

Pre-Construction Minor Works Approval Form

Minor Works are defined as any low impact activities that are undertaken prior to the commencement of 'construction' as defined in the project's applicable planning approval. However if Minor Works affect or potentially affect heritage items, threatened species, populations or endangered ecological communities, these works are defined as 'construction' unless otherwise determined by the applicable planning authority.

Minor Works approvals do not remove any obligation to comply with the project's applicable planning approval conditions (including requirements prior to 'any works' commencing) or obtain any other applicable permits, licenses or approvals as necessary.

This application and all supporting information must be submitted to Sydney Metro/the Environmental Representative as one (1) PDF file at least 10 business days prior to the commencement of the proposed Minor Works.

Part 1: Application	
Contractor:	Stantec
Project:	Sydney Metro City & Southwest
Application Title: (e.g. Smith St trenching works)	Barangaroo Chilled Water Facility Environmental Monitoring Program
Application Number:	BR-MWA-004
Application Date:	28/03/2024
Planning Approval:	CSSI 7400 Chatswood to Sydenham – Consistency Assessment: https://www.sydneymetro.info/sites/default/files/2022-08/CA-cooling-water-supply-Barangaroo-Station.pdf
Minor Works Categories: <ul style="list-style-type: none"> Highlight as applicable. If Items 4, 8 or 11 are applicable, this form must be endorsed by an Environmental Representative. 	<ol style="list-style-type: none"> Survey, survey facilitation and investigations works (including road and building dilapidation survey works, drilling and excavation). Treatment of contaminated sites. Establishment of ancillary facilities (excluding demolition), including construction of ancillary facility access roads and providing facility utilities. Operation of ancillary facilities that have minimal impact on the environment and community. Minor clearing and relocation of vegetation (including native). Installation of mitigation measures, including erosion and sediment controls, temporary exclusion fencing for sensitive areas and acoustic treatments. Property acquisition adjustment works, including installation of property fencing and utility relocation and adjustments to properties. Utility relocation and connections. Maintenance of existing buildings and structures. Archaeological testing under the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010) or archaeological monitoring undertaken in association with other Minor Works to ensure there is no impact on heritage items. Any other activities that have minimal environmental impact, including construction of minor access roads, temporary relocation of pedestrian and cycle paths and the provision of property access.
Planning Authority Determination: Will the proposed works affect or have the potential to affect heritage items, threatened species, populations or endangered ecological communities?	<p><i>If 'Yes', this completed form must be endorsed by an Environmental Representative, approved by Sydney Metro and submitted to the applicable planning authority to determine that the works are not defined as 'construction'.</i></p> <p>No</p>

Part 2: Details

Describe the proposed Minor Works:

Including work methodologies, site location(s) and site description(s) (e.g. landscape type, waterways, etc.).

To meet the requirements of the Barangaroo Station Chilled Water Facility – Environmental Monitoring Program, validation of desktop modelling predictions relating to the temperature plumes generated by the chilled water facility is required. To facilitate this validation field surveys are to be undertaken using vessel deployed instrumentation (in water) and drones (aerial).

Boat Deployed and Seabed Mounted Sensors

A Seabird multi-parameter conductivity, temperature and depth (CTD) sensor will be deployed from a commercially in-survey vessel and used to profile temperature and depth. Temperature profiles will be conducted at designated points within the vicinity of the outfall with the vessel starting ‘downwind’. Depending on the predicted tides on the day, approximately 10 locations within the vicinity of the outfall will be sampled once an hour.

A Teledyne acoustic doppler current profiler (ADCP) will also be mounted on the seabed to measure current speed and direction profiles. A GPS system would provide reliable locations of observed current speeds and water column temperatures. This will ensure that local current speed profiles can be described reliably for the time of data collection.

Location of the proposed seabed instrument deployment location and mooring configuration is below:

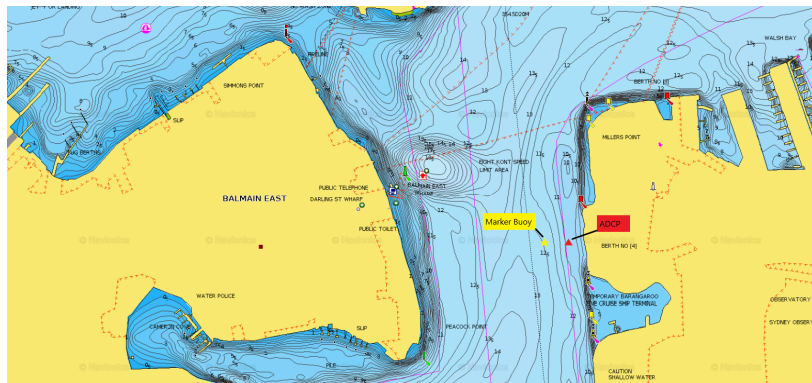


Figure 1 – Seabed instrument deployment location

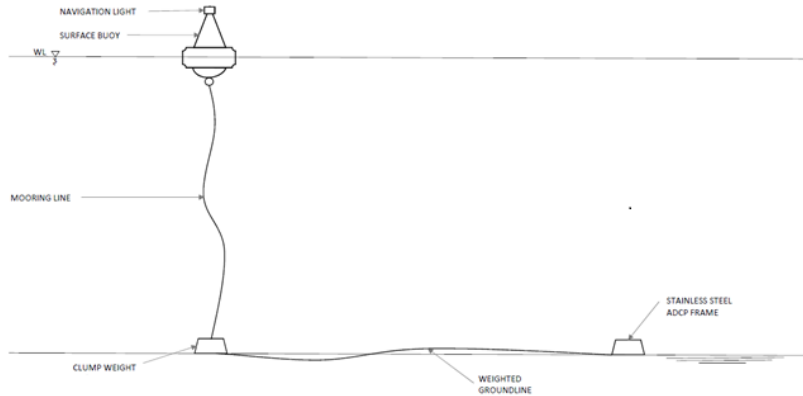


Figure 2 – Seabed instrument mooring configuration

A plankton net will also be towed behind the vessel.

Drone-mounted thermal imaging

A drone-mounted thermal imaging infra-red camera would be used to monitor the surface temperature of the plume. The drone would be flown in 20–30-minute intervals above the plume with data to be captured on the flood, ebb and slack tide over a single day.

Frequency of Surveys

Both the vessel deployed instrumentation / profiling and drone thermal imaging is to be conducted over 3 separate campaigns.

Indicative dates are below subject to change:

1. Trials of proposed methodology / refinement of operations (Late March 2024)
2. Neap Tide Scenario (18/04/2024 April 2024)
3. Spring Tide Scenario (07/05/2024 May 2024)

Note:

If there are any issues with the Neap tide scenario being completed on the 18/4 we have a backup date of the 30/4 or 14/05. If the Spring tide scenario is not possible on the 7/05 we have backup dates on the 4/6, 5/6 & 6/6.

<p>Planned Commencement Date:</p>	<p>Early April 2024</p>
<p>Local Sensitivities: Describe the presence (if any) of local sensitive environmental areas and community receptors</p>	<p>Environmental:</p> <ul style="list-style-type: none"> • Sydney Harbour marine waters <p>Community:</p> <ul style="list-style-type: none"> • Foreshore general public • Water side vessel operations such as commercial and recreational traffic

Part 3: Environmental Risk Assessment and Management

Prepare an Environmental Risk Assessment (in accordance with the [Sydney Metro Risk Management Standard](#)) and an Environmental Control Map for the proposed Minor Works and attach as Appendix 1.
 If an Environmental Risk Assessment and/or an Environmental Control Map for the proposed Minor Works is/are already contained in existing documentation, attach the relevant section(s) as Appendix 1.

<p>Documentation: List any existing documents (including those referenced above) that the proposed Minor Works will be undertaken in accordance with and attach as Appendix 2 (e.g. plans, procedures, etc.).</p>	<p>Refer Appendix 1. Environment Control Map and Environmental Risk Assessment</p> <p>Refer Appendix 2. Environmental Management Documentation:</p> <ol style="list-style-type: none"> 1. Port Authority NSW Harbour Master Approval 2. Port Authority NSW Notice to Mariners 3. CASA Drone Flight Authorisation 4. RPA Drone Noise Assessment 5. Environmental Monitoring Program <p>Refer Appendix 3 : Community Notification</p>
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Part 4: Workforce Notification

<p>How will the environmental and community risks and associated mitigation measures of the proposed Minor Works be communicated to the contractor's workforce?</p>	<p>A project site induction will be provided to all personal working on the project site with pre-start works meetings also be held prior to any works commencing. During the project induction and pre-start meetings relevant environmental aspects and risks associated with the works will be communicated.</p>
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Part 5: Community Consultation


<p>What community consultation has been undertaken already?</p>	<p>Nil</p>
<p>What community consultation is planned to be undertaken?</p>	<p>The monthly newsletter references these works. Given they will be completed within the standard construction hours and listed activities for the site no specific consultation is expected to take place.</p> <p>https://www.sydneymetro.info/sites/default/files/2024-03/Barangaroo%20Station%20construction%20notice%20April%202024.pdf</p>
<p>If drafted already, attach applicable Community Notification as Appendix 3.</p>	

Part 6: Contact Details

Nominate contractor's project manager, environmental and communications contact(s).

Name:	Sean Smith	Position:	Project Manager	Phone:	0401 979 420
	Junaid Iqbal		Environmental (HSSE Advisor NSWACT)		+61 2 8448 1897
	Sean Smith		Project Manager		0401 979 420



Part 7: Signature			
This signature acknowledges that the proposed Minor Works will be undertaken in accordance with this application, have minimal environmental impact and are not defined as 'construction' in accordance with the applicable planning approval.			
Name:	Matthew Smith		
Signature:		Date:	11/03/2024

Determination Page

(Sydney Metro/Environmental Representative Use Only)

12. Endorsement/Approval

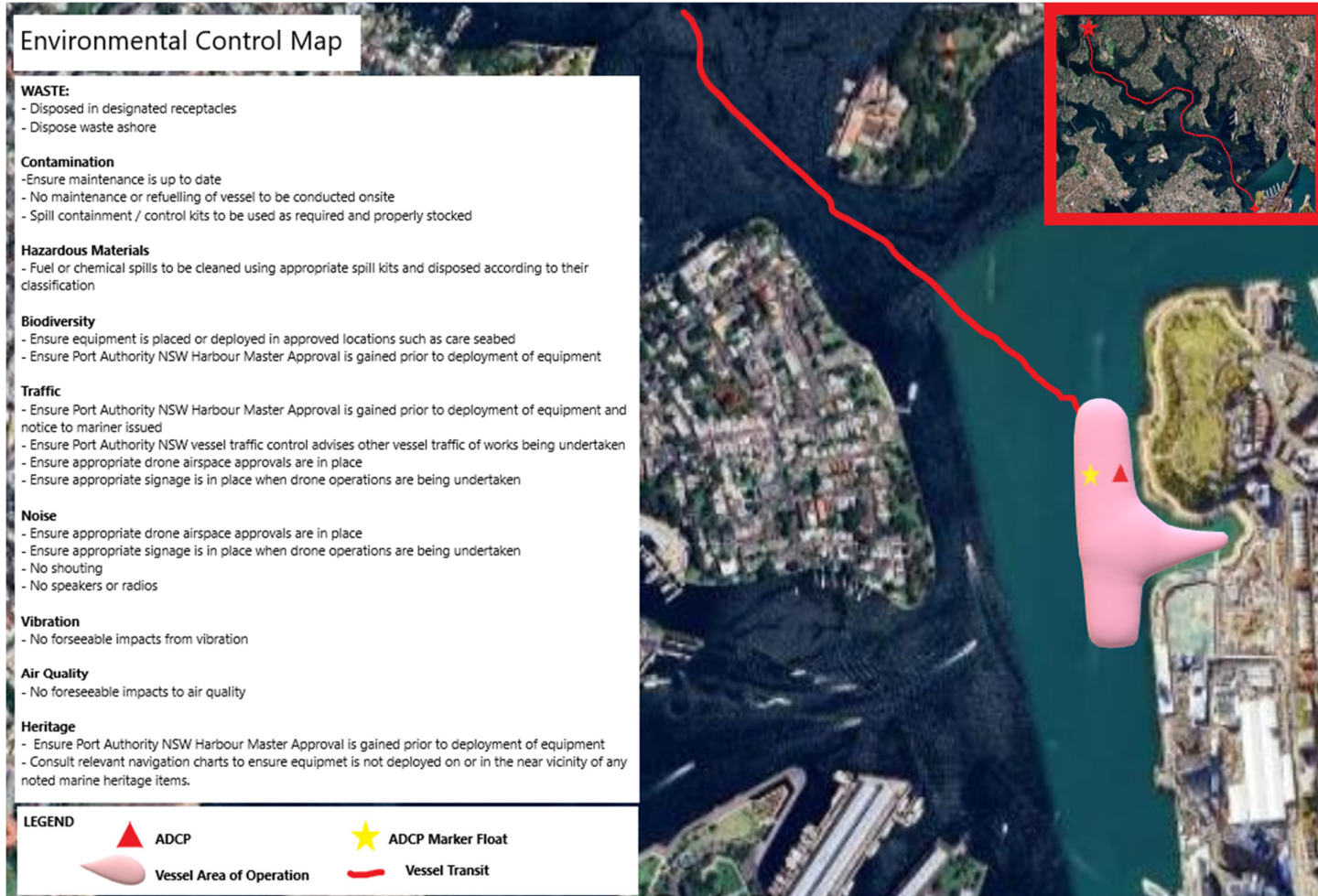
These signatures represent formal endorsement/approval for the proposed Minor Works to commence in accordance with this application and the applicable planning approval requirements (subject to any determination from the applicable planning authority as may be required by the planning approval conditions).

	Director Project Communications – Endorsement (required for all applications)	Director Environment, Sustainability & Planning – Approval (required for all applications)	Environmental Representative – Endorsement (required as necessary in accordance with the applicable planning approval, optional for all other circumstances)
Signature:			
Name:	Connie Choy	Fil Cerone	
Date:	4 April 2024	18 April 2024	
Comments:			<i>Supporting letter attached as Appendix 4 if necessary.</i>
Conditions:	per Table 5 conditions		<i>Supporting letter attached as Appendix 4 if necessary.</i>
<input checked="" type="checkbox"/>	Approved (by Sydney Metro)		
<input type="checkbox"/>	Endorsed (by Environmental Representative)		
<input type="checkbox"/>	Rejected		

x



Appendix 1: Environmental Control Map and Risk Assessment



Environmental Control Map



Proposed Vessel Transit Route

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SM-17-00000112

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Metro Body of Knowledge (MBoK)

(Uncontrolled when printed)



Aspect	Potential Environmental Impact	Initial Rating		Risk	Control Measures	Residual Rating		Risk	Management of Residual Risk
		C	L			C	L		
Waste	Any litter generated from the vessel operations can blow into the surrounding water ways	4	5	12	All waste generated onboard the vessel to be placed in the designed receptacle onboard. All waste to be disposed appropriately onshore at a suitable disposal point	5	6	2	Pre-start meetings prior to works beginning
Contamination	Potential for oil / fuel spills from plant / equipment	3	6	14	Ensure pre-start inspections are completed. Ensure scheduled maintenance is up to date. No fuelling or maintenance of vessel to be conducted onsite Spill containment / control kits to be used as required and be properly stocked Sydney Metro incident reporting procedure to be followed in the event of any spill or leaks from equipment and plant.	4	6	5	Pre-start meetings prior to works beginning
Hazardous Materials	No Hazardous materials to be onsite	6	6	1	Any fuel or chemical spills to be cleaned using appropriate spill kits and disposed according to their classification. Sydney Metro incident reporting procedure to be followed in the event of any spill or leaks from equipment and plant.	6	6	1	Pre-start meetings prior to works beginning
Biodiversity	Potential impact to marine benthic flora which placement of seabed deployed equipment	4	4	13	Ensure equipment is placed in approved locations that contain no sensitive locations such as bare seabed locations as identified in previous site marine ecological assessments. Ensure Port Authority NSW Harbour Master Approval is gained prior to deployment of equipment	5	6	2	Pre-start meetings prior to works beginning
Traffic	Potential to impact commercial and recreational vessel traffic in the vicinity of deployed seabed equipment and proposed profiling	4	4	13	Ensure Port Authority NSW Harbour Master Approval is gained prior to deployment of equipment and notice mariners is issued detailed proposed works.	6	4	4	Pre-start meetings prior to works beginning Continually monitor vessel traffic

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Metro Body of Knowledge (MBoK)

(Uncontrolled when printed)



	locations through traffic having to divert from the area. Potential to impact pedestrian access to foreshore in vicinity of drone operations				Ensure Port Authority NSW vessel traffic control advises other vessel traffic or works being undertaken Ensure appropriate drone airspace approvals are in place Ensure appropriate signage is in place when drone operations are being undertaken Ensure drone with weight rating 6kg is used for the survey works. Sydney Metro incident reporting procedure to be followed in the event of any incidents				Continually surrounding pedestrian traffic
Noise	Use of drone could cause limited nuisance noise to other foreshore users Workers behaviour could also increase noise impacts	5	2	7	Ensure appropriate drone airspace approvals are in place and conditions adhered to including limiting the weight of the drone used to >150Kg Ensure appropriate signage is in place when drone operations are being undertaken No shouting No Speakers or radios	6	3	6	Pre-start meetings prior to works beginning Regulate worker behaviour – no shouting or making loud noises
Vibration	No impacts from vibration	6	6	1	No foreseeable impacts from vibration – therefore no measures required	6	6	1	Pre-start meetings prior to works beginning
Air Quality	No impacts to air quality	6	6	1	No foreseeable impacts to air quality – therefore no control measures required	6	6	1	Pre-start meetings prior to works beginning
Heritage	Potential for Seabed mounted equipment to disturb marine heritage items	4	5	12	Ensure Port Authority NSW Harbour Master Approval is gained prior to deployment of equipment Consult relevant navigation charts to ensure equipment is not deployed on or in the near vicinity of any noted marine heritage items	6	6	1	Pre-start meetings prior to works beginning

Appendix 2: Environmental Management Documentation



1. Port Authority NSW Harbour Master Approval

Mr Matthew Smith
Principal Metocean Scientist
Stantec Australia Pty Ltd
Level 9 – The Forum, 203 Pacific Highway
St Leonards NSW 2065

Dear Mr Smith,

Permission for Disturbance of the Bed of a Special Port Area (ref:PAMAR110-SYD-2024-019)

As the Harbour Master for the Ports of Sydney Harbour and Botany Bay, I grant permission to Stantec Australian Pty Ltd (ABN 17 007 820 322) (Applicant) for works disturbing the seabed of a port, in accordance with the Ports and Maritime Administration Regulation 2021 clause 110.

This permission applies only to the works of the Applicant (Works) described as:

- Deploy a bed mounted Acoustic Doppler Current Profiler (ADCP), including with a ground line, clump weight and marker buoy as per *Disturbance of the Sea Bed* application sent to Port Authority on 28 March 2024.

This permission is valid from 9 April 2024 to 30 June 2024 and is issued subject to the attached conditions.

This Permission does not imply that any other permission, approval, or consent required by the Harbour Master, Port Authority, any other organisation, or under any state or federal legislation has been granted, and works are not to commence until all such permissions, approvals, or consents have been obtained.

Yours sincerely,

Myron Fernandes | Harbour Master, Sydney

8 April 2024

YAMBA

PO Box 143
Yamba NSW 2464
T: 61 2 6646 2002

NEWCASTLE

PO Box 663
Newcastle NSW 2300
T: 61 2 4985 8222

SYDNEY

PO Box 25
Millers Point NSW 2000
T: 61 2 9296 4999

PORT KEMBLA

PO Box 89
Port Kembla NSW 2505
T: 61 2 4275 0100

EDEN

PO Box 137
Eden NSW 2551
T: 61 2 66461596

Conditions

1. Activities associated with the Works must not interfere with safety, efficiency or security of navigation unless agreed in advance with the Harbour Master.
2. Any vessel used for the Works must participate in Sydney VTS.
3. Any significant change, delays, unanticipated event, or impact on safety, efficiency or security of navigation must be reported to Sydney VTS immediately.
4. Any material associated with the Works that enters the water/seabed must be retrieved, or Port Authority may organise for its removal and recover the cost from the Applicant.
5. The Applicant must notify the Harbour Master immediately on completion of the Works.
6. The Applicant must notify Harbour Master prior to Works commencement date (as per approval). Any significant changes or delays must be agreed in advance with the Harbour Master.
7. The Applicant must engage and consult with Transdev Sydney Ferries, to the satisfaction of the Harbour Master, prior to commencing Works.
8. The Applicant is required to submit an image of the instrument on the vessel upon retrieval for all three deployments, including a date stamp.

YAMBA

PO Box 143
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T: 61 2 6646 2002

NEWCASTLE

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T: 61 2 4985 8222

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Eden NSW 2551
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2. Port Authority NSW Notice to Mariners

Local Marine Notice 011-2024

Sydney Harbour - Barangaroo

Instrument Deployment

Mariners are required to navigate with caution between 23 April 2024 and 30 June 2024, an Acoustic Doppler Current Profiler (ADCP) and marker buoy will be in the vicinity off Barangaroo on three separate occasions. Mariners should maintain a listening watch on VHF channel 13 for relevant safety information.

Location

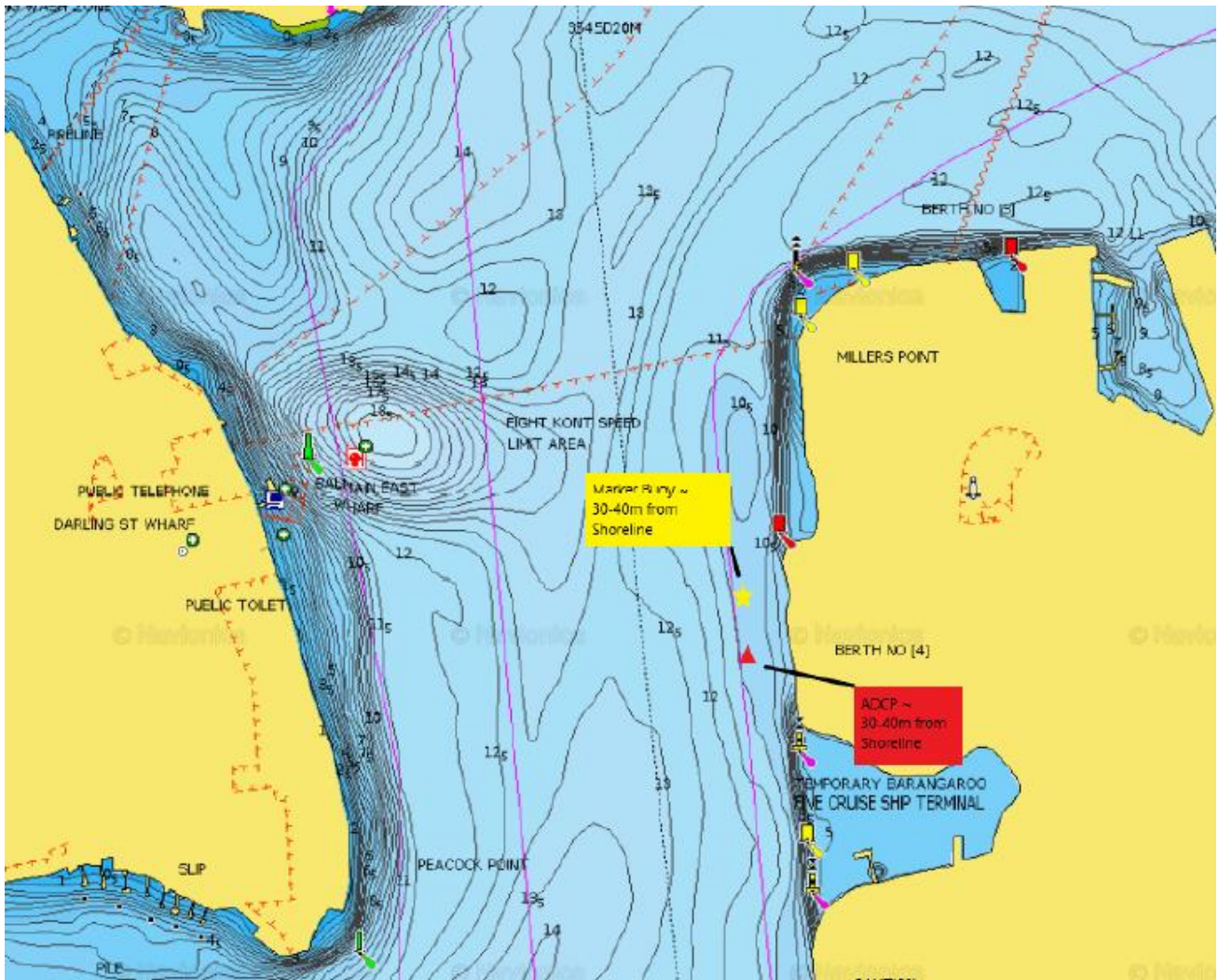


Image 1: Location of the ADCP and Marker Buoy

Instrument Information



Image 2: ADCP in stainless steel frame

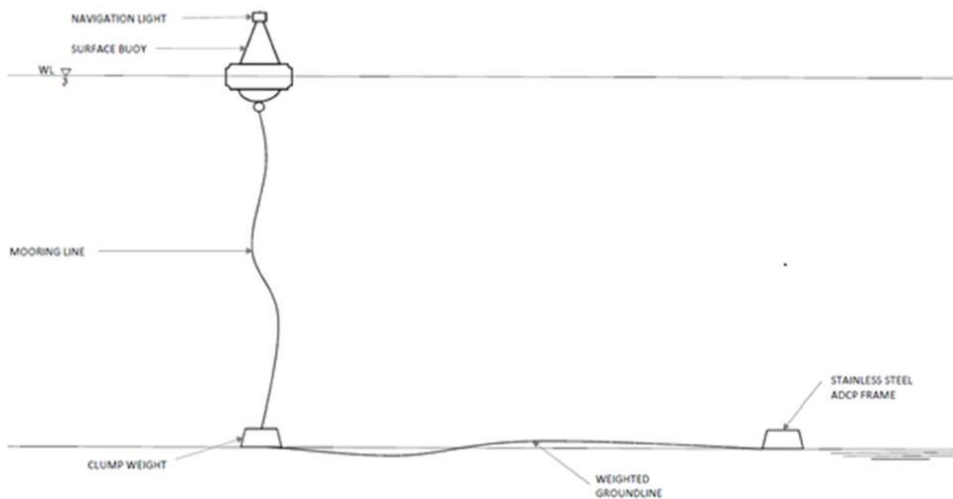


Image 3: ADCP Mooring Configuration

For a list of Local Marine Notices currently in force, please see:

[Local Marine Notices | Port Authority New South Wales \(portauthoritynsw.com.au\)](http://portauthoritynsw.com.au)



3. Civil Aviation Safety Authority (CASA) Drone Flight Authorisation

Request Authorised



Authorisation ID: **AU-OKF-BWZU2PL8F**

Approval Status: **APPROVED**

Maximum Altitude: **60.96m / 200ft**

The operator must ensure the RPA operation is conducted in accordance with the conditions specified in the CASA Instrument that is in force at the time of the authorised operation, available at

<https://www.casa.gov.au/drones/industry-initiatives/automated-airspace-approvals-trial>

For the purposes of the CASA Instrument that is in force at the time of the authorised operation, this airspace authorisation **AU-OKF-BWZU2PL8F** is issued to ReOC **6713** on **4/11/2024, 15:53**.

The operator is authorised to fly the remotely piloted aircraft **17TDG4N0027DP4** in the operating area in the approved area.

The operator is authorised to operate the RPA in the operating area in the approved area on **4/23/2024**, from **10:00** until **13:20**.

Acknowledged





REOC

Can Fly - With Conditions

Flight Info	Details
Approval Required	Approval is required. Some or all of the flight envelope intersects R405 airspace. Approved Maximum flight level : 60.96 metres
Un-Controlled Airports	You can fly RPA, but do not fly in ARR/DEP paths and over runways and taxiways
Approximate Location	Barangaroo, New South Wales, Australia
Coordinates	Lat: S33° 51.52', Lon: E151° 12.00'
What 3 Words	sweat.remove.nail
Elevation	-10 metres (AMSL)
Timing	Timing information for flight date : 4/23/2024 , Flight Time : 10:00 Daylight Start : 05:59 Daylight End : 17:50

Review

Complete

Cancel

Delete

Approvals: 2

<input type="checkbox"/>	ID	Reference	Start	End	Status	Updated
<input type="checkbox"/>	AU-OKF-RTRHVOTDB	304501025	4/23/2024, 13:30	4/23/2024, 16:50	APPROVED	
<input type="checkbox"/>	AU-OKF-BWZU2PL8F	304501025	4/23/2024, 10:00	4/23/2024, 13:20	APPROVED	



4. Remotely Piloted Aircraft (RPA) Noise Assessment

Steiger, Amy

From: drones.noreply@govcms.gov.au
Sent: Wednesday, 27 March 2024 1:05 PM
To: Steiger, Amy
Subject: RPA and Drone Noise Self-Assessment Form Outcome [SEC=OFFICIAL]

You don't often get email from drones.noreply@govcms.gov.au. [Learn why this is important](#)

Submitted on Wed, 2024-03-27 13:00

Dear Stantec Australia Pty Ltd

Thank you for your application.

You are approved under Regulation 16A(3) of the [Air Navigation \(Aircraft Noise\) Regulations 2018](#) (the Regulations) to engage your remotely piloted aircraft (RPA) in air navigation on the basis of the information you have provided to the self-assessment form on the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (the Department) website.

You have indicated that your RPA operations will:

- not have a noise impact on the same noise sensitive site(s) on an ongoing basis; and
- not operate an RPA that weighs more than 150kg.

As a condition of your approval, you must

- Not operate an RPA weighing over 150kg and
- Must not have a noise impact on the same noise sensitive sites(s) on an ongoing basis.

Note that if your RPA operations contravenes the above condition, the Secretary of the Department may revoke your approval or require further information as required.

Your approval to engage in air navigation under the Regulations is valid for one year from Wed, 2024-03-27 13:00.

If the nature of your operations changes significantly over the next 12 months, you may be required to complete the form again or provide additional information to the department to maintain a valid approval. You will need to undertake a full application process if your drone operations are considered to:

- pose a high risk of causing significant and ongoing noise impacts, and/or
- the weight of your RPA increases to over 150 kg

This process will require you to provide more detailed information to the department about your intended drone operations. The department will discuss this with you, and if necessary may impose exemptions on your drone operations designed to mitigate noise impacts.

Please make sure you follow the drone safety rules, available at the [Civil Aviation Safety Authority's](#) website.

If you have any questions, please email Dronenoise@infrastructure.gov.au.

Regards,

Drone Noise Team • National Emerging Aviation Technologies Policy • Safety and Future Technology Branch
Dronenoise@infrastructure.gov.au

The information you provided is:

Operator details

Name of operator/company name

Stantec Australia Pty Ltd

Email address

amy.steiger@stantec.com

Phone number

[0251042625](tel:0251042625)

Questions

1. Do you hold a remotely piloted aircraft operator's certificate (ReOC) or will your operation require you to hold one?

Yes

2a. For what purpose(s) will you be flying drones? (Check all boxes that apply)

For an environmental operation

2b. Will you be flying drones for a commercial purpose not listed above?

Surveying

3. Will you only operate your drones within the standard operating conditions?

No

4. Will you only operate drones weighing 250 grams or less?

No

5. Will noise from your drone operations impact any noise sensitive sites?

Yes

6. Are your operations likely to have a noise impact on the same noise sensitive site(s) on an ongoing basis?

No

7. Will you operate a drone weighing more than 150 kg?

No

Contact details

Your operation is eligible for an automated approval.

To complete the process and obtain the approval, you need to provide some basic details about your operation. An approval will then be emailed to your supplied email address.

Contact person for drone operator

Amy Steiger

Postal Address of drone operator

Level 4, 2 Constitution Avenue

Suburb/town

Canberra

State

Australian Capital Territory

Postcode

2601

ABN/ACN (if applicable)

17 007 820 322

Remote Piloted Aircraft Certificate (ReOC) number

6713

Location(s) of drone operation

Australian Capital Territory, New South Wales, Queensland, Victoria, Western Australia

Caution: This email originated from outside of Stantec. Please take extra precaution.

Attention: Ce courriel provient de l'extérieur de Stantec. Veuillez prendre des précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.



5. Environmental Monitoring Program



**Environmental Monitoring
Program**

Barangaroo Station Chilled Water
Facility

21/04/2023

Prepared for:

Sydney Metro

Prepared by:

Stantec Australia Pty Ltd



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

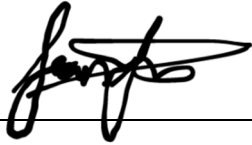
Revision	Description	Author		Quality Check	
A	First draft	Annabelle McTaggart	12/04/23	Sean Smith	18/04/23



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

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Reviewed and Approved by _____



Sean Smith



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Glossary and Abbreviations

CoA	Condition of Approval
CSSI	Critical State Significant Infrastructure
EMP	Environmental Monitoring Program
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
FM Act	<i>Fisheries Management Act 1994</i>
KFH	Key Fish Habitat
KTP	Key Threatening Process
MNES	Matter of National Environment Significance
POEO	<i>Protection of the Environment Operations Act 1997</i>
ROM	Rollingstock Operator and Maintainer
SSI	State Significant Infrastructure
WQOs	Water Quality Objectives



1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Sydney Metro City and Southwest – Chatswood to Sydenham project was approved, under Section 115ZB of the *Environmental Planning and Assessment Act 1979* (EP&A Act), by the Minister for Planning on 9 January 2017 (application number SSI 15_7400). The project included a new station at Barangaroo., under construction on Hickson Road, Barangaroo, adjacent to Nawi Cove. The station and station plant will be located below ground and the cooling strategy for the station will involve seawater energy transfer, resulting in a marine discharge of warmer water, which would include anti-fouling agent MEXEL 432.

The proposed cooling strategy is required to be compliant with the following condition of approval (CoA E107):

The CSSI must be constructed and operated so as to maintain the NSW Water Quality Objectives where they are being achieved as at the date of this approval, and contribute towards achievement of the NSW Water Quality Objectives over time where they are not being achieved as at the date of this approval, unless an EPL in force in respect of the CSSI contains different requirements in relation to the NSW Water Quality Objectives, in which case those requirements must be complied with.

Compliance with CoA E107 was demonstrated through a desktop consistency assessment, including an aquatic ecology impact assessment that confirmed the proposed design and operation maintains NSW Water Quality Objectives. The aquatic ecology impact assessment also recommended additional mitigation measures relating to impingement, entrainment and bioaccumulation. These are detailed in Consistency Assessment TfNSW 43 - Cooling water supply to Barangaroo Station.

An environmental monitoring program (EMP) is required to demonstrate compliance with CoA E107 during real world operational conditions and address additional mitigation measures.

1.1.1 Testing and Commissioning Phase

The operation of the new station at Barangaroo including the cooling system will be tested in August 2023. This 'testing and commissioning phase' will simulate operational conditions over a period of three months to trial the stations systems. The EMP intends to gather data throughout this phase to inform design considerations and confirm compliance with CoA E107 before commencement of real world operations.

1.2 SCOPE OF WORKS

This EMP has been designed to demonstrate compliance with CoA E107 during operation and address additional mitigation measures. A series of monitoring activities have been proposed including:



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Introduction

- Validation of modelling predictions relating to the temperature plume generated by the chilled water facility. This is to occur within the testing and commissioning phase.
- Monitor impingement rates within the testing and commissioning phase of operations.
- Annual testing for at least five years (including sampling before and during the testing and commissioning phase):
 - Water and sediment samples within the local area for active ingredients of MEXEL 432, compared against a reference site.
 - Collected shoreline and seabed organisms within the local area for active ingredients of MEXEL432, compared against a reference site.



2.0 LEGISLATIVE BACKGROUND

The operation of the cooling system and discharge to the marine environment intersects with multiple pieces of legislation and guidelines which are summarized below.

2.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) institutes a system of environmental planning and assessment in NSW and is administered by the NSW Department of Planning and Environment. The Sydney Metro City and Southwest – Chatswood to Sydenham project was approved under Section 115ZB of the EP&A Act on 9 January 2017 (application number SSI 15_7400). The approved project did not include provision for marine cooling discharge from the station, however the cooling strategy was approved through a consistency assessment, including a marine impact assessment. The relevant CoA for the cooling strategy was E107.

2.2 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997 (POEO ACT)

The *Protection of the Environment Operations Act 1997* (POEO Act) is the key piece of environment protection legislation administered by the NSW Environment Protection Agency (EPA) which establishes the regulatory framework and licensing requirements for certain activities. Under the POEO Act it is an offence to pollute waters without a licence.

Under section 120 of the POEO Act it is an offence to pollute waters with the definition of water pollution including the placing of any matter that changes the “physical, chemical or biological condition of the waters”. Schedule 5(j) of POEO Regulation describes ‘thermal waste’ as being a potential source of water pollution. Thermal waste is defined as being “any liquid which, after being used in, or in connection with any activity, is more than two degrees Celsius hotter or colder than the water into which it is discharged”.

2.3 FISHERIES MANAGEMENT ACT 1994

The *Fisheries Management Act 1994* (FM Act) contains provisions for the conservation of fish stocks, key fish habitat, biodiversity, threatened species, populations, and ecological communities. It regulates the conservation of fish, vegetation and some aquatic macroinvertebrates and the development and sharing of the fishery resources of NSW for present and future generations. The FM Act lists threatened species, populations, and ecological communities under Schedules 4, 4A and 5. Schedule 6 lists key threatening processes (KTPs) for species, populations and ecological communities in NSW waters and declared critical habitats are listed in a register kept by the Minister of Primary Industries.

Another objective of the FM Act is to conserve key fish habitat (KFH). These are defined as aquatic habitats that are important to the sustainability of recreational and commercial fishing industries, the



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Legislative Background

maintenance of fish populations generally and the survival and recovery of threatened aquatic species. In freshwater systems, most permanent and semi-permanent rivers, creeks, lakes, lagoons, billabongs, weir impoundments and impoundments up to the top of the bank are considered KFH. Small headwater creeks and gullies that flow for a short period after rain, farm dams on such systems and artificial water bodies (except for those that support populations of threatened fish or invertebrates) are excluded.

At a broad scale, KFH relevant to the project includes any waterbody if it is known to support or could be confidently expected (based on predictive modelling) to support threatened species, populations or communities listed under the FM Act.

2.4 NSW WATER QUALITY OBJECTIVES

The NSW Water Quality Objectives (WQOs) are the environmental values and long-term goals for consideration when assessing and managing the likely impact of activities on waterways. They are not intended to be applied directly as regulatory criteria, limits or conditions but are one factor to be considered by industry, the community, planning authorities or regulators when making decisions affecting the future of a waterway.

2.5 ANZECC WATER QUALITY GUIDELINES

The objective of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC Guidelines 2000) is to provide authoritative guidance on the management of water quality in Australia and New Zealand. This includes setting water quality and sediment quality objectives designed to sustain current, or likely future, community values for natural and semi-natural water resources.

The ANZECC (2000) guidelines recommend that wherever possible, site-specific data is used to define trigger values for physical and chemical factors which can adversely impact the environment. However, where this is not possible due to a lack of data, default trigger values (DTVs) may be used.



3.0 METHODOLOGY

3.1 STUDY AREA

The project will occur on Hickson Road, Barangaroo, adjacent to Nawi Cove. The marine habitats around the discharge point are comprised of soft sediments and rock/reef structures. Sensitive receptors include sessile invertebrates and algal assemblages on the shoreline wall, including key species such as Blue Mussels and the bryozoan *B. neritina*.

3.2 MEXEL 432

The proposed cooling system uses the anti-fouling MEXEL 432 compound to prevent marine organism growth. MEXEL 432 will be used for one hour a day at concentrations of 6 parts per million. Modelling indicates that antifoulant concentrations of 0.01 PPM are likely to occur up to 250 m north and 100m south of the outfall during discharge, with higher concentrations (greater than 0.5 PPM), more likely close to the source (within 10 m around the outfall) (MetOcean Solutions 2020).

The impact assessment identifies that MEXEL 432 is considered to have “no impact on the marine environment” and is “non-toxic to mammals, bacteria, algae, crustaceans, molluscs and fish”.

Environmental testing laboratories indicate that MEXEL 432’s active ingredients include Zinc (as Zinc Peroxide), Chlorhexidine and Tween-85. Zinc is a standard parameter to test for in marine water. Chlorhexidine and Tween-85 are non-standard and there are no readily available or NATA accredited laboratory analysis processes available. Custom analysis for these contaminants can be requested, however these are highly expensive (~\$3000 per analyte), un-accredited and have limits of reporting that may not be sufficient to pick up the low quantities of Chlorhexidine and Tween-85 being released.

With the cost, lack of accreditation and low accuracy it is instead proposed to sample water, sediment, shoreline organisms and seabed organisms for Zinc only. Zinc levels can act as a proxy for Chlorhexidine and Tween-85 concentrations and if elevated levels of Zinc are found this would indicate that Chlorhexidine and Tween-85 concentrations may also be elevated. In this circumstance additional analysis for these contaminants is to be considered in consultation with Sydney Metro and NSW EPA.

3.3 COOLING WATER PLUME – CONFIRMING MODELLING

Met-Ocean Solutions modelled the heated plume of cooling water so that the discharged cooling water was 5.5°C or 7 °C above the intake temperature (Figure 1). The model found that water warmer than 1.0 °C above ambient temperature was only found in very close proximity to the outlet. Generally, the plume, $\Delta T < 0.1$ °C, typically does not extend beyond 60m north or south of the outlet. The form of the cooling water plume was found to depend on tidal water level and the direction and speed of the tidal currents. Tidal water level affects the available plume rise height and initial dilution.



Methodology

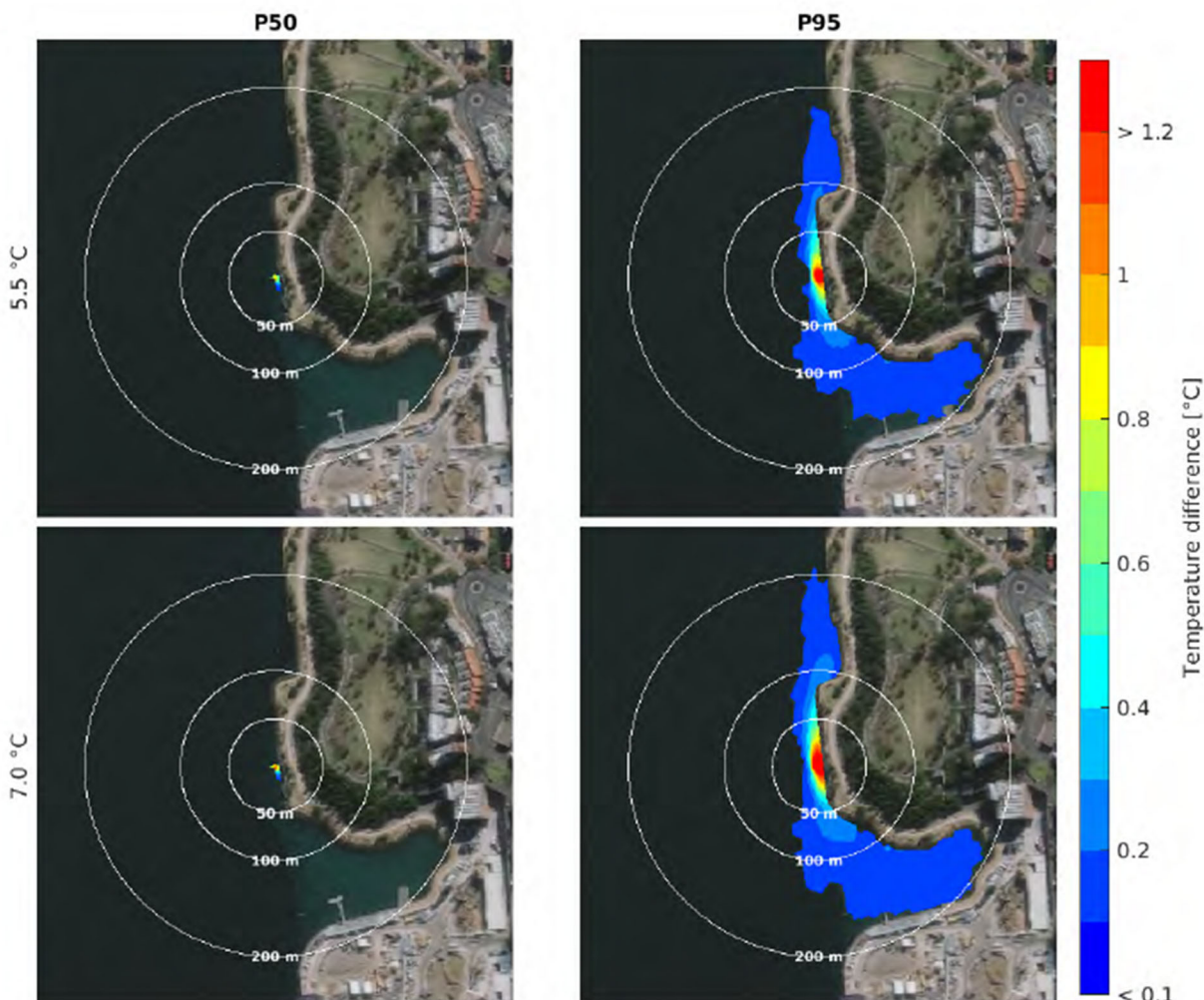


Figure 1 Modelled 50th and 95th percentile of water temperature difference in winter with 5.5°C (top) and 7.0°C (bottom) (Source: MetOcean Solutions)

Because the outlet is north of the intake, ebb tide flows will be less affected by any cooling water re-circulation (intake water temperature increased by entrainment of released cooling water that is warmer than the ambient harbour seawater). Greater temperature differences will be experienced during neap tide periods because current speeds will be lower. However, on low spring tides there will be less water column height for initial dilution.

Met-Ocean used the CORMIX system for nearfield analyses, which does not include any re-circulation, and the SCHISM system for far-field analyses. Model results show that in the far field, elevated water temperatures are confined to the top 3 to 4m of the water column.



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Methodology

Infield monitoring is required to confirm the model results under real-world conditions. Monitoring will occur during the testing and commissioning phase.

3.3.1 Methodology

Two complementary systems are proposed to monitor the cooling water plume.

3.3.1.1 Boat Deployed and Seabed Mounted Sensors

A Seabird multi-parameter conductivity, temperature and depth (CTD) sensor will be deployed from a commercially in-survey vessel and used to profile temperature and depth. This instrument has fast stabilisation rates, high resolution and accuracy which will increase the level of certainty of recorded measurements. Temperature profiles will be conducted at designated points within the vicinity of the outfall with the vessel starting 'downwind'. Depending on the predicted tides on the day, approximately 10 locations within the vicinity of the outfall will be sampled once an hour.

A Teledyne acoustic doppler current profiler (ADCP) will also be mounted on the seabed to measure current speed and direction profiles. A GPS system would provide reliable locations of observed current speeds and water column temperatures. This will ensure that local current speed profiles can be described reliably for the time of data collection.

This is to be repeated over a spring and neap tide period.

3.3.1.2 Drone-mounted thermal imaging

A drone-mounted thermal imaging infra-red camera would be used to monitor the surface temperature of the plume. The thermal imaging is able to simultaneously capture larger areas than the single point CTD and ADCP profiles. The drone would be flown in 20–30-minute intervals above the plume with data to be captured on the flood, ebb and slack tide over a single day. This is to be repeated over a spring and neap tide period.

Thermal imaging measures relative temperatures, so an intersection between the CTD/ADCP data and the drone observations is required to determine absolute temperature.

3.3.2 Frequency and Timing

The boat deployed CTD, seabed mounted ADCP and thermal imaging would occur together on a single day over an approximate seven hour period. To validate the modelling predictions data is required from the flood, ebb and slack tide. Two sampling events will be undertaken to coincide with a spring and a neap tide.

This work would be undertaken during the testing and commissioning phase, and when the cooling water system was operating continuously at a known rate similar to the modelled scenario.



3.4 IMPINGEMENT AND ENTRAINMENT

Any water intake system has the potential to impinge aquatic organisms on the screen or rack at the point of intake or entrain organisms through the piping and filter system. This is more likely for less mobile species such as fish larvae or zooplankton with serious injury or mortality the result.

The intake flow for the Barangaroo Station cooling system has a maximum normal operation velocity of 0.785m/second through two, 525 mm diameter intake pipes. The Marine Ecological Impact Assessment for this project suggested that this intake flow was such that impingement risk was low with “active swimming organisms able to move away from the intake structure”.

Monitoring of impingement and entrainment was required during the testing and commissioning phase to confirm this conclusion. A retrofit of the intake design may be required if significant impingement/entrainment is evident.

3.4.1 Methodology

3.4.1.1 Impingement Monitoring

Impingement will be monitored by photo and video of the intake pipe inlet screens taken by an underwater remotely operated vehicle (ROV) or by divers. Impinged biota also will be recorded in-situ. A trained marine ecologist will examine photo and video to identify biota to species level (where possible) and record sizes.

3.4.1.2 Entrainment Monitoring

In each sampling period, three samples will be collected from within the outlet stream using a plankton net operated by divers. Three samples would also be collected using a plankton net (300 µm), towed by a vessel in the harbour at a site close by, but upstream, of the inlet. Sampling would be done at the depth of the intake so that the amount of plankton entrained (as measured in the outlet) as a proportion of the total (as measured outside) can be calculated. The GPS co-ordinates, timing, duration, distance and speed would be recorded and a device to measure flow rates and calculate the volumes through the net used. Tows would be standardized by volume.

At the conclusion of each tow net would be washed down and contents concentrated into the cod end for collection. Samples are preserved immediately after collection using 10% formalin-seawater mixture containing Rose Bengal dye.

Three reference samples will also be collected, using the same methodology described above for nets tows, from a location west of the harbour bridge, well separated from the Barangaroo Station cooling system. Abundance of plankton at the reference site will be compared with abundance at the upstream site to provide context about natural variability of plankton within locations in the harbour.



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Methodology

3.4.1.3 Laboratory analysis

Samples are to be rinsed through a sieve with the same mesh size as the plankton net used in their collection (300 µm) to remove seawater and formalin. Ethanol is then added to each sample to make it up to a volume of 250 ml and this divided into 5 equal volume subsamples. Fish are removed and counted from each subsample. Zooplankton numbers are counted under the microscope for a single subsample.

Data from subsamples were multiplied by an appropriate factor to provide a measure of abundance of zooplankton for the entire sample. Visual comparisons between subsamples prepared in the laboratory indicated close agreement in terms of the numbers and types of animals present. Hence, the subsampling method used yields unbiased within-sample replicates of the entire sample collected.

3.4.2 Frequency and Timing

Impingement and entrainment monitoring will be carried out at a rate of one sampling event per month during the testing and commissioning phase to a total of three events.

3.5 WATER AND SEDIMENT QUALITY

Sampling locations for water and sediment quality, and bioaccumulation have been established based on dispersion modelling of MEXEL 432 concentrations (Figure 2). Modelling indicates that antifoulant concentrations of 0.01 PPM are likely to occur up to 250 m north and 100m south of the outfall during discharge, with higher concentrations (greater than 0.5 PPM), more likely close to the source (within 10 m around the outfall) (MetOcean Solutions 2020).



Methodology

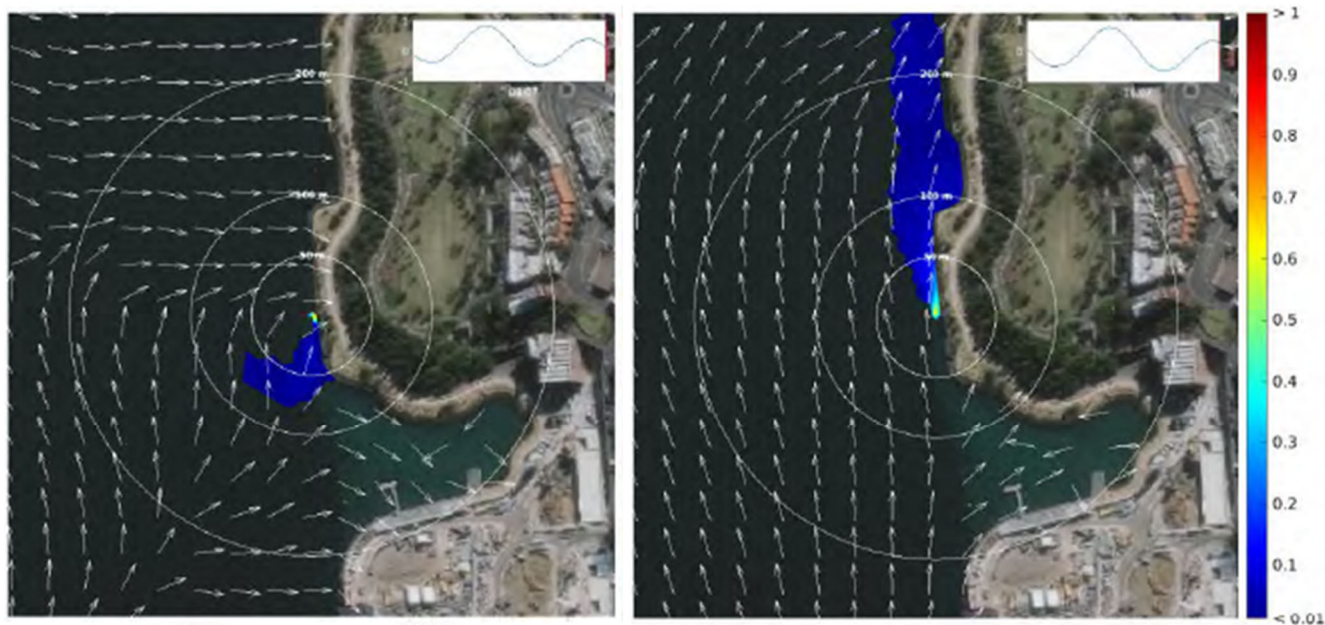


Figure 2 Modelled ‘worst-case’ scenario of MEXEL 432 concentration extent during rising tide (left) and falling tide (right)

Four impact monitoring sites have been established within the modelled plume area (**Error! Reference source not found.**) at <2 m from the outfall (I1), ~ 10 m from the outfall (I2), and 250 m north (I3) and 100 m south of the outfall (I4). Two reference sites at Balmain Headland and Goat Island will be used to control for natural variation (C1, C2).



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Methodology

3.5.1 Methodology

3.5.1.1 Water Quality

In-situ water quality measurements would be taken at each of the sampling locations using a calibrated YSI water quality probe or Seabird profiler. Two replicate readings were taken at the surface and the outlet depth. The standard suite of variables was measured including:

- Temperature (°C)
- Turbidity (NTU)
- Dissolved oxygen (mg/L and % saturation)
- pH

In addition to the in-situ sampling a discrete water sample will be collected at outlet height at each of the sampling locations using a Niskin bottle lowered from a vessel. One sample would be collected at each site, apart from the reference sites where two samples would be collected. Duplicate and triplicate samples would be taken as appropriate for quality control.

Discrete water samples would be submitted to a NATA accredited laboratory for analytical testing of Zinc levels.

3.5.1.2 Sediment Quality

Sediment samples will be collected at each of the sampling locations using a Van Veen or Ponar grab lowered from a vessel. Duplicate and triplicate samples would be taken as appropriate for quality control.

In addition to Zinc, each sample would be analyzed for particle size distribution and total organic carbon, given these compounds can influence sediment chemistry. All samples would be sent to a NATA accredited laboratory for analytical testing.

3.5.2 Frequency and Timing

Water and sediment quality testing would be undertaken:

- Once before the testing and commissioning phase (baseline).
- Twice during the testing and commissioning phase, once in the first month and once in the third month.
- Annually, at a similar time period to the testing and commissioning phase.

Frequency and timing of water and sediment quality testing may be adjusted based on the results of testing. More frequent testing may be required if this scope or the bioaccumulation scope shows elevated zinc levels at impact sites. In this circumstance testing for other active components of MEXEL 432 may be required. Alterations to the methodology, frequency and timing of sampling under this EMP must occur in consultation with Sydney Metro and the NSW EPA



3.6 BIOACCUMULATION

3.6.1 Methodology

The bioaccumulation of Zinc in intertidal (i.e. shoreline) and subtidal (i.e. seabed environments) would be measured using suitable bio-indicator species such as the Sydney Rock Oyster (*Saccostrea glomerata*) or Blue Mussel (*Mytilus galloprovincialis*). Both species have been used by bioaccumulation studies in the past, and been shown to be ideal as bioindicators, readily accumulating contaminants, being tolerant of handling stress and surviving deployment to a range of depths. The baseline survey is to determine the most appropriate bi-indicator species based on its local abundance.

This scope will use a combination of wild bio-indicators and translocated bio-indicators to reduce the risk that a suitable number of wild bio-indicators are not available at all sampling locations.

Wild bio-indicators

Wild bio-indicators (mussels or oysters) would be collected by SCUBA divers from the intertidal zone and seabed at the four impact and two reference monitoring sites used for water and sediment sampling. The tissue from 5-10 individuals would be combined to form a sample of adequate size for chemical tissue analysis (~100g) with three samples collected at each site, two for analysis and another held for quality assurance purposes. Handling techniques would conform to standard procedures for the preparation of biological tissues for metal contamination testing.

Translocated bio-indicators

The bio-indicators will be transported from Eden timed to coincide with the deployment of samples to minimise the stress occurring to the animals due to handling. The mussels or oysters will be deployed in socks/bags with 10-20 individuals per bag. Two bags will be deployed at each sampling locations by SCUBA divers.

The bio-indicators will be deployed for 6 to 8 weeks. Retrieval will also be performed by SCUBA divers. The mussels/oysters will be put on ice in the field and transported immediately to a laboratory for dissection and preparation. If immediate preparation is not possible the mussels will be frozen whole in plastic containers until processing is possible.

The tissue from 15-20 of the mussels from each sock would be combined to form a sample of adequate size for chemical tissue analysis (~100g). All dissection and handling techniques would conform to standard procedures for the preparation of biological tissues for metal contamination testing. Specific procedures for handling of mussels/bivalve samples would include ensuring that all water drained from within the shell is excluded from the samples, while water from within the organism (i.e. the adductor muscle) is included.



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Methodology

Three composited samples of mussels that have been transported from Eden, but not deployed, would also be analysed to establish background conditions of the specific set of mussels deployed. Samples collected for analysis of metals would be placed in appropriate sample containers and dispatched to a NATA accredited laboratory using Chain of Custody documentation within recommended holding times and conditions. The NATA accredited laboratory should have demonstrated experience in processing biological samples including analysis of contaminants in filter-feeding organisms.

3.6.2 Frequency and Timing

One baseline sampling event for wild bio-indicators species will be undertaken before the testing and commissioning phase. This event will determine the species to be utilized by the EMP. An additional wild bio-indicator sampling event is to occur at the end of the testing and commissioning phase.

Translocated bio-indicators will be deployed approximately one month into the testing and commissioning phase. These individuals will be collected 6-8 weeks later at the end of the testing and commissioning phase.

The appropriateness of the wild and installed bio-indicators will be reviewed at the end of the testing and commissioning phase monitoring program.

This bioaccumulation methodology is to be repeated annually, at a similar time period to the testing and commissioning phase.



Reporting

4.0 REPORTING

4.1 INITIAL FACTUAL ENVIRONMENTAL REPORT

EMP reporting would consist of a factual environmental impact report which would compare the monitoring data to the mitigation measures outlined in the Consistency Assessment and the requirements of CoA E107. The initial factual environmental report would confirm the validation of the modelling predictions for water temperature. The report would be structured around the mitigation measures outlined in the consistency assessment, including:

- Validation of modelling predictions for water temperature.
- Monitoring of impingement/ entrainment and recommendations for intake design retrofitting (if required).
- Testing of water, sediment, shoreline organisms and seabed organisms for MEXEL 432.

The factual environmental impact report would include:

- The methodologies applied in the monitoring.
- Calibration certificates of all equipment used.
- Outcomes relevant to the Met-Ocean modelling results, including time-series data and confirmation of validation.
- Results of the impingement/entrainment assessments, including raw and processed data and lab reports.
- Results of the temperature monitoring and comparison to the modelled results.
- Results of the MEXEL sampling.
- If required, the report will make recommendations to retrofit mitigation works, should compliance of the Chiller plant facility with the environmental requirements of the Planning Approval not be achieved.

4.2 ANNUAL REPORTING

Annual reporting would continue after the delivery of the initial factual environmental report. With the modelling predictions validated by the initial factual environmental report the annual reporting would focus on the ongoing confirmation of compliance with CoA E107 (testing of water, sediment, shoreline organisms and seabed organisms for MEXEL 432 only).

The annual report would include:

- The methodologies applied in the monitoring.
- Calibration certificates of all equipment used.
- Details of the sampling program.
- Results of the MEXEL sampling.



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Reporting

- Conclusions regarding compliance with CoA E107
- Recommendations regarding future monitoring (if required)



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Summary

5.0 SUMMARY

This EMP has been designed to meet the requirements of Water Monitoring for the Planning Approval stage of the Barangaroo Station cooling water system. The monitoring will allow for the demonstration of compliance against CoA E107 during the testing and commissioning phase of operations. An overview of the monitoring design is provided in Table 1.

Table 1 Summary of the Environmental Monitoring Plan

Component	Method	Indicators	Sites	Frequency
Cooling Water Plume	Sampling water temperature at intervals from the discharge point (Boat Deployed CTD and seabed mounted ADCP, Drone-mounted infra-red FLIR camera).	- Temperature	Designated points at set distances from the outfall, starting approximately 70m 'downwind'.	One day of monitoring within the commissioning period.
Impingement Monitoring	ROV videos.	- Species - Size	Inlet Screens.	One sampling event per month for three months.
Entrainment Monitoring	Collection of samples within the plant (at filter access points).	- Proportion of plankton entrained.	Filter Access Point. Reference site around Balmain Headland.	One sampling event per month for three months.
Water Quality	Grab sample	- Zinc	Four impact monitoring sites: - <2m from outfall - ~10m from outfall - 250m north of outfall - 100m south of outfall Two reference sites around Balmain headland.	One baseline sampling event before testing and commissioning phase. Two sampling events during testing and commissioning phase (one at beginning, one at end). Testing to be undertaken for at least 5 years.
Sediment Quality	Grab sample	- Zinc	Four impact monitoring sites: - <2m from outfall - ~10m from outfall - 250m north of outfall - 100m south of outfall	One baseline sampling event before testing and commissioning phase. Two sampling events during testing and commissioning phase (one at



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

Summary

			Two reference sites around Balmain headland.	beginning, one at end). Testing to be undertaken for at least 5 years.
Bioaccumulation of MEXEL 432	Shoreline and Seabed Organisms Sampling.	- Zinc	<p>Four impact monitoring sites:</p> <ul style="list-style-type: none"> - <2m from outfall - ~10m from outfall - 250m north of outfall - 100m south of outfall <p>Two reference sites around Balmain headland.</p>	One baseline sampling event before testing and commissioning phase. One sampling event at end of testing and commissioning phase.



ENVIRONMENTAL MONITORING PROGRAM – BARANGAROO CHILLED WATER FACILITY

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Appendix 3: Community Notification.

Project update – Barangaroo Station

April 2024

Sydney Metro is Australia's biggest public transport project

Services started in May 2019 in the city's North West, with a train every four minutes in the peak. Metro rail will be extended into the CBD in 2024, with new CBD metro railway stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Gadigal and Waterloo and new metro platforms at Central and then onto Bankstown in 2025.

BESIX Watpac is building Barangaroo Station, including the station fit-out, associated landscaping and civil works, and the realignment of Hickson Road.

Systems Connect (an unincorporated joint venture between CPB Contractors and UGL Limited) is delivering line-wide work, which includes installing metro rail track, power systems, communications, and infrastructure to turn the excavated tunnels into a working railway between Chatswood and Sydenham.

The Trains, Systems, Operations & Maintenance (TSOM) group is delivering the communication and signalling systems, and the platform screen door installation.

Barangaroo Station – upcoming work

Ad hoc single-lane road closures along Hickson Road will continue in early to mid-April and again in late-April. These closures will enable work to install bollards, further landscaping works, and remove hoarding at the south of the site.

The demolition and removal of crane pads will finish in early April, and we thank the community for its patience during this noisy work period.

Work to construct the final Hickson Road alignment under the Dalgety and Windmill Street bridges will continue in April and will be intermittently noisy. This work will include the construction of the final road alignment, pedestrian footpaths, coach parking and bus stops.

Landscaping along the foreshore and around the station entrances will continue and will be completed in front of the Cutaway in April. You can access information about the work on the public domain via the Sydney Metro Barangaroo Station webpage under quick links (<https://www.sydneymetro.info/station/barangaroo-station>)

Divers will use drones to continue their environmental monitoring work from boats on the harbour.

Underground, the team will continue focusing on testing and commissioning equipment in the plant rooms. In the tunnels, Systems Connect and the TSOM group will continue testing and commissioning rail services. TSOM will continue dynamic testing of the trains through the tunnels and testing and commissioning field equipment throughout the station, including speakers, cameras, and door security.

For any prolonged noisy work at the surface, respite periods will occur on weekdays from 9.30 am – 10.30 am and 12.30 pm – 1.30 pm. On Saturdays, work will commence at 8 am and end at either 1 pm without respite periods or 6 pm with respite periods in line with the weekday arrangements.

In addition to the respite hours, the team will use the available methods to reduce noise impacts on the local community, including:

- limiting the use of multiple pieces of loud machinery at the same time and location, where feasible.

- turning off equipment when not in use.
- using non-tonal reversing alarms on all equipment.
- installing temporary noise blankets around the noise source, where feasible.
- and operating equipment on the lowest effective vibration setting, where feasible.

The table below provides more information about the activities, weather and site conditions permitting.

Location	Activities during standard construction hours
Hickson Road (between Windmill Street Bridge and High Steps) and the public domain around Nawi Cove and at Headland Park	<ul style="list-style-type: none"> • Finishing the demolition and removal of crane pads as marked on the map on page three. This work is noisy with the use of jackhammering equipment. • An ad hoc single-lane road closure along Hickson Road will be in place between High Steps and 25 Hickson Road, to allow work to install topsoil in tree pits and bollards adjacent to Hickson Road and to remove hoarding at the south of the site. • Installing trees in and around the station precinct. • Continuing the installation of bollards and footings within the station precinct. • Landscaping work along the foreshore and around the station entrances, including pavement construction. • Preparing to switch pedestrians to a newly built footpath along the Nawi Cove foreshore. • Finalising the installation of tree support structures ahead of paving works. • Continuing to install pavers around the station precinct. • Continuing to install street and pathway lights across the station precinct. • Continuing the installation of the landscape precast seat. • Commencing the installation of the heritage boat inlay. • Finalising landscaping work in front of the Cutaway. • Installing precinct signage. • Continuing to construct the final Hickson Road alignment under Dalgety Bridge, including constructing kerbs and laying asphalt. • Finishing the connection stormwater pipe to the newly constructed pit outside 25 Hickson Road and continuing to install stormwater pits and pipes adjacent to that area. Some work will be intermittently noisy during standard construction hours only, using jackhammering equipment to break through concrete. This work is expected to be completed in early April. • Continuing work to remove the redundant services, mesh and anchors attached to the heritage wall under High Street using mobile plant and /or from scaffold. This work is being undertaken in adherence to heritage guidelines and will not generate noise. • Commencing work to install the brick façade around the ventilation pods along the heritage wall under High Street

- | | |
|---|--|
| <p>Inside the station box and tunnels</p> | <ul style="list-style-type: none"> • Environmental monitoring by divers in boats on the harbour, at times using a drone. • Delivering building materials and equipment for the station and tunnels. |
| | <ul style="list-style-type: none"> • Testing and commissioning of station equipment rooms. • Dynamic train testing through the tunnels. • Testing and commissioning activities of electrical services, including track, power, and communications and signalling equipment and systems. • Testing and commissioning of the platform screen doors and field communications equipment. |

Location Out-of-hours work activities

Specific details on all out-of-hours work occurring at the surface are provided in our weekly e-news.

- | | |
|---|--|
| <p>Inside the station box and tunnels</p> | <ul style="list-style-type: none"> • 24/7 access to tunnels (as required). • Testing, maintenance, and commissioning for mechanical and electrical services, including power, communications and signalling equipment and services, ventilation systems and dynamic train testing through the tunnels. |
|---|--|

Barangaroo Station work area with pedestrian detours during standard construction hours





No pedestrian access along the heritage wall below High Street during construction

Pedestrian access on Hickson Road along the heritage wall remains closed during the construction of Barangaroo Station. Alternative access is available via the High Steps, Wulugul Walk or Kent Street for those requiring an accessible route (via lifts from Hickson Road at Barangaroo to Kent Street, and lifts at Headland Park).

For maps of out-of-hours work, please refer to the specific notifications in the '**Construction updates**' tab at <https://www.sydneymetro.info/station/barangaroo-station>.

Thank you for your patience while we complete this essential work

If you are affected by our construction, and have any questions or complaints, please contact the BESIX Watpac Community Engagement Team on **1800 171 386** (24-hour community information line) or email barangaroometrostation@transport.nsw.gov.au. You can subscribe to receive this monthly notification and weekly updates by email at: www.sydneymetro.info/station/barangaroo-station



1800 171 386 Community information line open 24 hours



sydneymetro@transport.nsw.gov.au



Sydney Metro City & Southwest, PO Box K659, Haymarket NSW 1240



If you need an interpreter, contact TIS National on **131 450** and ask them to call **1800 171 386**