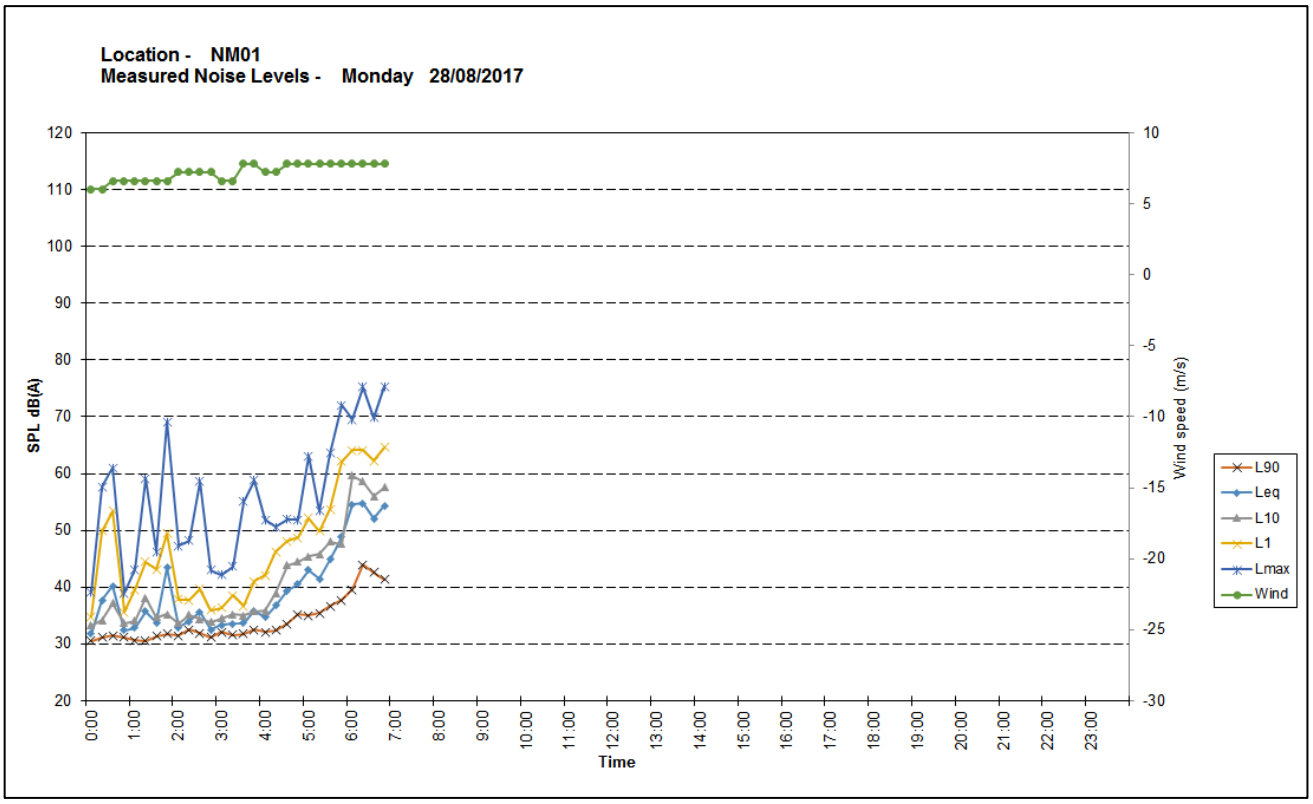

Location - NM01
Measured Noise Levels - Wednesday 23/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM01
Measured Noise Levels - Thursday 24/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM01
Measured Noise Levels - Friday 25/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM01
Measured Noise Levels - Saturday 26/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM01
Measured Noise Levels - Sunday 27/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind

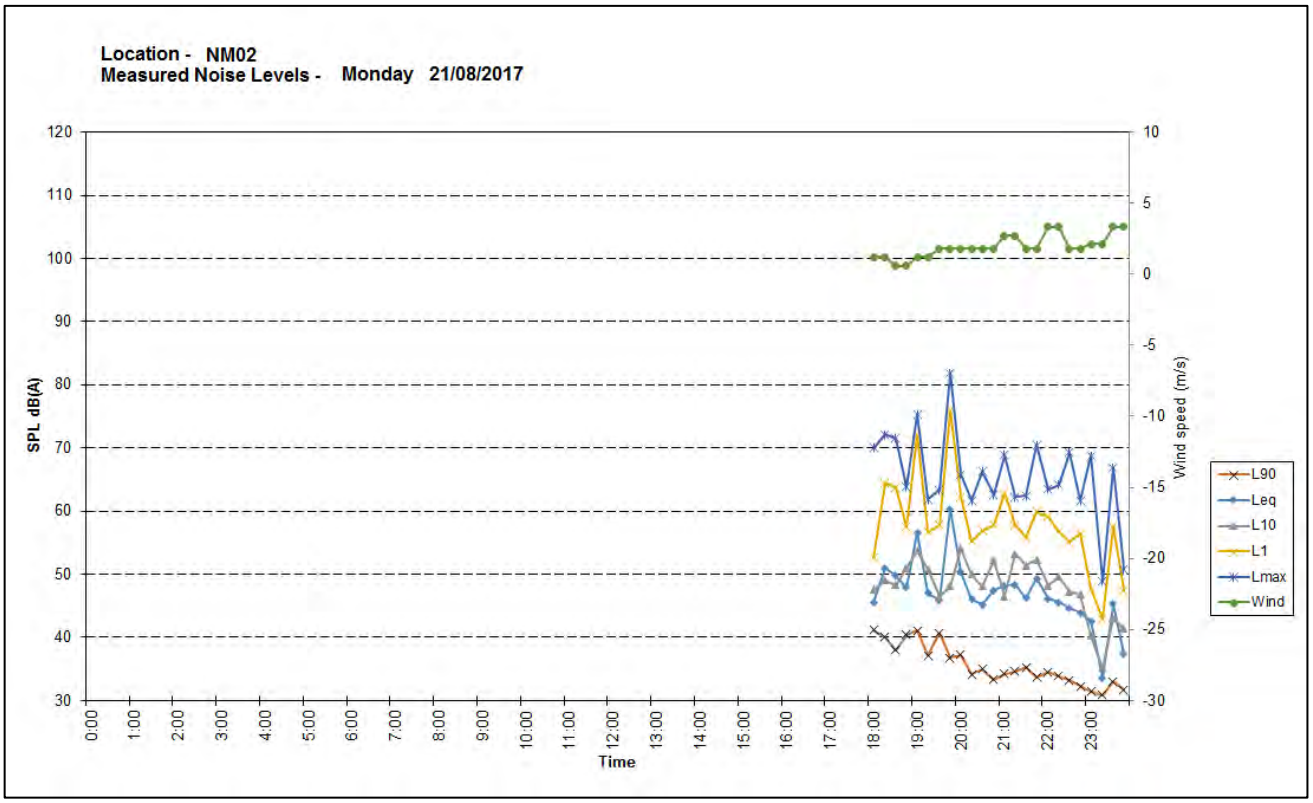

Location - NM01
Measured Noise Levels - Monday 28/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind

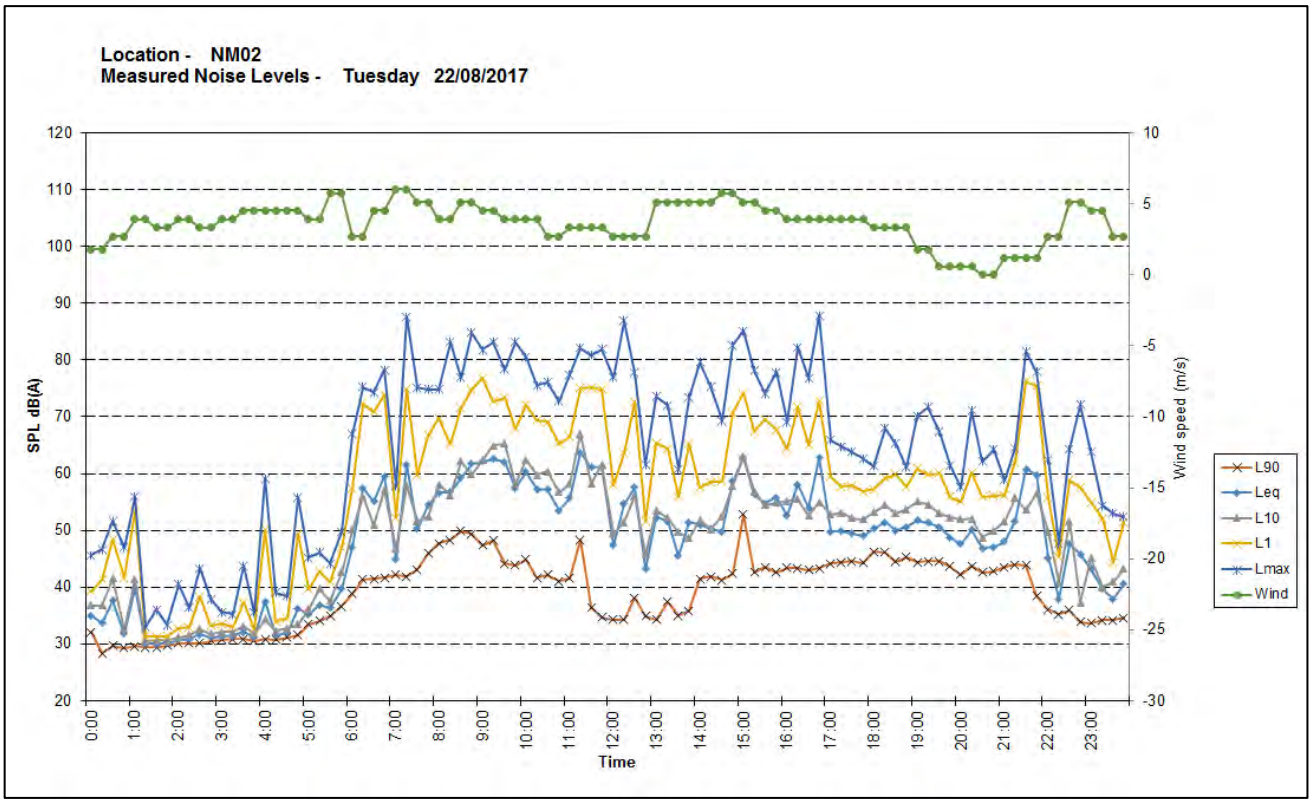
APPENDIX B

NOISE MONITORING GRAPHS – NM02

Note 1: Greyed area display measurements excluded due to weather

Note 2: The presented wind speed data have been obtained from Sydney Observatory Hill Station (Station ID: 66062)

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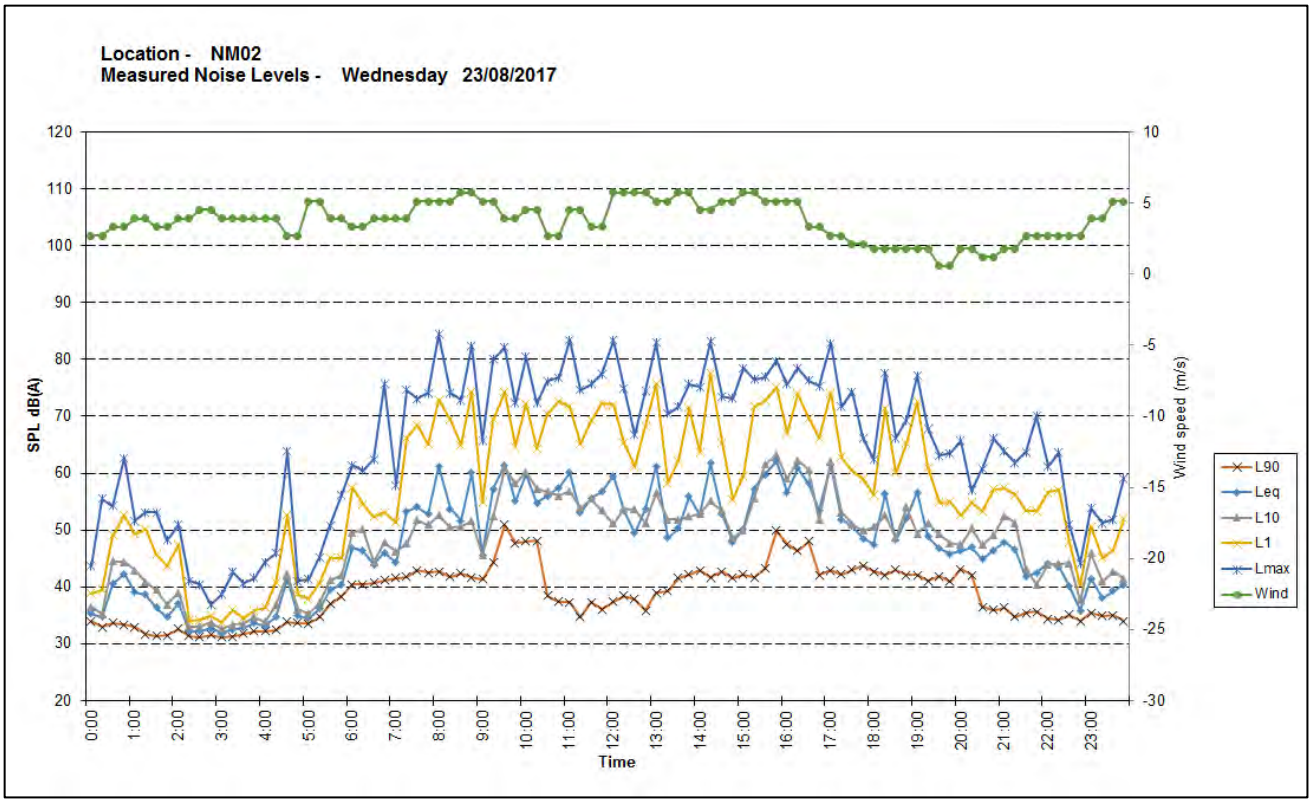
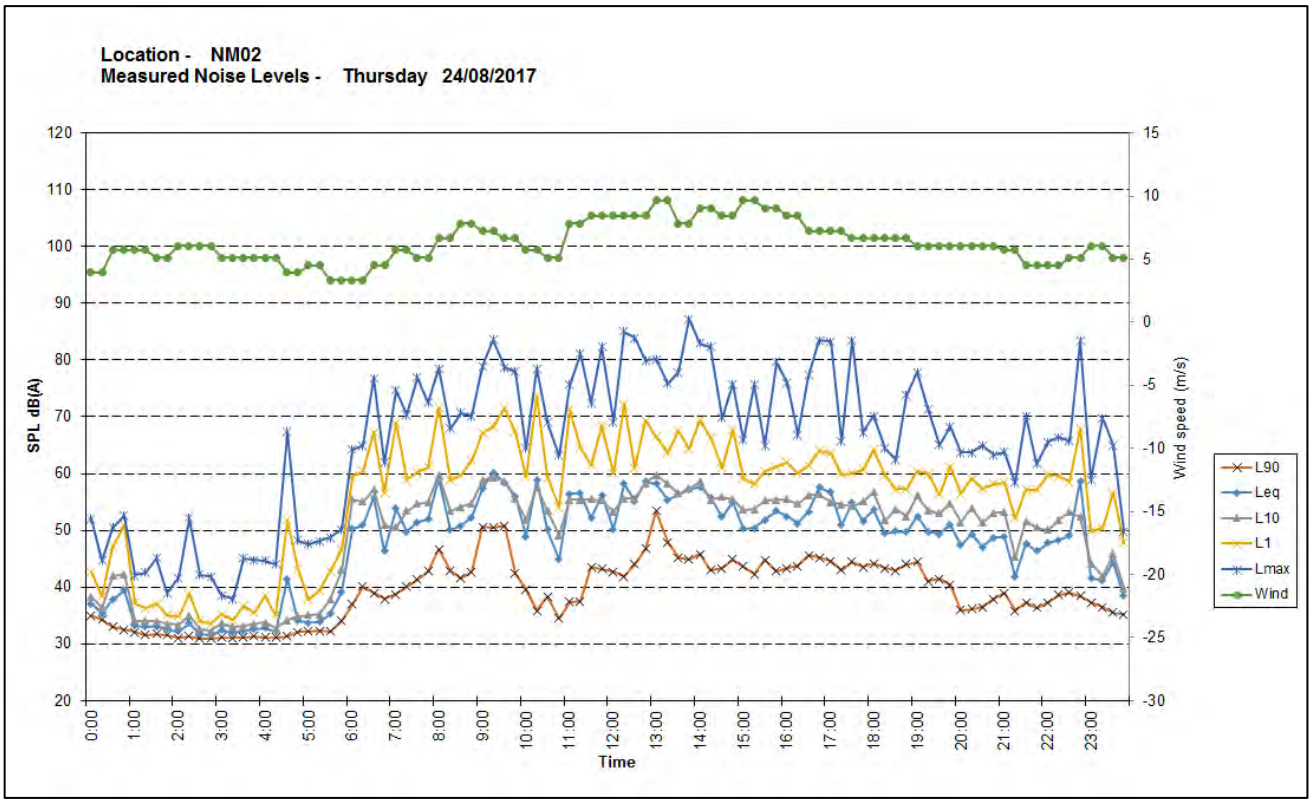
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM02
Measured Noise Levels - Wednesday 23/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM02
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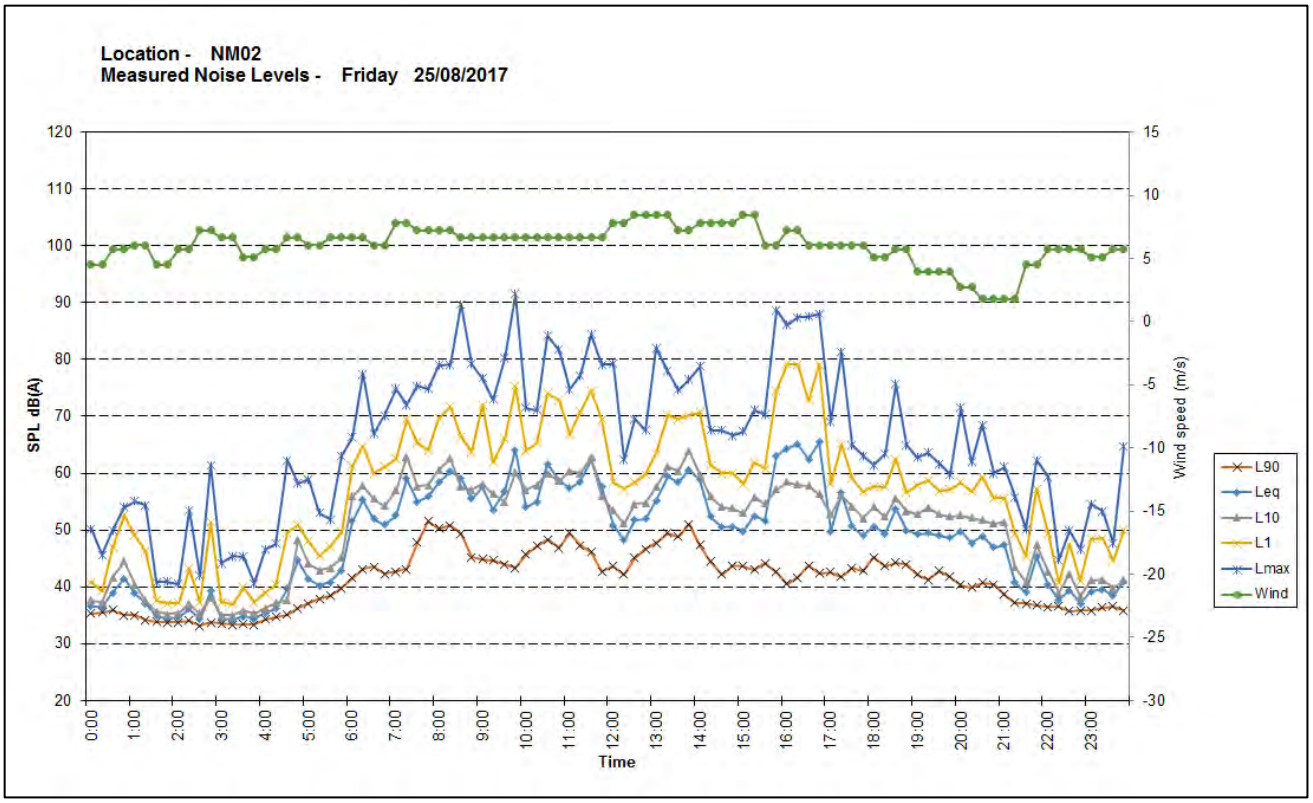
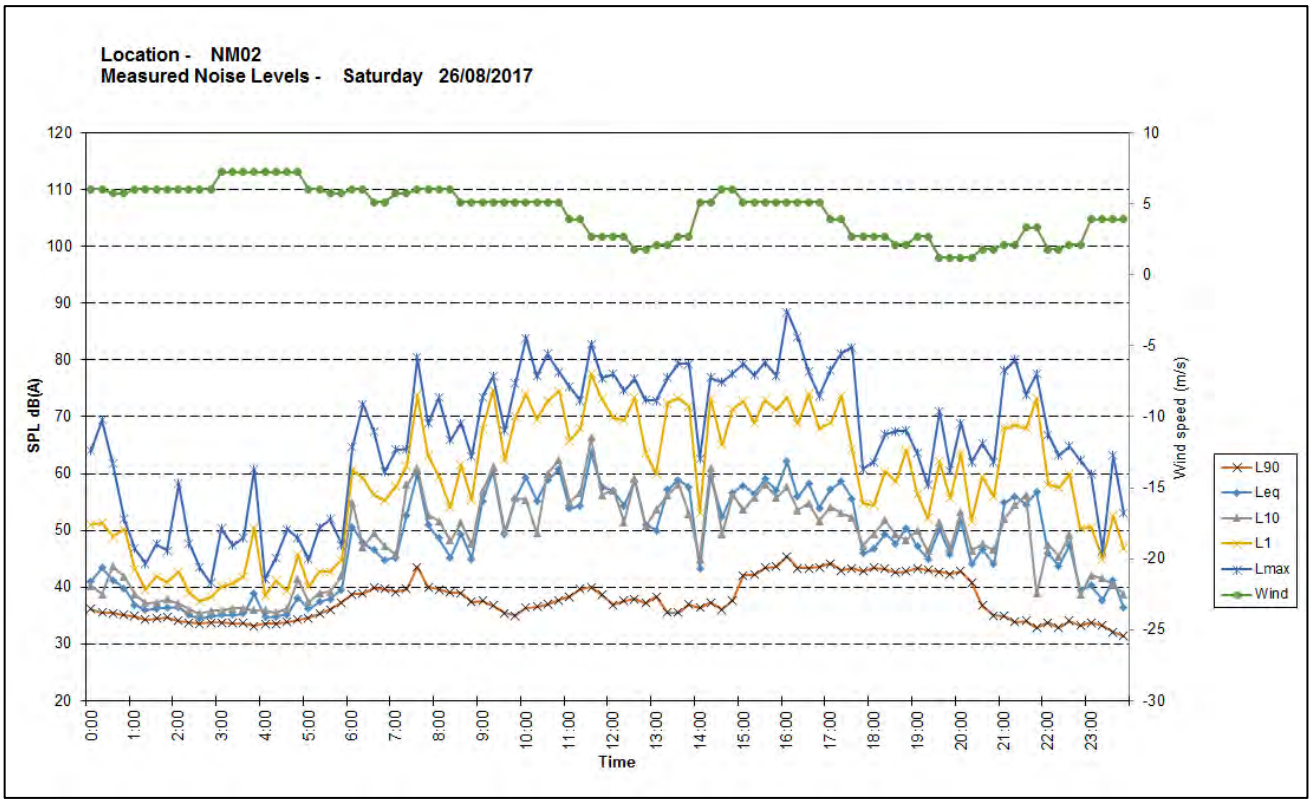
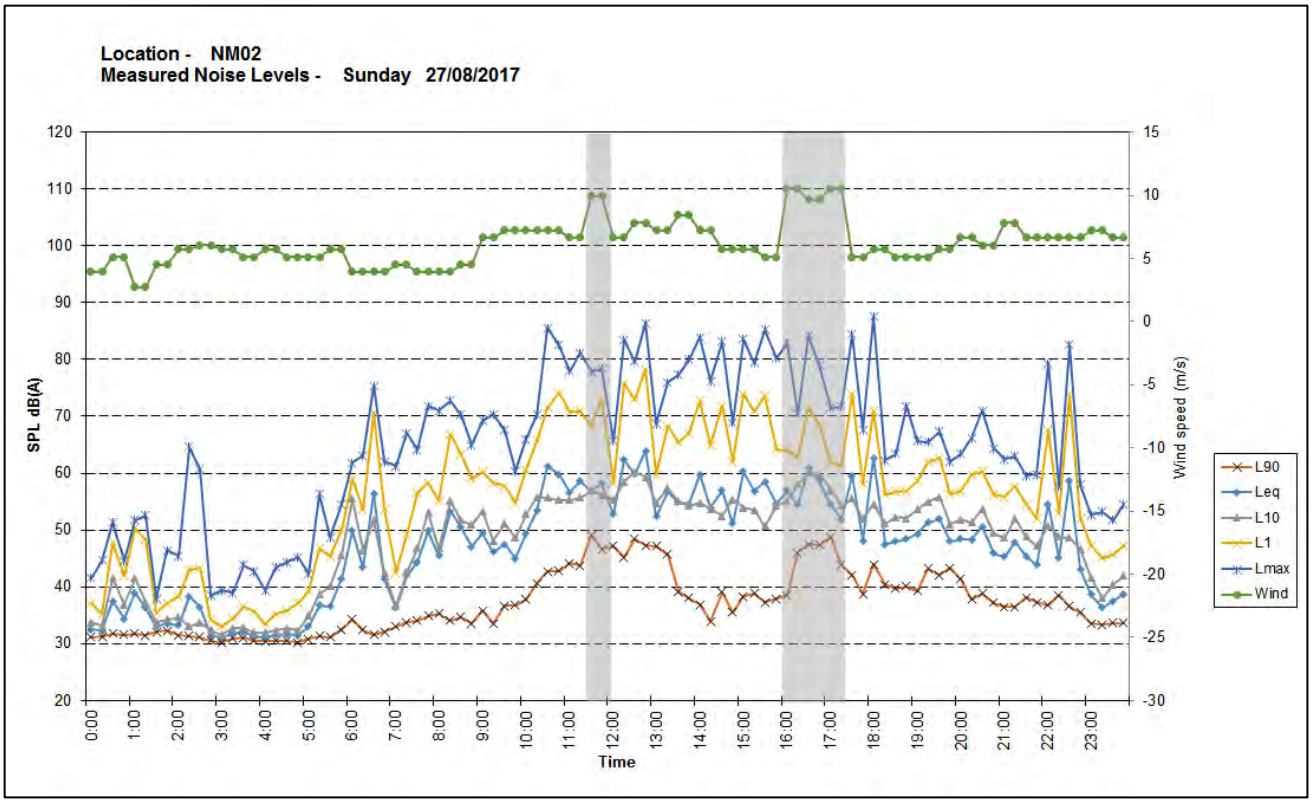
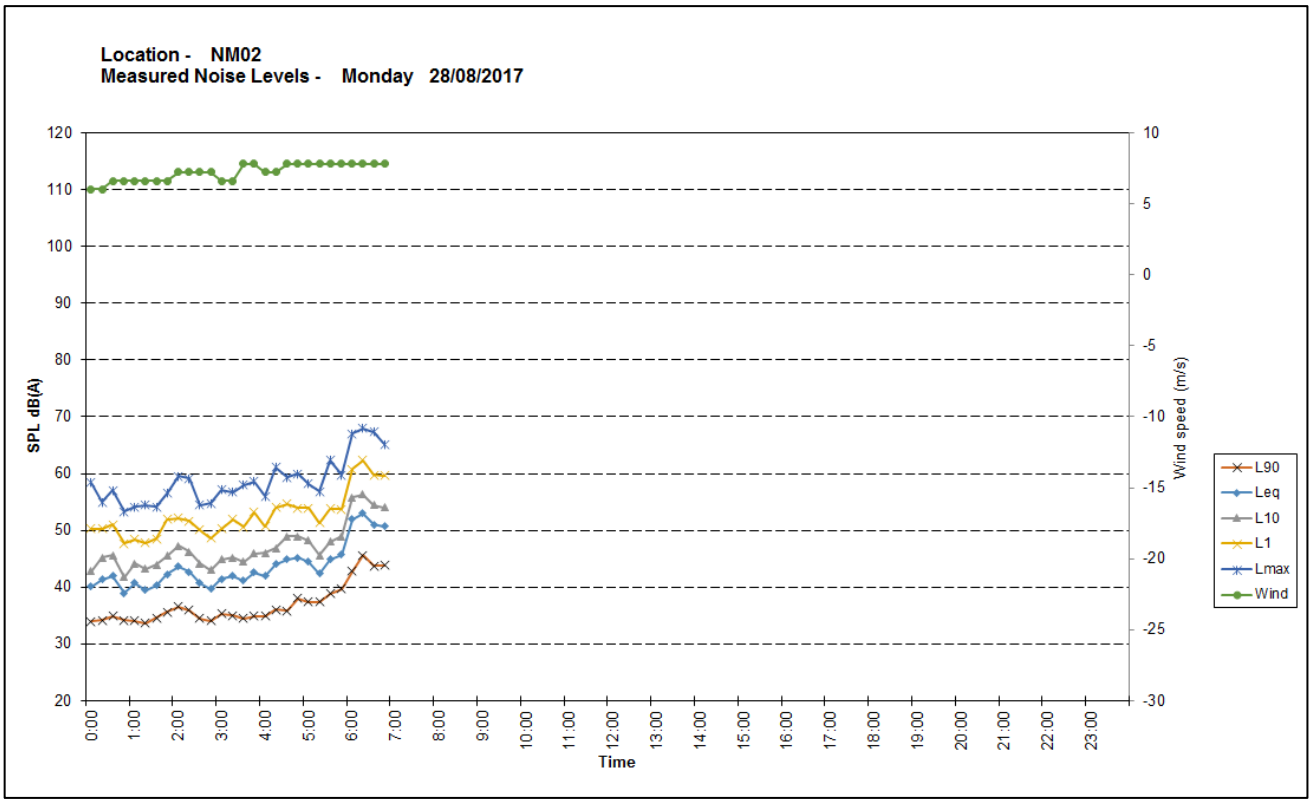
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM02
Measured Noise Levels - Friday 25/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM02
Measured Noise Levels - Saturday 26/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM02
Measured Noise Levels - Sunday 27/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind


Location - NM02
Measured Noise Levels - Monday 28/08/2017
SPL dB(A)
Wind speed (m/s)
Time
L90
Leq
L10
L1
Lmax
Wind

APPENDIX C

CNVG STANDARD MITIGATION MEASURES

ACTION REQUIRED	APPLIES TO	DETAILS
Management measures		
Implementation of any project specific mitigation measures required.	Airborne noise	Implementation of any project specific mitigation measures required.
Implement community consultation or notification measures (refer to Appendix C for further details of each measure).	Airborne noise. Ground-borne noise & vibration.	Notification detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required. Please contact Roads and Maritime Communication and Stakeholder Engagement for guidance. Website (If required) Contact telephone number for community Email distribution list (if required) Community drop in session (if required by approval conditions).
Site inductions	Airborne noise. Ground-borne noise & vibration	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: — all project specific and relevant standard noise and vibration mitigation measures — relevant licence and approval conditions — permissible hours of work — any limitations on high noise generating activities — location of nearest sensitive receivers — construction employee parking areas — designated loading/unloading areas and procedures — site opening/closing times (including deliveries) — environmental incident procedures.

ACTION REQUIRED	APPLIES TO	DETAILS
Behavioural practices	Airborne noise	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
Verification	Airborne noise Ground-borne noise & vibration	Where specified under Appendix C a noise verification program is to be carried out for the duration of the works in accordance with the Construction Noise and Vibration Management Plan and any approval and licence conditions.
Attended vibration measurements	Ground-borne vibration	Where required attended vibration measurements should be undertaken at the commencement of vibration generating activities to confirm that vibration levels are within the acceptable range to prevent cosmetic building damage.
Update Construction Environmental Management Plans	Airborne noise. Ground-borne noise & vibration.	The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies.
Building condition surveys	Vibration Blasting	Undertake building dilapidation surveys on all buildings located within the buffer zone prior to commencement of activities with the potential to cause property damage
Source controls		
Construction hours and scheduling.	Airborne noise. Ground-borne noise & vibration.	Where feasible and reasonable, construction should be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels should be scheduled during less sensitive time periods.
Construction respite period during normal hours and out- of-hours work	Ground-borne noise & vibration. Airborne noise.	Please refer to Appendix C for more details on the following respite measures: — Respite Offers (RO) — Respite Period 1 (R1) — Respite Period 2 (R2) — Duration Respite (DR)
Equipment selection.	Airborne noise. Ground-borne noise & vibration	Use quieter and less vibration emitting construction methods where feasible and reasonable. For example, when piling is required, bored piles rather than impact-driven piles will minimise noise and vibration impacts. Similarly, diaphragm wall construction techniques, in lieu of sheet piling, will have significant noise and vibration benefits. Ensure plant including the silencer is well maintained.
Plant noise levels.	Airborne-noise.	The noise levels of plant and equipment must have operating Sound Power or Sound Pressure Levels compliant with the criteria in Appendix H. Implement a noise monitoring audit program to ensure equipment remains within the more stringent of the manufacturers specifications or Appendix H.

ACTION REQUIRED	APPLIES TO	DETAILS
Rental plant and equipment.	Airborne-noise.	The noise levels of plant and equipment items are to be considered in rental decisions and in any case cannot be used on site unless compliant with the criteria in Table 2.
Use and siting of plant.	Airborne-noise.	The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers. Only have necessary equipment on site.
Plan worksites and activities to minimise noise and vibration.	Airborne noise. Ground-borne vibration.	Locate compounds away from sensitive receivers and discourage access from local roads. Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site. Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impact by concentrating noisy activities at one location and move to another as quickly as possible. Very noise activities should be scheduled for normal working hours. If the work can not be undertaken during the day, it should be completed before 11:00pm. Where practicable, work should be scheduled to avoid major student examination periods when students are studying for examinations such as before or during Higher School Certificate and at the end of higher education semesters. If programmed night work is postponed the work should be re-programmed and the approaches in this guideline apply again.
Reduced equipment power	Airborne noise. Ground-borne vibration.	Use only the necessary size and power
Non-tonal and ambient sensitive reversing alarms	Airborne noise.	Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work. Consider the use of ambient sensitive alarms that adjust output relative to the ambient noise level.
Minimise disturbance arising from delivery of goods to construction sites.	Airborne noise.	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.

ACTION REQUIRED	APPLIES TO	DETAILS
Engine compression brakes	Construction vehicles	Limit the use of engine compression brakes at night and in residential areas. Ensure vehicles are fitted with a maintained Original Equipment Manufacturer exhaust silencer or a silencer that complies with the National Transport Commission's 'In-service test procedure' and standard.
Path controls		
Shield stationary noise sources such as pumps, compressors, fans etc.	Airborne noise.	Stationary noise sources should be enclosed or shielded where feasible and reasonable whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS 2436:2010 lists materials suitable for shielding.
Shield sensitive receivers from noisy activities.	Airborne noise.	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.
Receptor controls		
Structural surveys and vibration monitoring	Ground-borne vibration.	Pre-construction surveys of the structural integrity of vibration sensitive buildings may be warranted. At locations where there are high-risk receptors, vibration monitoring should be conducted during the activities causing vibration.
See Appendix C for additional measures	Airborne noise. Ground-borne vibration.	In some instances additional mitigation measures may be required.

APPENDIX D

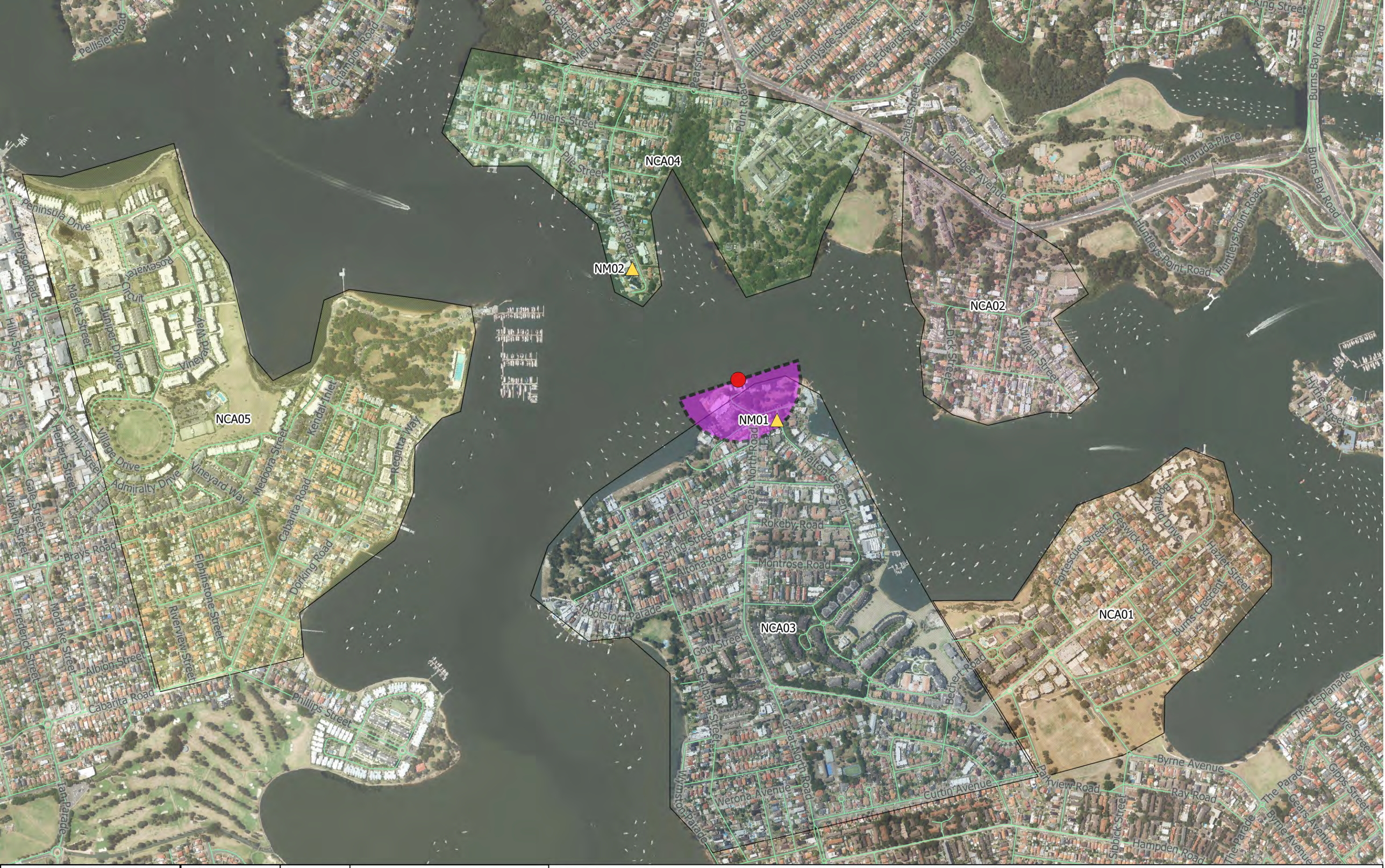
CNVG ADDITIONAL MITIGATION MEASURES

ABBREVIATION	MEASURE	DESCRIPTION
N	Notification (letterbox drop or equivalent)	Advanced warning of works and potential disruptions can assist in reducing the impact on the community. The notification may consist of a letterbox drop (or equivalent) detailing work activities, time periods over which these will occur, impacts and mitigation measures. Notification should be a minimum of 5 working days prior to the start of works. The approval conditions for projects may also specify requirements for notification to the community about works that may impact on them.
SN	Specific notifications	Specific notifications are letterbox dropped (or equivalent) to identified stakeholders no later than seven calendar days ahead of construction activities that are likely to exceed the noise objectives. The specific notification provides additional information when relevant and informative to more highly affected receivers than covered in general letterbox drops. The exact conditions under which specific notifications would proceed are defined in the relevant Additional Mitigation Measures (Tables C1 to C3). This form of communication is used to support periodic notifications, or to advertise unscheduled works.
PC	Phone calls	Phone calls detailing relevant information made to identified/affected stakeholders within seven calendar days of proposed work. Phone calls provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs. Where the resident cannot be telephoned then an alternative form of engagement should be used.
IB	Individual briefings	Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Project representatives would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project. Where the resident cannot be met with individually then an alternative form of engagement should be used.
RO	Respite offer	Respite Offers should be considered made where there are high noise and vibration generating activities near receivers. As a guide work should be carried out in continuous blocks that do not exceed 3 hours each, with a minimum respite period of one hour between each block. The actual duration of each block of work and respite should be flexible to accommodate the usage of and amenity at nearby receivers. The purpose of such an offer is to provide residents with respite from an ongoing impact. This measure is evaluated on a project-by-project basis, and may not be applicable to all projects.

ABBREVIATION	MEASURE	DESCRIPTION
R1	Respite Period 1	Out of hours construction noise in out of hours period 1 shall be limited to no more than three consecutive evenings per week except where there is a Duration Respite. For night work these periods of work should be separated by not less than one week and no more than 6 evenings per month
R2	Respite Period 2	Night-time construction noise in out of hours period 2 shall be limited to two consecutive nights except for where there is a Duration Respite. For night work these periods of work should be separated by not less than one week and 6 nights per month. Where possible, high noise generating works shall be completed before 11pm.
DR	Duration respite	Respite offers and respite periods 1 and 2 may be counterproductive in reducing the impact on the community for longer duration projects. In this instance and where it can be strongly justified it may be beneficial to increase the work duration, number of evenings or nights worked through Duration Respite so that the project can be completed more quickly. The project team should engage with the community where noise levels are expected to exceed the NML to demonstrate support for Duration Respite. Where there are few receivers above the NML each of these receivers should be visited to discuss the project to gain support for Duration Respite.
AA	Alternative accommodation	Alternative accommodation options may be offered to residents living in close proximity to construction works that are likely to experience highly intrusive noise levels. The specifics of the offer will be identified on a project-by-project basis. Additional aspects for consideration shall include whether the highly intrusive activities occur throughout the night or before midnight.
V	Verification	See Appendix F of CNVG for more details about verification of Noise and Vibration levels as part of routine checks of noise levels or following reasonable complaints. This verification should include measurement of the background noise level and construction noise. Note this is not required for projects less than three weeks unless to assist in managing complaints.

APPENDIX E

ADDITIONAL MITIGATION MEASURE LOCATIONS



Map: Construction S01 - Additional mitigation areas	Author: TDN	
Date: 13/09/2017	Approved by: MMS	

To be read in conjunction with WSP document: 2271407A-170913-TDN-ABBOTSFORD CNVIA

Map Source: NSW SIX Maps

80 0 80 160 240 320 m

1:9,000 at A3

Legend

- Project site
- Loggers
- NCA01
- NCA02
- NCA03
- NCA04
- NCA05

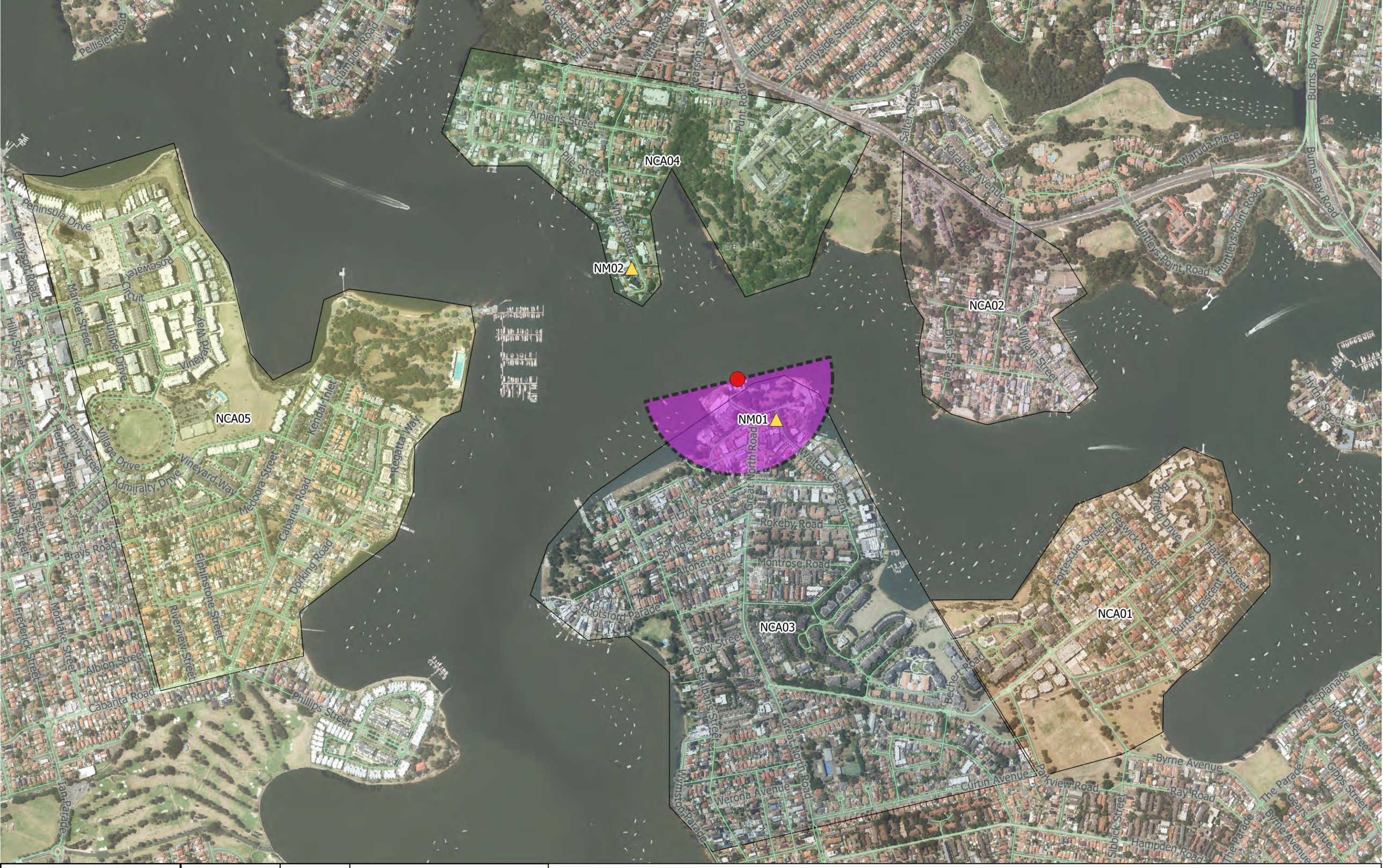
Mitigations

- N
- V, N, R2, DR
- V, IB, N, PC, SN, R2, DR
- N, V, PC, RO
- N, V

Sydney Ferry Wharfs

Construction and vibration noise impact assessment

wsp



Map: Construction S02 - Additional mitigation areas	Author: TDN	
Date: 13/09/2017	Approved by: MMS	

To be read in conjunction with WSP document: 2271407A-170913-TDN-ABBOTSFORD CNVIA

Map Source: NSW SIX Maps

80 0 80 160 240 320 m

1:9,000 at A3

Legend

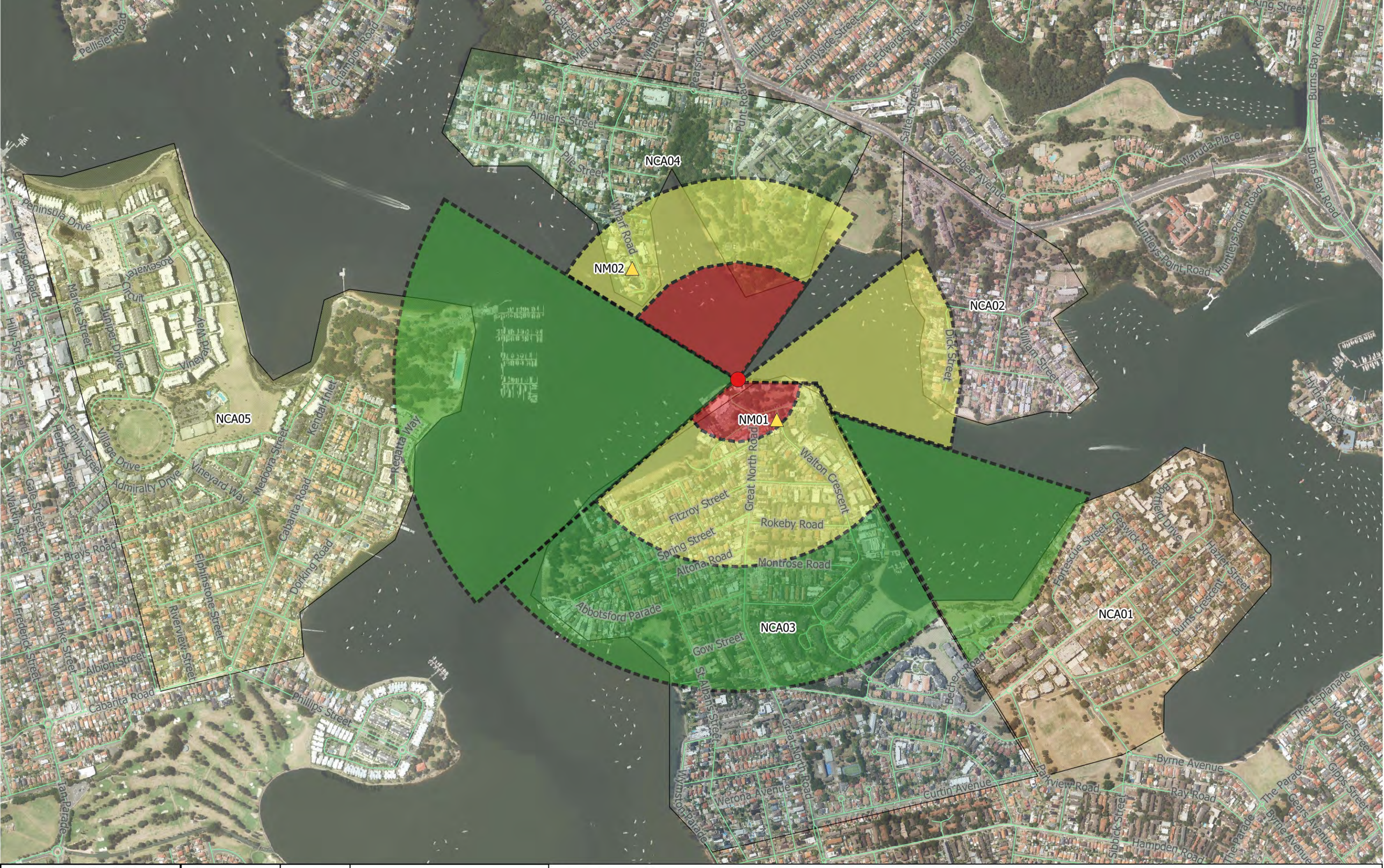
- Project site
- Loggers
- NCA01
- NCA02
- NCA03
- NCA04
- NCA05

Mitigations

- N
- V, N, R2, DR
- V, IB, N, PC, SN, R2, DR
- N, V, PC, RO
- N, V

Sydney Ferry Wharfs

Construction and vibration noise impact assessment



Map: Construction S03 - Additional mitigation areas	Author: TDN	
Date: 13/09/2017	Approved by: MMS	

To be read in conjunction with WSP document: 2271407A-170913-TDN-ABBOTSFORD CNVIA

Map Source: NSW SIX Maps

80 0 80 160 240 320 m

1:9,000 at A3

Legend

- Project site
- Loggers
- NCA01
- NCA02
- NCA03
- NCA04
- NCA05

Mitigations

- N
- V, N, R2, DR
- V, IB, N, PC, SN, R2, DR
- N, V, PC, RO
- N, V

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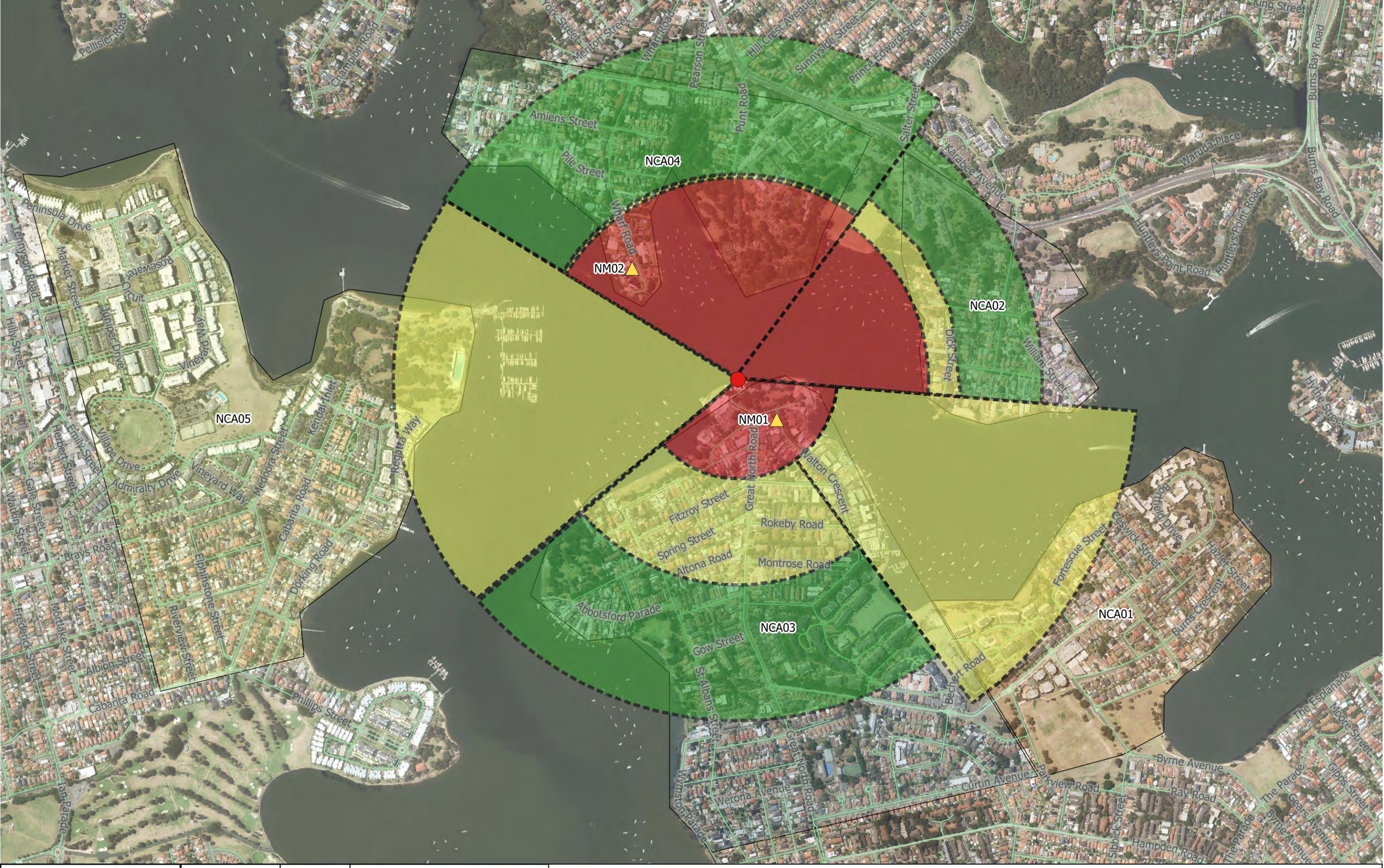
Construction and vibration noise impact assessment



Map: Construction S04 - Additional mitigation areas	Author: TDN	
Date: 13/09/2017	Approved by: MMS	

To be read in conjunction with WSP document: 2271407A-170913-TDN-ABBOTSFORD CNVIA

Map Source: NSW SIX Maps

80 0 80 160 240 320 m

1:9,000 at A3

Legend

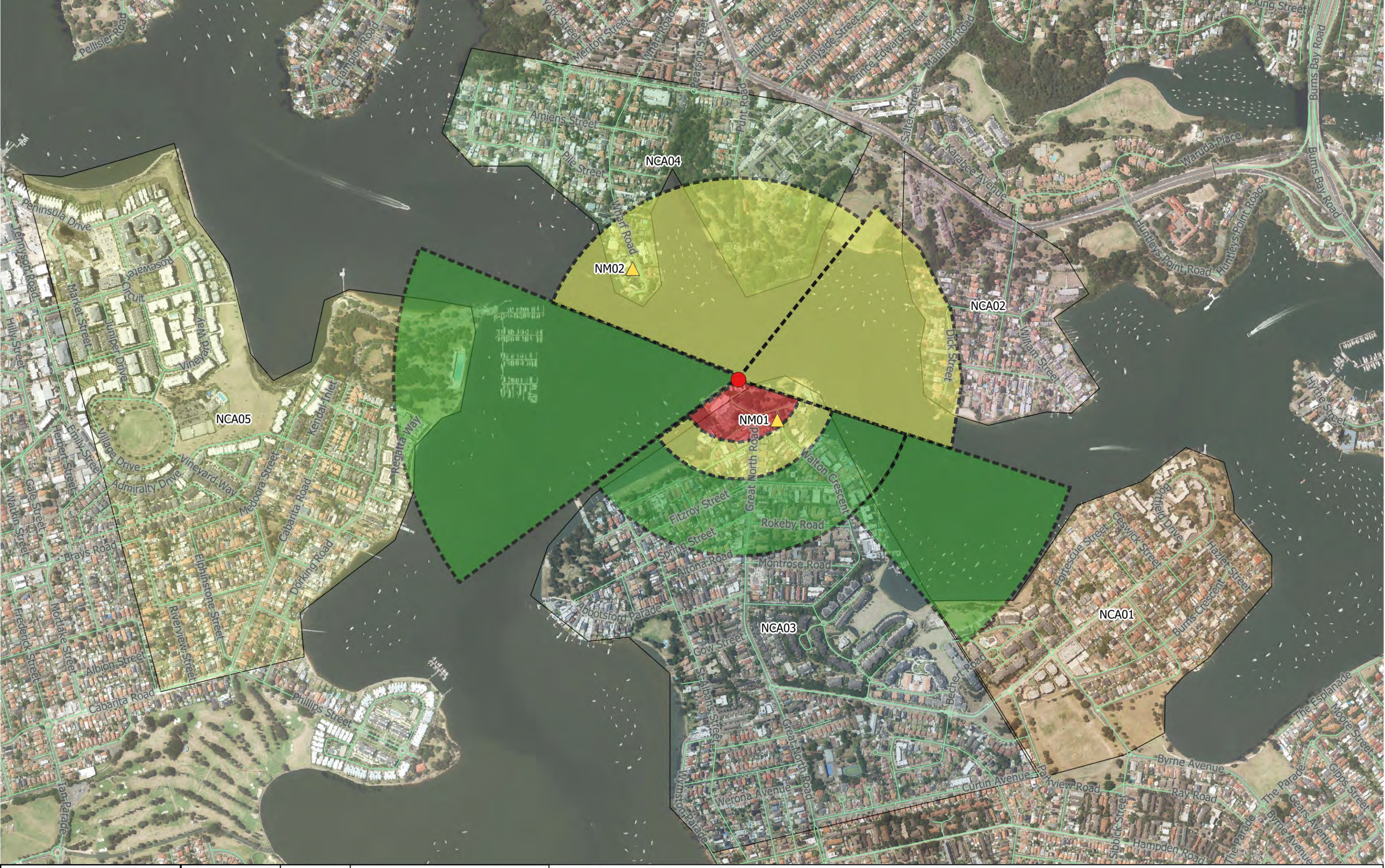
- Project site
- Loggers
- NCA01
- NCA02
- NCA03
- NCA04
- NCA05

Mitigations

- N
- V, N, R2, DR
- V, IB, N, PC, SN, R2, DR
- N, V, PC, RO
- N, V

Sydney Ferry Wharfs

Construction and vibration noise impact assessment



Map: Construction S05 - Additional mitigation areas	Author: TDN
Date: 13/09/2017	Approved by: MMS

To be read in conjunction with WSP document: 2271407A-170913-TDN-ABBOTSFORD CNVIA

Map Source: NSW SIX Maps

80 0 80 160 240 320 m

1:9,000 at A3

Legend

- Project site
- Loggers
- NCA01
- NCA02
- NCA03
- NCA04
- NCA05

Mitigations

- N
- V, N, R2, DR
- V, IB, N, PC, SN, R2, DR
- N, V, PC, RO
- N, V

Sydney Ferry Wharfs

Construction and vibration noise impact assessment

wsp

ABOUT US

WSP is one of the world's leading engineering professional services consulting firms. We are dedicated to our local communities and propelled by international brainpower. We are technical experts and strategic advisors including engineers, technicians, scientists, planners, surveyors, environmental specialists, as well as other design, program and construction management professionals. We design lasting Property & Buildings, Transportation & Infrastructure, Resources (including Mining and Industry), Water, Power and Environmental solutions, as well as provide project delivery and strategic consulting services. With 36,000 talented people in more than 500 offices across 40 countries, we engineer projects that will help societies grow for lifetimes to come.

wsp

Appendix F

Landscape character and visual impact assessment

ABBOTSFORD WHARF
LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT

Prepared for NSW Roads and Maritime Services
July 2017

By Jane Irwin Landscape Architecture

jila

Document Control

Issue	Date	Submission	Author	Review
1		Draft for review	HL/JI	JI
2	1/8/2017	Draft for review	HL/JI	JI
3	5/9/2017	Final Draft	HL	JI

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NSW 2010

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1.0 INTRODUCTION

1.1 The project

Jane Irwin Landscape Architecture (JILA) has been engaged by Hansen Yuncken for Roads and Maritime to assess the proposal for the upgrade at Abbotsford Wharf (the proposal). JILA's scope is to provide urban design and landscape architectural services from concept to documentation, with the landscape character and visual impact assessment (LCVIA) forming part of a process that informs the design outcome of the wharf and landside upgrades. It also supplements the REF and helps to determine the upgrade of the wharf (activities) under P5 of the EP&A Act

1.2 Assessment envelope

For the purposes of this assessment, and to provide some flexibility should elements need to be adjusted due to any site or navigational constraints, an envelope has been used to assess the potential landscape character and visual impacts of the proposal. The area shown in red outline at Figure 4 forms the envelope that has been used to undertake this assessment. If changes are material or outside of this area Roads and Maritime will need to consider if (a) additional assessment is needed (b) consistency assessment is needed (c) safeguards need revising or (d) the design needs modifying.

1.3 Purpose and scope of this report

The LCVIA has been prepared for Roads and Maritime as part of the Review of Environmental Factors (REF) for the proposal.

Under clause 68 (4) of the State Environment Planning Policy (SEPP Infrastructure) 2007, development for the purposes of a wharf may be carried out by or on behalf of a public authority on any land without consent, subject to the requirements of Part 5 of the *Environmental Planning and Assessment Act 1979* (the Act). Under the Act, "land" includes the harbour.

Part 5 of the Act defines development involving (amongst other things) the use of land, carrying out of work and demolition and construction of buildings as an activity. When considering an activity, Roads and Maritime as the determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. This is done through the preparation of a REF.

The requirements of a REF are specified under C228 of the Environmental Planning and Assessment Regulation 2000 (the Regulations) clause 228 (Under the regulations, guidelines have been developed for the likely impacts of marinas and related facilities such as wharves). The guidelines therefore apply to the commuter wharf projects. LCVIA forms one of the environmental factors which requires consideration as part of the REF process. The Department of Urban Affairs and Planning - *EIS Guideline - Marinas and Related Facilities - September 1996,* sets out the following issues to consider if a proposal is likely to have a visual impact.

a) Visual impact from adjoining properties and from surrounding land and water — consider potential impacts such as changed or obstructed views due to:

- The facility form, bulk, colour or reflectivity.
- Lighting from security requirements or night operations.
- Boat mooring and movements.
- The clearing of vegetation.

b) Proposed methods of reducing visual impact such as landscaping, materials selection and design and orientation of structures.

1.4 Report structure

The structure of this report is as follows:

1.0 Introduction - outlines the purpose of the report including the assessment methodology

2.0 Contextual analysis

3.0 Urban and landscape design concept

4.0 Landscape character impact assessment

5.0 Visual impact assessment

6.0 Summary and Mitigation Strategy

1.5 Urban Design policy and guidelines

This report has been prepared based on the structure outlined in the *RMS Environmental Impact Assessment Practice Note EIA-N04 - Guideline for landscape character and visual impact assessment*. (EIA-NO4 Guideline) March 2013.

The guideline differentiates between visual assessment (the impact on views), and landscape character (the impact on the aggregate of an area's built, natural and cultural character or sense of place).

Tasks outlined in the guide include:

- Analyse landscape character.
- Identify landscape character zones.
- Assess landscape character impacts.
- Assess the visibility of the proposal.
- Identify key viewpoints.
- Assess visual impacts.
- Refine the concept design to avoid and minimise landscape character and visual impacts.
- Develop a mitigation strategy to minimise landscape character and visual impacts.

These tasks are undertaken to inform Roads and Maritime, other agencies and the community about the landscape character and visual impact of the proposal, what mitigation strategies should be implemented, and to input to the final design.

1.6 Assessment methodology

According to the terms defined within the EIA-N04 Guideline, both a landscape character and a visual impact assessment have been carried out to determine impacts of the proposal on the character of the place and the views within that place.

The assessment grading for the landscape character and visual impact assessment is set out in Table 1 below. Through this table, the impact, or impacts are assessed based on both the sensitivity and magnitude.

Landscape character relates to the built, natural and cultural aspects that make a place unique. Landscape character assessments refer to the sensitivity (ability to absorb change) of the character zone to the proposed change and the magnitude or scale of the proposal within the character zone. The EIA-N04 Guideline notes that landscape character assessment is the assessment of impact on the aggregate of an area's built, natural and cultural character or sense of place.

Visual impact assessments refer to the quality of a view, type of viewer, number of viewers, and how sensitive it is to the proposed change, while magnitude refers to the nature (eg. scale, colour, reflectivity, materials) of the proposal and its proximity to the viewer. The EIA-N04 Guideline refers to visual assessment as the assessment of impact on views. It addresses people's views of an area from their homes or other places of value in the community.

Based on these two assessment criteria, a judgement must be made as to the quality of design outcome, and the strategies for mitigating and balancing the objectives of the project with its impact on its setting.

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

Table 1. Landscape character and visual impact grading matrix

2.0 CONTEXTUAL ANALYSIS

2.1 Location

The study area for the LCVIA is the area immediately surrounding the wharf at the end of Great North Road, Abbotsford.

2.2 Landscape Context

Abbotsford Wharf is at the northern end of a short peninsula, in a relatively contained location on the Parramatta River, among many headlands and bays. It sits at the end of Great North Road, which runs along a high ridge, with predominantly low density housing overlooking the water. Werrell Reserve, to the south and east of Abbotsford Wharf, is a public park of the Sydney Bush School landscape style. It runs down to the water in parts, and is encircled by the Great North Road and Teviot Avenue. Along the waterfront to the immediate west of the wharf is the NSW heritage listed Abbotsford Point Boatshed, and to the east is the Abbotsford Scout Hall and Sailing Club. The existing and proposed wharf are below the level of housing and most public infrastructure on the peninsula.

2.3 Character of the wharf in its setting

Above the general elevation at the foreshore, the land rises steeply to the south, with houses sitting prominently beyond the park boundaries, beyond the sailing club to the east, Werrell Reserve extends right to the waters edge. The park is well shaded, contributing to a dominant leafy character, and sits upon large patches of exposed sandstone, which is fitting with other headlands in the immediate river surrounds.

The wharf and low lying adjacent spaces, with topography and few buildings rising behind, are predominantly viewed in elevation from the water at close proximity. Across the river, most viewing points are accessed from specific points along the waters edge. The foreshore walk of Bedlam Bay is heavily vegetated which screens the water and wharf in many places. Landside, topography and the vegetation of Werrell Reserve restricts views to the wharf, and views from the harbour are contained by the overlapping headlands and islands. The wharf makes up a limited element in the wider context.

Great North Road follows the ridge line along the Abbotsford peninsula, with very few views to the water, except from the turning circle at Werrell Reserve. With that exception, the existing wharf is not visible from Great North Road. A pedestrian path and steps lead through the reserve and down to the water, with views opening to the existing shelter and jetty and the river beyond.

The material character of the retained elements of the wharf will be consistent with the surrounding landscape and urban setting - sandstone walls and timber structures characterise the locality, with outcropping sandstone appearing in the landscape of the park, and next to the wharf. The area immediately around the wharf is enclosed, intimate in scale, and rustic in character, making up a visually contained character unit when viewed at the level of the wharf.

Figures 1, 2 and 3 illustrate the broad and local context for the proposal.

2.4 Heritage Context

There are two State Heritage Items in the vicinity:

SHR Listing	Item name	Address	Distance from project area
LEP 222	Sandstone kerbing	North end Great North Road	20m
LEP 221	Abbotsford Point Boatshed	617 Great North Road, Abbotsford, NSW 2046	20m

Both items are visible from the wharf.

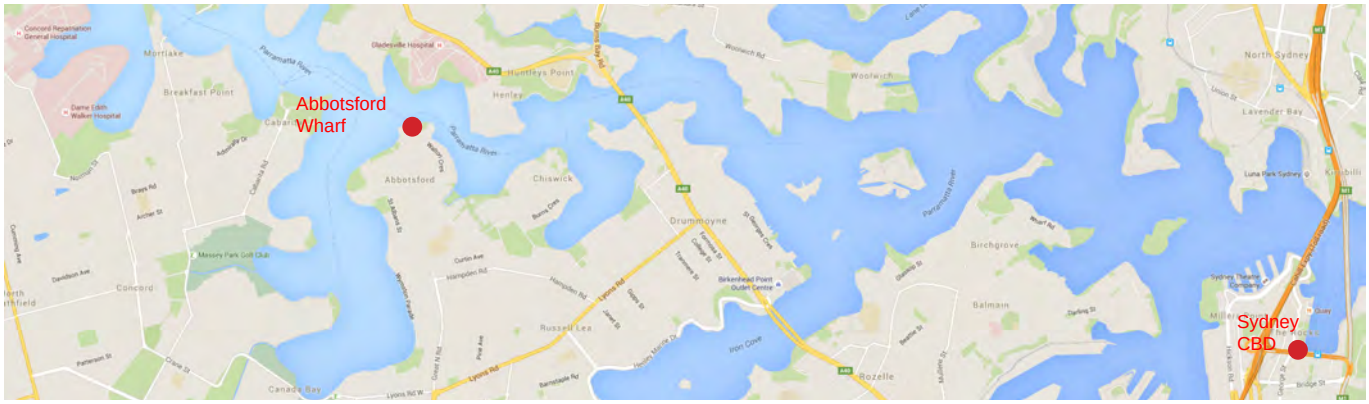


Figure 1. Context map (image courtesy of Google Maps)

Figure 2. Context with proposal location (image courtesy of Google Maps)

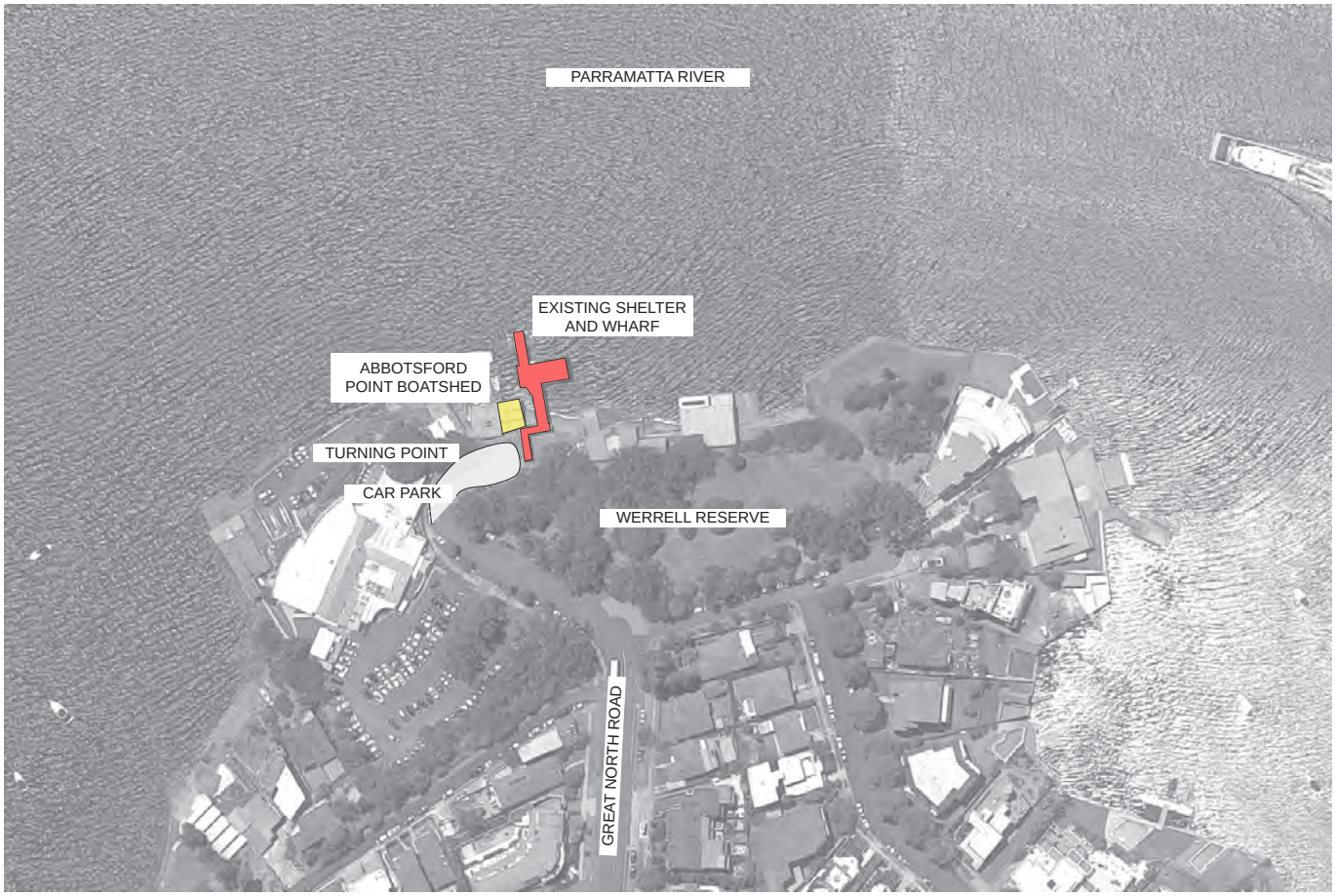


Figure 3. Existing foreshore with proposed wharf entry location (image courtesy of Google maps)

2.5 Sydney Harbour Foreshores and Waterways DCP Context

Under the Sydney Harbour Foreshores and Waterways DCP 2005 Landscape Character Type 12 applies to the peninsula:
"The character of these areas ranges from a flat to a sloping terrain. There are open spaces and some residential areas along the foreshore. The open space is predominantly grassed with few trees. The shoreline is mainly built up, often with a seawall, but pockets of natural shoreline do occur. Residential development forms the backdrop to these areas."

Activity under the EP&A Act needs to satisfy the following criteria:
• it enhances the recreational focus of the foreshore;
• it is sited so that natural features are protected and views of these features maintained;
• pockets of natural shoreline are retained; and
• landscaping is incorporated into the proposal.

2.6 Planning Context

The planning context is detailed in the REF for the proposal.

The proposal will be determined as an activity under Part 5 of the EP&A Act 1979, and the following planning instruments are relevant to the proposal:

- State Environmental Planning Policy (Infrastructure) 2007
- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005
- Environment Protection and Biodiversity Conservation Act 1999

3.0 URBAN AND LANDSCAPE DESIGN CONCEPT

Figure 4. Assessment Envelope

3.1 Vision

The purpose of this proposal is to refurbish and upgrade the existing wharf to improve amenity and provide greater accessibility for ferry users. The new wharf will comply with DDA/BCA requirements and access to the wharf will be improved. The existing shelter would be demolished, and new covered gangway provided and a new floating covered pontoon would be built. The upgrade would provide commuter amenity, and would be integrated sensitively into the existing landscape.

3.2 Objectives and principles

Urban Design Objectives

- Minimise clutter and work with the shapes and material selection of the landscape context.
- Minimise visual impact on the character of the public domain of the foreshore, and on landmark buildings and precincts.
- Minimise interruption to views.
- Respect the setting and place.
- Promote features that contribute to the character of the setting in any design interventions – simplicity of layout and materials palette, contemporary design, robust materials.
- Retain and enhance existing pedestrian systems.
- Where possible retain and protect existing vegetation.
- Upgrade facilities and open space to meet current standards and improve amenity.

Principles

- Maintain views through the gangway and roofed waiting area to mitigate the visual impact of the structures and retain views beyond.
- Consider impacts on the surrounding heritage buildings in the design and location of new wharf structures.
- Complement the existing design patterns and materials in design Interventions to the public domain, including access steps and sensitively integrate new elements into the existing fabric of the public domain.

3.3 Preferred concept - waterside

The proposal is to upgrade the Abbotsford ferry wharf as part of the Transport Access Program (TAP). Its key features would include:

- Removal of the existing wharf, including landside canopy
- Retention of about three metres of existing jetty
- An 18 metre long by three metre covered aluminium gangway extending north west from retained jetty section
- An 18 metres long by nine metre wide pile-founded floating covered and glazed steel pontoon
- Two new piled pivot piles to help with berthing
- A covered entry portal, of approximately six metres by three metres.
- Upgrade of the existing staircase and supporting hand rails
- New kiss-and-ride parking zone

The new gangway and covered platform, as well as the landside infrastructure works, is expected to be as shown in Figure 5. However, for the purposes of this REF, an envelope (shown in red outline in Figure 4) has been assessed to consider potential changes to the position of the wharf or landside elements should they be required following further design development. The proposal drawings are provided in Figures 6 and 7.

The proposal would be as follows:

The wharf would be built about 20 metres from shore. It would comprise an 18 metre wide and nine metre long steel floating pontoon and canopy shelter, which would include a waiting area, seating and information kiosk. The wharf would have one berthing face on the northern (harbour) side for ferries and other smaller vessels.

A curved zinc canopy roof would be built over the pontoon that would be supported on steel columns. The pontoon would be surrounded by a mixture of glass and stainless steel balustrades.

The floating pontoon would be attached to, and held in place by, four steel piles that would be ‘drilled’ into the underlying sandstone bedrock. The pontoon height would vary relative to the landfall depending on the state of the tide. The floating pontoon would be built from prefabricated units delivered in sections to site.

Gangway
The wharf pontoon would be accessed by an 18 metre long covered three metre wide lightweight aluminium covered gangway. The gangway would be built to be 90 degrees to the foreshore. The gangway would be held in place by a pivot that would be attached to steel piles founded in the bedrock. The gangway gradient would vary relative to the landfall depending on the state of the tide. It would allow for disabled and low mobility for most of the time except during extreme high and low tide, which is consistent with the TfNSW Design Guidelines for Ferry Wharf Gangways. The gangway would be built off site and delivered as one unit to site.

Jetty
The gangway would attach to a three metre section of existing jetty which would be retained, with new canopy coverage provided.

3.4 Preferred Concept - landside

Entry Portal
A six metres by three metres entry portal would be built at the entry to the jetty. The entry portal would be constructed with curved zinc canopy roof supported by steel columns, and would be built off site and delivered as one unit to site.

Steps
The existing 33 access steps from Werrell Park to the wharf would be upgraded to comply with AS1428.2:1992. This would involve:

- Removing the existing hand rail
- Installing new prefabricated supporting handrails
- Installing of tactile ground surface indicators and antiskid material

Supporting infrastructure
While the specifics of the supporting infrastructure, lighting, signage, and furniture would be confirmed during the detailed design, they would be consistent with the provisions included on the other wharfs on the network. It would therefore include:

- Safety and security lighting on the step approaches, in the shelter and on the pontoon wharf
- Passenger information boards, notices, and (electronic and display board) timetables
- Safety ladders around the walkway and wharf pontoon
- Strung cabling and ducting to provide power and communications
- Closed circuit television (CCTV)
- Tactile flooring
- Revision to the existing parking arrangements to create a ‘kiss and ride’ zone
- New signage to assist with information and navigation (wayfinding)
- Provision of five new bicycle racks.

The above would be developed in accordance with Roads and Maritime design specifications.

Figure 5. Proposed wharf photomontages (image courtesy of Hansen Yuncken)

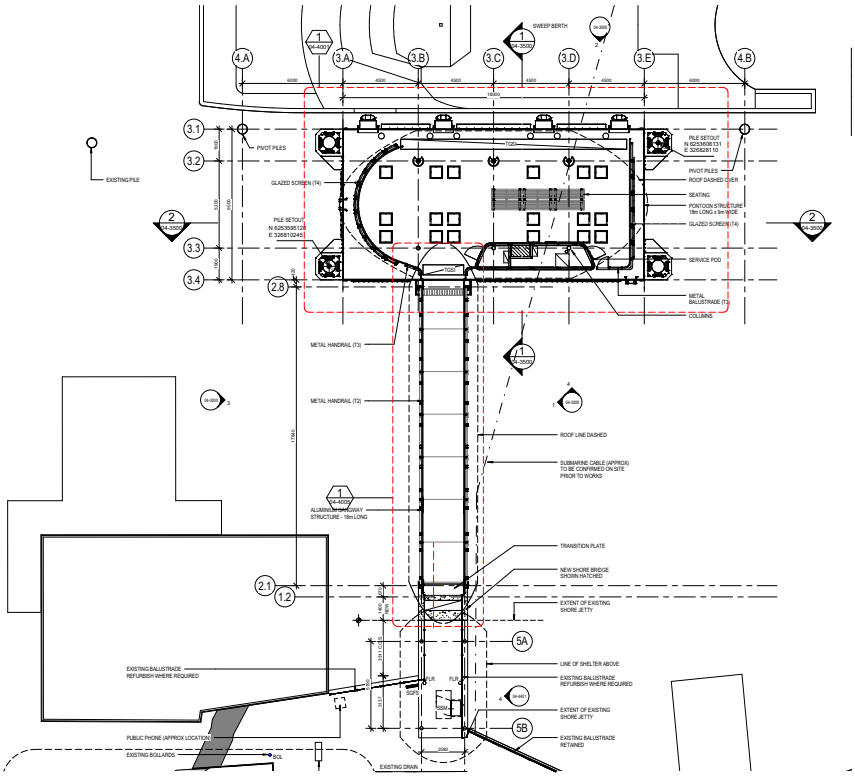


Figure 6. Proposed wharf plan (image courtesy of Conrad Gargett Ancher Mortlock Woolley)

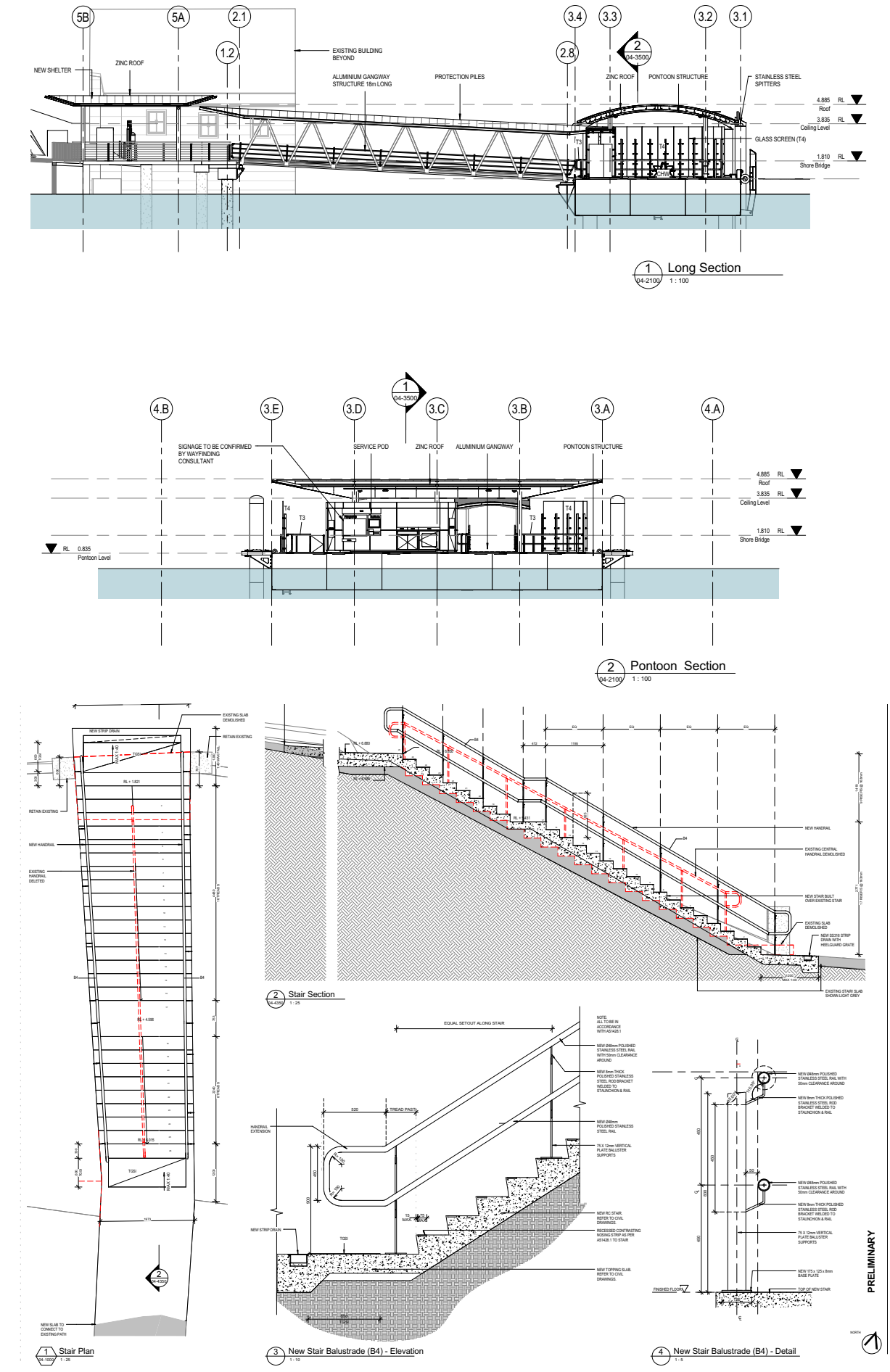
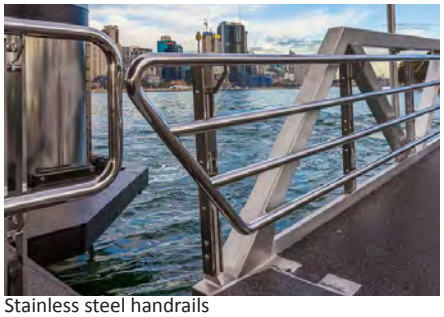
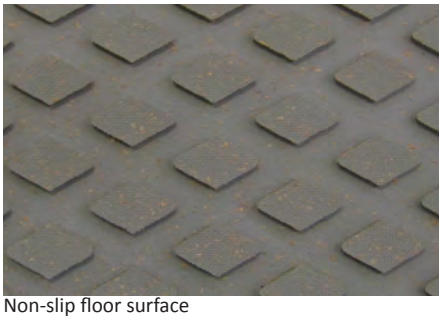


Figure 7. Architectural sections of proposed wharf structure and stair (courtesy of Conrad Gargett Ancher Mortlock Woolley)



Stainless steel handrails



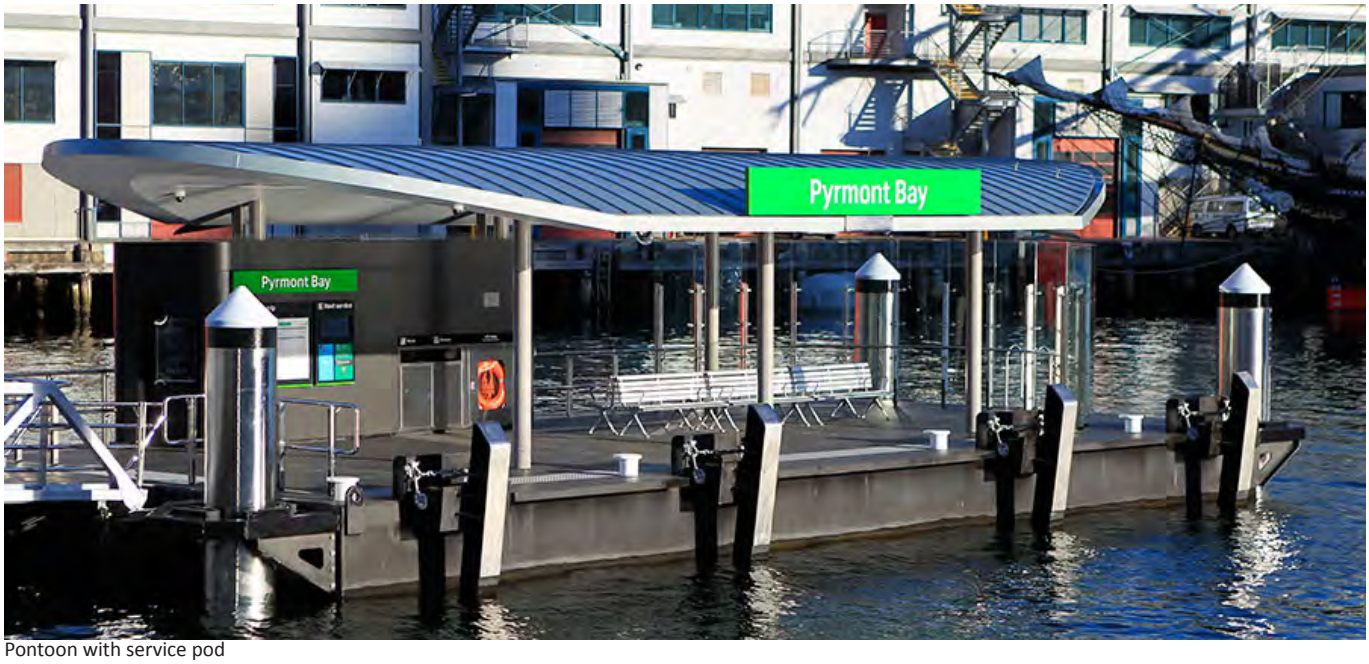
Non-slip floor surface

Bridge and gangway

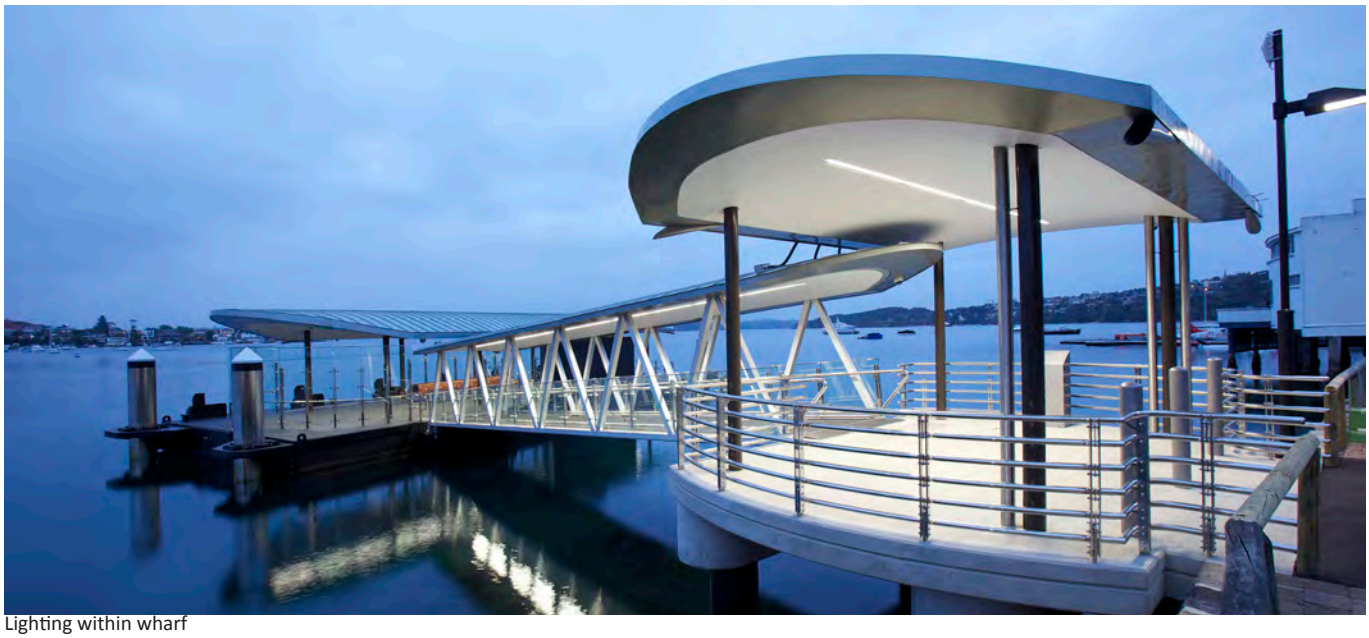
Zinc roof

Open light steel truss system - gangway

Service Pod



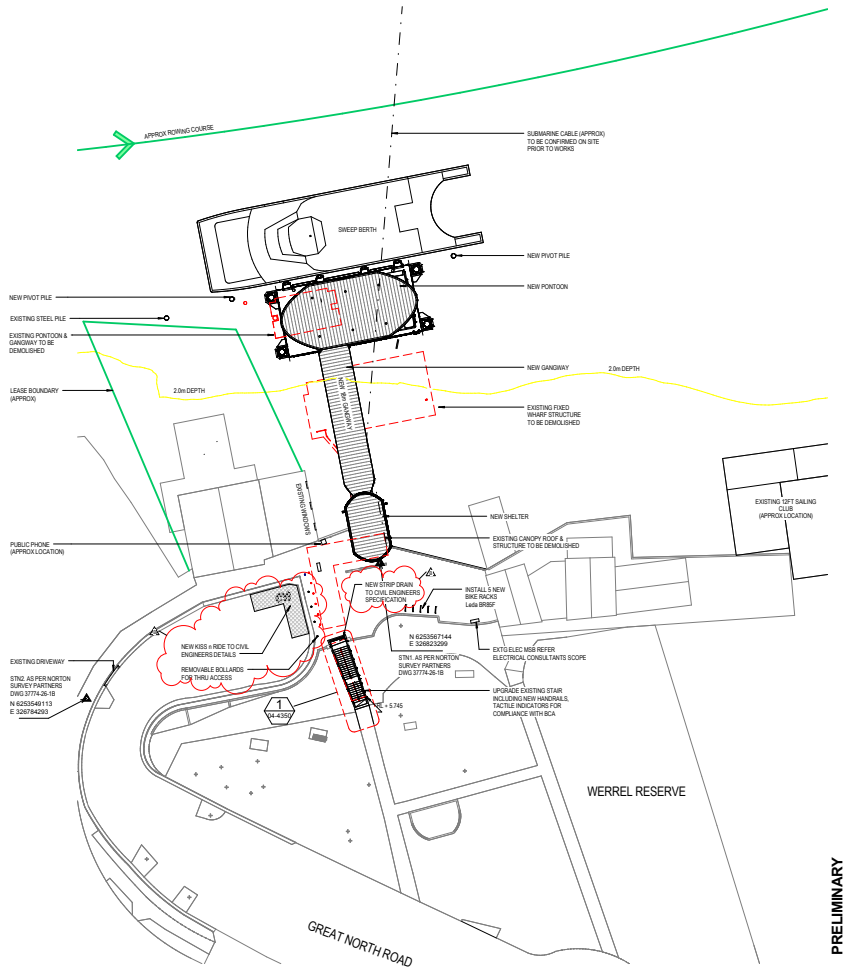
Pontoon with service pod



Lighting within wharf

Figure 8. Material palette of wharf (Images courtesy of Hansen Yuncken)

2 Site Plan - Existing
1 : 200



1 Site Plan - Proposed
1 : 250

Figure 9. Proposal and foreshore context

Existing steps and handrail

Sandstone of Werrell Reserve -pick marks in stone from early convict road construction

Heritage Boatshed

Sandstone sea wall and Scout Hall

Figure 10. Existing material palette

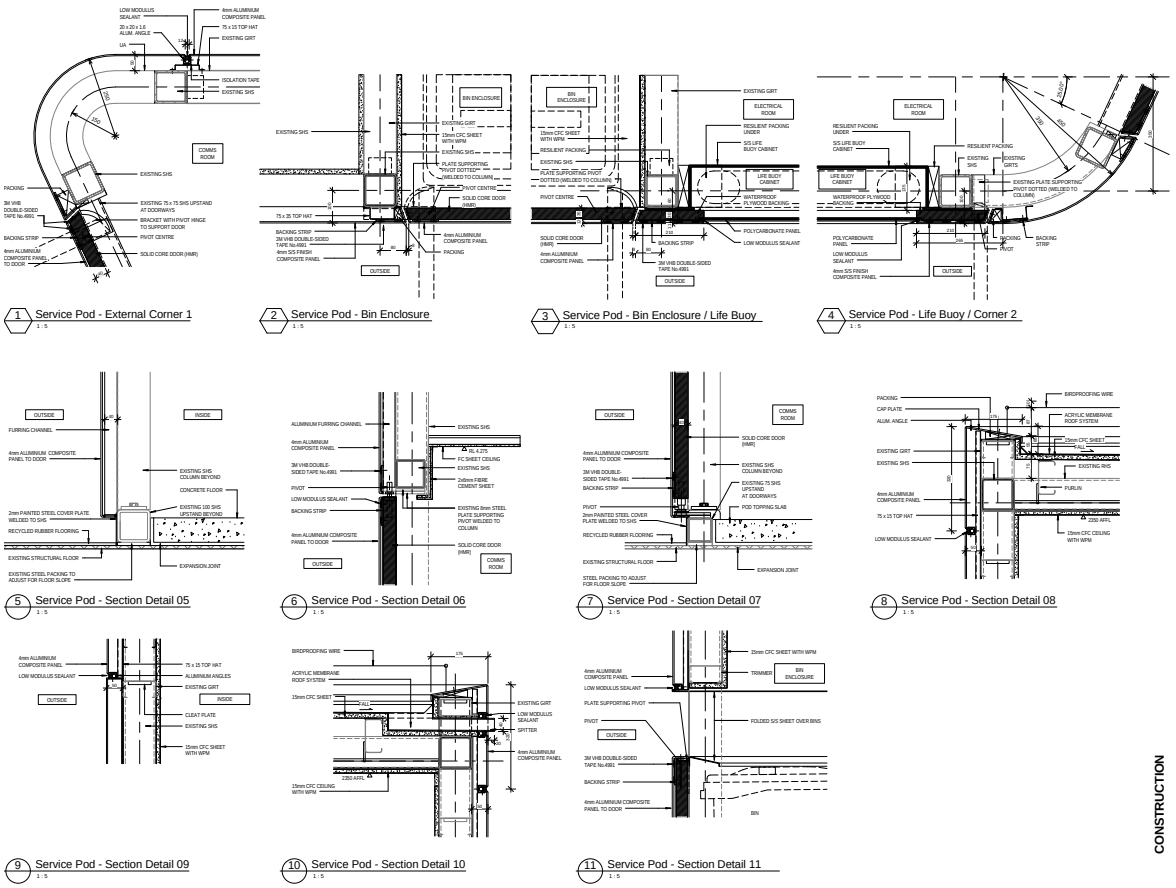


Figure 11. Details of proposed materials

4.0 LANDSCAPE CHARACTER IMPACT ASSESSMENT

4.1 Surrounding Landscape Character

In assessing the landscape character of Abbotsford Wharf, and how the proposal will fit within this, it is important to consider:

- That the wharf sits within a very particular character setting at the end of the peninsula, isolated to some degree from the urban environment of Abbotsford.
- How the proposal will sit against a backdrop of the elements that characterise the end of the peninsula.
- The existing character from the water and opposite points as a layering of elements, beginning with the wharf, adjacent parkland, and moving up the steep topography behind to the residential buildings that characterise Great North Road.
- The heritage context.
- The proposed landscape intervention, and kiss-and-ride plan.
- The character of Parramatta River at this location.

Refer to Figure 2 and 3 for context of Abbotsford Wharf. Refer to Figure 10 for landside materials palette.

Figure 12, below, indicates the character zones surrounding the proposal.

1. Werrell Reserve
2. Great North Road + Waterside Buildings
3. Abbotsford Residential
4. Parramatta River
5. Banjo Patterson Park
6. Gladesville Hospital
7. Bedlam Bay
8. Henley Residential
9. Cabarita Point
10. Looking Glass Point

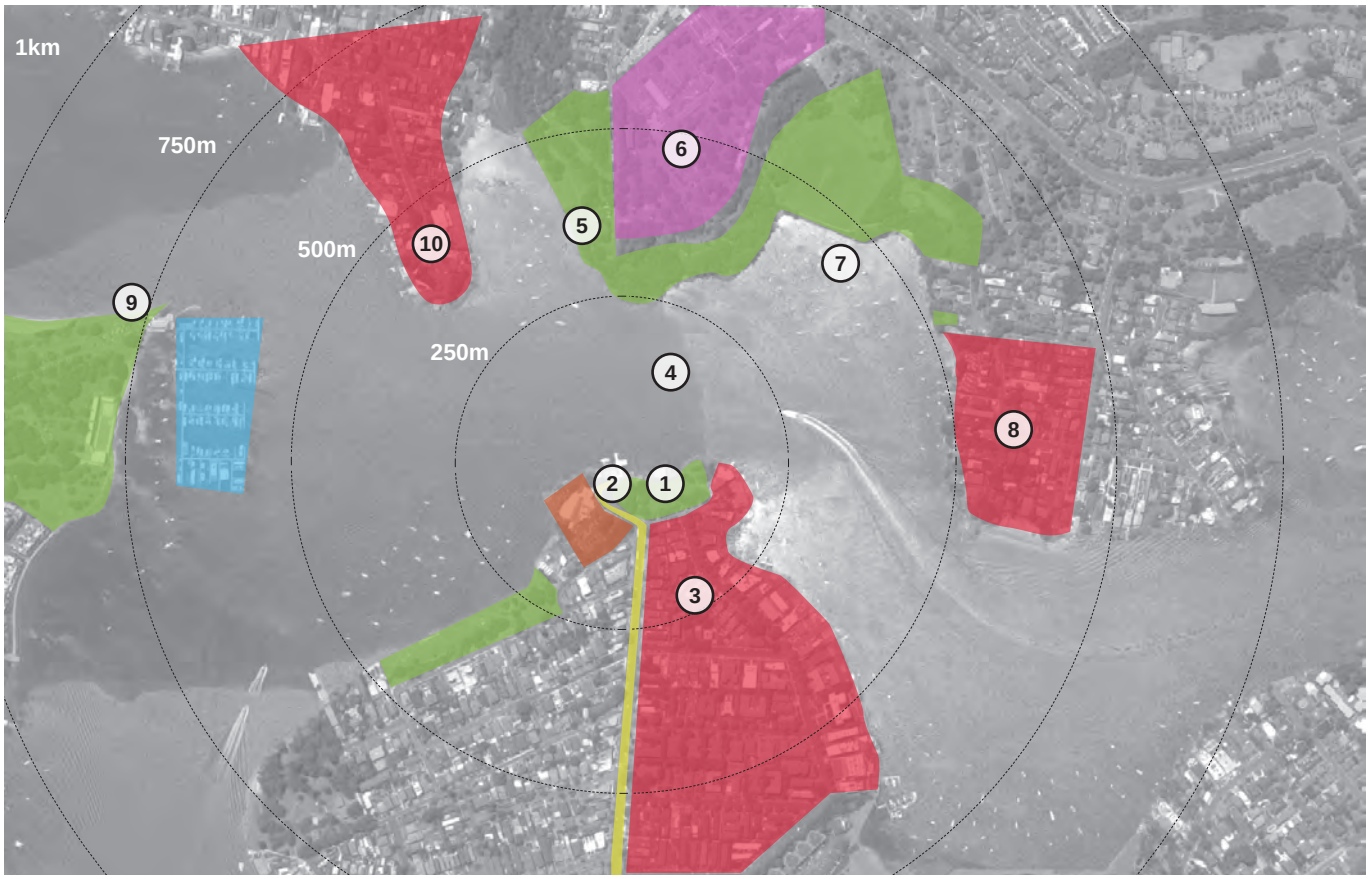


Figure 12 - Land Uses and character zones

Residential
Park/Open Space
Hospital
Public Event Space/Club
Marina

Table 3. Landscape Character Impact Assessment

Landscape character zone	Description of zone	Sensitivity	Magnitude	Description of impact by proposal
ZONE 1. Werrell Reserve	This zone forms the southern edge of the wharf area and pedestrian access to the wharf. It is a consistent landscape that contributes the strongest influence on an overall reading of landscape character at the end of the peninsula, and forms the backdrop to the wharf. The park is structured by sandstone outcrops, that continue beside the path and form natural walls and a sense of enclosure at the level of the existing shelter and jetty. To the east along the point there are flat green open spaces edged by concrete sea walls and an open vista to the surrounding river, currently only accessible by foot.	H	L	The existing shelter and jetty sit low in elevation against the backdrop of the green space of Werrell Reserve. Currently the shelter sits among a few other maritime buildings with rustic timber boat ramps. All three of these other buildings are used regularly by community groups and contribute considerably to the overall character of the landscape. The contemporary steel structures making up the covered gangway and pontoon are out of character with the materiality of the existing elements, however, they are replacing a ferry pontoon and gangway that are also out of character. All existing walls, including sea walls, will remain intact. The upgrade of the stairway will retain the character of the current pedestrian access through the park and down to the wharf. **The impact is considered moderate.**

Landscape character zone	Description of zone	Sensitivity	Magnitude	Description of impact by proposal
ZONE 2 Great North Road + Waterside Buildings	This zone is defined by low density housing, in a garden setting, along Great North Road. The scale is low, and there is a fine grain to the residential blocks. The houses sitting above the immediate Werrell Reserve area have well developed gardens, and continue the sandstone elements of the park, contributing to an overall park like, naturalistic character at the end of the peninsula. At the end of the road, the Sydney Rowing Club, Abbotsford Point Boatshed, Scout Hall and Sailing Club define the character of the foreshore. The timber clad boatshed is a local heritage item, that makes a significant contribution to the character of the immediate wharf area.	H	M	The new wharf structures will not be visible from most of Great North Road. From the turning area at the end of the road, there may be glimpses of the new covered pontoon. When viewed from the Scout Hall and Sailing Club, the wharf will read as a separate element from the rest of the foreshore at this point. The pontoon will sit further out on the river than in currently does, improving the visual connection between these two buildings and the heritage listed boatshed. The new wharf elements will be disparate from the character of the surrounding structures and sea wall. Where all these are seen together the impact on the character of these existing structures is evident. The existing Ferry Wharf already has a similar impact on the surrounding landscape structure. **The impact is considered high-moderate.**
ZONE 3. Abbotsford	Abbotsford, to the south of the site, is characterised by large residential houses of two to three stories in a range of styles, and some small blocks of units, generally sitting high in elevation above the harbour. There are a number of federation style buildings within the suburb and is fringed with waterfront properties. The terrain is steep with sandstone outcrops and tree lined streets.	M	N	Abbotsford Ferry Wharf is separated from the residential area of the suburb by topography and planted landscape - it is not visible from residences. **The impact is considered negligible.**

Landscape character zone	Description of zone	Sensitivity	Magnitude	Description of impact by proposal
ZONE 4. Parramatta River	The large body of water to the north of Abbotsford Wharf and stretching to the east and west of it. The river contains steep ridged peninsulas which enclose harbours, coves and inlets along its length.	M	N	Abbotsford Wharf forms part of a collection of wharfs located on headlands projecting into the river. The proposed upgrade largely replaces the current wharf and provides a covered element on the water. It would be consistent in character with other wharves in close proximity. The significance of the wharf in the broader landscape character of Sydney Harbour is the continuity it provides to commuting by water and its role in linking the waterside suburbs to a greater experience of the harbour. **Impact is considered negligible.**
ZONE 5. Banjo Paterson Park	Banjo Paterson Park forms part of a vegetated headland, not uncommon to this section of the Parramatta River. It is a steep, rocky sided headland clothed in both indigenous bushland and weeds. Low key roads provide access to small parking areas and picnic spots, and bushwalking tracks and lookout points thread through the forest. Banjo Paterson Cottage sits within the park and is a restaurant attraction for tourists and families. This is the closest point to the wharf across the harbour.	M	N	The proposed ferry wharf will not be viewed in juxtaposition to Banjo Paterson Park. This, and the distance between the two locations, make the potential for impact on the character of the headland **negligible**.
ZONE 6. Gladesville Hospital	Gladesville Mental Hospital was a psychiatric hospital established in 1838, its original name was Tarban Creek Lunatic Asylum. The site contains many buildings that are listed on the Register of the National Estate. These buildings serve as a collection of structures that contribute greatly to the character of the headland. The area is of note historically, and now accommodates a range of health and community services.	M	N	The proposed ferry wharf will not be viewed in juxtaposition to Gladesville Hospital. This, and the distance between the two locations, make the potential for impact on the character of the headland **negligible**.

Landscape character zone	Description of zone	Sensitivity	Magnitude	Description of impact by proposal
ZONE 7. Bedlam Bay	The waters of Bedlam Bay sit to the north east of the proposed wharf upgrade and provide mooring for private use boats. The edges of the bay are a mix of rocky shores with native woodland, a small sandy beach and a developed edge along the cricket oval.	M	N	The proposed wharf will be seen as part of a family of elements in this stretch of water - including the maritime elements of the existing small infrastructure in Bedlam Bay. The character of the new wharf will relate well to these existing elements, and impact on Bedlam Bay is considered **negligible**.
ZONE 8. Henley	This zone is characterised by large residential houses of two to three stories in a range of styles, generally sitting high in elevation above the harbour, and rising to the north. There are a large number of federation style buildings within the suburb. The terrain is steep with sandstone outcrops and tree lined streets.	M	N	The distance between Henley and the proposed ferry wharf will make the potential for impact on the character of this opposing headland negligible. From the majority of streets and residences the wharf will be obstructed from view. **The impact is considered negligible.**
ZONE 9. Cabarita Point	The open public parkland of Cabarita Point has a primary waterfront facing to the north. Set back from the waters edge is a developed wooded area and facilities for families for BBQs, play equipment and exercise. On the eastern edge of the point is D'Alboras Marina, where private boats can be moored, as well as a restaurant.	M	N	The proposed ferry wharf will be very similar in character to the existing facilities at Cabarita Point Marina. From here the wharf can be viewed across the water, it will be seen adjacent to the Sydney Sailing club and will not look out of character. **The impact is considered negligible.**
ZONE 10. Looking Glass Point	Wharf Road runs the length of this slender peninsula which is flanked by residential waterfront properties. At its southern tip, a patch of vegetation screens views of the proposed wharf from the upper level. Access to the rocky outcrop below can be made by foot and is a spot for hobby anglers.	M	L	Views of the water are screened by surrounding residences along the ridge of this narrow peninsula. A visual connection to the proposed wharf is established once descending to the waters edge at its point. The small scale of the wharf, across the body of water, and the distance between the two locations mitigate any potential for impact on the character of Looking Glass Point. **The impact is considered moderate-low.**

N=Negligible; L=Low; ML=Moderate-Low; M=Moderate; HM=High-Moderate; H=High

Landscape Character Assessment Methodology
Magnitude (the degree of intrusion/scale of the project). Magnitude is the expression of change in landscape character between the proposal and the existing environment.

Sensitivity (how sensitive is the landscape character zone to the proposed change, relating to natural environment, scale, number of viewers). Visual sensitivity is a measure of the importance of the visual environment to different user groups and areas. The sensitivity is affected by the function of areas, and the perceived quality of particular land uses and landscapes.

Character impact is then determined from the magnitude of change and the sensitivity of the landscape character zone to the change. This is calculated using the landscape character and visual impact matrix, Table 1.

Sensitivity - low to high
Abbotsford Wharf is at the end of a short headland, with the area of local influence and potential impact restricted to the immediate vicinity of the wharf - Werrell Reserve and three maritime halls either side of the existing wharf. Although not widely viewed from the land, the immediate area has a relatively high sensitivity to change as the Abbotsford Point Boatshed is a heritage item, and defines the character of the foreshore. The boatshed is the first visible structure at the end of Great North Road and is the strongest visual element in the immediate area.

The existing setting has a very distinctive character - the heritage building possesses colour and materials resonant of a passing maritime character. Werrell Reserve is well shaded in the immediate vicinity of the wharf, with sandstone outcrops and areas for family leisure. It sits high above the pedestrian access to the water and creates an intimate area below the natural sandstone walls.

In the context of the river, the visibility of the site is restricted by the overlapping headlands - the new wharf will be seen juxtaposed against very few landscapes, and at distance. The sensitivity in the wider landscape is considered low.

Magnitude - moderate
The existing wharf elements have a different material character to their immediate surroundings. The proposal replaces these disparate elements at the wharf and along the entry path. Despite this continuing disparity between the surrounding fine grain elements of the foreshore and the contemporary steel construction of the proposal, the new covered pontoon and gangway represent only a moderate magnitude of change.

Landside works comprising new steps will simply replace the existing concrete steps, with a new steel handrail structure, the magnitude of change is negligible.

The magnitude of change is perceptible only at close distances, when details can be viewed together. From most viewing points outside the peninsula, the change will be less perceptible.

4.2 Overall Landscape Character Impact - Low
Within the immediate character zone the impact is considered moderate. Although this zone has a high sensitivity, by merely replacing elements of the existing wharf and stair, differences in character won't impose a high degree of change. The new wharf will sit a little further out in the river, which provides a more direct visual connection across the gangway between the older maritime structures, this will marginally improve the character of the area and provide more water space in the immediate vicinity of the Scout Hall boat ramp. This visual improvement between the heritage listed boatshed and surrounding low lying areas may be negatively impacted with the installation of a roof over the gangway.

Impact on character zones beyond this point, and the character of Parramatta River, is considered low, due to separation from the area locally by the overlapping headlands and by distance for other zones. In addition, the wharf structure sits low against the landscape, meaning that the character defining elements of the rising topography to the south of the wharf are clearly visible, and appreciated as a part of a suite of natural landscapes and buildings in this part of Parramatta River.

5.0 VISUAL IMPACT ASSESSMENT

The proposed upgrade to Abbotsford wharf replaces and extends an existing built element, and introduces a new built element in the river. The key viewpoints are described in Figure 13.

Distance zones have been established within the visual catchment to aid in assessing the impact on key views. These zones are shown in the diagram below and referenced in the table. Distance has been broken down to:

- Foreground zone (FZ): 0-250m from the viewer
- Middle ground zone (MZ): 250m to 500m
- Background zone (BZ): areas greater than 500m from proposed new wharf

5.1 Visual Envelope Mapping - Methodology of Visual Assessment

The visual impact of each key viewpoint is established through an assessment of the sensitivity of the view combined with the magnitude of the proposal within that viewpoint. The impact is then determined by using Table 1 and the viewpoints shown in Figures 14-27.

Key viewpoint locations include:

1. Werrell Reserve
2. Abbotsford Point East
3. Cabarita Point
4. Looking Glass Point
5. Bedlam Point
6. Bedlam Bay
7. Kelly Street Picnic Area
8. Parramatta River

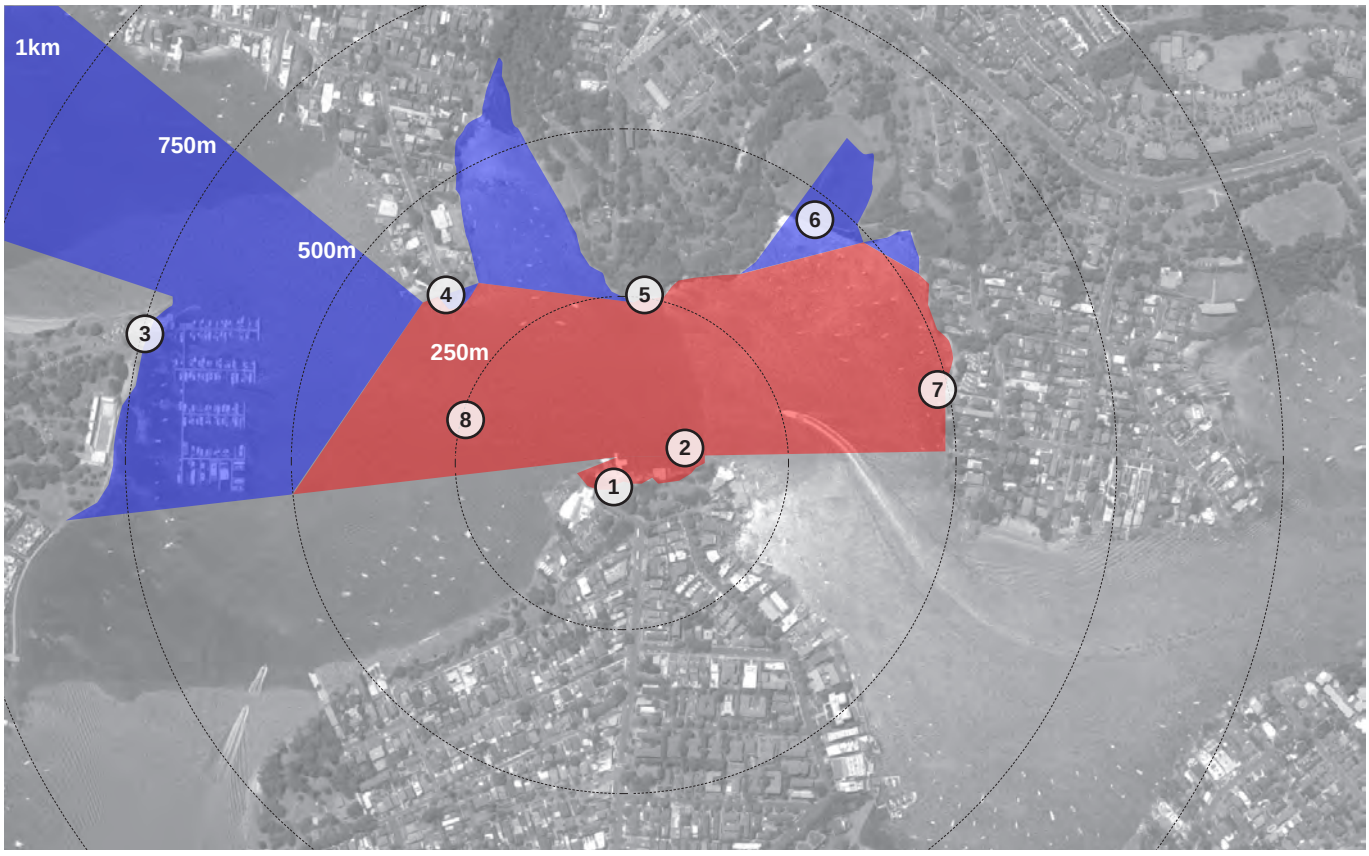


Figure 13. Visibility of project and key viewpoints

Viewpoint 1 - Werrell Reserve

Views looking north from two levels of Werrell Reserve. Vegetation screens the wharf for most of the park, some parts are visible from the west section.

Figure 14 - view north from lowest level of park, at its western fringe

Figure 15 - (context for Figure 14) view west from low level - dappled shadows are created by screening vegetation

Viewpoint 2 - Abbotsford Point East

Views looking west from Abbotsford Point East. Waters edge recently upgraded, this area is accessible by foot from the end of Teviot Avenue, the proposed wharf will be fully visible.

Figure 16 - view west from headland - the gangway and pontoon will be visible

Figure 17 - (context for Figure 16) open grassed area to waters edge, unimpeded views of the river and surrounding bays

Viewpoint 3 - Cabarita Point

Views east from Cabarita Point - wharf visible in the distance, though obscured by marina in foreground and other maritime elements

Figure 18 - view from the reserve through trees, across marina

Figure 19 - (context for Figure 18) Marina backs onto open parkland, and wooded areas in the distance

Viewpoint 4 - Looking Glass Point

Views south Looking Glass Point -the wharf is at the centre of the view from this point, and quite prominent in the view. It is a steep and rocky point immediately behind this vantage and is screened by casuarinas and figs from the top.

Figure 20 - view looking south from waters edge at Looking Glass Point

Figure 21 - (context for Figure 20) Meditation Park, water level at Looking Glass Point

Viewpoint 5 - Bedlam Point

Views from heritage stone wharf at Bedlam Point - this is the closest point across the harbour from Abbotsford Wharf, and is in full view

Figure 22. - view from stone wharf at Bedlam Point

Figure 23 - (context for Figure 22) sitting area as part of foreshore walk at Bedlam Point

Viewpoint 6 - Bedlam Bay

Views over the bay - the wharf will be obscured by maritime elements in the foreground, the great distance will mitigate any large impact it will have on the wider view.

Figure 24. View from Bedlam Bay waters edge

Figure 25. (context for Figure 24) Bedlam Bay cricket oval, field runs right to the edge of the bay

Viewpoint 7 - Kelly Street Picnic Area

Views west from rocky lookout, high over Bedlam bay. The wharf will be seen as an individual element in the distance. Other maritime elements populate both the foreground and the distant background

Figure 26. View from the lookout at Kelly St Picnic Area

Figure 27. (context for Figure 24) small grassed area fringed by residential sites and waterside vegetation

Table 4. Visual Impact Assessment

Viewpoint	Setting	Visible elements	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
1 **Werrell Reserve**	Werrell Reserve, public open space - variety of spaces from open grassland to wooded areas, play equipment and BBQ areas.	Platform roof, parts of gangway, access stair	H	ML	FZ	M	The park is a potentially sensitive location, as it is used by local residents for recreation. The wharf structures will be visible from parts of the park, as the views change considerably with topography and planting. The wharf structures generally sit below the main body of the park, and will not be highly visible, or block views of the harbour. The new stair will integrate well into the landscape as it will use a similar material palette to the existing stair.
2 **Great North Road**	Great North Road and maritime buildings adjacent to the wharf	Pontoon and roof, gangway, access stairs.	H	ML	FZ	M	The wharf and gangway will not be visible from most of Great North Road, as it traverses a steep incline and Werrell Park acts as a natural screen. The new elements will become visible on descent towards the wharf, but will mostly still be obscured by the heritage listed Abbotsford Point Boatshed. When visible, the wharf will be seen against the backdrop of the water and the far landscapes. The pontoon and gangway will be visible from the Sailing Club and Scout Hall to the east - these views are sensitive for the members. The construction of the pontoon further into the river will enable a stronger visual connection between these buildings and the heritage listed boatshed. The addition of a cover over the gangway however will negate any improvement that could be achieved. The magnitude in this case is considered moderate to low, although the Sailing Club hosts functions for a population beyond the immediate residents, the wharf occupies a small portion of a wider view.

Viewpoint	Setting	Visible elements	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
3 **Cabarita Point**	Parramatta River headland, open public parkland, marina and restaurant	Pontoon and gangway	H	L	BZ	M	This location is considered sensitive as the park is a widely used outdoor area for residents and tourists, and the restaurant boasts waterfront views. The wharf is not visible from roads and parking areas on Cabarita Point, and is barely visible from most open grassed areas. This is a result of both the marina on the east of Cabarita Point and the distance between the location and the proposed wharf upgrade.
4 **Looking Glass Point**	End of residential street of narrow, steep peninsula - rocky outcrop at waters edge	Pontoon and some parts of gangway	ML	L	MZ	L	The new wharf will be visible from the rocky waters edge of the lower part of Looking Glass Point. Views to the new wharf from a higher elevation are mostly obscured by vegetation at the end of the road. The part of the point that affords a visual connection to the wharf upgrade is not heavily trafficked by pedestrians or residents, as many have water access as it is, it mainly used by hobby anglers. From here the upgrade will not affect any views to the heritage listed boatshed, and the wharf will sit below the line of vegetation of Werrell Reserve.
5 **Bedlam Point**	Historic stone wharf, lookout along foreshore walk through dense vegetation	Pontoon and gangway	ML	L	FZ	L	This location is considered moderately sensitive, as it is the closest point across the harbour from the wharf upgrade and a point of historic note. It also forms part of the foreshore walk linking Bedlam Bay to Banjo Paterson Park. The new wharf may block some existing views of the heritage listed boatshed from this point, though the change will be barely discernible. The new elements sit low in the general elevation, against the backdrop of the landscape.

Viewpoint	Setting	Visible elements	Sensitivity	Magnitude	Distance zone	Overall rating	Comment
6 **Bedlam Bay**	Cricket oval on Parramatta River - small wharf structure and anchored private watercraft	Pontoon	M	L	MZ	ML	This location is considered moderately sensitive as it hosts local sport events and regular maritime leisure activities. Views are at an oblique angle and the new pontoon will obscure the boatshed. At this distance though, any material contradictions between the new structure and the fine grain detail of the older buildings will be barely discernible. Werrell Reserve and Abbotsford Point East will remain unimpeded.
7 **Kelly Street Picnic Area**	Small picnic area at end of residential street - water views, high elevation over rocky outcrop and through vegetation	Pontoon and gangway	L	L	MZ	L	This location represents the view from waterfront residences and the public areas of Henley, and has a low degree of sensitivity. The wharf will read as a separate element on the Parramatta River, amongst other maritime structures. At this distance the new structure will not impose any significant change to the greater vista west along the river.
8 **Parramatta River**	Parramatta River contains steep ridged peninsulas which enclose harbours, coves and inlets along its length. t is used for commercial, public and private watercraft use.	Pontoon and gangway	M	L	FZ/MZ/ BZ	ML	Abbotsford Wharf forms part of a family of wharfs located on headlands projecting into the river. Continuity of headland infrastructure helps to mitigate any visual impact that upgrade works may incur. From the foreground zone the pontoon may be seen partially against the rising landscape, and partially against a backdrop of other maritime elements. Beyond this zone, the distance to the pontoon and gangway, and the subsequent oblique angle, will mitigate any impact on broader views.

N=Negligible; L=Low; ML=Moderate-Low; M=Moderate; HM=High-Moderate; H=High

Foreground zone (FZ): 0-250m from the viewer

Middle ground zone (MZ): 250m to 500m

Background zone (BZ): areas greater than 500m from proposed new wharf

5.3 Visual Impact Assessment Summary - Overall visual impact - Moderate to low

Despite the sensitivity of a number of viewpoints, the impact of the new Abbotsford Wharf is considered moderate to low.

The greatest potential visual impact is from the areas directly next to the wharf - Werrell Reserve and the boatshed, sailing club and scout hall. The new elements introduced into the view of the river will be in the foreground for these areas. Construction of the pontoon further in the river won't impose drastically on current views of the wider landscape, as the existing pontoon is to be demolished. A covered gangway will impede views across the immediate foreshore however, which would detract from the connection between the existing maritime structures.

Overlapping headlands in the surrounding area obscure the wharf from a range of angles and minimize the visual impact the new element may have. From these surrounding headlands the new structure is often obscured by scrubland.

Generally, when visible from the vantage points within the visual catchment, the wharf is seen against the sloping sandstone backdrop and dense vegetation of Werrell Reserve, and amongst older maritime halls. This means that the new elements will partially obscure views of the existing heritage boatshed and sandstone outcrops. These views are mitigated by distance - the shelter is read as a small part of the landscape, barely visible from most vantage points.

Where the pontoon and gangway are viewed from an oblique angle, they are seen against a backdrop of other maritime elements, and do not obscure views of open water.

6.0 SUMMARY OF DESIGN CONCEPT AND MITIGATION STRATEGY

6.1 Summary of urban design recommendations and mitigation measures

The concept for the proposed wharf and interchange upgrade works at Abbotsford Wharf has been based on an investigation of the following:

- potential visual impact;
- access;
- safety and security;
- buildability;
- material palette and character;
- architectural form and design; and
- maintenance.

Key Mitigation Measures:

- **Material selection, location of services, and a standardised family of elements** form the key design strategies for mitigating the impact of the proposal;
- **Relocation of pontoon** further into the river mitigates any noticeable local impact of the larger scale pontoon, deisgned to accomodate increased demand;
- **Ramps and walkways** within the proposed wharf have been given close attention to meet access standards;
- **Revised accessible parking area** introduces a new element in a relatively sensitive area however change to the key character elements of sandstone outcrops and sandstone kerbs is minimised by using existing open paved area;
- **Sensitive lighting** for added safety and security along both the gangway and pontoon;
- **Retention of existing landside stair elements**, with only minor intervention helps to preserve the integrity of the pedestrian connection to Werrell Reserve and maintain landscape character;
- **Colour** of paint and materials respond to the surrounding palette, are low in reflectivity, and are sympathetic to the surrounding elements of the precinct. These colours are consistent with the family of wharves along Sydney Harbour;

Overall the proposal would promote a unified palette of materials which, while responding to the maritime heritage and surrounding character, also separates the structure as a piece of architectural design. The design of the wharf is in keeping with the family of ferry wharves on the harbour and in the Parramatta River, creating a homegeneity of character in the harbour.

6.2 Conclusion

The overall impact of the proposal is considered to be moderate to low. The proposal replaces part of the existing covered wharf structure with a new gangway and pontoon that sits further out into the Parramatta River. The larger scale of the pontoon caters to the future demand for ferry transport along the river, with the design providing greater amenity for commuters. While the proposed wharf signals an increase in scale from the current structure the impact of this increase is limited, as it sits below the line of sight from the landside approach.

The greatest potential impact identified, for both visual and character categories, is to Werrell Reserve and nearby waterside clubs. The proposed upgrade to Abbotsford wharf will increase the presence of new forms and materials against the existing landscape and wharf elements, however these forms are in keeping with the language of wharves throughout the harbour. The material, form and character of the proposed wharf requires sensitivity to the surrounding landscape character and nearby heritage items. The new elements are lightweight in character, in neutral tones, and the whole structure has a high degree of transparency, reducing impact of character and views. A covered gangway however, will impede a visual connection between the heritage boatshed and the immediate foreshore surrounds, negating any advantage gained from moving the pontoon further into the Parramatta River.

There will be a moderate to low impact on views from foreshores and headlands in the surrounding harbour, with the greatest impact at Bedlam Point opposite the wharf. From there the heritage boatshed will be partially obscured, as views of the wharf are at an oblique angle. From this point the new structures are seen against a backdrop of the bush vegetation and sandstone slope of Werrell Park and other maritime elements of an older character, though the wharf does not significantly obscure these views.

Viewed from more distant vantage points, the wharf is a very small part of the wider view, with negligible impact on the quality and character of Abbotsford Peninsula or the wider harbour landscape. The relatively small scale and open construction of the new wharf elements and stair reduce the potential impact on views to a low level.

Appendix G

Statement of heritage impact

Transport
Roads & Maritime
Services

Statement of Heritage Impact

Abbotsford Wharf

PLANNING
BUILDING
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URBAN DESIGN

CITY PLAN SERVICES

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Transport
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Services

Abbotsford Wharf

Statement of Heritage Impact

September 2017

PLANNING
BUILDING
HERITAGE
URBAN DESIGN

CITY PLAN SERVICES

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Executive Summary

This Statement of Heritage Impact incorporating an Aboriginal heritage due diligence assessment and a historical archaeological assessment has been commissioned by Roads and Maritime Services NSW (Roads and Maritime). Roads and Maritime proposes to upgrade Abbotsford Wharf to improve facilities and amenities for ferry passengers. The subject site and footprint of the proposed work is defined as the wharf itself, the land-side abutment to which the wharf is fixed up to the boundary with Werrell Park, and the Great North Road cul-de-sac.

Abbotsford Wharf is located on Abbotsford Point, the northern-most part of the suburb of Abbotsford. The wharf comprises a concrete jetty, pontoon, gangway and convex canopy of sheet metal. Roads and Maritime has provided the following description of works:

The proposal is to upgrade the Abbotsford ferry wharf as part of the Transport Access Program (TAP). Its key features would include:

- *Removal of the existing wharf, including landside canopy*
- *Retention of about three metres of existing jetty*
- *An 18 metre long by three metre covered aluminium gangway extending north west from retained jetty section*
- *An 18 metres long by nine metre wide pile-founded floating covered and glazed steel pontoon*
- *Two new piled pivot piles to help with berthing*
- *A covered entry portal, of approximately six metres by three metres.*
- *Upgrade of the existing staircase and supporting hand rails*
- *A new kiss-and-ride parking zone*

A search of heritage databases showed that Abbotsford Wharf is listed as a heritage item under Schedule 4 of the Sydney Regional Environmental Plan (SREP) (Sydney Harbour Catchment) 2005. It is also located in the vicinity of local heritage items and one Aboriginal site. Therefore, a Statement of Heritage Impact (SoHI) needs to be prepared to assess the impact of the proposal on the heritage values of the wharf itself and the heritage items and archaeological sites nearby. Results of the impact assessment will inform the proposal and consideration whether to proceed and whether consultation with City of Canada Bay Council is required.

This Statement of Heritage Impact has been prepared in accordance with the NSW Heritage Manual 'Assessing Heritage Significance' and 'Statements of Heritage Impacts' guidelines. The philosophy and process adopted by this report is that guided by the Australia ICOMOS Burra Charter 2013. This report has also been guided by the 'Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales' (2010), the 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales' (2010), the NSW Heritage Manual, and the NSW 'Historical Archaeology Code of Practice' (2006).

The first stage of assessment involved liaison between City Plan Heritage and the representatives of Roads and Maritime on-site to gather background information and identify any gaps in the available data.

Desktop historical research established that Abbotsford Wharf was first built at its current location in the late 19th century or earliest years of the 20th century, at an important early crossing point across the Paramatta River. The wharf has been consistently in use for almost 120 years.

The Aboriginal heritage due diligence process showed that there were no sites of Aboriginal heritage significance recorded in close proximity to the site of the wharf, but there is one registered

site within 200m of it, located to the south-west on private property. Consideration of the proposal and its potential impact determined a low likelihood of harm to the registered site as a result of the proposed work.

Analysis of the historical documentary evidence was undertaken to establish whether the proposal footprint could contain historical archaeological resources. It was determined that, since the wharf has been reconstructed at least two times throughout the long history of its operation, it was unlikely that remnants of former wharves were extant. Should remnants of former wharves be extant on the site, it is unlikely that these would be substantial or could provide information on early wharf-building techniques.

The significance of the wharf was assessed based on its history and in accordance with the NSW Heritage Manual guidelines, 'Assessing Heritage Significance'. The heritage significance of Abbotsford Wharf is not associated with its physical fabric, which has been replaced at least twice throughout the history of its operation, but with the long-standing use of the site as a wharf and river-crossing. Established Statements of Significance were retrieved from the State Heritage Inventory form for heritage items in the vicinity.

Roads and Maritime's concept design was assessed for its potential impact upon the heritage values of the wharf and nearby heritage items. City Plan Heritage has concluded that the proposal would have an overall neutral impact upon the heritage values of Abbotsford Wharf, Abbotsford Point Boatshed, Werrell Park, and the Sydney Rowing Club Boatshed. However, the proposed work has potential to adversely impact the heritage significance of the historical sandstone kerbing along the cul-de-sac of Great North Road. Mitigation strategies, consisting of recommendations at the detailed design stage to avoid impact, have been suggested. The proposal would not affect any known archaeological sites or places of Aboriginal heritage and, while it would be likely to affect historical archaeological resources should these exist, these would not be of significance. The significance of Abbotsford Wharf would be respected through the maintenance of its function as a ferry wharf in its current location, which is the most important aspect to its significance.

This report includes Appendices A, B C, and D, where 'A' a brief history of the Aboriginal association with Canada Bay (extracted from the *Aboriginal Cultural Heritage Management Plan for the City of Canada Bay by Gondwana Consulting*), 'B' is a printout of the State Heritage Inventory (SHI) forms for Abbotsford Wharf and heritage items in its vicinity, 'C' is the Site Inspection Recording Form for the existing wharf, and 'D' comprises copies of the search results from basic and extensive searches of the AHIMS database.

1 Introduction

1.1 Purpose

Roads and Maritime Services NSW (Roads and Maritime) proposes to upgrade Abbotsford Wharf as part of the Transport Access Program, which aims to improve Sydney's ferry services for customers. This Statement of Heritage Impact has been prepared to assess the impact of the proposal on items of heritage significance within and near the footprint of the proposed work.

1.2 Project Description

The proposed work is as follows:

- Removal of the existing wharf, including landside canopy;
- Retention of about three metres of existing jetty;
- Construction of:
  - an 18-metre-long by three-metre-wide covered aluminium gangway extending north west from retained jetty section;
  - an 18-metre-long by nine-metre-wide pile-founded floating covered and glazed steel pontoon;
  - two new piled pivot piles to help with berthing;
  - a covered entry portal, of approximately six metres by three metres;
- Upgrade of the existing staircase and supporting hand rails; and
- Provision of a new kiss-and-ride parking zone.

1.3 Background

Abbotsford Wharf is located at Abbotsford Point, at the northern side of the suburb of Abbotsford. The wharf comprises a concrete jetty, pontoon and gangway covered by a sheet metal canopy. The land-side abutment of Abbotsford Wharf has the real property description of Lot 2 of Deposited Plan (DP) 667084 Figures 1 and 2 show the location of Abbotsford Wharf and its surrounding urban context on a cadastral map and an aerial photograph respectively.

Abbotsford Wharf is listed as a heritage item:

- under Schedule 4 of the Sydney Regional Environmental Plan (SREP) (Sydney Harbour Catchment) 2005, under the name of "Abbotsford Jetty" (item no. 24).

Abbotsford Wharf is located close to the following heritage items:

- Abbotsford Point Boatshed (Canada Bay Local Environmental Plan (LEP) 2013, item no. I221);
- Sandstone kerbing (Canada Bay LEP 2013 item no. I222);
- Werrell Park (Canada Bay LEP 2013 item no. I443); and
- Sydney Rowing Club – Boatshed (Canada Bay LEP 2013 item no. I239).

These listings are summarised in Table 1. Figure 3 presents a map of the heritage items listed under Schedule 4 of the SREP (Sydney Harbour Catchment 2005). Figure 4 presents the heritage map of the Canada Bay LEP 2013 showing Abbotsford Wharf in context with the heritage items in the vicinity.

Heritage items and archaeological sites are protected under the *NSW Heritage Act* 1977, the *Environmental Planning and Assessment Act* 1979, and the *National Parks and Wildlife Act* 1974, and approvals to do works on or near heritage items and archaeological sites are normally required from the NSW Office of Environment and Heritage and local councils.

However, refurbishment and upgrade of Abbotsford Wharf is identified as development that may proceed without consent under the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP). Under Clause 14 of the ISEPP, government bodies must consider whether proposed work would impact items of local heritage significance or Heritage Conservation Areas. Such assessment is completed through the preparation of a Statement of Heritage Impact (SoHI).

Under the ISEPP, if a proposal is assessed to have an impact that is not minor or inconsequential, consultation with the relevant local council is required. However, if the proposal is assessed to have no heritage impact or only minor impact, no consultation is required. This SoHI assesses the impact of the proposal on the heritage values of the heritage item and the heritage items and archaeological sites in the vicinity.

Table 1: Heritage Listings for Abbotsford Wharf and items in its vicinity

Item	Heritage Listing	Heritage Significance
Abbotsford Jetty	SREP (Sydney Harbour Catchment) 2005 (#24)	Local
Abbotsford Point Boatshed	Canada Bay LEP (#I221)	Local
Werrell Park	Canada Bay LEP (#I443)	Local
Sandstone kerbing	Canada Bay LEP (#I222)	Local
Sydney Rowing Club – Boatshed	Canada Bay LEP (#I239)	Local

Figure 2: Cadastral map showing the location of Abbotsford Wharf (indicated by the red ellipse) within its surrounding context (Source: SIX Maps NSW)

Figure 1: Aerial photograph showing the location of Abbotsford Wharf (indicated by the red ellipse) within its urban context (Source: SIX Maps NSW)

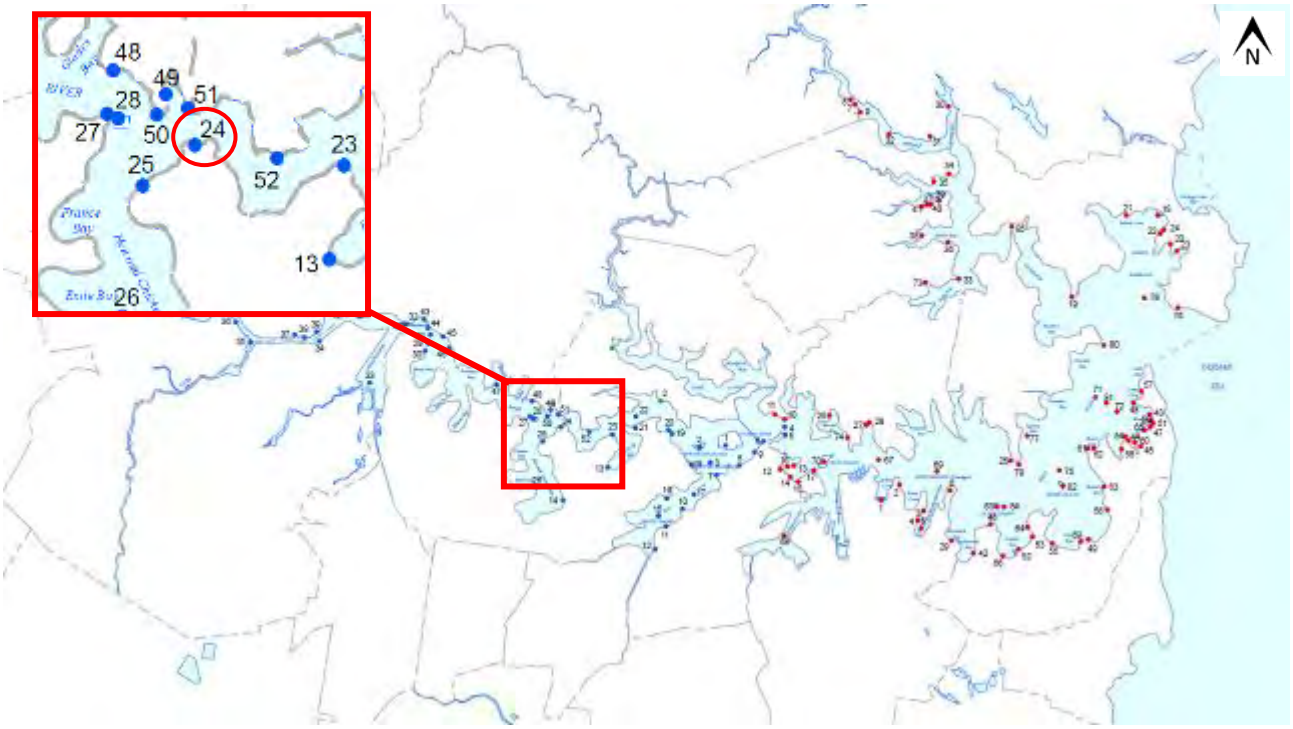

Figure 3: SREP (Sydney Harbour Catchment) 2005 map of heritage items, showing the location of Abbotsford Wharf, listed as “Abbotsford Jetty” (item no. 24), circled in red.

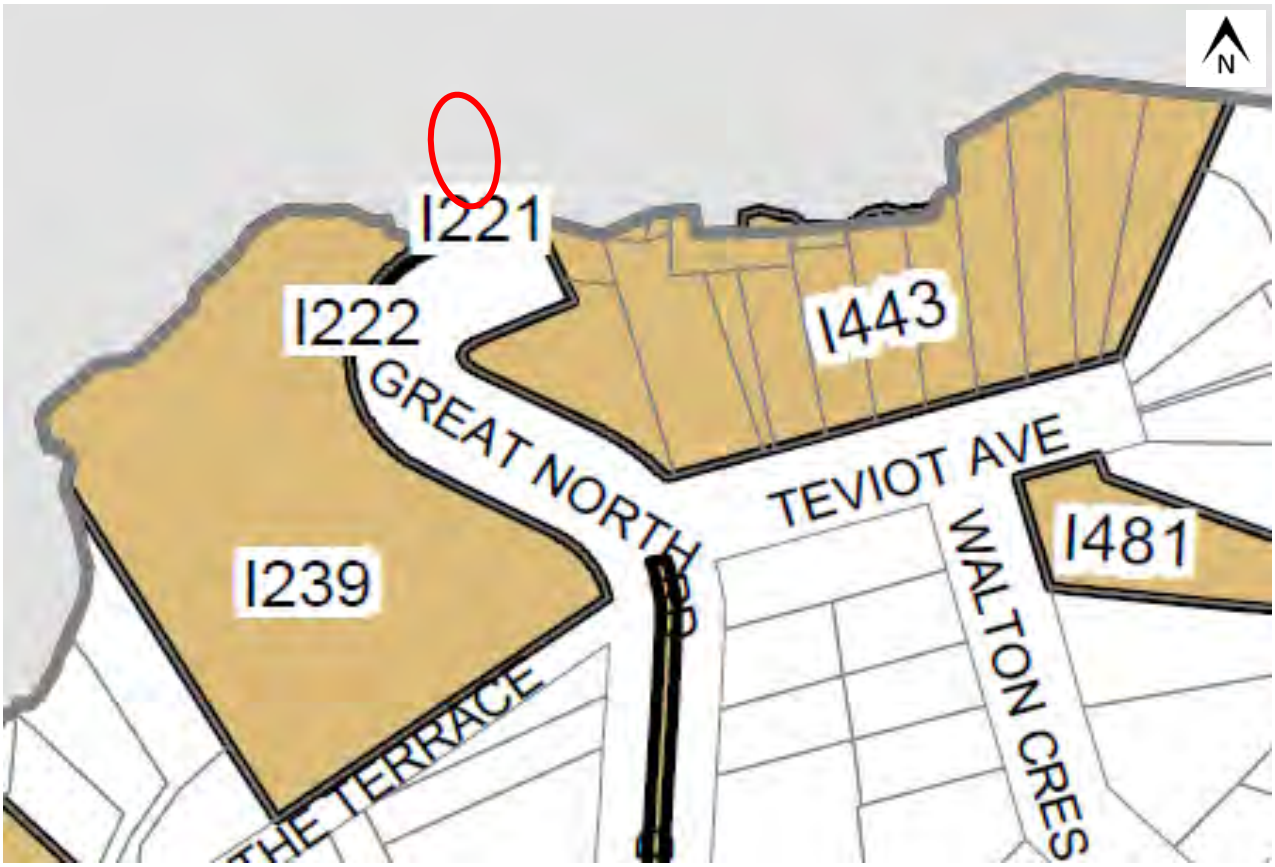

Figure 4: Canada Bay LEP heritage map no. 004, showing the location of Abbotsford Wharf within the red ellipse, and the local heritage items in its vicinity as per Table 1.

1.1 Methodology

This SoHI, incorporating an Aboriginal Heritage Due Diligence Assessment and a Historical Archaeological Assessment, has been prepared in accordance with the NSW *Heritage Manual* 'Assessing Heritage Significance' and 'Statements of Heritage Impacts' guidelines. The philosophy and process adopted by this report is that guided by the *Australia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013* (Burra Charter). This report has also been guided by the 'Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales' (2010), the 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales' (2010), the NSW Heritage Manual, and the NSW 'Historical Archaeology Code of Practice' (2006).

The NSW heritage management system consists of three aspects: investigate significance, assess significance and manage significance. Assessment of the impact of Roads and Maritime's proposal has involved all three aspects.

The first step towards the preparation of this SoHI involved liaison between City Plan Heritage and the representatives of Roads and Maritime on-site to gather background information and identify any gaps in the existing data. An initial visit to the site of Abbotsford Wharf and its surrounding context was conducted by Brittany Freelander (Senior Heritage Consultant) on 1 June 2017. A second, more detailed inspection of the site and its surrounding context was undertaken by Ana Silkatcheva (Heritage Consultant/Archaeologist) and Keira De Rosa (Assistant Heritage Consultant) on 19 June 2017. Specific items inspected were the Abbotsford Wharf structure, the associated timber waiting shelter, and nearby local heritage items Werrell Park, Abbotsford Point Boatshed, and the sandstone kerbing.

The existing heritage listings for Abbotsford Wharf, along with heritage items nearby, were identified and investigated by employing a variety of methods:

- Checking heritage items listed under Canada Bay Local Environmental Planning instruments and maps;
- Checking the State Heritage Inventory and State Heritage Register;
- Checking heritage items listed under Sydney regional planning instruments and maps;
- Checking Roads and Maritime Section 170 Register;
- Consulting the Aboriginal Heritage Information Management System (AHIMS) through basic and extensive searches;
- Carrying out site visits and visual inspections.

Desktop historical research was performed using resources available online through Canada Bay Local Studies, and digitised materials available in the National Library of Australia's Trove database.

The Aboriginal Heritage Due Diligence process was followed according to the steps recommended in the Code of Practice, and basic and extensive searches of the Aboriginal Heritage Information Management System database were performed.

Historical documentary evidence, including historical photographs and aerial photographs, were analysed to determine the likelihood that historical archaeological resources are present on the site.

The NSW Heritage Manual explains and promotes the standardisation of heritage investigation, assessment and management practices in NSW. The established assessment of heritage

significance was reviewed to ensure that it was prepared using the current evaluation criteria established by the New South Wales Heritage Council and for consistency with the history of the site. Additional information was added where it had been found.

This report includes Appendices A, B C, and D, where 'A' a brief history of the Aboriginal association with Canada Bay (extracted from the *Aboriginal Cultural Heritage Management Plan for the City of Canada Bay by Gondwana Consulting*), 'B' is a printout of the State Heritage Inventory (SHI) forms for Abbotsford Wharf and heritage items in its vicinity, 'C' is the Site Inspection Recording Form for the existing wharf, and 'D' comprises copies of the search results from basic and extensive searches of the AHIMS database.

Unless otherwise noted, all photographs were taken by City Plan Heritage.

1.2 Author Identification

This SoHI, incorporating an Aboriginal Heritage Due Diligence Assessment and Historical Archaeological Assessment, has been prepared by City Plan Heritage. Its principal author is Ana Silkatcheva (Heritage Consultant / Archaeologist). It has been reviewed by Kerime Danis (Director - Heritage), who has also endorsed its contents.

1.3 Limitations

The investigation and report preparation was undertaken within a brief period of time and was predominantly based on the scope of the project brief. This report constitutes a basic desktop assessment only, and no community consultation (from a heritage perspective) or fieldwork beyond two visual inspections has been performed towards its preparation.

2 Existing Environment

2.1 Site Context

Abbotsford Wharf extends north-ward into the Parramatta River from Abbotsford Point, the northern-most part of the suburb of Abbotsford. Abbotsford is located about 15 kilometres west of the Sydney Central Business District.

Abbotsford Wharf is located in a low-scale suburban context. It is accessed either from the cul-de-sac of the Great North Road to the west, Werrell Park to the south, or by water through the Parramatta River ferry service. Werrell Park is itself bounded by Great North Road to the west and Teviot Avenue to the south and east. The park is raised above the water level and provides access to the wharf via a set of concrete steps. Immediately west of the wharf is the Abbotsford Point Boatshed and its associated ramp into the water. A paved pathway to the east of the wharf provides access to other boatsheds along the waterfront.

2.2 Site Description

2.2.1 Abbotsford Wharf

Abbotsford Wharf comprises the following features:

- Jetty: Concrete structure supported by timber piles which projects north from the Abbotsford Point headland into the water. Dimensions of 27 X 8 metres.
- Pontoon: Concrete structure with glazing attached to the jetty, which supports floating vessels. Dimensions of 35 X 14 metres.
- Gangway: Structure which connects the pontoon to the jetty. Dimensions of 18 metres X 3 metres
- Canopy: Convex sheet metal overhead roof which covers the entire structure.

The concrete wharf extends land-side and is surrounded by pavers that lead to the Great North Road. Another canopy in the same style as that over the wharf provides additional shelter on the western side of the paving, near the Abbotsford Point Boatshed.

Figures 5 to 9 show the existing appearance and context of the wharf.

Figure 5: A general view of Abbotsford Wharf from the west.

Figure 6: A view down the jetty towards the Parramatta River.

Figure 7: A view of the wharf in its entirety from the east.

Figure 8: A view east from the wharf towards boatsheds on the waterfront.

Figure 9: A view west from the wharf towards the cul-de-sac of Great North Road.

2.2.2 Abbotsford Point Boatshed

The following physical description of heritage item, Abbotsford Point Boatshed, is reproduced from the State Heritage Inventory (SHI) database form for the item.[1]

> *The older section of the building is a weatherboarded and gabled structure, supported over the water on wooden piles repaired in concrete. A skillion leanto, also in weatherboard, has been added and is supported on sandstone piers.*

Figures 10 to 12 show the existing appearance and context of the boatshed.

[1] State Heritage Inventory sheet for Abbotsford Point Boatshed, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891053.

Figure 10: A general view of the northern façade of the Abbotsford Point Boatshed, facing the Paramatta River.

Figure 11: A general view of the eastern façade of the Abbotsford Point Boatshed, adjacent to the wharf.

Figure 12: A general view of the southern façade of the Abbotsford Point Boatshed, on Great North Road. The historical sandstone kerbing is also visible here, in the foreground.

2.2.3 Sandstone Kerbing

The following physical description of heritage item, Sandstone Kerbing, is reproduced from the State Heritage Inventory (SHI) database form for the item.[2]

> *A small section of sandstone kerbing running around the curve down to the wharf and boatshed that appears to date from the early construction of the road. It is typical of much sandstone kerbing throughout the area that is gradually being replaced and is of particular interest here in relation to the former ferry access and the historic nature of the area.*

Figures 13 and 14 show the existing appearance and context of the sandstone kerbing. It is also visible in Figure 12 above.

[2] State Heritage Inventory sheet for Sandstone Kerbing, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891054.

Figure 13: A view of the cul-de-sac of Great North Road, looking towards Abbotsford Wharf, with the sandstone kerbing indicated by the red ellipse.

Figure 14: A closeup view of the sandstone kerbing along Great North Road, facing west.

2.2.4 Werrell Park

The following physical description of heritage item, Werrell Park, is reproduced from the State Heritage Inventory (SHI) database form for the item.[3]

A picturesque foreshore (riverside) park sited on a sandstone promontory on the Parramatta River. There are fine views of the river (especially up Parramatta River) and across to Gladesville. The sandstone ledges and shelves are significant. It is notable for its remnant stand of indigenous trees (vegetation) including blackbutt (Eucalyptus Pillar's to 20m, stringy bark, Port Jackson, Fiscus Religions'), Casuarina glace, Glochidia Fendi Nandi, Pittosporum undulates, Kunze Amiga, Loanda conidial. Also notable are the exotic palms along the roadside edge (Canary Island?) and brushback. A recent new planting with local natives has been relatively sympathetic.

The Reserve and Point contain good quality mature planting. A Norfolk Island Pine which adds to the landscape qualities of the river environs, dominates the point as a landmark.

The park is linked to the jetty by a set of steps and was apparently a popular picnic spot in the years around the turn of the century, the jetty being used as a regular ferry stop.

On the east side of the reserve, the rock cutting for Great North Road includes a small area with convict pick marks.

Figures 15 to 18 show the existing appearance and context of Werrell Park.

[3] State Heritage Inventory sheet for Werrell Park, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891055.

Figure 15: The entrance to Werrell Park from Teviot Avenue in the south.

Figure 16: A general view of Werrell Park from within, facing the Parramatta River.

Figure 17: A view of the pathway and stair down to Abbotsford Wharf from Werrell Park.

Figure 18: A view of the steps to Werrell Park from the level of the wharf.

2.2.5 Sydney Rowing Club – Boatshed

The following physical description of heritage item, Sydney Rowing Club – Boatshed, is reproduced from the State Heritage Inventory (SHI) database form for the item.[4]

> *One of two major buildings on the site. A large timber boatshed, rectangular in form with a high, late Federation style roof. The roof is tiled in terra cotta with gambrels and wide dormer windows at the sides. The end forms are broken up by rectangular viewing areas and a rear addition (?). Glazing is otherwise limited. The building is c.1920 and is located in a prominent foreshore location. The building's impressive roof makes a positive contribution to the local landscape. The clubhouse behind is a more recent building of ordinary design.*

The Sydney Rowing Club Boatshed is not visible from Great North Road or the Abbotsford point Wharf.

[4] State Heritage Inventory sheet for Sydney Rowing Club - Boatshed, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891073.

3 Aboriginal Heritage

3.1 Legislative Framework

Aboriginal heritage in NSW is protected under the *National Parks and Wildlife Act 1974*.

3.1.1 National Parks and Wildlife Act 1974

The Office of Environment and Heritage (OEH, formerly the Department of Environment, Climate Change and Water) is primarily responsible for regulating the management of Aboriginal cultural heritage in New South Wales under the *National Parks and Wildlife Act* 1974 (the *NPW Act*). The *NPW Act* is accompanied by the National Parks and Wildlife Regulation 2009 (the Regulation), the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) and other industry-specific codes and guides.

The *NPW Act* defines an Aboriginal object as:

> *...any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales.*

In accordance with Section 86(1) of the *NPW Act*, it is an offence to harm or desecrate a known Aboriginal object, whilst it is also an offence to harm an Aboriginal object under Section 86(2). Similarly, Section 86(4) states that a person must not harm or desecrate an Aboriginal place. Harm to an object or place is defined as any act or omission that:

- *a) destroys, defaces or damages an object or place, or*
- *b) in relation to an object – moves the object from the land on which it had been situated, or*
- *c) is specified by the regulations, or*
- *d) causes or permits the object or place to be harmed in a manner referred to in paragraph (a), (b) or (c),*
- *but does not include any act or omission that:*
- *e) desecrates the object or place, or*
- *f) is trivial or negligible, or*
- *g) is excluded from this definition by the regulations*

It is necessary to exercise due diligence to determine whether proposed work will harm an Aboriginal object or site.

3.2 Aboriginal Association with Canada Bay

An *Aboriginal Cultural Heritage Plan of Management for the City of Canada Bay* was prepared by Gondwana Consulting in 2006. Aboriginal people had a long and sustained association with the Canada Bay area. This is explored extensively in the report by Gondwana Consulting and the relevant excerpt is included in Appendix A.

3.2.1 Previous Archaeological Research in Canada Bay and Abbotsford

The *Aboriginal Cultural Heritage Plan of Management for the City of Canada Bay* of 2006 is the most recent study of Aboriginal heritage in the Canada Bay area. It followed a number of Aboriginal

heritage assessments that had been conducted in Canada Bay as part of studies of a wider area.[5] The majority of the identification and recording of Aboriginal sites in the Canada Bay area was undertaken by two amateur archaeologists, R. Taplin and an Aboriginal recorder identified only as 'Informant', in the 1970s and 1980s.

The study by Gondwana Consulting involved a survey to investigate survival of sites that had been previously recorded in the Canada Bay area. The study identified 20 sites within the area that either definitely remained or possibly remained in 2006, the time of the study.

Three sites had previously been identified at Abbotsford: a midden in Quarantine Park, a rock shelter with pigment art on a private property nearby, and a shell midden burial further north across the Point. The midden was located again successfully in the 1985 fieldwork for the Parramatta River Heritage Study, but was subsequently assessed as being not of Aboriginal origin. The rock shelter, which had been originally recorded by Taplin in 1979, was not relocated by Gondwana Consulting in 2006. The shell midden burial, which had been identified by A. Kenney in 1987, was relocated by Gondwana Consulting in 2006 on private property and found to be have been sealed by a swimming pool. A search of the Aboriginal Heritage Information Management System shows that this site remains the only known and recorded site in Abbotsford (see Attachment C).

3.3 Assessment of the Proposed Works Against the Due Diligence Code of Practice

In 2010 the NSW Department of Environment, Climate Change and Water published the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales to guide the minimum requirements for conducting due diligence to determine whether sites or objects of Aboriginal heritage significance may be present on a site where development is proposed.

The Due Diligence Code of Practice recommends asking and answering several questions to determine whether a site is likely to contain sites or objects of Aboriginal heritage significance. The relevant questions are answered below for the site of Abbotsford Wharf.

Step 1: Will the activity disturb the ground surface?

The proposed development of a new kiss-and-ride parking zone inside the cul-de-sac of the Great North Road will not impact on the stone kerbing. However, installation of signage indicating this parking zone will require some disturbance of the ground surface.

The proposed activities would also require disturbance of the land/harbour interface on the coast of Abbotsford Point.

Step 2A: Search the AHIMS database and use any other sources of information of which you are already aware.

A basic search of the AHIMS database was undertaken for sites recorded within a 0m buffer, a 50m buffer and a 200m buffer of the landfall portion of Abbotsford Wharf (Lot 2 of Deposited Plan (DP) 667084) (See Attachment C). The searches for places within a 0m and a 50m buffer displayed 0 results, however, one registered site was found in the search within a 200m buffer of Lot 2. Subsequently, an extensive AHIMS search was conducted to identify the site. The site,

[5] The Parramatta River Heritage Study, conducted in mid-1985 (Fox & Associates 1986); the Port Jackson Archaeological Project, conducted in 1991-1992 (Attenbrow 2002, 1991); and the Resources Inventory of the Parramatta River in 1996 (EDAW (Aust) Pty Ltd and Environmental Partnership 1996).

identified by the number 45-6-0567, is recorded as “burial/shell midden” located near Fitzroy Street, south of Abbotsford Wharf.

This Aboriginal site is a substantial distance south-west from Abbotsford Wharf, on private property. According to the *City of Canada Bay Aboriginal Cultural Heritage Study and Management Plan*, prepared in 2006, by that time, the site had been sealed beneath and was therefore protected by a swimming pool.[6]

Step 2B: Activities in areas where landscape features indicate the presence of Aboriginal objects.

The Due Diligence Code of Practice identifies five landscape features that indicate the likely existence of Aboriginal objects, namely locations:

- within 200 metres of water;
- within a sand dune system;
- on a ridge top, ridge line or headland;
- within 200 metres below or above a cliff face; and
- within 20 metres of or in a cave, rock shelter, or a cave mouth.

The location must also be on land that is not disturbed. Disturbed land is defined in the Code as land that “has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable”.

By its nature as a wharf, Abbotsford Wharf is located on the interface of the land and harbour on the coast of Abbotsford Point. Aboriginal people have lived on the Australian coast for thousands of years, and have found food and raw materials in coastal environments. Therefore, sites of Aboriginal heritage significance may be predicted to be present. Indeed, as Step 2A has shown above, one such site have been recorded in the vicinity.

However, as with the majority of the shoreline in the Canada Bay area, the coastline around Abbotsford Point has been landscaped and a seawall has been constructed. In addition, human activity has taken place in the immediate location of the wharf and in its immediate vicinity through the construction of the Great North Road and later development (See Section 4.2). Therefore, these areas may be considered to be disturbed land. As such, if Aboriginal sites once existed in the immediate vicinity of Abbotsford Wharf, traces of these would have been removed through the human activities that have occurred on the site.

Step 3. Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?

The Aboriginal burial site identified on the AHIMS database is located a substantial distance away from the proposal footprint, on private property, and is sealed by a swimming pool. It is highly unlikely that harm would come to the site as a result of the proposed work.

[6] Gondwana Consulting 2006, p. 157.

3.3.1 Desktop Assessment Summary

This desktop assessment of Aboriginal archaeological potential has shown that the proposed work to upgrade Abbotsford Wharf would minimally disturb the ground surface and would also disturb the land/harbour interface along part of the shoreline of Abbotsford Point.

As a coastal area, Abbotsford Point would have been an important area for Aboriginal people. If the area had not been previously disturbed by human activity, there would be high potential for sites and objects of Aboriginal heritage significance to exist.

A search of the AHIMS database has shown that there are no recorded sites of Aboriginal heritage significance in the immediate vicinity of Abbotsford Wharf, but there is one recorded site within the 200m buffer zone beyond the 50m buffer zone to the south-west of it (see *Attachment C*).

Historical research has shown that human activities have changed the landscape. The shoreline has already been modified through landscaping and the construction of the seawall. The broader area has also been changed through the installation and use of the punt and later wharf.

Due to the limited proposal footprint, it is highly unlikely that harm would come to the recorded site as a result of the proposed work. Unrecorded sites and objects are unlikely to be present in the area due to the extensive human activities.

4 Non-Aboriginal Heritage

4.1 Legislative Framework

Historical heritage in NSW is protected by the *New South Wales Heritage Act 1977* and the *Environmental Planning and Assessment Act 1979* (EP&A Act) and its sub-instruments. These are discussed below.

4.1.1 NSW Heritage Act 1977

Architectural Works

In NSW, the legal protection for items of state heritage significance is afforded by the Heritage Act 1977. Those items of state significance are listed on the State Heritage Register and their inclusion on the register identifies them as possessing values that are important to the NSW community.

The research undertaken did not identify any heritage item that is included on the State Heritage Register, therefore the provisions of the Heritage Act 1977 for State level items do not apply; This means that neither a section 60 Application under section 57(1) of the Act or notification for Standard Exemptions under section 57 (2) of the Act are required for any work to the heritage items located within the study area. All of the heritage items are of local significance.

Archaeological Management

The archaeological resources ('relics') of New South Wales are recognised through the protection offered under the Heritage Act in which a 'relic' is defined as:

> *any deposit, artefact, object or material evidence that:*
> *(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
> *(b) is of State or local heritage significance*

Under the terms of the Act, automatic statutory protection is provided for 'relics'. Section 139 (1) of the Heritage Act provides that:

> *A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.*

No specific archaeological remnants have been identified within the footprint of the proposed upgrade to Abbotsford Wharf (see Section 4.3).

4.1.2 State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)

The ISEPP governs development that involves infrastructure. In addition to the requirement for notification of any proposed work under the EP&A, under the ISEPP, State Government bodies are required to consult the respective local council for any work proposed to a heritage item of local significance if its impact is assessed to be more than minor or inconsequential. Clause 14 of the State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) sets the requirements for such activity. The subject clause is provided below:

> *14 Consultation with councils – development with impacts on local heritage*
>
> *(1) This clause applies to development carried out by or on behalf of a public authority if the development:*

(a) 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, and
(b) is development that this Policy provides may be carried out without consent.

(2) A public authority, or a person acting on behalf of a public authority, must not carry out development to which this clause applies unless the authority or the person has:
(a) had an assessment of the impact prepared, and
(b) given written notice of the intention to carry out the development, with a copy of the assessment, to the council for the area in which the heritage item or heritage conservation area (or the relevant part of such an area) is located, and
(c) taken into consideration any response to the notice that is received from the council within 21 days after the notice is given.

Abbotsford Wharf is located within the Canada Bay Local Government Area (LGA). The wharf is listed as a heritage item of local significance under the Sydney Regional Environmental Plan (SREP) (Sydney Harbour Catchment) 2005 (item no. 24). It is located near other heritage items of local heritage significance listed on the Canada Bay LEP that could be impacted by the proposal to refurbish and upgrade the wharf. If the impact is assessed to be more than minor or inconsequential, City of Canada Bay Council will need to be consulted in accordance with Regulation 14 of the ISEPP.

4.2 Early European History of Abbotsford

The suburb of Abbotsford once formed part of Five Dock Farm, a 1,500-acre area of land originally granted to Surgeon John Harris in 1806 by Governor King.[7] Seven grants had been made in the area earlier, but these had all reverted to the crown by the time Governor King made his grant to Harris.[8] In 1828, Surveyor-General Sir Thomas Mitchell marked out a new road which traversed the farm north to south, and which would later become the Great North Road.[9] In 1836, Harris sold the entirety of Five Dock Farm to Samuel Lyons, who was the leading auctioneer in Sydney at the time but had originally been a convict. Lyons found that he urgently intended to leave the Colony and so engaged Mr. W. Hebblewhite to subdivide the farm and sell the allotments at auction for a quick sale.[10] In January 1837, 133 allotments, ranging from 2 to 60 acres in size, were put to the hammer. These continued to be sold progressively throughout the year, but even eleven months later forty two lots remained.[11] In April 1839 thirty five lots of the estate still remained unsold and auctions continued (Figure 19).

Samuel Lyons had reserved for himself and his family the prime portion of the Five Dock Estate, comprising marina lands facing Bedlam Point. In 1855, this area was put up for sale.[12] The area east of the Great North Road, with a frontage to Fig Tree Bay, was called Feltham (Figure 20).

The suburb would not receive its modern name for about another two decades. In 1878, one Dr (later Sir) Arthur Renwick, doctor, philanthropist, and politician, built a house in the area and called it Abbotsford House after author, Sir Walter Scott's, home village on the River Tweed in Great Britain.[13] A grand Victorian mansion typical of the Boom Style, the house was the area's defining feature and leant the entire suburb its name.

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[7] Commercial Journal and Advertiser, "Advertising", Saturday 24 September 1836, p.2.
[8] F. Pollon, 1988. The Book of Sydney Suburbs, p.104.
[9] Ibid.
[10] Commercial Journal and Advertiser, "Advertising", Saturday 24 September 1836, p.2.
[11] The Sydney Monitor, "Five Dock Farm", Monday 13 November 1837, p.3.
[12] Empire, "Sales by Auction", Friday 30 March 1855, p.8.
[13] Pollon 1988 op.cit., p.1.

Figure 19: Subdivision of Five Dock Farm. (Source: State Library of New South Wales, file number IE3787927)

Figure 20: Plan of Feltham, Fig Tree Bay, Parramatta River, Brownrigg & Row, 1857. (Source: National Library of Australia, Call number MAP F 148)

4.2.1 Development of Abbotsford Wharf and surrounds

Immediately west of Sydney, the Parramatta River is narrowest between Bedlam Point and Abbotsford Point. In the early decades of the 19th century, people wishing to cross were carried by one Mr. T. Small who had boats for hire.[14]

The ideal geography led the Government to select this area as the crossing point for the Great North Road, constructed by convict labour between 1825 and 1836. A punt was set up between the north and south banks to connect the two ends of the road. Known as the Bedlam or Gladesville Punt, it began operating in May 1832 to ferry horses and carriages across the River.[15] Merely a year later it was out of operation for at least three months due to a need for new rope.[16]

On the southern bank, the location of the punt was on Lot 1 of Lyons' and Hebblewhite's subdivision of Five Dock Farm in 1837 (see Figure 19 above). Originally purchased by one Mr. E. Solomon for 25 pounds per acre, it was almost immediately re-acquired by Lyons at a premium of 30 pounds per acre,[17] and in 1855 formed part of the subdivision called Feltham (See Figure 20 above).

By 1842, steam-boats would call at Bedlam Point four times daily,[18] stopping mid-stream to let people disembark and transfer to the punt for crossing to either bank (Figure 21).[19] In the interests of preserving the punt man's business, no one was permitted to "ply for hire" within one mile of either side of the punt east and west. But owing to the punt man's frequent abandonment of his responsibility, one enterprising fellow who owned a boat on the south shore (at Abbotsford) took advantage of the situation and acted as a ferryman.[20]

In 1877 tenders were invited for "the erection of a cottage residence and wharf at Abbotsford, Parramatta River, opposite Gladesville."[21] This is the first reference to a wharf in the area in the historical record. The punt continued to operate until the opening of the Gladesville Bridge in 1881 made it obsolete. The location of a "punt wharf ferry" matching the current location of Abbotsford Wharf was indicated on an undated map (Figure 22), but a parish map for Concord dating to 1885 merely indicates "ferry", showing that there was no longer any reference to the punt by that time (Figure 23).

In 1894 the Department of Lands granted a special lease to Alfred Charles Bailey for a "jetty and shed" on the Parramatta River.[22] Born in 1859, Alfred Charles Bailey had settled on the riverfront in the 1880s,[23] apparently originally a quarryman.[24] Bailey established a business of letting boats for hire, and used his shed to store them. It is unclear whether the jetty under his special lease was an early form of the wharf or if it related to one attached to his boatshed.

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[14] The Sydney Monitor, "To the Editor of the Sydney Monitor", Wednesday 26 June 1833, p.3.
[15] The Sydney Herald, "Domestic Intelligence", Monday 28 May 1832, p.3.
[16] The Sydney Monitor, "To the Editor of the Sydney Monitor", Wednesday 26 June 1833, p.3.
[17] The Sydney Monitor, "Five Dock Farm", Friday 27 January 1837, p.2.
[18] The Sydney Herald, "Advertising", Friday 25 February 1842, p.4.
[19] Recollections of W.S. Campbell in 1919, as presented by Parramatta City Council in their early history of the Parramatta River: http://arc.parracity.nsw.gov.au/blog/2014/05/14/the-parramatta-river-1848-to-1861-personal-observations-by-w-s-campbell/
[20] The Sydney Gazette and New South Wales Advertiser, "Bedlam Point Ferry", Saturday 27 February 1841, p.2.
[21] The Sydney Morning Herald, "Advertising", Tuesday 27 November 1877, p.2.
[22] Evening News, "Government Notices", Thursday 18 January 1894, p.2.
[23] Sands' Directory, 1880s entries for Five Dock.
[24] According to listings in Sands' Directory.

The first evidence for the early appearance of the wharf at Abbotsford Point comes in the form of an illustrated postcard from the early 1900s (Figure 24) and a photograph from 1903 (Figure 25). They both show that a tall and narrow lamp-post stood on the wharf, and taken together they demonstrate that the wharf extended for a substantial distance from the riverbank and had tidal steps at its mid-point.

An advertisement for the subdivision of the Abbotsford Estate from 1907 (Figure 26) shows the wharf with a T-shaped footprint, but later photographs how it had more of a battle-axe shape. By 1908, a booth or shelter had been installed on the wharf, behind the tidal steps (Figure 27). Bailey's Boatshed continued to operate now (Figure 28).

In 1920, the Sydney Rowing Club, which owned the land on the western side of Bailey's Boatshed, constructed a new rowing shed to supplement their activities at their Woolloomooloo headquarters.[25] This land, occupied by Red House, also known as Red Cow Inn, had been set aside for the Rowing Club's use in 1872 by Quarto L. Deloitte. The Rowing Club ran quarterly regattas along the Parramatta River, and Abbotsford Wharf was a prime spot was watching the action (Figure 29). By 1911 additional boatsheds had been built east of the wharf as well (Figure 30).

Between 1920 and 1925, Bailey had his boatshed extended eastward toward the wharf (Figure 31). Most development in the area occurred between the 1940s and 1980, with several new buildings constructed eastward of the wharf around Abbotsford Point (Figures 32 to 34).

The wharf retained its battle-axe form and its timber fabric at least until 1990 (Figure 35). Although ferries serviced Abbotsford Wharf since the early years of the 20th century, a plaque onsite shows that it was officially opened for public use on 23 July 1998 by the Minister for Transport/Minister for Roads and the Member of Parliament for Drummoyne (Figure 36).

In 2001 it had been replaced with a concrete structure and associated pontoon (Figure 37), a form it retains to this day (Figure 38).

[25] State Heritage Inventory sheet for Sydney Rowing Club - Boatshed, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891073.

Figure 21: Parish of Hunters Hill, County of Cumberland, South-East Sheet (undated), showing the crossing points across the Parramatta River at Bedlam Wharf and Abbotsford Wharf. (Source: Lands & Property Information Historical Land Records Viewer)

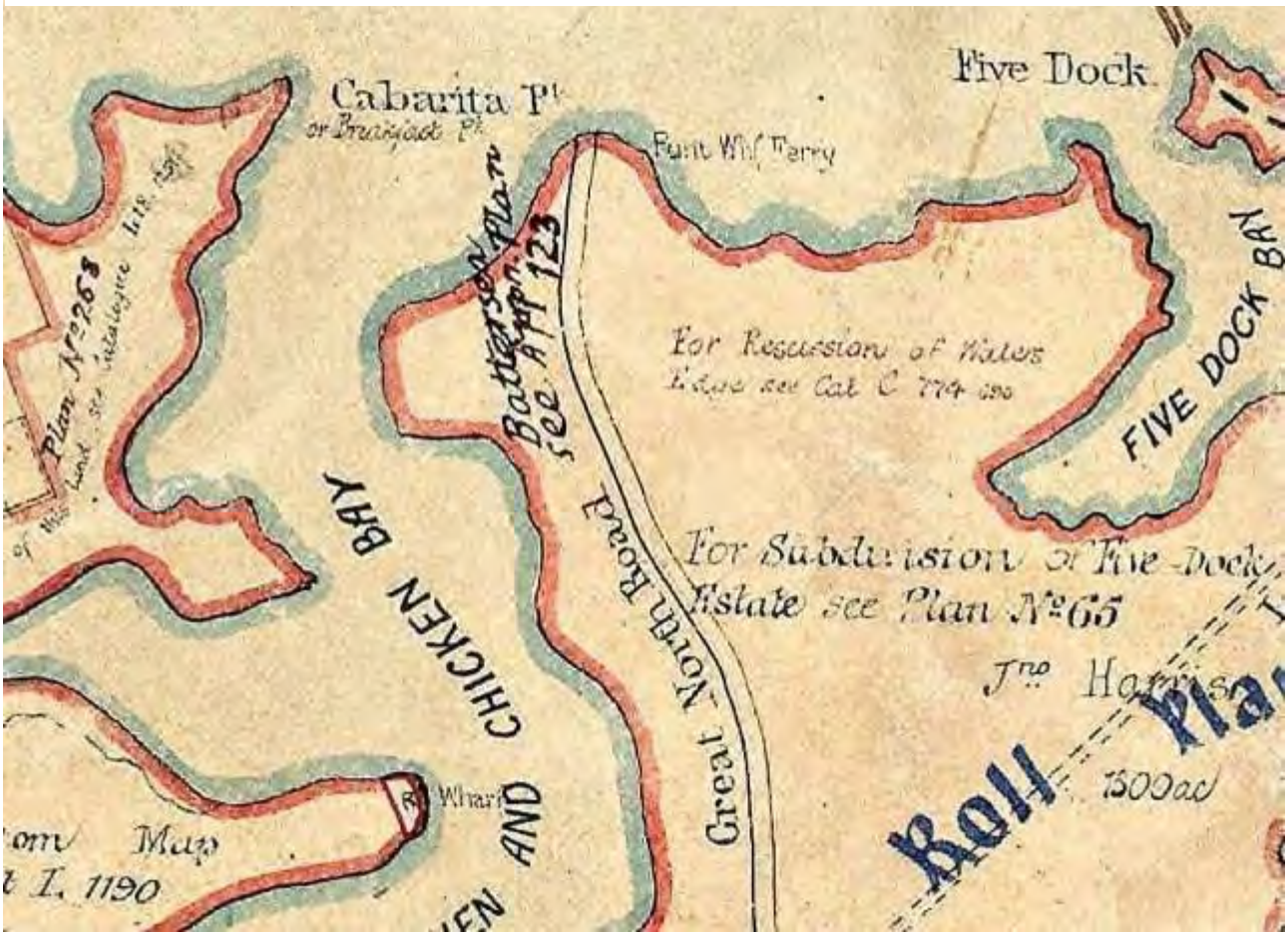

Figure 22: Excerpt of a parish map for Concord, undated, showing the existence of a 'Punt Wh[ar]f Ferry' at Abbotsford Point (circled in red). (Source: Lands & Property Information Historical Land Records Viewer)

Figure 23: 1885 parish map for Concord, County of Cumberland, showing the existence of a ferry at Abbotsford Point (circled in red). (Source: Lands & property Information Historical Land Records Viewer)

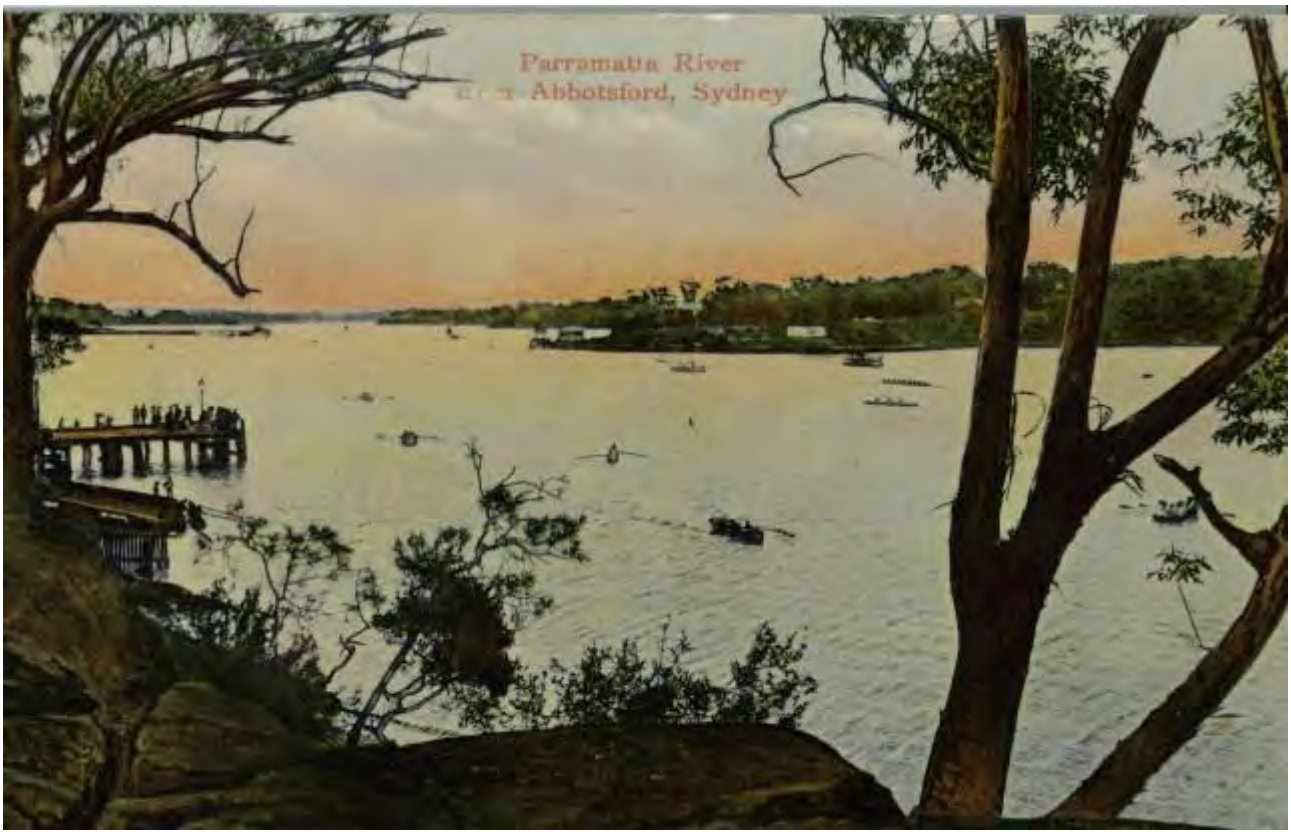

Figure 24: A postcard from the early 1900s showing a view of the Parramatta River from Abbotsford, including part of Abbotsford Wharf at the left. (Source: City of Canada Bay Council: Local Studies online archives)

Figure 25: Abbotsford Wharf, with a view of a steam ferry, 1903. (Source: City of Canada Bay Council: Local Studies online archives. Originally from 'Abbotsford Park', a booklet published by Batt, Rodd & Purves Limited to promote an auction of land on 14 November 1903)

Figure 26: Excerpt of a subdivision plan for Abbotsford Estate, 1907, Hugh Duff & Co., showing a footprint of Abbotsford Wharf. (Source: National Library of Australia, lithograph, Bib ID 2187384)

Figure 27: Alfred Charles bailey's boat shed and Abbotsford Wharf, with a steam ferry calling, 1908. (Source: City of Canada Bay Council: Local Studies online archives. Originally in Eric Russell, 1982. *Drummoyne: a Western Suburbs History from 1794*, p.172)

Figure 28: "Abbotsford Wharf near Alfred Charles Bailey's Boat shed (also known as Abbotsford Boat shed). Alfred Charles Bailey Jr is believed to be the bearded gentleman in the photograph," 1908. (Source: City of Canada Bay Council: Local Studies online archives)

Figure 29: Abbotsford Wharf and Boatsheds, including Alfred Charles Bailey's Boatshed on the right, 1911. (Source: City of Canada Bay Council: Local Studies online archives)

Figure 30: Alfred Charles Bailey's Boat shed and Abbotsford Wharf, with the crowd of people most likely spectators of a rowing regatta along the Parramatta River, 1920. (Source: Bill Allen Collection, City of Canada Bay Council Local Studies online archives)

Figure 31: Abbotsford Wharf and Parramatta River, 1925. (Source: City of Canada Bay Council: Local Studies online archives, file number. Originally published in 'Souvenir of the Five Dock Public School Jubilee, 1861-1936', p.74.

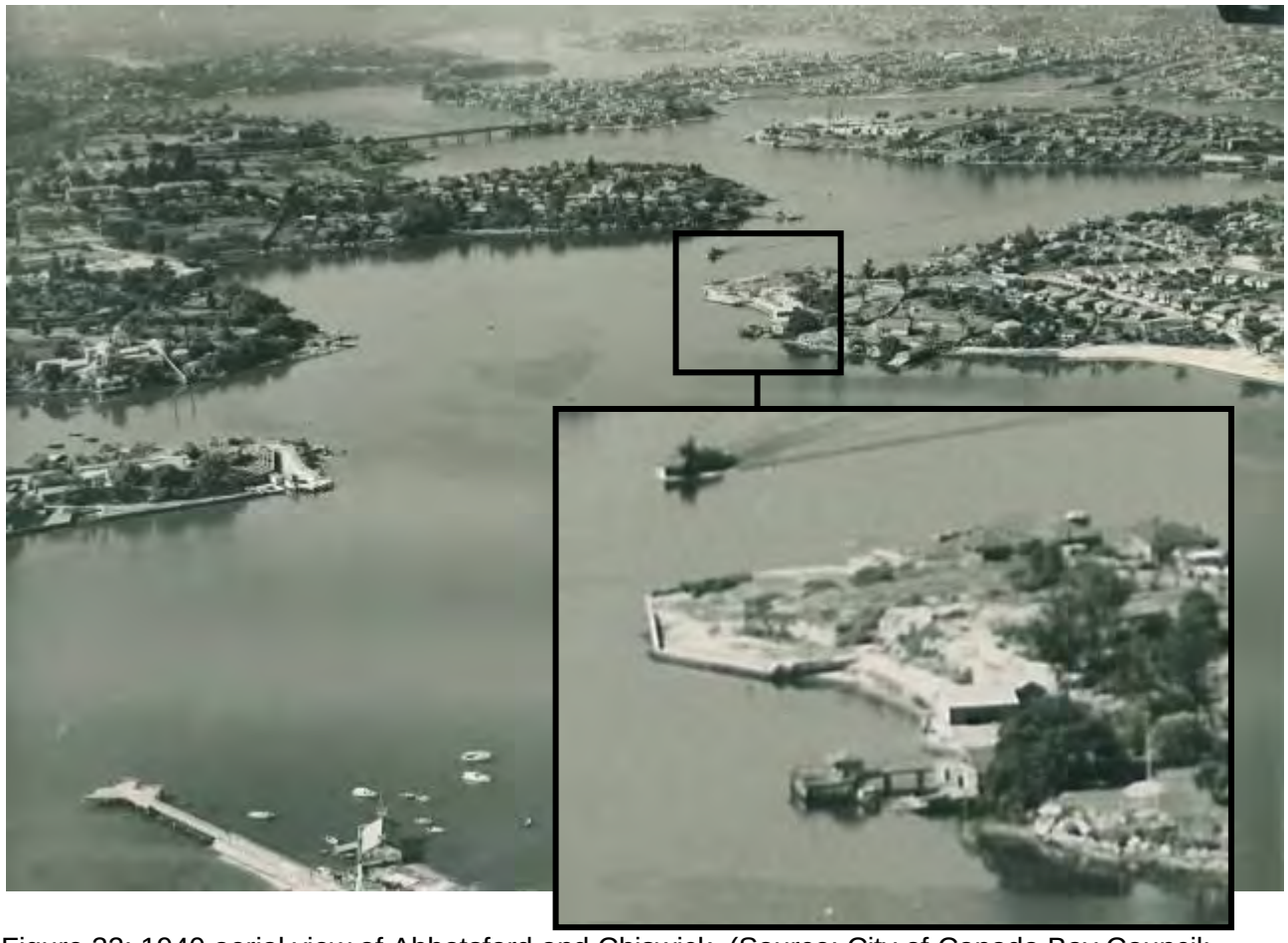

Figure 32: 1940 aerial view of Abbotsford and Chiswick. (Source: City of Canada Bay Council: Local Studies online archives)

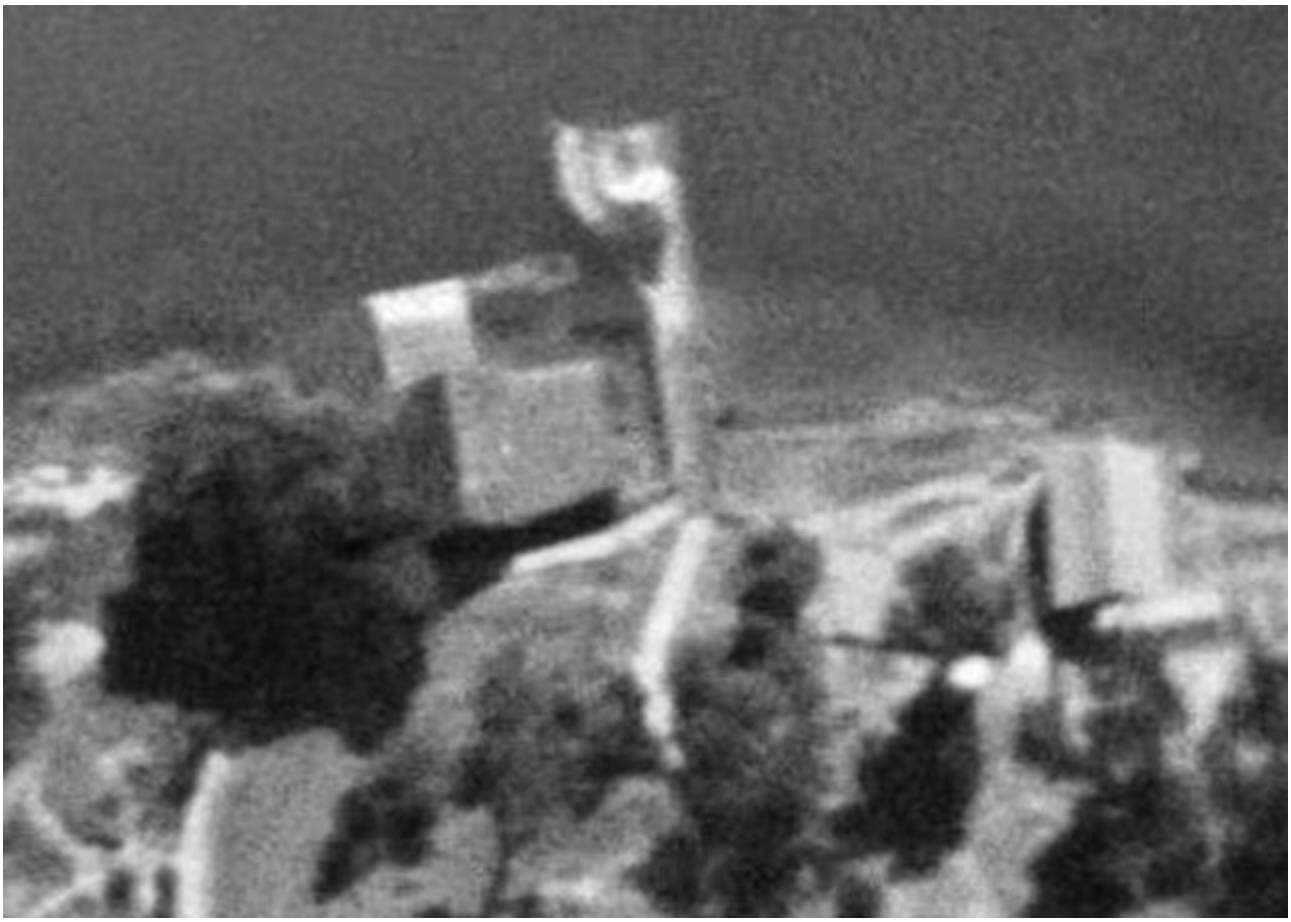

Figure 33: Aerial photograph of Abbotsford Wharf and Bailey's Boatshed, 1943. (Source: SIX Maps)

Figure 34: Oblique aerial view of Abbotsford Point, showing Abbotsford Wharf, Bailey's Boatshed, and the Sydney Rowing Club, 1980. (Source: City of Canada Bay Council Local Studies online archives)

Figure 35: Abbotsford Wharf as viewed from Parramatta River, 1990. (Source: Bill Allen Collection, City of Canada Bay Council: Local Studies online archives)

Figure 36: Plaque at Abbotsford Wharf showing that it was officially opened by the Minister for Transport/Roads and the local Member of Parliament in 1998.

Figure 37: A boat at Abbotsford Wharf, berthed at the concrete pontoon, 2001. (Source: City of Canada Bay Council: Local Studies online archives. Originally presented in 'Day in the Life of the City of Canada Bay', a photograph competition to celebrate the first anniversary of the proclamation of the City of Canada Bay)

Figure 38: Current appearance of Abbotsford Wharf. (Source: Roads and Maritime Services)

4.3 Historical Archaeological Potential

4.3.1 Site phasing: changes through time

Documentary evidence for the development of Abbotsford Wharf consists mostly of maps and photographs, with little written about the wharf in the public record.

According to written records, the Bedlam-Abbotsford punt operated between 1832 and 1881 at the same location as the present-day wharf (Figures 21 to 23). There are no images to indicate the appearance of the punt, although it is clear from written records that in its early days it was hauled by rope.

The earliest map of the area shows the subdivision of Feltham in 1857. This does not indicate that any structures pre-dated either the wharf or Bailey's Boatshed on their sites. However, west of Bailey's Boatshed, on the land which would be later owned by the Sydney Rowing Club, there was a building labelled as 'Residence of W. Wilson' (Figure 39 below). This may have been the site of the Red Cow Inn, a hostel that served people crossing the Parramatta River, and which was destroyed by fire in 1934.[26] This plan also indicates that the original alignment of the Great North Road has been preserved in its current form. The sandstone kerbing currently lining part of the northern footpath (see Figures 13 and 14 above) has been retained from these early years.

From at least the earliest years of the 20th century, the wharf comprised a timber structure laid out in a battle-axe shape with tidal steps at the mid-point, as seen in the postcard from the early 1900s and the first photograph of the wharf in 1903 (Figures 24 and 25 above). At this early time, lighting was provided to the wharf courtesy of a tall lamp post installed into the timber, likely powered by oil. The lamp post remained in place at least until 1911 (Figure 29 above). By 1908 a square timber shelter had been constructed on the broader part of the wharf (Figure 29).

Until at least 1911, the wharf was set relatively close to Bailey's Boatshed (Figures 27 to 29), but a photograph from 1920 indicates that, at that time, a substantial distance had appeared between them; the wharf must have been rebuilt in the new location further east during this decade. By 1925 Bailey had taken advantage of the increased space and extended his boatshed eastward towards the wharf. The timber shelter had been reconstructed as part of the renewal of the wharf, and remained in place at least until 1943 when it is seen in an aerial photograph.

Few historical photographs exist of Werrell Park. However, the earliest photograph, from 1911, shows that it was a sparsely treed area at that time (Figure 29 above). By 1920 the trees had grown taller and denser (Figure 30 above).

Comparison between photographs from 1925 and 1940 shows that the wharf was substantially lengthened during this time. Originally the broader section of its battle-axe shape had been aligned with Bailey's boatshed, but in the 1940s this part sat considerably further north-ward in the water (Figures 32 and 33 above).

The aerial photograph from 1943 is the final evidence for the appearance of the wharf until 1980. By 1980 the shelter was no longer present (Figure 34 above). By 2001 a concrete pontoon had been added to the wharf (Figure 37), a development which may have accompanied a complete refurbishment of the timber wharf and its replacement with a concrete structure.

[26] State Heritage Inventory sheet for 'Sydney Rowing Club', http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891073.

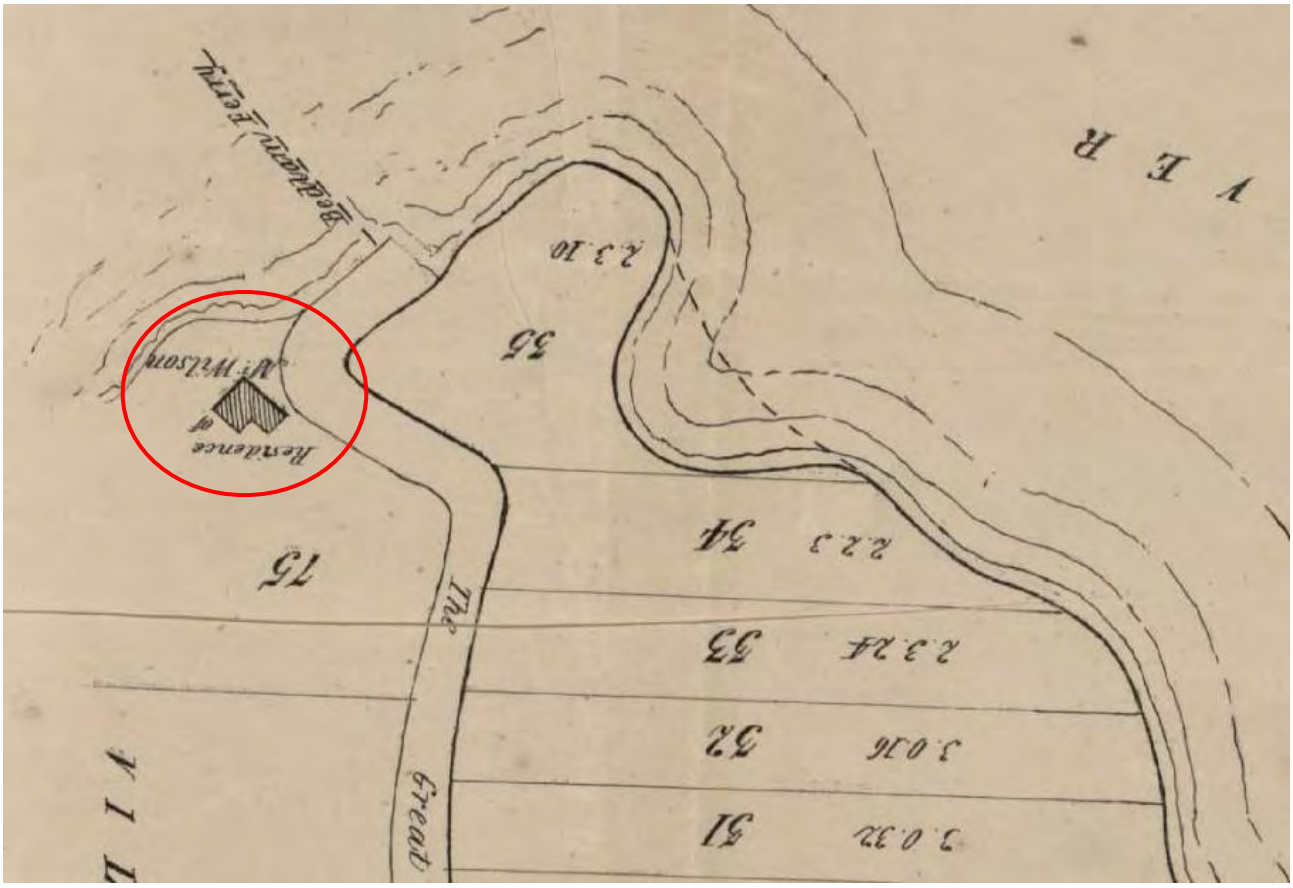

Figure 39: Excerpt of the subdivision plan for Feltham, 1857, showing the footprint of the 'Residence of W. Wilson' on the land that would be later owned by the Sydney Rowing Club. The location of Abbotsford Wharf is indicated by the 'Bedlam Ferry'. (Source: National Library of Australia, Call number MAP F 148)

4.3.2 Archaeological Potential

Analysis of the documentary evidence has shown that Abbotsford Wharf has been replaced at least two times since its first installation at the end of the 19th century or beginning of the 20th century. Changes have affected the wharf's location, size, form, and fabric.

It is likely that repeated reconstruction and refurbishment of the wharf progressively removed all parts of historical wharves on the site. Processes of damage and decay, along with improved engineering and new demands for use, would have led to the installation of new piles and timber and the disposal of older materials. There is some potential that remnants of older materials still exist beneath the water. Timber and wood do not decay when permanently submerged due to the lack of oxygen. However, the repeated renewal of the wharf suggests that, if any such materials do exist, they would be limited in number and size. Therefore, they would not have any great potential to demonstrate historical wharf building techniques.

There is no evidence to indicate that earlier structures stood on the site of either the wharf, Bailey's Boatshed, or Werrell Park.

The archaeological potential of the footprint of the proposed upgrade work to the wharf and its surrounds is low.

4.4 Heritage Significance

4.4.1 Assessment of Significance Criteria for Abbotsford Wharf

The following assessment of significance has been prepared in accordance with the 'Assessing Heritage Significance' guidelines from the NSW Heritage Manual.

a) an item is important in the course, or pattern, of the local area's cultural or natural history

The location of Abbotsford Wharf has been an important crossing point over the Parramatta River since 1832 with the installation of a punt that connected the two ends of the Great North Road. A wharf has been present at this location since the late 19th century, serving Government steam ferries.

b) an item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area's cultural or natural history

Historical research has not indicated that the wharf has had any strong or special association with any particular person or group of persons. The location of the wharf was associated with Alfred Charles Bailey's operation of his boatshed, but it is not clear whether he would have had any use for the wharf in his business, given that his boatshed had its own ramp and slipway.

c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area

Abbotsford Wharf has no particular aesthetic characteristics and is of a standard design for a modern ferry wharf within both the local and wider Sydney contexts.

d) an item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons

Although this criterion has not been assessed through community consultation, from the history of the wharf it is evident that it may have a special association with and social significance for people associated with the adjacent Abbotsford Point Boatshed, which has operated alongside the wharf for the wharf's history until now. In addition, as an operational ferry wharf and public space, it may hold social significance for various groups who have passed along the wharf as passengers, or who have spent extended time on the wharf for recreational activities such as fishing.

e) an item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history

The archaeological assessment presented above has not indicated a high likelihood that archaeological resources related to the physical fabric of earlier wharves would be extant. The physical fabric of Abbotsford Wharf is not original and has been replaced at least two times throughout its operation. Even if remnants of earlier wharves on the site exist beneath the water, the repeated renewal and reconstruction of the wharf suggests that these would not be substantial enough to demonstrate early wharf building techniques.

f) an item possesses uncommon, rare or endangered aspects of the local area's cultural or natural history

Abbotsford Wharf presents a design that is common to ferry wharves across Sydney Harbour. However, it is uncommon as a wharf that has continued functioning in the same location since its historical installation.

g) an item is important in demonstrating the principal characteristics of a class of the local area's

- ***cultural or natural places; or***
- ***cultural or natural environments***

The location and function of the wharf at Abbotsford Point preserves the historical importance of the place as a major crossing point across the Parramatta River.

4.4.2 Statement of Significance for Abbotsford Wharf

Abbotsford Wharf preserves the location of an important crossing point across the Parramatta River that was established in the early 19th century, when the Bedlam ferry/punt operated to connect the two ends of the Great North Road.

It significance is primarily associated with its location as its physical fabric has been replaced more than once in its history. For this reason, the wharf is of low research potential as it is unlikely to retain evidence of early wharf-building techniques.

Although a thorough community consultation has not been undertaken from a heritage perspective, from the history of the wharf it is evident that it may hold social significance for various groups who have passed along the wharf as passengers, or who have spent extended time on the wharf for recreational activities such as fishing.

4.4.3 Established Significance of Nearby Heritage Items

As mentioned previously, several items near Abbotsford Wharf are listed heritage items. As such, their heritage significance has previously been assessed. Established Statements of Significance for these items are reproduced below from the respective State Heritage database sheets.

Statement of Significance for Abbotsford Point Boatshed[27]

The boatshed is a good example of a simple boatshed, and has a positive influence on the surrounding area as a landmark. Its early date and historic usage demonstrate continuity.

Its building materials blend well with the environment.

Statement of Significance for Werrell Park[28]

A very significant area related to early transport routes, the Bedlam Ferry, Abbotsford Wharf, Great North Road, the cableway across the river and recreational use. The park terminates Great North Road and retains both natural and early manmade features.

Evidence of the convict construction of Great North Road is of very high significance.

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[27] State Heritage Inventory sheet for Abbotsford Point Boatshed, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891053.
[28] State Heritage Inventory sheet for Werrell Park, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891055.

Statement of Significance for Sandstone Kerbing[29]

An important remnant of the early road construction, one of the details that is often overlooked in redevelopment but which gives character and context to the surrounding structures.

Statement of Significance for Sydney Rowing Club – Boatshed[30]

The site has considerable historic interest for its early associations with Captains Deloitte and Wilson, pioneers of Five Dock, and later, the Sydney Rowing Club. One of New South Wales' oldest rowing clubs. The site also has the marker for the finishing line of the 2000m racing course on Parramatta River.

Also the site of one of the Municipality's first buildings, The Red Horse Inn.

A notable example of an Inter-War rowing shed that is of architectural interest particularly for its roof. Located on the headland, the boatshed is an important landmark on the water.

[29] State Heritage Inventory sheet for Sandstone Kerbing, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891054.
[30] State Heritage Inventory sheet for Sydney Rowing Club - Boatshed, http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2891073.

5 Heritage Impact Assessment

5.1 Statutory Controls

Under the ISEPP 2007, development related to public ferry wharfs may be carried out without consent. However, if the works are proposed to be carried out to any local heritage item or within an HCA, government bodies must consider the impact of the proposed work. As outlined above, Abbotsford Wharf and places nearby have numerous heritage listings. Therefore, impact of the proposal upon these items must be assessed, and if the impact is assessed to be more than minor or inconsequential, Roads and Maritime must notify the relevant local council (here, Inner West Council).

5.2 Impact on Abbotsford Wharf

The heritage significance of Abbotsford Wharf has been assessed to be associated primarily with its location and function. The location of Abbotsford Wharf has been an important crossing point across the Parramatta River since the early 19th century. In the late 19th century a ferry wharf was installed in the location and continued to operate until now. Historical research has shown that the wharf has been replaced and refurbished at least two times since its earliest installation. Therefore, the fabric of the wharf is not of heritage significance.

The proposal is for an upgrade of Abbotsford Wharf to improve facilities. The wharf would be removed, leaving about three metres landside, and replaced with a newer structure of concrete and metal. As the existing fabric of the wharf has not been assessed to be of heritage significance, material replacement of the wharf would have no impact on its heritage values.

Abbotsford Wharf would continue to function as a ferry wharf and preserve the location it has occupied as an important river crossing point since the early 19th century. This would ensure that the wharf's primary heritage values are conserved.

5.3 Impact on Abbotsford Point Boatshed

Abbotsford Point Boatshed, also known as Bailey's Boatshed, has been an important icon in the local area since the late 19th century. It is highly intact and largely retains its original fabric. The proposed work does not involve any intervention to the building or encroachment upon its curtilage. The Boatshed is unlikely to be impacted through the proposed work.

Abbotsford Wharf would be replaced with a similar wharf with upgraded facilities. It would not be likely to visually impact the aesthetic values of the Boatshed.

5.4 Impact on Historical Sandstone Kerbing

The cul-de-sac of Great North Road is proposed to be upgraded for use as a kiss-and-ride parking zone. This would involve the installation of signage only and so would have minimal impact on the historical sandstone kerbing.

5.5 Impact on Werrell Park

The footprint of the proposed work does not encroach upon Werrell Park itself, although it does involve work at the interface of the park boundary and the paving leading to Abbotsford Wharf. Work up to the park boundary has the potential to impact the existing steps leading up and into the park. A visual inspection has determined that the steps themselves are of concrete and therefore not of historical fabric. However, the steps are set into sandstone ledges that contain evidence of

the manual labour that carved out the stone, in the form of pick marks. Although these do not seem to be the pick marks related to the convict construction of Great North Road as described in the Statement of Significance for the park (which are located on the eastern side), all sandstone ledges and shelves have been identified as elements of high significance. Therefore, any proposed work should avoid these sandstone ledges.

Abbotsford Wharf would be replaced with a similar wharf with upgraded facilities. It would not be likely to visually impact the aesthetic values of Werrell Park.

5.6 Impact on Sydney Rowing Club - Boatshed

The Sydney Rowing Club Boatshed is located a substantial distance from the footprint of the proposed work. It is, therefore, unlikely that the proposed work could physically impact the Boatshed.

As a replacement wharf with upgraded facilities, the new wharf is unlikely to impact views from the Boatshed across Parramatta River any more than the current wharf already does.

5.7 Impact on Aboriginal Sites

Exercise of the Aboriginal heritage due diligence process has determined that there is one Aboriginal site within the area of the wharf, though located a substantial distance south-west of it, on private property. The site has been sealed by a swimming pool. Impact assessment has determined that the likelihood of harm coming to the site as a result of the proposal is low, given that the footprint of the proposed work is limited and does not encroach upon the location of the site in any way.

5.8 'Statements of Heritage Impact' (NSW Heritage Manual)

The NSW Heritage Manual encourages consideration of the following themes in an assessment of heritage impact:

The following aspects of the proposal respect or enhance the heritage significance of the item or conservation area for the following reasons.

- Abbotsford Wharf is significant as it preserves the location of an important early crossing point across the Parramatta River. It has retained this purpose since its original construction in the late 19th century and its sustained use until the present day. Its physical fabric and form have been replaced at least two times within its history and are therefore not of heritage significance. The proposal is for an upgrade of the wharf to improve facilities for ferry passengers. The proposal involves removal of the physical fabric of the wharf and replacement with a new gangway and pontoon using modern materials. The proposal would preserve the location of the wharf and allow it to continue functioning as a river-crossing point. The proposal respects the primary heritage values of the wharf.

- Heritage items in the vicinity of the wharf include Abbotsford Point Boatshed, Werrell Park, and the Sydney Rowing Club Boatshed. As the upgrade work is proposed within a limited footprint, the expected impact to these heritage items is negligible.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts.

- The wharf upgrade requires the removal of existing physical fabric, especially the wharf structure itself. If the heritage significance of the wharf relied upon its existing physical fabric, the proposal could be assessed as having an adverse impact. However, as the

assessment of heritage significance has established that Abbotsford Wharf is significant primarily for its location and continuous function as a river crossing-point, and not for its physical fabric, the outcomes of the proposal are considered acceptable.

- The proposed kiss-and-ride at the cul-de-sac of the Great North Road has the potential to impact the sandstone kerbing on the northern side of the road. This kerbing a testament to the construction of this important roadway by convict labour in the early 19th century. To mitigate impact, it is recommended that any new asphalt or paving be laid in a way that does not require the removal of the kerbing or conceal it in its entirety. This could be achieved by leaving the top plane clear and visible, which would allow this evidence of the early road to be interpreted.

The following sympathetic solutions have been considered and discounted for the following reasons:

- One way to avoid any potential heritage impact is to do nothing at all. In line with Roads and Maritime's policy of service to its customers, Roads and Maritime consider that Abbotsford Wharf is in need of an upgrade to improve its amenity. As such, a do-nothing approach has been discounted.

5.9 Summary of Impacts

Table 2 summarises the expected impacts to Abbotsford Wharf, the heritage items in its vicinity, and known archaeological sites and places of Aboriginal heritage significance.

Table 2: Summary of heritage impacts

Name	Heritage Listing/ Protection	Heritage Significance	Potential or known Impact to fabric?	Potential or known Impact to curtilage?	Recommendation	Action
Abbotsford Wharf	SREP (Sydney Harbour Catchment) 2005 (#24)	Local	Yes	No	Continue with proposal as is; physical fabric not considered significant	SoHI and notification under ISEPP
Abbotsford Point Boatshed	Canada Bay LEP (#221)	Local	No	No	Continue with proposal as is; physical fabric not considered significant	SoHI and notification under ISEPP
Werrell Park	Canada Bay LEP (#443)	Local	No	No	Continue with proposal as is; no impact to the character of the park is expected	SoHI and notification under ISEPP
Sandstone kerbing	Canada Bay LEP (#222)	Local	No	No	In detailed design, ensure that the installation of signage in the kiss-and-ride parking zone does not damage the heritage-listed Sandstone Kerbing	SoHI and notification under ISEPP
Sydney Rowing Club - Boatshed	Canada Bay LEP (#239)	Local	No	No	Continue with proposal as is; no impact to the nearby heritage item is expected	SoHI and notification under ISEPP

Registered sites of Aboriginal heritage significance	NPW Act (site ID 45-6-0567)	National	No	No	Continue with proposal as is; no impact to the nearby site of Aboriginal heritage significance is expected; no unknown archaeological resources are expected to be uncovered	SoHI and notification under ISEPP

6 Conclusions and Recommendations

Following the heritage impact assessment, it is possible to conclude that the proposal:

- would have a neutral impact upon the heritage values of Abbotsford Wharf;
- would have no impact upon most heritage items in the vicinity (Abbotsford Point Boatshed, Werrell Park, and the Sydney Rowing Club Boatshed);
- has minimal potential to adversely impact the heritage-listed Sandstone Kerbing with the installation of signage in the kiss-and-ride zone on the northern side of Great North Road cul de sac;
- would not affect known archaeological sites or places of Aboriginal heritage; and
- would be unlikely to affect historical archaeological resources as there is low potential for these to exist.

- The primary heritage values of Abbotsford Wharf would be respected through the maintenance of its function as a ferry wharf and its location as a crossing point across the Parramatta River, which are the most important aspects of the wharf's significance.

- Repeated reconstruction and refurbishment of the wharf structure suggests that any original components have been replaced. There is potential for archaeological resources to be in existence underwater, however the assessment of significance has found that these would not be likely to demonstrate evidence of early wharf building techniques.

- There is no evidence to indicate that earlier structures were present on the site of either the wharf, Bailey's Boatshed, or Werrell Park. If work results in archaeological finds that are not expected, however, then all work must stop, an RMS notified and the 'unexpected heritage items procedure' in the *Standard Management Procedure: Unexpected Heritage Items by RMS* (2015)[31] be followed.

- It has been concluded that the proposal would have a neutral heritage impact overall, as long as the installation of signage at the kiss-and-ride zone has a minimal impact.

- An RMS Heritage Officer should be nominated to amend the RMS S170 Register entry to include all modifications to the Wharf as soon as the works have been completed.

- The overall impact of the proposed work would be minor and inconsequential. ISEPP notification, as detailed in *Table 2,* has been undertaken and no further consultation is required with City of Canada Bay Council prior to proceeding.

- Although it is not required, Interpretation in the form of signage to indicate the location and inform on the history of the former wharf would result in an even better heritage outcome.

CITY PLAN HERITAGE for Roads and Maritime
September 2017

[31] 'Unexpected Heritage Items Procedure' (2015). Accessed on 01 September, 2017. Available from http://www.rms.nsw.gov.au/documents/about/environment/protecting-heritage/managing-development/unexpected-heritage-items-procedure.pdf

7 Bibliography

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Attachment A: Heritage Listing Database Sheets

Abbotsford Point Boatshed

Item details

Name of item:	Abbotsford Point Boatshed
Type of item:	Built
Group/Collection:	Transport - Water
Category:	Boat shed
Primary address:	617 Great North Road, Abbotsford, NSW 2046
Parish:	Concord
County:	Cumberland
Local govt. area:	Canada Bay

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
617 Great North Road	Abbotsford	Canada Bay	Concord	Cumberland	Primary Address

Statement of significance:

The boatshed is a good example of a simple boatshed, and has a positive influence on the surrounding area as a landmark. Its early date and historic usage demonstrate continuity. Its building materials blend well with the environment.

Date significance updated: 21 Dec 06

Note: There are incomplete details for a number of items listed in NSW. The Heritage Division intends to develop or upgrade statements of significance and other information for these items as resources become available.

Description

Construction years:	1895-
Physical description:	The older section of the building is a weatherboarded and gabled structure, supported over the water on wooden piles repaired in concrete. A skillion lean-to, also in weatherboard, has been added and is supported on sandstone piers.

Further information: This boatshed is largely located beyond the high water line of Parramatta River.

Current use: Boatshed

Former use: Boatshed

History

Historical notes: The boatshed was Alfred Bailey's boatshed, with boats for hire. It has had skillion additions on the side of the building.

Historic themes

Australian theme (abbrev)	New South Wales theme	Local theme
3. Economy-Developing local, regional and national economies	Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Transport-
8. Culture-Developing cultural institutions and ways of life	Social institutions-Activities and organisational arrangements for the provision of social activities	Social-

Assessment of significance

SHR Criteria a) [Historical significance] The early date and historic usage of this boatshed demonstrate continuity.

SHR Criteria c) [Aesthetic significance] The boatshed is a good example of a simple boatshed, and has a positive influence on the surrounding area as a landmark. Its building materials blend well with the environment.

Integrity/Intactness: Altered, extended sympathetically

Assessment criteria: Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Local Environmental Plan	Abbotsford Point Boatshed	221	07 Mar 08	30	1464
Heritage study					

Study details

Title	Year	Number	Author	Inspected by	Guidelines used
Drummoyne Heritage Study Review	1996		Paul Davies & Associates		Yes

References, internet links & images

None

Note: internet links may be to web pages, documents or images.

Data source

The information for this entry comes from the following source:

Name: Local Government

Database number: 2891053

Return to previous page

Every effort has been made to ensure that information contained in the State Heritage Inventory is correct. If you find any errors or omissions please send your comments to the **Database Manager**.

Sandstone Kerbing

Item details

Name of item:	Sandstone Kerbing
Type of item:	Built
Group/Collection:	Transport - Land
Category:	Other - Transport - Road
Primary address:	north end Great North Road, Abbotsford, NSW 2046
Parish:	Concord
County:	Cumberland
Local govt. area:	Canada Bay

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
north end Great North Road	Abbotsford	Canada Bay	Concord	Cumberland	Primary Address

Statement of significance:

An important remnant of the early road construction, one of the details that is often overlooked in redevelopment but which gives character and context to the surrounding structures.

Date significance updated: 21 Dec 06

Note: There are incomplete details for a number of items listed in NSW. The Heritage Division intends to develop or upgrade statements of significance and other information for these items as resources become available.

Description

Construction years:	1880-1890
Physical description:	A small section of sandstone kerbing running around the curve down to the wharf and boatshed that appears to date from the early construction of the road. It is typical of much sandstone kerbing throughout the area that is gradually being replaced and is of particular interest here in relation to the former ferry access and the historic nature of the area.

History

Historical notes: The Great North Road was constructed between 1826 and 1836 to provide an important overland link between Sydney and the Hunter Valley. The section of the road through Five Dock, Wareemba and Abbotsford is the southern part of the road and is the only part that retains the name Great North Road. From Abbotsford Point, a ferry took travellers across Parramatta River to continue their journey.

Historic themes

Australian theme (abbrev)	New South Wales theme	Local theme
3. Economy-Developing local, regional and national economies	Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Transport-

Assessment of significance

SHR Criteria c) [Aesthetic significance] An important remnant of the early road construction, one of the details that is often overlooked in redevelopment but which gives character and context to the surrounding structures.

SHR Criteria f) [Rarity] A rare surviving example in the local area of early road construction.

Integrity/Intactness: Disturbed or damaged

Assessment criteria: Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Recommended management:

Preferred management for sandstone kerb and gutter
1. if sandstone in reasonable condition, retain following lifting, resetting on stable base to address subsidence
2. if sandstone in poor condition, turn over and expose opposite side if possible
3. if original kerb and guttering is unable to be saved, replace with sandstone to match (better remnant pieces of the kerb and guttering may able to be stored for re-use for other purposes)
4. If cost of replacement with sandstone is unable to be met, cast new kerb and guttering blocks only as necessary in concrete with oxide additive to match original form, texture and colour of sandstone kerb and guttering

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Local Environmental	Sandstone	222	07 Mar 08	30	1464

Plan	Kerbing				
Heritage study					

Study details

Title	Year	Number	Author	Inspected by	Guidelines used
Drummoyne Heritage Study Review	1996		Paul Davies & Associates		Yes

References, internet links & images

None

Note: internet links may be to web pages, documents or images.

Data source

The information for this entry comes from the following source:

Name: Local Government

Database number: 2891054

Return to previous page

Sydney Rowing Club - Boatshed

Item details

Name of item:	Sydney Rowing Club - Boatshed
Type of item:	Built
Group/Collection:	Transport - Water
Category:	Boat shed
Primary address:	613 Great North Road, Abbotsford, NSW 2046
Parish:	Concord
County:	Cumberland
Local govt. area:	Canada Bay

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
613 Great North Road	Abbotsford	Canada Bay	Concord	Cumberland	Primary Address

Statement of significance:

The site has considerable historic interest for its early associations with Captains Deloitte and Wilson, pioneers of Five Dock, and later, the Sydney Rowing Club. One of New South Wales' oldest rowing clubs. The site also has the marker for the finishing line of the 2000m racing course on Parramatta River.

Also the site of one of the Municipality's first buildingsm The Red Horse Inn.

A notable example of an Inter-War rowing shed that is of architectural interest particularly for its roof. Located on the headland, the boatshed is an important landmark on the water.

Date significance updated: 02 May 08

Note: There are incomplete details for a number of items listed in NSW. The Heritage Division intends to develop or upgrade statements of significance and other information for these items as resources become available.

Description

Construction years:	1920-
Physical description:	One of two major buildings on the site. A large timber boatshed, rectangular in form with a high, late Federation style roof. The roof is tiled in terra cotta with gambrels and wide dormer windows at the sides. The end forms are broken up by rectangular viewing areas and a rear addition (?). Glazing is otherwise limited. The building is c.1920 and is located in a prominent foreshore location. The building's impressive roof makes a positive contribution to the local landscape. The clubhouse behind is a more recent building of ordinary design.
Modifications and dates:	Extensive additions to main clubhouse in twentieth century.
Current use:	Rowing shed
Former use:	Rowing shed

History

Historical notes:	Sydney Rowing Club was formed in 1870 and had their first boatshed at East Circular Quay moving to Woolloomooloo soon after. The Woolloomooloo boatshed was destroyed by fire in 1922. A new boatshed was opened at Woolloomooloo in November of the same year. Land at Abbotsford Point occupied by the Red House (better known as the Red Cow Inn) was secured by first captain of Sydney Rowing Club, Quarton L. Deloitte in 1872. The club retained the licence of the Red Cow Inn and built a boathouse and later living quarters on the site. A sandstone wall at the rear of the present Bradley Lounge is the only remains of the inn. A fire in 1934 destroyed most of the inn. In 1946 the club decided to relocate all its activities to the Abbotsford site which until then had been known as "The Branch". The Woolloomooloo boatshed was dismantled and rebuilt in its present postion.

Historic themes

Australian theme (abbrev)	New South Wales theme	Local theme
3. Economy-Developing local, regional and national economies	Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Transport -
8. Culture-Developing cultural institutions and ways of life	Leisure-Activities associated with recreation and relaxation	Recreation-

Assessment of significance

SHR Criteria a) [Historical significance]	One of New South Wales' oldest rowing clubs. The site also has the marker for the finishing line of the 2000m racing course on Parramatta River.
SHR Criteria b) [Associative significance]	The site has considerable historic interest for its early associations with Captains Deloitte and Wilson, pioneers of Five Dock, and later, the Sydney Rowing Club.
SHR Criteria c) [Aesthetic significance]	A notable example of an Inter-War rowing shed that is of architectural interest particularly for its roof. Located on the headland, the boatshed is an important landmark on the water.
SHR Criteria e) [Research potential]	The site of one of the Municipalities first buildings, the Red Horse Inn.
SHR Criteria f) [Rarity]	A rare surviving example of an Inter-War rowing shed.
Integrity/Intactness:	Altered, extended unsympathetically
Assessment criteria:	Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Local Environmental Plan	Sydney Rowing Club - Boatshed	239	07 Mar 08	30	1464
Heritage study					

Study details

Title	Year	Number	Author	Inspected by	Guidelines used
Drummoyne Heritage Study	1988		Perumal Murphy Pty Ltd		Yes
Drummoyne Heritage Study Review	1996		Paul Davies & Associates		Yes

References, internet links & images

Type	Author	Year	Title	Internet Links
Written		2006	Sydney Rowing Club - history on Sydney Rowing Club Website	

Note: internet links may be to web pages, documents or images.

Data source

The information for this entry comes from the following source:

Name:	Local Government
Database number:	2891073

Return to previous page

Werrell Park

Item details

Name of item:	Werrell Park
Type of item:	Complex / Group
Group/Collection:	Parks, Gardens and Trees
Category:	Urban Park
Primary address:	2P Teviot Avenue, Abbotsford, NSW 2046
Parish:	Concord
County:	Cumberland
Local govt. area:	Canada Bay

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
2P Teviot Avenue	Abbotsford	Canada Bay	Concord	Cumberland	Primary Address
Great North Road	Abbotsford	Canada Bay	Concord	Cumberland	Alternate Address

Statement of significance:

A very significant area related to early transport routes, the Bedlam Ferry, Abbotsford Wharf, Great North road, the cableway across the river and recreational use. The park terminates Great North Road and retains both natural and early manmade features.

Evidence of the convict construction of Great North Road is of very high significance.

Date significance updated: 21 Dec 06

Note: There are incomplete details for a number of items listed in NSW. The Heritage Division intends to develop or upgrade statements of significance and other information for these items as resources become available.

Description

Construction years:	1890-

Physical description:	A picturesque foreshore (riverside) park sited on a sandstone promintory on the Parramatta River. There are fine views of the river (especially up Parramatta River) and across to Gladesville. The sandstone ledges and shelves are significant. It is notable for it remnant stand of indigenous trees (vegetation) including blackbutt (Eucalyptus Pilularis) to 20m, stringy bark, Port Jackson Fig (Ficus Rubiginosa), Casuarina Glauca, Glochidion Fendinandi, Pittosporum Undulatum, Kenzea Ambigua, Lomandra Congildia. Also notable are the exotic palms along the roadside edge (Canary Island) and brushbox. A recent new planting with local natives has been relatively sympathetic. The rockface adjacent to the end of Great North Road has pick marks indicating the convict construction of the road.
Physical condition and/or Archaeological potential:	Fair **Date condition updated:**21 Dec 06
Current use:	Park
Former use:	Park

Historic themes

Australian theme (abbrev)	New South Wales theme	Local theme
3. Economy-Developing local, regional and national economies	Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Transport-
4. Settlement-Building settlements, towns and cities	Towns, suburbs and villages-Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages	Suburbanisation-

Assessment of significance

SHR Criteria a) [Historical significance]	A very significant area related to early transport routes, the Bedlam Ferry, Abbotsford Wharf, Great North road, the cableway across the river and recreational use.
SHR Criteria c) [Aesthetic significance]	The park terminates Great North Road and retains both natural and early manmade features.
SHR Criteria e) [Research potential]	Evidence of the convict construction of Great North Road is rare in the Canada Bay area and of very high significance.
SHR Criteria f) [Rarity]	Evidence of the convict construction of Great North Road is rare in the Canada Bay area and of very high significance.
Integrity/Intactness:	Disturbed or damaged

Assessment criteria: Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Local Environmental Plan	Werrell Park	443	07 Mar 08		
Heritage study					

Study details

Title	Year	Number	Author	Inspected by	Guidelines used
Drummoyne Heritage Study Review	1996		Paul Davies & Associates		Yes

References, internet links & images

None

Note: internet links may be to web pages, documents or images.

Data source

The information for this entry comes from the following source:

Name: Local Government

Database number: 2891055

Return to previous page

Attachment B: Site Inspection Recording Form

Appendix B: Site Inspection Recording Form

Project Name:	UPGRADE OF ABBOTSFORD WHARF		
Survey Date	19/06/2017	Recorded by	AS & KDR (CPH)
Site Recording Number	AW1	Heritage Item Name	"Abbotsford Wharf"
Location	Great North Road, Abbotsford Point, Abbotsford		
GPS / Lot No.	Jetty abutment: Lot 2 of DP 667089		
Site Access	YES		
Owner	Roads and Maritime Services		
Current Use	Operational wharf		
Physical Description	The wharf consists of a concrete jetty, concrete pontoon and concrete gangway all covered with a convex canopy of sheet metal. It is attached to a paved area of land that leads to a stair with access to Werrell Park to the south and to the cul-de-sac of Great North Road to the west.		
Archaeological Potential	LOW. Even if remnants of earlier wharves on the site exist beneath the water, the repeated renewal and reconstruction of the wharf suggests that these would not be substantial enough to demonstrate early wharf building techniques.		
Heritage Listing	Local: SREP (Sydney Harbour Catchment) 2005 (item no. 24)		
Significance	Significant primarily for its sustained use as a wharf since the end of the 19th century or very beginning of the 20th century, and its preservation of an important river-crossing point.		
Brief Historic Context	Constructed on the site of the Bedlam Ferry Punt in the late 19th century or early 20th century. Used consistently as a government passenger ferry wharf.		

Mud Map Sketch

Photographs (Site Survey Photos)

Attachment C: AHIMS Searches

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Abbotsford Wharf

Client Service ID : 284866

City Plan Services - Sydney

Suite 6.02 120 Sussex Street
Sydney New South Wales 2000

Attention: Ana Silkatcheva

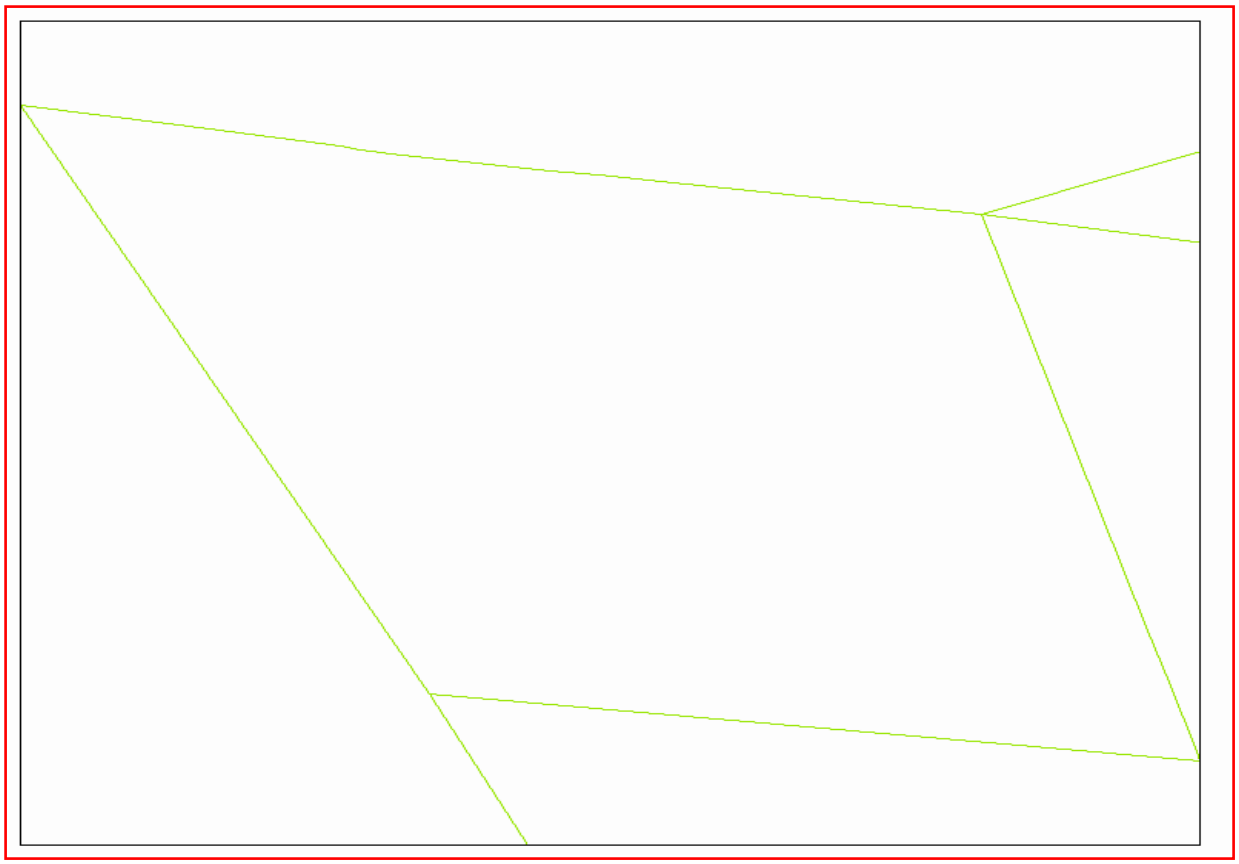
Email: anas@cityplan.com.au

Date: 05 June 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 2, DP:DP667084 with a Buffer of 0 meters, conducted by Ana Silkatcheva on 05 June 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Abbotsford Wharf

Client Service ID : 284867

City Plan Services - Sydney

Suite 6.02 120 Sussex Street
Sydney New South Wales 2000

Attention: Ana Silkatcheva

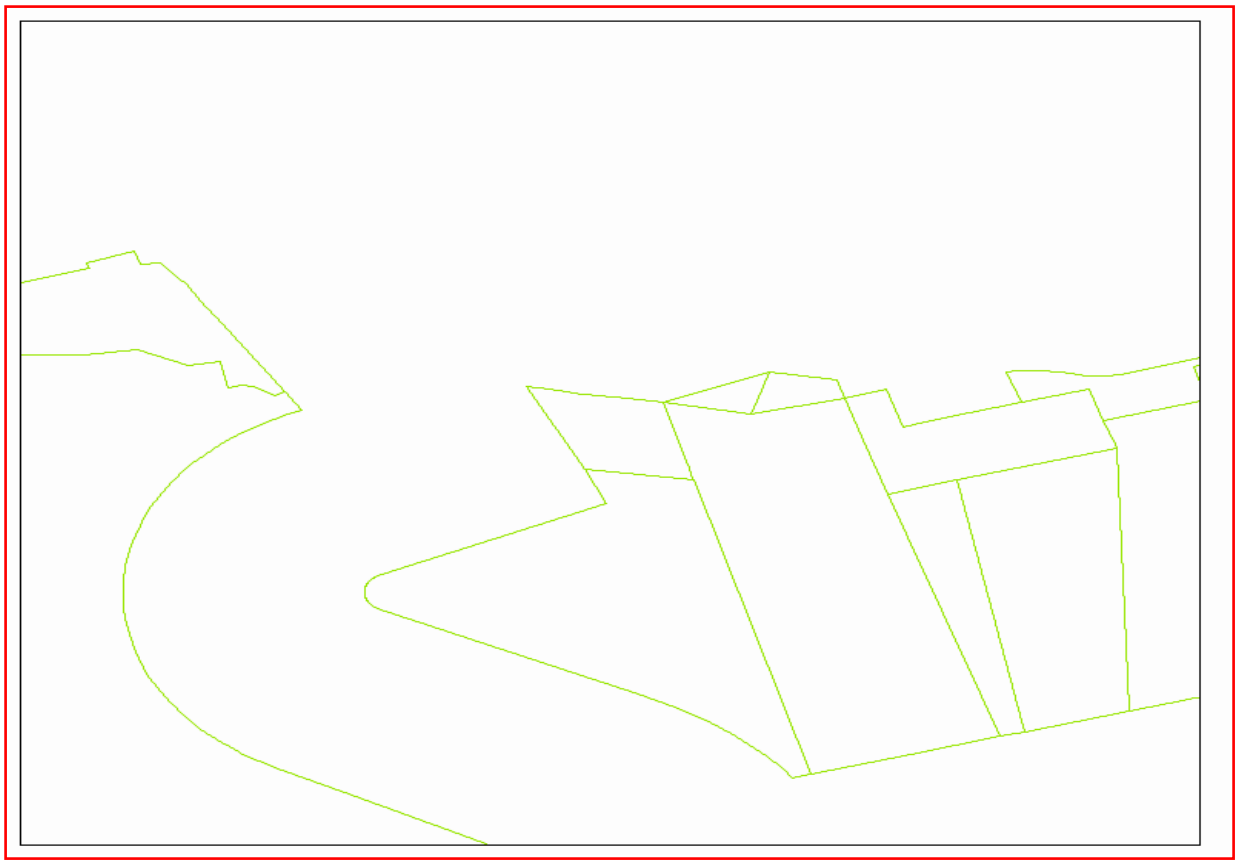
Email: anas@cityplan.com.au

Date: 05 June 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 2, DP:DP667084 with a Buffer of 50 meters, conducted by Ana Silkatcheva on 05 June 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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0	Aboriginal places have been declared in or near the above location. *

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Abbotsford Wharf

Client Service ID : 284869

City Plan Services - Sydney

Suite 6.02 120 Sussex Street
Sydney New South Wales 2000

Attention: Ana Silkatcheva

Email: anas@cityplan.com.au

Date: 05 June 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 2, DP:DP667084 with a Buffer of 200 meters, conducted by Ana Silkatcheva on 05 June 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

1	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

PLANNING
BUILDING
HERITAGE
URBAN DESIGN

CITY PLAN SERVICES

rms.nsw.gov.au

contactus@rms.nsw.gov.au

Customer feedback
Roads and Maritime
Locked Bag 928,
North Sydney NSW 2059

NSW GOVERNMENT Transport Roads & Maritime Services

Appendix H

Aboriginal heritage information system search and Stage 1 clearance letter

Transport
Roads & Maritime
Services

22/06/2017

Chris Williams
Environment Officer
Greater Sydney Program Office | Journey Management

Dear Chris

Re: Preliminary assessment results for the Abbotsford Wharf Riverbed Pothole Investigation Memo 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 study area does not contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Roads and Maritime Services' procedure.
- The Aboriginal cultural heritage potential of the study area appears to be severely reduced due to past disturbance.

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

M. Lester

Mark Lester
Aboriginal Cultural Heritage Officer – Sydney Region
27-31 Argyle St Parramatta NSW 2150
Phone - 02 8849 2583 Mobile – 0448 731 510

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Abbotsford Wharf

Client Service ID : 284866

City Plan Services - Sydney

Suite 6.02 120 Sussex Street
Sydney New South Wales 2000

Attention: Ana Silkatcheva

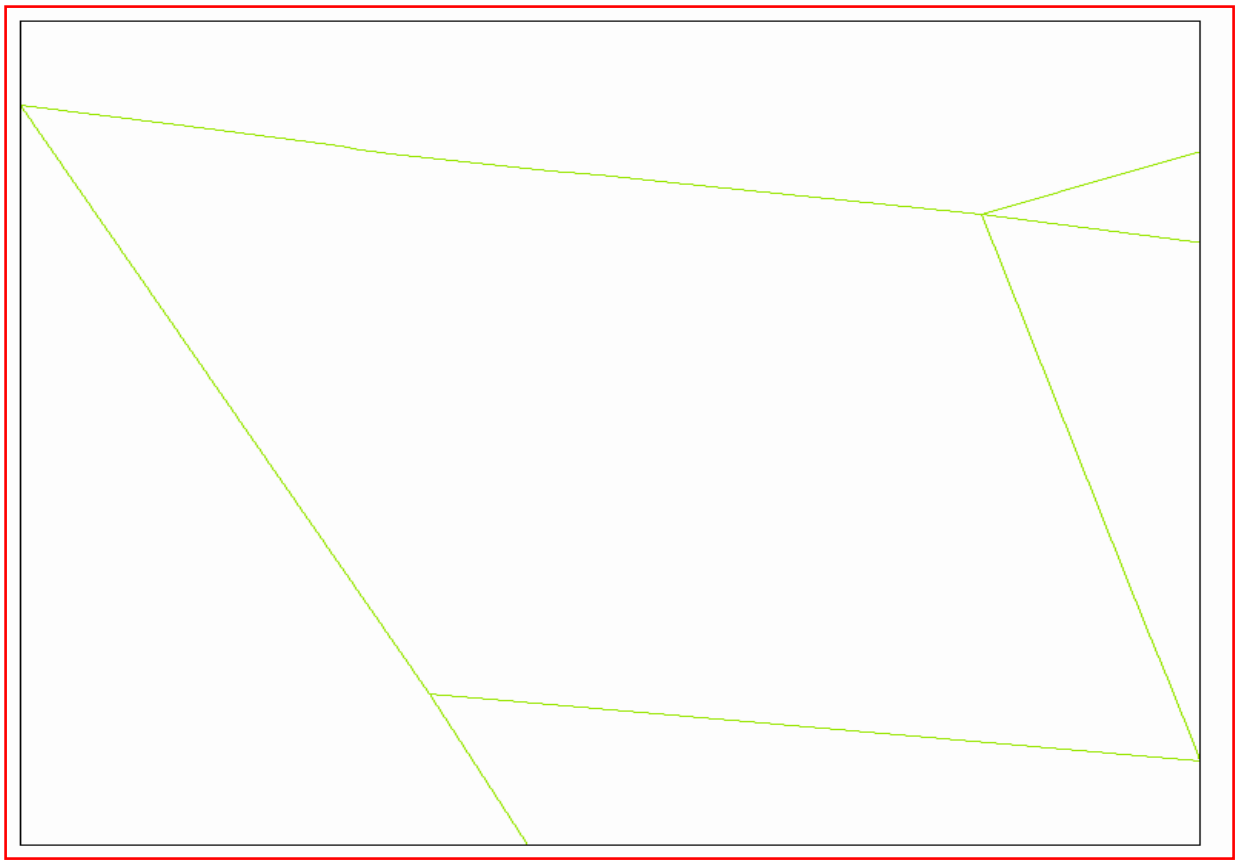
Email: anas@cityplan.com.au

Date: 05 June 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 2, DP:DP667084 with a Buffer of 0 meters, conducted by Ana Silkatcheva on 05 June 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Abbotsford Wharf

Client Service ID : 284867

City Plan Services - Sydney

Suite 6.02 120 Sussex Street
Sydney New South Wales 2000

Attention: Ana Silkatcheva

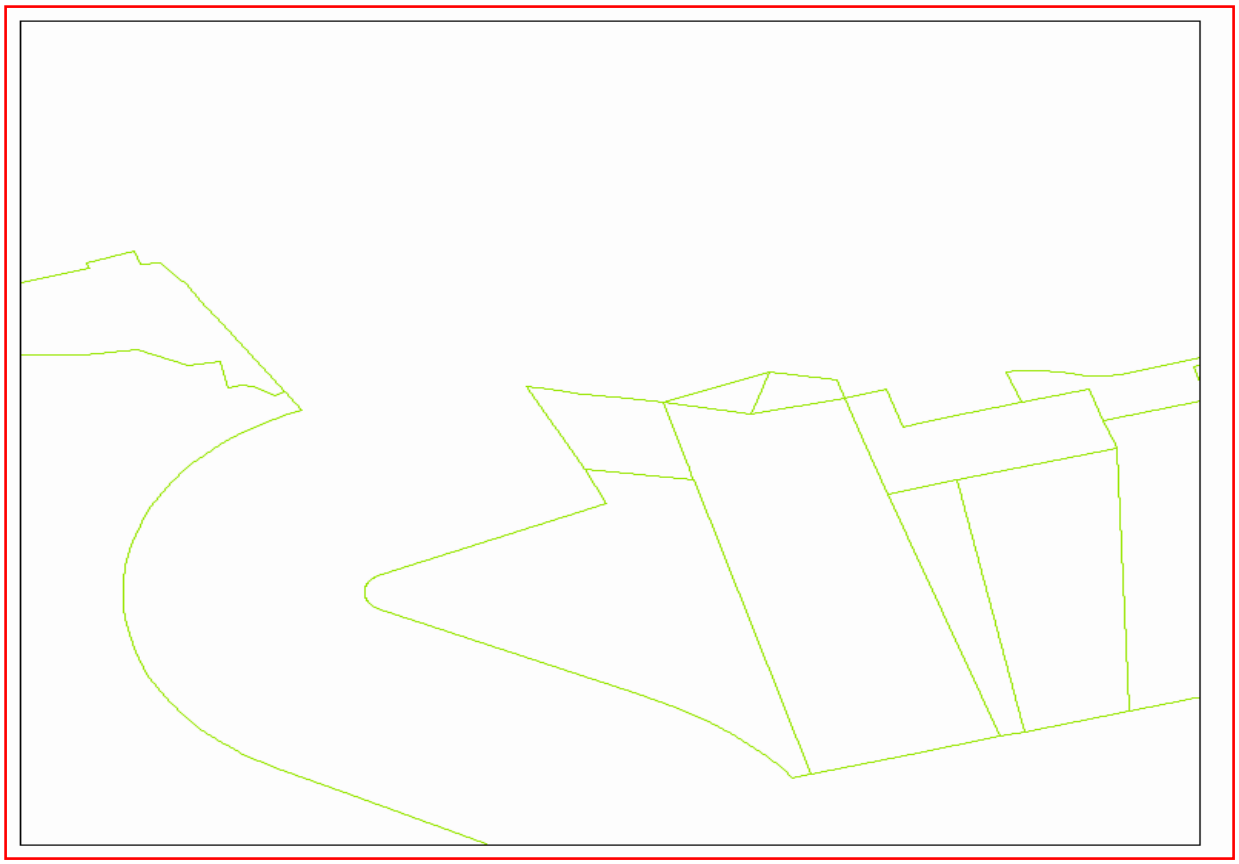
Email: anas@cityplan.com.au

Date: 05 June 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 2, DP:DP667084 with a Buffer of 50 meters, conducted by Ana Silkatcheva on 05 June 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



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0	Aboriginal places have been declared in or near the above location. *

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Abbotsford Wharf

Client Service ID : 284869

City Plan Services - Sydney

Suite 6.02 120 Sussex Street
Sydney New South Wales 2000

Attention: Ana Silkatcheva

Email: anas@cityplan.com.au

Date: 05 June 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 2, DP:DP667084 with a Buffer of 200 meters, conducted by Ana Silkatcheva on 05 June 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

1	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

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- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
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Web: www.environment.nsw.gov.au

rms.nsw.gov.au

contactus@rms.nsw.gov.au

Customer feedback
Roads and Maritime
Locked Bag 928,
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