



Planning Approval Consistency Assessment Form

SM-17-00000111

Metro Body of Knowledge (MBoK)

Assessment name:	The Bays / White Bay Power Station Geotechnical Boreholes
Prepared by:	AFJV Environmental Graduate
Prepared for:	Sydney Metro
Assessment number:	AFJV12
Status:	For SM approval
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Date required:	July 2022
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For information – do not alter:

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Table of contents

1. Existing Approved Project	3
2. Description of proposed development/activity/works.....	5
3. Timeframe.....	7
4. Site description	7
5. Site Environmental Characteristics	8
6. Justification for the proposed works.....	9
7. Environmental Benefit	9
8. Control Measures.....	10
9. Climate Change Impacts.....	10
10. Impact Assessment – Construction.....	11
11. Impact Assessment – Operation	21
12. Consistency with the Approved Project.....	23
13. Other Environmental Approvals	24
Author certification	25
Appendix A – Borehole locations	27
Appendix B – DNVIS	28
Appendix C – Safe working distance technical note.....	29
Appendix D – Heritage Assessment Memo – The Bays	30

The Planning Approval Consistency Assessment Form should be completed in accordance with [SM-17-00000103 Planning Approval Consistency Assessment Procedure](#).

1. Existing Approved Project

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

- CSSI 10038 Sydney Metro West Concept and Stage 1 (11 March 2021)
- Administrative Modification 1 (28 July 2021).

Date of determination:

11 March 2021

Type of planning approval:

CSSI, Critical State Significant Infrastructure

Description of existing approved project you are assessing for consistency:

Sydney Metro West (the Concept)

Sydney Metro West (the Concept) would involve the construction and operation of a metro rail line around 24 kilometres long between Westmead and Hunter Street in the Sydney CBD. The key components are expected to include (as described in Chapter 6 of the Environmental Impact Statement (EIS)):

- Construction and operation of new passenger rail infrastructure between Westmead and the central business district of Sydney, including:
 - Tunnels, stations (including surrounding areas) and associated rail facilities
 - Stabling and maintenance facilities (including associated underground and overground connections to tunnels)
- Modification of existing rail infrastructure (including stations and surrounding areas)
- Ancillary development.

Sydney Metro West - all major civil construction works between Westmead and The Bays (the approved project)

The Sydney Metro West Project Concept; and all major civil construction works between Westmead and The Bays, including station excavation and tunnelling was determined on 11 March 2021. The scope of Stage 1 of the planning approval process for Sydney Metro West (the approved project) is described in Chapter 9 of the EIS, with the key features including:

- Tunnel excavation including tunnel support activities between Westmead and The Bays
- Station excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- Shaft excavation for services facilities
- Civil work for the stabling and maintenance facility at Clyde.

To construct the above, the Sydney Metro West Stage 1 is divided into multiple packages, each with their own design and construction scope. The package relevant to this Consistency Assessment is the Central Tunnel Package (CTP) which has an overall design and construction timeframe of approximately three years, from July 2021 to Q4 2024.

This consistency assessment relates to proposed supplementary geotechnical boreholes adjacent to The Bays construction site. Two geotechnical boreholes are required to be drilled at the White Bay Power Station (WBPS) site. The location of the investigations is shown in Appendix A. The coordinates of the proposed boreholes are summarised in Table 1.

Table 1: Proposed Borehole Locations

Borehole ID	Easting	Northing
AF CGW2		6251180
AF CGW11		6251036

Relevant background information (including EA, REF, Submissions Report, Director General's Report, CoA):

- Sydney Metro West Concept and Stage 1, Environment Impact Statement, April 2020
- Sydney Metro West Concept and Stage 1, Amendment Report, November 2020
- Sydney Metro West Concept and Stage 1, Submissions Report, November 2020
- Sydney Metro West Concept and Stage 1 - Assessment Report (SSI 10038), March 2021
- Sydney Metro West Concept and Stage 1, Conditions of Approval (CoA), released on 11 March 2021 and updated on 28 July 2021.

2. Description of proposed development/activity/works

Describe ancillary activities, duration of work, working hours, machinery, staffing levels, impacts on utilities/authorities, wastes generated or hazardous substances/dangerous goods used.

The proposed activity involves the establishment of two geotechnical boreholes at the WBPS site. Each borehole is subsequently required to be fitted with a data logger and would be monitored throughout construction. The borehole locations are currently indicative and subject service searches. Locations may be refined by up to 10m providing the can comply with the mitigation measures outlined in Section 10.

The boreholes would be drilled using a small track mounted or truck mounted drilling rig. The drilling would be completed to a depth of up to approximately 45m below the existing surface level. At each site localised environmental controls would be installed to capture any of the drilling water and a vacuum truck would also be on site. Sites would also be delineated from surrounding areas by ATF fencing, wrapped in Sydney Metro approved shade cloth. Figure 1 shows the proposed typical drilling site setup. These boreholes would be fitted with suitable caps and made flush with ground level. They would be monitored monthly to record groundwater quality.



Figure 1: Typical drilling site setup

Plant and Equipment

- Light vehicles
- Track or truck mounted drill rig
- Vacuum truck
- Hand tools.

Works are likely to be conducted during the Project's approved working hours and the works would be delivered in accordance with the Project's Environmental Protection Licence (EPL), Revised Environmental Mitigation Measures (REMMs) and CoA.

In the event that works are required to be completed outside of approved construction hours, an out of hours works (OOHW) permit would be produced in accordance with the with the CoAs and REMMs, including the measures contained within the Construction Noise and Vibration Management Sub-Plan. For the purposes of this consistency assessment, a DNVIS was produced to model potential noise and vibration impacts to sensitive receivers, should works be required to be completed outside standard construction hours, see Section 10 and Appendix B.

3. Timeframe

When will the proposed change take place? For how long?

The proposed change would indicatively take up to about one week and are expected to take place between July-August dependant on the approval timeline for this consistency assessment. The boreholes will be in place generally until completion of the Project. No change is proposed to the indicative construction program as outlined in Figure 9-31 of the Stage 1 EIS. It is likely that the works would be undertaken during standard construction hours, however, there is potential they would be required during night time hours due to potential interactions with other works in the area.

4. Site description

Provide a description of the site on which the proposed works are to be carried out, including, Lot and Deposited Plan details, where available. Map to be included here or as an appendix. Detail of land owner.

The WBPS is a heritage-listed former coal-fired power station on a 38,000 m² (410,000 sq ft) site in White Bay, in the suburb of Rozelle. It is located adjacent to the Bays Station construction site to the east, and adjacent to the junction of Victoria Road and Roberts Street to the west. Refer to Appendix A for a map of the site.

The adjacent The Bays Station construction site is located in front of the former White Bay Power Station and on the foreshore of White Bay. The site was previously used for industrial and wharf operations which is detailed extensively in the revised Archaeological Research and Design Excavation Methodology (ARDEM) prepared in accordance with CoA D25 (note the proposed works are not subject to the ARDEM themselves).

5. Site Environmental Characteristics

Describe the environment (i.e., vegetation, nearby waterways, land use, surrounding land use), identify likely presence of protected flora/fauna and sensitive area.

The existing environmental characteristics of adjacent The Bays Station construction site and White Bay Power Station is included in the Stage 1 EIS

and a summary is as follows:

- The site is located on the foreshore of White Bay
- White Bay has been heavily modified for port purposes and is unlikely to contain significant aquatic habitat
- Previous land uses of the site include Port and Employment and land zonings include IN2 – Light Industrial and W1 – Maritime Waters
- There is no naturally occurring native vegetation on the site. The site is almost devoid of vegetation except for opportunistic weed species. The land directly adjacent (to the south, west and north) contains a mix of planted vegetation and weeds
- Soils and groundwater have a moderate potential contamination risk associated with current and historic activities
- There is one registered Aboriginal heritage site within The Bays construction site (located within the footprint of the EIS construction site boundary (note; this site was listed in the Aboriginal Heritage Information Management System (AHIMS) after the EIS was prepared).
- The locations of both boreholes are within the WBPS curtilage, the area is vacant and largely paved.

The non-Aboriginal heritage site characteristics are described in Table 2.

Table 2 Non-Aboriginal heritage items at The Bays

Item and listing	Significance	Proximity to The Bays Station construction site
White Bay Power Station SHR (01015), Urban Development Corporation s170 (4500460) and SREP No. 26 City West Part 3 No. 11	State	The construction site falls partially within the curtilage of the White Bay Power Station.

The Valley Heritage Conservation Area Leichhardt LEP 2013 (C7)	Local	Located to the north and north-west of the construction site.
White Bay Power Station (outlet) Canal / Circulating Water Conduit Ports Authority of NSW s170 (4560026)	Local	Located within the approved construction site, and the study area of the approved construction site.
White Bay Power Station (inlet) Canal Ports Authority s170 (4560062)	Local	Located within the approved construction site, and the study area of the construction site, and extending west under the White Bay Power Station to Rozelle Bay south of the approved construction site.
Beattie Street Stormwater Channel No. 15 Sydney Water s170 (4570329)	Local	Partially located within the northern part of the study area of the construction site.
Glebe Island Silos Ports Authority of NSW s170 (4560016) and SREP No. 26 City West Part No. 1	Local	Located to the south-east of the construction site, and the western end is partially within the study area.

6. Justification for the proposed works

Address the need for the proposed works, whether there are alternatives to the proposed works (and why these are not appropriate), and the consequences with not proceeding with the proposed work.

The locations have been recommended by AFJVs design consultant. The justification of the proposed works is primarily focused on ensuring adequate groundwater monitoring locations in proximity to The Bays site are available. Certain boreholes have been destroyed during earlier works and require replacing. Whilst the location of the additional wells will also provide further groundwater information for areas to the north of the station box excavation and above the tunnel alignment.

This proposal will assist with compliance with respect to REMM GW4 in terms of identifying quantity/quality changes within and surrounding The Bays site conditions. REMM GW4 requires groundwater monitoring to occur before, during and after construction.

7. Environmental Benefit

Identify whether there are environmental benefits associated with the proposed works. If so, provide details:

It is not anticipated that the proposed change would result in an environmental benefit.

8. Control Measures

Will a project and site specific EMP be prepared? Are appropriate control measures already identified in an existing EMP?

The works will be managed under the project Construction Environment Management Plan (CEMP). Appropriate control measures are already identified in the CEMP that will accommodate the changes proposed in this assessment.

9. Climate Change Impacts

Is the site likely to be adversely affected by the impacts of climate change? If yes, what adaptation/mitigation measures will be incorporated into the design?

The effects of climate change on the Sydney Metro West Stage 1 project were discussed in the EIS Chapter 26. The proposed change is expected to result in a negligible change to that assessed in the EIS.

10. Impact Assessment – Construction

Attach supporting evidence in the Appendices if required. Make reference to the relevant Appendix if used.

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	<p>Biodiversity impacts were assessed in Chapter 22 of the Stage 1 EIS. It was identified that The Bays site contains opportunistic weed species, and adjoining land contains a mix of planted vegetation and weeds.</p> <p>The proposed drilling location is located on hardstand and as such is unlikely to have any impact on flora and fauna within the WBPS site. No additional impacts as therefore anticipated.</p>	No additional measures	Y	Y	
Water	No change from the Approved Project. The proposed additional construction site land will be managed in accordance with the CoA and Revised Environmental Management Measures (REMMs) relating to erosion and sediment controls.	No additional measures	Y	Y	
Air quality	The proposed works would result in negligible ground disturbance. As a result air quality impacts are expected to be negligible.	No additional measures	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Noise vibration	<p>Construction noise and vibration was assessed in Chapter 11 of the Stage 1 EIS. The extent of noise and vibration impacts of the proposed change are expected to be similar to the Approved Project.</p> <p>It should be noted that the construction footprint required for the proposed works described in this consistency assessment was not assessed in the Detailed Noise and Vibration Impact Statement for The Bays construction site (required by CoA D43). As such a supplementary DNVIS has been prepared (see Appendix B). In order to assess a worst-case scenario, it was assumed the works were carried out as night works. With reference to the DNVIS, 0 receivers are predicted to be classified as Highly Impacted during the Night period, with the worst-case predicted noise level of 66 dB(A) during the works. Likewise, no exceedances of vibration criteria were predicted for the duration of these works.</p> <p>Potential noise and vibration impacts will be managed in accordance with the CoAs and REMMs, including the measures contained within the Construction Noise and Vibration Management Sub-Plan.</p>	No additional measures	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Indigenous heritage	<p>Chapter 13 of the Stage 1 EIS assessed Aboriginal heritage impacts from the Approved Project. The EIS study area included a 50m buffer from the EIS site boundary. Since the EIS was prepared the Aboriginal Potential Archaeological Deposit (PAD) at The Bays has been listed in the Aboriginal Heritage Information Management System (AHIMS) as item 45-6-3826. The next closest recorded Aboriginal site is AHIMS ID 45-6-2278, a potential archaeological deposit (PAD) site located approximately 650 metres to the east.</p> <p>Neither of the above items would be impacted. As such, the potential Aboriginal heritage impact would be consistent with the Approved Project. Furthermore, Appendix D summarises that impacts to Aboriginal objects are unlikely as a result of the proposed works.</p>	No additional measures	Y	Y	

<p>Non-indigenous heritage</p>	<p>WBPS (state item) <u>Direct impact</u></p> <p>In reference to the revised Heritage Assessment Memo for The Bays, Artefact assessed geotechnical boreholes to be installed both inside and surrounding the WBPS including AF_CG_W2 and AF_GG_W11 . This heritage assessment identified a number of recommendations and mitigation strategies to preserve the heritage value of the WBPS. These have been included to produce a list of mitigation measures that AFJV will implement for the proposed borehole installation and are included in the “Proposed Control Measures in addition to project COA and REMMs” column.</p> <p><u>Indirect impact</u></p> <p>Visual: The impact of additional equipment is negligible in the broader context of the adjacent construction site and other works being undertaken at WBPS by Place Management NSW (PM NSW). Noting that shade cloth has been installed surrounding this site by PM NSW, removing direct lines of site to the proposal area. Furthermore, any additional equipment would be on site temporarily.</p> <p>Vibration: Hutchinson Weller, noise and vibration consultants, produced a technical note for the AFJV which determined the safe working distance for geotechnical equipment (refer to Appendix C). In accordance with the project’s Noise and Vibration Management Plan (NVMP), the risk of vibration damage to heritage buildings and structures is assessed under a conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity (from Table 4 of DIN 4150-3: 2016 <i>Structural Vibration – effects of vibration on structures</i>). The Hutchison Weller technical note</p>	<ul style="list-style-type: none"> No building fabric may be modified by the works, except for the concrete flooring surfaces where boreholes are proposed. Specifically, surface-level elements which are present, including (but not limited to) rail beams, strip drain grills, flagging stones, original floor markings and areas where the floor interfaces with wall structures cannot be impacted by borehole excavation During core drilling and NDD works, the area around the core-hole must be bunded to prevent surface water run-off into the surrounding area and the area protected from splash. Care must be taken during core drilling that if sub-floor cavities are present below a drilling location, that these cavities are not flooded with water ingress. Archaeological monitoring would be conducted during the geotechnical excavation process, including all 	<p>Y</p>	<p>Y</p>	
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	<p>determined that in order to meet 2.5mm/s criteria, the safe working distance is 3m. Vibration monitoring of geotechnical drilling the 2.5mm/s criteria was not exceeded at one metre. Therefore, a three-metre safe working distance is conservative and is included as a mitigation measure (noting, the proposed locations are further than 3m away).</p> <p><u>Archaeology</u></p> <p>There is nil-low potential for remains relating to Phase 2 to be present and they are likely to be locally significant, although any intact remains would be considered State significant if they are related to the White Bay Power Station. Historical plans of the power station also indicate that no known sub-floor conduits or cavities are located in the direct area of the proposed bore hole locations. However, the potential for geotechnical works being located in the same area as one of the timber piles – which are known to exist but for which no historical plan of their location has been identified – is considered possible. Archaeological controls have been provided in this consistency assessment and in the proposed works methodology to prevent inadvertent impacts to any timber piles if they geotechnical investigation occurs in an area which they are preserved in. Therefore, the proposed works will have negligible impacts to significant non-Aboriginal archaeological resources at White Bay.</p> <p>Once the Artefact recommendations are undertaken, the proposed works will have a minor adverse impact on the State archaeological significance of the WBPS. Mitigation measures, as recommended above, will minimise the potential for damage or harm by ensuring that machinery is appropriately located, that archaeological monitoring is undertaken and any removed or damaged fabric is reinstated. Therefore, the AFJV is confident that the</p>	<p>steps outlined in the proposed works brief of this memo.</p> <ul style="list-style-type: none"> • Prior to the commencement of works and after the completion of concrete core reinstatement, the area where works are proposed would be archivally photographed in accordance with Heritage NSW guidelines 'How to Prepare Archival Records of Heritage Items' and 'Photographic Recording of Heritage Items Using Film or Digital Capture' • If any elements of unanticipated subfloor significant fabric are identified in a borehole location after the removal of the concrete core (such as undocumented conduits or culverts, or remnants of the supporting timber piles from the first stage of the power station), the borehole must be relocated to avoid impacting that significant fabric. Should significant fabric be present within the entirety of an area where borehole works are proposed, the works 			
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	<p>archaeological impact to the WBPS will be minimised to a degree in which it is considered negligible.</p> <p>As the proposed works are outside of The Bays construction site footprint, CoA D25 would not apply to the proposed works and they would not require management in accordance with the ARDEM.</p>	<p>may not proceed in that location</p> <ul style="list-style-type: none"> • The removal of concrete surfaces must not use jackhammers or similar high-vibration tools should concrete be difficult to remove with core drilling. Should core drilling not work, rotational saw-cutters may be used to cut the concrete • Concrete which is removed must also be reinstated and made good following works. Cement used to reinstate the removed concrete must be applied in a concealed manner, and must be colour matched as close as practicable to the original concrete flooring, to minimise any visual impacts following the completion of works • Should removed concrete not be fit for reinstatement, the replacement cement must be colour matched and blended as closely as possible as the original flooring to minimise visual disturbance. The use of replacement concrete / 			
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		<p>cement must be clearly recorded in the archival photographic log prepared for the works.</p> <ul style="list-style-type: none">• Building fabric (including concrete to be removed and reinstated) cannot be marked with permanent markers (spray paint or similar). Should marking be required for survey and control purposes, these must be applied with removable materials and be completely reversible. The removal of marking must be completed at the end of this program of works.• The smallest possible drill rig must be used inside the power station to prevent damage or modifications to the heritage item. No fabric or moveable heritage may be moved or relocated for the machine to enter• Non-destructive digging vehicles (vacuum suction trucks) must not enter the Power Station's structures; rather, the water and vacuum pipes should be fed into the building from the vehicle outside without moving or			
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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
		impacting any heritage significant fabric <ul style="list-style-type: none"> Works must maintain a minimum safe working distance of three metres from the WBPS structure. 			
Community and stakeholder	No change from the approved project. Future community and stakeholder notifications would include reference to additional land subject to this consistency assessment.	No additional measures	Y		
Traffic	<p>For the purposes of installing the boreholes, plant and equipment will need to access the proposed locations via WBPS access off Roberts Street for CGW2. This will cause less disruption to FDC for CGW11 by accessing via the southern WBPS gate via the western access road. Noting that this is at the request of the asset owner (FDC), which will occur following approval of the CA.</p> <p>Monitoring for the proposed boreholes is likely to be accessed via walking directly from The Bays site and there would be No additional traffic impacts as a result of the proposed changes.</p>	No additional measures	Y		
Waste	<p>There is the potential to encounter acid sulfate soils at the site during drilling and other ground disturbance.</p> <p>Spoil and waste will be managed in accordance with existing CoAs and REMMs including the CEMF. As such, the potential spoil and waste impacts would be consistent with the Approved Project.</p>	No additional measures	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Social	No change from the approved project.	No additional measures	Y	Y	
Economic	No change from the approved project.	No additional measures	Y	Y	
Visual	<p>The landscape character and visual amenity impacts were assessed in Chapter 15 of the Stage 1 EIS. The approved The Bays Station construction site was assessed as having a negligible landscape character impact, and a negligible or minor adverse visual impact from five viewpoints.</p> <p>The proposed plant and equipment required to construct the boreholes would result in a temporary minor visual impact adjacent to The Bays Station construction site. Noting that this impact would be limited to only a few days, landscape character and visual impacts are considered to be consistent with that assessed in the Stage 1 EIS.</p>	No additional measures	Y	Y	
Urban design	No change from the approved project.	No additional measures	Y	Y	
Geotechnical	No change from the approved project.	No additional measures	Y	Y	
Land use	No change from the approved project.	No additional measures	Y	Y	
Climate Change	No change from the approved project.	No additional measures	Y	Y	
Risk	No change from the approved project.	No additional measures	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Other	There is a moderate risk of encountering contaminated soil or groundwater during the proposed works. The EIS identified the potential for the presence of heavy metals, hydrocarbons, pesticides, PCB, solvents and asbestos at the adjacent The Bays site. Waste material would be classified and managed in accordance with Waste Classification Guidelines (NSW EPA, 2014) and any unexpected contamination would be managed in accordance with the unexpected finds procedure to mitigate the risk of encountering significant contamination.	No additional measures	Y	Y	
Management and mitigation measures	No change from the approved project.	No additional measures	Y	Y	

11. Impact Assessment – Operation

Attach supporting evidence in the Appendix if required. Make reference to the relevant Appendix if used.

Stage 1 of the planning application for Sydney Metro West (subject of this Consistency Assessment) is for major civil construction work for Sydney Metro West between Westmead and The Bays. At this stage, measures to avoid or minimise impacts have been developed only for major civil construction work for Sydney Metro West between Westmead and The Bays – which involves construction only. Impacts applicable to the operational aspects of Sydney Metro West including operation stage environmental mitigation measures would be developed when planning approval applications are made for future stages. As such, operational impacts of the proposal are not applicable, and therefore there are no changes from the approved project are anticipated.

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	No change from the approved project.	No additional measures	Y	Y	
Water	No change from the approved project.	No additional measures	Y	Y	
Air quality	No change from the approved project.	No additional measures	Y	Y	
Noise vibration	No change from the approved project.	No additional measures	Y	Y	
Indigenous heritage	No change from the approved project.	No additional measures	Y	Y	
Non-indigenous heritage	No change from the approved project.	No additional measures	Y	Y	
Community and stakeholder	No change from the approved project.	No additional measures	Y	Y	
Traffic	No change from the approved project.	No additional measures	Y	Y	

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Waste	No change from the approved project.	No additional measures	Y	Y	
Social	No change from the approved project.	No additional measures	Y	Y	
Economic	No change from the approved project.	No additional measures	Y	Y	
Visual	No change from the approved project.	No additional measures	Y	Y	
Urban design	No change from the approved project.	No additional measures	Y	Y	
Geotechnical	No change from the approved project.	No additional measures	Y	Y	
Land use	No change from the approved project.	No additional measures	Y	Y	
Climate Change	No change from the approved project.	No additional measures	Y	Y	
Risk	No change from the approved project.	No additional measures	Y	Y	
Other	No change from the approved project.	No additional measures	Y	Y	
Management and mitigation measures	No change from the approved project.	No additional measures	Y	Y	

12. Consistency with the Approved Project

Based on a review and understanding of the existing Approved Project and the proposed modifications, is there is a transformation of the Project?	No. The proposed change would not transform the project. The project would continue to provide a metro rail line between Westmead and The Bays as part of the Approved Project.
Is the project as modified consistent with the objectives and functions of the Approved Project as a whole?	Yes. The proposed change would be consistent with the objectives and functions of the Approved Project as a whole.
Is the project as modified consistent with the objectives and functions of elements of the Approved Project?	Yes. The proposed change would be consistent with the objectives and functions of elements of the approved project.
Are there any new environmental impacts as a result of the proposed works/modifications?	No. There are no new environmental impacts. All risks identified for the approved project and the proposed change would be adequately addressed through the application of the mitigation measures provided in the Environmental Impact Statement, Submissions Report, Amendment Report and the conditions of approval.
Is the project as modified consistent with the conditions of approval?	Yes. The proposed change is consistent with the conditions of approval.
Are the impacts of the proposed activity/works known and understood?	Yes. The impacts of the proposed change are understood.
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 proposal are understood and will be accounted for by implementing the existing mitigation measures provided in the Environmental Impact Statement, Submissions Report, Amendment Report and the Instrument of Approval for the approved project.

13. Other Environmental Approvals

Identify all other approvals required for the project:

Nil. No additional environmental approvals are required.

Author certification

To be completed by person preparing checklist.

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 Revision; and
- Examines the consistency of the Proposed Revision with the Approved Project; is accurate in all material respects and does not omit any material information.

Name:	Oliver Gilroy-Sarkies	Signature:	
Title:	Environmental Graduate		
Company:	AFJV	Date:	29/06/2022

This section is for Sydney Metro only.

Application supported and submitted by

Name:	Yvette Buchli	Date:	07/07/2022
Title:	Associate Director Planning Approvals	Comments:	
Signature:			

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

Yes

The proposed activity/works are consistent and no further assessment is required.

No

The proposed works/activity is not consistent with the Approved Project. A modification or a new activity approval/ consent is required. Advise Project Manager of appropriate alternative planning approvals pathway to be undertaken.

Endorsed by


Name:	Stuart Hodgson	Date:	7/7/2022
Title:	Director Environment, Sustainability & Planning, West	Comments:	
Signature:			

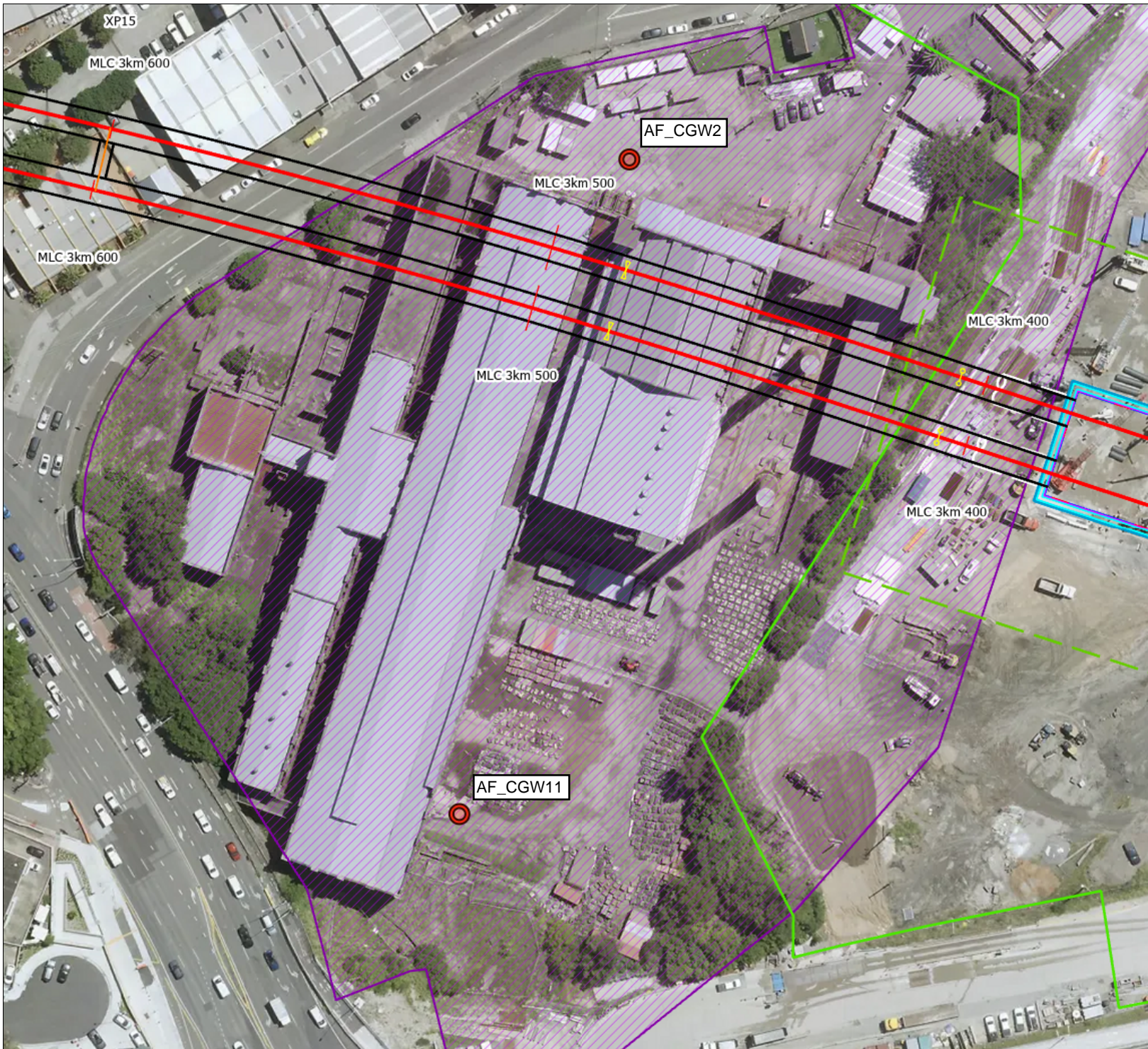
Appendix A – Borehole locations

Borehole locations

Legend

 Site Boundary

 White Bay Power Station SHR Curtilage



This map is shown for reference purposes only. Acciona Ferrovial JV provides this information "as is" with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. While every effort is made to ensure the information displayed is as accurate and current as possible, Acciona Ferrovial JV will not be held responsible for any loss, damage or inconvenience caused as a result of reliance on such information or data.



Appendix B – DNVIS



Additional Geotechnical Borehole Investigation

Project Client	SMW - CTP: The Bays (Updated April 22) AFJV		
Assessment Date	28/04/2022	Assessment Id	20220428
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Contents

Acoustic terms and acronymsii

1 Introduction1

 1.1 Overview1

 1.2 Planned works.....1

 1.3 Justification of the works1

1 Existing environment3

 1.1 Sensitive receivers3

 1.2 Heritage items.....3

 1.3 Noise catchment areas3

2 Assessment framework4

 2.1 Approved construction hours4

 2.2 Noise assessment criteria4

 2.3 Project construction noise management levels6

 2.4 Vibration management7

3 Impact assessment9

 3.1 Modelling method9

 3.2 Predicted noise levels10

 3.3 Vibration10

4 Controls and safeguards12



Acoustic terms and acronyms

AA	Acoustic Advisor
AMM	Additional mitigation measures – applicable where standard measures have been implemented and NML is still expected to be exceeded.
dB(A)	Unit used to measure ‘A-weighted’ sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
DPIE	NSW Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
ICNG	Interim Construction Noise Guideline (Department of Environment and Climate Change 2009)
NCA	Noise Catchment Area
Noise level statistics	<p>L_{A90} - The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise.</p> <p>L_{Aeq} - The equivalent continuous A-weighted noise level—the level of noise equivalent to the energy average of noise levels occurring over a measurement period.</p> <p>L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period.</p> <p>L_{Amax} – The maximum A-weighted noise level associated with the measurement period.</p>
NML	Noise Management Level
PPV	Peak Particle Velocity – Measurement of ground-borne vibration in units of mm/s
RBL	Rating Background Level - a single figure that represents the background noise level for assessment purposes
ROL	Road Occupancy Licence – granted by Transport for NSW and required for any activity likely to impact on traffic flow.
SWL	Sound Power Level - The A-weighted sound power level is a logarithmic ratio of the acoustic power output of a source relative to 10-12 watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
SPL	<p>Sound pressure level - This is the level of noise, usually expressed in dB(A), as measured by a standard sound level meter with a pressure microphone. The sound pressure level in dB(A) gives a close indication of the subjective loudness of noise.</p> <p>A technical definition for the sound pressure level, in decibels, is 20 times the logarithm (base 10) of the ratio of any two quantities related to a given sound pressure to a reference pressure (typically 20 μPa equivalent to 0 dB).</p>
Tonal noise	Noise with perceptible and definite pitch or tone
VDV	Vibration dose value – used when assessing intermittent vibration as it is sensitive to peaks in vibration acceleration and accumulates the vibration energy received over the daytime and night-time periods



1 Introduction

1.1 Overview

The Sydney Metro Central Tunnelling Package is being delivered by the Acciona Ferrovia Joint Venture (ACJV) and involves excavation of around 11.5 kilometres of twin-bore tunnel linking five station boxes at The Bays, Five Dock, Strathfield, Burwood North and Sydney Olympic Park (the Project).

During the Project, there is potential for nearby sensitive receivers to experience adverse impacts relating to noise and vibration. The project's Noise and Vibration Management Sub Plan (NVMP) was developed to satisfy the project's Conditions of Approval (CoA) and addresses the assessment and management of noise and vibration impacts during construction.

CoA D43 requires planned works to be assessed within a Detailed Noise and Vibration Impact Statement (DNVIS) where works may exceed the NMLs, vibration criteria and/or ground-borne noise levels specified in CoA D39 and D40 at any residence outside construction hours identified in CoA D35, or where receivers will be highly noise affected.

Under the NVMP, KNOWnoise™, a project-specific noise prediction tool, has been developed to prepare site and activity-specific noise assessments for ongoing risk analysis during project delivery and for when out-of-hours work is proposed (as per the Project's out-of-hours protocol).

This DNVIS has been prepared using KNOWnoise™ and addresses activities for construction of The Bays Station box and south shaft, as illustrated in Figure 1.

The structure of this DNVIS meets the requirements of CoA D43 and the CNVS and includes:

- Section 1.2 – Construction works and hours with justification for these works in Section 1.3
- Section 2 – Existing environment
- Section 3 – Assessment framework including noise and vibration management levels
- Section 4 – Construction noise assessment
- Section 5 – Construction vibration assessment
- Section 6 – Mitigation and management, including consultation

1.2 Planned works

The AFJV plans to carry out the works described in Appendix A, which lists each assessed activity, its timing and proposed equipment.

1.3 Justification of the works

In line with the Interim Construction Noise Guidelines (DECC 2009), justification is typically required to work outside approved construction hours. These situations may involve low impact or emergency works and works under an out-of-hours work protocol.

The AFJV proposes the works subject to this assessment outside approved construction hours for the following reason.

- Justification is to demonstrate no impacts of proposed activity to the approved project



Sydney Metro West - The Bays

Legend

- Site footprint
- Sydney Metro West Alignment

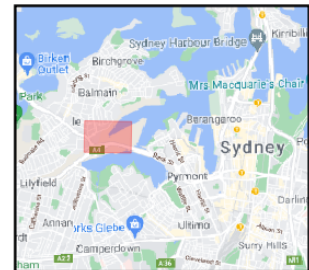
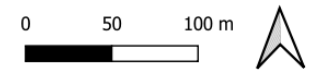


Figure 1 Location map



1 Existing environment

1.1 Sensitive receivers

The Bays construction site occupies around 4 ha in the White Bay area south of Balmain and East of Rozelle as illustrated in Figure 1. Land uses adjacent to the site are industrial and commercial to the north, east and west. The closest receiver to the site is the defunct White Bay Power Station. To the south across City West Link and James Craig Drive are additional commercial premises and Rozelle Bay.

Residential receivers that may be impacted by works on The Bays site include the nearest in Balmain, around 120 metres north, and in Rozelle, around 250 metres to the south west. Residences in Glebe are around 500 metres across Rozelle Bay to the south.

St Joseph's Catholic Church and Sydney Community College are located around 350 metres west of the site. The Bald Rock Hotel is located around 130 metres north of the construction site on Mansfield Street and the Rosebud Cottage Child Care is located around 180 metres west of the construction site on Quirk Street.

1.2 Heritage items

Parts of The Bays area have been identified in the EIS as possessing items of heritage value, which include the following. These items will be considered for impacts of vibration-intensive activities.

- White Bay Power Station, including buried assets such as culverts or inlet/outlet structures
- Australian Cement Silos

1.3 Noise catchment areas

To facilitate the assessment of noise impacts from the project and to apply representative Noise Management Levels (NMLs) to all receivers, receivers adjacent to the The Bays sites have been divided into Noise Catchment Areas (NCAs).

NCAs group individual sensitive receivers by representative traits such as existing noise environment and potential exposure to noise and vibration from the Project.

NCAs established as part of the EIS are summarised in Table 1 and illustrated in Figure 1. Background noise monitoring has been completed as part of the EIS to apply appropriate NML to each NCA.

Table 1 Summary of work areas, Noise Catchment Areas and land uses

NCA	Location	Description	Ambient noise influences
19	North of City West Link in Lilyfield.	Mainly residential. 'Other sensitive' receivers include the University of Tasmania, NSW/Ambulance, Sydney University College of the Arts, Orange Grove Public School, and outdoor recreation areas.	Road traffic on Victoria Road and City West Link including heavy vehicles. Frequent aircraft
20	West of Victoria Road in Rozelle.	Mainly residential with some commercial receivers along Victoria Road and Lilyfield Road. 'Other sensitive' receivers include Sydney Community College, St Joseph's Catholic Church and Rosebud Cottage child care centre.	Road traffic on Victoria Road and City West Link including heavy vehicles. Frequent aircraft
21	East of Victoria Road in Rozelle and Balmain	Includes White Bay, the former White Bay Power Station and Glebe Island. This catchment is mainly residential, with various commercial areas surrounding White Bay and Glebe Island. 'Other sensitive' receivers include Inner Sydney Montessori School.	Road traffic on Victoria Road and City West Link including heavy vehicles. Frequent aircraft
22	South of Victoria Road/Western Distributor in Glebe.	Commercial areas associated with Rozelle Bay area to the south of Victoria Road/Western Distributor and the more distant areas across Rozelle Bay are residential.	Road traffic on City West Link and The Crescent including heavy vehicles. Frequent aircraft



2 Assessment framework

2.1 Approved construction hours

Working hours are set by CoA D35 to D36 as summarised in Table 2. Use of power saws, rock breakers, drills and other tonal or impulsive activities are defined as annoying under the Interim Construction Noise Guideline (ICNG) and are ‘highly noise intensive works’.

Table 2 Approved construction hours

CoA	Construction activity	Monday to Friday	Saturday	Sunday / Public holiday
D35	Approved construction	7:00 am to 6:00 pm	8:00 am to 6:00 pm	No work (unless approved under out-of-hours work protocol)
D36	Highly noise intensive works	8:00 am to 6:00 pm ¹	8:00 am to 1:00 pm ¹	No work (unless approved under out-of-hours work protocol)

Notes:

1. if continuously, then not exceeding three hours, with a minimum cessation of work of not less than one hour.

2.2 Noise assessment criteria

2.2.1 Construction noise

The ICNG describes noise in excess of the background level as potentially having an adverse impact on sensitive receivers and increasing the likelihood of complaint. During standard construction hours, where construction noise is within 10 dB(A) of the RBL, impacts would be acceptable.

Where construction noise is more than 10 dB(A) above the RBL during standard construction hours, a residential receiver is considered noise affected and the proponent should undertake all reasonable and feasible steps necessary to manage the impact and consult with the affected community.

Above a $L_{Aeq, 15 \text{ minute}}$ noise level of 75 dB(A), a receiver is highly affected, requiring consideration of additional mitigation measures including alternative accommodation in the night period.

Outside standard construction hours, construction noise at a residential receiver more than 5 dB(A) above the RBL is taken to be noise affected. Table 1 (reproduced from Table 2 of the ICNG) sets out the NMLs for residences and how they are to be applied.

In addition, annoying noise such as rock hammers, impact piling, or other impulsive noise sources usually result in greater annoyance than continuous construction noise. A 5 dB(A) penalty is applicable to such activities prior to comparison with the NMLs.

2.2.2 Sleep disturbance

The CNVS requires maximum noise levels to be analysed in terms of the extent and number of times the maximum noise exceeds specific noise trigger levels, in general accordance with the Noise Policy for Industry (NPfI) (EPA 2017). These triggers are:

- $L_{Aeq, 15 \text{ minute}}$ 40 dBA or the prevailing RBL plus 5 dB, whichever is greater, and the
- L_{Amax} 52 dBA or the prevailing RBL plus 15 dB, whichever is greater.

The NPfI also recommends the DECCW (2011) Road Noise Policy (RNP) be reviewed for further risk assessment. The RNP recommends maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep and one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.



Detailed noise and vibration impact statement

Table 3 Residential noise management levels

Time of day	NML $L_{Aeq(15\text{ min})}$ *	How to apply
Standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm	Noise affected RBL + 10 dB	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <p>Where the predicted or measured $L_{Aeq(15\text{ min})}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.</p>
	Highly noise affected 75 dB(A)	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise.</p> <p>Where noise is above this level, the relevant authority may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:</p> <ul style="list-style-type: none"> - times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences); - if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	<p>A strong justification would typically be required for works outside the recommended standard hours.</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level.</p> <p>Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.</p>

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Other sensitive land uses, such as schools and offices, typically find noise from construction disruptive when the properties are being used (such as during work and school times). The noise management levels for non-residential receivers set in accordance with the Interim Construction Noise Guideline are provided in Table 4. These levels apply only during hours when the non-residential premises are being used.

The difference between an internal noise level and the external noise level is about 10 dB(A), which provides a conservative assumption that windows are open for ventilation. Buildings where windows are fixed or cannot otherwise be opened may achieve a greater noise level performance.



Detailed noise and vibration impact statement

Table 4 Non-residential sensitive land uses noise management levels

Land use	Noise assessment location	NML ($L_{Aeq,15min}$)
Classrooms at schools and other educational institutions	Internal	45
Places of worship		
Active recreation areas (such as sporting activities and activities which generate their own noise or focus for participants)	External	65
Passive recreation areas (contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External	60
Industrial premises	External	75
Office, retail outlets	External	70

2.3 Project construction noise management levels

The Project specific construction noise management levels for residential receivers have been established in line with the ICNG, based on the RBLs relevant to each NCA. These are presented in Table 5. NMLs for non-residential sensitive receivers are described in Table 4.

Table 5 Project specific construction NMLs

NCA	Noise Management Level, $L_{Aeq,15\text{ minute}}$							
	Approved hours		Outside approved hours				Sleep disturbance (CNVS)	
	Noise affected	Highly noise affected	Day	Evening	Night			
						$L_{Aeq,15\text{ minute}}$	L_{Amax}	
19	46	75	41	41	38	40	52	
20	61	75	56	56	50	50	60	
21	53	75	48	48	40	40	50	
22	58	75	53	52	44	44	54	

As part of planning for out of hours works, standard mitigation measures, as described in the CNVMP, are implemented where reasonable and feasible. However, after these measures have been applied, noise and vibration levels may continue to exceed the NMLs.

In this case, additional mitigation measures outlined in the CNVS, which largely focus on engagement with affected sensitive receivers, should be implemented where reasonable and feasible, unless other agreements are in place with the impacted receiver.

Triggers and additional mitigation measures for airborne noise are taken from the Project's OOH Protocol and the CNVS and are summarised in Table 3. Further details of specific additional mitigation measures are described in the CNVS.



Table 6 Triggers for additional mitigation measures – Airborne noise

Construction hours	Class	dB above NML	Additional management measures
Approved hours Monday – Friday: 7am – 6pm Saturday: 8am to 6pm	B	0 to 10	-
	C	10 to 20	LB
	D	20 to 30	LB, M, SN
	E	>30	LB, M, SN
Evening Monday – Friday: 6pm – 10pm Saturday: 7am – 8am, 6pm – 10pm Sunday / PH: 8am – 6pm	B	0 to 10	LB
	C	10 to 20	LB, M
	D	20 to 30	LB, M, SN, RO
	E	> 30	LB, M, SN, IB, PC, RO
Night Monday – Saturday: 10am – 7am Saturday: 10pm – 8am) Sunday / PH: 6pm – 7am	B	0 to 10	LB
	C	10 to 20	LB, M, SN, RO
	D	20 to 30	LB, M, SN, IB, PC, RO, AA
	E	> 30	LB, M, SN, IB, PC, RO, AA

Notes: PC = Phone Calls and emails
M = Monitoring
IB = Individual briefings
AA = Alternative accommodation
SN = Specific notification
LB = Letterbox drops
RO = Project specific respite offer

2.4 Vibration management

2.4.1 Human comfort

When assessing human exposure to construction-related vibration, the CNVS requires vibration goals to be established using *Environmental Noise Management Assessing Vibration: A Technical Guideline* (DECC 2006), which provides criteria for the assessment of vibration impacts on humans.

Construction activities typically generate vibration of an intermittent nature, which is assessed using a Vibration Dose Value (VDV). Acceptable values of vibration doses are presented in Table 7 for sensitive receivers.

Table 7 VDV Vibration criteria

Receiver type	Low probability of adverse comment (m/s ^{1.75})	Adverse comment possible (m/s ^{1.75})	Adverse comment probable (m/s ^{1.75})
Residential buildings – 16 hour day (7am to 11pm) ¹	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings – 8 hour night (11pm to 7am) ¹	0.13	0.26	0.51

Note 1: Day time and night time as described in BS6472:1992 (as referenced in the CNVS), i.e. a daytime period of 16 h or a night time period of 8 h, for example 23.00 h to 07.00 h.



2.4.2 Buildings

Potential building damage from construction vibration requires the application of values in BS 7385 Part 2-1993 *Evaluation and measurement for vibration in buildings Part 2*. These values are presented in Table 8 and relate to transient vibration which does not give rise to resonant responses in structures, and to low-rise buildings.

Table 8 Guideline values for vibration velocity for the effects of short-term vibration on structures (BS 7385).

Line	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz to 50 mm/s at 40 Hz and above

Where vibration may give rise to magnification due to resonance, especially at lower frequencies where lower guide values apply, the guide values may be reduced by 50%. The CNVS describes rock breaking/hammering and sheet piling activities as having potential to cause dynamic loading in some structures (e.g. residences).

For activity involving rock breakers, piling rigs, vibratory rollers, excavators, vibration predominantly occurs at frequencies in the 10 Hz to 100 Hz range. On this basis, a conservative vibration damage screening level is:

- Reinforced or framed structures: 25.0 mm/s
- Unreinforced or light framed structures: 7.5 mm/s

2.4.3 Heritage

Heritage buildings and structures would be assessed under a conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity (from DIN 4150). Where vibration levels at heritage items are identified as exceeding this screening level, structural assessment would be completed by the Project team to confirm the structure's sensitivity to vibration. If a heritage building or structure is found to be structurally unsound (following inspection) the conservative criterion would stand. Where the structure is suitably sound, the guideline values from Table 8 would be applicable.

2.4.4 Additional mitigation measures

The CNVS recommends additional mitigation measures where all standard mitigation measures to minimise vibration at the nearest receivers have been implemented and vibration is still predicted to exceed the maximum guideline values. The Additional Mitigation Measures Matrix (AMMM) for vibration from the CNVS is presented in Table 9.

Table 9 Additional Vibration Mitigation Measures (CNVS)

Construction hours	Mitigation measures where predicted vibration levels exceed maximum levels
Approved hours Monday – Friday: 7am – 6pm, Saturday: 8am to 6pm	LB, M, RO
Evening Monday – Friday: 6pm – 10pm; Saturday: 7am – 8am, 6pm – 10pm; Sunday / PH: 8am – 6pm	LB, M, IB, PC, RO, SN
Night Monday – Saturday: 10am – 7am Saturday: 10pm – 8am); Sunday / PH: 6pm – 7am	LB, M, IB, PC, RO, SN, AA



3 Impact assessment

3.1 Modelling method

Predictions of noise impacts were performed using KNOWnoise™, a project-specific noise assessment tool developed by Hutchison Weller for the CTP Project. KNOWnoise calculates the maximum $L_{Aeq,15\text{minute}}$ noise level for each identified receiver for each proposed activity using predictions from SoundPlan noise modelling software. Predictions include geometric spreading, air and ground absorptions as well as topographical and structural screening and reflection.

The following components were incorporated in the model:

- Topography – Based on terrain data of 1 m resolution.
- Individual sensitive receivers – Worst-affected façade of each building to 700 metres from the works
- Construction noise sources – Activities and equipment provided by AFJV were included in the noise model as individual sources across the nominated work areas for each activity. The maximum predicted L_{Aeq} noise level within each work area was identified for each receiver.
- Cumulative impacts – all activities with overlapping time periods are included in cumulative results
- Source height – construction noise sources assumed to be at 1.5 metres above ground level.
- Ground Absorption – Ground assumed to be mixed hard and soft with absorption factor of 0.5
- Meteorology – worst-case meteorological conditions (gentle breeze from source to receiver and stable conditions).
- Residential building structures are included in the model, meaning screening provided by neighboring houses is considered.
- Results are shown for all floors of assessed buildings with the worst-case façade result assumed for the whole floor.

Equipment proposed to be used for OOHW activities together with estimated sound power levels for each item are summarised in Appendix A.

The sound power levels and ultimate predicted noise levels will depend on the number of plant items operating at any one time and their precise location relative to a sensitive receiver. In practice, the predicted levels will vary due to plant moving around the site and not operating intensively or concurrently for a 15 minute assessment period. Shielding and reflection provided by buildings will also vary as plant moves around the site. Therefore, predicted noise levels are conservative.



3.2 Predicted noise levels

Detailed predicted noise levels for each potentially affected receiver are presented Appendix C.

A summary of predicted noise levels for the Night period is presented in Table 10, with the worst-case predicted noise level of 66 dB(A) during the works, resulting in 0 receivers classed as highly noise affected.

With reference to the CNVS, 0 receivers are predicted to be classified as Highly Impacted during the Night period.

Table 10 Summary of predicted noise levels with comparison against ICNG criteria for the Night period.

Maximum cumulative predicted $L_{Aeq, 15 \text{ minute}}$ noise level		66 dB(A)
Number of highly noise affected receivers (>75 dB)		0
Impact class	Predicted exceedance	Predicted number of receivers
Noticable	0 <= 10 dB above NML	107
Clearly Audible	10 <= 20 dB above NML	4
Moderately Intrusive	20 <= 30 dB above NML	0
Highly Intrusive	> 30 dB above NML	0

Predicted impact classes for the Night period are illustrated graphically in Appendix B. Each identified receiver in the study area has been coloured to highlight the predicted level of impact.

In the event works are planned for more than two consecutive nights, sleep disturbance is considered. Table 11 summarises the number of residents predicted to exceed the sleep disturbance screening criteria. Further analysis is provided to indicate the number of receivers expected to be woken, at L_{Amax} noise levels greater than 65 dBA.

Where exceedances of the awakening criteria are predicted, additional care should be taken, and mitigation measures implemented to minimise the frequency and duration of such events.

Table 11 Summary of predicted exceedances of sleep disturbance screening criterion and awakening criterion.

Criterion	Predicted number of receivers
Potentially Sleep Disturbed (exceed RBL + 15 screening criterion)	256
Exceed 65 dBA awakening criterion	4

3.3 Vibration

The CNVS requires attended vibration measurements at commencement of vibration generating activities to confirm vibration levels satisfy the criteria for that activity.

Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the calculated safe-working distances.



Detailed noise and vibration impact statement

Based on the proposed work locations and selected equipment, indicative exceedances of the vibration criteria are summarised in Table 12. The exceedances are based on recommended minimum working distances from vibration intensive plant given in Appendix D of the Construction Noise and Vibration Strategy (Transport for NSW 2019). Vibration impacts for each sensitive receiver are listed in Appendix C.

Table 12 Predicted exceedances of vibration criteria

Impact classification	Number of potentially affected receivers
Human comfort	0
Cosmetic damage	0
Heritage structure	0



4 Controls and safeguards

The Project represents a risk of adverse impacts on sensitive receivers, particularly when working close to the project boundary and outside approved hours.

Where short term noise impacts are unavoidable, mitigation measures described in the project construction environment management plan should be implemented together with the recommendations in Table 13 and additional mitigation measures for each receiver identified in Appendix B and summarised in

Table 14.

Table 13 Standard mitigation measures

Community consultation	<ul style="list-style-type: none"> Potentially affected receivers will be notified of OOH works in accordance with project requirements. Where practicable, works will be scheduled to not conflict with major student examination periods, church congregation times, and other sensitive periods identified through community consultation.
Site induction	<ul style="list-style-type: none"> All workers will be inducted to the project prior to commencing work and will be cognisant of their noise and vibration obligations under the CNVMP.
Behavioural practices	<ul style="list-style-type: none"> Avoid swearing and unnecessary shouting or loud radios onsite. Avoid dropping materials from height.
Equipment selection	<ul style="list-style-type: none"> Priority given to the use of quieter and less vibration emitting construction methods and plant alternatives where feasible and reasonable. The noise levels of plant and equipment would meet the maximum noise requirements of the CNVS.
Use and siting of plant	<ul style="list-style-type: none"> Locate compounds away from sensitive receivers and discourage access from local roads. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers where possible. Stationary plant should be located behind a structure or enclosed if practicable. Deliveries should be made as far as practical from sensitive receivers. Dedicated loading/unloading sites should be shielded where possible, if close to receivers. Plan traffic flow, parking and loading/unloading areas to minimise reversing. Avoid compression breaking on approach to the site. Where additional activities or plant may result in marginal noise increases and speed works up, consider concentrating activities at one location and complete works as quickly as possible.
Non-tonal reversing alarms.	<ul style="list-style-type: none"> Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work.
Noise monitoring	<ul style="list-style-type: none"> Monitoring should be completed to verify the assumptions of this CNVIS regarding estimated equipment noise emissions and to ensure compliance with the CNVS.
Vibration monitoring	<ul style="list-style-type: none"> Attended vibration measurements should be completed at commencement of vibration generating activities predicted to occur within safe working distances for cosmetic damage. Where monitoring demonstrates maximum levels exceeded, consider alternative methodologies/equipment
Implement any project specific mitigation measures	
1	N/A



Table 14 Additional mitigation measures

Code	Measure	Description
AA	Alternative accommodation	Alternative accommodation options may be provided for residents living in close proximity to construction works that are likely to incur unreasonably high impacts over an extended period of time. Alternative accommodation will be determined on a case-by-case basis.
M	Monitoring	Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals, noise or vibration monitoring may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the noise or vibration goal has been exceeded so that additional management measures may be implemented.
IB	Individual briefings	Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Communications representatives from the contractor would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project.
LB	Letterbox drops	For each Sydney Metro project, a newsletter is produced and distributed to the local community via letterbox drop and the project mailing list. These newsletters provide an overview of current and upcoming works across the project and other topics of interest. The objective is to engage and inform and provide project-specific messages. Advanced warning of potential disruptions (e.g. traffic changes or noisy works) can assist in reducing the impact on the community. Content and newsletter length is determined on a project-by-project basis. Most projects distribute notifications on a monthly basis. Each newsletter is graphically designed within a branded template.
RO	Respite offer	The purpose of a project specific respite offer is to provide residents subjected to lengthy periods of noise or vibration respite from an ongoing impact.
PC	Phone calls	Phone calls and/or emails detailing relevant information would be made to identified/affected stakeholders within 7 days of proposed work. Phone calls and/or emails provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs etc.
SN	Specific notifications	Specific notifications would be letterbox dropped or hand distributed to identified stakeholders no later than 7 days ahead of construction activities that are likely to exceed the noise objectives. This form of communication is used to support periodic notifications, or to advertise unscheduled works.



Appendix A Proposed activities and associated sound power levels

BH Construction

Drilling of AF_CGW2

5/30/2022 10:00:40 PM - 5/31/2022 5:00:45 AM

Equipment	Quantity	Usage	Reduction	SWL
Vacc truck	1	10 %	5	97
Drill rig - tracked mobile 20 tonne	1	40 %	5	109
Hand Tools (electric)	1	20 %	5	82

Activity Sound Power Level: 109

* includes 5 dB penalty for potentially annoying characteristics in line with the ICNG

BH Construction

Drilling of AF_CGW11

5/31/2022 10:00:40 PM - 6/1/2022 5:00:45 AM

Equipment	Quantity	Usage	Reduction	SWL
Drill rig - tracked mobile 20 tonne	1	40 %	5	109
Vacc truck	1	10 %	5	97
Hand Tools (electric)	1	20 %	5	82

Activity Sound Power Level: 109

* includes 5 dB penalty for potentially annoying characteristics in line with the ICNG



Detailed noise and vibration impact statement

Appendix B Map showing predicted noise impacts by impact class





Detailed noise and vibration impact statement

Appendix C Detailed predictions

C.1 Noise

Assessment: Additional Geotechnical Borehole Investigation					NML, LAeq, 15 minute				Sleep, LAmax		Predicted noise level, dBA		Exceedance summary											
NCA	Rec	Address	Flr	Land use	Day	O/day	Eve	Night	Screen	Awake	Cumulative LAeq, 15 minute	LMax	Highly Affected?	Exceed NML by (dB):				Exceed sleep disturbance by (dB):		Impact classification				
														Day	O/day	Eve	Night	Screen	Awake	Day	O/day	Eve	Night	
NCA 20	6950 88	14 QUIRK ST, ROZELLE NSW 2039	1	RES	61			50	Y		50	64		0	-	-	0	-	0	None				Noticable
NCA 20	6950 53	7 LILYFIELD RD, ROZELLE NSW 2039	1	RES	61			50	Y		51	65		0	-	-	1	-	1	None				Noticable
NCA 20	6949 71	9 QUIRK ST, ROZELLE NSW 2039	1	RES	61			50	Y	Y	52	66		0	-	-	2	1	2	None				Noticable
NCA 20	6949 34	13 QUIRK ST, ROZELLE NSW 2039	1	RES	61			50	Y		51	65		0	-	-	1	-	1	None				Noticable
NCA 20	6945 97	15 QUIRK ST, ROZELLE NSW 2039	1	RES	61			50	Y		51	65		0	-	-	1	-	1	None				Noticable
NCA 20	6943 97	5/12 QUIRK ST, ROZELLE NSW 2039	1	RES	61			50	Y	Y	53	66		0	-	-	3	1	3	None				Noticable
NCA 20	6943 89	16A QUIRK ST, ROZELLE NSW 2039	1	RES	61			50	Y		50	64		0	-	-	0	-	0	None				Noticable
NCA 20	6943 38	10 QUIRK ST, ROZELLE NSW 2039	1	RES	61			50	Y		50	64		0	-	-	0	-	0	None				Noticable
NCA 21	6941 46	47 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None				Noticable
NCA 21	6941 44	49 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None				Noticable
NCA 21	6941 43	45 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None				Noticable
NCA 21	6941 42	43 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None				Noticable
NCA 21	6941 15	9 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None				Noticable
NCA 21	6941 13	11 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	55		0	-	-	1	-	1	None				Noticable
NCA 21	6941 05	5 RUMSAY ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None				Noticable
NCA 21	6935 36	43A The Crescent, ROZELLE NSW 2039	1	RES	53			40	Y		52	65		0	-	-	12	-	12	None				Clearly Audible
NCA 21	6935 11	2/166 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		44	57		0	-	-	4	-	4	None				Noticable
NCA 21	6935 03	77 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None				Noticable
NCA 21	6935 02	101 MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None				Noticable
NCA 21	6934 96	1/133 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		44	58		0	-	-	4	-	4	None				Noticable
NCA 21	6934 50	134 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None				Noticable
NCA 21	6934 34	6/28 MACKENZIE ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None				Noticable
NCA 21	6934 16	125 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		44	57		0	-	-	4	-	4	None				Noticable
NCA 21	6934 15	1 RUMSAY ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None				Noticable
NCA 21	6934 01	8 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None				Noticable
NCA 21	6933 77	13/56-62 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None				Noticable
NCA 21	6933 65	82 ROSSER ST, BALMAIN NSW 2041	1	RES	53			40	Y		44	58		0	-	-	4	-	4	None				Noticable
NCA 21	6933 61	79 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None				Noticable
NCA 21	6933 51	15 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None				Noticable
NCA 21	6933 32	75 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None				Noticable
NCA 21	6933 09	23 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None				Noticable



Detailed noise and vibration impact statement

Assessment: Additional Geotechnical Borehole Investigation					NML, LAeq, 15 minute				Sleep, LAmax		Predicted noise level, dBA		Exceedance summary										
NCA	Rec	Address	Flr	Land use	Day	O/day	Eve	Night	Screen	Awake	Cumulative LAeq, 15 minute	LMax	Highly Affected?	Exceed NML by (dB):				Exceed sleep disturbance by (dB):		Impact classification			
														Day	O/day	Eve	Night	Screen	Awake	Day	O/day	Eve	Night
NCA 21	6933 04	14 GEORGE ST, BALMAIN NSW 2041	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6933 02	11 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None			Noticable
NCA 21	6932 93	58 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None			Noticable
NCA 21	6932 21	137 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		45	59		0	-	-	5	-	5	None			Noticable
NCA 21	6931 99	7 RUMSAY ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None			Noticable
NCA 21	6931 42	3/14-16 CRESCENT ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6930 63	111 MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6930 37	13 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None			Noticable
NCA 21	6930 24	49 CRESCENT ST, ROZELLE NSW 2039	1	RES	53			40	Y	Y	53	67		0	-	-	13	2	13	Noticable			Clearly Audible
NCA 21	6930 05	142A MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		46	60		0	-	-	6	-	6	None			Noticable
NCA 21	6929 85	16 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None			Noticable
NCA 21	6928 98	105 MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6928 87	10/56-62 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None			Noticable
NCA 21	6928 73	3 RUMSAY ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6928 29	22 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	55		0	-	-	1	-	1	None			Noticable
NCA 21	6927 73	3 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None			Noticable
NCA 21	6927 72	5 MOORE LANE, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6927 49	14 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6927 29	10/51 VICTORIA RD, ROZELLE NSW 2039	1	RES	53			40	Y		51	65		0	-	-	11	-	11	None			Clearly Audible
NCA 21	6927 11	10 CRESCENT ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None			Noticable
NCA 21	6926 56	51 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		46	59		0	-	-	6	-	6	None			Noticable
NCA 21	6926 49	27 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6926 36	3/89 MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6926 17	154 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		48	62		0	-	-	8	-	8	None			Noticable
NCA 21	6925 99	134 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		44	57		0	-	-	4	-	4	None			Noticable
NCA 21	6925 96	1/168 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		50	63		0	-	-	10	-	10	None			Noticable
NCA 21	6925 78	99 MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6925 63	9 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None			Noticable
NCA 21	6925 52	11 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None			Noticable
NCA 21	6925 37	5 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None			Noticable
NCA 21	6924 31	87 MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6924 12	179 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6923 67	154 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		48	62		0	-	-	8	-	8	None			Noticable
NCA 21	6923 23	139 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		45	59		0	-	-	5	-	5	None			Noticable



Detailed noise and vibration impact statement

Assessment: Additional Geotechnical Borehole Investigation					NML, LAeq, 15 minute				Sleep, LAmax		Predicted noise level, dBA		Exceedance summary										
NCA	Rec	Address	Flr	Land use	Day	O/day	Eve	Night	Screen	Awake	Cumulative LAeq, 15 minute	LMax	Highly Affected?	Exceed NML by (dB):				Exceed sleep disturbance by (dB):		Impact classification			
														Day	O/day	Eve	Night	Screen	Awake	Day	O/day	Eve	Night
NCA 21	6923 06	169 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		49	63		0	-	-	9	-	9	None			Noticable
NCA 21	6922 93	15 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	55		0	-	-	1	-	1	None			Noticable
NCA 21	6922 34	153 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		46	60		0	-	-	6	-	6	None			Noticable
NCA 21	6922 30	129 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		44	58		0	-	-	4	-	4	None			Noticable
NCA 21	6920 84	13/18-20 GEORGE ST, BALMAIN NSW 2041	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None			Noticable
NCA 21	6920 77	127 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		44	58		0	-	-	4	-	4	None			Noticable
NCA 21	6920 10	3-5 PINE ST, ROZELLE NSW 2039	1	RES	53			40	Y		46	60		0	-	-	6	-	6	None			Noticable
NCA 21	6919 75	107 MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6919 72	141 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		45	59		0	-	-	5	-	5	None			Noticable
NCA 21	6919 54	8 CRESCENT ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None			Noticable
NCA 21	6919 47	21 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	55		0	-	-	1	-	1	None			Noticable
NCA 21	6919 13	148 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		47	61		0	-	-	7	-	7	None			Noticable
NCA 21	6919 04	144 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		47	60		0	-	-	7	-	7	None			Noticable
NCA 21	6918 98	126 EVANS ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6918 89	94 ROSSER ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	56		0	-	-	3	-	3	None			Noticable
NCA 21	6918 38	4/3-5 PINE ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6918 23	49 CRESCENT ST, ROZELLE NSW 2039	1	RES	53			40	Y	Y	53	66		0	-	-	13	1	13	None			Clearly Audible
NCA 21	6917 35	29 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		45	59		0	-	-	5	-	5	None			Noticable
NCA 21	6917 27	176 BEATTIE ST, BALMAIN NSW 2041	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6917 02	27 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		45	59		0	-	-	5	-	5	None			Noticable
NCA 21	6916 67	2/146 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		49	63		0	-	-	9	-	9	None			Noticable
NCA 21	6916 48	116 EVANS ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6915 65	12 CRESCENT ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	54		0	-	-	1	-	1	None			Noticable
NCA 21	6914 99	29 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		45	58		0	-	-	5	-	5	None			Noticable
NCA 21	6914 87	10 MACKENZIE ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6914 78	5 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	55		0	-	-	1	-	1	None			Noticable
NCA 21	6914 69	143 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		46	59		0	-	-	6	-	6	None			Noticable
NCA 21	6913 78	181 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None			Noticable
NCA 21	6913 57	2/12 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None			Noticable
NCA 21	6912 96	35 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None			Noticable
NCA 21	6912 80	149 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		46	60		0	-	-	6	-	6	None			Noticable
NCA 21	6912 38	13 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None			Noticable
NCA 21	6911 67	24 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None			Noticable
NCA 21	6911 23	165 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		47	61		0	-	-	7	-	7	None			Noticable



Detailed noise and vibration impact statement

Assessment: Additional Geotechnical Borehole Investigation					NML, LAeq, 15 minute				Sleep, LAmax		Predicted noise level, dBA		Exceedance summary											
NCA	Rec	Address	Flr	Land use	Day	O/day	Eve	Night	Screen	Awake	Cumulative LAeq, 15 minute	LMax	Highly Affected?	Exceed NML by (dB):				Exceed sleep disturbance by (dB):		Impact classification				
														Day	O/day	Eve	Night	Screen	Awake	Day	O/day	Eve	Night	
NCA 21	6910 87	147 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		46	59		0	-	-	6	-	6	None				Noticable
NCA 21	6910 85	17 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	55		0	-	-	2	-	2	None				Noticable
NCA 21	6910 81	141 EVANS ST, ROZELLE NSW 2039	1	RES	53			40	Y		40	54		0	-	-	0	-	0	None				Noticable
NCA 21	6910 14	164 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		49	63		0	-	-	9	-	9	None				Noticable
NCA 21	6909 84	53 MANSFIELD ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None				Noticable
NCA 21	6909 72	177 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		50	63		0	-	-	10	-	10	None				Noticable
NCA 21	6909 66	152 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		47	61		0	-	-	7	-	7	None				Noticable
NCA 21	6909 23	19 ROSSER ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	55		0	-	-	1	-	1	None				Noticable
NCA 21	6909 20	10 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		42	56		0	-	-	2	-	2	None				Noticable
NCA 21	6909 00	131 MULLENS ST, ROZELLE NSW 2039	1	RES	53			40	Y		44	58		0	-	-	4	-	4	None				Noticable
NCA 21	6908 75	87A MULLENS ST, BALMAIN NSW 2041	1	RES	53			40	Y		43	57		0	-	-	3	-	3	None				Noticable
NCA 21	6908 67	28 SMITH ST, ROZELLE NSW 2039	1	RES	53			40	Y		41	55		0	-	-	1	-	1	None				Noticable



Detailed noise and vibration impact statement

C.2 Vibration

NCA	Receiver	Address	Land use	Vibration Impact
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Appendix C – Safe working distance technical note

Geotechnical drilling vibration – White Bay Power Station

Project Sydney Metro West Central Tunnelling Package
Client Acciona Ferrovia Joint Venture

15 November 2021

21028-NV-TN-1-1

1 Introduction

Acciona Ferrovia Joint Venture (AFJV) is delivering the Central Tunnelling Package (CTP) of the Sydney Metro West project.

As part of the early works for the project, geotechnical borehole investigations are proposed inside and within the curtilage of heritage-listed buildings forming the White Bay Power Station, which is adjacent to The Bays station construction site.

Four boreholes up to 45 metres below ground level would be constructed using a track-mounted drill rig. Three of these boreholes would be inside and one outside, as illustrated in Figure 1.

The proposed drilling techniques and locations may have consequences for construction vibration impacts on the heritage structures.

This document provides a review of the level of risk of vibration damage on the White Bay Power Station including:

- Identification of appropriate vibration guideline values
- Establishment of the level of vibration caused by the proposed drilling technique
- Confirmation of the level of risk and any applicable mitigation measures for the works.



2 Vibration guideline value

In line with the project's Noise and Vibration Management Plan (NVMP), the risk of vibration damage to heritage buildings and structures is assessed under a conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity (from Table 4 of DIN 4150-3: 2016 *Structural Vibration – effects of vibration on structures*).

3 Proposed activities and vibration emissions

The procedure for constructing each borehole would be as follows:

1. An initial core of the concrete floor would be created using a 300 mm core drill. The core would be retained for replacement once drilling is complete.
2. Non-destructive digging would be undertaken for the top metre of fill material to identify any potential services or utilities using a vacuum truck.
3. If no services or utilities are identified geotechnical drilling would be undertaken using a track mounted wireline geotechnical drill (model: Hanjin DB8). A bore of around 45 metres would be constructed.
Note: if any archaeological/heritage fabric or services/utilities are identified the borehole would be relocated.

The nominated borehole construction techniques are relatively low sources of vibration with rotary mechanisms rather than percussive. Specific vibration emission data are not readily available for the proposed equipment; however vibration levels for similar equipment have been referred to for this assessment. Estimated vibration curves are presented in Figure 2.

Based on the curves, a safe working distance for all phases of the borehole construction would be 3 metres.

4 Recommendations

Upon creating the first of these boreholes, vibration monitoring should be undertaken to confirm the emission levels from the core drill and the drill rig and confirm the safe working distance prior to continuing with the remaining boreholes.

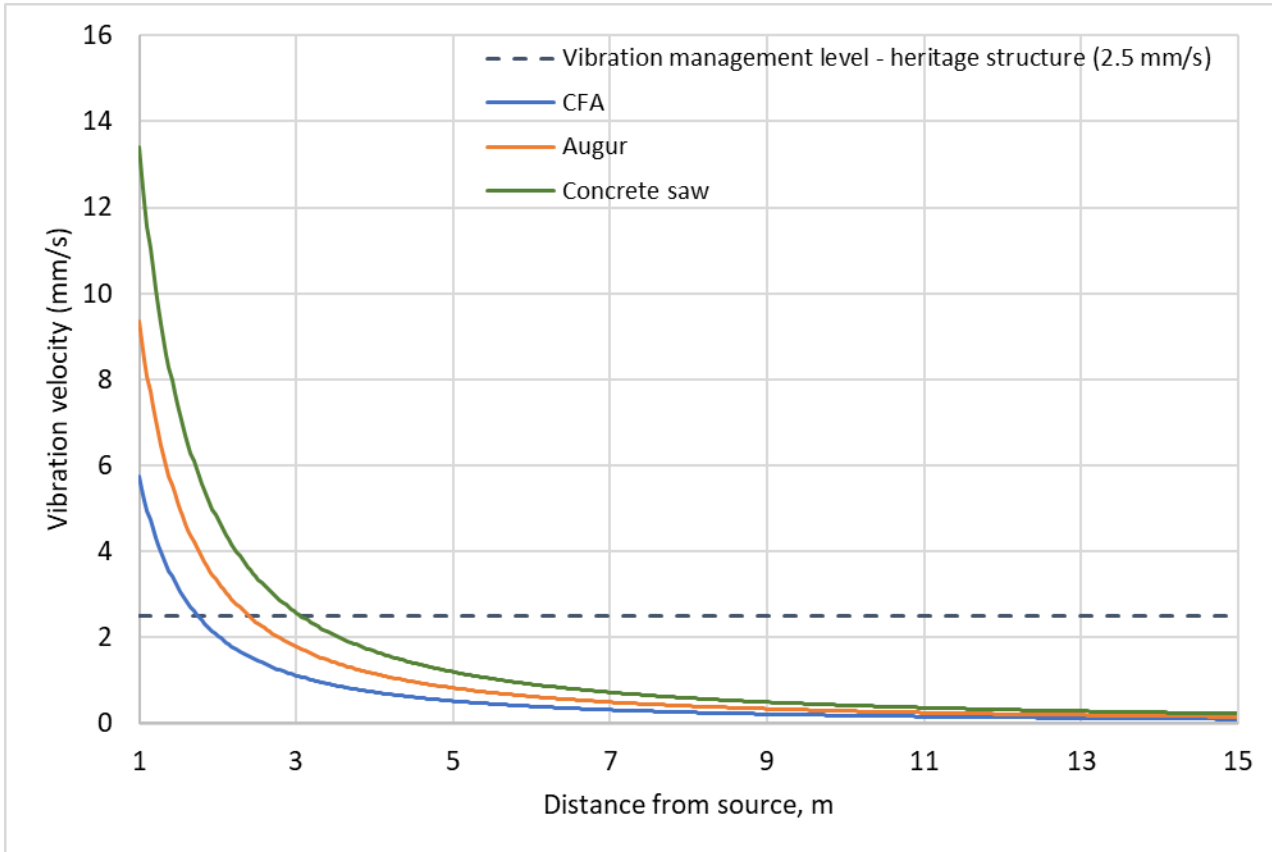


Figure 2 Estimated vibration curves for similar drilling equipment

Appendix D – Heritage Assessment Memo – The Bays



artefact

Heritage Assessment Memo for The Bays

**Project: Metro West Central Tunnelling Package–
The Bays**

Date: 12 November 2021

Revised 28th January 2022

Revised 28th June 2022

**Authors: Samuel Sammut, Sandra Wallace and Dr
Iain Stuart**

Project background

Sydney Metro West is a critical step in the delivery of Future Transport Strategy 2056. It would provide fast, reliable and frequent rail service, doubling rail capacity between Greater Parramatta and the Sydney CBD, transforming Sydney for generations to come.

The once-in-a-century infrastructure investment will have a target travel time of about 20 minutes between Parramatta and the Sydney CBD, link new communities to rail services and support employment growth and housing supply. Stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street (Sydney CBD).

This advice memo outlines proposed enabling works to be undertaken at The Bays construction site as low impact works by the contractor for the Central Tunnelling Package portion of Metro West Stage 1.

An additional bore hole location was added in January 2022 which will be assessed in this updated memo. As the project is now in construction phase the bore hole will not be undertaken as low impact works.

A further revision to this memo has been undertaken to include two additional boreholes, AF-CHW2 and AF_CGW11 proposed in June 2022.

An impact assessment has been undertaken in order to adhere to the approved Archaeological Research Design and Excavation Methodology (ARDEM) and to ensure the correct archaeological management is undertaken.

Approvals context

The planning process for Sydney Metro West is being assessed as a staged infrastructure application under section 5.20 of the *Environment Planning and Assessment Act 1979*.

Artefact Heritage was engaged to prepare a non-Aboriginal heritage assessment for inclusion in the Environmental Impact Statement for Stage 1 of Metro West.¹ The Environmental Impact Statement, including the non-Aboriginal heritage assessment, was published for public exhibition on 30 April 2020.

The non-Aboriginal heritage assessment included consideration of how the project would affect listed items including the White Bay Power Station which is listed on the State Heritage Register (SHR) and is partially with The Bays construction site.

The non-Aboriginal heritage assessment also identified that potential significant non-Aboriginal archaeological resources would be impacted within The Bays Station construction site. The assessment recommended preparation of an Archaeological Research Design (ARD) to manage impacts to these potential archaeological resources. The ARD was prepared as part of the submissions report and set out a high level management approach to the archaeology at the site.

The Sydney Metro West Concept and major civil construction for Sydney Metro West between Westmead and The Bays (Stage 1 of the planning approval process for Sydney Metro West), application number SSI-10038, were approved on 11 March 2021.

Condition D25 of the SSI approval requires the preparation of a revised ARDEM for The Bays construction site. The ARDEM has been approved by Heritage NSW and Sydney Metro.

The proposed works as assessed in the November 2021 memo were undertaken prior to the construction phase of the project under the low impact works provisions of the planning approval. This memo will provide advice as to whether the proposed works have an 'affect' on SHR listed items or significant archaeology. If an affect is assessed the works would be defined as construction under the SSI and can only be undertaken prior to the construction phase if consultation with Heritage NSW is undertaken and the impacts are approved by DPIE in consultation with Heritage NSW.

The additional bore hole (AF_BH51, AF_CG-W2 and AF_CGW11) will be undertaken during the construction phase therefore works will need to maintain consistency with the approved CEMP and ARDEM.

¹ Artefact April 2020. *Sydney Metro West Technical Paper 3: Non-Aboriginal Heritage*. Report prepared for Sydney Metro.

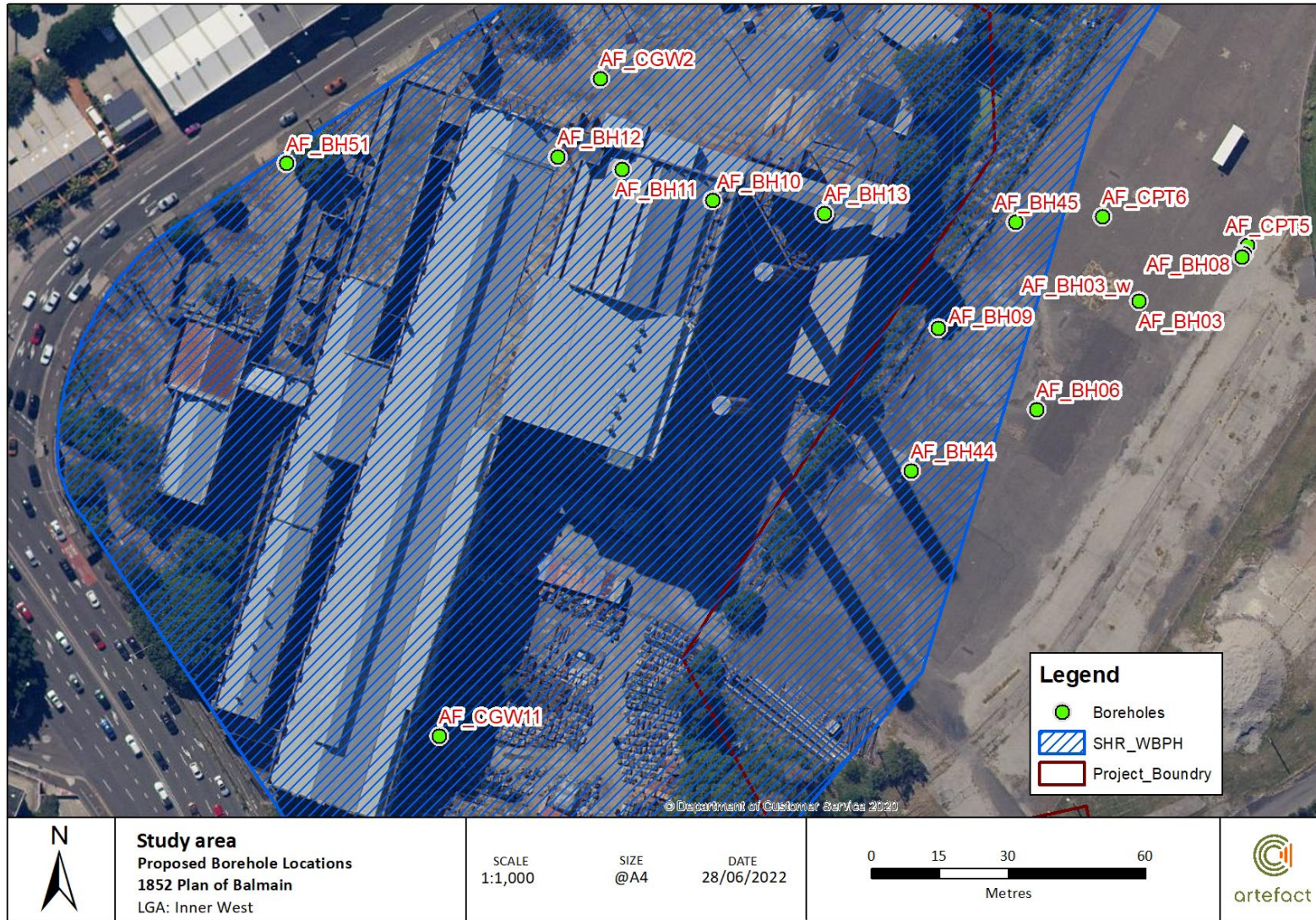


Figure 1: White Bay Power Station curtilage with proposed borehole locations.

Heritage listings

White Bay Power Station, developed between 1912 and 1948, is bound by Victoria Road and Robert Street on the Balmain Peninsula. The power station comprises two steel stacks; a coal handling unit serviced by a spur rail line; a turbine hall; building incorporating administration offices; the old laboratory and a workshop; a boiler house; a switch house and substation; and an ancillary structure including coal loading wharf and coal handling system. The White Bay Power Station is a local landmark and is visible from many vantage points in the surrounding urban and harbour setting.

The NSW State Heritage Inventory entry for SHR listed item No. 01015, listed as *White Bay Power Station*, contains the following statement of significance:

“White Bay Power Station was the longest serving Sydney power station and is the only one to retain a representative set of machinery and items associated with the generation of electricity in the early and mid-twentieth century. It retains within its fabric, and in the body of associated pictorial, written archives and reports and oral history recordings, evidence for the development of technology and work practices for the generation of electrical power from coal and water. This development of power generation at White Bay contributed to the expansion of the economy of Sydney and NSW.

As a result of its remarkably intact survival, it retains the unique ability to demonstrate, by its location, massing, design, machinery and associated archives, the influence and dominance that early power-generating technology exerted on the lives and urban fabric of inner cities in the first half of the twentieth century. The extant items within the surviving operation systems are of an impressive scale and exhibit a high degree of creative and technical achievement in their design and configuration. They encompass all aspects of the generation of electrical power and represent all phases from the inter-war period through to the more sophisticated technologies of the mid-twentieth century. They are of exceptional technical significance with research potential to yield information not available from any other source. Aesthetically, White Bay Power Station contains internal and external spaces of exceptional significance. These spaces include raw industrial spaces of a scale, quality and configuration which is becoming increasingly rare and which inspires visitors and users alike. Externally, it is a widely recognised and highly visible landmark, marking the head of White Bay and the southern entry to the Balmain Peninsula and its industrial waterfront. It retains a powerful physical presence and industrial aesthetic and is the most important surviving industrial building in the area.

White Bay Power Station has strong and special associations and meanings for the local community, for former power station workers and for others who have used the site and is of high social significance. It is a potent symbol of the area’s industrial origins and working traditions, aspects of community identity that are strongly valued today by both older and new residents. It is one of the few surviving features in the area that provide this symbolic connection. It is the only coal based industrial structure, dependent on a waterside location to survive adjacent to the harbour in the Sydney Region. It also forms part of a closely related group of large-scale industrial

structures and spaces (White Bay Hotel, define a major entry point to the city from the west. It is of exceptional structural significance to the State of NSW.”

The White Bay Power station is of State significance and its curtilage is shown in Figure 1

Heritage item	Register listings	Address	Significance	Relationship to study area
White Bay Power Station (SHR Listing No. 01015)	SHR Listing No. 01015; Sydney Harbour Foreshore s170 4500460; SREP No 26 – City West Part 3 Item No. 11; RNE Item No. 19512; NTR classified item	Victoria Road, Rozelle, NSW 2039	State	Within study area

Archaeological potential and significance

The proposed boreholes are located in an area outside of the area of assessment of the revised ARD prepared for the Bays Metro construction site and the ARDEM (Figure 4). As such, additional assessment has been conducted.

Phase 1: Early occupation and land reclamation (1800-1910)

The Glebe Island area was initially developed by British colonists from the 1840s onwards. Much of the land in this area was covered by White Bay’s tidal flats until reclamation works were undertaken during the latter half of the century. Historical evidence demonstrates that there were no structures from this period in the area where the White Bay Power Station is presently situated. In fact, parts of the Power Station site were originally tidal flats and marshland prior to the reclamation of White Bay. As such, there is nil potential for significant structures and low potential for artefacts related to reclamation efforts or early land use. There is moderate potential for bulk fill material used in the reclamation of the area and these materials would be considered locally significant. The location of boreholes with respect to the largely unmodified 1850s-era shoreline of White Bay is shown in Figure 3.

Phase 2: Establishment of Government Infrastructure and wartime use of the site (1910-1950)

During this phase, the White Bay area underwent significant development. The area was repurposed towards industrial use, which also included the construction of wharfage and railway infrastructure. The White Bay Power Station was constructed during this development period to support the ensuing electrification of Sydney’s railway system and facilitate its future expansion. Beginning in 1912, the Power Station was constructed in two stages. Between 1912 and 1917, the original Power House and Boiler House sections of the Power Station were constructed, along with the rail infrastructure and water conduit necessary to support them. The second stage occurred from 1923-1928, involving the extension of the existing structures southward and expansions to the Power Station’s coal-handling facilities to meet the increasing demand for electrical power.

These first stage of structures, particularly the boiler room, were installed over driven timber piles spaced approximately 1 m apart. However, no design plan of the locations of these piles exists and ground disturbance within the north-eastern portion of the building has the potential of encountering timber piling.

Below-ground remains related to the sub-floor elements of the building, including the water circulating system, conduit casings, sub-floor cavities and buried timber piling would be of State significance. The water circulating system is known to have a vacant cavity below the concrete floor on the eastern side. Based on historical plans, this cavity is estimate at approximately 300 cm in width from the eastern edge of the conduit itself (Figure 2).

A plan of known sub-floor elements of the White Bay Power Station with respect to propose boreholes is provided in Figure 4, showing that boreholes have been positioned away from known surface and sub-surface elements.

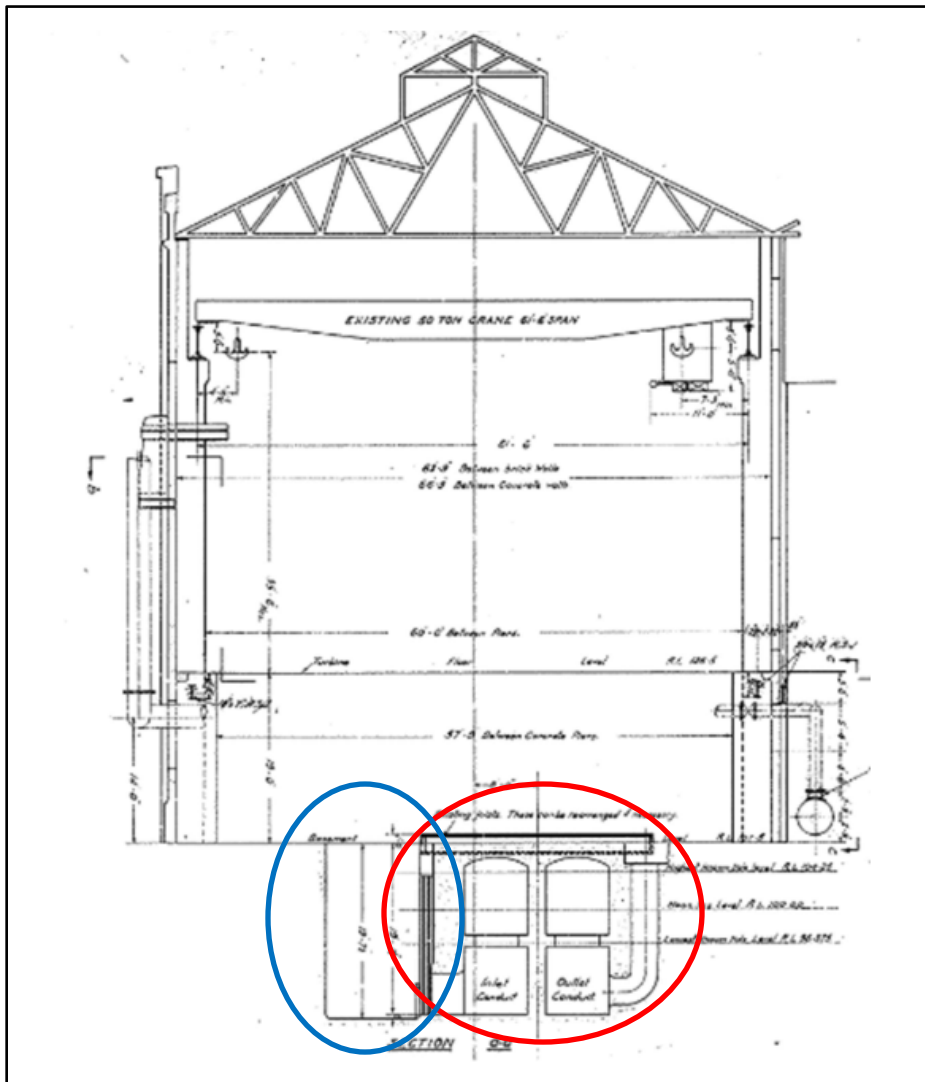


Figure 2: Northern elevation of the turbine hall, showing subfloor cavity (blue circle) to the east of water circulating conduit (red circle) within the turbine hall

Phase 3: Development for coal and bulk good shipping and handling (1950-1970)

Increasing growth of urban centers within NSW and demand for resources during the post-WWII years resulted in further upgrades to the Glebe Island area as a means of increasing its industrial potential. The White Bay Power Station received several upgrades to intended to modernise the Power Station and increase its power output. These included the demolition of part of the original Boiler House No. 1, and the construction of a new Boiler House, Switch House and Control Room. The works, which were completed by 1958, again expanded the Power Station's footprint, extending the structure's boundaries to the north and east through the construction of the new Boiler House. These works would have further disturbed the site, having been performed in areas of the Power Station's curtilage which had previously been undeveloped. As few major works have occurred in the area since this period much of the White Bay Power Station remains unaltered from this state. Therefore, although many of the remains of the Power Station were removed during its decommissioning, remains associated with this phase would generally be extant.

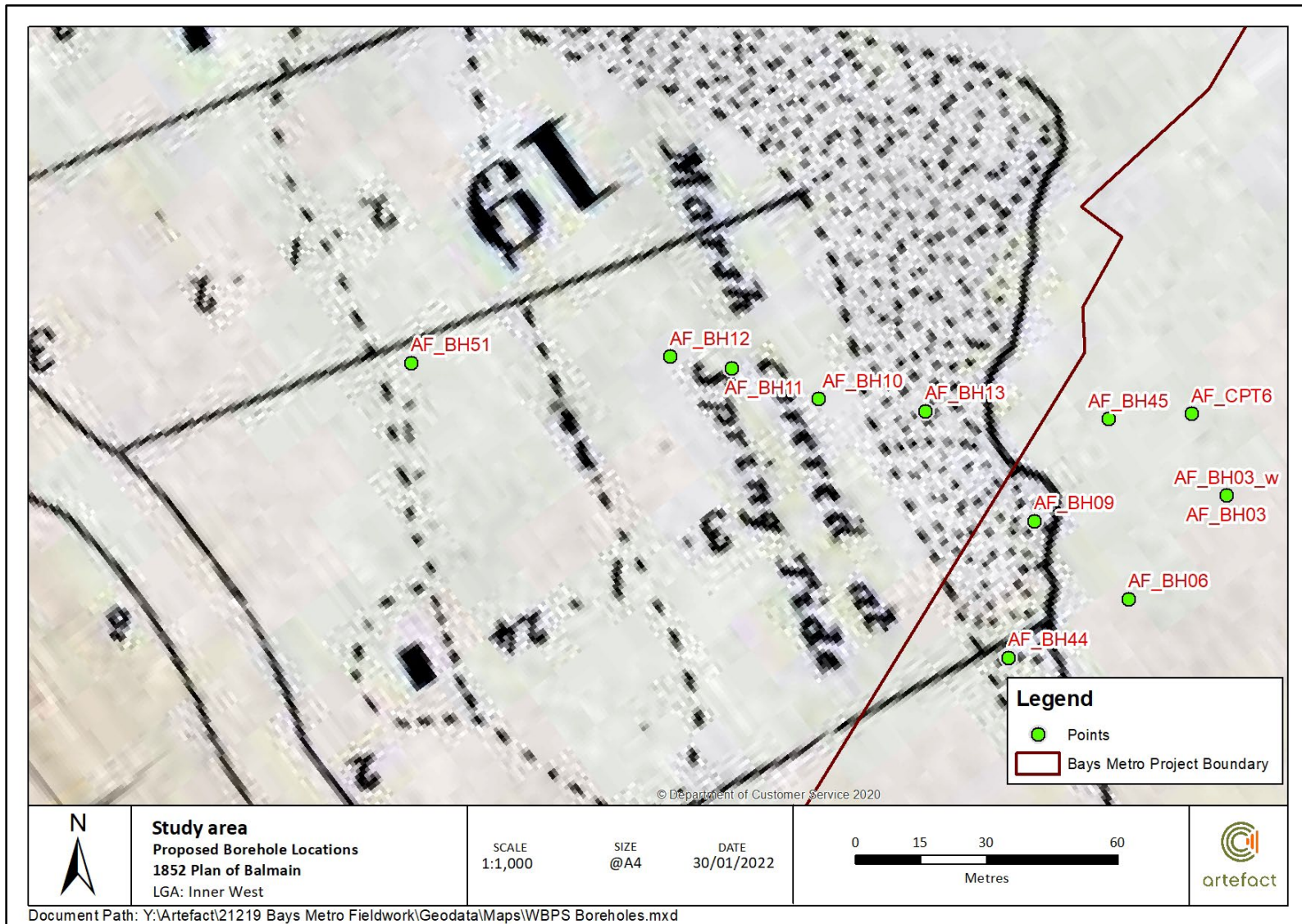


Figure 3: 1852 Plan of pre reclamation fill landscape with bore hole locations shown in green .



Figure 4: Plan of the White Bay Power Station Power House ground level with borehole locations.

Site inspection

A site inspection of The Bays construction site was conducted on 21 September 2021 by Duncan Jones. The site inspection was conducted to understand the ground levels of the site; to identify evidence of ground disturbance and to locate historic fabric which was present at ground level. A photographic record of the landscape, evidence of ground disturbance and relevant inspected features was made during the site inspection.

An inspection of the concrete flooring was conducted at all borehole location sites. Borehole locations were identified in areas where no visible sub-floor cavities or conduits were located. Borehole locations were situated on concrete hard-stand, and were located away from above-ground portions of heritage significant fabric.

Borehole AF_BH51 which was added later was not inspected but in any case is located outside the White Bay Power Station.



Figure 5: Approximate location with red arrow of proposed BH 10



Figure 6: Approximate location with red arrow of proposed BH 11



Figure 7: Approximate location with red arrow of proposed BH 12



Figure 8: Approximate location of proposed BH 13 (red arrow)

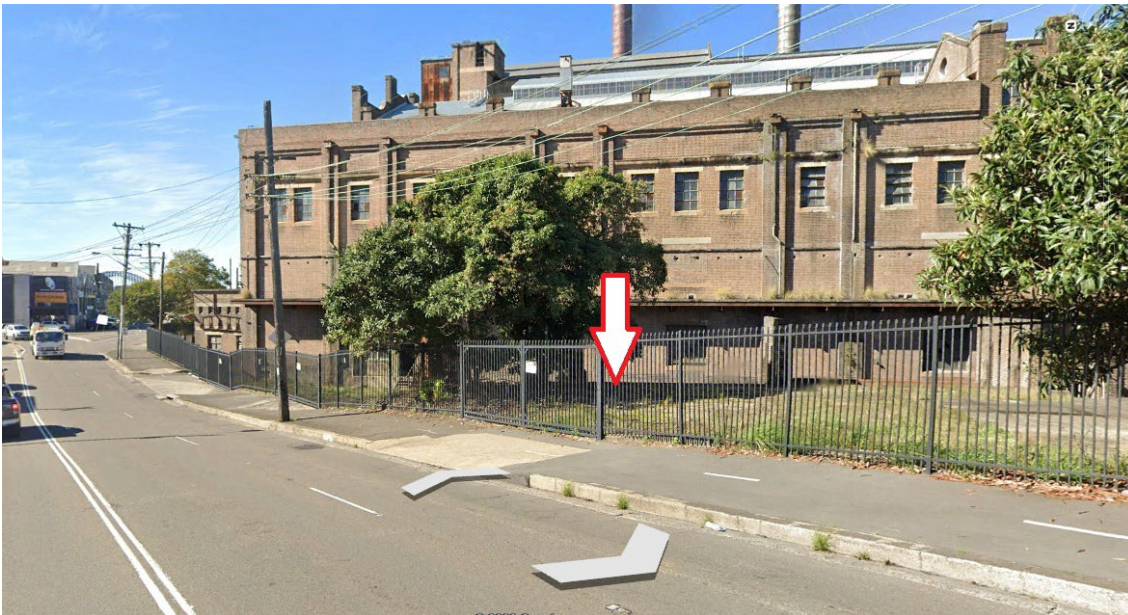


Figure 9 Approximate location of proposed BH 51 (superimposed on Google Street View)

Proposed works

Geotechnical borehole investigation

Four geotechnical investigation boreholes are proposed using a truck-mounted drilling rig. Two boreholes are proposed inside the White Bay Power Station building (BH 11 and BH 12), while two boreholes would be excavated within concrete hardstand to the immediate east of the White Bay Power Station building structure (Figure 9).

Borehole BH51 is located on the northern boundary of the site adjacent to Roberts Street (see Figure 9).

The protocol for excavating these boreholes has been provided as follows:

1. The depth of the concrete slab would be estimated from an existing core-hole observed on site
2. An initial core using a 300 mm core drill would be terminated at the depth measured in step 1.
3. The concrete core would be retrieved (and kept for replacement at step 10).
4. Is the concrete slab fully drilled through? No go to step 5, yes go to step 6.
5. If the concrete slab is not fully drilled through at step 4 the concrete core would continue to be drilled at 10mm increments, with an attempt to retrieve the concrete core every 10 mm.
6. Once it has been confirmed the concrete slab has been fully drilled through, the archaeologist would visually inspect the base of the hole for archaeological or heritage fabric as per the recommendations of the heritage memo.
7. If no archaeological or heritage fabric is identified nondestructive digging would be undertaken for the top 1m of fill material to identify any potential services or utilities.
8. If no services or utilities are identified geotechnical drilling would be undertaken.
9. If either archaeological/heritage fabric or services/utilities are identified the borehole must be relocated.
10. The concrete core retrieved at Step 3 would be used to reinstate the borehole at the conclusion of drilling.

Note: non-destructive digging and concrete coring would use water suppression. A vacuum would be used to capture water discharged during this process.



Figure 10: Location of proposed borehole excavations within White Bay Power Station

Assessment against conservation management policies

The conservation policies provided in the White Bay Power Station Conservation Management Plan (CMP) 2011 have been reviewed. Policies provided in the CMP relevant to assessing the impacts of the proposed works have been extracted and provided below for reference.

Policy	Assessment of impacts against recommendations
1.1.1	<p><i>White Bay Power Station retains considerable cultural significance and must be retained and conserved. In order to ensure its long-term maintenance and survival it must be adapted for appropriate new use or uses. Such uses must retain and respect the significant elements and attributes of this place.</i></p> <p>Proposed works would involve the removal and reinstatement of small sections of concrete flooring in the Turbine Hall, Boiler Room and underneath the Coal</p>

Policy	Assessment of impacts against recommendations
1.1.7	<p>Loader. The removal and reinstatement of the concrete flooring would not alter these spaces or impact significant machinery and would not result in any loss of significance or damage to significant elements of the heritage item.</p> <p><i>The aesthetic (including sensory aspects of visual, aural and tactile) qualities of the internal and external spaces and elements of exceptional and high significance must be retained and respected, viz. the visual and special qualities of the Turbine Hall.</i></p>
2.1	<p>Proposed works would involve the removal and reinstatement of small sections of concrete flooring in the Turbine Hall, Boiler Room and underneath the Coal Loader. These works would not alter the configuration or significance of any of these Exceptionally significant spaces.</p> <p><i>Any and all works to White Bay Power Station should be carried out in accordance with the principles and processes set out in the Australia ICOMOC Burra Charter 1999</i></p>
2.2	<p>The proposed works have been undertaken to minimise impacts to significant fabric by avoiding geotechnical investigation in areas where known subsurface elements of the building are located. All works are being conducted to be as reversible as possible.</p> <p><i>Spaces ranked of exceptional, high and moderate significance at White Bay Power Station must be fully recorded photographically for archival purposes before any intervention or works commence. Those spaces ranked as having only little significance require a general photograph only for archival purposes. (Refer to Heritage Office guidelines 'How to Prepare Archival Records of Heritage Items' and 'Photographic Recording of Heritage Items Using Film or Digital Capture')</i></p> <p>Photographic recording of the areas of works would be conducted prior to the commencement of geotechnical investigation. Photographic recording of the areas of geotechnical investigation would be made after the completion of the works to demonstrate the area was 'made good'.</p> <p><i>All works to White Bay Power Station must be directed, supervised and carried out by person with appropriate knowledge, skills and experience in conservation and adaptation of such elements.</i></p> <p>Heritage personnel would be present to supervise geotechnical works and to undertake archaeological monitoring as necessary. Protocols have been developed in this memo to minimise impacts to significant fabric.</p>

Heritage impact assessment

Built heritage impact assessment

The proposed boreholes would cut and drill through the original fabric of the flooring of the White Bay Power Station; specifically in the northern end of the Turbine Hall, the northern end of the Boiler House, and on the exterior of the Power House structure near its northeast corner. Based on existing as-built plans of the structure, these boreholes are situated in areas where they would not impact any subfloor structure, and as such elements of Exceptional significance such as the water circulating system or conduits relating to the former operation of the boilers, would not be impacted.

The Turbine Hall and Boiler Room are both assessed as of Exceptional value to the State significance of the structure overall. However, the concrete flooring of these rooms is not graded independently as high

significance fabric. The significance value of the Turbine Hall and Boiler Room have been noted for their aesthetic qualities (the layout and proportions of the space, which are demonstrative of the former operation of the power plant) as well as remnant machine equipment of the power plant. The proposed works would not impact or alter either the configuration or aesthetic values of these spaces, nor impact any equipment in the structure.

Concrete flooring segments which would be removed would be reinstated following the completion of geotechnical excavation and the area made good. These works would result in **negligible** physical and visual impact to the heritage significance of White Bay Power Station.

Borehole AF_BH51 is outside the Turbine Hall and Boiler room and would have negligible physical and visual impact to the heritage significance of White Bay Power Station.

Non-Aboriginal archaeological impact assessment

The proposed boreholes would drill through the flooring of the White Bay Power Station up to a depth of 45m. Based on historical mapping, this would excavate into ground that has been heavily modified by previous construction work and into potential fill layers from reclamation works in the late 1800s. However, the depth of reclamation fills in this location are not anticipated to be significant as the majority of the power station is located in an area which was either intertidal mudflats or above the pre-modified high tide mark. This assessment has found there is nil-low potential for Phase 1 remains associated with reclamation fill to be present, these would be locally significant.

Borehole AF_CG_W2 is located outside the Power station building in an area that is shown as semi-tidal mangroves on the historical plans and was vacant land until the area was resumed for the Power Station. Clearly there would be a low potential for reclamation fills and for archaeological remains related to the use of the power station.

Borehole AF-CGW11 is located in an area which was cut down for the construction of the 1920s extension to the White Bay Power Station (Boiler House No 2). Boiler House No 2 was in operation from c1925 until its demolition in the mid-1970s. The physical evidence of Boiler House No 2 is in the concrete footing remains. Currently the area is used for storage.

There is nil-low potential for remains relating to Phase 2 to be present and they are likely to be locally significant, although any intact remains would be considered State significant if they are related to the White Bay Power Station. Historical plans of the power station also indicate that no known sub-floor conduits or cavities are located in the direct area of the proposed bore hole locations. However, the potential for geotechnical works being located in the same area as one of the timber piles – which are known to exist but for which no historical plan of their location has been identified – is considered possible. Archaeological controls have been provided in this memo and in the proposed works methodology to prevent inadvertent impacts to any timber piles if they geotechnical investigation occurs in an area which they are preserved in.

Therefore, the proposed works will have **negligible** impacts to significant non-Aboriginal archaeological resources at White Bay.

Aboriginal archaeological impact assessment

There are no Aboriginal Heritage Information Management System (AHIMS) registered sites in the proposed borehole locations. Due to nineteenth century foreshore reclamation and large-scale industrial

development where the boreholes are located, no Aboriginal sites are predicted to be located within the area where the boreholes are proposed to be excavated.

Impacts to Aboriginal objects are unlikely as a result of the proposed works.

Conclusion

The proposed boreholes have been assessed as having a negligible impact on the White Bay Power Station SHR item and are unlikely to impact significance archaeological remains or Aboriginal objects. Mitigation measures have been recommended below which will minimize the potential for harm to the Power Station, including keeping machinery at a distance, archaeological monitoring and reinstating removed fabrics. As such, the proposed bore holes will not affect the heritage significance of the White Bay Power Station and would be undertaken under the low impact work provisions of the SSI.

Recommendations

The following is recommended for the proposed works for AF_BHs 10-13):

- No building fabric may be modified by the works, except for the concrete flooring surfaces where boreholes are proposed.
 - Specifically, surface-level elements which are present, including (but not limited to) rail beams, strip drain grills, flagging stones, original floor markings and areas where the floor interfaces with wall structures cannot be impacted by borehole excavation
- During core drilling and NDD works, the area around the core-hole must be bunded to prevent surface water run-off into the surrounding area and the area protected from splash. Care must be taken during core drilling that if sub-floor cavities are present below a drilling location, that these cavities are not flooded with water ingress.
- Archaeological monitoring would be conducted during the geotechnical excavation process, including all steps outlined in the proposed works brief of this memo.
- Prior to the commencement of works and after the completion of concrete core reinstatement, the area where works are proposed would be archivally photographed in accordance with Heritage NSW guidelines 'How to Prepare Archival Records of Heritage Items' and 'Photographic Recording of Heritage Items Using Film or Digital Capture'
- If any elements of unanticipated subfloor significant fabric are identified in a borehole location after the removal of the concrete core (such as undocumented conduits or culverts, or remnants of the supporting timber piles from the first stage of the power station), the borehole must be relocated to avoid impacting that significant fabric. Should significant fabric be present within the entirety of an area where borehole works are proposed, the works may not proceed in that location

- The removal of concrete surfaces must not use jackhammers or similar high-vibration tools should concrete be difficult to remove with core drilling. Should core drilling not work, rotational saw-cutters may be used to cut the concrete
- Concrete which is removed must also be reinstated and made good following works. Cement used to reinstate the removed concrete must be applied in a concealed manner, and must be colour matched as close as practicable to the original concrete flooring, to minimise any visual impacts following the completion of works
- Should removed concrete not be fit for reinstatement, the replacement cement must be colour matched and blended as closely as possible as the original flooring to minimise visual disturbance. The use of replacement concrete / cement must be clearly recorded in the archival photographic log prepared for the works.
- Building fabric (including concrete to be removed and reinstated) cannot be marked with permanent markers (spray paint or similar). Should marking be required for survey and control purposes, these must be applied with removable materials and be completely reversible. The removal of marking must be completed at the end of this program of works.
- The smallest possible drill rig must be used inside the power station to prevent damage or modifications to the heritage item. No fabric or moveable heritage may be moved or relocated for the machine to enter
- Non-destructive digging vehicles (vacuum suction trucks) must not enter the Power Station's structures; rather, the water and vacuum pipes should be fed into the building from the vehicle outside without moving or impacting any heritage significant fabric

As AF-BH51 is outside of the SHR curtilage and is not expected to impact archaeological remains it can be undertaken in accordance with the projects Unexpected Finds Procedure.

Borehole AF_CG_W2 is located outside the Power Station building so while care should be taken not to impact the adjacent building, the recommendations above relating to work inside the buildings can be disregarded.

Although borehole AF_GG_W11 is also located outside the Power Station building it is within the location of the former No 2 Boiler House all the above heritage management recommendations will apply to this borehole.