Planning Approval Consistency Assessment Form

SM-17-00000111

Metro Body of Knowledge (MBoK)

Assessment name:	Waterloo – Temporary closure of Cope Street
Prepared by:	Julian Paul
Prepared for:	Sydney Metro
Assessment number:	JH02
Status:	Final
Version:	1.0
Planning approval:	SSI 15_7400
Date required:	January 2022
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For information – do not alter:

Applicable to:	Sydney Metro
Document Owner:	Director, Environment, Sustainability & Planning
System Owner:	Deputy Chief Executive, Operations, Customer & Place-making
Status:	Final
Version:	3.0
Date of issue:	27 November 2020

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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)):

SSI15_7400 Sydney Metro City & Southwest – Chatswood to Sydenham
Mod 1 Victoria Cross Station, Artarmon Substation and minor administrative mod
Mod 2 Central Walk mod
Mod 3 Martin Place Station mod
Mod 4 Sydenham Station and Sydney Metro Trains Facility South mod
Mod 5 Blues Acoustic Shed
Mod 6 Administrative Changes
Mod 7 Administrative Changes
Mod 8 Blues Point Access Site

Date of determination:

Infrastructure Approval date 09 January 2017
Modification 1 Approval date 18 October 2017
Modification 4 Approval date 13 December 2017
Modification 2 Approval date 21 December 2017
Modification 3 Approval date 22 March 2018
Modification 5 Approval date 02 November 2018
Modification 6 Approval date 21 February 2019
Modification 7 Approval date 29 June 2020
Modification 8 Approval date 25 November 2020

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Type of planning approval:

Critical State Significant Infrastructure

Description of existing approved project you are assessing for consistency:

SSI_7400: The Chatswood to Sydenham component of Sydney Metro City & Southwest comprises a new metro rail line, approximately 16 kilometers long, between Chatswood and Sydenham. New metro stations would be provided at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Waterloo, as well as new underground metro platforms provided at Central Station.

In regards to the Waterloo Station construction site, the Submissions and Preferred Infrastructure Report (SPIR) identified that the construction works included the temporary incorporation of the footpath and parking lane on the western side of Cope Street into the Waterloo Station construction site for the duration of construction. The approved indicative layout of the Waterloo Station construction site is provided in Figure 3-18 of the SPIR and provided in **Appendix A** for reference.

Section 8.4.17 of the Environmental Impact Statement (EIS) defines the haulage routes for the Project, where Botany Road, Raglan, Wellington and Cope Street are all utilised as primary and secondary routes (refer Appendix A), however no specific temporary haulage routes via George Street or Elizabeth Street are proposed under the EIS or SPIR.

The EIS identifies temporary road closures will occur across the Sydney Metro Chatswood to Sydenham project, however no specific temporary closure details for Cope Street are proposed under the EIS or SPIR. See extract of Figure 8-47 in **Appendix A**.

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

- Chatswood to Sydenham Environmental Impact Statement, May 2016
- Chatswood to Sydenham Submissions and Preferred Infrastructure Report, October 2016
- Chatswood to Sydenham Conditions of Approval, 9 January 2017, as modified
- Modifications 1-8 Modification Reports and Submission Reports

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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.

Description of proposed activities:

Closure of a 90m section of Cope Street just north of Wellington Street (see Appendix B) to facilitate the establishment and use of two large mobile cranes to lift large pre-cast elements into the station box. The pre-cast elements are required to support the upper levels 1 and 2 of the station structure. The cranes will be used to lift in other pre-cast elements such as access stairs into the core following the removal of the southern tower crane. The additional area will support crane operations setup, operation, deliveries and laydown of materials. This scope of work will be undertaken during the day, evening and night period. A temporary concrete slab will be installed on the western footpath to support the temporary storage of the concrete columns. The crane will be stabilised using steel plates under the outriggers.

Concrete pours may occur within the Cope Street closure while the 500T crane is being utilised within the Waterloo Site. The concrete pours would occur during standard hours and require the use of a concrete pump and approx.. 3 concrete agis per hour. This activity was assessed in the SPIR as part of the partial closure of Cope Street, however, the SPIR assessed the use of 2 concrete pumps and an increased number of agis to service the pour.

The closure of Cope Street will result in a change to the haulage routes as heavy vehicles will be required to travel further east on Wellington Street to either George or Elizabeth Streets. This will occur following delivery of materials (ie. precast) to Cope Street. The heavy vehicle route on Raglan Street will also change requiring the use of George Street east of Raglan Street, refer to Appendix B for details of the change to inbound and outbound haulage routes and Appendix D Construction Traffic Management Plan (CTMP) Addendum #2.

The existing site hoarding will be removed progressively along Cope Street to facilitate access to the site from the extended area created by taking possession of the parking and traffic lanes. Temporary site hoarding will be established to delineate the revised site boundary. This hoarding will consist of traffic barriers and screens. Noise blankets to a height of approx.. two metres will be installed on the barriers/screens on Cope Street to assist with reducing the noise impact.

Access will be maintained to the residential car park at 104-219 Cope Street and on street car parking will be maintained on the eastern side of the closed portion as shown in **Appendix B**.

All roads will be reinstated to pre-existing condition or as per the final design once construction has finished.

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3. Timeframe

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

The temporary works for the above will commence in January 2022 and will continue until the end June 2022.

All changes to traffic detailed in this consistency assessment will be for 24 hours a day 7 days a week during construction.

Approved, standard working hours for the Project are as follows:

- 07.00 – 18.00 Monday to Friday
- 08.00 – 13.00 Saturdays
- No works Sundays or Public holidays
- *Where the Environmental Planning and Assessment (COVID-19 Development—Infrastructure Construction Work Days No. 2) Order 2020* allows, work may be completed on Saturday and Sunday 07.00 – 18.00. It is noted that the COVID-19 order is temporary and can only be used whilst in force (looking to cease 31 March 2022).

Where out of hours works are required, they will be undertaken in accordance with the Project Planning Approval and City Southwest Out of Hours Work Strategy Protocol.

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 Waterloo Integrated Station Development is located within Sydney's suburb of Waterloo. The Waterloo station construction site comprises the land bounded by Botany Road, Raglan Street, Cope Street and Wellington Street, but excluding the Congregational Church located at 103 Botany Road. It is situated approximately 3km from the Sydney CBD and is surrounded by established residential properties.

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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.

Cope Street Closure

Cope Street is a local road under jurisdiction and control of City of Sydney Council and contains 1 parking lane and 1 live lane north bound and 1 parking lane and 1 live lane south bound (total 4 lanes). The Project site is on the western side of Cope Street with residential buildings located on the eastern side of Cope Street. The eastern footpath is 2m wide with vegetated verges typically located between the footpath and roadway (2m). There are nine trees located adjacent to the proposed works along the eastern footpath on Cope Street (T2-T10), as per the Tree Report (SMCSWSWL-JHG-SWL-EM-REP-000002). The western footpath is 4.5m wide with no vegetation verge (adjacent to the work site).

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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.

Cope Street Closure

Two large mobile cranes (expected to be 450 tonne and 500 tonne) are required to be set up outside the existing construction boundary on Cope Street. Due to the size of the cranes, a 90m section of Cope Street will be closed to traffic, however, pedestrian access will be maintained on the eastern side of the street. The cranes are required to enable the installation of large pre-cast elements (including six columns) which cannot be lifted, due to the weight of the column, into position from within the station site boundary. The Cope Street closure is temporary for approx. 6 months.

While the cranes are set up on Cope Street they will be used to dismantle the southern tower crane and install other pre-cast elements, e.g. access stairs in the southern core and beams and planks as part of the station structure. The dismantling of the southern tower crane requires a mobile crane to be positioned on Cope Street so there is adequate space for the crane operations and loading of the tower crane segments onto heavy vehicles for transportation. The pre-cast elements require a separate mobile crane to also be positioned on Cope Street due to the weight of the columns as the boom cannot be extended far enough under that weight to facilitate another cranage location. Hence, both cranes cannot be located at any other location than what is proposed to undertake this scope of works.

The placement of the cranes in this area enables the slew radius and boom extension to be minimised while lifting a load, reducing the potential for workers to be at risk of a live load suspended above. Worker safety will also be increased through the use of both cranes lifting the columns vertically before being positioned into the station box. Use of a large mobile crane from the western side of the station site has been considered, however the reach is not sufficient due to the position of the crane being constrained by the position of the Church.

The safest delivery method of precast beams and columns is to minimise the boom extension and slew radius of a crane by allowing delivery trucks to park adjacent to the corresponding crane. This is not achievable within the current site boundary. The requirement for two separate cranes is to enable the smaller crane to support the larger crane lifting the large (up to 90 T) columns into position within a safe working load and limit. The precast columns will be delivered on jinkers outside of standard hours due to travel restrictions enforced by the road authority.

In acquiring the closure of the 90m section of Cope Street, worker and public safety can be managed more effectively through the installation of robust site delineation, i.e. barriers with anti-gawk screens. To assist with reducing the noise impacts the barriers will have acoustic blanks installed to reduce noise impacts to residents on Cope Street.

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7. Environmental Benefit

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

There are environmental benefits to the proposed traffic changes on Cope Street. This includes:

- When temporary short-term changes to traffic patterns are undertaken to facilitate construction activities there is a greater risk of vehicle incidents occurring. This is due to moving traffic out of its usual path. By implementing more established traffic closures the revised traffic route will become the regular path and will not disrupt the public driving patterns after the initial change.
- The installation of more robust boundary controls, ie. traffic barriers with anti-gawk screens and noise blankets to delineate the work areas from the public creates a safer environment for pedestrians, traffic controllers as the site is more secure and reduces the reliance of traffic controllers in the path of live traffic.

8. Control Measures

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

No site specific CEMP will be prepared, the works would be adequately managed by the control measures in the existing CEMP. An Environmental Control Map (ECM) will be prepared to document appropriate control measures, refer to the draft ECM in Appendix B.

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?

There would be no climate change impact as a result of the temporary closure of Cope Street

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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	Two trees will be impacted due to the spatial constraints of the cranes. The crane positioning has been modified to ensure minimal impact on the surrounding flora. Removal Tree No. 7 Mugga Ironbark, medium significance (native to Australia). Identified in the Tree Report required by Condition E6. Trimming Tree No. 8 Tallowwood, high significance (native to Australia). Identified in the Tree Report. Refer to Appendix C for trimming requirements. Both trees will be impacted by the counterweights of the crane when it slews. The position of the crane is not able to be moved any closer to the station box/capping beam without impacting on the 'zone of influence' which would result in destabilising the station structure. Relocating the crane further north or south on Cope Street was also considered but is not possible with the required capacity and reach for the lifts. The impact to trees has been assessed in the Tree Report. Control measures, including tree protection for trees to be retained will be implemented prior to work commencing. All trees removed as part of the Project will be replaced as part of the tree replacement strategy detailed the Landscape and Public Domain Design Package (DP80).	No additional measures required	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Water	No change from approved Project. Erosion and Sediment Control Plan (ESCP) will be implemented to manage surface water during rain events.	No additional measures required	Y	Y	
Air quality	The closure of 90m of Cope Street moves the site boundary closer to residents. The temporary air quality impact as a result of this is similar to the assessment in the EIS/SPIR. The temporary establishment of this area behind barriers/screens will bring construction closer to the residents but have a negligible impact on air quality as no ground disturbance is required. ESCP will be implemented to manage air quality during dust generating activities. The temporary change in haulage routes will bring vehicle emissions closure to new receivers. The temporary air quality impact as a result of this is similar to the assessment in the EIS/SPIR.	No additional measures required	Y	Y	
Noise vibration	The closure of Cope Street to enable setup and operation of two cranes to lift pre-cast elements into the station site will result in an increase in noise impacts on receivers in close proximity to the works on Cope Street and Wellington Street. The EIS considered day time noise impacts to be up to 20dBA above NML. The use of the crane is predicted to be 11dBA above the NML for day time noise and up to 40 dBA during the night period when the cranes are lifting the precast into position (~30min interval). While the crane is holding the precast, the noise level is expected to be reduced by approx..10-20dBA as the engine will be idling (~2-3 hours). The use of the crane on Cope Street during out of hours will be limited to 5 consecutive nights followed by a respite period. Respite will be offered	No additional measures required	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
	in accordance with the approved out of hours permit and will include providing vouchers, ear mould offers and where applicable alternate accommodation. The establishment of site hoarding, other than the installation of concrete barriers, noise blankets and screens (to a height of 2m) to minimise noise from the cranes is not considered feasible due to the height of the noise source and the temporary works required to install new hoarding. Noise impacts from the change in haulage routes along local roads has been assessed in CNVIS Addendum (SMCSWSWL-JHG-SWL-EM-REP-000012) (refer Appendix E) and determined to be below noise criterion set out in the NSW RNP (2011). A total of 9 columns will be delivered to Cope Street on jinkers during the night period. Six columns will be delivered over five consecutive nights. Following the western column install that occurs within the station site the remaining three columns will be delivered and installed from Cope Street. Where possible the jinkers will retract and exit the Cope Street work area by heading west bound on Wellington Street and Botany Road or use the alternate haul route and exit by turning east on Wellington Street. This will occur if Wellington Street is reduced to one-way. Following installation of columns, beams (x3) will be delivered via extendable trucks which will use the same haul options as the jinkers. Other pre-cast elements will be delivered progressively while Cope Street is closed and lifted into the station box, e.g. precast stairs.				

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
	The increase in heavy vehicles on the alternate haul route is expected to be very low to negligible. Concrete pours will require a maximum of 3 agis per hour. Concrete pours, nine (9) in total, will be completed from Cope Street during the road closure, this will generally occur during day shift. One receiver has been identified where noise will be up to 20 dBA above NML and six receivers are identified where noise will be up to 10dBA above NML. In the instance the concrete pour is required to be completed into the evening period, the activity will be assessed and approved through an out of hours permit. The noise impacts have been assessed in the CNIVS Addendum (SMCSWSWL-JHG-SWL-EM-REP-000012) (refer Appendix E) and is consistent with the approved project. The extent of noise impacts assessed are consistent with the approved Project. No vibration impacts are expected as a result of the change				
Indigenous heritage	No change from approved Project.	No additional measures required	Y	Y	
Non-indigenous heritage	No change from approved Project.	No additional measures required	Y	Y	

Community and stakeholder	Inconveniences to the community will be experienced due to the changes in road network operations and loss of street parking. Consultation with the community will be undertaken prior to works commencing. The community will be notified in accordance with the Community Consultation Strategy. This includes specific notification and door knocks for local businesses. The community will also receive a monthly notification further updating them of any changes to the Project.	Notification and directional signage installed prior to the traffic/pedestrian changes. This includes Vehicle Management Systems (VMS) installed 2 weeks prior to the closure. Access and egress on the northern section from Raglan Street will be maintained to the public & properties for the duration of works. Land And Housing Corporation (LAHC) and City of Sydney have been notified of the closure. Google maps will be updated to include the temporary closure. See below indicative consultation summary: Waterloo redevelopment group (Local residents/ Cos / LAHC / DCJ, RedWatch) — 20-Nov Community online update - Local Residents — 21-Nov Ear moulds notification - Wellington & Cope all resident letter box drop — 26-Nov December notification - Bus Stop and rounder about notification – 200m radius — 7-Dec LAHC / Metro comms meeting - Notification — 03-Dec	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
		of road changes / closer				
		Waterloo redevelopment group (Local residents/ Cos / LAHC / DCJ, RedWatch)	15-Dec			
		January - Corflute signage - Cope, Wellington, Raglan x 50	23-Dec			
		Enews - update end of year	23-Dec			
		January Notification & property signs – 200m radius	05-Jan			
		Reinstall corflutes / Cope property signs which have been remove or damaged signage	05-Jan			
		VMS Boards (7 days prior)	*24-Jan			
		Enews Update	*24-Jan			
		Enews Update & Google maps update via Sydney Metro Opps	*31-Jan			

Traffic	**Parking loss** There will be a loss of 10 parking spaces as a result of the closure of Cope Street. The loss of parking spaces would not have a major impact on parking considering the proximity and availability of other untimed spaces on surrounding local streets including Raglan Street, Wellington Street and Cooper Street, which is consistent with the SPIR. All private property (residential and business) access will be maintained. All street parking loss is temporary. **Vehicle and cycle impacts** The closure of 90m on Cope Street will result in a slight increase in traffic flow on local streets as vehicles are diverted in accordance with the Construction Traffic Management Plan (CTMP) Addendum via George or Elizabeth Street. The haulage route for construction vehicles will also be altered to utilise this route. These local roads have been deemed able to receive the public and construction traffic by CoS Council. A dilapidation survey of the streets has been undertaken. Heavy vehicle movements include up to 3 jinkers (night period)/night and 3 concrete agis per hour during concrete pours. This is not expected to result in a significant increase in traffic volumes on the revised haul routes. During the closure of Cope Street, George Street will have the same 'good operation' level of service as Cope Street for both public and construction impacts (refer **Appendix D** CTMP Addendum #2 Section 5.9). Cyclists will also be diverted along this detour as shown in the CTMP Addendum #3 Section 5.5. The impact to cyclists is expected to be minimal. **Pedestrian impacts**	Traffic and pedestrian management will be implemented in accordance with the CTMP Addendum#3. Road Occupancy Licence (ROL) and any other relevant traffic permits will be obtained prior to site establishment. Parking availability reviewed on surrounding local roads and determined to be sufficient. Specific notifications will be provided to residents and where required suggestions on alternative parking options provided. The TfNSW Customer Journey Planning division who endorse the Traffic Management Plans (TMPs)/CTMPs and ROLs; the TfNSW Planning and Programs division who approve TMPs/ CTMPs; and the City of Sydney Council have all been consulted on the CTMP, which forms part of this CA. Road dilapidation survey completed for the additional haul routes. CoS approval for the use of local roads for Heavy vehicles obtained, refer **Appendix B.**	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
	The eastern footpath on Cope Street will be maintained for pedestrians and therefore the impact is expected to be minimal as access to all properties is maintained. Footpaths adjacent to the site will be closed to pedestrians on Cope and Wellington Street. The closure of the footpaths does not impact on any residents, property access, driveways, or businesses and pedestrians will be directed to the alternative footpath (**Appendix D** CTMP Addendum #2 Section 5.4). The existing pedestrian volumes are low and the increased volume on the alternate route is expected to be minimal.				
Waste	No change from approved Project.	No additional measures required	Y	Y	
Social	No change from approved Project.	No additional measures required	Y	Y	
Economic	No change from approved Project.	Ongoing community engagement and notification.	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
Visual	The closure of 90m of Cope Street will move the site boundary and works (e.g. two cranes) closer to residents. Traffic signage will be displayed to direct traffic for the change to traffic flow and pedestrian diversions. The location of signage will be as outlined in the TCP (**Appendix D**). This temporary visual impact is short term and is considered to be consistent with the visual impact assessment of the Approved Project. The use of the Cope Street site at night may result in an impact to receivers on the surrounding streets. No change from approved Project in relation to light spill.	Ongoing community engagement and notification. Review of barriers/screens for graffiti and manage in accordance with the Visual Amenity Management Plan Lighting to be reviewed as per the mitigation measures in the Visual Amenity Management Plan. This includes: - Directing lights away from receivers; Reviewing site set-up at the beginning of night shift.	Y	Y	
Urban design	No change from approved Project.	No additional measures required	Y	Y	
Geotechnical	No change from approved Project.	No additional measures required	Y	Y	
Land use	Temporary change from operational local road to construction area. All roads utilised for the Project will be reinstated as per its current condition or as arranged with the relevant authorities. Road dilapidation survey completed for the additional haul routes. CoS approval for the use of local roads for Heavy vehicles obtained, refer **Appendix B.**	No additional measures required	Y	Y	

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Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Climate Change	No change from approved Project.	No additional measures required	Y	Y	
Risk	No change from approved Project.	No additional measures required	Y	Y	
Other	No change from approved Project.	No additional measures required	Y	Y	
Management and mitigation measures	The Waterloo CTMP is being updated to reflect the changes to traffic. This will be documented in an addendum. The Waterloo CNVIS is being updated to reflect the changes to noise impacts on receivers. This will be documented in an addendum. An Environmental Control Map will be prepared to include the additional areas. No change to the CEMP from the approved project.	No additional measures required.	Y	Y	

11. Impact Assessment – Operation

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

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 approved Project.	No additional measures required		Y	
Water	No change from approved Project.	No additional measures required		Y	
Air quality	No change from approved Project.	No additional measures required		Y	
Noise vibration	No change from approved Project.	No additional measures required		Y	
Indigenous heritage	No change from approved Project.	No additional measures required		Y	
Non-indigenous heritage	No change from approved Project.	No additional measures required		Y	
Community and stakeholder	No change from approved Project.	No additional measures required		Y	
Traffic	No change from approved Project.	No additional measures required		Y	
Waste	No change from approved Project.	No additional measures required		Y	
Social	No change from approved Project.	No additional measures required		Y	
Economic	No change from approved Project.	No additional measures required		Y	
Visual	No change from approved Project.	No additional measures required		Y	

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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
Urban design	No change from approved Project.	No additional measures required		Y	
Geotechnical	No change from approved Project.	No additional measures required		Y	
Land use	No change from approved Project.	No additional measures required		Y	
Climate Change	No change from approved Project.	No additional measures required		Y	
Risk	No change from approved Project.	No additional measures required		Y	
Other	No change from approved Project.	No additional measures required		Y	
Management and mitigation measures	No change from approved Project.	No additional measures required		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 works would not transform the project. The project would continue to provide a new metro rail line between Chatswood and Sydenham.	
Is the project as modified consistent with the objectives and functions of the Approved Project as a whole?	Yes. The proposed works would be consistent with the objectives and functions of the approved project.	
Is the project as modified consistent with the objectives and functions of elements of the Approved Project?	Yes. The changes identified in this assessment are temporary and are consistent with the objectives and functions of the Approved Project.	
Are there any new environmental impacts as a result of the proposed works/modifications?	No. Potential impacts are consistent with the potential impacts assessed in the Approved Project. Potential impacts would be adequately addressed through the application of the proposed control measures in the above tables.	
Is the project as modified consistent with the conditions of approval?	Yes. The proposed works would be consistent with the conditions of approval.	
Are the impacts of the proposed activity/works known and understood?	Yes. The impacts of the proposed works 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 proposed works can be managed so as to avoid an adverse impact.	

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13. Other Environmental Approvals

Identify all other approvals required for the project:	Road Occupancy Licence (ROL) is required and will be obtained prior to site establishment.	

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:	Sally Reynolds	Signature:	
Title:	Environment and Sustainability Manager		
Company:	John Holland	Date:	25/01/2022

Environmental Representative Review

(Additional step for City & Southwest projects only – if this is a CA against a Northwest Project or REF delete this table)

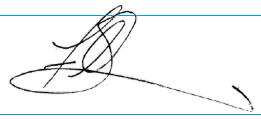
As an approved ER for the Sydney Metro City & Southwest project, I have reviewed the information provided in this assessment. I am satisfied that mitigation measures are adequate to minimise the impact of the proposed work.			
Name:	George Kollias	Signature:	
Title:	Environmental Representative	Date:	28 January 2022

This section is for Sydney Metro only.

Application supported and submitted by			
Name:	Yvette Buchli	Date:	31/01/2022
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	[X]	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:	Fil Cerone	Date:	31 January 2022
Title:	Director City & Southwest, Sustainability, Environment & Planning	Comments:	
Signature:			

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Appendix A Previous assessments

Submissions and Preferred Infrastructure Report

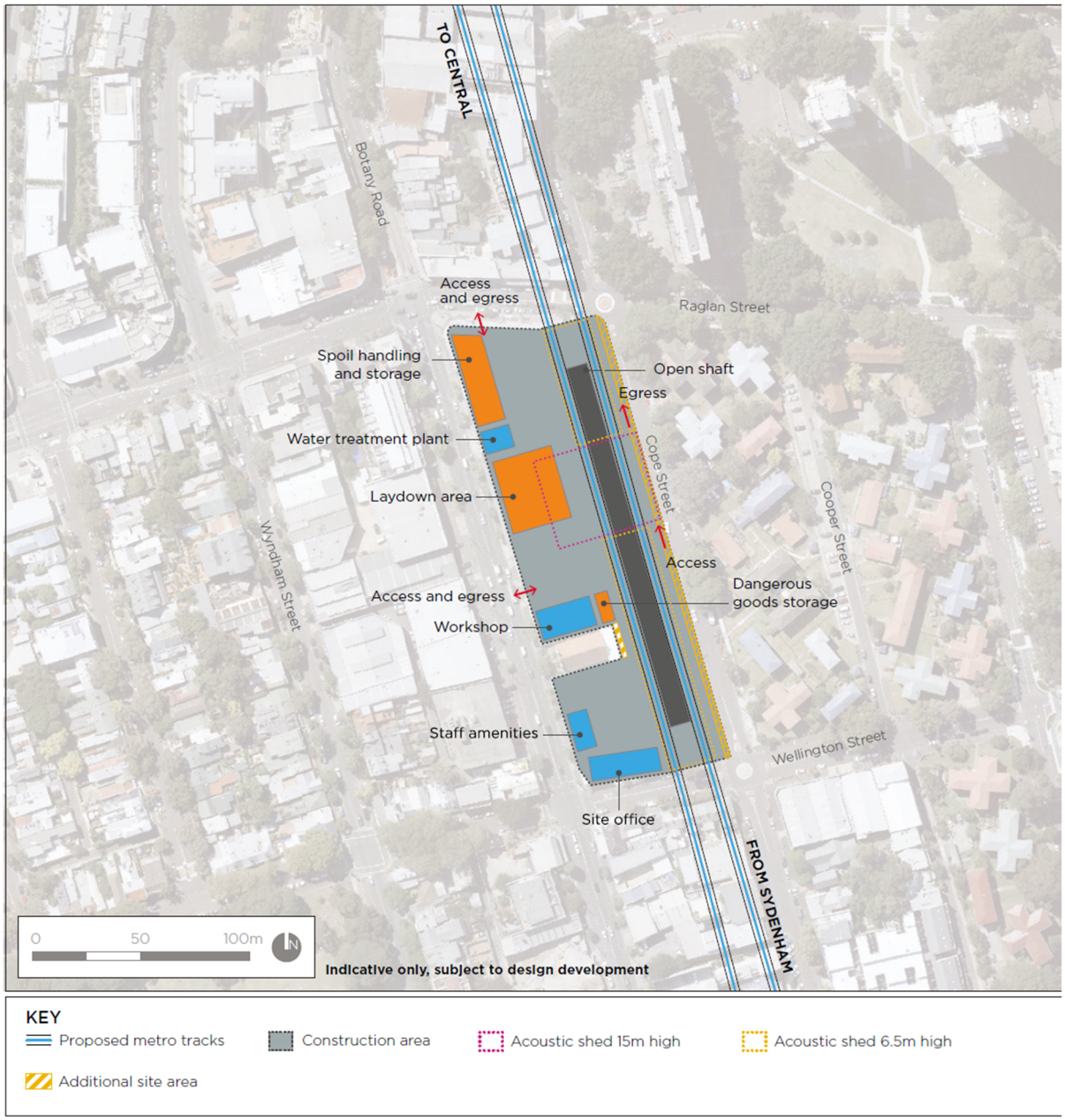

Figure 3-18 Revised Waterloo Station construction site – indicative location and layout

Environmental Impact Statement Chapter 8

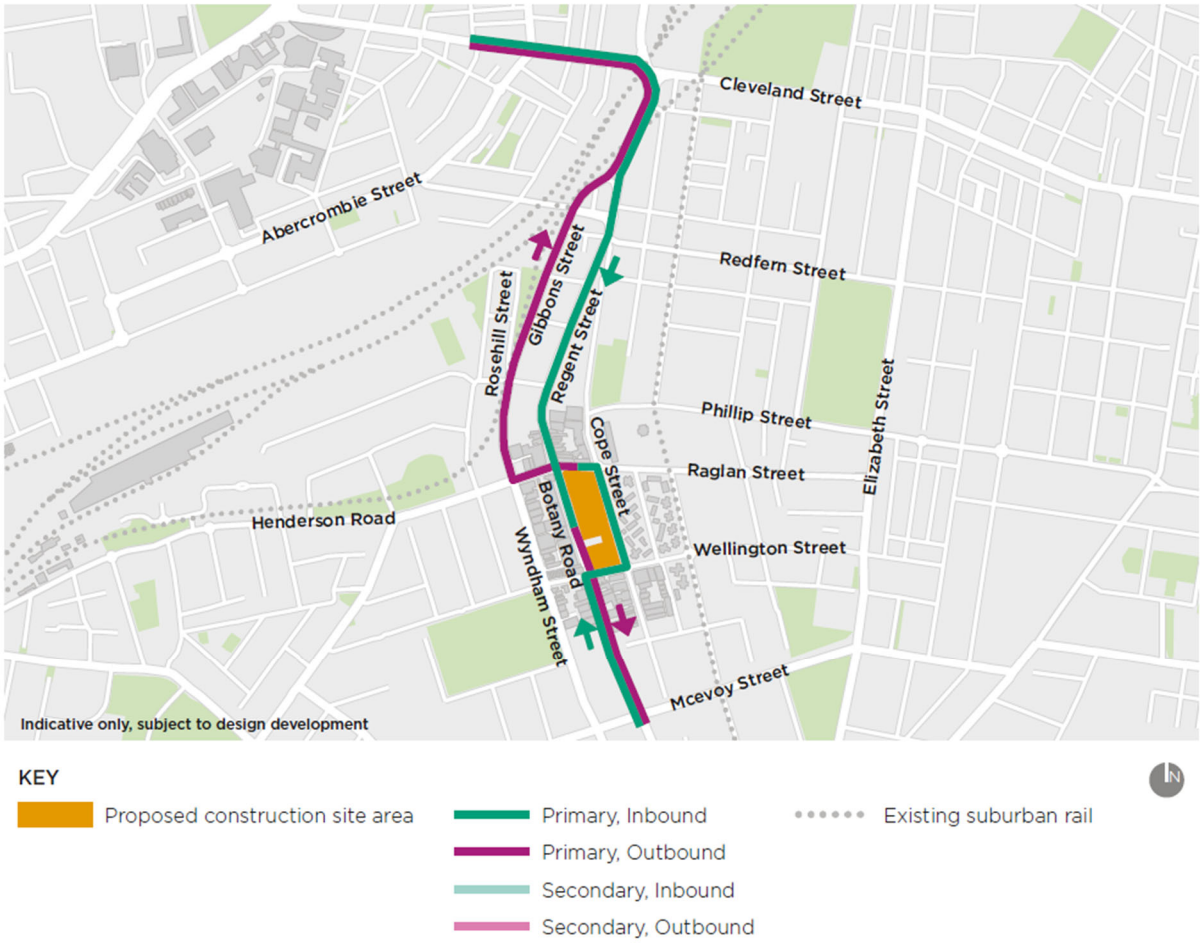

Figure 8-47 Waterloo Station construction site haul routes

Appendix B Indicative ECM and Haul Routes

ENVIRONMENTAL CONTROL MAP –
ECM_07 Waterloo Station — Cope Street Closure

Incident Notification Numbers					
			General Superintendent	Anthony Dodds	0409 944 805
Sustainability & Environment Advisor	Julian Paul	0409 195 132	Superintendent	Greg Beer	0497 011 192
Stakeholder & Community Manager	BJ Jordan	0499 006 341	EMERGENCY	Police/Fire/Ambulance	000

Site Layout and Planned Routes and Closures

Scenario 1: Vehicles approaching site North Bound on Botany Rd required to enter site on Botany Rd from south bound. Proposed Route:

• Right turn on Wellington Street, Left Turn on George Street, Left Turn on Raglan Street, Left Turn on Botany Rd and Left into site

• Once unloaded heavy vehicles will exit left from site onto Botany Rd and head South Bound on Wellington Street.

Scenario 2: Vehicles approaching site North Bound or South Bound on Botany Rd required to be unloaded off Wellington Street or Inside Wellington Street/Cope Street. Proposed Route:

• Left/Right Turn onto Wellington Street, left into site (reverse) or park up on east bound parking lane.

• Once unloaded heavy vehicles will exit left from site onto Wellington Street and head east bound on Wellington to Elizabeth Street.

Scenario 3 (not shown on the map): Use of the existing haul routes approved in the EIS/SPIR. Vehicles approaching site North Bound or South Bound on Botany Road be unloaded off Cope Street:

• Left/Right Turn onto Wellington Street, left into site (reverse) or park up on east bound parking lane.

• Once unloaded heavy vehicles will exit right from site/Cope Street onto Wellington Street and head west bound on Wellington Street to Botany Road.

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Appendix C Tree trimming details

4th November 2021

Attn: Nathaniel Lasky
John Holland
84 – 88 Botany Road
Alexandria NSW 2017

RE: Waterloo Integrated Station Development
Pruning Specification

This Pruning Specification was prepared for John Holland and relates to one (1) *Eucalyptus microcorys* (Tallowwood) located within the eastern Cope Street road reserve. The tree requires pruning to provide for to provide clearance to a 750t crane which needs to be mobilised to install concrete columns for the station box on Cope Street.

The works consist of the Selective Pruning of three (3) branches as indicated in **Figure 1**. The branches to be pruned represent 10-15% approx. of total crown volume and should not significantly impact the health or amenity value of the tree.

Figure 1: Pruning

Selective Prune:

- 1x 250mmØ 1st order branch W side of crown at 5m
- 1x 200mmØ 1st order branch SW side of crown at 7m
- 1x 100mmØ 2nd order branch W side of crown at 8m

Pruning works should be carried out by a Practising Arborist. The Practising Arborist should hold a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent. The Practising Arborist should have a minimum of 3 years' experience in practical Arboriculture. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007), Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

Anna Hopwood – Director

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Appendix D Construction Traffic Management Plan Addendum 2 Stage 1 Road Closure (SMCSWSWL-JHG-SWL-EM-PLN-000013)

JOHN HOLLAND

Waterloo Integrated Station Development

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

ADDENDUM 2

STAGE 1 ROAD CLOSURE

DOCUMENT No: SMCSWSWL-JHG-SWL-EM-PLN-000013

Document and Revision History

Document Details	
Title	Construction Traffic Management Plan
Client	Sydney Metro City & Southwest

Revisions

Rev #	Date	Description	Prepared by	Reviewed by	Approved by
G	03/12/2021	Minor Updates	M. Hearne	A. Finlay	A. Finlay
H	10/12/2021	Updated to Show Closure of Cope St South for Structures Works	M. Kerry	N. Lasky	
I	15/12/21	Updated for Stage 1 works only	M. Kerry	N. Lasky	
J	17/12/21	Final Adjustments from RMS comments	M. Kerry		

Glossary

Term	Explanation
CEMF	Construction Environmental Management Framework
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CSSI	Critical State Significance Infrastructure
CTMP	Construction Traffic Management Plan
DPIE	Department of Planning, Industry & Environment
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
ER	Environmental Representative
GMR	Global Mandatory Requirements
ISD	Integrated Station Development
JHPL	John Holland Pty Limited
Minister, the	NSW Minister for Planning
OEH	Office of Environment and Heritage
OSOM	Oversize and Over Mass Vehicles
PkMP	Parking Management Plan
PMP	Pedestrian Management Plan
PHSMP	Project Health and Safety Management Plan
RSA	Road Safety Audit
REMMs	Revised Environmental Mitigation Measures
SMCSW	Sydney Metro City and Southwest
SWTC	Scope of Work and Technical Criteria
TGS	Traffic Guidance Scheme
TCWSM	Roads and Maritime Services Traffic Control at Work Sites Manual
TMP	Traffic Management Plan
TRA	Task Risk Assessment
TSE	Sydney Metro Tunnel and Station Excavation Contractor
VMP	Vehicle Movement Plan

Table of contents

1 Introduction

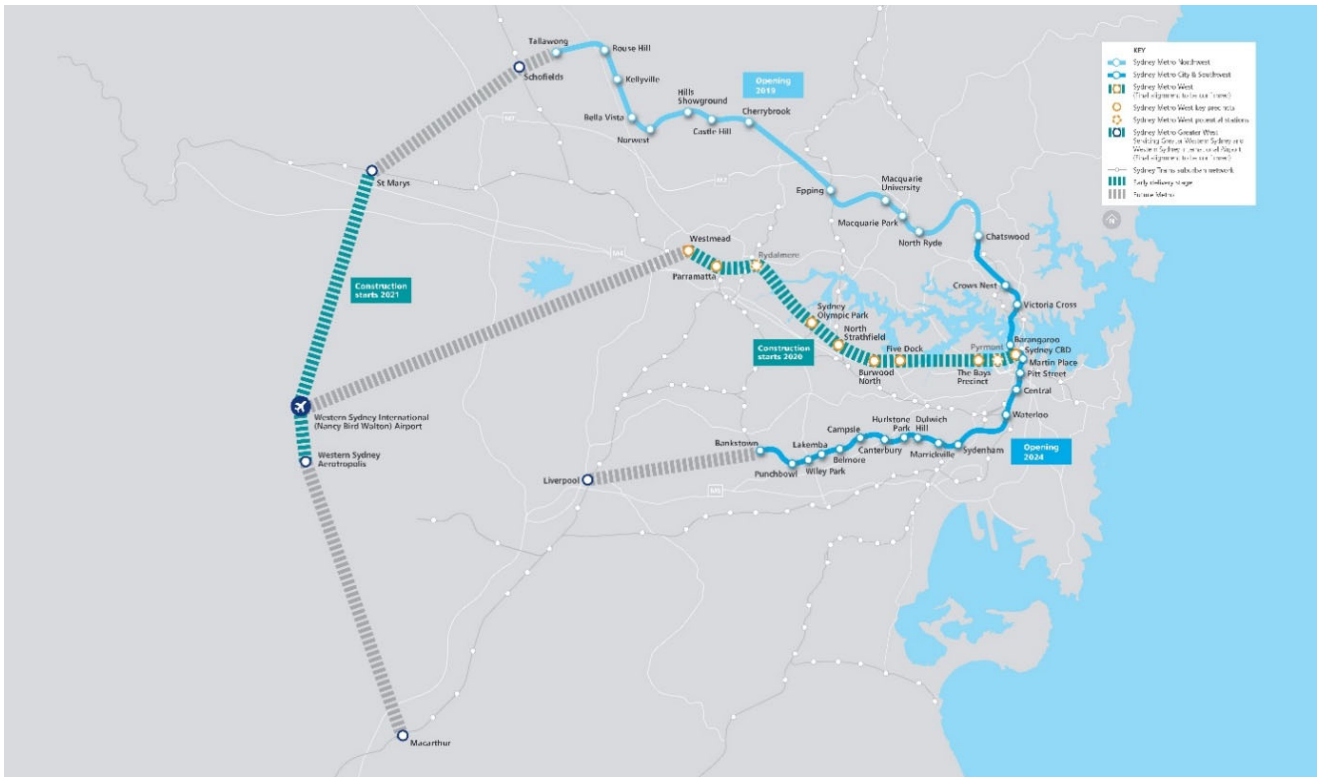
1.1 Project Overview

The Sydney Metro is Australia's biggest public transport project.

Services started in 2019 in the city's North-West with a train every four minutes in the peak. Metro rail will be extended into the CBD and beyond to Bankstown in 2024. Sydney Metro includes new CBD railway stations underground at Martin Place, Pitt Street and Barangaroo and new metro platforms under Central.

In 2024, Sydney Metro will have 31 stations on a new 66km rail system – the biggest urban rail project in Australian history. Sydney Metro will have ultimate capacity for a train every two minutes in each direction under the CBD.

Figure 1: Sydney Metro



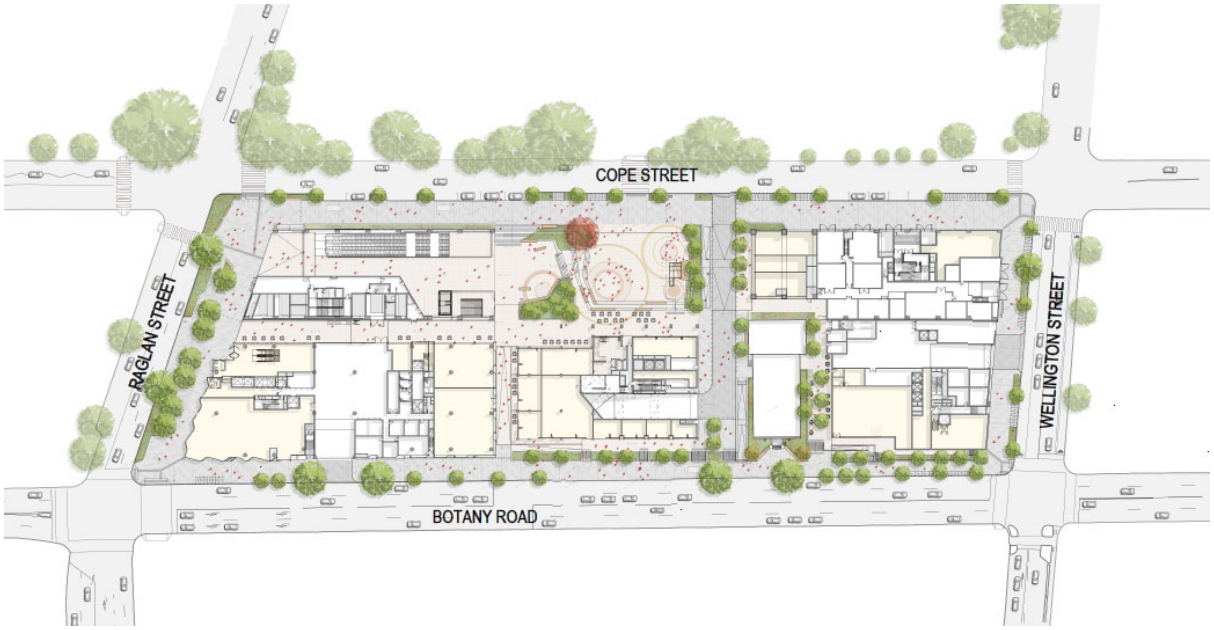
Waterloo Integrated Sydney Metro Upgrade

John Holland Pty Ltd has been awarded by Sydney Metro the contract to deliver the Waterloo Integrated Station Development (ISD).

The Waterloo ISD Project Works comprises of construction of the new station infrastructure to support customer movement and experience.

The Waterloo ISD is located within Sydney's suburb of Waterloo, as shown in Figure 2, within the Metro Quarter. The Metro Quarter Development (MQD) comprises the land bounded by Botany Road, Raglan Street, Cope Street and Wellington Street, but excluding the Congregational Church located at 103 Botany Road. It is situated approximately 3km from the Sydney CBD and is surrounded by established residential properties.

Figure 2: Site Location Plan



1.2 Purpose of this Plan

The purpose of this Construction Traffic Management Plan (CTMP) Addendum #2: Stage 1 Road Closure is to detail the traffic changes to facilitate construction for structures (Stage 1) around the Waterloo Integrated Station Development. This plan will set out the traffic management requirements that will be deployed to minimise disruption to and ensure the safety of the wide range of stakeholders potentially affected by the works, including but not limited to motorists, pedestrians; cyclists; public transport users, local residents and property owners; business owners; and workers/staff engaged on the Project.

2 Existing Road Conditions

2.1 Cope Street

Cope Street is a local road under jurisdiction and control of City of Sydney Council. It spans from Redfern Street to the North in Redfern and ends at McEvoy Street to the South in Waterloo. The speed limit is 50 km/h. This area has substantial residential land uses with low daily light vehicle volumes.

Vehicle volumes are low, with traffic surveys undertaken in June 2020 (pre covid restrictions) recorded:

- AM Peak: 8:15AM – 9:15AM
  - 71 northbound, 32 southbound
- PM Peak: 5:00 PM – 6:00 PM
  - 86 northbound, 38 southbound

Traffic surveys during the COVID-19 lockdown in August 2021 recorded:

- AM Peak: 8:00AM – 9:00AM
  - 52 northbound, 28 southbound
- PM Peak: 4:00 PM – 5:00 PM
  - 73 northbound, 31 southbound.

Roundabouts exist at the intersections of Raglan Street and Wellington Street.

There are two existing bus stops to the South of Raglan St servicing route 355, located on the eastern side of the road.

Parking is unrestricted between Raglan Street & Wellington Street with “No Stopping” signposted at all intersections.

There is no on road cycling facility on Cope Street. The Eastern footpath is 2m wide with verges typically located between the footpath and roadway (2m). The Western footpath is 4.5m wide with no vegetation verge (adjacent to the work site). There are no pedestrian crossing facilities along Cope Street other than the use of the splitter islands located at the roundabouts.

There are two garbage collection points located on the eastern side within the Land and Housing Estate which will need to be serviced weekly.

There is an open air off-street car park for the local residents on the eastern side which is in use.

2.2 Raglan Street

Raglan Street is classified as a local road and is under the control of City of Sydney Council. Raglan Street commences from Botany Road and ceases on Elizabeth Street to the East in Waterloo. The speed limit on Raglan Street is 50 km/h.

Vehicle volumes are low, with traffic surveys undertaken in June 2020 (pre covid restrictions) recorded:

- AM Peak: 8:15AM – 9:15AM
    - 247 eastbound, 248 westbound
- PM Peak: 5:00 PM – 6:00 PM
    - 260 eastbound, 300 westbound

Traffic surveys during the COVID-19 lockdown in August 2021 recorded:

- AM Peak: 8:00AM – 9:00AM
    - 160 eastbound, 156 westbound
- PM Peak: 4:00 PM – 5:00 PM
    - 183 eastbound, 208 westbound.

There are no bus stops on Raglan Street (adjacent to the site) between Cope Street and Botany Road, however Sydney Bus routes 301-303 travel east and west.

There are one hour (Monday -Friday) parking restrictions in this street.

The existing footpaths are approximately 3.7 - 4.5m wide. There are no cycling facilities on this section of Raglan Street.

There are four businesses located on the Northern side of Raglan Street and a loading zone to service the bottle shop.

2.3 Wellington Street

Wellington Street is classified as a local road and is under the control of City of Sydney Council. Wellington Street commences at Botany Road and continues to Morehead Street Waterloo. The State default speed limit of 50km/h applies. There are no bus stops on Wellington Street (adjacent to the site) between Botany Road and Cope Street, however, Sydney Bus route 355 travels east on Wellington.

There is two-hour parking restriction in this street on the south side and unrestricted parking on the north side.

Vehicle volumes are low, with traffic surveys undertaken in June 2020 (pre covid restrictions) recorded:

- AM Peak: 8:15 AM – 9:15 AM
    - 174 eastbound, 71 westbound
- PM Peak: 5:00 PM – 6:00 PM
    - 131 eastbound, 124 westbound

Traffic surveys during the COVID-19 lockdown in August 2021 recorded:

- AM Peak: 8:00AM – 9:00AM
    - 117 eastbound, 62 westbound
- PM Peak 4:15 PM – 5:15 PM
    - 112 eastbound, 102 westbound.

The existing footpath on the southern side maintain a minimum width of 1.6m. There is a short cycling facility on this section of Wellington Street on the southern side prior to crossing or entering Botany Road.

There is one business located on the southern side of Wellington Street (i.e. Cauliflower Hotel) along with residential properties. There is a loading zone to service the hotel.

3 Scope of Work

Stage 1: Structure

Commencement: January 2022

Duration: 2 months approximately

3.1 Work Required

3.1.1 Stage 1 – Structures Works

As part of the Waterloo ISD, works on Cope and Wellington Streets will include three cranes (ranging from 250T to 500T) mobilising on Cope St (two cranes at any given time) to demobilise tower crane at the Southern structure, and install critical precast columns and beams which cannot be completed from within the construction site. The precast elements will be delivered on night shift (as current approved arrangement with City of Sydney). Once these cranes have installed the precast elements, the area will be used to complete concrete pours with the use of concrete pumps and concrete agitators.

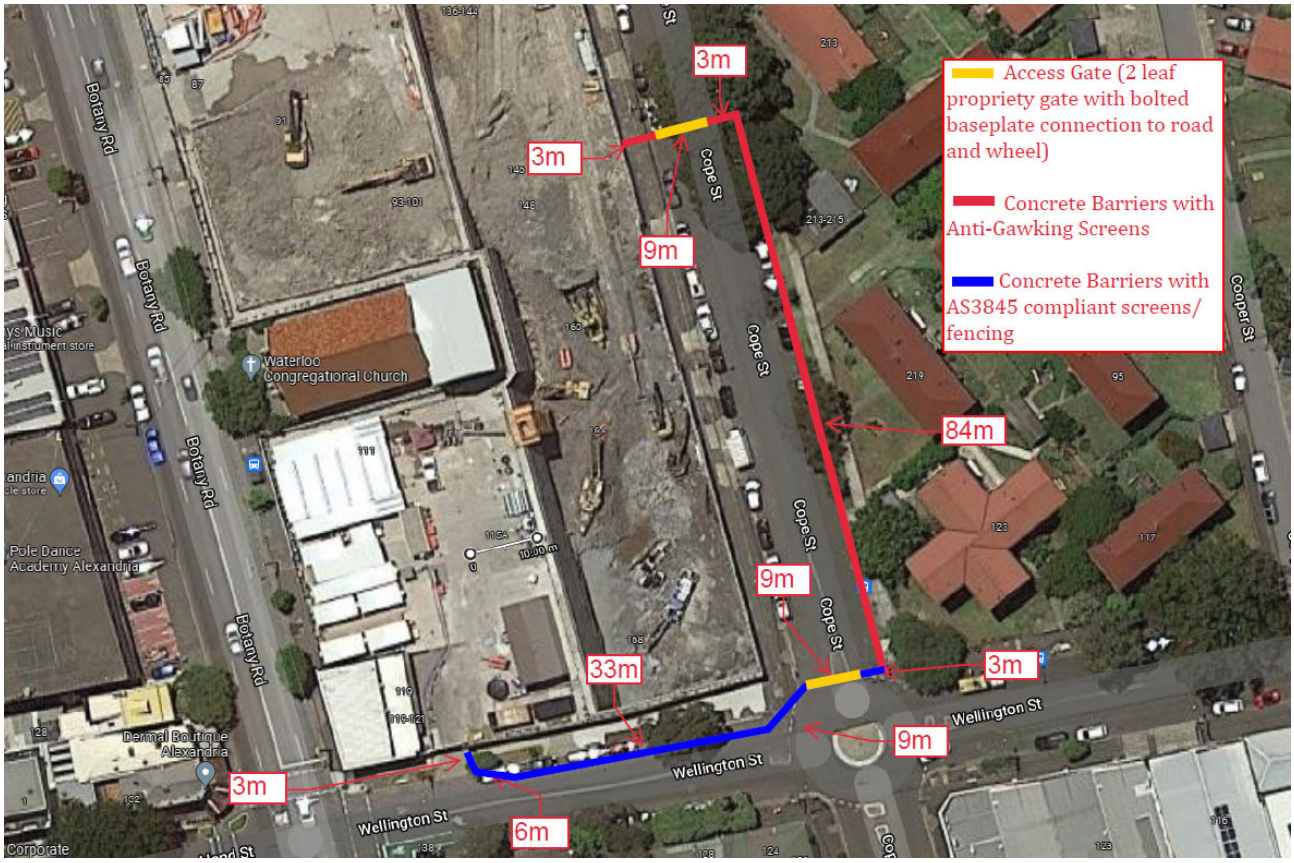
All precast deliveries for these works are via Jinker vehicles which are restricted to travel between 9:30pm and 5am. Trucks are then expected to arrive on site between 11:30pm and 4am under traffic control in accordance with the Appendix B – Traffic Guidance Scheme Plans. For any given night, a maximum of 4 Jinkers will be arriving to be unloaded and are limited to a maximum of 6 consecutive nights.

The current programme of Structures Works is to commence from the 13th January 2022 and is programmed to be completed by end of February 2022.

The nature and location of works require the traffic changes for the safety of general public and construction workers in the area.

Australian Standard compliant concrete barriers and screens/fencing will be placed along the road to delineate Waterloo Contractor Site to general public area (Australian Standard AS3845). In locations where barriers are not delineating the Waterloo Contractor Site to general public area concrete barriers with anti-gawking screens will be placed (Eastern interface of Cope St with footpath and north of Cope St closure). Barriers will be set up as shown in Figure 3. Short term works including setup of barriers, line marking, sign changes, utility crossings and other associated works will require traffic management to be implemented. Refer to Appendix B – Traffic Guidance Scheme.

Figure 3: Stage 1 Barrier Arrangement


Access Gate (2 leaf propriety gate with bolted baseplate connection to road and wheel)
Concrete Barriers with Anti-Gawking Screens
Concrete Barriers with AS3845 compliant screens/ fencing
3m
3m
9m
84m
9m
3m
33m
9m
3m
6m
Cope St
Botany Rd
Waterloo Congregational Church
Pole Dance Academy Alexandria
Dermal Boutique Alexandria
Wellington St
Cooper St

4 Proposed Conditions of Roads Affected by CTMP

4.1 Cope Street

The existing and proposed arrangements of Cope Street are shown below in Figure 3, Figure 4 and Figure 6.

4.1.1 Stage 1 - Structures Works

The proposed configuration will occupy all trafficable lanes on Cope St from North of the intersection of Cope St & Wellington St to 83m South of the intersection of Cope St & Raglan St. Concrete barriers with anti-gawk screens will be installed to separate the Construction Work Site from public access. Traffic will be diverted to George St (refer to Section 5.6).

The Western footpath of Cope St will be closed for the duration of the Stage 1 closure. The Eastern footpath will remain unimpeded for pedestrians to use (refer to Section 5.4).

Partial removal of parking to facilitate the Stage 1 closure will be on Eastern & Western side of Cope St (refer to Section 5.2).

The roundabout at the intersection of Cope Street / Wellington Street will be retained for Stage 1.

The open air off-street car park and garbage collection points (two being affected) for the Land and Housing Estate residents will not be impeded. John Holland will facilitate the collection of bins from these locations that are impacted by the proposed works.

Figure 4: Cope Street (looking North)

Figure 5: Cope Street existing arrangement

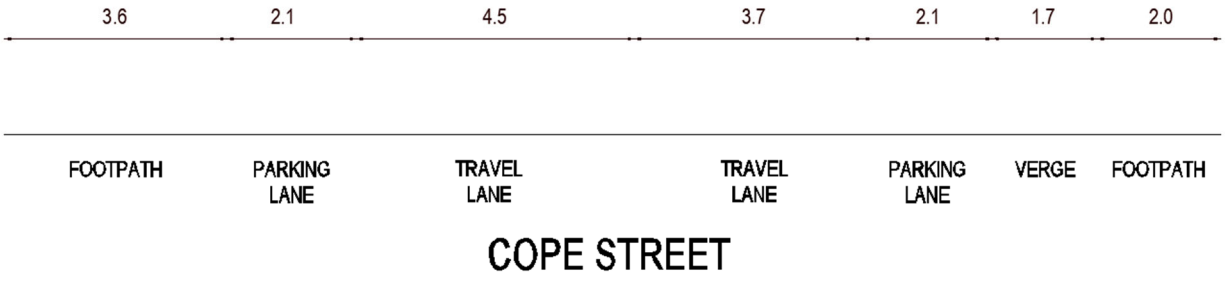
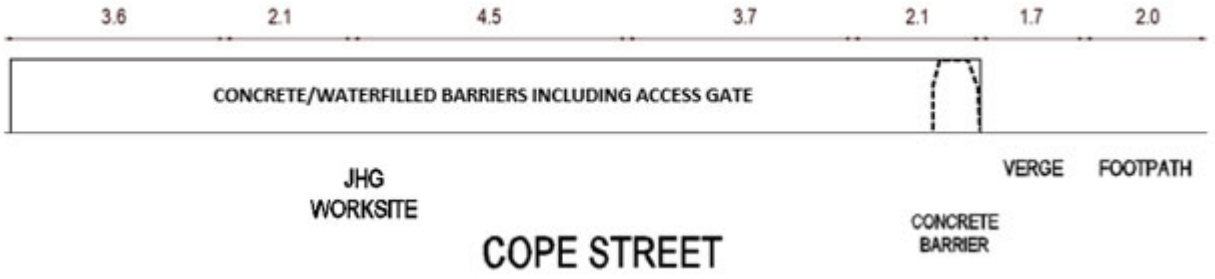


Figure 6: Cope Street proposed arrangement for Stage 1



4.2 Raglan Street

4.2.1 Stage 1 - Structures Works

No impact to Raglan St for Structures Works

4.3 Wellington Street

Figure 6 Wellington Street (looking west)

4.3.1 Stage 1 - Structures Works

The proposed configuration will close the northern footpath to pedestrians and remove kerbside parking to facilitate structures works. The roundabout at the intersection of Cope and Wellington Street will be retained. This section of Wellington Street will remain as two directional with no changes to vehicles or cyclist configurations.

The parking spaces and loading zone on the southern side of Wellington Street will remain available to reduce the effect on the local community to ensure the businesses are serviced and not impeded by the works.

The existing and proposed arrangements of Wellington Street are shown below in Figure 7 and Figure 8.

It is understood that concrete barriers with chevron will be placed on Wellington Street, separating the travel lane from the work area.

Figure 7: Wellington Street existing arrangement

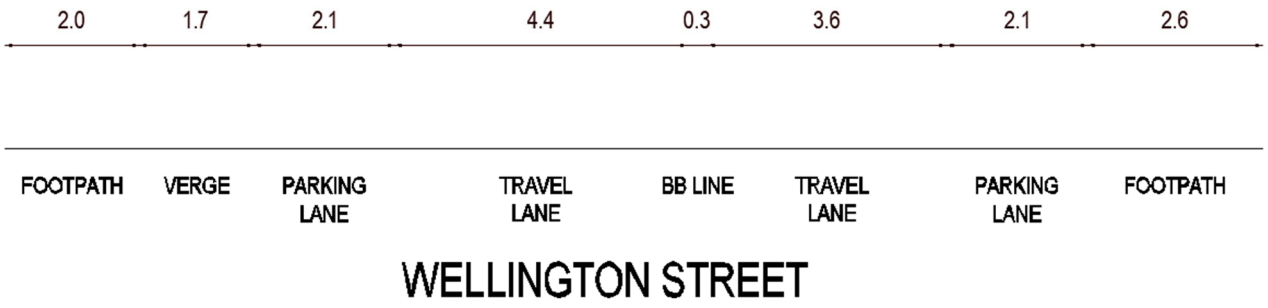
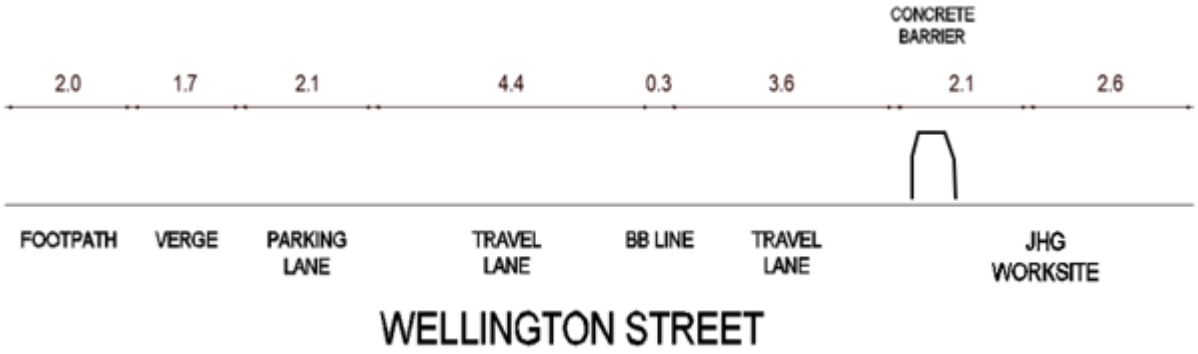


Figure 8: Wellington Street proposed arrangement for Stage 1



5 Impact Assessment

5.1 Public Transport Services

The proposed work area will affect bus stops around the Waterloo ISD site. The affected bus stops are located along Cope Street, and one bus stop is located east of Cope Street on Wellington Street, refer to Figure 9:

- Route 355 Cope Street at Raglan Street – 201772
- Route 355 Cope Street at Wellington Street – 201773

Bus Route 355 operates along Cope Street – Marrickville Metro from Bondi Junction via Moore Park and Erskineville.

These bus stops affected by the work area are shown in Figure 9 below.

Figure 9: Stage 1 – Affected Bus Stop Facilities Near the Site for Stage 1

The updated bus routes and temporary bus stops are shown in Figure 10 below. It is understood that allocating additional bus zones signage and J-stem signage is required. The positioning and dimensions of bus shelters are to comply with AS 1428.1—2001 Design for Access and Mobility. Exact specifications to be determined in consultation with TfNSW and STA.

Figure 10: Affected Bus Routes

The proposed modified bus routes and new bus stops are expected to be sufficient and no further mitigation measures are expected to be necessary.

Note: Swept paths indicate that the bus left turn from Raglan Street to Botany Road may slightly encroach on the kerb ramp at the south-eastern corner of Raglan Street/Botany Road. Pedestrian management may be required during bus movements to ensure that pedestrians are kept away from this corner during bus turning movements. This is to be handled by qualified traffic controllers. Further to the above, 14.5m buses cannot complete the movement safely and cannot be used on this route.

5.2 Parking Spaces

5.2.1 Stage 1 - Structures Works

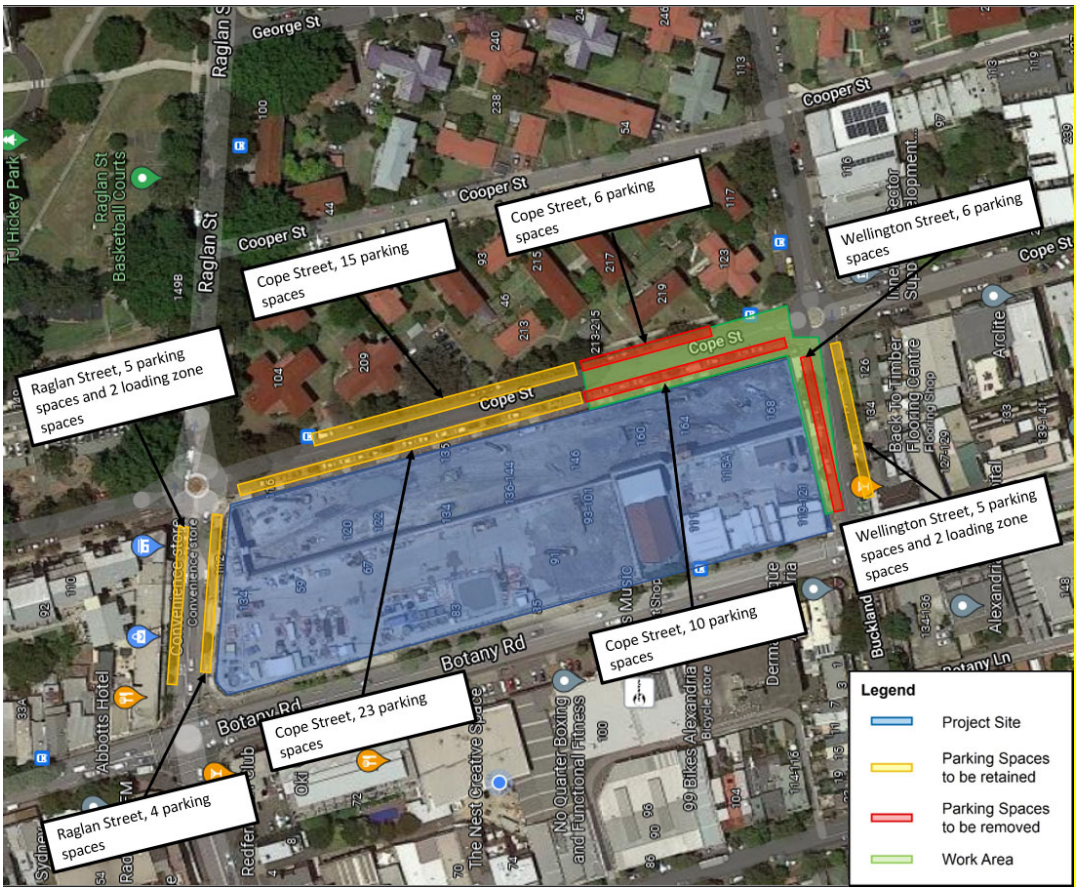
The proposed work area will affect parking spaces around the Waterloo ISD surroundings. Parking spaces along Cope Street and Wellington Street will be affected as shown in Figure 11 below.

The affected parking spaces are summarised as follows:

- Wellington Street: loss of 6 parking spaces on the Northern Side
- Cope Street: loss of 16 parking spaces. i.e. 10 on the Western Side (currently occupied as part of a previously approved City of Sydney TMP) and 6 on the Eastern Side.

Parking along Wellington Street consists of two-hour (2P) and untimed parking spaces. Like Wellington Street, Cope Street provides untimed parking spaces on both sides of vehicle travel lanes. Raglan Street consists of one-hour (1P) parking spaces.

Figure 11: Stage 1 - Affected Parking Spaces

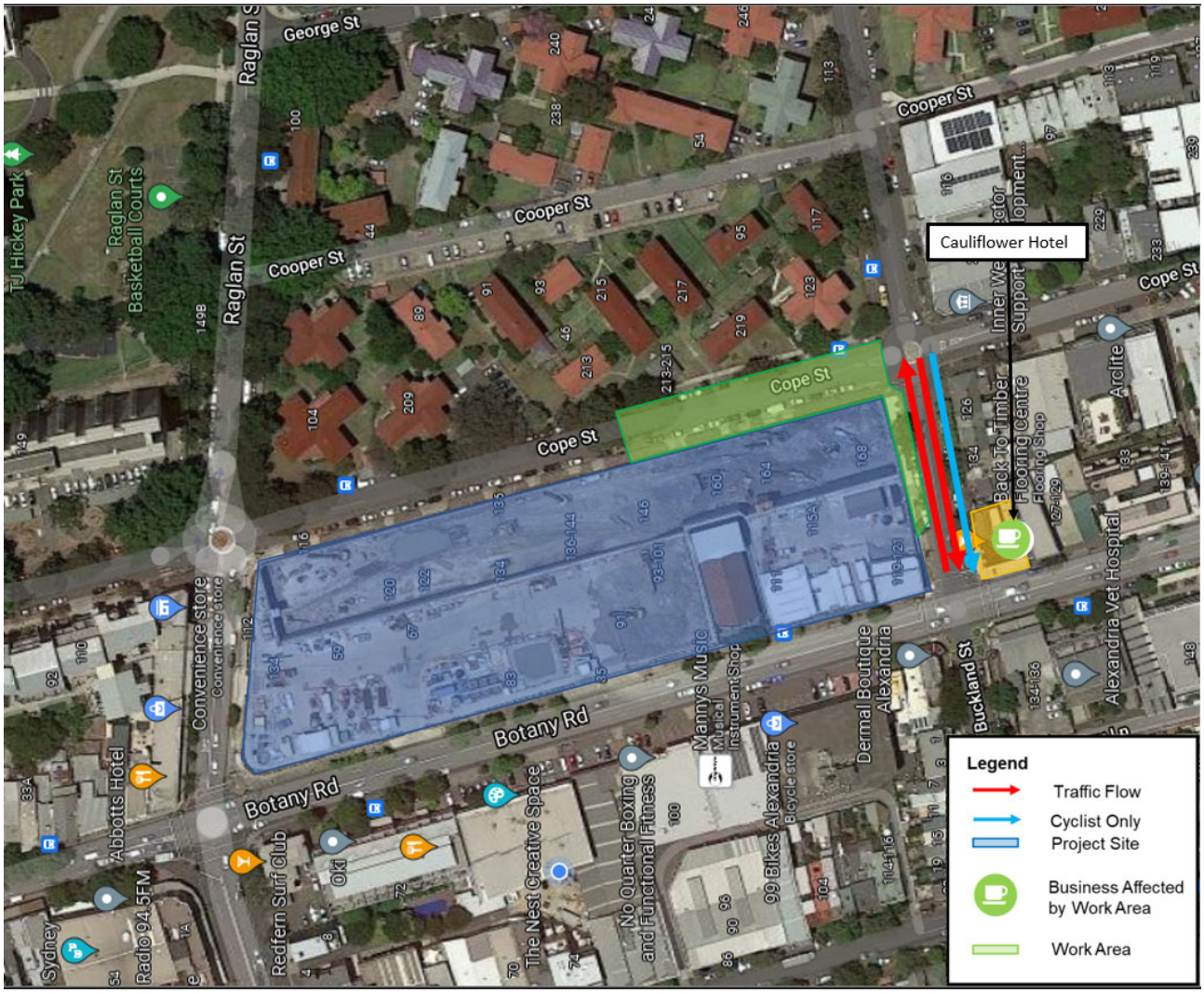


Other parking options are available on Raglan Street (east of Cope Street), Wellington Street (east of Cope Street), and Cope Street (north of Raglan Street and South of Wellington Street), and George Street. While no parking surveys have been undertaken for these works due to the unreliability of data associated with the ongoing Sydney COVID-19 lockdown, it is expected that these areas would have sufficient capacity to handle the displaced vehicles.

5.3 Surrounding Businesses

As a result of stage 1 works, the traffic along the streets may influence customer traffic to each business. Furthermore, performance of businesses may be affected due to the loss of available parking spaces. However, as no loading zones or kerbside parking immediately outside local businesses are directly affected, there are expected to be negligible impacts to these businesses from a traffic perspective. Figure 1712 identifies the businesses on the surrounding streets.

Figure 172: Stage 1 - Businesses near the site



5.4 Pedestrian Facilities

5.4.1 Stage 1 - Structures Works

As shown in Figure 13, a few pedestrian footpaths located along Wellington Street and Cope Street will be closed or partially closed. Details of pedestrian footpaths affected are summarised as follows:

- Wellington Street: Northern side, between Botany Road and Cope Street
- Cope Street: Western side, between Wellington Street and Raglan Street

At each of these areas, there are footpaths available on the opposite side of the road. Signalised intersection at Botany Road / Wellington Street provides safe crossing opportunities for pedestrians.

The closure of the footpaths does not impact on any residents, driveways, or businesses and pedestrians have an alternative footpath available. Therefore, the impacts are expected to be negligible and additional mitigation options are not considered necessary.

Figure 13: Stage 1 - Pedestrian Facilities near the site

Additionally, due to safety precautions several pedestrian ramps nearby the work zone will be closed. Figure 148 below shows the locations of the pedestrian ramp closures.

Figure 148: Pedestrian Ramp Closure near Cope Street / Wellington Street Roundabout for Stage 1

5.5 Cyclist Paths

5.5.1 Stage 1 - Structures Works

Due to the proposed road closure on Cope St only there will be no impacts to cyclists during works.

A designated cycle path exists along the southern side of Wellington Street, travelling Westbound. This will be retained as the cycle lane for the duration of stage 1.

The Eastbound direction does not have a dedicated cycle lane, and cyclists here are on-road. Eastbound movements are retained during construction.

Cyclist paths affected are summarised as follows:

- Wellington Street westbound cycle lanes.

The purple route in the below Figure 15 will be retained to allow cyclists to travel westbound along Wellington Street.

Figure 159: Stage 1 - Affected Cyclist Facilities near the site

5.6 Existing Vehicle Routes

5.6.1 Stage 1 - Structures Works

Existing vehicle routes will be affected due to the proposed works of the subject site. The full road closure of Cope St will divert vehicles travelling along the existing vehicle routes of Cope Street northbound and southbound.

To support these changes, alternative routes for each existing vehicle route are provided below:

- Cope Street Southbound travel: Detour route is via Raglan Street Westbound, Botany Road Southbound and Wellington Eastbound, or else Raglan Street Eastbound, George Street Southbound and Wellington Westbound (Figure 16).
- Cope Street Northbound travel: Detour route is via Wellington Street Eastbound, George St Northbound, Raglan Street Westbound (Figure 17).

Figure 16: Stage 1 - Cope Street alternative route for existing southbound travel

Figure 17: Stage 1 - Cope Street alternative route for existing northbound travel

5.7 Additional Traffic Signage

5.7.1 Stage 1 - Structures Works

Additional traffic signage is required to be placed due to the proposed works of the work site as shown in Figure 18. The signage will provide additional awareness to drivers that site access gates are limited to construction personnel only.

Figure 18: Additional Traffic Signage around the subject site

The gate locations along Cope Street are shown in the TGS. Each will also have the same “NO ENTRY” and “CONSTRUCTION VEHICLES EXCEPTED” signage.

5.8 Heavy Vehicle Manoeuvres

5.8.1 Stage 1 - Structures Works

During the Stage 1 closure of Cope St Heavy vehicle movements around the Stage 1 of the CTMP. Swept path analysis of a 28.5m Jinker Dual Steer was conducted for precast deliveries to the closure.

All precast deliveries for these works are via Jinker vehicles which are restricted to travel between 930pm and 5am. Trucks are then expected to arrive on site between 1130pm and 4am under traffic control in accordance with the attached TGS Plans. For any given night, a maximum of 4 Jinkers will be arriving to be unloaded and are limited to a maximum of 6 consecutive nights.

Swept path analysis has been undertaken for key precast delivery heavy vehicle movements for this project and is available in Appendix A – Swept Paths.

Swept paths shown for Jinker movements on Botany Rd turning right into Raglan St will only be utilised for Jinker movements during night shift between 11pm and 5am (i.e. not used for any other delivery or vehicle manoeuvre). RMS accredited Traffic Controllers will confirm that signals will not be operational (i.e., flashing amber) prior to implementing TGS plans for managing the delivery of jinkers via this route.

marked Stop Slow will cannot control traffic at signals, unless that the contractor

The 28.5m Jinker movements provide smooth manoeuvring through the key turning points of the subject site. A key consideration is the possible removal of roundabouts around the site.

All Heavy Vehicle movements accessing / egressing will be completed under traffic control.

Refer to Appendix A – Swept Paths for heavy vehicle manoeuvres.

5.9 Heavy Vehicle Haulage Routes - Stage 1

Due to the closure of Cope St, Waterloo Construction traffic will be affected with revised haulage routes requiring Heavy Vehicles to travel on surrounding streets to access site. These revised routes are as detailed below:

Scenario 1: Vehicles approaching site North Bound on Botany Rd required to enter site on Botany Rd from south bound. Proposed Route:

- Right turn on Wellington St, Left Turn on George St, Left Turn on Raglan St, Left Turn on Botany Rd and Left into site
- Once unloaded heavy vehicles will exit left from site onto Botany Rd and head South Bound on Wellington St

Scenario 2: Vehicles approaching site North Bound or South Bound on Botany Rd required to be unloaded off Wellington St or Inside wellington St Gate. Proposed Route:

- Left/Right Turn onto Wellington St, left into site (reverse) or park up on east bound parking lane.
- Once unloaded heavy vehicles will exit left from site onto Wellington St and head east bound on wellington to Elizabeth St.

Figure 19: Heavy Haulage Routes for Stage 1

It is noted that Wellington St, George St and Raglan St to the East of Cope St are all 3T limited roads. City of Sydney have approved these routes (refer to Appendix D – Heavy Vehicle Haulage Routes Approval (Stage 1)).

It is expected that the number of heavy vehicles per day shift and night shift will not increase from the current numbers experienced on the Waterloo Site.

5.10 Impacts to Traffic Control Signals

5.10.1 Botany Road / Raglan Street

No changes to the TCS required for Stage 1.

5.10.2 For Botany Road / Wellington Street

No changes to the TCS required for Stage 1.

6 Community Notification

6.1 VMS Strategy

This section provides the operational strategy for Variable Message Signs (VMS) for these works.

This section is prepared in accordance with the VMS requirements set out in Austroads Guide to Traffic Management Part 10: Traffic Control and Communication Devices Section 5 – Electronic Signs ("Austroads Guide"), and Transport for NSWs Guide to use of Portable Variable Message Signs for Temporary Traffic Management on NSW Roads.

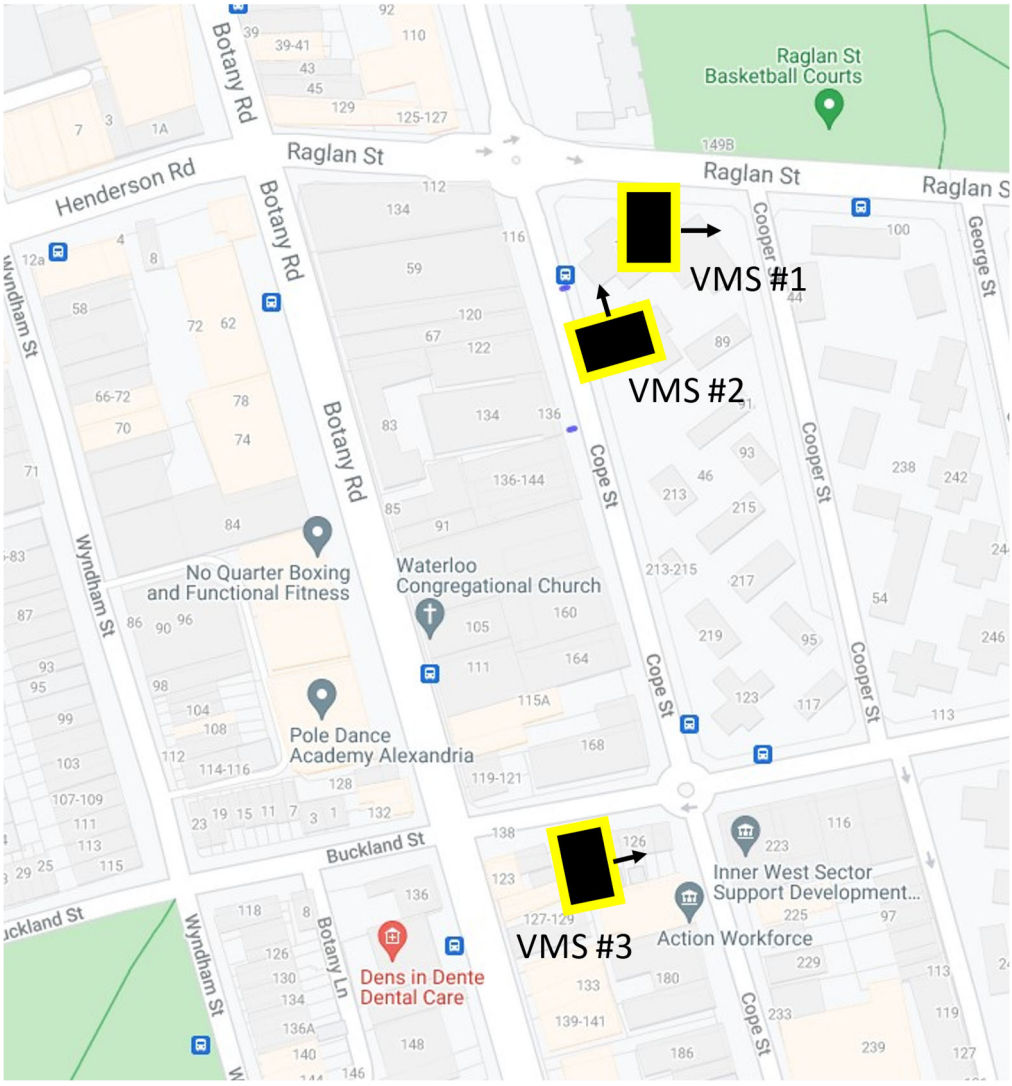
6.2 VMS Locations

6.2.1 VMS Placement

Three VMS are to be used for these works. The locations are shown in Figure 20 below.

The precise placement of the VMS must be in accordance with the Austroads Guide, Section 5.8.

Figure 20: VMS Locations



6.2.2 VMS Specifications

- The colour of the text is to be white or yellow, with a black background
- Contrast level between 8 and 12 is to be used during daytime hours
- Automatic dimming is to be used at night in order to reduce glare.

6.3 VMS Details

6.3.1 Prior to the Works

For two weeks prior to the works and remain for two weeks post implementation, the VMS is to display two frames of information:

1. COPE ST
   DETOUR
   DD/MM

Where DD/MM is the commencement of the road closure.

In addition to the above, JHG will have Traffic Controllers on site for the first week to guide traffic to the new arrangements.

6.3.2 Post Works

The VMS are to be removed.

6.4 Other Notification

Community notification will be undertaken in accordance with Waterloo ISD Community Communications Strategy.

This will include advertising significant traffic management changes, detours, traffic disruptions and work outside any working hours contained in the Planning Approval at least 5 Business Days before any detour, disruption, work or change occurs. These advertisements must be placed in local newspapers that cover Waterloo ISD area.

7 Other notes

7.1.1 Emergency Response

The Emergency Evacuation and Response Plan for this project is available in JHG-SWL-HS-PLN-000002. Other relevant emergency plans are:

- JH-MPR-RCC-006 Crisis Management
- JH-MPR-WHS-005 First Aid & Rehabilitation Management.

Additional emergency response documentation can be found in the Project Health and Safety Management Plan Section 6.1 *Emergency Preparedness and Crisis Management.* This is to be implemented for all incidents involving construction traffic.

The proposed road closures are to be communicated to emergency services through TCG and TTLG.

The nearest emergency services are located at the following areas:

- Fire: Alexandria Fire Station – 177-187 Wyndham St, Alexandria NSW 2015
- Police: Redfern Police Station – 1 Lawson St, Redfern NSW 2016
- Public Hospital: Royal Prince Alfred – 50 Missenden Rd, Camperdown NSW 2050.

8 Consultation

8.1 TCG

The CTMP has been presented at the following TCG Meetings:

Date	Stage 1
07-Dec-21	Presented
23-Nov-21	Presented
09-Nov-21	Presented
22-Oct-21	N/A

8.2 TTLG

The CTMP has been presented at the following TTLG Meetings:

Date	Stage 1
25-Nov-21	Presented
27-Oct-21	N/A

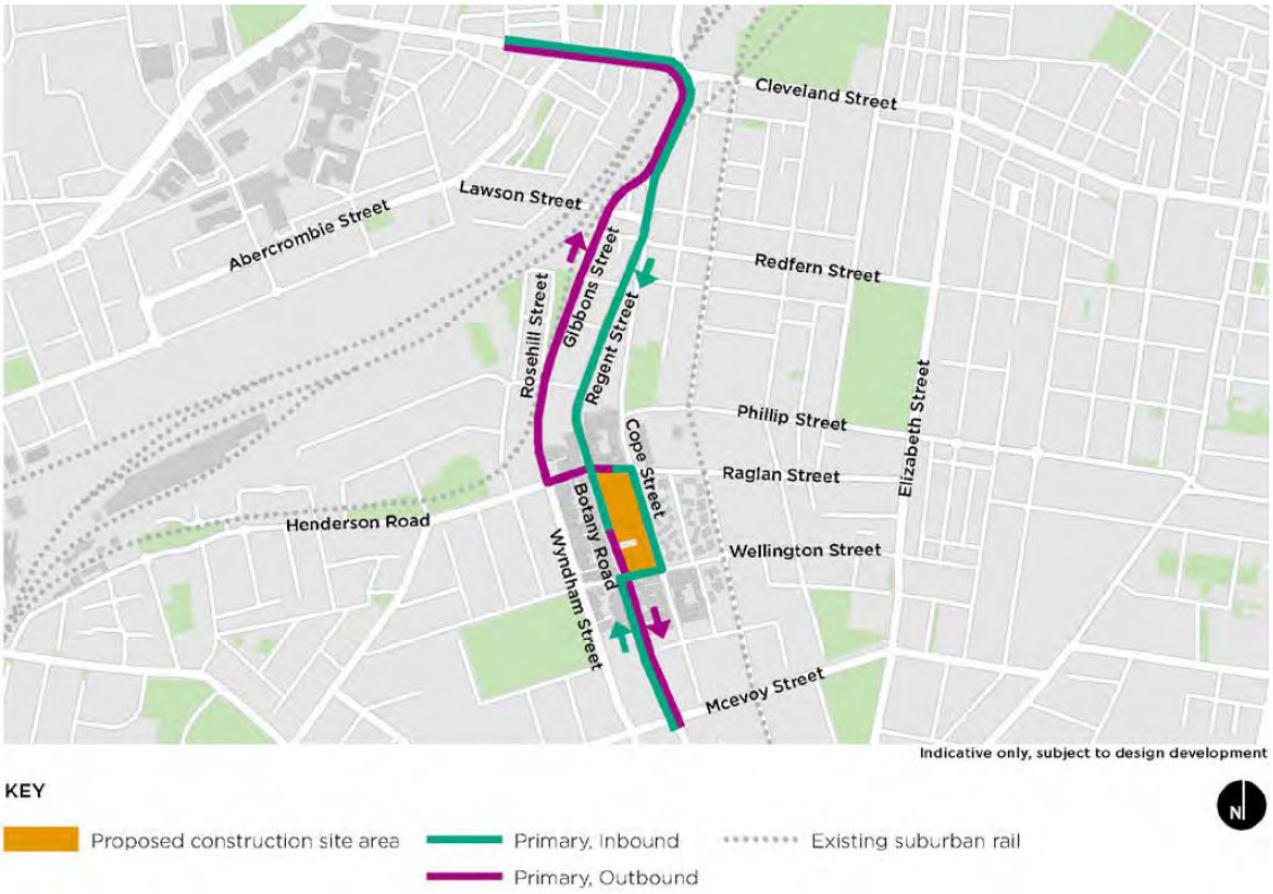
Appendix A – Swept Paths

Appendix B – Traffic Guidance Scheme

Traffic Guidance Scheme plans provided below are for the stage 1 closure of Cope St and will be implemented as follows:

- 00JHCS45.5 – Installation of Closure During Day Shift
- 00JHCS61 – Management of site whilst Stage 1 closure is in place (i.e. gate management).
- 00JHCS51.5 – Management of Jinker Deliveries from Botany Rd, Wellington St and forward into Closure on Cope St. Implemented on Night Shift for deliveries
- 00JHCS47.5 – Management of Jinker Deliveries from Wellington St and Reverse into Closure on Cope St. Implemented on Night Shift for deliveries
- 00JHCS50 – Management of Jinker Deliveries from Botany Rd, Raglan St and Reversing into Closure on Cope St. Implemented on Night Shift for deliveries.

Appendix C – Haulage Routes



Source: Chatswood to Sydenham Environmental Impact Statement May 2016 Technical Paper 1: Traffic and Transport

Appendix D – Heavy Vehicle Haulage Routes Approval (Stage 1)

Matthew Kerry-JHG

From: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Sent: Wednesday, 1 December 2021 3:31 PM
To: Matthew Kerry-JHG
Cc: Sally Reynolds-JHG; Baria Mahdy-JHG; Julian Paul-JHG; Nathaniel Lasky-JHG
Subject: RE: Cope St Closure - Revised Haulage Routes

Hi Matt,

Any vehicle over 3t can use a 3t load limited street as long as it has a delivery too that street or needs to use that street to access a property for a delivery.

Joshua Faull
Construction Liaison Coordinator
Construction & Building Certification Services

CITY OF SYDNEY

Telephone: +612 9265 9767
Mobile: +61 448 488 384
cityofsydney.nsw.gov.au

The City of Sydney acknowledges the Gadigal of the Eora Nation as the Traditional Custodians of our local area.

From: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Sent: Wednesday, 1 December 2021 3:27 PM
To: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Cc: Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>; Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Julian Paul-JHG <Julian.Paul@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>
Subject: RE: Cope St Closure - Revised Haulage Routes

Josh,

Thanks for the below response. Can you please confirm the following:

- Does the below no objection apply to John Holland Heavy Vehicles (>3T) using the proposed routes.
- Noting the above is there any requirements for John Holland to implement to allow heavy vehicles to use these routes. John Holland note existing 3T limited signage is in place on Wellington St.

Regards,

Matthew Kerry
Site Engineer
Waterloo Station

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND mirvac

Level 10, 54 Park Street
Sydney NSW 2000
M. +61 429 163 644
E. Matthew.Kerry@jhg.com.au
W. johnholland.com.au

From: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Sent: Wednesday, 1 December 2021 3:16 PM
To: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Cc: Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>; Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Julian Paul-JHG <Julian.Paul@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>
Subject: FW: Cope St Closure - Revised Haulage Routes

Hi Matt,

See below no objection to the proposed short term change in haulage routes.

Joshua Faull
Construction Liaison Coordinator
Construction & Building Certification Services

CITY OF SYDNEY

Telephone: +612 9265 9767
Mobile: +61 448 488 384
cityofsydney.nsw.gov.au

The City of Sydney acknowledges the Gadigal of the Eora Nation as the Traditional Custodians of our local area.

From: Joseph Gomes <jgomes@cityofsydney.nsw.gov.au>
Sent: Wednesday, 1 December 2021 3:10 PM
To: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Subject: RE: Cope St Closure - Revised Haulage Routes

Just to confirm our discussion – this is okay

From: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Sent: Wednesday, 1 December 2021 1:14 PM
To: Joseph Gomes <jgomes@cityofsydney.nsw.gov.au>
Cc: Ganesh Vengadasalam <GVengadasalam@cityofsydney.nsw.gov.au>
Subject: FW: Cope St Closure - Revised Haulage Routes

Hi Joe,

See below and attached, Sydney Metro will have Cope St closed for around 6 weeks, during that time they will need to temporarily change their route from Wellington St to the Botany Rd gate. Are you okay for the short period?

Joshua Faull
Construction Liaison Coordinator
Construction & Building Certification Services

CITY OF SYDNEY

Telephone: +612 9265 9767
Mobile: +61 448 488 384
cityofsydney.nsw.gov.au

The City of Sydney acknowledges the Gadigal of the Eora Nation as the Traditional Custodians of our local area.

From: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Sent: Wednesday, 1 December 2021 8:46 AM
To: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Cc: Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>; Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Julian Paul-JHG <Julian.Paul@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>
Subject: Cope St Closure - Revised Haulage Routes

Josh,

As discussed last week, John Holland wish to obtain approval to alter our haulage route around site whilst the Cope St closure is in place. As such, the below haulage routes for the Waterloo Project are proposed for heavy vehicles for City of Sydney Approval.

- Scenario 1: Vehicles approaching site North Bound on Botany Rd required to enter site on Botany Rd from south bound.
    - Proposed Route
        - Right turn on Wellington St, Left Turn on George St, Left Turn on Raglan St, Left Turn on Botany Rd and Left into site
        - Once unloaded heavy vehicles will exit left from site onto Botany Rd and head South Bound on Wellington St
- Scenario 2: Vehicles approaching site North Bound or South Bound on Botany Rd required to be unloaded off Wellington St or Inside wellington St Gate
    - Proposed Route

- Left/Right Turn onto Wellington St, left into site (reverse) or park up on east bound parking lane.
- Once unloaded heavy vehicles will exit left from site onto Wellington St and head east bound on wellington to Elizabeth St.

Refer attached markup routes.

Can you please assist in passing this information onto the relevant department in council for approval and advise if there is any additional information required to obtain approval for the temporary haulage routes while Cope St is closed.

Regards,

Matthew Kerry
Site Engineer
Waterloo Station

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

Level 10, 54 Park Street
Sydney NSW 2000
M. +61 429 163 644
E. Matthew.Kerry@jhg.com.au
W. johnholland.com.au

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Site Layout and Planned Routes and Closures

Appendix E – Council Garbage Bins Correspondence

Nathaniel Lasky-JHG

From: Joshua Faull
Sent: Monday, 6 December 2021 3:16 PM
To: Matthew Kerry-JHG
Cc: Baria Mahdy-JHG; Nathaniel Lasky-JHG; Bj Jordan-JHG; Sally Reynolds-JHG
Subject: RE: Cope St Closure - Resident Bin Requirements

Okay thanks I have advised our team and will let you know the details once I hear back.

Joshua Faull
Construction Liaison Coordinator
Construction & Building Certification Services

CITY OF SYDNEY

Telephone: +612 9265 9767
Mobile: +61 448 488 384
cityofsydney.nsw.gov.au

The City of Sydney acknowledges the Gadigal of the Eora Nation as the Traditional Custodians of our local area.

From: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Sent: Monday, 6 December 2021 1:27 PM
To: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Cc: Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>; Bj Jordan-JHG <Bj.Jordan@jhg.com.au>; Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>
Subject: RE: Cope St Closure - Resident Bin Requirements

Josh,

Yes this can be accommodated.

Please advised on collection days and times to best ensure bins can be taken out. Alternatively, John Holland can assist upon arrival with CoS personnel notifying John Holland and we can arrange for the bins to be brought out and taken in at the same time.

Regards,

Matthew Kerry
Site Engineer
Waterloo Station

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

Level 10, 54 Park Street
Sydney NSW 2000
M. +61 429 163 644
E. Matthew.Kerry@jhg.com.au
W. johnholland.com.au

From: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Sent: Monday, 6 December 2021 11:51 AM
To: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Cc: Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>; Bj Jordan-JHG <Bj.Jordan@jhg.com.au>; Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>
Subject: RE: Cope St Closure - Resident Bin Requirements

Okay so if they need to collect at Wellington St or Raglan then you will need to get the bins taken out to the location and then take them back in as they wont do that.

Can this be accommodated?

Joshua Faull
Construction Liaison Coordinator
Construction & Building Certification Services

CITY OF SYDNEY

Telephone: +612 9265 9767
Mobile: +61 448 488 384
cityofsydney.nsw.gov.au

The City of Sydney acknowledges the Gadigal of the Eora Nation as the Traditional Custodians of our local area.

From: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Sent: Monday, 6 December 2021 11:26 AM
To: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Cc: Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>; Bj Jordan-JHG <Bj.Jordan@jhg.com.au>; Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>
Subject: RE: Cope St Closure - Resident Bin Requirements

Josh,

Thanks for your response. Please note the following in relation to the queries:

- The Bins would be able to be collected during the usual collection time during the week.
- The Truck will not be able to access directly to the bin storage as cranes will be setup on the full width of the roadway. However, can park up on wellington or cope St outside the closure.
- The footpath on the eastern side of Cope St will be open and as such the bin storage unit can be accessed from the footpath for CoS collection Personnel to access the unit without interfacing with John Holland.

Can you please pass the above onto the appropriate team for comment.

Regards,

Matthew Kerry
Site Engineer
Waterloo Station

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND mirvac

Level 10, 54 Park Street
Sydney NSW 2000
M. +61 429 163 644
E. Matthew.Kerry@jhg.com.au
W. johnholland.com.au

From: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Sent: Monday, 6 December 2021 11:10 AM
To: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Cc: Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>; Bj Jordan-JHG <Bj.Jordan@jhg.com.au>; Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>
Subject: RE: Cope St Closure - Resident Bin Requirements

I have been speaking to our waste team and they have asked the below.

Is there a specific time that the bins would need to be collected? If so will the truck be able to access into the street under control to get the bins?

Otherwise can John Holland bring the bins to the nearest accessible intersection and return them back after collection?

Joshua Faull
Construction Liaison Coordinator
Construction & Building Certification Services

CITY OF SYDNEY

Telephone: +612 9265 9767
Mobile: +61 448 488 384
cityofsydney.nsw.gov.au

The City of Sydney acknowledges the Gadigal of the Eora Nation as the Traditional Custodians of our local area.

From: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Sent: Monday, 6 December 2021 11:07 AM
To: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Cc: Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>; Bj Jordan-JHG <Bj.Jordan@jhg.com.au>; Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>
Subject: RE: Cope St Closure - Resident Bin Requirements

Hi Josh,

Just following up on the below regarding resident bins on Cope St. Can you please advise at your earliest convenience on the below.

Regards,

Matthew Kerry
Site Engineer
Waterloo Station

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

Level 10, 54 Park Street
Sydney NSW 2000
M. +61 429 163 644
E. Matthew.Kerry@jhg.com.au
W. johnholland.com.au

MENTAL HEALTH FIRST AIDER ACCREDITED

From: Matthew Kerry-JHG
Sent: Friday, 3 December 2021 11:35 AM
To: Joshua Faull <jfaull@cityofsydney.nsw.gov.au>
Cc: Baria Mahdy-JHG <Baria.Mahdy@jhg.com.au>; Nathaniel Lasky-JHG <Nathaniel.Lasky@jhg.com.au>; Bj Jordan-JHG <Bj.Jordan@jhg.com.au>; Sally Reynolds-JHG <Sally.Reynolds@jhg.com.au>
Subject: Cope St Closure - Resident Bin Requirements

Josh,

The residents on the eastern side of Cope St have bin storage units that will have access affected during the road closure on Cope St.

Can City of Sydney please advise the requirements to facilitate access to these bin storage units during the closure of Cope St.

If you have any questions please feel free to give me a call.

Regards,

Matthew Kerry
Site Engineer
Waterloo Station

Waterloo Integrated Station Development
A Joint Venture Project
JOHN HOLLAND
mirvac

Level 10, 54 Park Street
Sydney NSW 2000
M. +61 429 163 644
E. Matthew.Kerry@jhg.com.au
W. johnholland.com.au

MENTAL HEALTH FIRST AIDER ACCREDITED

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Appendix F – Endorsement for Stage 1 Implementation

SWL General Correspondence

Reference No: SMCSWBMS-SCO-SWL-GEN-000001
Project Title: Sydney Metro City & Southwest - Metro Stations Development
Contract No: BMS - Building Monitoring and Control System
Sub Contract: -
Orig Ref No:
DLM:

Date: 23 December 2021, 05:27 PM **Response required by:**

From: Steve Brown (Sydney Coordination Office)

To: Jason Azzi (Sydney Metro) ; Luke Garden (Sydney Metro) ; Tracy Young (Sydney Metro) ; Jake Coles (Sydney Coordination Office) ; Carl Mella (Roads and Maritime Services (part of TfNSW division))

Cc:

Subject: **Construction Traffic Management Plan Addendum 2 Half Road Closure - Approval**

In reference to your transmittal SMCSWSWL-SMD-TX-001522 dated 20/12/21.

In accordance with Schedule C1 Appendix A.9 Section 2.1 (c) and 2.2 (c) of the Principal's General Specifications G10 – Traffic and Transport Management and Minister's Condition of Approval E82 for the Sydney Metro City & South West, Transport for NSW - Greater Sydney - Planning & Programs, and the Sydney Coordination Office approve the Sydney Metro City & South West Construction Traffic Management Plan – Construction Traffic Management Plan Addendum 2 Half Road Closure (SMCSWSWL-JHG-SWL-EM-PLN-002531 Rev J) subject to the following requirements:

- Road Occupancy Licences (ROLs) are to be obtained from TMC prior to any works commencing
- ROLs and TfNSW approvals are to be obtained for any temporary or permanent installation and/or change of any regulatory traffic control device, road closures, occupation of the road network to conduct works and the associated installation of temporary traffic control devices
- No activities are to commence onsite that might have an effect on traffic without an approved (by TfNSW and/or CJP) TMP (long term work) and/or TCPs (for short term works)
- All TCPs must comply with AS1742.3 and TfNSW's (RMS') Traffic Control at Worksites manual and signed by a person with TfNSW (RMS) certification to prepare TCPs
- Coordinate with any approximately situated construction sites in relation to appropriate placement of proposed construction advisory signs and to manage the cumulative impacts of truck movements
- There is no designated long term speed reduction. Short term works e.g. during contra-flow or lane closures, which may require 40 km/hr speed zones are to be approved separately and installed in accordance with AS1742.3, TfNSW (RMS) TCAWS Manual Version 5 and SZATruck and pedestrian movements during all closures and detours must be directed by TfNSW (RMS) accredited traffic controllers
- Barricades and signs to be provided in accordance with Australian Standards
- Comply with any additional conditions that Council, TMC and NSW Police may require
- Addressing any safety issues identified within the Road Safety Audit review for this CTMP, in advance of any works commencing
- Addressing any issues raised by Council, TMC, STA, Bus Operators, Taxi Council, residents/businesses, NSW Police or Emergency Services in the CTMP approval process
- Promptly addressing any CJP and/or TMC and/or TfNSW issue that eventuates during the works

Jake Coles
Operations Manager – Eastern Harbour City

Operations| Customer Journey Planning | Greater Sydney
Transport for NSW

Design Series:

Discipline: **Design Lots:** **Location:**

City of Sydney Endorsement of Road Closure

Matthew Kerry-JHG

From: Claudia Calabro <CCALABRO@cityofsydney.nsw.gov.au>
Sent: Wednesday, 1 December 2021 11:14 AM
To: Matthew Kerry-JHG
Cc: Joshua Faull
Subject: Approval Letter - Temporary Road Closure - Cope Street Waterloo - 2021/485808
Attachments: Approval Letter - Temporary Road Closure - Cope Street Waterloo.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

1 December 2021

TRIM Ref: 2021/485808

Matthew Kerry
John Holland
88 Botany Road
Alexandria NSW
Matthew.Kerry@jhg.com.au

Dear Matthew,

Temporary Full Road Closure

Please find attached approval letter for Temporary Full Road Closure Application of Cope Street, Waterloo, between Raglan Street and Wellington Street, (four lanes), from Thursday 13 January 2022 to Friday 28 February 2022, 24 Hours, with contingency dates of 1 March 2022 to 14 April 2022.

Kind regards

Claudia Calabro
Traffic Works Coordinator
City Infrastructure & Traffic Operations (CITO)

CITY OF SYDNEY

Telephone: 02 9265 9333
cityofsydney.nsw.gov.au

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STA Endorsement of Road Closure and Swept Path of Buses

Matthew Kerry-JHG

From: Frankie Passarelli <Frankie.PASSARELLI@transport.nsw.gov.au>
Sent: Wednesday, 22 December 2021 8:51 AM
To: Daneil Marzetti; Bushara Gidies
Cc: Matthew Kerry-JHG; Craig Dunn; Jim Niahos; Rabih Bekdache; Elizabeth Harrison; Carl Mella; Fraser Leishman; Jake Coles; Stephen Brown; Wade Mitford; Bushara Gidies
Subject: RE: Conflict Check: Sydney Metro, Waterloo Part 01 of 02
Attachments: Appendix A - Swept Path Analysis - Stage1 - Jinkers.pdf

Daniel,

Thanks for the email, I had a quick catch up with the local operator , our planning team and operational change team yesterday to discuss the attached.

I have concerns with the swept path as attached but have no objections to the RMS findings or commentary and support the suggestion below, as a temporary measure during construction, for traffic controllers to be in situ to assist as required.

I would like it noted that this solution is temporary until a design solution is achieved to make this movement safer.

Given this stretch of roadway is a significant bus corridor which will likely see an increase in services and frequency post Metro opening, the current road alignment is inadequate.

I haven't been privy to end state design as yet but suffice to say the current setup if unaltered will not be fit for purpose and contribute to significant degradation in the bus network.

Regards,
Frankie Passarelli
Transport Planning Project Manager
Customer Journey Planning – Short Term & Temporary Transport Planning
Greater Sydney | **Transport for NSW**

E: Frankie.PASSARELLI@transport.nsw.gov.au
T: 0447 174 312
231 Elizabeth St | Sydney NSW 2000

From: Daneil Marzetti [mailto:daneil@varigroup.com.au]
Sent: Friday, 17 December 2021 3:05 PM
To: Bushara Gidies <Bushara_Gidies@sta.nsw.gov.au>; Frankie Passarelli <Frankie.PASSARELLI@transport.nsw.gov.au>
Cc: Matthew Kerry-JHG <Matthew.Kerry@jhg.com.au>
Subject: RE: Conflict Check: Sydney Metro, Waterloo Part 01 of 02

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Good Afternoon Frankie and Bushara,

I hope this email finds you well.

RMS have noted that in the updated CTMP it has been stated that Swept paths indicate that the bus left turn from Raglan Street to Botany Road may slightly encroach on the kerb ramp at the south-eastern corner of Raglan Street/Botany Road. Pedestrian management may be required during bus movements to ensure that pedestrians are kept away from this corner during bus turning movements. This is to be handled by qualified traffic controllers. Further to the above, 14.5m buses cannot complete the movement safely and cannot be used on this route.

As such, can you please advised if you have any objections towards our new findings. In particular the comment around the 14.5m buses cannot complete the movement safely and cannot be used on this route.

Should you have any questions or concerns, please do not hesitate to contact me at any time.

Kind Regards,

Daneil Marzetti

Traffic Planner

VARI GROUP

Wishing you a Merry Christmas and a Happy New Year!

| Unit 3, 42-50 Violet Street Revesby NSW 2212

|M 0460 675 215 |P (02) 9790 3900 | F (02) 8458 6182 | **Varigroupcom.au** |

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From: Frankie Passarelli <Frankie.PASSARELLI@transport.nsw.gov.au>
Sent: Friday, 17 December 2021 8:14 AM
To: Daneil Marzetti <daneil@varigroup.com.au>
Cc: Bushara Gidies <Bushara_Gidies@sta.nsw.gov.au>; Karina D'silva <Karina.D'Silva@transport.nsw.gov.au>; Jim Niahos <Jim.Niahos@transport.nsw.gov.au>; Craig Dunn <craig.dunn@transport.nsw.gov.au>; Rabih Bekdache <Rabih.Bekdache@transport.nsw.gov.au>
Subject: RE: Conflict Check: Sydney Metro, Waterloo

Daniel,

Thanks for the email.

No objections to works.

Regards,
Frankie Passarelli
Transport Planning Project Manager
Customer Journey Planning – Short Term & Temporary Transport Planning
Greater Sydney | **Transport for NSW**

E: Frankie.PASSARELLI@transport.nsw.gov.au
T: 0447 174 312
231 Elizabeth St | Sydney NSW 2000

From: Daneil Marzetti [mailto:daneil@varigroup.com.au]
Sent: Thursday, 16 December 2021 3:40 PM
To: Frankie Passarelli <Frankie.PASSARELLI@transport.nsw.gov.au>
Cc: Bushara Gidies <Bushara_Gidies@sta.nsw.gov.au>
Subject: Conflict Check: Sydney Metro, Waterloo

CAUTION: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Good Afternoon Frankie,

I hope you are well.

Attached is TGS: 00JHCH61,

This works will go from 07:00-17:00
(21/12/21-23/12/21)

Are there any objections to these works?

If you have any questions or concerns, please do not hesitate to contact me.

Daneil Marzetti

Traffic Planner

| Unit 3, 42-50 Violet Street Revesby NSW 2212

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Appendix E Construction Noise and Vibration Impact Statement (SMCSWSWL-JHG-SWL-EM-RPT-000012 CNVIS (Addendum 2))

JOHN HOLLAND

Waterloo Integrated Station Development

Construction Noise and Vibration Impact Statement Amendment 2

SMCSWSWL-JHG-SWL-EM-RPT-000012
VMS Report Number 10-1808R2R1

Document and Revision History

Document Details	
Title	Construction Noise and Vibration Impact Statement Amendment 2 – Additional Scenarios
Client	Sydney Metro City & Southwest

Revisions

Rev #	Date	Description	Prepared by	Reviewed by	Approved/Endorsed by
0-A	7 December 2021	Prepared to consider full closure of Cope St	Yang Liu	M. Blake	
1-B	8 December 2021	Updated to address AA comments	Yang Liu	M. Blake	
0	21 January 2022	Endorsed by the AA			Carl Fokkema (Alternate AA)

Note: Appendix B – D are available on request due to the volume of data

APPROVAL
CITY & SOUTHWEST ACOUSTICS ADVISOR

Review of	**Construction Noise and Vibration Statement Waterloo Integrated Station Development (WISD)**	**Document reference:**	**Construction Noise and Vibration Impact Statement – Waterloo Integrated Station Development – Amendment 2 – Additional Scenarios** **Prepared by VMS Australia Pty Ltd** *Document Number: SMCSWSWL-JHG-SWL-EM-RPT-000012 Construction Noise and Vibration Impact Statement Amendment 2 – Additional Scenarios_Rev 0* *Date: 21 January 2022*
Prepared by:	Carl Fokkema Alternate Acoustics Advisor		
Date of issue:	21 January 2022		

As approved Alternate Acoustics Advisor for the Sydney Metro City & Southwest project, I have reviewed and provided comment on the Construction Noise and Vibration Impact Statement (CNVIS) – Amendment 2 – Additional Scenarios, as required under A27 (d) of the project approval conditions (SSI 15-7400).

I am satisfied that the CNVIS Amendment 2- Additional Scenarios R2R1 is technically valid and includes appropriate noise and vibration mitigation and management (21 January 2022). On this basis I endorse CNVIS SMCSWSWL-JHG-SWL-EM-RPT-000012 in respect of Additional Scenarios.

Carl Fokkema, City & Southwest Alternate Acoustics Advisor

Construction Noise and Vibration Impact Statement

Waterloo Integrated Station Development

Amendment 2 - Additional Scenarios

VMS AUSTRALIA

Report Number 10-1808R2R1

John Holland Pty Ltd

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Quality Management

Reference	Status	Date	Prepared	Checked	Authorised
10-1808R2R1	Revision 1	8 December 2021	Yang Liu	Mark Blake	Yang Liu
10-1808R2R0	Revision 0	7 December 2021	Yang Liu	Mark Blake	Yang Liu

This Report by VMS Australia Pty Ltd is prepared for the Client listed above and is based on the objective, scope, conditions and limitations as agreed. The Report presents only the information that VMS Australia Pty Ltd believes, in its professional opinion, is relevant and necessary to describe the issues involved. The Report should not be used for anything other than the intended purpose. All surveys, forecasts, projections, and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to VMS Australia Pty Ltd at the date of this report, and upon which VMS Australia Pty Ltd relied.

VMS Australia Pty Ltd does not accept any liability or responsibility to any party with respect to the information and opinions contained in this report.

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Glossary

Term/Acronym	Definition
AA	The independent Acoustic Advisor appointed under the Project Planning Approval
Acceleration	Acceleration is defined as the rate of change of Velocity of a particle over a period of time and is typically measured in the units of m/sec^2.
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
AMMM	Additional Mitigation Measures Matrix
Annoying Activities	As defined by the Interim Construction Noise Guideline to include: • use of 'beeper' style reversing or movement alarms, particularly at night-time • use of power saws, such as used for cutting timber, rail lines, masonry, road pavement or steel work • grinding metal, concrete or masonry • rock drilling • line drilling • vibratory rolling • rail tamping and regulating • bitumen milling or profiling • jackhammering, rock hammering or rock breaking • impact piling
AS 1055	Standards Australia AS1055–1997™ – Description and Measurement of Environmental Noise
AS2187:2006	Australian Standard AS 2187.2-2006: Explosives - Storage and Use - Use of Explosives
AS2436	Standards Australia AS 2436–2010™ – Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites.
AS61672 or AS1259	Standards Australia AS IEC 61672.1–2004™ – Electro Acoustics - Sound Level Meters Specifications Monitoring or Standards Australia AS1259.2-1990™ – Acoustics – Sound Level Meters – Integrating/Averaging as appropriate to the device.
Attenuation	The reduction in the level of sound or vibration.
AVTG	Assessing Vibration – a technical guideline
A-weighting, dBA	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
BS 6472	British Standard (BS 6472–1992) – Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz) dated 1992;
BS 7385	British Standard BS7385: Part 2-1993 - Evaluation and Measurement for Vibration in Buildings — Part 2 – Guide to Damage Levels from Ground-borne Vibration, dated 1993.
CEMF	Construction Environmental Management Framework (Appendix B) of the Submissions and Preferred Infrastructure Report)
CEMP	Construction Environmental Management Plan

Term/Acronym	Definition
CNS	Transport for New South Wales Construction Noise Strategy (Document Number ST-157/4.1, 23 April 2019)
CNVIS	Construction Noise and Vibration Impact Statement (this document)
CNVMP	Construction Environmental Management Sub-plan , Waterloo Integrated Station Development, Noise and Vibration Management Sub-Plan
CNVS	Sydney Metro City & Southwest Construction Noise and Vibration Strategy (Report Number 610.14213 R3, dated 9 August 2017)
CoA	Conditions of Approval for SSI 15_7400
Construction	Includes all physical work required to construct the Project, as defined in the CoA
CSSI	Critical State Significant Infrastructure
DECCW	Department of Environment, Climate Change and Water (now Environment, Energy and Science (EES) Group)
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa. Note that the above formula is only valid for sound propagation in the free-field (see below).
DIN4150:3	German Institute for Standardisation – DIN 4150 (1999-02) Part 3 – Structural Vibration - Effects of Vibration on Structures.
DP&I	NSW Department of Primary Industries, including DPI Agriculture, DPI Biosecurity and Food Safety, DPI Land and Natural Resources, DPI Crown Lands and Water and DPI Fisheries
DPIE	NSW Department of Planning, Industry and Environment
EIS	Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement, 3 May 2016
ENMM	Environmental Noise Management Manual (RTA 2001)
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2000 (NSW)
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence under the POEO Act
ER	The independent Environmental Representative appointed under the Project Planning Approval
Fast/Slow Time Weighting	Averaging times used in sound level meters.
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. engineering considerations and what is practical to build. Reasonable Feasible relates to relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community views and nature and extent of potential improvements.

Term/Acronym	Definition
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Heritage item	A place, building, work, relic, archaeological site, tree, movable object or precinct of heritage significance that is listed under one or more of the following registers: the State Heritage Register under the Heritage Act 1977 (NSW), a heritage item registered under a Local Environmental Plan under the EP&A Act, the World, National or Commonwealth Heritage lists under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth), and an Aboriginal object or Aboriginal place as defined in section 5 of the National Parks and Wildlife Act 1974 (NSW).
Hertz, Hz	The unit of Frequency (or Pitch) of a sound or vibration. One hertz equals one cycle per second. 1 kHz = 1000 Hz, 2 kHz = 2000 Hz, etc.
HNML	Highly Noise Affected Management Level
ICNG	Interim Construction Noise Guideline (OEH, 2009)
Infrastructure Approval	CSSI project approval for SSI 15_7400 Sydney Metro granted by the Minister for Planning on 9 January 2017
ISD	Integrated Station Development
JHPL	John Holland Pty Ltd
L90,15minute	A noise level index. The noise level exceeded for 90% of the time over a 15-minute period. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
Leq,15minute	A noise level index called the equivalent continuous noise level over a 15-minutes period. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
Lmax,15minute	A noise level index defined as the maximum noise level during a 15-minute period. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Metro Quarter Development	Metro Quarter Development (MQD) comprises the land bounded by Botany Road, Raglan Street, Cope Street and Wellington Street, but excluding the Congregational Church located at 103 Botany Road. It is situated approximately 3km from the Sydney CBD and is surrounded by established residential and commercial land uses.
Monitoring Program	Construction Noise and Vibration Monitoring Program
NCA	Noise Catchment Area
NML	Noise Management Level as derived from the Interim Construction Noise Guideline
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
NPfI	NSW Noise Policy for Industry (2017)
NSW Vibration Guideline	NSW Department of Environment and Conservation – NSW Environmental Noise Management – Assessing Vibration: a Technical Guideline (the NSW Vibration Guideline), February 2006.

Term/Acronym	Definition
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit.
OEH	Office of Environment and Heritage
OOHW	Out of Hours Works
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
PPV	The particles of a medium are displaced from their random motion in the presence of a vibration wave. The greatest instantaneous velocity of a particle during this displacement is called the Peak Particle Velocity (PPV) and is typically measured in the units of mm/s.
Project	Sydney Metro City & Southwest - Waterloo Integrated Station Development
Project Planning Approval	Critical State Significant Infrastructure Sydney Metro & Southwest Chatswood to Sydenham Infrastructure Approval dated 9 January 2017 (Application no. SSI 15_7400)
RBL	The Rating Background Level for each period is the median value of the Assessment Background Level values for the period over all of the days measured. There is therefore an RBL value for each period (day, evening and night)
REMM	Revised Environmental Mitigation Measures (Chapter 11 of the Submissions and Preferred Infrastructure Report).
Residential zones	As defined by the relevant Local Environment Plan including Zone R1 General Residential, Zone R2 Low Density Residential, Zone R3 Medium Density Residential, Zone R4 high Density Residential
RMS	NSW Roads and Maritime Services
RNP	NSW Road Noise Policy (DECCW 2011)
Secretary	Secretary of the NSW Department of Planning and Environment or nominee
Sensitive periods	Period of time determined in consultation with affected sensitive receiver
Sensitive receiver	Includes residences, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres, passive recreation areas (including outdoor grounds used for teaching), active recreation areas (including parks and sports grounds). Receivers that may be considered to be sensitive include commercial premises (including film and television studios, research facilities, entertainment spaces, temporary accommodation such as caravan parks and camping grounds, restaurants, office premises, and retail spaces) and industrial premises, and others as identified by the Secretary
Sound Power	Sound Power is the rate at which sound energy is emitted, reflected, transmitted or received, per unit time. Unlike sound pressure, sound power is neither room-dependent nor distance-dependent.
Sound Power Level (SWL)	The Sound Power Level is the sound power relative to a standard reference pressure of 1pW ($20x10^{-12}$ Watts) on a decibel scale. The SWL of a simple point source may be used to calculate the SPL at a given distance (r) using the following formula: $SPL = SWL - 10 \times Log_{10}(4 \times \pi \times r^2)$ Note that the above formula is only valid for sound propagation in the free-field (see below).

Term/Acronym	Definition
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (SPL)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa ($20x10^{-6}$ Pascals) on a decibel scale.
Spoil	All material generated by excavation into the ground
SSI	State Significant Infrastructure
Submissions and Preferred Infrastructure Report	Sydney Metro City & Southwest Chatswood to Sydenham Submissions and Preferred Infrastructure Report, October 2016
Sub-plans	Sub Plans to the CEMP requiring the approval the Secretary of the Department of Environment and Planning under Conditions C3 and C7 including construction noise and vibration, construction soil, water and groundwater, heritage, flora and fauna and air quality
SWMS	Safe Work Method Statement
Sydney CBD	Sydney Central Business District
Sydney Metro	Sydney Metro City & Southwest Project
TfNSW	Transport for New South Wales
Vibration Dose, VDV	When assessing intermittent vibration it is necessary to use the vibration dose value (VDV), a cumulative measurement of the vibration level received over an 8-hour or 16-hour period. The VDV formulae uses the RMS Acceleration raised to the fourth power and is known as the Root-mean-quad method. This technique ensures the VDV is more sensitive to the peaks in the acceleration levels. VDVs are typically measured in the units of $m/s^{1.75}$.
VMS	VMS Australia Pty Ltd
Works	All physical activities to construct the Project
Waterloo ISD	Waterloo Integrated Station Development Project comprises of construction of the new Waterloo station infrastructure to support customer movement and experience.

1 Project Information

1.1 Introduction

The New South Wales (NSW) Government through Transport for NSW (TfNSW) is implementing *Sydney's Rail Future*, a plan to transform and modernise Sydney's rail network so that it can grow with the city's population and meet the needs of commuters and customers in the future.

Sydney Metro is a new standalone rail network identified in *Sydney's Rail Future*. The Sydney Metro network consists of Sydney Metro Northwest (previously known as the North West Rail Link) and Sydney Metro City & Southwest.

The proposed Sydney Metro City & Southwest (SMC&SW) comprises of two core components:

- The Chatswood to Sydenham project involves the construction and operation of an underground rail line approximately 15.5 kilometres long inclusive of new stations between Chatswood and Sydenham.
- The second core component will involve upgrading the 13.5 kilometre rail line and existing stations from Sydenham to Bankstown.

Waterloo Integrated Station Development (Waterloo ISD, the Project) comprises the construction of the new station infrastructure to support customer movement and experience.

The Waterloo ISD is located within the South Sydney local area in the suburb of Waterloo, as shown in **Figure 1.** The Project Site is situated on one city block bounded by Botany Road, Raglan Street, Cope Street and Wellington Street, but excluding the Congregational Church located at 103 Botany Road. The Project Site is situated approximately 3km from the Sydney CBD and is surrounded by established residential dwellings and businesses.

Figure 1 Project Site Location Plan

2 Objectives

Condition E33 of the Sydney Metro City & Southwest Chatswood to Sydenham Infrastructure Approval (CoA, under Section 115ZB of the Environmental Planning Act 1979, Application No: SSI 15_7400, determined 9 January 2017) requires that a Construction Noise and Vibration Impact Statement (CNVIS) must be prepared for each construction site prior to undertaking works which may cause adverse noise and vibration impacts. The key objectives of the CNVIS are to:

- Identify noise and vibration sensitive receivers.
- Predict the noise and vibration impacts from the proposed construction works.
- Based on the predictions, assess the noise and vibration impacts against the objectives set out in the Construction Noise and Vibration Management Plan (CNVMP).
- Where exceedances of the nominated noise and vibration objectives have been predicted, include site specific mitigation measures identified through consultation with affected receivers to reduce noise and vibration impacts.

The approved CNVIS for the Project was prepared in October 2020 to comply with the Sydney Metro City & Southwest Construction Noise and Vibration Strategy (CNVS), the Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009) (ICNG) and the conditions in the SSI 15_7400 Infrastructure Approval. In addition, the CNVIS draws guidance from the Construction Noise and Vibration Management Plan (CNVMP, JHPL Document Reference: SMCSWSWL-JHG-SWL-EM-PLN-000005).

VMS was subsequently engaged to prepare an amendment (Amendment 1) to the approved CNVIS based on the current work method and program, and in particular to assist in the management and scheduling of OOHWs. The amended CNVIS (CNVIS Amendment 1, report number: 10-1808R1R2) has been submitted to Sydney Metro and endorsed by the Acoustics Advisor dated 25 November 2021.

This CNVIS (CNVIS Amendment 2) is the second amendment to the approved CNVIS and provides detailed assessment of the proposed additional activities to be conducted on Cope Street.

This document will be read in addition to the CNVIS Amendment 1 (report number: 10-1808R1R2) dated 24 November 2021 for the additional construction activities. This document may be altered during the course of works. Any changes to this document will be submitted to relevant parties for approval prior to implementation.

3 Additional Construction Activities and Tasks

The Project scope of works (Project Works) is detailed in the Construction and Site Management Plan (CSMP). **Table 1** summaries the additional noise and vibration producing construction activities associated with the Projects Works and used for assessment in this CNVIS.

Table 1 Project Scope of Works

Construction Scenario ID	Construction Activity
S13a	Crane Operation on Cope Street
S13b	Concrete Pouring on Cope Street

4 Construction Program

The construction program for the Project including the estimated commencement date and completion date are presented in **Table 2**.

Table 2 Project Construction Program

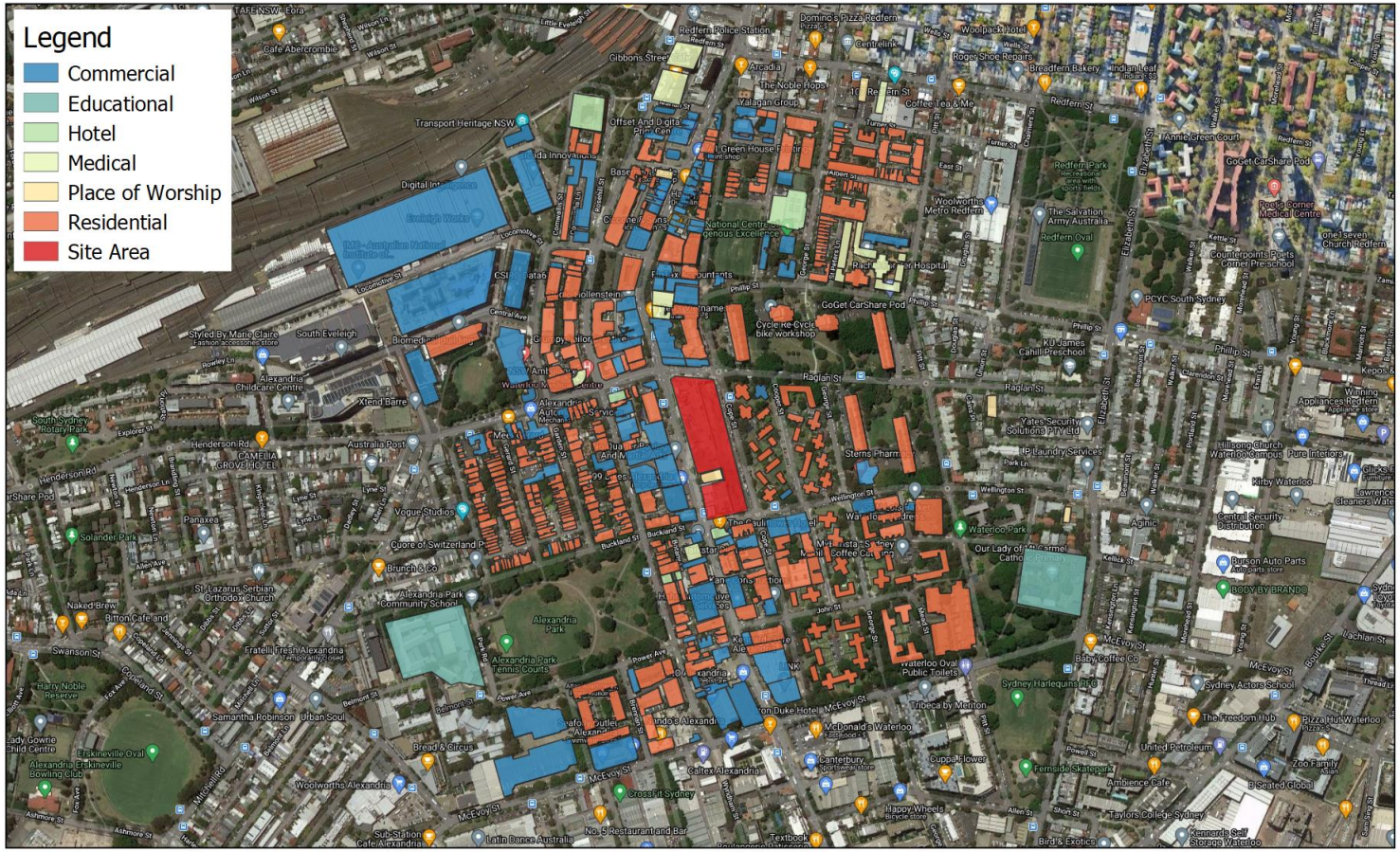
Stage	Phase	Activities	Commencement	Completion
Site Setup	Establishment of site compound	Installation of site sheds, establishment of site access (vehicle & pedestrian), hoarding adjustments etc	Aug-20	Oct-20
	General Site Operations	Deliveries, operation of water treatment plant, crane movements etc	Aug-20	Oct-23
Station Construction	Piling/Foundations	Piling works, waterproofing, base slab construction, commence wall construction	Oct-20	Mar-21
	Structure	FRP walls/Slabs, install precast elements	Oct-20	Aug-22
	Fitout	Blockwork, paving, services installation, cladding works, glazing, building finishes etc	Oct-20	Oct-23
Surface Works	Utilities	Service location, utility relocation and diversion works (trenching, install, backfill, cut-over), smart pole installation	Aug-20	Dec-22
	Civil/Pavements	Removal of redundant pavement, re-construction of new pavement, asphalting, kerb construction and re-alignment, traffic signal install and commissioning, line marking, retaining wall/vehicle barrier construction, stormwater drainage	Jan-21	Dec-23
	Precinct	Hard landscaping, soft landscaping, street furniture, public art	Jun-21	Dec-23

5 Sensitive Receivers

The Project has noise and vibration sensitive receivers within adjoining or adjacent buildings to the Project Site. The properties identified to be potentially most affected by the Project Works are detailed in **Appendix A**.

Figure 2 shows usage of the surrounding receivers. **Figure 3** shows the sensitivity to vibration for the surrounding receivers.

Figure 2 Site Plan – Receiver Usage



Project No.:	10-1808
Date:	13/10/2020
Drawn by:	YL
Scale:	1:9034
Sheet Size:	@A4
Projection:	GDA 1994 MGA Zone 56

0 100 200

N

Sydney Metro City & Southwest

Waterloo Integrated Station Development

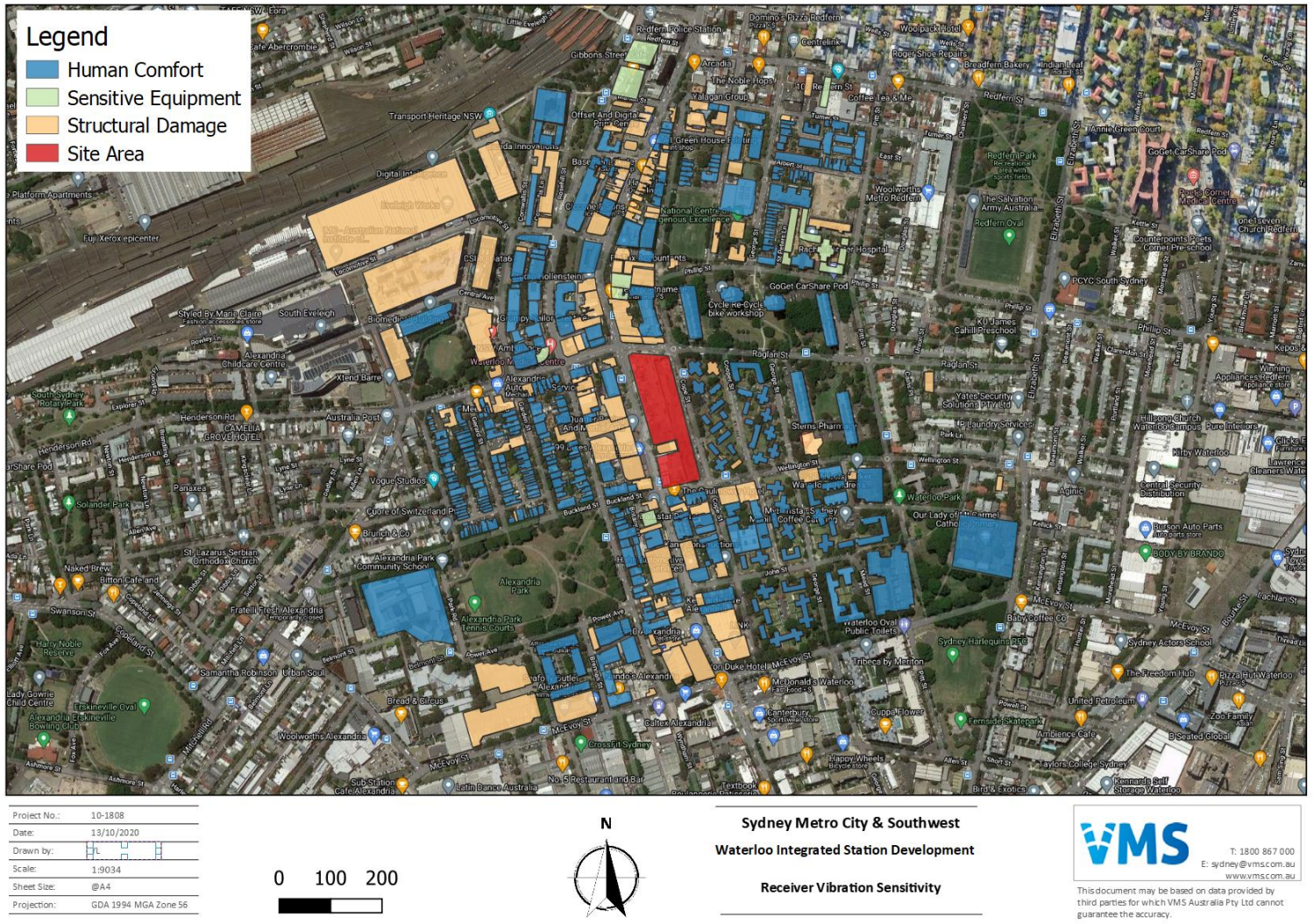
Receiver Usage

VMS
T: 1800 867 000
E: sydney@vms.com.au
www.vms.com.au

This document may be based on data provided by third parties for which VMS Australia Pty Ltd cannot guarantee the accuracy.

Note 1: The Receiver Type colour coding presented represents the building usage type. Refer to Appendix A for detailed building usage.

Figure 3 Site Plan – Receiver Vibration Sensitivity



Note 1: The Receiver Type colour coding presented represents the receiver vibration sensitivity throughout the entire building. Refer to Appendix A for detailed building usage.

6 Construction Hours

6.1 Approved Construction Hours

The standard construction hours as outlined in the Project contract and as per CoA E36 are as follows:

- 7:00 am to 6:00 pm, Mondays to Fridays, inclusive;
- 8:00 am to 1:00 pm on Saturdays; and
- at no time on Sundays or public holidays.

6.1.1 COVID-19 Extended Standard Hours

COVID-19 Extended Standard Hours only apply while the Ministerial Order is in place.

Due to the unexpected COVID-19 viruses situation, the standard construction hours has been extended in accordance with the *Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order (No 3) 2021 (made on 30 July 2021 and remain in force until 24 December 2021)* (Development Construction Order) *and the Environmental Planning and Assessment (COVID-19 Development – Infrastructure Construction Work Days) Order 2020 (made on 9 April 2020)* (Infrastructure Construction Order) (COVID-19 Orders) for the limited period (until 31 March 2022) as nominated by the Minister of Planning and Public Spaces. The extended construction work days in accordance with the COVID-19 Orders are conditioned as follows for the Project:

- Project Works are permitted on a Saturday, Sunday or public holiday
- Comply with all CoAs other than CoA E36 that restricts the hours of work or operation on a Saturday, Sunday or public holiday
- For work or operation on a Saturday, Sunday or public holiday, comply with the standard weekday construction hours (7am to 6pm) defined in CoA E36
- Not involve the carrying out of rock breaking, rock hammering, sheet piling, pile driving or similar activities during the COVID-19 Extended Standard Hours unless allowed under the CoA E46.
- Take all feasible and reasonable measures to minimise noise

Accordingly, the standard construction hours for the COVID-19 special period are:

a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive;

b) 7:00 am to 6:00 pm, on Saturdays; and Sundays or public holidays (with limited construction activities, ie. no rock breaking, rock hammering, sheet piling, pile driving or similar activities, unless allowed under the CoA E46).

Where works are to be undertaken outside of the standard construction hours (including standard construction hours for the COVID-19 special period), the approved City & Southwest Out of Hours Work Strategy / Protocol prepared in accordance CoA E47 would be followed.

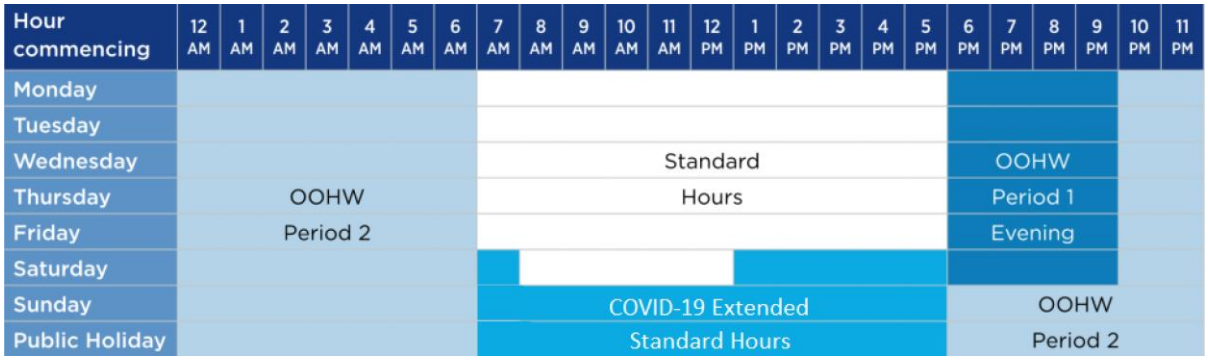
The approved construction hours do not apply in the event of a direction from police or other relevant authority for safety reasons, to prevent environmental harm or risk to life. Construction hours may be extended in accordance CoA E47 and E48.

6.2 Out of Hours Works

Project Works may be carried out outside of standard hours under CoA E36, E41, E42, E44 and E47.

The out-of-hours work (OOHW) periods are further defined as OOHW Period 1 and 2, based on the TfNSW's Construction Noise Strategy (CNS) and The Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2021 as presented in the **Figure 4**.

Figure 4 Out-of-Hours Work Periods



Construction hours are to be in accordance with the CoA and may be extended or varied in accordance with CoA E47. Where Out of Hours Works are to be undertaken, they must be in accordance with the Sydney Metro Out of Hours Work Protocol.

Subject to the Out of Hours Work Protocol, haulage and delivery of spoil and materials may be undertaken 24 hours per day, seven (7) days per week.

The use of hydraulic hammers or other annoying activities is to be avoided outside of standard construction hours, unless the Noise Management Levels present in **Section 7** can be achieved at all sensitive receivers or if allowed under CoA E44 or CoA E46.

7 Background Noise Levels

Unattended environmental noise monitoring was conducted by SLR Consulting Pty Ltd between 31 August and 13 September 2015 in order to identify the existing rating background levels (RBLs) at the potentially noise affected receivers in absence of the construction works at Waterloo ISD. Based on the information presented in Section 2.3 of *Chatswood to Sydenham Environmental Impact Statement* prepared by SLR Consulting dated in 2016, the RBL for day, evening and night-time period are summarised in **Table 3**.

Table 3 Rating Background Levels (dBA)[1,2]

	Daytime 7:00 am to 6.00pm	Evening 6:00 pm to 10:00 pm	Night 10:00 pm to 7:00 am
RBL	54	47	39

Note 1: The RBL noise levels have been obtained using the calculation procedures documented in the Industrial Noise Policy (INP).

Note 2: In accordance with the INP, where the RBL is found to be less than 30 dBA, then it is set to 30 dBA

8 Construction Noise and Vibration Management Levels

8.1 Construction Noise Management Levels

The noise (including ground-borne noise) and vibration management levels have been nominated in the CNVMP in accordance with CoA (SSI 15_7400) and ICNG.

8.1.1 Residential Receivers

Site specific residential construction Noise Management Levels (NMLs) for Waterloo ISD have been nominated in the CNVMP and reproduced in **Table 4**.

Table 4 Residential Construction Noise Management Levels

Receiver Types	LAeq(15minute) Construction NMLs (dBA)			
	Daytime[1]	Daytime OOH[2]	Evening[3]	Night-time[4]
Residential	64	59	52	44

Note 1: The Daytime period includes Monday to Friday 7.00 am to 6.00 pm and Saturdays 8.00 am to 1.00 pm, except for Public Holidays.

Note 2: The Daytime Out of Hours period includes Saturdays 7.00 am to 8.00 am and 1.00 pm to 6.00 pm, and Sundays and Public Holidays 7.00 am to 6.00 pm

Note 3: The Evening period includes 6.00 pm to 10.00 pm.

Note 4: The Night-time period includes 10.00 pm to 7.00 am.

8.1.2 Other Land Uses

The Project specific $L_{Aeq(15minute)}$ NMLs for non-residential receivers are summarised in the CNVMP and reproduced in **Table 5**.

Table 5 Summary of Noise Management Levels for Other Land Uses

Land Use	Area	NML $L_{Aeq(15minute)}$ Noise Levels	
		External	Internal
Hotel[1]	Bars and Lounges	70 dBA	50[2,3] (Daytime & Evening)
	Sleeping Areas: - Hotels near major roads	As per **Table 4** for residential[4]	40[4] (Night-time)
Café[1]	Coffee bar	70 dBA[3]	50[2,3] (when in use)
Bar/Restaurant[1]	Bars and Lounges / Restaurant	70 dBA[3]	50[2,3](when in use)
Library[1]	Reading Areas	70 dBA	45[5](when in use)
Recording Studio[1]	Music Recording Studios	70 dBA	25[6](when in use)
Theatre/ Auditorium[1]	Drama Theatres	70 dBA	30[6](when in use)
Childcare Centres	Internal Play Area	65 dBA	55 dBA
	Sleeping Area	50 dBA (when in use)	40 dBA (when in use)

Land Use	Area	NML $L_{Aeq(15minute)}$ Noise Levels	
		External	Internal
Classrooms at schools and other education institutions		55 dBA	45 dBA[7] (when in use)
Hospital wards and operating theatres		70 dBA	45 dBA
Places of Worship		70 dBA	45 dBA
Active recreation areas[8]		65 dBA	-
Passive recreation areas[9]		60 dBA	-
Community centres		Depends on the intended use of the centre. Refer to the recommended upper internal design sound levels in AS 2107 for specific uses.	
Commercial premises[10]	offices, retail outlets and small commercial premises	70 dBA (when in use)	45 dBA (when in use)
Industrial premises[10]		75 dBA (when in use)	-

Note 1: Design noise levels specified in AS 2107 internal noise levels.

Note 2: Where no external seating has been identified, fixed window glazing and air conditioning is assumed to mitigate high existing ambient noise levels and/or control internal noise break-out. A minimum outside-to-inside attenuation of 20 dB is assumed. The internal ICNG noise goal then corresponds to a façade level of 70 dBA.

Note 3: Where an open frontage or outdoor seating area has been identified, the external noise goal is taken as 60 dBA.

Note 4: Hotels (sleeping areas during the night-time) are assumed to have incorporated acoustic façade design in order to mitigate high existing ambient noise levels (refer to Section 3) to achieve the internal design noise level of 40 dBA specified in AS 2107. Notwithstanding, the more conservative external NML corresponding to residential receivers (refer to **Table 4**) has been applied to the sleeping areas of hotels.

Note 5: These receivers are typically well insulated from external noise break-in.

Note 6: These receivers are typically well insulated from external noise break-in, with significant acoustic mitigation included in the façade design.

Note 7: Assumed based on external noise levels being 10 dB higher than internal noise levels when windows are open.

Note 8: Characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion.

Note 9: Characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion (eg reading and meditation).

Note 10: Assess at the most affected occupied point on the premises.

8.1.3 Sleep Disturbance

The CNVMP, in accordance with the ICNG, recommends that where construction works are planned to extend over more than two consecutive nights between 10pm and 7am, maximum noise levels and the extent and frequency of maximum noise level events exceeding the RBL should be considered.

Based on the information presented in the NSW Road Noise Policy (RNP) and Environmental Noise Management Manual (ENMM), the research on sleep disturbance to date has shown that:

- *Maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep;*
- *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.*

Accordingly, to assess the potential of sleep disturbance, an initial screening level will be adopted using the below guidance (CNVS v3.0):

- $L_{Amax} \leq$ RBL + 15 dBA

- L_{Amax} ≤ 65 dBA (assuming windows open)

Where there are noise events found to exceed the initial screening level, further analysis will be made to identify:

- The likely number of events that might occur during the night assessment period; and
- Whether events exceed an 'awakening reaction' level of 55 dBA L_{Amax} (internal)

The NSW EPA's Noise Policy for Industry (2017) also state that the maximum noise level event assessment for sleep disturbance should be undertaken where the Project night-time noise levels at a residential location exceed:

- L_{Aeq}, 15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

8.1.4 Ground-borne Noise

Ground-borne noise refers to noise produced by vibration of floor slabs and other building elements, which radiates noise into the interior of a building, sometimes referred to as regenerated noise. The ground-borne noise management levels recommended in the CNVMP, in accordance with ICNG and CoA E41 and CoA E42, are presented in **Table 6**.

Table 6 Ground-borne Noise Management Levels

Time	Building Category	Management Level – LAeq(15minute)
Day: 7:00 am – 6:00 pm	Internal residential	45 dB
	Internal commercial	50 dB
Evening: 6:00 pm – 10:00 pm	Internal residential	40 dB
Night: 10:00 pm – 7:00 am	Internal residential	35 dB

8.1.5 Construction Road Traffic Noise

Road traffic noise criteria from the additional traffic generated by the Project has been nominated in NSW Road Nosie Policy (RNP) (2011) and represented in **Table 7**

Table 7 Road Traffic Noise Criteria (RNP 2011)

Road Category	Assessment Criteria – dB(A)	
	Day (7 am – 10 pm)	Night (10 pm – 7 am)
Arterial/ sub-arterial roads	LAeq, (15 hour) 60 (external)	LAeq, (9 hour) 55 (external)
Local roads	LAeq, (1 hour) 55 (external)	LAeq, (1 hour) 50 (external)

8.2 Vibration Management Levels

The CNVIS has been prepared to address the vibration requirements of CoA E28, E29, E30 and E31. The following sections describe the vibration management criteria. Notification to affected receivers will be completed in accordance with the Community Communication Strategy.

8.2.1 Human Comfort Continuous and Impulsive Vibration Criteria

Vibration and its associated effects on people are usually classified as continuous, impulsive or intermittent as follows:

- Continuous vibration: machinery, steady road traffic, continuous construction activity such as underground drilling
- Impulsive vibration: infrequent activities that create up to three distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading
- Intermittent vibration: trains, nearby intermittent demolition activity, rock breakers and jack hammers.

The CNVMP nominates preferred and maximum values for continuous, impulsive and intermittent vibration for residential and office buildings as reproduced in **Table 8**, **Table 9** and **Table 10** (respectively). It is noted that the Conditions of Approval define a "perceptible level of vibration" as the "preferred" peak velocity levels presented in **Table 8** and **Table 9**.

Table 8 Criteria for exposure to Continuous Vibration

Space Occupancy	Time of Day	Peak velocity (mm/s)	
		Preferred[1]	Maximum
Residential	Day	0.28	0.56
	Night	0.20	0.4
Offices	Day/Night	0.56	1.1

Note 1: The Preferred Peak Velocity presented represent a "perceptible level of vibration".

Table 9 Criteria for exposure to Impulsive Vibration

Space Occupancy	Time of Day	Peak velocity (mm/s)	
		Preferred[1]	Maximum
Residential	Day	8.6	17.0
	Night	2.8	5.6
Offices	Day/Night	18.0	36.0

Note 1: The Preferred Peak Velocity presented represent a "perceptible level of vibration".

Table 10 Acceptable Vibration Dose Values

Space Occupancy	Time of Day	VDV ($m/s^{1.75}$)	
		Preferred	Maximum
Residential	Day	0.20	0.40
	Night	0.13	0.20
Offices, schools, educational institutions, places of worship	Day/Night	0.40	0.80

8.2.2 Structural Damage Site Vibration Control Criteria

Project site specific structural damage vibration control criteria haven been nominated in the CNVMP in accordance with CoA E28 and are reproduced in **Table 11**.

Table 11 Nominated Structural Damage Site Vibration Control Criteria

Building type	Included Buildings	Site Control Criteria[1]	
		Operator warning level	Operator halt level
Reinforced frame structure	All surrounding commercial	20 mm/s PPV	25 mm/s PPV
Unreinforced or light framed structures	All surrounding Residential	5 mm/s PPV	7.5 mm/s PPV
Heritage (structurally sound)	Waterloo Congregational Church, The Cauliflower Hotel, Redfern Surf Club	5 mm/s PPV	7.5 mm/s PPV
Buried Utilities	All	20 mm/s PPV	25 mm/s PPV
Human Response	All	0.2 $m/s^{1.75}$ VDV	0.4 $m/s^{1.75}$ VDV
Vibration Sensitive Equipment	Medical Centre, Hospital	0.013 mm/s PPV	0.018 mm/s PPV

Note 1: An exceedance of the operator warning level does not require activities to cease, but will alert the Project Manager and Foreman to proceed with caution at a reduced force or load.

8.3 Additional Mitigation Measures Matrix Category

Additional Mitigation Measures Matrix (AMMM) has been developed in the Sydney Metro City and Southwest Construction Noise and Vibration Strategy (CNVS). The AMMM includes definition of the level of noise impact compared with the background noise levels (RBLs) during standard construction hours and OOHWs periods. According to the CNVS, the following steps need to be carried out to determine the additional mitigation measures to be implemented:

- Determine the duration (time period) when the work is to be undertaken.
- Determine the level of exceedance.
- From the relevant AMMM table, identify the additional mitigation measures to be implemented.

The standard and additional mitigation measures to be implemented based on the predicted construction noise levels will be discussed in **Section 12**.

9 Construction Methodology - Noise and Vibration Sources

9.1 Construction Activities

The additional construction activities and tasks were outlined in **Table 12**. A 90m section of Cope Street (between Wellington Street and Raglan Street) will be closed when these additional construction activities are undertaken. Additional hoarding (ie. water filled barriers or concrete barriers fitted with acoustic blankets) with a height of 2070mm will be installed along Wellington Street and a 90m section of Cope Street directly adjacent to residents, to manage the noise emission from the proposed construction activities. The locations of the proposed construction works are shown in **Figure 5**.

Figure 5: Location of Works

Source: JHG

Noise and vibration will be generated from the construction activities. The major noise and vibration generated equipment for each additional construction activity considered in this CNVIS are presented in **Table 12**. In order to reduce noise and vibration emissions, where possible, concrete delivery and pumping would be undertaken behind perimeter noise barriers.

Table 12 Equipment for each Construction Activity

Construction Scenario ID	Construction Activity	Location	Equipment
S13a	Crane Operation	Cope Street	450t Mobile Crane 750t Mobile Crane Delivery Trucks
S13b	Concrete Pouring	Cope Street	Concrete Agitator (3 per hour) Concrete Pump

9.2 Noise and Vibration Sources

9.2.1 Plant and Equipment at Noise Source Control

Plant and equipment likely to be used during construction are identified in **Table 13** along with maximum allowable sound levels in accordance with the CNVS.

Table 13 Maximum Plant and Equipment Sound Levels[1]

Plant Item	Maximum Allowable Construction Plant Sound Levels – dBA	
	Sound Power Level	Sound Pressure Level at 7m
Concrete Agitator	105	80
Concrete Pump	103	78
Concrete Vibrator	105	80
450t Mobile Crane	110	85
750t Mobile Crane	110	85
Delivery Truck	108	83

Note 1: Source - Maximum allowable sound level nominated in CNVS where possible.

9.2.2 Correction Factors

CoA E37 and E38 require that construction activities which have been proven to be "annoying" have a 5 dB penalty applied to them. However, no noise intensive plant will be used for these additional construction activities. Accordingly, the 5 dB correction factor will not be applied in the noise assessment.

10 Construction Noise and Vibration Assessment

10.1 Airborne Noise Assessment

Construction noise levels from each additional construction activity have been predicted at the nearest noise sensitive residential and non-residential receivers and assessed against the NMLs presented in **Section 8.1** for standard construction hours and OOHW construction hours.

10.1.1 Residential Receivers

The predicted numbers of exceedances of the NMLs at residential receivers due to the construction works during day, evening and night-time periods are summarised in **Table 14**. The full set of predicted external noise levels for the noise affected residential receivers are shown in **Appendix B1**. The detail numbers of exceedances of the NMLs at residential receivers due to the construction works during day, evening and night-time periods are presented in **Appendix B3**.

The numbers of receivers presented in **Table 14** are split into the following categories:

Standard construction hours:

- Less than 10dB above NML - Construction noise clearly audible
- 10-20 dB above NML - Construction noise moderately intrusive
- greater than 20 dB above NML - Construction noise highly intrusive
- greater than 75 dBA - highly noise affected

OOHW periods (i.e. evening, shoulder and night):

- Less than 5 dB above NML - Construction noise clearly noticeable
- 5-15 dB above NML - Construction noise clearly audible
- 15-25 dB above NML - Construction noise clearly moderately intrusive

- greater than 25 dB above NML - highly intrusive

Table 14 Number of residential buildings where noise levels may exceed construction NMLs - Day

Construction Scenario ID	Location	Number of residential buildings where $L_{Aeq(15minute)}$ noise levels may exceed construction NMLs			
		0-10 dBA	10-20 dBA	>20 dBA	Highly Affected, >75dBA
S13a	Cope Street	9	1	-	-
S13b	Cope Street	6	1	-	1

Table 15 Number of residential buildings where noise levels may exceed construction NMLs - Evening

Construction Scenario ID	Location	Number of residential buildings where $L_{Aeq(15minute)}$ noise levels may exceed construction NMLs				
		0-5 dBA	5-15 dBA	15-25 dBA	>25 dBA	Highly Affected, >75dBA
S13a	Cope Street	17	15	6	-	-
S13b	Cope Street	10	8	6	-	1

Table 16 Number of residential buildings where noise levels may exceed construction NMLs - Night

Construction Scenario ID	Location	Number of residential buildings where $L_{Aeq(15minute)}$ noise levels may exceed construction NMLs				
		0-5 dBA	5-15 dBA	15-25 dBA	>25 dBA	Highly Affected, >75dBA
S13a	Cope Street	49	37	14	4	-
S13b	Cope Street	26	34	6	5	1

Additional Mitigation Measures Matrix (AMMM) has been developed in the Sydney Metro City and Southwest Construction Noise and Vibration Strategy (CNVS). The predicted number of exceedances of the RBLs in accordance with AMMM categories at residential receivers due to the construction works during day evening and night periods are summarised in **Table 17 to Table 19**. The detailed numbers of exceedances of the RBLs at residential receivers due to the construction works during day, evening and night-time periods are presented in **Appendix B3**.

In accordance with AMMM, the numbers of receivers presented in **Table 17** to **Table 19** are split into the following categories:

- 0-10 dB above RBL - Construction noise noticeable
- 10-20 dB above RBL - Construction noise clearly audible

- 20-30 dB above RBL - Construction noise moderately intrusive
- greater than 30 dB above RBL - Construction noise highly intrusive

Table 17 Number of residential buildings where noise levels may exceed RBLs (AMMM category) – Day

Construction Scenario ID	Location	Number of residential buildings where noise levels may exceed RBLs - Quantitative assessment of noise levels			
		0-10 dBA	10-20 dBA	20-30 dBA	>30 dBA
		-	-	M, LB	M, LB
S13a	Cope Street	21	9	1	-
S13b	Cope Street	13	6	1	-

Table 18 Number of residential buildings where noise levels may exceed RBLs (AMMM category) – Evening

Construction Scenario ID	Location	Number of residential buildings where noise levels may exceed RBLs - Quantitative assessment of noise levels			
		0-10 dBA	10-20 dBA	20-30 dBA	>30 dBA
		-	LB	M, LB	M, IB, LB, PC, RO, SN
S13a	Cope Street	49	15	6	-
S13b	Cope Street	39	8	6	-

Table 19 Number of residential buildings where noise levels may exceed RBLs (AMMM category) – Night

Construction Scenario ID	Location	Number of residential buildings where noise levels may exceed RBLs - Quantitative assessment of noise levels			
		0-10 dBA	10-20 dBA	20-30 dBA	>30 dBA
		-	M, LB	M, IB, LB, PC, RO, SN	AA, M, IB, LB, PC, RO, SN
S13a	Cope Street	231	37	14	4
S13b	Cope Street	99	34	6	5

10.1.2 Other Receivers

The numbers of non-residential noise sensitive receivers where noise levels are expected to exceed the NMLs during operating hours of the receiver are summarised in **Table 20**. The full set of predicted external noise levels and noise exceedances for all the noise affected non-residential receivers are shown in **Appendix B2**. The detailed numbers of exceedances of the NMLs at non-residential receivers due to the construction works during daytime period are presented in **Appendix B3**.

Table 20 Number of non-residential buildings where noise levels may exceed construction NMLs - Day

Construction Scenario ID	Location	Number of non-residential buildings where noise levels $L_{Aeq(15minute)}$ may exceed construction NMLs			
		0-10 dBA	10-20 dBA	>20 dBA	Highly Affected, >75dBA
S13a	Cope Street	-	-	-	-
S13b	Cope Street	-	-	-	-

The predicted numbers of exceedances of the RBLs in accordance with AMMM categories at non-residential receivers due to the construction works during both standard construction hours and OOHWs periods are summarised in **Table 21**. The detailed numbers of exceedances of the RBLs at non-residential receivers due to the construction works during daytime period are presented in **Appendix B3**.

Table 21 Number of non-residential buildings where noise levels may exceed RBLs (AMMM category) - Day

Construction Scenario ID	Location	Number of non-residential buildings where noise levels may exceed RBLs - Quantitative assessment of noise levels			
		0-10 dBA	10-20 dBA	20-30 dBA	>30 dBA
		-	-	M, LB	M, LB
S13a	Cope Street	5	1	-	-
S13b	Cope Street	3	-	-	-

Note that the potential impacts identified in **Table 20** and **Table 21** apply when the properties are in use, i.e. during commercial opening hours or religious services. Some works would be undertaken outside of standard construction hours, during the evening and night-time period and therefore sensitive receivers such as commercial and industrial receivers may not be affected significantly by the works.

10.1.3 Cumulative construction noise impacts

While most construction activities are expected to occur at separate times and locations, it is possible that noisy construction activities for the project may occur at the same time in close proximity to each other. In these cases, it is possible that predicted noise levels may increase by up to 3 dBA and there is potential that this would increase the number of receivers where noise levels would be greater than 20 dB above the NMLs.

10.1.4 Sleep disturbance assessment

While construction works would be undertaken during standard construction hours, some works outside of standard construction hours would be required and conducted in accordance with CoA E44-E48. This section provides an assessment of the potential for sleep disturbance due to these night works. The predicted numbers of exceedances of the sleep disturbance screening level (L_{Amax}) at residential receivers due to the construction works during night-time period are summarised **Table 22**. The full set of predicted L_{Amax} noise levels for all the noise affected residential receivers are shown in **Appendix C**.

Table 22 Number of residential buildings where noise levels may exceed sleep disturbance screening level

Construction Scenario ID	Location	Number of residential buildings where noise levels may exceed sleep disturbance screening level		
		0-10 dBA	10-20 dBA	>20 dBA
S13a	Cope Street	10	4	-
S13b	Cope Street	7	3	-

10.2 Traffic Noise Assessment

In accordance with Construction Traffic Management Plan (CTMP) prepared by Vari Group, Wellington Street is classified as a "Local Road". Based on the information provided by JHG, up to four (4) x delivery trucks movements are expected on Wellington Street. The predicted traffic noise levels at the nearest residential receivers are presented in **Table 23**.

Table 23 Predicted Traffic Noise Levels

Road Name	Period	Distance to the Nearest Residential Receivers	Overall Traffic Volume (per hour)		Predicted Traffic Noise Levels – $L_{Aeq(1\ hour)}$
			Light Vehicle[1]	Heavy Vehicle	
Wellington Street	Day (7.00am – 10.00pm)	10	400	14[2]	55
	Night (10.00pm – 7.00am)	10	250	4	50

Note 1: Assuming light vehicle traffic flow of up to 400 movements per hour during daytime period and up to 250 movements per hour during night-time period.

Note 2: Assuming up to 4 x heavy vehicle movements per hour from the Project and up to 10 x heavy vehicle movements per hour from the public during daytime period.

The predicted traffic noise levels at the nearest residential receivers shown in **Table 23** on Wellington Street are below the daytime $L_{Aeq(1\ hour)}$ traffic noise criterion of 55 dBA and night-time $L_{Aeq(1\ hour)}$ traffic noise criterion of 50 in accordance with NSW RNP (2011).

10.3 Ground-borne Noise

No vibration generated activities will be conducted for the additional construction scenario S13a or S13b. Accordingly, potential ground-borne noise impacts are not considered further in this CNVIS.

10.4 Vibration Assessment

Similarly, no vibration generated activities will be conducted for the additional construction scenario S13a or S13b. Accordingly, potential vibration impacts are not considered further in this CNVIS.

11 Discussion of Results

The predicted airborne noise levels from the proposed construction S13a (crane operation) presented in **Appendix B1** show that the worst case predicted noise levels of up to 75 dBA is likely to occur at the most noise affected residential receivers. The daytime, evening and night-time Project NMLs of 64 dBA, 52 dBA and 44 dBA are exceeded by up to 11 dB, 23 dB and 31 dB, respectively, at the nearest residential receivers (123 Wellington Street). The predicted construction noise levels are below the highly affected noise level of 75 dBA when crane operation is being undertaken. The predicted $L_{Aeq(15minute)}$ noise levels exceed the daytime, evening and night-time RBLs of 54 dBA, 47 dBA and 39 dBA by up to 21 dB, 28 dB and 36 dB, respectively, from crane operation at the nearest residential receivers. The sleep disturbance screening level of 65 dBA is exceeded by up to 15 dB at nearest residential receiver (123 Wellington Street) when crane operation is being undertaken during night-time period.

The predicted airborne noise levels from the proposed construction S13b (concrete pouring) presented in **Appendix B1** show that the worst case predicted noise levels of up to 76 dBA is likely to occur at the most noise affected residential receivers. The daytime, evening and night-time Project NMLs of 64 dBA, 52 dBA and 44 dBA are exceeded by up to 12 dB, 24 dB and 32 dB, respectively, at the nearest residential receiver (219 Cope Street). The highly affected noise level of 75 dBA is exceeded by up to 1 dB at 219 Cope Street when concrete pouring activity is being undertaken. The predicted $L_{Aeq(15minute)}$ noise levels exceed the daytime, evening and night-time RBLs of 54 dBA, 47 dBA and 39 dBA by up to 22 dB, 29 dB and 37 dB, respectively, from concrete pouring activity at the nearest residential receivers. The sleep disturbance screening level of 65 dBA is exceeded by up to 16 dB at nearest residential receiver (219 Cope Street) when concrete pouring activity is being undertaken during night-time period.

The predicted airborne noise levels at the nearest non-residential receiver are below the Project daytime NMLs nominated in **Table 5**. The impacts for the non-residential receivers are only applied when the properties are in use, i.e. during commercial opening hours or religious services. Thus, the OOHWs undertaken during the evening and night-time period may not significantly affect the non-residential receivers such as commercial and industrial receivers.

The results presented are based on the worst-case scenario. Alternative construction techniques, where possible, would be investigated during detailed planning and the noise mitigation measures presented in **Section 12** are recommended to be implemented to manage noise emissions. The community consultation will outline the work and the expected noise duration.

Attended noise monitoring will be undertaken as outlined in **Section 12**. The monitoring will be used to confirm the effectiveness of the noise management measures and if additional measures are required.

12 Mitigation Measures

12.1 Consultation to Identify Mitigation Measures

The Waterloo ISD Community Manager, who previously worked for the Sydney Metro Tunnel and Station Excavation Contractor, completed consultation with the Waterloo community and stakeholders. The following provides details of the consultation completed.

The Project Planning Approval Condition E33 requires the CNVIS to include specific mitigation measures identified through consultation with affected sensitive receivers. The consultation undertaken included the following:

- 5,100 leaflets were distributed (Friday 5 June 2020) to properties within 500 metres catchment area of the site, seeking community comments on the Waterloo Integrated Station Development, including construction impacts;
- eNews to approximately 1100 email subscriber (Friday 12 June 2020) seeking comments on the Waterloo Integrated Station Development, which included construction impacts;
- Community and Stakeholder Manager sent follow up emails to residents and businesses, seeking feedback in relation to previous construction impacts as well as any suggestions to consider in the development of the CNVIS;
- A total of 12 webinar sessions were held in June, where participants living or working in the area were asked to comment about construction impacts or make suggestions for improvements. Approximately 50 individuals attended the webinars to-date;
- Of the residents, business and landowner who attended the webinars, 11 individuals provided comments in relation to construction impact. Their properties were located in Wellington Street, Cope Street, Buckland Street, Regent Street and Botany Road.

12.2 Mitigation Measures

The outcome from the consultation sessions with the sensitive receivers and on the basis of being feasible and reasonable, mitigation measures that will be implemented during the construction works are summarised as follows:

- Adherence to daytime construction hours is recommended for construction works, in particular hydraulic hammering activities;
- Use hydraulic sears or pulverisers instead of hydraulic hammering where possible;
- Use dampened rock hammers;
- Night works, where applicable, should be programmed to minimise the number of consecutive nights work impacting the same receivers;
- Avoiding the coincidence of noisy plant working simultaneously close together and adjacent to sensitive receivers will result in reduced noise emissions;
- Equipment which is used intermittently is to be shut down when not in use;
- Where possible, the offset distance between noisy plant items and nearby noise sensitive receivers should be as great as possible;
- Where possible, equipment with directional noise emissions should be oriented away from sensitive receivers;
- Undertake compliance checks on the noise emissions of plant and machinery used for the Project to indicate whether noise emissions from plant items are higher than noise emissions from well-maintained plant;
- Regular noise monitoring during construction at sensitive receivers during critical periods to identify and assist in managing high risk noise events;
- Where possible heavy vehicle movements should be limited to daytime hours;
- Non-tonal reversing alarms should be fitted to all permanent mobile plant and during out of hours works;
- Reversing of equipment should be minimised so as to prevent nuisance caused by reversing alarms;
- Loading and unloading should be carried out away from sensitive receivers, where practicable;
- Installation of localised noise barriers around noisy areas;

- Installation of sound barrier screening to scaffolding where permitted noise levels are exceeded at neighbouring noise affected properties;
- Provision of respite from noise intensive activities;
- Alternate construction method or other negotiated outcomes with the affected community;
- Modifications or alterations to plant and equipment;
- Limiting times for certain construction activities that are high noise generating;
- Where possible separate structural connections between adjoining buildings using saw-cutting and propping, hand held splitters and pulverisers or hand demolition to reduce structure borne noise impacts.

12.3 Additional Mitigation Measures

Additional Mitigation Measures Matrix (AMMM) has been developed in the Sydney Metro City and Southwest Construction Noise and Vibration Strategy (CNVS). The AMMM includes definition of the level of noise impact compare with the background noise levels (RBLs) during standard construction hours and OOHWs periods. According to the CNVS, the following steps need to be carried out to determine the additional mitigation measures to be implemented:

- Determine the duration (time period) when the work is to be undertaken.
- Determine the level of exceedance.
- From the relevant AMMM table, identify the additional mitigation measures to be implemented.

Where the predicted construction noise and vibration levels exceed the noise and vibration management levels after the standard mitigation measures are applied, the additional noise mitigation measures in accordance with AMMM of the CNVS will be implemented based on the level of noise impact which triggers consideration of each additional mitigation measure (reproduced in **Table 24**, **Table 25** and **Table 26**).

The abbreviations are defined as the following:

AA: Alternative Accommodation; M: Monitoring; IB: Individual Briefing; LB: Letter Box Drops; RO: project specific Respite Offer; PC: Phone Calls and emails; and SN: Specific Notifications.

Table 24 AMMM - Airborne Construction Noise

Time Period		Mitigation Measures Predicted LAeq(15minute) Noise Level Above Background (RBL)			
		0 to 10 dB	10 to 20 dB	20 to 30 dB	> 30 dB
Standard	Mon-Fri (7.00 am - 6.00 pm)	-	-	M, LB	M, LB
	Sat (8.00 am - 1.00 pm)				
	Sun/Pub Hol (Nil)				
COVID-19 Extended	Mon-Sun/ Pub Hol (7.00 am - 6.00 pm)	-	-	M, LB	M, LB
OOHW	Mon-Sun (6.00 pm - 10.00 pm)	-	LB	M, LB	M, IB, LB, PC, RO, SN
OOHW	Mon-Sat (10.00 pm - 7.00 am)	-	M, LB	M, IB, LB, PC, RO, SN	AA, M, IB, LB, PC, RO, SN
	Sun/Pub Hol (6.00 pm - 7.00 am)				

Table 25 AMMM - Ground-borne Construction Noise

Time Period		Mitigation Measures Predicted LAeq(15minute) Noise Level Exceedance		
		0 to 10 dB	10 to 20 dB	>20 dB
Standard	Mon-Fri (7.00 am - 6.00 pm)	LB	LB	M, LB, SN
	Sat (8.00 am - 1.00 pm)			
	Sun/Pub Hol (Nil)			
COVID-19 Extended	Mon-Sun/Pub Hol (7.00 am - 6.00 pm)	LB	LB	M, LB, SN
OOHW	Mon-Sun (6.00 pm - 10.00 pm)	LB	M, LB, SN	M, IB, LB, PC, RO, SN
OOHW	Mon-Sat (10.00 pm - 7.00 am)	M, LB, SN	AA, M, IB, LB, PC, RO, SN	AA, M, IB, LB, PC, RO, SN
	Sun/Pub Hol (6.00 pm - 7.00 am)			

Table 26 AMMM - Ground-borne Vibration

Time Period		Mitigation Measures Predicted Vibration Levels Exceed Maximum Levels
Standard	Mon-Fri (7.00 am - 6.00 pm)	M, LB, RO
	Sat (8.00 am - 1.00 pm)	
	Sun/Pub Hol (Nil)	
COVID-19 Extended	Mon-Sun/Pub Hol (7.00 am - 6.00 pm)	M, LB, RO
OOHW	Mon-Sun (6.00 pm - 10.00 pm)	M, IB, LB, PC, RO, SN
OOHW	Mon-Sat (10.00 pm - 7.00 am)	AA, M, IB, LB, PC, RO, SN
	Sun/Pub Hol (6.00 pm - 7.00 am)	

13 Noise and Vibration Monitoring

Management and control of noise and vibration impacts shall be monitored and assessed as described below. Noise and vibration monitoring is to be undertaken by suitably qualified persons in accordance with the CNVMP.

Operator-attended measurements are to be undertaken within a period of 14 days from the commencement of each stage of construction in order to confirm that the noise and vibration levels in the adjacent community are consistent with the predictions in the CNVIS. Operator-attended noise measurements would be repeated at a minimum interval of every month in order to ensure ongoing compliance.

Figure 6 presents proposed noise monitoring locations for the additional construction scenarios. Real-time continuous noise monitoring would be implemented upon commencement of a high-risk activity or as required to manage a complaint. High-risk activities are defined in the Sydney Metro City & Southwest Out of Hours Work Strategy / Protocol (Version 4.3). The continuous noise monitor would be placed either within the construction site or alternatively at the Church.

Operator-attended noise monitoring is to be conducted at the nearest noise affected receivers upon commencement of the additional construction scenario S13a and S13b in order to verify the noise modelling assumptions and results presented in the CNVIS. The following key locations are indicative monitoring locations based on the proximity to the works:

- 123 Wellington Street
- 213 Cope Street
- 215 Cope Street
- 217 Cope Street
- 219 Cope Street

Operator-attended noise monitoring will occur at the representative location closest to the receiver to review the predicted noise levels with the actual noise levels.

Operator-attended vibration monitoring will not be required for the additional construction scenario S13a or S13b as no vibration generated equipment or plant will be used.

If the measured noise level from the operator-attended survey exceeds the CNVIS predicted noise level and the exceedance is related to construction activities (and not external sources e.g. road traffic), noise management and mitigation measures will be carried out in accordance CNVMP **Section 13.6.3** and **13.7.3**, including identifying and applying additional mitigation and management (ie. Replace the equipment, reduce the number of equipment or use of noise barrier etc.)

Figure 6 Noise Monitoring Locations

Table 27 presents the indicative noise monitoring locations for the monitoring program for the additional construction scenario S13a and S13b.

Noise measurements shall be undertaken consistent with the procedures documented in *AS 1055.1-1997 Acoustics - Description and Measurement of Environmental Noise - General Procedures*.

Table 27 Noise Monitoring Program

Type	Location	Timing/Frequency	Purpose
Noise	123 Wellington St	Operator-attended	Monitoring noise emissions from noise generated works
	213 Cope St		
	215 Cope St		
	217 Cope St		
	219 Cope St		

13.1 Plant and Equipment Noise Auditing

Internal compliance auditing of plant and equipment noise emissions would be undertaken via operator-attended measurements of a representative selection of plant and equipment used on-site. The representative items of equipment are to be regularly monitored to confirm that the operating noise levels of all noise intensive plant items comply with the maximum sound power levels in **Table 13**. Monitoring will be completed on a monthly basis.

13.2 Reporting

As per the requirements of the CNVMP, noise and vibration monitoring reports will be submitted to the Project Director and Environment and Sustainability Manager with noise and/or vibration monitoring results and details of affected sensitive receivers within one week of being undertaken or at weekly intervals for continuous monitoring. In the case of noise exceedances, details of the plant or operations causing the exceedances along with corrective action and the status of its implementation are to be supplied.

Details of noise and vibration monitoring will be reported to Sydney Metro on an annual basis. The consolidated noise and vibration monitoring report will be submitted to the Secretary and relevant regulatory agencies for information by Sydney Metro as required by Project Planning Approval C16.

13.3 Inspections

An activity log or site diary will be used by the Site Supervisor on site to keep an accurate record of construction activities on a daily basis. If required, the activity log will be used to correlate on-site activities with measured noise and vibration levels and/or complaints. The acoustic consultant may periodically review the proposed monitoring program with the aim to reduce or increase the monitoring depending on monitoring results and community feedback received.

The Site Supervisor, Environment & Sustainability Manager or nominated representative is to conduct regular site inspections, observing any instances of excessively noisy machinery or key activities that are associated with the works. Noise or vibration records are to be reviewed for potential issues arising from works. Results from the inspection are then to be recorded on an environmental checklist.

Copies of noise and vibration monitoring results will be made available to the Client as required.

14 Discussion of Additional Management Measures Triggered

AMMM have been triggered for airborne noise from the proposed additional construction activities listed in **Table 12**.

In summary, the following AMMM categories have been triggered:

- Letter Box Drops;
- Monitoring
- Individual Briefing
- Phone Calls and emails
- Specific Notifications
- Project Specific Respite Offer
- Alternative Accommodation

The residential receivers which trigger AMMM from airborne noise have been identified and listed in **Appendix D** for each proposed additional construction scenario.

15 Conclusion

Noise and vibration impact assessment for the additional construction works associated with the Waterloo ISD have been undertaken. Due to the close proximity of adjacent receivers to the construction works, the noise generated activities from construction scenario S13a (crane operation) are predicted up to 75 dBA at 123 Wellington Street. The predicted noise levels from the proposed construction works exceeded the day, evening and night-time NMLs by up to 11 dB, 23 dB and 31 dB, respectively, at 123 Wellington Street. The predicted construction noise levels are below the highly affected noise level of 75 dBA when crane operation is being undertaken. The predicted construction noise levels exceeded the day, evening and night-time RBLs by up to 21 dB, 28 dB and 36 dB, respectively, at the most noise affected residential receivers. The sleep disturbance screening level is exceeded by up to 15 dB at the nearest residential receiver when crane operation is undertaken.

The noise generated activities from construction scenario S13b (concrete pouring) are predicted up to 76 dBA at 219 Cope Street. The predicted noise levels from the proposed construction works exceeded the day, evening and night-time NMLs by up to 12 dB, 24 dB and 32 dB, respectively, at 219 Cope Street. The highly affected noise level of 75 dBA is exceeded by up to 1 dB at the nearest receivers when concrete pouring activity is undertaken. The predicted construction noise levels exceeded the day, evening and night-time RBLs by up to 22 dB, 29 dB and 37 dB, respectively, at the most noise affected residential receivers. The sleep disturbance screening level is exceeded by up to 16 dB at the nearest residential receiver when concrete pouring activity is undertaken.

The construction noise levels are predicted as up to 68 dBA at the nearest non-residential receiver. The predicted noise levels are below the daytime NMLs from construction scenario S13a and S13b. It is also worth noting that the impacts for the non-residential receivers are only applied when the properties are in use, i.e. during commercial opening hours or religious services. Accordingly, the OOHWs undertaken during the evening and night-time periods would not affect the non-residential receivers.

Additional noise mitigation measures in accordance with AMMM are recommended to be implemented for construction works conducted during standard construction hours and OOHWs periods in accordance with the CNVMP.

Negotiations may be undertaken with these receivers in order to ensure that appropriate periods of respite are offered during sensitive periods.

Road traffic noise generated by the Project on Wellington Street is below the $L_{Aeq(1hour)}$ noise criteria for local road in accordance with NSW RNP (2011).

Vibration safe working distances have been determined in accordance with the CNVS. Where applicable, periods of respite would be negotiated with receivers as per above and in accordance with AMMM.