

Planning Approval Consistency Assessment Form

SM ES-FT-414

Sydney Metro Integrated Management System (IMS)

Assessment Name:	Staged opening of the southern station entry at Barangaroo Station and extended use of the Water Treatment Plant
Prepared by:	Sydney Metro
Prepared for:	Sydney Metro
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1. Existing Approved Project

Planning approval reference details (Application/Document No. (including modifications)):

SSI 15_7400 Sydney Metro City & Southwest – Chatswood to Sydenham
 Modification 1 Victoria Cross Station, Artarmon Substation and minor administrative mod
 Modification 2 Central Walk mod
 Modification 3 Martin Place Station mod
 Modification 4 Sydenham Station and Sydney Metro Trains Facility South mod
 Modification 5 Blues Acoustic Shed
 Modification 6 Administrative Changes
 Modification 7 Administrative Changes
 Modification 8 Blues Point Access Site
 Modification 9 Extension to standard construction hours

Date of determination:	Infrastructure Approval date – 09 January 2017 Modification 1 Approval date – 18 October 2017 Modification 4 Approval date – 13 December 2017 Modification 2 Approval date – 21 December 2017 Modification 3 Approval date – 22 March 2018 Modification 5 Approval date – 02 November 2018 Modification 6 Approval date – 21 February 2019 Modification 7 Approval date – 29 June 2020 Modification 8 Approval date – 25 November 2020 Modification 9 Approval date – 30 June 2022	Type of planning approval:	Critical State Significant Infrastructure
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Relevant background information (including EA, REF, Submissions Report, Director General’s Report, MCoA):

Chatswood to Sydenham Environmental Impact Statement, May 2016
 Chatswood to Sydenham Submissions and Preferred Infrastructure Report, October 2016
 Chatswood to Sydenham Conditions of Approval, 9 January 2017, as modified.
 Modifications 1-9 Modification Reports and Submission Reports

Relevant background information also includes:

- Consistency Assessment Barangaroo Temporary Additional Land (TfNSW 23 Approved 11 October 2017)
- Consistency Assessment Barangaroo Additional Land (TfNSW 25 Approved 27 June 2018)
- Consistency Assessment Barangaroo Extension of Use of Additional Land (TfNSW 40 Approved 21 August 2020)
- Consistency Assessment Barangaroo Extension of Use of Additional Land (TfNSW 45 Approved 1 February 2021)
- Consistency Assessment Barangaroo Extension of Use of Additional Land (TfNSW 53 Approved 18 August 2021)
- Consistency Assessment Barangaroo Extension of Use of Additional Land (TfNSW 59 Approved 22 June 2022)
- Consistency Assessment Barangaroo Extension of Use of Additional Land (TfNSW 67 Approved 21 December 2022)
- Consistency Assessment Barangaroo Extension of Use of Additional Land (TfNSW 67 Revision 2 Approved 18 April 2023)

All proposed works identified in this assessment would be undertaken in accordance with the mitigation measures identified in the EIS, SPIR, SR, Modifications 1-9 and Conditions of Approval.

Description of existing approved project you are assessing for consistency:

The Approved Project involves a new metro rail line, approximately 16 kilometres long, between Chatswood and Sydenham. New metro stations will be provided at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo, as well as new underground metro platforms provided at Central Station.

Barangaroo Station is located beneath Hickson Road towards its northern end. The station entries are within Central Barangaroo and Barangaroo Reserve, with the southern station entry to be integrated within a future development within Central Barangaroo. The future development is located on Infrastructure NSW (INSW) land.

The station shaft and cavern of Barangaroo Station is designed as a ‘tanked’ structure, which inhibits the inflow of groundwater. The ‘tanked’ approach to all elements of the station at Barangaroo has been adopted to isolate the station from the surrounding groundwater environment and minimises the potential for contaminated groundwater inflow. Concrete lining and waterproofing membrane are typically used for this.

During construction, collected groundwater (and other tunnel water) is being treated at temporary water treatment plants at tunnel boring machine support sites (Chatswood, **Barangaroo** and Marrickville dive sites) as assessed in Section 17.4.4 of the EIS. At the end of the construction phase, the contractor would demobilise all construction equipment from the construction sites.

2. Description of proposed change which is the subject of this assessment

This Consistency Assessment has been prepared to assess the staged opening of the southern station entry at Barangaroo Station and management of the groundwater ingress until construction of the southern entrance as part of the future adjacent Central Barangaroo development can commence.

Since the project approval the delivery for the adjacent Central Barangaroo development, within which the station's underground southern station entry was designed to be integrated, is delayed. Therefore the southern subterranean station entry cannot be opened when operations of the metro line commence. Sydney Metro have completed all the works needed for the southern station entry without the adjacent development. There are no further construction activities required under the Approved Project and the tie-in activities and works to integrate the station entry with the development will be undertaken by the developer of Central Barangaroo in accordance with their planning approval.

Currently Barangaroo Station has a temporary piled wall at the property boundary, with a structural impact hoarding installed in front to facilitate construction of the future development during Station operation. To manage the ingress at this location, a groundwater equalisation (depressurisation) system has been in place since the Tunnels and Stations Excavation Contractor stage of works. Water is collected in a bunded containment at B3 level, drains into a sump and is pumped to a nearby temporary Water Treatment Plant (WTP), and treated water is discharged to the adjacent Sydney Harbour at Nawi Cove.

The WTP is located on a 35m x 12m slab foundation, on the surface near the entry of the future southern station entry, on the inside of the Sydney Harbour foreshore at Nawi Cove to the west and north. The WTP is located within Infrastructure NSW (INSW) land for a future harbour park development, with construction hoarding around the INSW development area.

Construction

The indicative scope of works that are required to facilitate the extended use of the WTP and the staged delivery of the southern station entry are as follows:

- Additional hoarding would be installed around the WTP on the surface to address visual amenity impacts and to ensure safety and security
- Additional area would be required within the WTP hoarding for vehicle access and movements and chemical and waste management.

Operation

Groundwater ingress at the temporary piled wall would continue until the southern station entry and development can be completed and therefore requires continued management through the extended use of the WTP. The southern station entrance would not be available when the metro line commences operations however would be provided upon completion of the adjacent development. In the interim, day one operation pedestrian access would be provided via a northern station entry from within Barangaroo Reserve.

As per the approved project, demobilisation of the WTP would be required. However, the timeframe for demobilisation of the WTP would be delayed and would occur during Station operation when the southern entrance works commence. The demobilisation works is subject to consultation with INSW.

A comparison of the Approved Project against the proposed works is provided in Table 1.

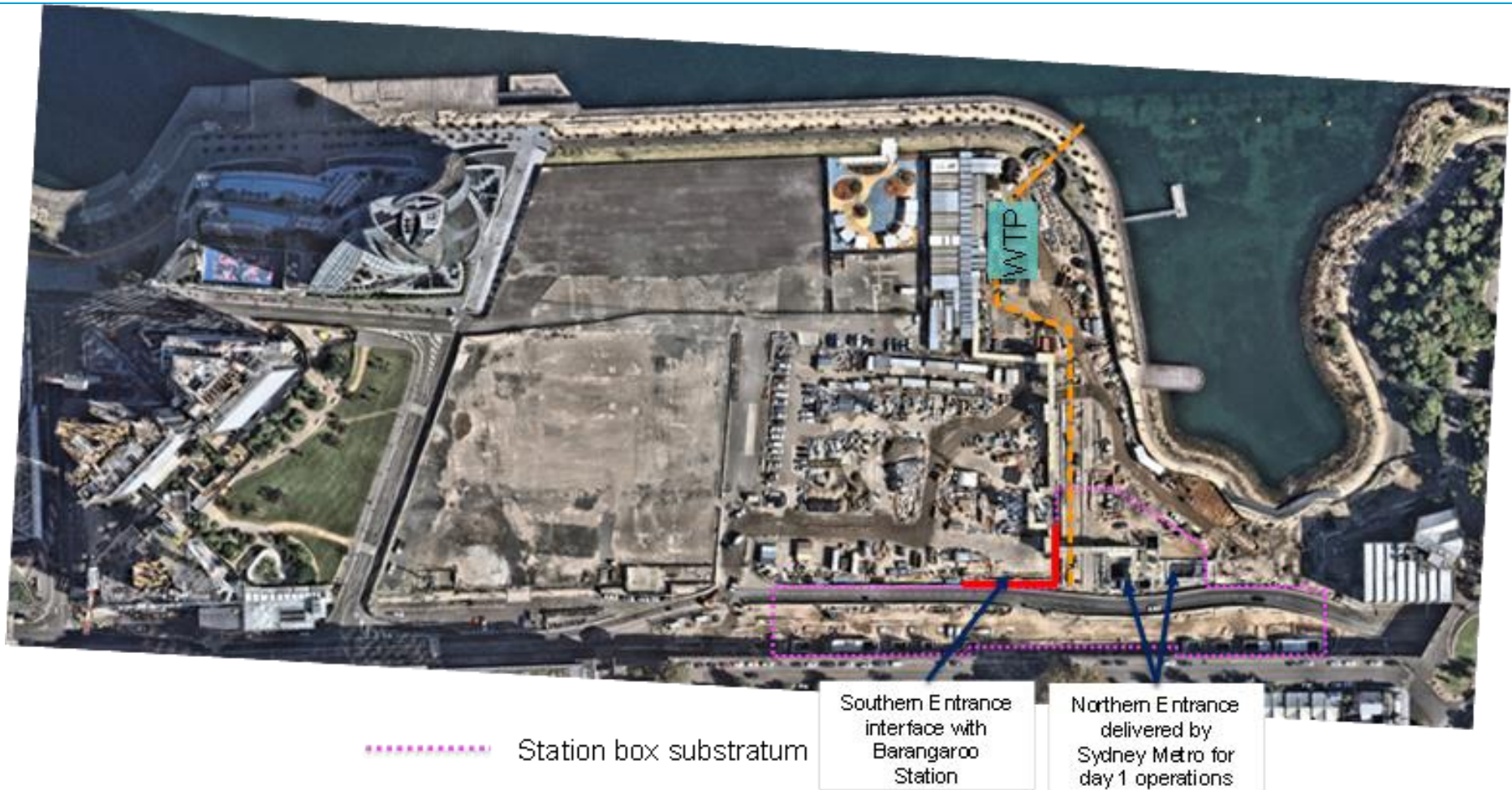


Figure 1 – Location of the WTP (blue) and associated pipe work (orange), in relation to the station box (purple outline) and southern entrance wall at B3 (red)

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Table 1 - Comparison of the proposal with relevant elements of the Approved Project

Relevant elements of the Approved Project	Proposed change
<p>‘Tanked’ shaft design Barangaroo Station would be ‘tanked’ to isolate the station from the surrounding groundwater environment.</p>	<p>Barangaroo Station cannot be fully ‘tanked’ until the station entry has been integrated with the future development. The proposed change is to deliver the approved tanked approach through a short-term solution, extended use of managing water ingress through the temporary WTP.</p>
<p>Barangaroo southern entrance The southern subterranean station entry at Barangaroo Station would be integrated within a future development at Central Barangaroo.</p>	<p>As the Central Barangaroo development construction has not commenced, the southern subterranean entrance to the station would not be available when the metro line commences operations. The southern station entry would still be provided upon completion of the adjacent development, however the timeframe for the delivery of this station entry has changed.</p>
<p>Water Treatment Plant Section 17.4.4 of the EIS identifies that during construction, collected groundwater (and other tunnel water) would be treated at temporary water treatment plants at tunnel boring machine support sites (Chatswood, Barangaroo and Marrickville dive sites).</p>	<p>The groundwater ingress management arrangements including the WTP are required to be in use until construction of the southern entrance commences and the temporary wall can be replaced, resolving the water ingress issue.</p>

3. Timeframe

Minor construction elements (hoarding, traffic and waste management) would occur during the construction phase of the Approved Project.

The proposed WTP would remain in operation to manage water ingress prior to commencement of operations in 2024 and would continue to operate until the southern entrance to the station is delivered.

Due to the delay to the adjacent Central Barangaroo Development, which is subject to a separate planning approval and not managed by Sydney Metro, the timing of the southern entrance works is beyond the indicative timeframe for station construction as identified in the EIS. The southern station entry would still be provided upon completion of the adjacent development.

4. Site description

Barangaroo Station site is located on Hickson Road, south of Munn Street. The WTP which is proposed to be kept in operation past the end of station construction works, is located to the west of the northern entrance to Barangaroo Station, closer to the harbour, west of Hickson Road, within Barangaroo South precinct. The WTP is located outside of station precinct and within NSW land.

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To the north of the proposed site is Barangaroo Reserve and Walsh Bay. To the south is the Central Barangaroo precinct, Barangaroo South, King Street Wharf, and the Cockle Bay and Darling Harbour precinct.

The nearest residential premises are located to the east, above the Hickson Road wall, along High Street and High Lane, and to the north along Argyle Place.

The WTP and Barangaroo station including southern entrance are located near to but not within the State heritage listed Millers Point Heritage Conservation Area and the Millers Point & Dawes Point Village Precinct Heritage Conservation Area. Hickson Road cutting heritage wall forms the eastern boundary of the Barangaroo station site. The Hickson Road cutting and retaining wall is a contributory element of the State heritage listed Millers Point & Dawes Point Village Precinct and the similarly located listed Conservation Area 35 (Sydney LEP), which is located near to the site.

Sydney Harbour including Nawi Cove is located to the west and north of the site.

Currently Barangaroo Station has a temporary piled wall at the B3 level at the property boundary southern entrance, with a structural impact hoarding installed in front to facilitate construction of the future development whilst the station is operational. The Central Barangaroo development would be to the west of the station, with direct access into the B3 level concourse via the future integrated southern entrance.



Figure 2 WTP discharge location at Nawi Cove

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5. Site Environmental Characteristics

The site for the proposed work is currently hardstand and does not contain vegetation or habitat suitable for protected species.

Barangaroo Station is located adjacent to a declared remediation site under the *Contaminated Land Management 1997*. Accordingly, the EIS describes that all elements of the station excavation and cavern would be tanked to isolate the station from the surrounding groundwater environment and limit ingress of contaminants onto the site. A [Site Audit Report](#) and Statement (2021) have been produced for the extent of the station box, which concluded “*that the site is suitable for the proposed underground train station*”.

Groundwater at and around the site is expected to be tidally influenced, but generally flow towards the west or north-west and discharge into the nearby Nawi Cove and Sydney Harbour. Based on the information provided in EIS Technical Paper 8, contaminated soils were considered not to contribute towards groundwater contamination. According to the Site Audit Report as for the Barangaroo Station box excavation (2021), the depth to groundwater in the monitoring wells was recorded between 1.45 mbgl to 2.75 mbgl. Field records of groundwater parameters recorded during sampling indicated that the pH was 5.87 to 7.33, dissolved oxygen (DO) was 0.35 to 3.32 mg/L, redox was -30 to 100 mV, and electrical conductivity (EC) was 970 to 43,700 $\mu\text{S}/\text{cm}$. Two primary sources of groundwater contamination which were identified as potential influences of the quality of water draining into the station excavation were the former gasworks located to the south of the site and reclaimed lands to the immediate west of the site. The main contaminants of concern include TRH, BTEX, ammonia, total organic carbon (TOC), PAHs, phenol, cyanide, and selected metals. It was not established if the low-level PAH groundwater contamination, majority of which were detected within the deeper sandstone aquifer, is from the gasworks or from an alternative source such as a former vehicle wash bay.

Recent groundwater quality data obtained in the quarterly water quality monitoring results for Q3 2023 (as per CoA E107) at level B3 indicated that groundwater prior to water treatment had minor exceedances for discharge criteria, hence the requirement to treat the groundwater through the WTP prior to discharge. In circumstances where there have been exceedances in the treated water for a small number of analytes, these would continue to be managed under CoA E107 and Sydney Metro Environmental Incident and Non-compliance Reporting Procedure.

The waters of Sydney Harbour and Nawi Cove are adjacent to the site in the north and west. The distance from the WTP to the harbour is approximately 50m to the west and north. To the south, the surrounding land uses are currently construction zones, and associated laydown and ancillary facilities for the Barangaroo Central Development. Residential properties are not directly adjacent to the site but are located on High Street to the east of the construction site, and along Hickson Road and Towns Place to the north.

Hickson Road cutting heritage wall forms the eastern boundary of the Barangaroo station site. Hickson Road was constructed in the early twentieth century and holds social significance as it is the only remaining significant feature of the ‘Hungry Mile’ that forms part of the Millers Point and Dawes Point Village Precinct. South of the High Street stairs, there are mixture of contemporary and heritage buildings which align with the line of the wall, addressing the road with a mix of commercial, offices and service entries. In this area, there is a second staircase, providing access to the upper levels of the peninsula along Kent Street.

There are no recorded Aboriginal sites located within 100 meters of Barangaroo station construction site, with the closest sites located 300 meters to the north and east.

6. Justification for the proposed change

An integrated station entry between Barangaroo Station and the future proposed Central Barangaroo development (known as the southern station entry) was proposed and approved as per the Approved Project. This southern station entry would ensure Barangaroo Station is a ‘fully tanked’ station. However, as a result of project delays for the Central Barangaroo development, the southern station entry would not be delivered until the completion of the Central Barangaroo development. To manage this, Sydney Metro have constructed a temporary shoring wall (not-waterproofed) at the location of the future integrated station entry at B3 level of the Barangaroo Station.

During wet weather events when rainfall recharge to groundwater increases, the water table rises behind the perimeter walls of the Barangaroo station box. Some stormwater also drains downward behind the perimeter walls. Under such conditions Barangaroo Station has experienced sustained periods of infiltration/leakage at or around the location of the temporary shoring wall. This causes groundwater ingress into the station through the temporary shoring wall. The treatment of this groundwater through the construction Water Treatment Plant (WTP) would ensure compliance with CSSI 7400 CoA E107 and *Protection of the Environment Operations Act 1997*. Additionally, the pumping of groundwater ingress to the WTP would also reduce potential flooding to the station.

The proposed change involves the extended use of the construction WTP to manage this groundwater ingress. This would be a short-term solution until the excavation and associated ‘tie-in’ construction works for the adjacent Central Barangaroo development is completed, creating the southern station entry with Sydney Metro’s Barangaroo Station (this subject to separate planning approvals (SSD-46922214) which has not yet been approved). Once this is completed, the groundwater ingress into Barangaroo Station would no longer occur.

Alternative options considered

The following are the other options considered and the outcome of the evaluation of each:

Dewatering Options Considered	Option evaluation outcomes
1. Connect to tunnel drainage	The tunnel drainage system is not designed to accommodate this flow and the sump system and fire performance system would be impacted. This option would require significant redesign of impacted systems and modifications to operating contract.
2. New water treatment plant	Requires additional land on surface which is not available. Infrastructure NSW (INSW) consulted and have not supported this option.
3. Discharge to Sydney Water sewer	Option not pursued due to concerns raised by Sydney Water related to water quality exceedances in the groundwater.
4. Offsite disposal	Logistically not viable due to the volume of water
5. Waterproof hoarding from inside station construction	Not technically feasible due to structural design

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6. Temporary waterproofing wall construction

The construction of the temporary waterproofed wall solution would represent poor value for money and construction works could pose potential risks to the safe operation of Barangaroo station

The proposed change is preferred, as the investigations into other options have concluded that they are not viable for either technical, logistical, commercial reasons and/or have not been supported by the approving stakeholders. Collection, treatment and discharge of the groundwater ingress at the B3 level of Barangaroo Station is the only viable option to prevent water damage to the station, impacts to safe operations, and pollution caused by any untreated discharge and ensure compliance with CSSI 7400 CoA E107.

7. Environmental Benefit

The extended use of the WTP provides a short-term solution to prevent water damage to the station, impacts to safe operations, ongoing management of potential poor quality groundwater until the southern entrance works can commence.

8. Control Measures

Will a project and site specific EMP be prepared?	<input type="checkbox"/> Yes	Are appropriate control measures already identified in an existing EMP?	<input checked="" type="checkbox"/> Yes – All management plans can be found on the contractor’s website: Barangaroo Station - BESIX Watpac
	<input checked="" type="checkbox"/> No		<input type="checkbox"/> No

9. Conditions of Approval / Environmental mitigation measures

Will the proposal be consistent with the conditions of approval?	<input checked="" type="checkbox"/> Yes
	<input type="checkbox"/> No
Relevant Conditions of Approval	B1, B5, E5, E36, E41, E44, E65, E67-E68, E80, E99, E107
Relevant Environmental Mitigation Measures	LV1, LV4, LV6, NV1, T13, SCW3,SCW4, AQ1 – AQ4, AQ6, AQ7, WM1, WM4

10. Impact Assessment – Construction

The construction impact assessment refers to the works that are required to facilitate the extended use of the WTP and the staged delivery of the southern station entry.

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	No change from Approved Project.	No additional measures required.	Y	Y	
Water	No change from Approved Project.	No additional measures required.	Y	Y	
Soils and contamination	No change from Approved Project.	No additional measures required.	Y	Y	
Air quality	No change from Approved Project.	No additional measures required.	Y	Y	
Noise and vibration	No change from Approved Project.	No additional measures required.	Y	Y	
Aboriginal heritage	The proposed works would not impact Aboriginal heritage. Technical Paper 5 in the EIS states no recorded Aboriginal sites are located within 100 meters of the station, with the closest sites located 300 meters to the north and east. A search of the Aboriginal Heritage Information Management System (AHIMS) on 26 September 2023 confirmed there are no recorded Aboriginal sites in the proposal area (See Appendix B). Additional ground disturbance is not required.	No additional measures required.	Y	Y	
Non-Aboriginal heritage	Extended use of Water Treatment Plant The EIS identifies the following heritage items in the vicinity of the proposal: <ul style="list-style-type: none"> • Millers Point & Dawes Point Village Precinct – State Heritage Register (SHR) listed • The Hickson Road cutting and retaining wall – contributory element to the SHR listed Millers Point & Dawes Point 	No additional measures required.	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>Village Precinct and the similarly locally listed Conservation Area 35 (Sydney LEP)</p> <ul style="list-style-type: none"> • The Palisade Fence and High Steps – LEP listed • Bridges Over Hickson Road – LEP listed • Millers Point Conservation Area – SHR and LEP listed • Terrace Duplexes Hight Street Millers Point – SHR and LEP listed • Warehouses/Dalgety’s Bond Store group – SHR listed <p>Any heritage impacts during construction would be consistent and managed under the Approved Project.</p> <p>Hoarding would be installed around the WTP to minimise the visual impact of the proposed extended use of the WTP. Where required, the design of the hoarding would be consistent with the Heritage Interpretation Plan for Barangaroo Station.</p> <p>No additional excavation is proposed as part of the proposal. The proposal would not impact archaeology.</p>				
Community and socio-economic	<p>Extended use of Water Treatment Plant</p> <p>Any community impacts during construction would be consistent and managed under the Approved Project. The <i>City and Southwest Overarching Community Communications Strategy</i> would be</p>	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	implemented for community consultation in relation to the extended timeframe for the operations of the WTP. Any impacts would be consistent with the Approved Project.				
Traffic and transport	Extended use of Water Treatment Plant Additional area within the site hoarding for the WTP would be required for vehicle access and movements. The <i>Construction Traffic Management Framework - City & Southwest Chatswood to Sydenham Contracts</i> would be implemented. The vehicle numbers would be consistent with the anticipated EIS numbers. Any waste material that is required to be removed from site would be done so in line with waste classification and use existing haulage routes.	No additional measures required.	Y	Y	
Waste and resource management	Extended use of Water Treatment Plant Additional area within the site hoarding for the WTP would be required for chemical and waste management. The waste material from operation of the WTP would be managed in accordance with REMM WM1. This includes filter cake and used chemical containers. This would be consistent and managed under the Approved Project.	No additional measures required.	Y	Y	
Visual	Extended use of Water Treatment Plant The proposed works would result in an extension of minor impact on the visual amenity of	No additional measures required.	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project CoA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>Barangaroo Reserve and the foreshore areas that is currently associated with the Approved Project. To mitigate this, hoarding would be installed around the WTP, consistent with REMM LV6. This would be consistent with the impacts as assessed for the Approved Project, although would occur over a longer duration.</p> <p>Staged opening of the southern station entry Currently Barangaroo Station has a temporary piled wall at the property boundary, with a structural impact hoarding installed in front to facilitate construction of the future development during station operation. These impacts are short-term only and are consistent with the Approved Project.</p>				
Land use and property	<p>Extended use of Water Treatment Plant The WTP as identified in this consistency assessment, is on Infrastructure NSW (INSW) land. Sydney Metro would continue to consult with INSW for use of this land and comply with their requirements and any associated permits.</p>	No additional measures required.	Y	Y	
Hazard and risk	Approved Project.	No additional measures required.	Y	Y	
Other	Approved Project.	No additional measures required.	Y	Y	

11. Impact Assessment – Operation

The operation impact assessment refers to any impacts associated with the extended use of the WTP and the staged delivery of the southern station entry throughout operation of Barangaroo Station, until the construction of the southern entrance as part of the future adjacent Central Barangaroo development can commence. Sydney Metro have completed all the works needed for the southern station entry without the adjacent development. There are no further construction activities required throughout operation under the Approved Project. The tie-in activities and works to integrate the station entry with the development will be undertaken by the developer of Central Barangaroo in accordance with their planning approval.

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	No change from Approved Project.	No additional measures required.	Y	Y	
Water	<p>Extended use of Water Treatment Plant</p> <p>When Sydney Metro operations commence at Barangaroo Station, the proposed infiltration management solutions including the WTP are required to be in place to collect water ingress at the station B3 level southern entrance location and discharge treated water to Nawi Cove until the construction of the southern entrance as part of the future adjacent Central Barangaroo development can commence and the temporary wall can be replaced, resolving the water ingress issue.</p> <p>Groundwater ingress at B3 southern entrance location would be collected in a sump and pumped to the WTP on the surface. The water would be treated prior to discharge and CoA E107 would be complied with, including the implementation of a Water Discharge Impact Assessment.</p> <p>The impacts would be consistent with the construction activities as assessed for the Approved Project, although would occur for a short-term period during operation of Barangaroo Station.</p>	No additional measures required.	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>In an emergency overflow scenario, and in the event that the sump/pipes fail and groundwater collects in the stormwater sump at B6, there is small potential for interaction between surface water collected in the station and groundwater. To manage this, a three-way valve at the surface will switch and stop pumping water collected at the B6 sump to the stormwater network and divert to the water treatment plant.</p> <p>The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p> <p>Staged opening of the southern station entry No change from Approved Project.</p>				
Soils and contamination	<p>Extended use of Water Treatment Plant Section 2.10.3 of EIS Technical Paper 8 identified that seepage water into below ground basements within the southern portion of the Barangaroo Central Development Area (to the south of the construction footprint) may pose a vapour risk which could impact upon future site users. It was considered that groundwater in proximity of the southern basement requires either remediation to reduce levels of a range of potentially volatile chemicals of potential concern, or basement design to prevent infiltration of adjoining groundwater into the accessible areas of the basement.</p> <p>Mitigation Measures in section 4 Technical Paper 8 noted that in the event a Remediation Action Plan is required, these would be developed in accordance</p>	No additional measures required.	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>with Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998) and a site auditor would be engaged.</p> <p>A Site Audit Report for the Barangaroo Station box excavation (2021) identified that the site is suitable for the proposed station development from a groundwater contamination risk perspective. It noted that any changes to water ingress potential at the connection to the Central Barangaroo Development or the ventilation system could change the risk from contamination at the site. Given the change in approach/timing for final waterproofing of the station box structure, and ongoing contaminated groundwater ingress, the Site Audit Statement (2021) recommends reviewing the impact on risk from contamination to manage any potentially unacceptable risks. As such, contamination specialists would review the need to prepare an update to the Vapour Intrusion Assessment Report (Metron, 2021) and the Site Audit Statement would be updated accordingly.</p> <p>Mitigation measures to ensure compliance with CoA E67 and E68 would continue to be implemented, consistent with the EIS commitment for groundwater migration and contamination risks to be addressed by design and managed during construction.</p> <p>The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p>				

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Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	Staged opening of the southern station entry No change from Approved Project.				
Air quality	No change from Approved Project.	No additional measures required.	Y	Y	
Noise and vibration	<p>Extended use of Water Treatment Plant Noise monitoring has been conducted during operation of the WTP at its previous location, which was closer to residential receivers, and determined that it was inaudible at the closest receiver on High Street (Renzo Tonin, 23 January 2023). The measured levels at two residential receivers on High Street were estimated to be below the night-time NML of 45dB(A). Therefore, the noise and vibration impacts would be consistent with the impacts assessed for the Approved Project, although would occur over a longer duration. The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p> <p>Staged opening of the southern station entry No change from Approved Project.</p>	No additional measures required.	Y	Y	
Aboriginal heritage	The proposed works would not impact Aboriginal heritage, as assessed within the construction impact assessment table. See Appendix B for the AHIMS Search results.	No additional measures required.	Y	Y	
Non-Aboriginal heritage	<p>Extended use of Water Treatment Plant There would be continued minor impacts to views and vistas between the harbour and foreshore and</p>	No additional measures required.	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>the Hickson Road heritage wall as a result of proposed water ingress management arrangements. The impacts would be consistent with the assessment within the Approved Project, although would occur over a longer duration.</p> <p>Overall, the proposed extended use of the WTP would not directly impact heritage items in the vicinity of the proposal. The impact to the setting, views or vistas is consistent with the impact assessed for the Approved Project. The proposed works are therefore consistent with the Approved Project.</p> <p>The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p> <p>Staged opening of the southern station entry No change from Approved Project.</p>				
Community and socio-economic	<p>Extended use of Water Treatment Plant</p> <p>There is potential for ongoing minor impacts during the extended use of the WTP. Any impacts would be short-term only and would be consistent with the Approved Project, although would occur over a longer duration.</p> <p>The <i>City and Southwest Overarching Community Communications Strategy</i> would be implemented for community consultation in relation to the extended timeframe for the operations of the WTP. The operational impacts and benefits would be consistent with those assessed for the Approved</p>	No additional measures required.	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>Project once the southern entrance construction commences.</p> <p>Staged opening of the southern station entry The delivery is delayed for the adjacent Central Barangaroo development (subject to a separate planning approval) within which the southern station entry was designed to be integrated.</p> <p>The full scope of works at Barangaroo Station, would not be delivered for day one operations of the metro line and would be delivered once the southern entrance construction can commence. This remains consistent with the Approved Project as it was identified that the southern station entry would be integrated within future development within Central Barangaroo.</p> <p>Relevant mitigation measures and Conditions of Approval for the project would continue to apply to minimise any community and socio-economic impacts.</p> <p>The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p>				
Traffic and transport	<p>Extended use of Water Treatment Plant</p> <p>The anticipated vehicle numbers (heavy and light vehicles) at the Barangaroo Station construction site over a typical day are provided in Figure 8-30 of the EIS. The EIS anticipates up to 10 light vehicles per hour (6:00am to 7:00am and 10:00am to 4:00pm) and up to 24 heavy vehicles per hour (10:00am to 3:00pm).</p>	No additional measures required.	Y	Y	

(Uncontrolled when printed)

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>Vehicle movements would be required for the delivery of chemical containers used in the treatment process, as well as filter cake waste removal and maintenance access.</p> <p>The <i>Construction Traffic Management Framework - City & Southwest Chatswood to Sydenham Contracts</i> would be implemented.</p> <p>The vehicle numbers would be consistent with the anticipated EIS numbers. Any waste material that is required to be removed from site would be done so in line with waste classification and use existing haulage routes.</p> <p>Staged opening of the southern station entry Prior to the completion of the Central Barangaroo Development, day one interim operation pedestrian access would be provided via a northern station entry from within Barangaroo Reserve. The completion of the adjacent future development, Central Barangaroo, would allow for a future southern station entry, provided from within that development.</p> <p>The use of the northern station entry would provide suitable access to the station to meet the expected patronage. The future delivery of the southern entrance would be consistent with the Approved Project, as it would provide access to the adjacent development upon completion. The Sydney Metro Barangaroo Interchange Access Plan details analysis of levels of access and service for all users including pedestrians. Pedestrian modelling has</p>				

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	been assessed to 2036 and is of an acceptable level of service.				
Waste and resource management	<p>Extended use of Water Treatment Plant The waste material from operation of the WTP would be managed in accordance with REMM WM1. This includes filter cake and used chemical containers.</p> <p>There would be short-term impacts whilst operation commences until the water ingress is no longer occurring due to commencement of the southern entrance works.</p> <p>The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p> <p>Staged opening of the southern station entry No change from Approved Project.</p>	No additional measures required.	Y	Y	
Visual and urban design	<p>Extended use of Water Treatment Plant The proposed water ingress management arrangements would result in an extension of minor impact on the visual amenity of Barangaroo Reserve and the foreshore areas that is currently associated with the Approved Project.</p> <p>However, this would be short-term only and would be consistent with the Approved Project.</p> <p>The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p>	No additional measures required.	Y	Y	

(Uncontrolled when printed)

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>Staged opening of the southern station entry</p> <p>The future delivery of the southern entrance would be consistent with the Approved Project, as it would provide access to the adjacent development upon completion. There are short-term visual impacts from hoarding as a result, this is consistent with the Approved Project however over a longer duration. Relevant mitigation measures and Conditions of Approval for the project would continue to apply to minimise visual impacts.</p> <p>The full operational visual and urban design benefits, including the delivery of the southern station entry, would be delivered upon completion of the adjacent development works and would be consistent with the Approved Project.</p>				
Land use and property	<p>Extended use of Water Treatment Plant</p> <p>The WTP as identified in this consistency assessment, is on Infrastructure NSW (INSW) land. Sydney Metro would consult with INSW for use of this land and comply with their requirements and any associated permits.</p> <p>Staged opening of the southern station entry</p> <p>The southern station entry would be delivered as part of the future adjacent Central Barangaroo development. This is consistent with the Approved Project.</p>	No additional measures required.	Y	Y	
Hazard and risk	<p>Extended use of Water Treatment Plant</p> <p>The proposal consists of extending operation of the station depressurisation system and the WTP which</p>	No additional measures required.	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	<p>has been used through the station construction phase.</p> <p>There would be short-term impacts whilst operation of Barangaroo Station commences until the water ingress is no longer occurring as the southern entrance construction commences.</p> <p>Water quality monitoring and treatment was identified within Section 18.4.2 of the EIS. As a result, the water quality monitoring program checks the quality of water which is being discharged from the WTP, and within the receiving waters of Sydney harbour to ensure compliance with CoA E107 and mitigation measure SCW4.</p> <p>Additional mitigation to address bund overflow risks to station operations would be implemented consisting of a secondary overflow bund behind hoarding which is covering the rock face and containing the ingress, with a waterproofed membrane, an overflow pump, permanent power via station local distribution board. A gravity piped overflow route to a level B6 stormwater sump would also be pumped to the WTP.</p> <p>Maintenance of the depressurisation system would continue through operations, involving inspections of sump and pumps and regular cleaning.</p> <p>The operational impacts would be consistent with those assessed for the Approved Project once the southern entrance works are delivered.</p>				

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Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed change, relative to the relevant impact in the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Consistent Impact Y/N	Endorsed	
				Y/N	Comments
	Staged opening of the southern station entry No change from Approved Project.				
Other	No change from Approved Project.	No additional measures required.	Y	Y	

12. Consistency with the Approved Project

Question	Consider the following:
Is the project (including the proposed changes) consistent with the conditions of approval?	Yes. The proposed works would be consistent with the Conditions of Approval.
Is the project (including the proposed changes) consistent with the objectives and functions of elements of the Approved Project?	Yes. The project would continue to deliver an integration station entry with a future development at Barangaroo, albeit after opening of the metro line, and the station would continue to be ‘tanked’ to be consistent with the objectives and functions of the Approved Project.
Are the environmental impacts of the proposed change consistent with the impacts of the Approved Project?	Yes. The impacts of the proposed change are consistent with the impacts of the Approved Project.
Are there any new environmental impacts as a result of the proposed works/project changes?	The proposed works would not result in any new environmental impacts beyond those considered in the Approved Project. All impacts identified for the proposed change would be adequately mitigated through the application of the mitigation measures in the above impact assessment tables and mitigation measures provided in the EIS, Submissions Report and Conditions of Approval.
Are the impacts of the proposed activity/works known and understood?	Yes. The impacts of the proposed works are understood and would be accounted for by implementing the control measures within this document, and relevant environmental management plans, found on the Principal Contractor’s website: Barangaroo Station - BESIX Watpac .
Are the impacts of the proposed activity/works able to be managed so as not to have an adverse impact?	Yes. The impacts of the proposed works can be managed so as to avoid an adverse impact.
Is the proposed change/s consistent with the approval (having regard to the above assessment)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

13. Other Environmental Approvals

Identify all other approvals required for the proposed works:	N/A
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14. Recommendation

Based on the above impact assessment, and with reference to the Sydney Metro Chatswood to Sydenham Environmental Impact Statement (May 2016), Submissions and Preferred Infrastructure Report (October 2016) and the Conditions of Approval, it is recommended that:

Tick relevant box	
The proposed change has negligible or more than negligible impacts on the environment or community however is consistent with the Approval, including the conditions of approval. The proposed impacts are consistent with those assessed for the Approved Project (i.e., does not trigger a change to the conditions of approval).	✓
The proposed change is not consistent with the Approved Project including the conditions of approval and would be subject to a separate modification application.	
The proposed change is not substantially the same as the Approved Project and is considered a radical transformation. A new planning pathway should be considered.	

Author certification

I certify that to the best of my knowledge this Consistency Checklist:

- Examines and takes into account the fullest extent possible all matters affecting or likely to affect the environment as a result of activities associated with the proposed change; and
- Examines the consistency of the proposed change with the Approved Project; is accurate in all material respects and does not omit any material information.

Name:	Isabella Caruso / Julia Diamond	Signature:	<i>Isabella Caruso</i>
Title:	Planning Approval Officer/ A/Environment Manager		
Company:	Sydney Metro	Date:	7 November 2023

Environmental Representative Review

As an approved ER for the Sydney Metro City & Southwest (Chatswood to Sydenham) project, I have reviewed the information provided in this assessment. I am satisfied that mitigation measures are adequate to minimise the impact of the proposed work.

Name:	Jo Heltborg	Signature:	<i>J. Heltborg</i>
Title:	Environmental Representative *	Date:	9 November 2023

Assessment Supporting Signature

Application supported and submitted by

Name:	Yvette Buchli	Date:	9/11/2023
Title:	Director Planning Approvals	Comments:	
Signature:	<i>Yvette Buchli</i>		

*ER Comments: The ER has not considered consistency of the proposed change.

ER endorsement is based on the information that has been provided for review. The ER has not been involved in the discussion or assessment of alternative options. ER endorsement assumes that commitments made within the CA for the future tanking of the station box, and measures to ensure compliance with CoA E69 will be implemented.

Assessment Endorsement

Based on the above assessment, are the impacts and scope of the proposed change consistent with the existing Approved Project?

Yes The proposed change is consistent with the Approved Project and no further assessment is required.

No The proposed change is not consistent with the Approved Project.

A modification or a new activity approval/ consent is required. Advise Senior Project Manager of appropriate alternative planning approvals pathway to be undertaken.

Endorsed by			
Name:	Fil Cerone	Date:	10 November 2023
Title:	Director City & Southwest, Environment, Sustainability and Planning	Comments:	
Signature:			

Appendix A – Barangaroo Metro Station – Water Treatment Plant Noise Monitoring Report

23 January 2023

TM031-05F04 WTP Noise Monitoring Report (r1)

BESIX Watpac

Level 24, 44 Market Street Sydney NSW 2000

Barangaroo Metro Station - Water Treatment Plant Noise Monitoring Report

1 Introduction

Renzo Tonin & Associates was engaged by BESIX Watpac to conduct noise monitoring during the operation of the water treatment plant at Barangaroo. The noise monitoring was undertaken to assess the water treatment plant against the noise management level specified in the Noise and Vibration Management Plan (NVMP)¹ and Station CNVIS².

2 Details of monitoring

2.1 Measurement location

Noise monitoring was undertaken at Barangaroo during the operation of the water treatment plant on 17th January 2023 approximately from 10:05pm to 10:43pm. The measurement locations are listed in Table 2-1. Figure depicting the monitoring locations is included in Appendix A.1.

Table 2-1: Measurement locations

Assessment Point	Date	Time	Measured plant	Measured distance
22 High Street, Millers Point (Appendix A.2)	17.01.2023	10:05pm – 10:20pm	Water Treatment Plant	65 metres away
20 High Street, Millers Point (Appendix A.3)	17.01.2023	10:23pm – 10:38pm	Water Treatment Plant	65 metres away
High street - opposite to 20 High Street, Millers Point (Appendix A.4)	17.01.2023	10:41pm – 10:43pm	Water Treatment Plant	50 metres away

¹ BESIX Watpac, Barangaroo Metro Station, Noise and Vibration Management Plan, dated 30 September 2022, revision 10

² BESIX Watpac, Barangaroo Metro Station, Construction Noise and Vibration Impact Statement: Underground station sit-out works, dated 19 December 2022, revision 6

2.2 Instrumentation

The instrumentation used for the noise measurement is summarised in Table 2-2.

Table 2-2 – Instrumentation

Type	Make / Model	Last Calibrated
Type 1 Sound Level Meter (XL2)	NTi XL2 (SN: A2A-19156-E0)	10 March 2022
Calibrator Type 4231	B&K (SN: 3027924)	4 April 2022

3 Noise monitoring results

The results of the noise compliance monitoring at the selected receivers in Barangaroo are presented in Table 3-1.

Table 3-1: Barangaroo noise monitoring results

Assessment Point	Measured plant	Distance to source	Measured external noise level dB(A)		ICNG NML	Exceeding NML	Comments
			L _{Aeq} , 15 minute	L _{Amax}			
22 High Street, Millers Point	Water Treatment Plant	65 metres away	42 (52-10) ¹	75	45	No	- The WTP was inaudible during measurement at this location. - Maximum noise events can be attributed to the operation of the personnel hoist on site and consistent traffic on Hickson Rd.
20 High Street, Millers Point	Water Treatment Plant	65 metres away	42 (52-10) ¹	75	45	No	- The WTP was inaudible during measurement at this location. - Maximum noise events can be attributed to the operation of the personnel hoist on site and consistent traffic on Hickson Rd.
High street (opposite to 20 High Street, Millers Point)	Water Treatment Plant	50 metres away	43 (53-10) ¹	61	45	No	- The WTP was inaudible during measurement at this location. - Maximum noise events can be attributed to the operation of the personnel hoist on site and consistent traffic on Hickson Rd.

Notes: 1) Reduction of 10dB correction has been applied as source was inaudible at the receiver

Based on the results presented in Table 3-1, receivers more than 50 metres away from the water treatment plant experienced external noise levels below the night-time noise management level of 45dB(A).

As can be noted in Table 3-1, during operation of the personnel hoist, the opening and closing the hoist doors was often audible. Practices such as avoiding slamming the doors open/close and the use of door pads should be considered to slow down the door as it closes (preventing a slam) where practicable.

4 Conclusion

Renzo Tonin & Associates completed noise monitoring during the operation of the water treatment plant at Barangaroo on 17th January 2023.

Noise monitoring determined that the water treatment plant located on site was inaudible at the closest receiver on High Street. The measured levels at two residential receivers on High Street were estimated to be below the night-time NML of 45dB(A).

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
20.01.2023	First Issue	0	1	A. Hannelly	R. Zhafranata	M. Tabacchi

File Path: R:\AssocSydProjects\TM001-TM050\TM031 mt Barangaroo Metro Station\1 Docs\05 COMPLIANCE MEASUREMENTS\TM031-05F04 WTP Noise Monitoring Report (r1).docx

Important Disclaimers:

The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian/New Zealand Standard AS/NZS ISO 9001.

This document is issued subject to review and authorisation by the suitably qualified and experienced person named in the last column above. If no name appears, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

This document is prepared for the particular requirements of our Client referred to above in the 'Document details' which are based on a specific brief with limitations as agreed to with the Client. It is not intended for and should not be relied upon by a third party and no responsibility is undertaken to any third party without prior consent provided by Renzo Tonin & Associates. The information herein should not be reproduced, presented or reviewed except in full. Prior to passing on to a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission.

In preparing this report, we have relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, we have not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

We have derived data in this report from information sourced from the Client (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination and re-evaluation of the data, findings, observations and conclusions expressed in this report.

We have prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

The information contained herein is for the purpose of acoustics only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics engineering including and not limited to structural integrity, fire rating, architectural buildability and fit-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.

External cladding disclaimer: No claims are made and no liability is accepted in respect of any external wall and/or roof systems (eg facade / cladding materials, insulation etc) that are: (a) not compliant with or do not conform to any relevant non-acoustic legislation, regulation, standard, instructions or Building Codes; or (b) installed, applied, specified or utilised in such a manner that is not compliant with or does not conform to any relevant non-acoustic legislation, regulation, standard, instructions or Building Codes.

APPENDIX A Measurement locations

A.1 Barangaroo Noise Monitoring Locations



A.2 22 High Street, Millers Point



A.3 20 High Street, Millers Point



A.4 High Street (opposite to 20 High Street, Millers Point)



Appendix B – Aboriginal Heritage Information Management System (AHIMS) Search