Sydney Metro City and Southwest – Central Station Main Works
Construction Noise and Vibration Management Plan (CNVMP)

Document

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Revisions

Date	Version	Description	Prepared by	Approved by
24/04/2018	1	First Draft	ERM	LOR
12/06/2018	2	Revised following Sydney Metro, AA, and ER comments	ERM	LOR
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June 2023	14	Annual Review	LOR	LOR

Terms and definitions

The following general terms, abbreviations and definitions are used in this plan.

Terms	Explanation
A1055	Standards Australia AS1055–1997™ – Description and Measurement of Environmental Noise
AMM	Additional Mitigation Measures
AMMM	Additional Mitigation Measures Matrix
BMP	Business Management Plan
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.
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.
CBD	Sydney Central Business District
CNVS	Construction Noise and Vibration Strategy
CNS	NSW Government – Transport for NSW (TfNSW) Construction Noise Strategy (CNS), April 2013.
CNVIS	Construction Noise and Vibration Impact Statement
CNVMP	Construction Noise and Vibration Management Plan
CoA	Conditions of Approval
CEMP	Construction Environmental Management Plan
CSM	Central Station Main (Works)
DIN4150:3	German Institute for Standardisation – DIN 4150 (1999-02) Part 3 – Structural Vibration - Effects of Vibration on Structures.
CSSI	Critical Sate Significant Infrastructure
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	NSW Environment Protection Authority
ER	Environmental Representative
ERAP	Environmental Risk Action Plan
ERM	Environmental Resources Management Australia Pty Ltd
HNAML	Highly Noise Affected Management Level
ICNG	NSW Department of Environment and Climate Change – NSW Interim Construction Noise Guideline, July 2009.
IEC60942	Standards Australia AS/IEC 60942:2004/IEC 60942:2003 – Australian Standard™ – Electroacoustic – Sound Calibrators.

Terms	Explanation
INP	NSW Environment Protection Authority – NSW Environmental Noise Management – Industrial Noise Policy, January 2000 and relevant application notes.
Laing O'Rourke	Laing O'Rourke Australia Construction Pty Limited
LEP	Local Environment Plan
LGA	Local Government Area
LOR	Laing O'Rourke Australia Construction Pty Limited
Minister, the	NSW Minister for Planning
NCA	Noise Catchment Area
NML	Noise Management Level
NSW Vibration Guideline, the	NSW Department of Environment and Conservation – NSW Environmental Noise Management – Assessing Vibration: a Technical Guideline (the NSW Vibration Guideline), February 2006.
NVIA	Noise and Vibration Impact Assessment
OEH	Office of Environment and Heritage
OOHW	Out of Hours Works
PEM	Project Environment Manager
POEO Act	Protection of the Environment Operations Act 1997
RNP	NSW Department of Environment, Climate Change and Water – NSW Road Noise Policy, March 2011.
SSI	State Significant Infrastructure
SYAB	Sydney Yard Access Bridge
TBM	Tunnel Boring Machine
TSE	Tunnels and Station Excavation Works
TfNSW	Transport for New South Wales
the Project	Central Station Main Works Construction Project

The following technical terms, abbreviations and definitions are used in this plan. A glossary of relevant acoustical concepts and terminology is provided in *Appendix A*.

Terms	Explanation
Decibel, dB	The unit used to describe sound levels and noise exposure. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure
dBA	The unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear
LAeq	Equivalent Continuous Sound Level
LAeq, 15minute	Equivalent Continuous Sound Level, over a period of 15 minutes
LA90	Background Noise Level
RBL	Rating Background Level
LW or SWL	Sound Power Level
LP or SPL	Sound Pressure Level
PPV	Peak Particle Velocity (in mm/s)
VDV	Vibration Dose Value (in $m/s^{1.75}$)
mm/s	Millimetres per second
m/s	Metres per second

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0. Consolidated Compliance Matrix

Table 0.1 – Conditions of Approval (CoA)

Item	Requirement	Document Reference
A3	In the event of an inconsistency between the EIS as amended by the description in Chapters 2, 3 and 9 of the PIR, or any other document required under this approval, and a term of this approval, the term of this approval prevails to the extent of the inconsistency. For the purpose of this condition, there will be an inconsistency between a term of this approval and any document if it is not possible to comply with both the term and the document.	Section 2
A9	Where the terms of this approval require consultation with identified parties, details of the consultation undertaken, matters raised by the parties, and how the matters were considered must accompany the strategies, plans, programs, reviews, audits, protocols and the like submitted to the Secretary.	Section 1.8
A24	(a) From commencement of construction until completion of construction, the approved ER must: receive and respond to communications from the Secretary in relation to the environmental performance of the CSSI; (b) consider and inform the Secretary on matters specified in the terms of this approval; (c) consider and recommend any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community; (d) review documents identified in Conditions C1, C3 and C9 and any other documents that are identified by the Secretary, to ensure they are consistent with requirements in or under this approval and if so: i. make a written statement to this effect before submission of such documents to the Secretary (if those documents are required to be approved by the Secretary), or ii. make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Secretary for information or are not required to be submitted to the Secretary); (e) regularly monitor the implementation of environmental management related documents to ensure implementation is being carried out in accordance with what is stated in the document and the terms of this approval; (f) review the Proponent's notification of incidents in accordance with Condition A41 of this approval; (g) as may be requested by the Secretary, help plan, attend or undertake Department audits of the CSSI, briefings, and site visits; (h) if conflict arises between the Proponent and the community in relation to the environmental performance of the CSSI, follow the procedure in the Community Communication Strategy approved under Condition B3 of this approval to attempt to resolve the conflict, and if it cannot be resolved, notify the Secretary; (i) review any draft consistency assessment that may be carried out by the Proponent, and provide advice on any additional mitigation measures required to minimise the impact of the work; (j) consider any minor amendments to be made to the documents listed in Conditions C1, C3 and C9 and any document that requires the approval of the Secretary (excluding noise and vibration documents) that comprise updating or are of an administrative or minor nature, and are consistent with the terms of this approval and the documents listed in	Section 12

Item	Requirement	Document Reference
	Conditions C1, C3 and C9 or other documents approved by the Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; (k) assess the impacts of minor ancillary facilities as required by Condition A18 of this approval; and (l) prepare and submit to the Secretary and other relevant regulatory agencies, for information, a monthly Environmental Representative Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month (or other timeframe agreed with the Secretary). The Environmental Representative Report must be submitted within seven (7) days following the end of each month for the duration of works and construction of the CSSI, or as otherwise agreed with the Secretary.	
A25	A suitably qualified and experienced Acoustics Advisor (AA), who is independent of the design and construction personnel, must be nominated by the Proponent and engaged for the duration of construction and for no less than six (6) months following operation of the CSSI. The details of the nominated AA must be submitted to the Secretary for approval no later than one (1) month before commencement of works, or within another timeframe as agreed with the Secretary. The Proponent may nominate additional suitably qualified and experienced persons to assist the lead Acoustics Advisor for the Secretary's approval. The Proponent must cooperate with the AA by: (a) providing access to noise and vibration monitoring activities as they take place; (b) providing for review of noise and vibration plans, assessments, monitoring reports, data and analyses undertaken; and (c) considering any recommendations to improve practices and demonstrating, to the satisfaction of the AA, why any recommendation is not adopted.	Section 12
A26	Any activities generating noise and vibration in excess of the Noise Management Level derived from the Interim Construction Noise Guideline must not commence until an AA nominated under Condition A25 of this approval, has been approved by the Secretary.	Section 12
A27	The approved AA must: (a) receive and respond to communication from the Secretary in relation to the performance of the CSSI in relation to noise and vibration; (b) consider and inform the Secretary on matters specified in the terms of this approval relating to noise and vibration; (c) consider and recommend, to the Proponent, improvements that may be made to work practices to avoid or minimise adverse noise and vibration impacts; (d) review all noise and vibration documents required to be prepared under the terms of this approval and, should they be consistent with the terms of this approval, endorse them before submission to the Secretary (if required to be submitted to the Secretary) or before implementation (if not required to be submitted to the Secretary); (e) regularly monitor the implementation of all noise and vibration documents required to be prepared under the terms of this approval to ensure implementation is in accordance with what is stated in the document and the terms of this approval;	Section 12

Item	Requirement	Document Reference
	(f) review the Proponent's notification of noise and vibration incidents in accordance with Condition A41 of this approval; (g) in conjunction with the ER (where required), the AA must: i. consider requests for out of hours construction activities and determine whether to endorse the proposed activities in accordance with Condition E47; ii. as may be requested by the Secretary or Complaints Mediator, help plan, attend or undertake audits of noise and vibration management of the CSSI including briefings, and site visits; iii. if conflict arises between the Proponent and the community in relation to the noise and vibration performance during construction of the CSSI, follow the procedure in the Community Communication Strategy approved under Condition B3 of this approval to attempt to resolve the conflict, and if it cannot be resolved, notify the Secretary; iv. consider relevant minor amendments made to any noise and vibration document approved by the Secretary that require updating or are of an administrative or minor nature, and are consistent with the terms of this approval and the document approved by the Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of this approval; v. assess the noise impacts of minor ancillary facilities as required by Condition A18 of this approval; and vi. prepare and submit to the Secretary and other relevant regulatory agencies, for information, a monthly Noise and Vibration Report detailing the AAs actions and decisions on matters for which the AA was responsible in the preceding month (or other timeframe agreed with the Secretary). The Noise and Vibration Report must be submitted within seven (7) days following the end of each month for the duration of construction of the CSSI, or as otherwise agreed with the Secretary.	
C2	The CEMP must provide: (a) a description of activities to be undertaken during construction (including the scheduling of construction); (b) details of environmental policies, guidelines and principles to be followed in the construction of the CSSI; (c) a schedule for compliance auditing; (d) a program for ongoing analysis of the key environmental risks arising from the activities described in subsection (a) of this condition, including an initial risk assessment undertaken before the commencement of construction of the CSSI; (e) details of how the activities described in subsection (a) of this condition will be carried out to: i. meet the performance outcomes stated in the EIS as amended by the documents listed in A1; and ii. manage the risks identified in the risk analysis undertaken in subsection (d) of this condition; (f) an inspection program detailing the activities to be inspected and frequency of inspections; (g) a protocol for managing and reporting any: i. incidents; and ii. non-compliances with this approval and with statutory requirements; (h) procedures for rectifying any non-compliance with this approval identified during compliance auditing, incident management or at any time during construction;	See CEMP Section 8, Section 9, Table 8.1 Section 12.3

Item	Requirement	Document Reference
	(i) a list of all the CEMP sub-plans required in respect of construction, as set out in Condition C3. Where staged construction of the CSSI is proposed, the CEMP must also identify which CEMP sub-plan applies to each of the proposed stages of construction; (j) a description of the roles and environmental responsibilities for relevant employees and their relationship with the ER; (k) for training and induction for employees, including contractors and sub-contractors, in relation to environmental and compliance obligations under the terms of this approval; (l) for periodic review and update of the CEMP and all associated plans and programs.	
C3	The following CEMP sub-plans must be prepared in consultation with the relevant government agencies identified for each CEMP sub-plan and be consistent with the CEMF and CEMP referred to in Condition C1. (a) Noise and Vibration – consult with relevant council(s)	This document, Section 1.8, Table 0.5 - Compliance Matrix – Sydney Metro CEMF.
C4	The CEMP sub-plans must state how: (a) the environmental performance outcomes identified in the EIS as amended by the documents listed in A1 will be achieved; (b) the mitigation measures identified in the EIS as amended by the documents listed in A1 will be implemented; (c) the relevant terms of this approval will be complied with; and (d) issues requiring management during construction, as identified through ongoing environmental risk analysis, will be managed.	(a) Section 8 (b) Refer Table 0.2 below (c) This table (d) Refer Table 0.5 below
C5	The CEMP sub-plans must be developed in consultation with relevant government agencies. Where an agency(ies) request(s) is not included, the Proponent must provide the Secretary justification as to why. Details of all information requested by an agency to be included in a CEMP sub-plan as a result of consultation and copies of all correspondence from those agencies, must be provided with the relevant CEMP sub-plan.	Section 1.8
C6	Any of the CEMP sub-plans may be submitted to the Secretary along with, or subsequent to, the submission of the CEMP but in any event, no later than one month before commencement of construction.	Section 12.3
C8	Construction must not commence until the CEMP and all CEMP sub-plans have been approved by the Secretary. The CEMP and CEMP sub-plans, as approved by the Secretary, including any minor amendments approved by the ER (or AA in regards to the Noise and Vibration sub-plan), must be implemented for the duration of construction. Where the CSSI is being staged, construction of that stage is not to commence until the relevant CEMP and sub-plans have been approved by the Secretary.	This Plan, Section 12

Item	Requirement	Document Reference
C9	The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each Construction Monitoring Program to compare actual performance of construction of the CSSI against predicted performance. (a) Noise and Vibration – EPA and Relevant Council(s)	Section 1.8 Section 10
C10	Each Construction Monitoring Program must provide: (a) details of baseline data available; (b) details of baseline data to be obtained and when; (c) details of all monitoring of the project to be undertaken; (d) the parameters of the project to be monitored; (e) the frequency of monitoring to be undertaken; (f) the location of monitoring; (g) the reporting of monitoring results; (h) procedures to identify and implement additional mitigation measures where results of monitoring are unsatisfactory; and (i) any consultation to be undertaken in relation to the monitoring programs.	Section 10
C11	The Noise and Vibration Construction Monitoring Program and Blast Construction Monitoring Program must include provision of real time noise and vibration monitoring data. The real time data must be available to the construction team, Proponent, ER and AA in real time. The Department and EPA must be provided with access to the real time monitoring data in real time.	Section 10
C12	The Construction Monitoring Programs must be developed in consultation with relevant government agencies as identified in Condition C9 of this approval and must include, to the written satisfaction of the Secretary, information requested by an agency to be included in a Construction Monitoring Programs during such consultation. Details of all information requested by an agency including copies of all correspondence from those agencies, must be provided with the relevant Construction Monitoring Program.	Section 1.8 Section 10
C13	The Construction Monitoring Programs must be endorsed by the ER (or AA in regards to the Noise and Vibration Construction Monitoring Program) and then submitted to the Secretary for approval at least one (1) month before commencement of construction or within another timeframe agreed with the Secretary.	Section 10
C14	Construction must not commence until the Secretary has approved all of the required Construction Monitoring Programs, and all relevant baseline data for the specific construction activity has been collected.	Section 10
C15	The Construction Monitoring Programs, as approved by the Secretary including any minor amendments approved by the ER (or AA in regards to the Noise and Vibration Construction Monitoring Program), must be implemented for the duration of	Section 10

Item	Requirement	Document Reference
	construction and for any longer period set out in the monitoring program or specified by the Secretary, whichever is the greater.	
C16	The results of the Construction Monitoring Programs must be submitted to the Secretary for information, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	Section 10.2.8
C17	Where a relevant CEMP sub-plan exists, the relevant Construction Monitoring Program may be incorporated into that CEMP sub-plan.	This CNVMP
E28	**Vibration** The Proponent must ensure that vibration from construction activities does not exceed the vibration limits set out in the British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from ground-borne vibration	Section 4.4, Section 5.4
E29	Owners of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before construction that generates vibration commences in the vicinity of those properties. The management of construction works in the vicinity of properties at risk of exceeding the screening criteria for cosmetic damage must be considered in the Noise and Vibration management sub plan required by Condition C3.	Section 5.4 Section 8.2
E30	The Proponent must conduct vibration testing before and during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures.	Section 5.4 Section 8.1.3 Section 8.1.4
E31	The Proponent must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage-listed structures.	Section 5.4 Section 8.1.4
E32	**Construction Noise and Vibration Strategy** The Proponent must review the Sydney Metro City and Southwest Construction Noise and Vibration Strategy in the PIR during detailed construction planning to consider scale and duration of impacts, the requirements of this approval and all measures to limit construction noise impacts to sensitive receptors including: (a) at property or architectural treatment; (b) relocation; and	This CNVMP Section 8 Section 8.2

Item	Requirement	Document Reference
	(c) other forms of mitigation where impacts are predicted to be long term and significant. The revised Sydney Metro City and Southwest Construction Noise and Vibration Strategy must be submitted to the Secretary for approval at least one (1) month before construction commences. Note: The Construction Noise and Vibration Strategy was prepared by TfNSW and approved by DP&E. In accordance with condition allocation in the contract, LORAC is required to comply with the Sydney Metro City & Southwest Construction Noise and Vibration Strategy for all works south of Chatswood Station, including any subsequent versions of this document which may be produced. This CNVMP has been prepared to assist LORAC achieve this.	
E33	Construction Noise and Vibration Impact Statements must be prepared for each construction site before construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive receptors.	Section 7, Section 8
E34	Noise generating works in the vicinity of potentially-affected, religious, educational, community institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) must not be timetabled within sensitive periods, unless other reasonable arrangements to the affected institutions are made at no cost to the affected institution or as otherwise approved by the Secretary.	Section 6.1
E35	The Proponent must review alternative methods to rock hammering and blasting for excavation as part of the detailed construction planning with a view to adopting methods that minimise impacts on sensitive receptors. Construction Noise and Vibration Impact Statements must be updated for each location or activity to adopt the least impact alternative in any given location unless it can be demonstrated, to the satisfaction of the AA, why it should not be adopted.	Section 8
E36	**Standard Construction Hours** Construction, except as allowed by Condition E48 (excluding cut and cover tunnelling), must only be undertaken during the following standard construction hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 6:00pm Saturdays; and (c) at no time on Sundays or public holidays.	Section 6.1
E37	**Respite for Receptors** The Proponent must identify all receivers likely to experience internal noise levels greater than Leq(15 minute) 60 dB(A) inclusive of a 5 dB penalty, if rock breaking or any other annoying activity likely to result in regenerated (ground-borne) noise or a perceptible level of vibration is planned (including works associated with utility adjustments), between 7am – 8pm at: (a) Crows Nest, Victoria Cross, Blues Point, Barangaroo, Martin Place, Pitt Street, and Central; and	Section 7 Section 8 Table 8.1

Item	Requirement	Document Reference
	(b) Marrickville, Newtown, St Peters, Sydenham and Tempe for works specified in SSI 7400_MOD 4 referenced in Condition A1 (c).	
E38	The Proponent must consult with all receptors identified in accordance with Condition E37 with the objective of determining appropriate hours of respite so that construction noise (including ground-borne noise), does not exceed internal noise levels of: (a) Leq, 15 minute 60 dBA inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am – 8pm for more than 50 percent of the time; and (b) Leq ,15 minute 55 dBA inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am – 8pm for more than 25 percent of the time, unless an agreement is reached with those receptors. This condition does not apply to noise associated with the cutting surface of a TBM as it passes under receptors. *Note: This condition requires that noise levels be less than Leq, 15 minute 60 dBA for at least 6.5 hours between 7am and 8pm, of which at least 3.25 hours must be below LAeq, 15 minute 55 dBA. Noise equal to or above Leq 15 minutes 60 dBA is allowed for the remaining 6.5 hours between 7am and 8pm.*	Section 7 Section 8 Table 8.1
E39	The Proponent must consult with proponents of other construction works in the vicinity of the CSSI and take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receptors.	Section 8
E40	The Proponent must ensure all works (including utility works associated with the CSSI where undertaken by third parties) are coordinated to provide the required respite periods identified in accordance with the terms of this approval.	Section 6.1, Table 8.1
E41	**Mitigation – Non Residential Zones** The Proponent must ensure that residential receptors, located in non-residential zones, likely to experience an internal noise level exceeding Leq,15 minute 60 dB(A) between 8pm and 9pm or Leq, 15 minute 45 dB(A) between 9pm and 7am (inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise, or a perceptible level of vibration is planned (including works associated with utility adjustments)) must be offered additional mitigation in accordance with the Sydney Metro City and South West Noise and Vibration Strategy referenced in Condition E32.	Section 7 Section 8 Table 8.1

Item	Requirement	Document Reference
E42	**Mitigation – Residential receptors in residential zones** The Proponent must ensure that residential receptors in residential zones likely to experience an internal noise level of Leq, 15 minute 45 dB(A) or greater between 8pm and 7am (inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise, or a perceptible level of vibration is planned (including works associated with utility adjustments)) must be offered additional mitigation in accordance with the Sydney Metro City and South West Noise and Vibration Strategy referenced in Condition E32.	Section 7 Section 8 Table 8.1
E43	**Workplace health and safety for nearby workers** At no time can noise generated by construction exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of LAeq, 8h of 85dBA for any employee working at a location near the CSSI.	Table 8.1
E44	**Variation to Standard Construction Hours** Notwithstanding Condition E36 construction associated with the CSSI may be undertaken outside the hours specified under those conditions in the following circumstances: (a) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (b) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or (c) where different construction hours are permitted or required under an EPL in force in respect of the construction; or (d) construction that causes LAeq, 15 minute noise levels: i. no more than 5 dBA above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009), and ii. no more than the noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses, and iii. continuous or impulsive vibration values, measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006), and iv. intermittent vibration values measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006); or (e) where a negotiated agreement has been reached with a substantial majority of sensitive receptors who are within the vicinity of and may be potentially affected by the particular construction, and the noise management levels and/or limits for ground-borne noise and vibration (human comfort) cannot be achieved. All agreements must be in writing and a copy forwarded to the Secretary at least one (1) week before the works commencing; or (f) construction approved through an Out of Hours Work Protocol referred to in Condition E47, provided the relevant council, local residents and other affected stakeholders and sensitive receptors are informed of the timing and duration at least five (5) days and no more than 14 days before the commencement of the works.	Section 6.1

Item	Requirement	Document Reference
	Note: This condition does not apply where an EPL is in force in respect of the construction.	
E45	On becoming aware of the need for emergency construction in accordance with Condition E44(b), the Proponent must notify the AA, the ER and the EPA (if an EPL applies) of the need for those activities or work. The Proponent must also use best endeavours to notify all affected sensitive receptors of the likely impact and duration of those works.	Section 6.1.2
E46	Notwithstanding Conditions E44 and E48, rock breaking and other particularly annoying activities for station shaft or cut and cover stations is not permitted outside of standard construction hours, except at Central (excluding Central Walk works at 20-28 Chalmers Street, Surry Hills); or (a) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or (b) where different construction hours are permitted or required under an EPL in force in respect of the construction or approved through an Out of Hours Work Protocol developed in accordance with Condition E47; or (c) construction that causes LAeq(15 min) noise levels: i. no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009); and ii. no more than the noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses; and iii. continuous or impulsive vibration values, measures at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006); and iv. intermittent vibration values measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006).	Section 6.1, Section 8, Table 8.1
E47	**Out of Hours Work Protocol for works not subject to an EPL** An Out of Hours Work Protocol for the assessment, management and approval of work outside of standard construction hours, as defined in Condition E36 of this approval, must be prepared in consultation with the EPA and submitted to the Secretary for approval before construction commences for works not subject to an EPL. The protocol must include: (a) the identification of low and high risk construction activities; (b) a risk assessment process in which the AA reviews all proposed out of hours activities and identifies their risk levels; (c) a process for the endorsement of out of hours activities by the AA and approval by the ER for construction activities deemed to be of: i. low environmental risk; or ii. high risk where all construction works cease by 9pm. All other high risk out of hours construction must be submitted to the Secretary for approval unless otherwise approved through an EPL.	Section 6.1.1 Appendix G

Item	Requirement	Document Reference
	The protocol must detail standard assessment, mitigation and notification requirements for high and low risk out of hours works, and detail a standard protocol for referring applications to the Secretary.	
E48	**24 Hour Construction** Notwithstanding Condition E36 of this approval and subject to Condition E47, the following activities may be undertaken 24 hours per day, seven (7) days per week: (a) tunnelling and associated support activities (excluding cut and cover tunnelling, and excluding the installation and decommissioning of the Blues Point acoustic shed except where compliance with Condition E44 is achieved); (b) excavation within an acoustic enclosure (excluding the Blues Point temporary site except where compliance with Condition E44 is achieved); (c) excavation at Central (excluding Central Walk works at 20-28 Chalmers Street, Surry Hills) without an acoustic enclosure; (d) station and tunnel fit out; and (e) haulage and delivery of spoil and materials.	Section 6.1.1, Appendix G, Table 8.1
E49	All acoustic sheds must be erected as soon as site establishment works at the facilities are completed and before undertaking any works or activities which are required to be conducted within the sheds.	Section 8
E50	**Blast Management** A Blast Management Strategy must be prepared and include: (a) sequencing and review of trial blasting to inform blasting; (b) regularity of blasting; (c) intensity of blasting; (d) periods of relief; and (e) blasting program.	*Not Applicable*[1]
E51	The Blast Management Strategy must be endorsed by a suitably qualified and experienced person and reviewed by an independent specialist.	*Not Applicable*[1]
E52	The Blast Management Strategy must be prepared so that all blasting and associated activities are carried out so as not to generate unacceptable noise and vibration impacts or pose a significant risk to sensitive receptors. The Blast Management Strategy must be prepared in accordance with relevant guidelines including the principles outlined in Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis (Department of Planning Industry and Environment, January 2011) and Assessment Guideline: Multi-Level Risk Assessment (Department of Planning and Infrastructure, May 2011) for the handling and storage of hazardous materials and include:	*Not Applicable*[1]

Item	Requirement	Document Reference
	(a) details of blasting to be performed, including location, timing, method and justification of the need to blast; (b) identification of all potentially affected noise and vibration sensitive sites including heritage buildings and utilities; (c) establishment of appropriate criteria for blast overpressure and ground vibration levels at each category of noise sensitive site; (d) details of the storage and handling arrangements for explosive materials and the proposed transport of those materials to the construction site; (e) identification of hazardous situations that may arise from the storage and handling of explosives, the blasting process and recovery of the blast site after detonation of the explosives; (f) determination of potential noise and vibration and risk impacts from blasting and appropriate best management practices; and (g) community consultation procedures.	
E53	The Blast Management Strategy must be submitted to the Secretary one (1) month before blasting commences, or as agreed by the Secretary. The Blast Management Strategy as submitted to the Secretary, must be implemented for all blasting activities.	*Not Applicable*[1]
E54	Blasting associated with the CSSI must not exceed the following criteria, measured at the most affected residence or other sensitive receiver as specified below: (a) airblast overpressure (dB(Lin Peak)) 125 dBL; and (b) vibration (PPV): i. 25 mm/s generally; or ii. 7.5mm/s for heritage structures except where detailed investigation of the construction of the building determines that increasing the screening criterion to 25 mm/s is acceptable. The investigation must be undertaken by a suitably qualified structural engineer with experience assessing heritage structures that is approved by the Secretary. Any decision to adopt the higher vibration criterion must be supported by evidence to demonstrate the higher criterion is appropriate.	*Not Applicable*[1]
E55	Blasting must be limited to a single detonation in any one day, and a maximum of six per week, at each station location, or any other frequency agreed by the Secretary. Note: for the purpose of this Condition, a single detonation may involve a number of individual blasts fired in quick succession in a discrete area.	*Not Applicable*[1]
E56	Blasting associated with the project must be undertaken at a time to have the least impact on the nearby sensitive receptors determined in consultation with those receptors. All sensitive receptors affected by any blast must be advised fortnightly of the proposed blasting schedule. The Secretary must also be advised of the advance blasting schedule for any location.	*Not Applicable*[1]

Source: *CSSI 7400 MOD 3 – Consolidated Approvals Instrument (22 March 2018)*

Item	Requirement	Document Reference
1.	*Although this item is relevant to Noise and Vibration, it is not applicable to the CSM Project.*	

Table 0.2 - PIR Revised Environmental Mitigation Measures (REMM)

Item	Requirement	Document Reference
NV1	The Construction Noise and Vibration Strategy would be implemented with the aim of achieving the noise management levels where feasible and reasonable. This would include the following example standard mitigation measures where feasible and reasonable: • Provision of noise barriers around each construction site • Provision of acoustic sheds at Chatswood dive site, Crows Nest, Victoria Cross, Barangaroo Martin Place, Pitt Street, Waterloo and Marrickville dive site • The coincidence of noisy plant working simultaneously close together would be avoided • Offset distances between noisy plant and sensitive receptors would be increased • Residential grade mufflers would be fitted to all mobile plant • Dampened rock hammers would be used • Non-tonal reversing alarms would be fitted to all permanent mobile plant • High noise generating activities would be scheduled for less sensitive period considering the nearby receptors • The layout of construction sites would consider opportunities to shield receptors from noise. This would also include carrying out the requirements in relation to construction noise and vibration monitoring.	Section 8, Table 8.1 • CNV13 • N/A • CNV13 • Section 8, pg 69 • CNV13 • CNV8 • CNV12 • CNV6 • CNV6
NV2	Unless compliance with the relevant traffic noise criteria can be achieved, night time heavy vehicle movements at the Chatswood dive site, Crows Nest Station, Victoria Cross Station and Waterloo Station sites would be restricted to: • The Pacific Highway and Mowbray Road at the Chatswood dive site • The Pacific Highway, Hume Street and Oxley Street at the Crows Nest Station construction site • McLaren Street, Miller Street and Berry Street at the Victoria Cross Station construction site • Botany Road and Raglan Street at the Waterloo Station construction site.	*Not Applicable*[1]
NV3	Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure.	Section 7.2.3 Section 8.1.1, Section 8.1.4

Item	Requirement	Document Reference
	For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	
NV4	Feasible and reasonable measures would be implemented to minimise ground borne noise where exceedances are predicted.	Section 8.1.1, Section 8.1.2, Section 8.2
NV5	Feasible and reasonable mitigation measures would be implemented where power supply works would result in elevated noise levels at receptors. This would include: • Carrying out works during the daytime period when in the vicinity of residential receptors • Where out of hours works are required, scheduling the noisiest activities to occur in the evening period (up to 10 pm) • Use of portable noise barriers around particularly noisy equipment such as concrete saws.	*Not Applicable*[1]
NV6	Transport for NSW would engage an Independent Acoustic Advisor to act independently of the design and construction teams and provide oversight of construction methods, construction noise and vibration planning, management and mitigation, and construction noise and vibration monitoring and reporting. The key responsibilities of the Independent Acoustic Advisor would include: • Assurance of contractor noise and vibration planning, modelling, management and monitoring practices • Verification of compliance with relevant guidelines and approval requirements • Audit noise and vibration management practices.	Section 12
NV7	Alternative demolition techniques that minimise noise and vibration levels would be investigated and implemented where feasible and reasonable. This would include consideration of: • The use of hydraulic concrete shears in lieu of hammers/rock breakers • Sequencing works to shield noise sensitive receptors by retaining building wall elements • Locating demolition load out areas away from the nearby noise sensitive receptors • Providing respite periods for noise intensive works • Methods to minimise structural-borne noise to adjacent buildings including separating the structural connection prior to demolition through saw-cutting and propping, using hand held splitters and pulverisers or hand demolition • Installing sound barrier screening to scaffolding facing noise sensitive neighbours • Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods.	Section 7.2.1 Section 7.2.3 Section 8, pg 69 Table 8.1 Section 8.1.1

Item	Requirement	Document Reference
Source: *Sydney Metro C2S SPIR Chapter 11 Revised Environmental Outcomes* *1. Although this item is relevant to Noise and Vibration, it is not applicable to the CSM Project.*		

Table 0.3 - PIR Revised Environmental Performance Outcomes

Item	Requirement	Document Reference
PIR, Table 11-2	• Noise **and vibration – amenity (requirement)**: Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimize adverse impacts on acoustic amenity. • **Environmental performance outcome:** Noise levels would be minimised with the aim of achieving the noise management levels where feasible and reasonable.	Section 8
PIR, Table 11-2	• **Noise and vibration – structural (requirement):** Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimize adverse impacts on the structural integrity of buildings and items including Aboriginal places and environmental heritage. • **Environmental performance outcome:** The project would avoid any damage to buildings from vibration.	Section 8
Source: *Sydney Metro C2S SPIR Chapter 11 Revised Environmental Outcomes*		

Table 0.4 - Management Requirements – Environment (MR-E)

Item	Requirement	Document Reference
2.1(a)	The Contractor must comply with the relevant requirements of the Sydney Metro Construction Environmental Management Framework (CEMF) SM ES-ST-204, as indicated in Table 1.1 of Annexure A.	This CNVMP
2.1(b)	Where the CEMF requires the Contractor to submit a document for review, the Contractor must submit those Documents to the Principal's Representative for review in accordance with the Contract.	Section 10
2.2(a)	The Contractor must provide a monthly report, using the Sydney Metro City & Southwest Environmental Reporting Template SM ES-FT-421.	Section 10

Item	Requirement	Document Reference
2.2(b)	Within 5 Business Days of each Calendar Quarter Date, a register of Environmental Compliance Requirements (ECRs), which identifies progress, and evidence of compliance against each ECR, must be submitted to the Principal's Representative for review in accordance with the Contract.	Section 10
2.2(c)	The register of ECRs must classify each ECR as: i. Ongoing or Complete, to indicate their progress; and ii. Compliant or Non Complaint, to indicate compliance.	Section 10
2.3(a)	i. the Contractor must measure and report the "Actual versus planned attendance rate" (Ratio) at environmental training events (excluding toolbox talks and inductions), where the Ratio is a percentage, calculated as the ratio of actual participant numbers divided by the planned participant numbers e.g. If 20 participants attend an event, and it was planned to have 25 participants, the Ratio would be 20/25 = 80%; ii. a Ratio of 80% and below will contribute a score of 0, and a Ratio of 95% and above will contribute a score of 100. iii. a Ratio of greater than 80% and less than 95%, will contribute to the scoring on a pro-rata basis e.g. a Ratio of 90% would contribute a score of 67, a Ratio of 85% would contribute a score of 331.	
2.3(b)	For vibration-intensive activities undertaken on the Site such as impact piling and vibratory rolling, The Contractor's Heritage Consultant must review all construction methodologies and monitoring to ensure heritage structures are appropriately accounted for, protected and managed to prevent damage.	

Source: *Management Requirements – Environment – Central Station Main Works (MR-E) - SM-17-00000461 (22 February 2018)*

Table 0.5 - Sydney Metro CEMF (as required by Annexure A of MR-E)

Item	Requirement	Document Reference
3.3(e)	As a minimum the CEMP will: i. For each plan under the CEMP include a matrix of the relevant Conditions of Approval or Consent showing where each requirement is addressed. ii. For each plan under the CEMP, set objectives and targets, and identify measurable key performance indicators in relation to these. iii. Include procedures for the control of environmental records.	i. Section 0 ii. Section 3 iii. Section 10.2.7 (Refer CEMP)

Item	Requirement	Document Reference
9.1(a)	**Construction Noise and Vibration Management Objectives** The following noise and vibration management objectives will apply to construction: i. Minimise unreasonable noise and vibration impacts on residents and businesses; ii. Avoid structural damage to buildings or heritage items as a result of construction vibration; iii. Undertake active community consultation; and iv. Maintain positive, cooperative relationships with schools, childcare centres, local residents and building owners.	Section 1.7
9.2(a)	Principal Contractors will develop and implement a Construction Noise and Vibration Management Plan for their scope of works consistent with the Interim Construction Noise Guidelines (Department of Environment and Climate Change, 2009). The Construction Noise and Vibration Management Plan will include as a minimum: i. Identification of work areas, site compounds and access points; ii. Identification of sensitive receptors and relevant construction noise and vibration goals; iii. Be consistent with, and include the requirements of the noise and vibration mitigation measures as detailed in, the environmental approval documentation and the Sydney Metro Construction Noise and Vibration Strategy (CNVS); iv. Details of construction activities and an indicative schedule for construction works, including the identification of key noise and/or vibration generating construction activities (based on representative construction scenarios) that have the potential to generate noise or vibration impacts on surrounding sensitive receptors, in particular residential areas; v. Identification of feasible and reasonable procedures and mitigation measures to ensure relevant vibrations and blasting criteria are achieved, including a suitable blast program; vi. Community consultation requirements and Community notification provisions specifically in relation to blasting; vii. The requirements of any applicable EPL conditions; viii. Additional requirements in relation to activities undertaken 24 hours of the day, 7 days per week; ix. Pre-construction compliance requirements and hold points; x. The responsibilities of key project personnel with respect to the implementation of the plan; xi. Noise monitoring requirements; xii. Compliance record generation and management; and xiii. An Out of Hours Works Protocol applicable to all construction methods and sites.	i. Section 1.2 ii. Section 3 iii. Section 8 iv. Section 7 v. Section 8 vi. Section 8.2 vii. Section 2/5 viii. Section 6.1.1, Section 8.2 ix. Section 12.1 x. Section 12.1 xi. Section 10 xii. Section 10, Section 11 xiii. Section 6.1.1, Appendix G
9.2(b)	Detailed Construction Noise and Vibration Impact Statements will be prepared for noise intensive construction sites and or activities, to ensure the adequacy of the noise and vibration mitigation measures. Specifically, Construction Noise and Vibration Impact Statements will be prepared for EPL variation applications and works proposed to be undertaken outside of standard construction hours.	CSM CNVIS
9.2(c)	Noise and vibration monitoring would be undertaken for construction as specified in the CNVS and the EPL.	Section 10

Item	Requirement	Document Reference
9.2(d)	The following compliance records would be kept by Principal Contractors: i. Records of noise and vibration monitoring results against appropriate NMLs and vibration criteria; and ii. Records of community enquiries and complaints, and the Contractor's response.	Section 10 Section 11
9.3(a)	All feasible and reasonable mitigation measures would be implemented in accordance with the CNVS. Examples of noise and vibration mitigation measures include: i. Construction hours will be in accordance with the working hours specified in Section 5.1; ii. Hoarding and enclosures will be implemented where required to minimise airborne noise impacts; and iii. The layout of construction sites will aim to minimise airborne noise impacts to surrounding receptors.	Section 8
Source: *Sydney Metro - Construction Environmental Management Framework*		

Table 0.6 – Noise Conditions of EPL 21148, 28 November 2018

Item	Requirement	Document Reference
L3.1	The licensee must implement all feasible and reasonable noise and vibration abatement measures at the premises to minimise noise and vibration impacts on noise sensitive receivers to seek to achieve the Noise Management Levels in the Interim Construction Noise Guidelines (DECC, 2006).	This Plan and CNVIS
L4.1	Unless permitted by another condition of this licence, construction works and activities must: (a) only be undertaken between the hours of 0700 and 1800 Monday to Friday; and (b) only be undertaken between the hours of 0800 and 1300 Saturday; and (c) not be undertaken on Sundays or Public Holidays.	Sec 6.1
L4.2	The following works and activities may be carried out outside of the hours specified in Condition L4.1 if the works and activities do not cause, when measured at the boundary of the most affected noise sensitive receiver: (a) LAeq(15 minute) noise levels greater than 5dB above the day, evening and night rating background level (RBL) as applicable; and (b) LA1(1 minute) or LAmax noise levels greater than 15dB above the night RBL for night works; and	S6.1, S8, Table 8.1

Item	Requirement	Document Reference
	(c) continuous or impulsive vibration values greater than those for human exposure to vibration, set out for residences in Table 2.2 in "Environmental noise management - Assessing Vibration: a technical guideline" (Department of Environment and Conservation, February 2006); and (d) intermittent vibration values greater than those for human exposure to vibration, set out for residences in Table 2.4 in "Environmental noise management - Assessing Vibration: a technical guideline" (Department of Environment and Conservation, February 2006). For the purpose of this condition, the RBLs are those contained in an environmental assessment for the scheduled activity subject to this licence prepared under the Environmental Planning and Assessment Act 1979. Alternatively, the licensee may use another RBL determined in accordance with the NSW Industrial Noise Policy (EPA, 2000) and provided to the EPA prior to carrying out any works or activities under this condition.	
L4.3	(a) The licensee may undertake works outside of standard construction hours if any of the following applies: i. emergency works is required to avoid the loss of lives or property, or to prevent material harm to the environment; ii. the delivery of oversized plant or structures has been determined by the police or other authorized authorities to require special arrangements to transport along public roads. (b) The licensee must, on becoming aware of the need to undertake emergency construction work under this condition notify the EPA's Environment Line as soon as practicable and submit a report to the EPA by 2pm on the next business day after the emergency works commenced that describes: i. the cause, time and duration of the emergency; and ii. action taken by or on behalf of the licensee in relation to the emergency; and iii. details of any measures taken or proposed to be taken by the licensee to prevent or mitigate against a recurrence of the emergency. For the purpose of this condition, "material harm to the environment" has the same meaning as in section 147 of the POEO Act.	S6.1
L4.4	The following works are permitted to be undertaken 24 hours a day, 7 days per week: (a) Haulage and delivery and of spoil and materials; and (b) Excavation, excluding Central Walk Works at 20-28 Chalmers Street Surry Hills; and (c) Station and tunnel fit out.	S6.1.1, S8, Table 8.1
L4.5	Unless otherwise specified by another condition of this licence, the following applies in relation to high noise impact works: (a) High noise impact works and activities associated with Central Walk Works at 20 - 28 Chalmers Street Surry Hills must only be undertaken: 1. between the hours of 8:00am to 6:00pm Monday to Friday; 2. between the hours of 8:00am to 1:00pm Saturday; and	S6.1.1 , Appendix G, Table 8.1

Item	Requirement	Document Reference
	3. in continuous blocks not exceeding 3 hours each with a minimum respite from those activities and works of not less than 1 hour between each block. For the purposes of this condition 'continuous' includes any period during which there is less than a 1hour respite between ceasing and recommencing any of the work that is the subject of this condition.	
L4.6	The licensee must: (a) identify all receivers likely to experience internal noise levels greater than Leq(15 minute) 60 dB(A) inclusive of a 5dB penalty, if rock breaking or any other annoying activity likely to result in regenerated (ground-borne) noise or a perceptible level of vibration is planned, between 7am to 8pm; and, (b) consult with all receivers identified in Condition L4.6(a) with the objective of determining appropriate hours of respite so that construction noise (including ground-borne noise), does not exceed internal noise levels of: i. Leq(15 minute) 60dB(A) inclusive of a 5dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am to 8pm for more than 50% of the time; and, ii. Leq(15 minute) 55dB(A) inclusive of a 5dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am to 8pm for more than 25% of the time. (c) at least two weeks prior to commencement of work packages associated with this licence that have been identified to exceed the noise levels and times stipulated in L4.6(a), the licensee must supply EPA with the results of consultation with receivers in accordance with condition L4.6(b) and the proposed work practices and scheduling to provide receivers with the respite required under condition L4.6(b)(i) and (ii).	S7, S8, Table 8.1
L4.7	(a) Works and activities may be undertaken during any local possession, but only if: i. carrying on those works and activities during standard construction hours (specified in Condition L4.1) would cause unacceptable risks to: 1. construction personnel safety; 2. rail passenger and railways personnel safety; or 3. railway network operational reliability as may be notified to the licensee from time to time by Sydney Trains; and ii. noise and vibration mitigation measures are implemented as detailed in the Interim Construction NoiseGuideline (DECC 2009); and iii. the licensee complies with Condition L4.9(e),(f)&(g). (b) High noise impact works and activities (excluding rail adjustment, tamping and regulating) may be undertaken during any local possession permissible by Condition L4.7(a) as follows: i. between the hours of 6:00am to 10:00pm on any day subject to the works and activities being undertaken in continuous blocks not exceeding 3 hours each with a minimum respite from those works and activities of not less than one hour between each block.	S6.1.1 , Appendix G, Table 8.1

Item	Requirement	Document Reference
	For the purposes of this condition "continuous" includes any period during which there is less than a 1 hour respite between ceasing and recommencing any of the works or activities that are the subject of this condition. (c) Rail adjustment, tamping and regulating may be undertaken at any time during a local possession permissible by Condition L4.7(a).	
L4.8	(a) Local area and utilities works may be undertaken outside of standard construction hours specified in L4.1 but only if one or more of the following applies: i. carrying on those works and activities during the hours specified in Condition L4.1 would result in a high risk to construction personnel or public safety, based on a risk assessment carried our in accordance with AS/NZS ISO 31000:2009 "Risk Management"; or ii. the relevant road network operator has advised the licensee in writing that carrying out the works and activities during the hours specified in Condition L4.1 would result in a high risk to road network operational performance; or iii. the relevant utility service operator has advised the licensee in writing that carrying out the works and activities during the hours specified in Condition L4.1 would result in a high risk to the operation and integrity of the utility network; or iv. the TfNSW Transport Management Centre (or other road authority) have advised the licensee in writing that a road occupancy licence is required and will not be issued for the works or activities during the hours specified in Condition L4.1.	S6.1.1 , Appendix G, Table 8.1
L4.9	In undertaking any works or activities under Condition L4.8 the licensee must: (a) Consider the nature of nearby potentially impacted land uses and undertake the works at times when impacts are expected to be minimised. (b) Ensure that works and activities undertaken under L4.8 do not impact the same noise sensitive receivers on more than: i. 3 occasions per week; and ii. 10 occasions per month. (c) (c) Are coordinated with track possession works to provide the community with the greatest respite from construction noise as is practicable. (d) (d) Implement reasonable and feasible noise and vibration mitigation measures as detailed in the Interim Construction Noise Guidelines (DECC 2009). (e) (e) Undertake noise monitoring at the boundary of the most noise affected receiver or other sensitive land uses(s) that is most representative of noise generating activities being carried out at the site; and (f) Comply with the requirements of Condition R4.1; and (g) Comply with the requirements of Condition R4.4; and (h) Ensure that an indicative rolling one month "look ahead" schedule of works undertaken in accordance with L4.7 and L4.8 is made publicly accessible on the licensee's project website. NOTE: For the purposes of L4.9(b) "impact" is defined as noise levels that exceed the noise levels in L4.2 and an "occasion" is a period of work outside the hours stipulated in condition L4.1 that does not exceed 8 hours.	S6.1.1 , Appendix G, Table 8.1

Item	Requirement	Document Reference
L4.10	If works are undertaken by a utilities provider during a scheduled respite period identified by Condition L4.9, and those works are related to the scheduled activity permitted by this licence, the licensee must: (a) where feasible, reschedule any works permissible by Condition L4.8 to provide respite to impacted noise sensitive receivers so that the minimum number of respite periods in any week can be achieved; or (b) consider the provision of alternative respite or mitigation to impacted noise sensitive receivers; and (c) provide documentary evidence to the EPA in support of any decision made by the licensee in relation to the provision or refusal of any respite or mitigation within the validation report required by Condition R4.4.	S6.1.1 , Appendix G, Table 8.1
L4.11	The licensee may undertake works outside of standard construction hours if agreement between the licensee and a substantial majority of noise sensitive receivers has been reached. Note: This condition applies to out-of-hours works that have not been approved by another condition of this licence.	S6.1.1 , Appendix G, Table 8.1
L4.12	Any agreement(s) between the licensee and noise sensitive receivers referred to in Condition L4.11 must be: (a) submitted to the EPA for approval prior to any works that are the subject of the agreement being undertaken; and (b) prepared in writing and a copy of the agreement(s) kept on the premises by the licensee for the duration of this licence; and (c) kept on the licensee's project website for the duration of the agreement (personal details of residents must be omitted); and (d) prepared and implemented in accordance with Condition E1	S6.1.1 , Appendix G, Table 8.1
L4.13	(a) The licensee must notify affected noise sensitive receivers of works approved outside of standard construction hours not less than 5 days and not more than 14 days before those works are to be undertaken. (b) The notification must be: • by letterbox drop or email; and • be detailed on the project website. (c) The notification required by paragraphs (a) and (b) of this condition must: • clearly outline the reason that the work is required to be undertaken outside the hours specified in Condition L4.1; • include a diagram that clearly identifies the location of the proposed works in relation to nearby cross streets and local landmarks; • include details of relevant time restrictions that apply to the proposed works; • clearly outline, in plain English, the location, nature, scope and duration of the proposed works; • detail the expected noise impact of the works on noise sensitive receivers; • clearly state how complaints may be made and additional information obtained; and • include the number of the telephone complaints line required by Condition M4.1, an after hours contact • phone number specific to the works undertaken outside the hours specified in Condition L4.1, and the	S6.1.1 , Appendix G, Table 8.1

Item	Requirement	Document Reference
	• project website address. This condition does not apply to works undertaken in accordance with Condition L4.3.	
L4.14	The operation of Conditions L4.8 is subject to review by the EPA after the first four (4) occasions of works undertaken under L4.8.	S6.1.1 , Appendix G, Table 8.1
M6.5	**Noise and Vibration Complaints** (a) The licensee must investigate noise and vibration complaints: i. within two hours of the complaint being made; or ii. in accordance with any documented complaint management agreement between the licensee and the complainant. (b) The licensee must ensure that any investigation referred to in this condition that identifies works or activities being undertaken on the licenses premises as the likely source of the complaint, includes an offer to the complainant to undertake attended noise or vibration monitoring at their premises unless representative real-time monitoring data was being collected at the time of the complaint. (c) If the occupant of the dwelling or management personnel of a noise sensitive receiver other than a dwelling accepts the offer of attended noise or vibration monitoring the licensee must undertake that attended monitoring: i. As soon as practicable; or ii. At a time agreed with the complainant.	S11.1
R4.1	(a) The licensee must submit by 2:00pm each business day a report to the EPA that provides details of all complaints received in relation to construction activities regulated by the licence on the telephone complaints line required by Condition M5 or through any other means. (b) The report must: 1. Be submitted to the email address nominated by the EPA; and 2. Include a unique identifier number for each complainant together with the details required by condition M4.2; and 3. Include date and time as reported by the complainant of the event that is the subject of the complaint; and 4. Include an outline of the work or activity that is the subject of the complaint; and 5. Include the complaints received between 12am and 12pm; and 6. If the works have been carried out under Conditions L4.2, L4.3, L4.4, L4.7, L4.8, or L4.11 the report must include a copy of any assessments required by these conditions unless previously provided to the EPA, and details of how the requirements of these conditions have been met. (c) The licensee is not required to submit a report for any reporting period during which no complaints have been received.	S11.1
R4.2	Noise and Vibration Reports	S11.1

Item	Requirement	Document Reference
	(a) Upon request of an authorised officer, the licensee must submit a Preliminary Investigation Report to the EPA in respect of any noise or vibration monitoring undertaken in accordance with the requirements of Condition M6.5 (b) The Preliminary Investigation Report must be submitted to the EPA by 4:30pm on the afternoon of the next working day following any noise or vibration monitoring. (c) The Preliminary Investigation Report must: 1. Include numerical and/or graphical representation of the noise and vibration monitoring results; and 2. Highlight any detected exceedance of noise limits or noise management levels specified in this licence, relevant noise modelling and any relevant noise guidelines.	
R4.3	In the event of any exceedance of the best achievable noise performance objectives identified in Construction Noise and Vibration Impacts Statements prepared for the works, the licensee must: (a) Modify activities and implement all reasonable and feasible measures to prevent a recurrence of the exceedance; and (b) Submit a Follow-Up Investigation Report to the EPA within 5 working days of any noise or vibration monitoring having been undertaken (unless otherwise approved by the EPA). (c) The Follow-Up Investigation Report must include: 1. Confirmation of whether noise monitoring has been undertaken in accordance with AS2659 and the compliance monitoring guidance provided in the NSW Industrial Noise Policy; and 2. Confirmation of whether vibration monitoring has been undertaken in accordance with the guidance provided in Assessing Vibration: a technical guideline (DEC 2006). 3. Details of the prevailing meteorological conditions during the period when the monitoring was undertaken; and 4. A map of each noise and vibration monitoring location in relation to the noise source, including relevant distances; and 5. Numerical and graphical representation of the noise and vibration monitoring results; and 6. An analysis of the noise and vibration monitoring results; and 7. Details of any remedial action taken in relation to the matter; and 8. In cases not the subject of remedial action, detailed justification of the decision not to undertake remedial action.	S11.1
M7.2	Any noise monitoring must be undertaken in accordance with Australian Standard AS 2659.1 – 1998: Guide to the use of sound measuring equipment – portable sound level meters, or any revisions of that standard which may be made by Standards Australia, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.	S10
M7.2	Any vibration monitoring must be undertaken in accordance with the technical guidance provided in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DECC, 2006). All vibration monitoring results may be assessed and reported against the acceptable values of human exposure to vibration set out in Tables 2.2 and 2.4 of the guideline.	S10
M7.3	The licensee must undertake noise and vibration monitoring as directed by an authorised officer of the EPA.	S10

0.1 Structure of this Plan

This CNVMP has been prepared to address all requirements tabulated in the consolidated compliance matrix outlined above. They are addressed throughout this Plan which is structured in the following format:

- **Section 1 – Introduction**: provides an overview of the purpose and application of this CNVMP, a background to the Central Station Main (CSM) works and the broader Sydney Metro City and Southwest Project, identifies the location of work areas, identifies the likely works duration and summarises potential noise and vibration issues.
- **Section 2 – Legal and Other Requirements**: provides an overview of the legal context of the Plan and summarises the applicable policy, standards and guideline.
- **Section 3 – Existing Environment**: summarises the existing noise environment, presents the measured baseline (background noise) data from the EIS, identifies potentially sensitive receptors, and describes how the baseline data is applied in the content of the applicable noise and vibration guidelines.
- **Section 4 – Noise and Vibration Guidelines:** describes the noise and vibration guidelines that will apply during construction works and activity.
- **Section 5 – Management Levels**: describes the management levels (for noise and vibration) that will apply during construction works and activity.
- **Section 6 – Work Hours**: describes the hours of work that will apply during construction works and activity.
- **Section 7 – Aspects, Impacts & Risks**: presents likely noise and vibration generating sources and reproduces the predicted noise and vibration impacts from the CNVIS.
- **Section 8 – Mitigation and Management Measures**: describes the overall approach to managing and mitigating noise and vibration impacts as a result of the CSM works based on the predicted impacts as summarised this CNVMP. It details the relevant noise and vibration mitigation measures to be implemented during the works.
- **Section 9 – Training**: summarises the training that will be provided during CSM works as applicable to the management of noise and vibration.
- **Section 10 – Noise and Vibration Monitoring Plan**: details the requirements of any noise and vibration monitoring that is required and the technical methods that will be adopted.
- **Section 11 – Enquiries, Complaints and Incident Management**: summarises the enquiries, complaints and incident management that will be undertaken as per the CSM CEMP and Communications Strategy, including that related to noise and vibration.
- **Section 12 – CNVMP Administration**: provides information regarding relevant roles and responsibilities associated with this Plan and the CNVMP review process.
- **Section 13 – References**: lists the documents, policy, standards and guidelines applicable to this Plan, those that were considered during the preparation of the CNVMP.
- **Appendix A – Acoustics: Glossary of Terms and Definition**: provides an overview of relevant acoustical terminology and concepts.
- **Appendix B – Assessment Scenarios**: presents the assessment scenarios and noise modelling data (sound power levels) from the CNVIS.
- **Appendix C – Predicted Noise Levels**: presents the predicted noise levels from the CNVIS.
- **Appendix D – Safe Work Distance Figures**: presents the Ground-borne noise and vibration safe work distance figures from the CNVIS.
- **Appendix E – Sydney Metro Out of Hours Works Protocol**: presents the Out of Hours Works (OOHW) Protocol that will apply during the CSM construction works. A template Out Of Hours Work Application Form (OOHWAF) is also provided.
- **Appendix F – Consultation**: presents the consultation undertaken as part of the preparation of this CNVMP.

- **Appendix G – Construction Noise and Vibration Monitoring Guideline:** This document is intended to provide guidance and outline the minimum requirements for contractors undertaking construction noise and vibration monitoring on the Sydney Metro Project.

1. Introduction

1.1 Purpose

This Construction Noise and Vibration Management Plan (CNVMP) outlines the Central Station Main Works (CSM) Project's approach to ensure all risks associated with noise and vibration issues are considered and managed effectively in accordance with the Project's legal, planning and contractual requirements.

1.2 Background

Sydney Metro City & Southwest – Chatswood to Sydenham Project is a new 30km metro line extending metro rail from the end of Sydney Metro Northwest at Chatswood under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the capacity to run a metro train every two minutes each way through the centre of Sydney. The Project forms part of the Sydney Metro City & Southwest – Chatswood to Sydenham Project and includes the construction of new underground platforms at Central Station and new related pedestrian access ways. The works will be undertaken by Laing O'Rourke. The Project consists of the Metro Station Works, the Central Station Works and the Central Walk Works which are described in the sections below.

1.3 Planning Approval

The Project has been assessed by the Department of Planning Industry and Environment under Section 115ZB of the Environmental Planning and Assessment Act 1979 (EP&A Act) as Critical State Significant Infrastructure (CSSI). The Project, its impacts, consultation and mitigation were documented in the following suite of documents:

- Critical State Significant Infrastructure Application SSI 15_7400;
- Sydney Metro – Chatswood to Sydenham –Environmental Impact Statement (Jacobs/Arcadis/RPS, 2016);
- Sydney Metro – Chatswood to Sydenham –Response to Submissions and Preferred Infrastructure Report (Jacobs/Arcadis/RPS 2016); and
- The Planning Assessment Commission granted Approval for the Project on 9 January 2017 and the Laing O'Rourke scope of works is subject to the Minister's Conditions of Approval.

Following approval of the Sydney Metro City and Southwest – Chatswood to Sydenham Project, a modification (SSI Mod 2: Central Walk) was assessed by the Department of Planning Industry and Environment and subsequently approved on 21 December 2017 under section 115ZI of the EP&A Act.

The consolidated Conditions of Approval's for the Sydney Metro City and Southwest have been defined from the following approval modification documents.

- CSSI 7400 MOD 1 – Victoria Cross and Artarmon Substation (determined 18 October 2017)
- CSSI 7400 MOD 4 – Sydenham Station and Metro Facility South (determined 13 December 2017)
- CSSI 7400 MOD 2 – Central Walk (determined 21 December 2017)
- CSSI 7400 MOD 3 – Martin Place Metro Station (determined 22 March 2018).
- CSSI 7400 MOD 4 - Sydenham Station and Metro Facility South – Chatswood to Sydenham (determined 13 December 2017)
- CSSI 7400 MOD 5 - Blues Point Acoustic Shed (determined 2 November 2018)
- CSSI 7400 MOD 6 – Administrative Changes- Modification to Sydney Metro City & Southwest - Chatswood to Sydenham (determined 21 February 2019)
- CSSI 7400 MOD 7 – Administrative Changes (determined 24 June 2020)
- CSSI 7400 MOD 8 – Blues Point Access Site (determined 25 November 2020)
- CSSI 7400 MOD 9 – Extension to standard construction hours (determined 30 June 2022)

1.4 Overview of the Project

The Metro Station Works include the installation of new platforms that will be constructed using sophisticated excavation techniques to create a cavern with an island platform, beneath Central Station's existing heavy-rail platforms 12, 13, 14 and 15.

The Central Station Works include new infrastructure and the adjustments to existing infrastructure at Central Station to construct, operate and maintain the Metro Station Works. The key features of the Central Station Works as seen in figure 1.1 include:

- a new north-south concourse for Central Station which will link the new metro station with the existing northern entrance and north concourse, a new east concourse entitled 'Central Walk', and the existing southern baggage tunnel; and
- adjustments to the existing Paid Intercity Concourse, Olympic Tunnel, north concourse, and northern entrance to Central Station.

The Central Walk Works include the provision of other infrastructure to provide improved connectivity and other operational enhancements throughout Central Station. The key features of the Central Walk Works include:

- a new eastern entrance for Central Station at Chalmers Street
- a new east concourse for Central Station beneath existing platforms 16 to 23 (the 'Central Walk'), which will link the new eastern entrance, the new north south concourse, existing platforms 16 to 23 and the existing Eastern Suburbs Railway (ESR) concourse; and
- provisions to enable the future construction (by others) of an extension of the Central Walk through a new west concourse and a new western entrance for Central Station.

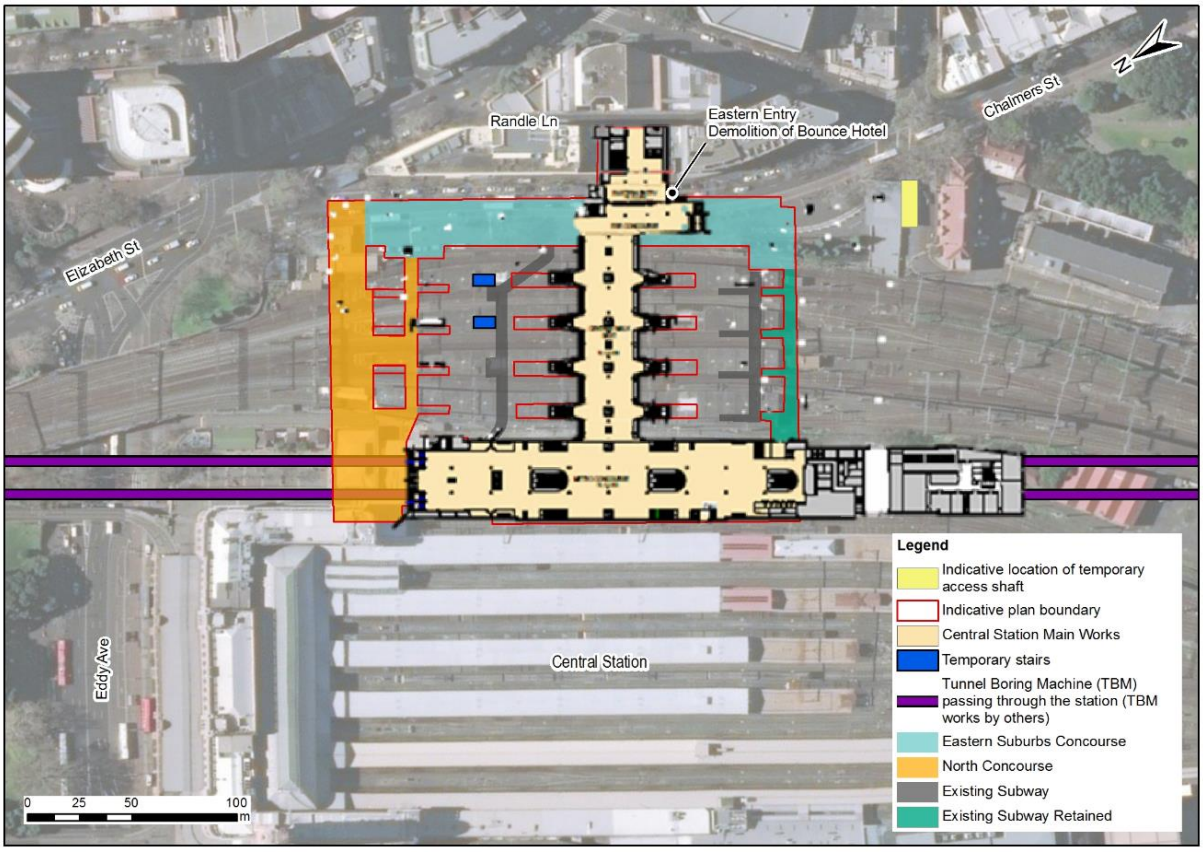


Figure 1.1 Key work areas of CSM.

1.4.1 Combined Services Route CSM

The CSR for Central Station will provide for Communications (Comms) services (voice, data and IT connectivity, requiring 6 to 8 cables) and High Voltage electrical (HV) services that will service the whole site, both existing and the new infrastructure installations that are being introduced as part of the Central Station Main Works. It will extend as a circular route around the site, utilising existing service infrastructure where this is available and providing new installations as required to complete the system. The CSR was included in the Environmental Impact Statement that was approved under SSI 15_7400 as part of the concept design (refer EIS Chapter 7, Project Description – Construction, Part 7.10.9, p231) and has progressed through a detailed design process (see figure 1.2).

The CSR will be delivered in two phases. Phase A occurs in areas, 2, 3 and 4 and is restricted to the Western Baggage Tunnel, Northern Baggage Tunnel and Platform 1. Phase B occurs in all other Areas and extends to the Darling Harbour Goods Line, Mortuary Tunnel, Sydney Yard, Water Mains tunnel, Prince Alfred Substation, Railway Institute driveway and Sydney Network Base.

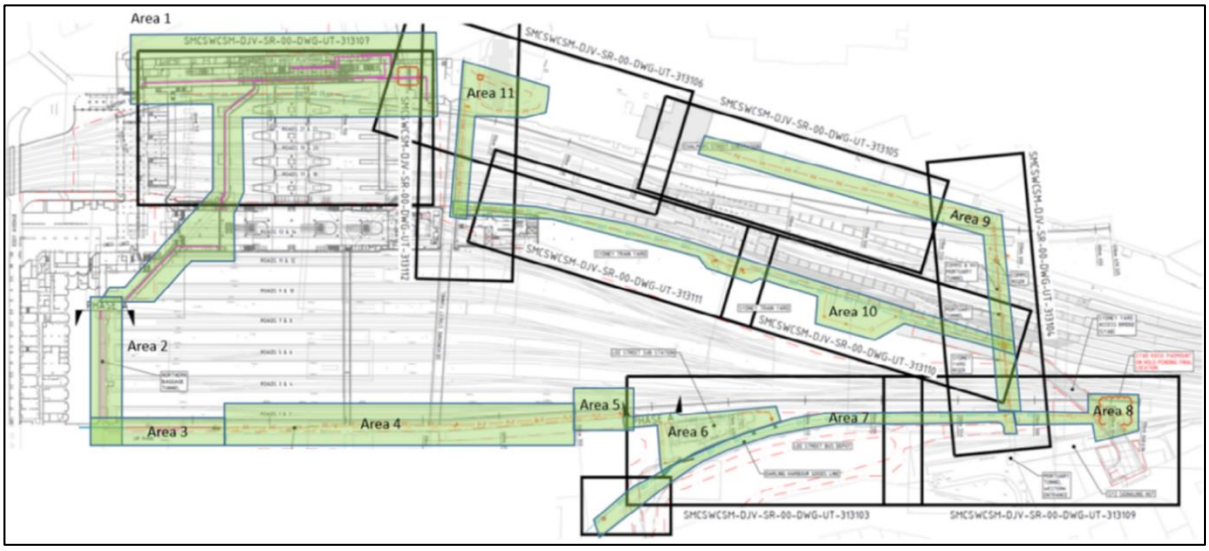


Figure 1.2 CSR around Central Station.

1.5 CSM Scope of Works

1.5.1 Permanent Works

The permanent new infrastructure to be constructed includes:

- Shortening of platforms 9 to 14 at the northern end, and a corresponding lengthening at the southern end.
- Demolition of platforms 13 to 15 and re-instatement of platforms 13 to 14 to accommodate the construction of the new metro station.
- Reinforcement of Platform 12 and demolition of exiting canopies of Platform 12
- Minor existing canopy modifications for Platform 14 for lift risers
- Suburban platforms refreshing
- Station excavation requiring the removal of approximately 230,000 cubic metres of spoil.
- Demolition of the ‘Bounce Hotel’ (20-28 Chalmers St, Surry Hills NSW).
- Construction of the new eastern pedestrian portal, the Central Walk and related station access arrangements to existing platforms.
- Construction of a padmount substation in Sydney Yard and associated feeders to Lee Street Substation.

1.5.2 Ancillary works

Ancillary works include fencing, maintenance access, utilities works, drainage, noise barriers, road and transport network works and temporary facilities to support construction. In order to facilitate construction of the metro platforms, ancillary works will be required at Central Station including:

- the construction of a permanent vehicle access bridge from Regent Street (the Sydney Yard Access Bridge), and
- construction of temporary stairs to platforms 20 to 23 (Olympic Stairs).

1.6 Works Location Site Layout

The CSM work site layout is highlighted in Figure 1.3.

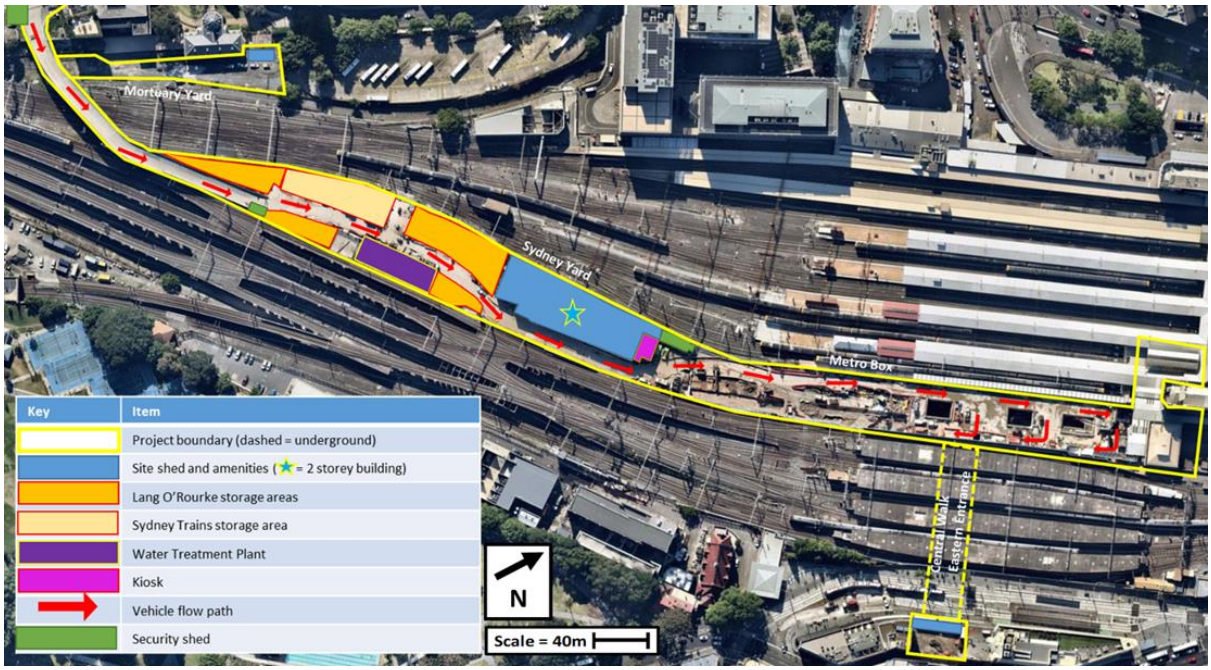


Figure 1.3 Depicts the key work fronts of CSM including: Eastern Entrance and the Central Walk, Metro Box, Sydney Yard, Northern and Grand Concourse and Mortuary Yard.

1.7 Objectives and Targets

The objectives and targets related to construction noise and vibration are identified in **Table 1.1**. Details on how the project objectives and performance targets will be achieved is provided in **Section 8** of this CNVMP.

Table 1.1 Objectives and Targets

Objectives	Performance Targets
• Minimise unreasonable noise and vibration impacts on residents and businesses; • Avoid structural damage to buildings or heritage items as a result of construction vibration; • Undertake active community consultation; and • Maintain positive, cooperative relationships with schools, childcare centres, local residents and building owners.	• Noise levels would be minimised with the aim of achieving the noise management levels where feasible and reasonable • The Project would avoid any damage to buildings from vibration.

For the purpose of this CNVMP a feasible mitigation measure is considered to be a measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance

and reliability requirements. It may also include options such as amending construction practices to reduce noise impacts by carrying out the works during less noise sensitive times, as is detailed in the CNVMP.

For the purpose of this CNVMP selecting reasonable measures from those that are feasible involves judging whether the overall noise and/or vibration benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. Where mitigation measures are considered both feasible and reasonable, they will be implemented. Where mitigation measures are not considered both feasible and reasonable, they will not be implemented. Furthermore, some mitigation and/or management measures may not be feasible and reasonable at all times and at all work locations within the rail corridor, for example, where the use of alternate equipment or the ability to erect noise barriers is not possible. In these circumstances, alternatives may be considered, or a combination of the measures outlined in **Section 8** of this CNVMP implemented to achieve similar outcomes

1.8 Consultation

This CNVMP has been prepared in consultation with the Sydney City Council (**CoA - C3(a)**) and the Monitoring Program has been prepared in consultation with the Sydney City Council and EPA (**CoA - C9(a)**). **CoA C5**, **C9(a)** and CoA **C12** require that the CNVMP be prepared in consultation with the EPA and/or relevant Councils. The CSM project falls into the City of Sydney Council area. A consultation copy of the CNVMP was provided to City of Sydney Council on 30 April 2018 for review and comment. City of Sydney Council responded on 16 May 2018. A consultation copy of the CNVMP was provided to the EPA on 26 June 2018 for review and comment. The EPA responded on 4 July 2018. The City of Sydney Council and the EPA reviewed and acknowledged the CNVMP with no comments or edits required. Evidence of consultation is provided in **Appendix F**.

In accordance with **CoA – E33**, consultation with sensitive receptors will be undertaken as the project progresses where sensitive periods can be refined based on the type of activities, expected impacts and the particular circumstances of the receptor at that time. All consultation will be undertaken prior to the start of the relevant portion of works predicted to affect those receptors. Mitigation measures can then be tailored based on the consultation feedback. The updated information will be made available to the AA and ER four weeks prior to commencement of that scenario. Further detail of mitigation is outlined in **Section 8** of this CNVMP.

2. Legal and Other Requirements

2.1 Legislation

In NSW, noise pollution is typically regulated through the *Protection of the Environment Operations Act 1997* (POEO Act) as the key piece of environment protection legislation. Noise pollution is defined under the POEO Act as:

'*the emission of offensive noise, which means noise that by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances, is harmful (or is likely to be harmful) to or interferes unreasonably (or is likely to interfere unreasonably) with the comfort or repose of a person outside the premises from which the noise is emitted*'.

Pre-construction works were delivered in accordance with the CoA and the Sydney Trains Environmental Protection Licence (EPL) 12208. The Project EPL 21148 was obtained 28 November 2018. The project CoA requirements apply to all works within the project, refer **Section 0**. The project EPL covers all works outlined in the CEMP and sub plans. Refer to Section 4 of the CEMP for further detail on legal and other requirements. Refer to Section 1.3 of the CEMP for further detail on planning approval.

Various construction noise and vibration assessment guidelines (and policy) are endorsed by NSW regulators and provide a framework and methodology for deriving acceptable levels and standard methods for assessing, managing and measuring construction noise and vibration impacts with due regard to the POEO Act. For the CNVMP the applicable policy and guidelines are presented in **Section 2.2** below.

2.2 Policy and Guidelines

The CNVMP has been prepared with due regard to and in accordance with the:

- NSW Department of Environment and Climate Change – NSW Interim Construction Noise Guideline (ICNG), July 2009; and
- NSW Government – Transport for NSW (TfNSW) - Sydney Metro Construction Noise and Vibration Strategy (CNVS), August 2016 and CNVS Addendum August 2017.

The ICNG is the key guideline relating to construction noise and vibration in NSW with the CNVS developed to address other noise and vibration issues associated with the broader project.

The CNVMP has also considered and applied the following additional policy, guidelines and standards as relevant:

- NSW Environment Protection Authority – NSW Environmental Noise Management – Industrial Noise Policy (INP), January 2000 and relevant application notes
- NSW Department of Environment, Climate Change and Water – NSW Road Noise Policy (RNP), March 2011
- NSW Government – Transport for NSW (TfNSW) - Construction Noise Strategy (CNS), April 2013
- Standards Australia AS 2436–2010™ (AS2436) – Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites
- Standards Australia AS1055–1997™ (AS1055) – Description and Measurement of Environmental Noise
- Standards Australia AS IEC 61672.1–2004™ (AS61672) – Electro Acoustics - Sound Level Meters Specifications Monitoring or Standards Australia AS1259.2-1990™ (AS1259) – Acoustics – Sound Level Meters – Integrating/Averaging as appropriate to the device
- Standards Australia AS/IEC 60942:2004/IEC 60942:2003 (IEC60942) – Australian Standard™ – Electroacoustic – Sound Calibrators
- German Institute for Standardisation – DIN 4150 (1999-02) Part 3 (DIN4150:3) – Structural Vibration - Effects of Vibration on Structures
- British Standard BS7385: Part 2-1993 (BS 7385) - Evaluation and Measurement for Vibration in Buildings — Part 2 – Guide to Damage Levels from Ground-borne Vibration, dated 1993; and
- NSW Department of Environment and Conservation – NSW Environmental Noise Management – Assessing Vibration: A Technical Guideline (the NSW Vibration Guideline), February 2006.

3. Existing Environment

The noise environment in the vicinity of the CSM project receptors is best described as 'urban' - defined by the NSW Environment Protection Authority (EPA) – Industrial Noise Policy (INP), (January 2000) as an area with an acoustical environment that:

- Is dominated by 'urban hum' or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources.
- Has through-traffic with characteristically heavy and continuous traffic flows during peak periods.
- Is near commercial districts or industrial districts.
- Has any combination of the above.

This area may be located in either a residential zone as defined on a Local Environment Plan (LEP) or other planning instrument, and also includes mixed land use zones such as mixed commercial and residential uses.

Existing conditions have been quantified from the data presented in the EIS. Environmental noise monitoring was conducted by SLR at two locations during August to September 2015 to inform the EIS (TfNSW, SLR 2016). These monitoring locations are identified in the EIS as B.09 and B.10.

Supplementary data has been obtained from other reports provided by LOR, these are:

- Degnan Constructions Pty Ltd - Sydney to Burwood Compressor House Detailed Design Operational Noise Assessment, prepared by GHD Pty Ltd, dated November 2012 (GHD 2012).
- TfNSW – Power supply Upgrade Program – Lee Street Substation Noise and Vibration Assessment prepared by GHD Pty Ltd, dated February 2014 (GHD 2014).
- Sydney Yard Access Bridge – Noise Monitoring Summary Report, prepared by Environmental Resources Management (ERM) Pty Ltd, dated April 2018 (SYAB 2018).

3.1.1 Potentially Sensitive Receptors

For the purpose of the CNVMP and CNVIS, fifty receptor locations were identified to be the closest and/or potentially most affected locations situated within the potential area of influence of CSM works. These potentially sensitive receptor locations are presented below in **Figures 3.1 to 3.5** and **Table 3.1**. In addition to these locations, the vibration assessment has considered potential impacts (cosmetic and structural damage) to nearby heritage and rail structures throughout Central Station, situated around the site at various distances.

The residential receptors assessed for the CNVIS and CNVMP have been identified to occur within 'mixed use' and 'metropolitan centre' zoning areas. With reference to **CoA – E41** and **E42**, it is understood that these receptors would therefore be considered "residential in a non-residential zone".

3.2 Background Noise Levels

Quantifying the existing noise environment (via measurement) at the closest and/or potentially most affected receptors situated within the potential area of influence of a site is a key feature of assessing and managing potential noise impacts.

Rating Background Levels (RBL) representative of each of the potentially sensitive receptors identified for this CNVMP were adopted based on the RBLs presented in the EIS and the supplementary reports outlined above. The RBLs adopted for the CNVMP are consistent with the CNVIS and are presented in **Table 3.1** below for the day, evening, and night-time periods. The background noise logging locations are also presented in **Figures 3.1 to 3.5**.

RBLs are utilised to establish project specific noise management levels (NMLs) for residential receptors, this is further outlined in **Section 4**. Non-residential NMLs are established from fixed values derived from the CNVS and ICNG, however the RBLs at non-residential receptors are provided in **Table 3.1** below for information purposes. Measuring existing vibration levels has yet be to undertaken as they are typically (in the absence of any significant vibration generating source) imperceptible. Due to the nature of site location and the identification of vibration sensitive equipment at receptors nearby, vibration baseline monitoring will be undertaken at Dental Hospital and Central Station heritage structure (Electrical Building), prior to the commencement of construction works.

Table 3.1 Potentially Sensitive Receptors and Rating Background (Noise) Levels

Location ID	Receptor Type - Address	Overall Rating Background Levels (RBL) in dBA			RBL Source
		Daytime (7am to 6pm)	Evening (6pm to 10pm)	Night-time (10pm to 7am)	
R01	Commercial - 138 Hay St	51	50	49	EIS B.10
R02	Commercial - 323 Castlereagh St	51	50	49	EIS B.10
R03	Commercial - 467 Pitt St	51	50	49	EIS B.10
R04	Commercial - 228 Elizabeth St	51	50	49	EIS B.10
R05	Commercial - 477 Pitt St	51	50	49	EIS B.10
R06	Commercial - 24 Rawson Pl	51	50	49	EIS B.10
R07	Commercial - 242 Elizabeth St	51	50	49	EIS B.10
R08	YHA Hostel - 11 Rawson Pl	51	50	49	EIS B.10
R09	Church - 812 George St	51	50	49	EIS B.10
R10	Recreational - Belmore Park	51	50	49	EIS B.10
R11	Commercial (China Investment Corporation) - 250 Elizabeth St	56	53	45	EIS B.09
R12	Hostel (Wake up Sydney) - 509 Pitt St	51	50	49	EIS B.10
R13	Commercial (Various) - 280 Elizabeth St	56	53	45	EIS B.09
R14	Commercial (Various) - 300 Elizabeth St	56	53	45	EIS B.09
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	56	53	45	EIS B.09
R16	Adina Hotel - 2 Lee St	51	50	49	EIS B.10
R17	YHA Hostel - 10 Lee St	54	52	49	GHD 2014 + EIS B.10
R18	Dental Hospital_A (north) - 2 Chalmers St	56	53	45	EIS B.09
R19	Commercial - 18 Lee St	51	50	49	EIS B.10
R20	Commercial - 14 Lee St	54	52	49	GHD 2014 + EIS B.10
R21	Dental Hospital_B (south) - 2 Chalmers St	56	53	45	EIS B.09
R22	Residential - 1 Randle St	56	53	45	EIS B.09
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	56	53	45	EIS B.09
R24	Residential - 30 Chalmers St	56	53	45	EIS B.09

Location ID	Receptor Type - Address	Overall Rating Background Levels (RBL) in dBA			RBL Source
		Daytime (7am to 6pm)	Evening (6pm to 10pm)	Night-time (10pm to 7am)	
R25	Residential - 34 Regent St	54	52	46	GHD 2014
R26	Commercial (Various) - 11 Randle St	56	53	45	EIS B.09
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	54	52	46	GHD 2014
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	54	52	46	GHD 2014
R29	Residential - 38 Chalmers St	56	53	45	EIS B.09
R30	Commercial (Mils Gallery) - 15 Randle St	56	53	45	EIS B.09
R31	Residential - 46 Chalmers St	56	53	45	EIS B.09
R32	Commercial - 419 Elizabeth St	56	53	45	EIS B.09
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	56	53	45	EIS B.09
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	56	53	45	EIS B.09
R35	Residential - 53 Regent St	54	52	46	GHD 2014
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers St	56	53	45	EIS B.09
R37	Industrial (Substation) - Chalmers St	56	53	45	EIS B.09
R38	Residential - 65 Regent St	54	52	46	GHD 2014
R39	Residential - 73 Regent St	54	52	46	GHD 2014
R40	Industrial – Sydney Trains, Chalmers St	48	48	45	GHD 2012
R41	Residential - 52 Regent St	50	50	44	SYAB 2018
R42	Residential - 105 Regent St	54	52	46	GHD 2014
R43	Residential - 54 Regent St	50	50	44	SYAB 2018
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	54	52	46	GHD 2014
R45	Commercial – Sydney Trains, Chalmers St	48	48	45	GHD 2012
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	54	52	46	GHD 2014
R47	Commercial - 70 Regent St	54	52	46	GHD 2014
R48	Recreational - Prince Alfred Park	48	48	45	GHD 2012
R49	Church - 242 Cleveland St	48	48	45	GHD 2012
R50	Residential - 141 Regent St	54	52	46	GHD 2014

Source: CNVIS

Guidance Note

The measured overall RBL values summarised in **Table 3.1** are typical of urban areas already experiencing natural, traffic, urban hum or existing commercial/industrial noise within the overall noise

environments. Decreasing noise levels in the evening and night are evident in the data and consistent with that anticipated for urban environments.

These locations were established during preparation of the CNVIS and were based on review of aerial photography, land use zoning and cadastre data and the results of preliminary noise modelling, where receptor positions were optimised to ensure representative worst-case levels were being predicted. These locations do not represent all receptors located in the vicinity of CSM works but have been selected for the purposes of this noise and vibration impact assessment; they are considered to be representative of locations that will potentially experience the highest impacts associated with CSM works, and will be the most affected during construction.

Other sensitive receptors within close proximity to the project that have not been mapped will be included in the community consultation database and will be consulted throughout the construction program. For example:

- 87-97 Regent Street, commercial receptor
- 81 Regent Street, commercial receptor
- 818 George Street, hotel
- 28 Regent Street, hotel
- receptors located on Devonshire Street between Randle Street and Elizabeth Street
- 101 Chalmers Street, commercial receptor
- 35 Regent Street, commercial receptor
- 260 Elizabeth Street, Child Care Centre; and
- receptors enclosed between Regent Street, Balfour Street and Wellington Street (some include residential units).

4. Noise and Vibration Guidelines

The ICNG and CNVS are relevant to the CSM works and provide guidance to establishing noise and vibration management levels (criteria) for the purpose of assessing and managing noise impacts.

For residential receptors, the noise management levels are established based on existing background noise levels i.e. thresholds above which the background noise level may be exceeded. For other sensitive receptors the management levels are fixed values.

For residential and other sensitive receptors (human); and potentially sensitive structures (buildings), vibration management levels are fixed values established for either human comfort or structural/cosmetic damage. The levels vary depending on the potential sensitivity of the receptor and do not rely on existing conditions.

A summary of each in the context of the ICNG and CNVS is provided in the sections below.

4.1 Residential Receptors (Noise)

The method for establishing ICNG Noise Management Levels for residential receptors is summarised in **Table 4.1** below. Separate criteria are provided for works during and outside the ICNG standard construction hours. The ICNG recommends more stringent noise criterion for works outside these standard hours. These hours of work are consistent with the approved hours described in **CoA – E36**.

Table 4.1 Construction Noise Management Levels – Residences

Time of Day	Noise Management Level (LAeq, 15minute)	How to Apply
Recommended Standard Hours: Monday to Friday, 7am to 6pm Saturday, 8am to 1pm No work on Sundays or Public Holidays	Noise affected RBL + 10 dBA	• The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq,15minute}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	• The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the proponent would consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. • If no quieter work method is feasible and reasonable, and the works proceed, the proponent would communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.
Outside the Recommended Standard Hours	Noise affected RBL + 5 dBA	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dBA above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see section 7.2.2 of the Guideline.

Source: ICNG, CNVS

4.2 Sleep Disturbance (Noise)

For residential receptors it is also important to consider potential sleep disturbance impacts associated with OOHW conducted during the night-time (10pm to 7am) period. The RNP provides indicative sleep disturbance thresholds and was utilised as the basis for establishing 'sleep disturbance screening levels' in the CNVS and CNVIS.

This method (RBL + 15 dB) is widely accepted as the appropriate method for assessing and managing sleep disturbance impacts (using the $L_{A1, 1minute}$ or L_{Amax} parameters) and is adopted here to establish criteria for use in the CNVMP. The RBL + 15 dB noise threshold is an external screening criterion, and that closed, or partially open windows of a building provide noise attenuation of between 20 and 10 dB respectively.

4.3 Non-Residential Receptors (Noise)

As noted above the ICNG defines fixed management levels for other sensitive receptors and non-residential sensitive land uses. These values are reproduced in **Table 4.2** below. The CNVS also provides Noise Management Levels (NML's) for Cafés, Bars and Restaurants which have also been included in the **Table 4.2** below.

Table 4.2 Noise Levels for non-residential sensitive land use

Land Use	Noise Management Level: LAeq, 15minute (applies when properties are being used)
Hotels, night-time sleeping areas.	Internal Noise Level 40dB[3]
Classrooms at schools and other educational Institutions	Internal Noise Level 45dB[1]
Hospital wards and operating theatres	Internal Noise Level 45dB[1]
Places of worship	Internal Noise Level 45dB[1]
Café, Bar and Restaurant	Internal Noise Level 50dB[2]
Active recreation	External noise level 65dB
Passive recreation	External noise level 60dB
Community centre	Depends on intended use – see AS2107/CNVS
Industrial premises	External Noise Level 75 dB
Commercial premises (e.g. Offices, retail outlets)	External Noise Level 70 dB.

Source: ICNG, CNVS

1. External goal of 55dBA applies. The ICNG recommends that construction noise levels do not exceed 45 dB (LAeq, 15minute) internally within school classrooms when in use. For the purpose of the CNVIS (and as adopted here to verify criteria for use in the CNVMP) the internal noise level has been translated to an external level of 55dB (LAeq, 15minute) based on the accepted level of attenuation 10dB that is readily achieved through windows, partially opened for ventilation.
2. External goal of 60dBA applies. The CNVS classifies outdoor cafes and restaurants as passive recreation, therefore outdoor areas of cafes and restaurants will be adopted as 60dBA, this is also in line with the internal noise level being translated to an external level, where an attenuation of 10dB is achieved through windows, partially opened for ventilation.
3. The CNVS recommends an external goal of 60dBA at hotels and hostels near busy roads with windows closed.

4.4 Vibration (All receptors)

Vibration refers to the oscillating movement of any object. In relation to construction projects, ground-borne vibration is the most likely outcome of intensive piling, demolition, vibratory rolling or hammering works. For the CSM works this is limited to sheet piling activities, demolition activities and the use of vibratory rollers which have two potential effects on sensitive receptors: ground-borne vibration that may cause annoyance and ground-borne vibration that may have an adverse effect (cosmetic or structural damage) on a structure e.g. a building.

Each of these two potential effects are assessed in accordance with the relevant standard. For human comfort the NSW Vibration Guideline and British Standard BS 6472-1992 applies in accordance with the CNVS. For cosmetic or structural damage, the British Standard BS 7385:1993 applies in accordance with the CNVS and **CoA – E28**.

To meet the requirements of the CNVS, BS7385 is also considered in this CNVMP to provide guidance for potential cosmetic damage issues. Each of these relevant guidelines and standards are technical in nature but ultimately present fixed (frequency dependant) criterion values that may apply to either human or building receptors.

Heritage buildings and structures are also considered in the CNVMP, assessed as per the screening criteria presented in **Section 5.4.2**, as they should not be assumed to be more sensitive to vibration unless they are found to be structurally unsound. If a heritage building or structure is found to be structurally unsound conservative cosmetic damage criteria from German standard DIN 4150 will apply. Each standard is considered and adopted in the CNVMP to establish the applicable management levels for vibration that will apply to the CSM works and activity.

Sensitive Scientific and Medical Equipment

Some scientific equipment (e.g. electron microscopes and microelectronics manufacturing equipment) can require more stringent objectives than those applicable to human comfort.

Where it has been identified that vibration sensitive scientific and/or medical instruments are likely to be in use inside the premises of an identified vibration sensitive receiver, objectives for the satisfactory operation of the instrument will be sourced from manufacturer's data. Where manufacturer's data is not available, generic vibration criterion (VC) curves as detailed in the CNVS and presented below in **Table 4.3** will be adopted as vibration goals.

It should be noted that these criteria are conservative, therefore baseline vibration measurements will be undertaken at receptors that are identified to contain sensitive scientific / medical equipment prior to construction activities being undertaken. The baseline data in combination with the VC curves presented below will ascertain project / equipment specific vibration goals.

Table 4.3: Application and Interpretation of the Generic Vibration Criterion (VC) Curves

Criterion Curve	Max Level (µm/sec, rms)[1]	Detail Size (microns)[2]	Description of Use
VC-A	50	8	Adequate in most instances for optical microscopes to 400X, microbalances, optical balances, proximity and projection aligners, etc.
VC-B	25	3	An appropriate standard for optical microscopes to 1000X, inspection and lithography equipment (including steppers) to 3-micron line widths.
VC-C	12.5	1	A good standard for most lithography and inspection equipment to 1-micron detail size.
VC-D	6	0.3	Suitable in most instances for the most demanding equipment including electron microscopes and E-Beam systems, operating to the limits of their capability.
VC-E	3	0.1	A difficult criterion to achieve in most instances. Assumed to be adequate for the most demanding of sensitive systems including long path, laser-based, small target systems and other systems requiring extraordinary dynamic stability.

Source: CNVS

1. As measured in one-third octave bands of frequency over the frequency range 8 to 100 Hz.
2. The detail size refers to the line widths for microelectronics fabrication, the particle (cell) size for medical and pharmaceutical research, etc. The values given take into account the observation requirements of many items depend upon the detail size of the process.

5. Noise Management Levels (NMLs) and Vibration Criteria

Based on the ICNG and CNVS methodology summarised in **Section 4** the following construction Noise Management Levels (NMLs) will apply to the CSM works as presented in **Table 5.1**.

5.1 General Construction Noise (Airborne) Management Levels

The following general construction NML (**Table 5.1**) will apply externally and will be assessed at the most-affected point on or within the receptor property boundary or, if that is more than 30 metres (m) from the receptor, at the most-affected point within 30 m of the receptor.

For other sensitive receptors (classrooms at schools and other educational institutions; hospital wards and operating theatres; and places of worship) the external criteria value translated from the ICNG internal goal may be adopted as relevant and if other receptors are identified. The NML of other sensitive receptors are further outlined in the CNVIS and identified in **Table 5.1**.

Section 4.1 of the ICNG notes that the NML apply at a height of 1.5 m above floor level and also notes that noise levels may be higher at upper floors of a noise affected residence. Where multi-storey buildings/receptors are identified their features will be noted (i.e. double storey brick house etc.).

'Sleep disturbance screening thresholds' have been developed as per the guidance summarised in **Section 4** and will be assessed externally, at a boundary location consistent with other NML and at a representative height of at least 1.5 m above ground level. These screening levels (refer **Table 5.1**) will only apply during the night-time period. These screening levels will generally apply at residential (dwelling) receptors with other sensitive receptors considered where applicable e.g. at other receptors where habitable sleeping spaces are identified.

It should be noted that the hours of business for the Dental Hospital (R18 / R21), are 8:00AM to 4:30PM Monday to Friday. Therefore, construction noise impacts are not considered for the Dental Hospital to occur outside the standard hours of construction. In accordance with **CoA – E33**, consultation with sensitive receptors will be undertaken as the project progresses where sensitive periods can be refined based on the type of activities, expected impacts and the particular circumstances of the receptor at that time. All consultation will be undertaken prior to the start of the relevant portion of works predicted to affect those receptors.

In the event of any conflict between the noise management levels determined by the ICNG and the CNVS, and those specified in the CoA (for example **CoA- E37** and **E38),** the noise management levels specified in **CoA** will prevail as per **CoA - A3**.

The potentially sensitive noise receptors considered in the CNVIS and the predicted noise level compared to the NMLs are presented in **Appendix C**.

Table 5.1 Construction Noise Management Levels

Location ID	Receptor ID - Type	Acceptable LAeq, 15-minute Noise Level				Sleep Disturbance (LA1,1minute / LAmax)	Sleep Awakening Level (LAmax)
		Standard Construction Hours[1]	Outside Standard Construction Hours				
			Daytime[2]	Evening[3]	Night[4]		
R01	Commercial - 138 Hay St	70	70	70	70	-	-
R02	Commercial - 323 Castlereagh St	70	70	70	70	-	-
R03	Commercial - 467 Pitt St	70	70	70	70	-	-
R04	Commercial - 228 Elizabeth St	70	70	70	70	-	-
R05	Commercial - 477 Pitt St	70	70	70	70	-	-
R06	Commercial - 24 Rawson Pl	70	70	70	70	-	-

Location ID	Receptor ID - Type	Acceptable LAeq, 15-minute Noise Level				Sleep Disturbance (LA1,1minute / LAmax)	Sleep Awakening Level (LAmax)
		Standard Construction Hours[1]	Outside Standard Construction Hours				
			Daytime[2]	Evening[3]	Night[4]		
R07	Commercial - 242 Elizabeth St	70	70	70	70	-	-
R08	YHA Hostel - 11 Rawson Pl	70	70	70	60	64	75
R09	Church - 812 George St	55	55	55	55	-	-
R10	Recreational - Belmore Park	60	60	60	60	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth St	70	70	70	70	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	70	70	70	60	64	75
R13	Commercial (Various) - 280 Elizabeth St	70	70	70	70	-	-
R14	Commercial (Various) - 300 Elizabeth St	70	70	70	70	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	70	70	70	70	-	-
R16	Adina Hotel - 2 Lee St	70	70	70	60	64	75
R17	YHA Hostel - 10 Lee St	70	70	70	60	64	75
R18	Dental Hospital_A (north) - 2 Chalmers St	55	55	55	55	-	-
R19	Commercial - 18 Lee St	70	70	70	70	-	-
R20	Commercial - 14 Lee St	70	70	70	70	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	55	55	55	55	-	-
R22	Residential - 1 Randle St	66	61	58	50	60	65
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	60	60	60	60	-	-
R24	Residential - 30 Chalmers St	66	61	58	50	60	65
R25	Residential - 34 Regent St	64	59	57	51	61	65
R26	Commercial (Various) - 11 Randle St	70	70	70	70	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	70	70	70	70	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	70	70	70	70	-	-
R29	Residential - 38 Chalmers St	66	61	58	50	60	65
R30	Commercial (Mils Gallery) - 15 Randle St	70	70	70	70	-	-
R31	Residential - 46 Chalmers St	66	61	58	50	60	65
R32	Commercial - 419 Elizabeth St	70	70	70	70	-	-

Location ID	Receptor ID - Type	Acceptable LAeq, 15-minute Noise Level				Sleep Disturbance (LA1,1minute / LAmax)	Sleep Awakening Level (LAmax)
		Standard Construction Hours[1]	Outside Standard Construction Hours				
			Daytime[2]	Evening[3]	Night[4]		
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	70	70	70	70	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	60	60	60	60	-	-
R35	Residential - 53 Regent St	64	59	57	51	61	65
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers St	60	60	60	60	-	-
R37	Industrial (Substation) - Chalmers St	75	75	75	75	-	-
R38	Residential - 65 Regent St	64	59	57	51	61	65
R39	Residential - 73 Regent St	64	59	57	51	61	65
R40	Industrial – Sydney Trains, Chalmers St	75	75	75	75	-	-
R41	Residential - 52 Regent St	60	55	55	49	59	65
R42	Residential - 105 Regent St	64	59	57	51	61	65
R43	Residential - 54 Regent St	60	55	55	49	59	65
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	70	70	70	70	-	-
R45	Commercial – Sydney Trains, Chalmers St	70	70	70	70	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	60	60	60	60	-	-
R47	Commercial - 70 Regent St	70	70	70	70	-	-
R48	Recreational - Prince Alfred Park	65	65	65	65	-	-
R49	Church - 242 Cleveland St	55	55	55	55	-	-
R50	Residential - 141 Regent St	64	59	57	51	61	65

Source: CNVIS, CNVS, EIS

1. Standard (daytime): 7:00am to 6:00pm Mondays to Fridays, inclusive and 8:00am to 1:00pm Saturdays
2. Outside standard (daytime): 1:00pm to 6:00pm Saturdays, and 8:00am to 6:00pm on Sundays or public holidays
3. Outside standard (evening): 6:00pm to 10pm Monday to Sunday, inclusive; and
4. Outside standard (night-time): 10:00pm to 7:00am Monday to Friday and 10:00pm to 8:00am on Saturdays, Sundays and public holidays.

Highly Noise Affected Management Level

In accordance with the ICNG, the Highly Noise Affected Management Level (HNAML) of 75 dBA will apply to residential (dwelling) receptors. LOR will consult with all receptors identified in accordance with **CoA - E37**, **CoA - E38** and **CoA E44** with the objective of determining appropriate hours of respite so that construction noise (including ground-borne noise), do not exceed the Highly Noise Affected Management Level, the noise levels specified in **CoA – E44(d)** and the internal noise levels outlined in **CoA - E37**, **E38**, **E41** and **E42.** In accordance with **CoA - E33** consultation with affected sensitive receptors will allow

mitigation measures to be tailored based on the consultation feedback. Consultation for refining mitigation and respite is further outlined in **Section 8** of this CNVMP.

5.2 Construction Road Traffic Noise

The ICNG does not include any criteria to assess off-site traffic noise associated with construction and demolition. Criteria for off-site road traffic noise applicable to 'existing residences affected by additional traffic on existing roads generated by land use developments' are specified in the RNP.

An objective of the RNP is to protect sensitive receptors against excessive decreases in amenity as the result of a project by applying relevant permissible noise increase criteria. In assessing feasible and reasonable mitigation measures, an increase of up to 2 dBA represents a minor impact that is considered barely perceptible to the average person.

On this basis, as outlined in the CNVS, construction traffic NMLs set at 2 dBA above the existing road traffic noise levels during the daytime and night-time periods are considered appropriate to identify the onset of potential noise impacts. Where the road traffic noise levels are predicted to increase by more than 2 dBA as a result of construction traffic on the road network, consideration would be given to applying feasible and reasonable noise mitigation measures to reduce the potential noise impacts and preserve acoustic amenity.

In considering feasible and reasonable mitigation measures where the relevant noise increase is greater than 2 dB, consideration would also be given to the actual noise levels associated with construction traffic and whether or not these levels comply with the road traffic noise criteria in the RNP, refer **Table 5.2.**

Table 5.2 Road Traffic Noise Management Levels

Road	Category	Management Level, dBA	
		Daytime[1]	Night time[2]
Regent St / Lee St	Sub-arterial road	$L_{Aeq,15\ hour} \leq 60$ (external)	$L_{Aeq,9\ hour} \leq 55$ (external)
Chalmers St	Sub-arterial road	$L_{Aeq,1\ hour} \leq 60$ (external)	$L_{Aeq,1\ hour} \leq 55$ (external)
Randle Street	Local road	$L_{Aeq,1\ hour} \leq 55$ (external)	$L_{Aeq,1\ hour} \leq 50$ (external)

Source: EIS

1. Daytime means between 7:00am and 10:00pm, Monday to Sunday inclusive; and
2. Night-time means between 10:00pm to 7:00am, Monday to Sunday inclusive.

The **Table 5.2** criteria do not apply to vehicle movements within the CSM Site. For the purpose of this CNVMP any noise generated by on-site vehicle movements is considered as construction noise and managed holistically with on-site mobile plant in accordance with the ICNG. Additionally, it is typically recognised that for existing residences and other sensitive land uses affected by additional traffic on existing roads, any increase in the total traffic noise level should preferably be limited to 2 dB above the existing road traffic noise levels as an increase of 2 dB is typically considered not noticeable.

The road traffic noise management levels differ from general construction NML and apply 1 m from the property façade. Road traffic impacts are not anticipated, however detailed traffic management strategies will be developed prior to the commencement of construction for each site area and access/egress points to manage the impacts of construction road traffic noise. CSM road traffic noise will be further assessed where it becomes necessary (i.e. impacts are identified or complaints are received) during the works. Where impacts are identified or complaints are received, the extent of assessment will be determined on a case-by-case basis.

5.3 Ground-Borne Noise Management Levels

Ground-borne noise is noise generated by vibration transmitted through the ground into a structure. The following ground-borne noise levels for residences are nominated in the ICNG and CNVS and indicate when

management actions would be implemented. These levels recognise the temporary nature of construction and are only applicable when ground-borne noise levels are higher than airborne noise levels. Ground-borne noise management levels are summarised in **Table 5.3** below.

In addition to the NMLs outlined in **Table 5.3** below. The following conditions of approval also stipulate internal noise level limits relevant to ground-borne noise, **CoA – E38, E41**, **E42** and **E43**.

CoA – E38 requires that noise levels (including ground-borne noise levels) be less than Leq, 15-minute 60 dBA for at least 6.5 hours between 7am and 8pm, of which at least 3.25 hours must be below LAeq, 15 minute 55 dBA. Noise equal to or above Leq 15 minutes 60 dBA is allowed for the remaining 6.5 hours between 7am and 8pm.

As the potentially sensitive residential receptors identified for the CSM project have been identified to occur outside a residential zone (i.e mixed use and metropolitan centre), **CoA – E41** takes precedence over **CoA – E42**. Therefore, the proponent must ensure that residential receptors, located in non-residential zones, likely to experience an internal noise level exceeding Leq,15 minute 60 dBA between 8pm and 9pm or Leq, 15 minute 45 dBA between 9pm and 7am (inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise, or a perceptible level of vibration is planned (including works associated with utility adjustments)) must be offered additional mitigation in accordance with the Sydney Metro City and South West Noise and Vibration Strategy referenced in **CoA - E32**.

CoA – E43 also details that noise generated by construction must not exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of $L_{eq, 8h}$ of 85dBA for any employee working at a location near the CSSI.

Table 5.3 Ground-Borne Noise Management Levels

Receptor Type	Management Level, $L_{eq, 15\text{-minute}}$ dBA		
	Daytime[1]	**Evening[2]**	Night time[3]
Commercial (internal)	50	-	-
Residential (internal)	45	40	35

Source: CNVS

1. Daytime means between 7:00am and 6:00pm, Monday to Sunday inclusive
2. Evening means between 6:00pm and 10:00pm, Monday to Sunday inclusive; and
3. Night-time means between 10:00pm to 7:00am, Monday to Sunday inclusive.

5.4 Ground-Borne Vibration Management Levels

Impacts from vibration will be considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (structural/cosmetic damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance will be achieved with the building damage objectives.

Refer **Section 5.4** which describes how the human comfort structural/cosmetic damage criteria will be evaluated, selected and applied as appropriate to the receptor and potential impacts.

5.4.1 Human Comfort (or Annoyance)

The NSW Vibration Guideline provides guidance for assessing human exposure to vibration. The publication is based on British Standard BS 6472:1992.

BS 6472-1992 provides guideline values for continuous, transient, and intermittent events that are based on a Vibration Dose Value (VDV). The vibration dose value is dependent upon the level and duration of the short-term vibration event, as well as the number of events occurring during the daytime or night-time period.

Table 5.4 VDV Ranges which might result in various probabilities of adverse comment within residential buildings

Place and Time	Low Probability of Adverse Comment ($m/s^{1.75}$)	Adverse Comment Possible ($m/s^{1.75}$)	Adverse Comment Probable ($m/s^{1.75}$)
Residential buildings 16 hr day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 hr night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

Source: CNVS

Note: For offices and workshops, multiplying factors of 2 and 4 respectively would be applied to the above vibration dose value ranges for a 16-hr day.

It is noted however that the direct measurement (or equivalent estimation via calculation) of VDV is often impractical and does not allow for the assessment of impacts in real-time e.g. whilst works are occurring. VDV provides an indication of impacts after the works have occurred based on the duration, intensity and characteristic frequency of the measured vibration events throughout a workday. To provide greater flexibility and to enable the assessment of potential impact via the Peak Particle Velocity (PPV) parameter (which can be measured and evaluated during works) the following thresholds identified in **Table 5.5** will be applied to assess the probability for adverse comment from residential receptors. These values have been established as per Table C1.1 of the NSW Vibration Guideline and will be applied in combination with the VDV presented in **Table 5.4**.

Table 5.5 Perceptible Vibration Criteria for Exposure to Continuous and Impulsive Vibration

Place	Time	PPV (mm/s)	
		Preferred	Maximum
Continuous Vibration			
Residences	Daytime	0.28	0.56
	Night-time	0.20	0.40
Offices	Day- or Night-time	0.56	1.1
Workshops	Day- or Night-time	1.1	2.2
Impulsive Vibration			
Residences	Daytime	8.6	17.0
	Night-time	2.8	5.6
Offices	Day- or Night-time	18.0	36.0
Workshops	Day- or Night-time	18.0	36.0

1. Values given for the most critical frequency range >8Hz assuming sinusoidal motion.

Source: Table C1.1 – The NSW Vibration Guideline

5.4.2 Building Damage (Structural/Cosmetic Damage)

There are currently no Australian Standards or guidelines to provide guidance on assessing the potential for building damage from vibration and it is common practice to derive goal levels from international standards.

To achieve the requirements of the CNVS and **CoA – E28**, vibration from construction activities must not exceed the vibration limits set out in the British Standard BS 7385:1993. The Standard is presented (refer **Table 5.6**) in the CNVMP and provides safe limit guideline values, below which vibration is considered insufficient to cause structural or cosmetic damage to buildings.

The recommended limits (guide value, refer CNVS) from BS7385 for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented in **Table 5.6** with each "Line" shown in **Figure 5.1**.

For most construction activities involving intermittent vibration sources such as rock breakers, piling rigs, vibratory rollers, excavators (with hydraulic hammers) and the like, the predominant vibration energy occurs at frequencies greater than 4 Hz (and usually in the 10 Hz to 100 Hz range). On this basis, a conservative vibration damage screening level per receptor type is given below:

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

At locations where the predicted and/or measured vibration levels are greater than shown above (peak component particle velocity), a more detailed analysis of the building structure, vibration source, dominant frequencies and dynamic characteristics of the structure would be required to determine the applicable safe vibration level.

In accordance with **CoA – E29**, owners of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before construction that generates vibration commences in the vicinity of those properties. The management of vibration generating construction works in the vicinity of properties at risk of exceeding the screening criteria for cosmetic damage are outlined in **Section 8** of this CNVMP.

Where buildings are identified within the risk zones structural assessments will take place prior to any vibration intensive works taking place in the area, in accordance with **CoA – E30** and CNVS.

Table 5.6 Building Damage Vibration Management Levels (BS 7385)

Line	Type of Building	PPV (mm/s) in the Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz & Above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15mm/s at 4 Hz increasing to 20mm/s at 15 Hz	20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above

Source: BS 7385, *CNVS*

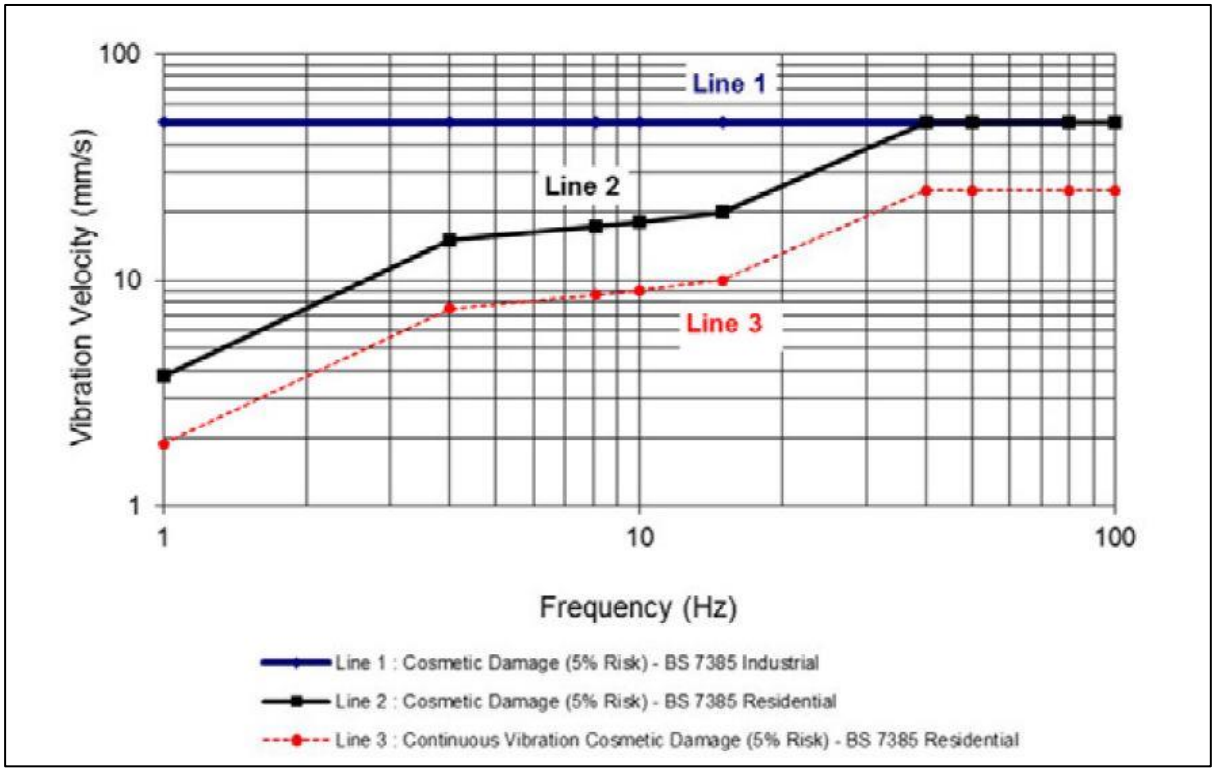


Figure 5.1: Building Damage Vibration Management Levels (BS 7385)

Guidance Note

With regard to these levels BS 7385 states, *"Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK."*

Also, that: "*A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive."*

Heritage Structures

In accordance with the CNVS, if a heritage building or structure is found to be structurally unsound (following inspection) a more conservative cosmetic damage criteria of **2.5 mm/s** peak component particle velocity from the *German Institute for Standardisation – DIN 4150 (1999-02) Part 3 (DIN4150:3) – Structural Vibration - Effects of Vibration on Structures, dated 1999* would be considered.

No buildings were identified in proximity to the CSM project as structurally unsound in the tender documents. During the preparation of this CNVMP, heritage buildings within close proximity to the CSM project were being assessed by a structural engineer as part of the pre-construction surveys. In the unlikely event that a building is deemed structurally unsound during these surveys then the DIN4150 heritage criteria will be applied. However, at this stage it is considered that the heritage buildings in close proximity to the CSM works are structurally sound. The DIN4150:3 criteria are therefore not presented in this CNVMP.

Heritage buildings and structures will be assessed as per the screening criteria in **Table 5.6** as they should not be assumed to be more sensitive to vibration unless they are found to be structurally unsound.

In accordance with **CoA - E30**, the proponent must conduct vibration testing before and during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology and, if necessary, implement additional mitigation measures.

CoA - E31 also states that the proponent must seek the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage-listed structures.

5.4.3 Sensitive Scientific and Medical Equipment

As outlined in **Section 4.4**, some scientific equipment can require more stringent objectives than those applicable to human comfort. As there is a potential for some scientific equipment in the Dental Hospital located on Chalmers Street (R18 / R21), further investigation will be required prior to vibration intensive activities occurring in the vicinity of the Dental Hospital.

Baseline vibration measurements will therefore be undertaken at receptors that are identified to contain sensitive scientific / medical equipment prior to construction activities being undertaken. The baseline data in combination with the VC curves presented in **Table 4.3**, will be used to determine project / equipment specific vibration criteria.

6. Work Hours

6.1 Hours of Work

The approved CSM standard construction hours, as outlined in **CoA – E36** are as follows. An application for the variation of LOR EPL 21148 has been submitted to EPA to reflect the modification to **CoA – E36 in L4.1** of the licence. General construction works and activities will be scheduled to occur between these hours, unless OOHW becomes necessary (see below):

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

As outlined in **Section 2.1**, LOR obtained EPL 21148, on 28 November 2018. Condition L4.5 captures provisions for high noise generating activities that need to be undertaken outside standard working hours (Refer Table 0-1). Furthermore, the project CoA requirements apply to all works within the project. Out of hours works approval process will be undertaken in accordance with Out of Hours Works Assessment Procedure.

High noise impact is defined in EPL 21148 as:

jack hammering, rock breaking or hammering, pile driving, vibratory rolling, cutting of pavement, concrete or steel or other work occurring on the surface that generates noise with impulsive, intermittent, tonal or low frequency characteristics and results in a noise level, adjusted by plus 5dB(A) to account for the aforementioned characteristics, at a sensitive receiver location that exceeds the relevant noise management level in the Interim Construction Noise Guideline.

For high noise impact works, in accordance with L4.5, High noise impact works and activities associated with Central Walk Works at 20 - 28 Chalmers Street Surry Hills must only be undertaken:

1. between the hours of 8:00am to 6:00pm Monday to Friday
2. between the hours of 8:00am to 1:00pm Saturday; and
3. in continuous blocks not exceeding 3 hours each with a minimum respite from those activities and works of not less than 1 hour between each block.

For the purposes of this condition ‘continuous’ includes any period during which there is less than a 1hour respite between ceasing and recommencing any of the work that is the subject of this condition.

Notwithstanding **Condition E36** of this approval and **CoA – E48 and** subject to Condition E47, the following activities may be undertaken 24 hours per day, seven (7) days per week:

(a) tunnelling and associated support activities (excluding cut and cover tunnelling, and excluding the installation and decommissioning of the Blues Point acoustic shed except where compliance with Condition E44 is achieved)

(b) excavation within an acoustic enclosure (excluding the Blues Point temporary site except where compliance with Condition E44 is achieved)

(c) excavation at Central (excluding Central Walk works at 20-28 Chalmers Street, Surry Hills) without an acoustic enclosure

(d) station and tunnel fit out; and

(e) haulage and delivery of spoil and materials.

CoA - E37 states that the Proponent must identify all receptors likely to experience internal noise levels greater than Leq, 15 minute 60 dBA inclusive of a 5 dB penalty, if rock breaking or any other annoying activity likely to result in regenerated (ground-borne) noise or a perceptible level of vibration is planned (including works associated with utility adjustments), between 7am – 8pm.

In accordance with **CoA – E38**, LOR must consult with all receptors identified as per **CoA - E37** with the objective of determining appropriate hours of respite so that construction noise (including ground-borne noise), does not exceed internal noise levels of:

(a) Leq, 15 minute 60 dBA inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am – 8pm for more than 50 percent of the time; and

(b) Leq ,15 minute 55 dBA inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am – 8pm for more than 25 percent of the time, unless an agreement is reached with those receptors.

Note: This condition requires that noise levels be less than $L_{eq,\ 15\text{-minute}}$ 60 dBA for at least 6.5 hours between 7am and 8pm, of which at least 3.25 hours must be below $L_{eq,\ 15\text{-minute}}$ 55 dBA. Noise equal to or above $L_{eq\ 15\ minutes}$ 60 dBA is allowed for the remaining 6.5 hours between 7am and 8pm.

LOR must consult with all receptors identified in the CNVIS/CNVMP/EIS in accordance with **CoA – E33, E37** and **E38** with the objective of determining appropriate mitigation and hours of respite so that construction noise (including ground-borne noise), does not exceed internal noise levels outlined in **CoA –E38.**

In accordance with **CoA – 34**, noise generating works in the vicinity of potentially-affected, religious, educational, community institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) must not be timetabled within sensitive periods, unless other reasonable arrangements to the affected institutions are made at no cost to the affected institution or as otherwise approved by the Secretary.

In addition to CoA E38, any deviation from the EPL conditions and in accordance with L4.12, any agreement(s) between the licensee and noise sensitive receivers referred to in Condition L4.11 must be:

(a) submitted to the EPA for approval prior to any works that are the subject of the agreement being undertaken; and

(b) prepared in writing and a copy of the agreement(s) kept on the premises by the licensee for the duration of this licence; and

(c) kept on the licensee's project website for the duration of the agreement (personal details of residents must be omitted); and

(d) prepared and implemented in accordance with Condition E1

6.1.1 Works Outside of the Approved Standard Hours

Out of Hours Work (OOHW) (i.e. works outside the approved CSM standard hours) at this stage are proposed for a number of work phases. Impacts for these phases are assessed in the CNVIS. Other activities may become necessary as the construction methodology develops, during both design and actual implementation of the works at the site.

In accordance with **CoA – E48** and EPL Condition L4.4 as outlined above, the following CSM activities may be undertaken 24 hours per day, seven days per week:

- excavation at Central (excluding Central Walk works at 20-28 Chalmers Street, Surry Hills) without an acoustic enclosure
- station and tunnel fit out; and
- haulage and delivery of spoil and materials.

Where OOHW is required or becomes necessary as part of the CSM project, the Sydney Metro OOHW Protocol developed in accordance with **CoA – E44(f)** and **CoA – E47** will be implemented. Consultation with Sydney City Council, local residents and other affected stakeholders and sensitive receptors is a requirement under **CoA – E37, CoA – E38, CoA - E44** and **CoA - E45** where variations to standard construction hours occur. The OOHW process of approval is outlined in Figure 6.1 below.

In accordance with **CoA - E47**, the Sydney Metro OOHW protocol (refer **Appendix G**) includes:

(a) the identification of low and high risk construction activities;

(b) a risk assessment process in which the AA reviews all proposed out of hours activities and identifies their risk levels;

(c) a process for the endorsement of out of hours activities by the AA and approval by the ER for construction activities deemed to be of:

i. low environmental risk; or

ii. high risk where all construction works cease by 9pm.

The protocol also details standard assessment, mitigation and notification requirements for high and low risk out of hours works and details a standard protocol for referring applications to the Secretary.

Condition L4.13 has replaced CoA E44(f) as follows

(a) The licensee must notify affected noise sensitive receivers of works approved outside of standard construction hours not less than 5 days and not more than 14 days before those works are to be undertaken.
(b) The notification must be:
- by letterbox drop or email; and
- be detailed on the project website.

(c) The notification required by paragraphs (a) and (b) of this condition must:
- clearly outline the reason that the work is required to be undertaken outside the hours specified in Condition L4.1
- include a diagram that clearly identifies the location of the proposed works in relation to nearby cross
- streets and local landmarks
- include details of relevant time restrictions that apply to the proposed works
- clearly outline, in plain English, the location, nature, scope and duration of the proposed works
- detail the expected noise impact of the works on noise sensitive receivers
- clearly state how complaints may be made and additional information obtained; and
- include the number of the telephone complaints line required by Condition M4.1, an afterhours contact phone number specific to the works undertaken outside the hours specified in Condition L4.1, and the project website address.

This condition does not apply to works undertaken in exceptional circumstances accordance with Condition L4.3.

The OOHW Protocol does not apply as per E47 with the project EPL 21148 in place. The approval authority for OOHW is the LOR Environment Manager, with notification of works being provided to Sydney Metro, ER and AA for information. The OOHW process of approval is outlined in **Figure 5.1** below. Local Area and Utility Works outside of the EPL boundary premise can carried out in accordance with EPL Conditions L4.8 to 4.10, however the License applies to the Licensed premises, which is within the premise's boundary. The OOH works Protocol applies for OOHW outside the premises boundary.

In addition to the Sydney Metro OOHW protocol, the Additional Mitigation Measures (AMM) requirements will be considered as outlined in **Section 8.2** of this CNVMP and in accordance with the CNVS. If required, an Out Of Hours Work Application (OOHWA) will be prepared to identify noise generating items, identify receptors, predict noise levels, quantify impacts and provide for suitable mitigation and management measures and submitted to the LOR Environmental Manager for approval.

In accordance with **CoA - E46,** notwithstanding **CoA - E44** and **E48**, rock breaking and other particularly annoying activities for station shaft or cut and cover stations is not permitted outside of standard construction hours, except at Central (excluding Central Walk works at 20-28 Chalmers Street, Surry Hills); or

(a) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or

(b) where different construction hours are permitted or required under an EPL in force in respect of the construction or approved through an Out of Hours Work Protocol developed in accordance with Condition E47; or

(c) (similar to L4.2 exemption) construction that causes LAeq(15 min) noise levels:

i. no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009); and

ii. no more than the noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive land uses; and

iii. continuous or impulsive vibration values, measures at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.2 of Assessing Vibration: a technical guideline (DEC, 2006); and

iv. intermittent vibration values measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.4 of Assessing Vibration: a technical guideline (DEC, 2006).

In accordance with **CoA – E41**, LOR must ensure that residential receptors, located in non-residential zones, likely to experience an internal noise level exceeding $L_{eq,15\ minute}$ 60 dBA between 8pm and 9pm or $L_{eq,\ 15\ minute}$ 45 dBA between 9pm and 7am (inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise, or a perceptible level of vibration is planned (including works associated with utility adjustments)) must be offered additional mitigation in accordance with the Sydney Metro City and South West Noise and Vibration Strategy referenced in **CoA - E32**.

In accordance with **CoA – E42**, LOR must ensure that residential receptors in residential zones likely to experience an internal noise level of $L_{eq,\ 15\ minute}$ 45 dBA or greater between 8pm and 7am (inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise, or a perceptible level of vibration is planned (including works associated with utility adjustments)) must be offered additional mitigation in accordance with the Sydney Metro City and South West Noise and Vibration Strategy referenced in **CoA - E32**.

The residential receptors assessed for the CNVIS and CNVMP have been identified to occur within ‘mixed use’ and ‘metropolitan centre’ zoning areas. With reference to **CoA – E41** and **E42**, it is understood that these receptors would therefore be considered "residential in a non-residential zone" and therefore the internal noise levels specified in **CoA – E41** will apply.

Sydney Trains staff, customers and tenants are also acknowledged as sensitive receivers which may be impacted by CSM works. The affected receiver engagement process will include the specific requirements of Sydney Trains receivers including following the E34 process as required.

6.1.2 Emergency Construction

In accordance with **CoA - E45,** on becoming aware of the need for emergency construction, LOR must notify the AA, the ER and the EPA (where the EPL applies) of the need for those activities or work. LOR must also use best endeavours to notify all affected sensitive receptors of the likely impact and duration of those works.

For works that are covered under **EPL12208**, conditions O5.1 to O5.6 of the EPL, which stipulate the hours of work for construction activities in the rail corridor, do not apply to emergency works. For the purposes of the EPL emergency works are defined as unforeseen works required to:

a) to avoid the loss of life or damage to property or to prevent environmental harm; or
b) to restore safe and reliable railway passenger and freight services or to prevent imminent interruption to those services.

In accordance with **CoA – E44(b)** notwithstanding **CoA – E36** construction associated with the CSSI may be undertaken outside the hours specified under those conditions where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm. An exemptions to standard construction hours in exceptional circumstances is permitted by Condition L4.3 as follows;

(a) The licensee may undertake works outside of standard construction hours if any of the following applies:
   i. emergency works is required to avoid the loss of lives or property, or to prevent material harm to the environment;
   ii. the delivery of oversized plant or structures has been determined by the police or other authorised authorities to require special arrangements to transport along public roads.

(b) The licensee must, on becoming aware of the need to undertake emergency construction work under this condition notify the EPA's Environment Line as soon as practicable and submit a report to the EPA by 2pm on the next business day after the emergency works commenced that describes:
   1. the cause, time and duration of the emergency; and
   2. action taken by or on behalf of the licensee in relation to the emergency; and
   3. details of any measures taken or proposed to be taken by the licensee to prevent or mitigate against a recurrence of the emergency.

For the purpose of this condition, “material harm to the environment” has the same meaning as in section 147 of the *POEO Act.*

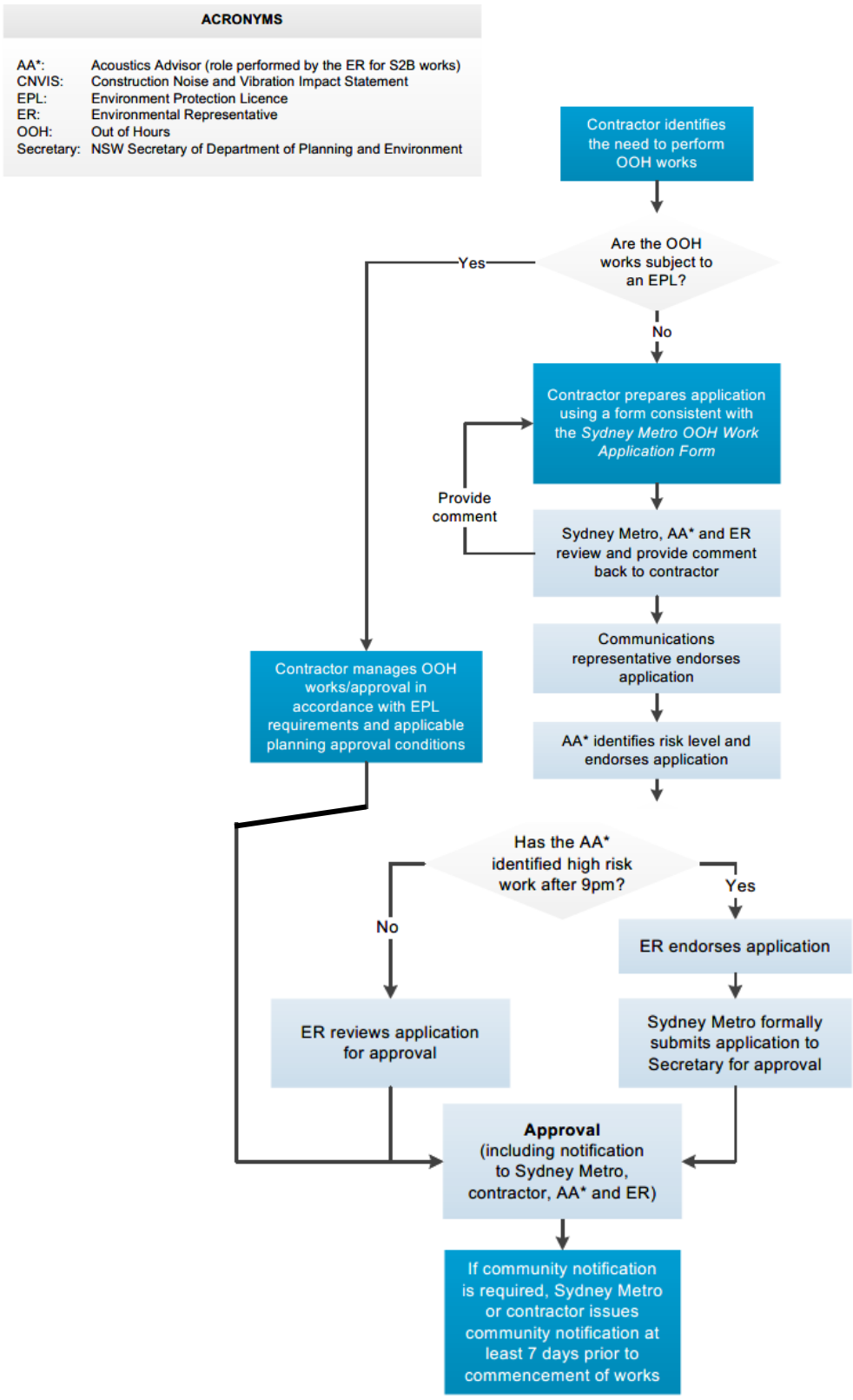


Figure 6.1 - OOHW Approval Process (Source: *Sydney Metro OOHW Protocol*, refer **Annex G**)

7. Aspects, Impacts & Risks

This section outlines relevant aspects of the construction methodology and the predicted construction noise and vibration impacts. The predicted noise and vibration impacts are detailed in the CNVIS and summarised here as relative to the surrounding community or nearby by structures.

7.1 Construction Methodology

A number of key construction scenarios (SCN / Work Phases) were identified in the CNVIS. These assessment scenarios were developed to identify significant noise and vibration generating plant, equipment and machinery that may be in use or activities that will be undertaken as part of the CSM works. These scenarios were informed through information provided by LOR and the indicative construction schedule provided in the CEMP. The scenarios are consistent with the current construction methodology of CSM as described in **Section 1**.

A summary of the indicative construction schedule that was considered is provided below in **Figure 7.1**. Details of these construction works (reproduced from the CNVIS) and scenarios are presented in **Appendix B**. As seen in **Figure 7.1** there may be some overlap between these work phases.

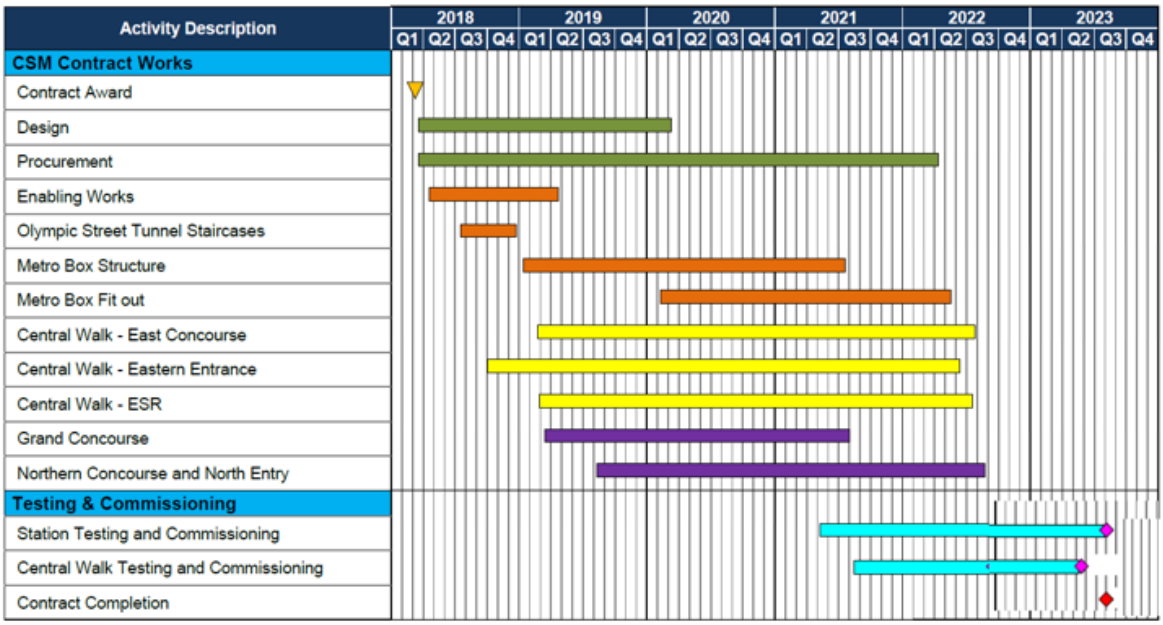


Figure 7.1 - Indicative Construction Schedule

7.2 Predicted Construction Impacts

In general, noise (and vibration) impacts may occur due to CSM Project emissions that are considered offensive by the community and may result in complaints being received, additional mitigation or management measures being implemented, or additional monitoring being required.

For airborne noise impacting residential and other sensitive receptors, the potential impacts relate to annoyance or an unacceptable noise amenity. The noise receptors considered in the CNVIS and the predicted value at each is presented in **Appendix C**. Sydney Trains staff, customers and tenants are also acknowledged as sensitive receivers which may be impacted by CSM works. The affected receiver engagement process will include the specific requirements of Sydney Trains receivers including following the E34 process as required. A weekly working group has been set up to inform Sydney Trains staff on project updates and impacts.

For ground-borne noise impacting residential and other sensitive receptors, potential impacts also relate to annoyance or an unacceptable noise amenity. These impacts can be minimised with good practice

construction management, adherence to safe work distances and monitoring of significant ground-borne noise generating activities to verify compliant levels.

For ground-borne vibration impacting building structures, the potential impacts relate to structural or cosmetic damage. These however are unlikely to occur with good practice construction management, adherence to safe work distances and monitoring of significant vibration activities to verify compliant levels.

The Central Station buildings have been identified as state significant heritage structures in close proximity to the site and the CNVIS identified that monitoring will be required in the early stages of work to confirm that vibration levels satisfy the cosmetic damage criteria outlined in **Section 4.4** of this CNVMP, in accordance with the CNVS.

Demolition of Bounce Hotel identified in SCN23 of **Appendix B** will occur within the human comfort safe working distance of 7 m. Therefore, it is anticipated that the human comfort criteria (BS6472) will be exceeded at times during this scenario. To minimise impacts to human comfort, additional mitigation and management measures may also be warranted. These will need to be implemented in conjunction with community and stakeholder consultation and notification processes outlined in the Additional Mitigation Measures Matrix (AMMM) for Ground-borne vibration in **Section 8.2** of this CNVMP.

7.2.1 Potential Noise Impacts

The CNVIS provided a detailed breakdown of the key construction periods and associated equipment, and their source noise emission (Sound Power Levels, L_W or SWL). These values and the predicted $L_{Aeq,\ 15minute}$ noise levels from the CNVIS (determined via modelling for each scenario) are reproduced in **Appendix B** and **Appendix C**. Values that exceed the NML are highlighted in **bold** typeset. Values that exceed the HNAML (fixed at 75 dB for residential receptors) are highlighted in **bold and underlined** typeset. In accordance with **CoA – E37, E38, E41** and **E42** all noise predictions have included a 5dB penalty for rock breaking and other annoying activities. Penalty inclusions out detailed in the CNVIS and **Appendix B**.

In each scenario, it was assumed in the CNVIS that all plant would operate simultaneously, which is considered to be representative of potential worst-case conditions. The CNVIS results (reproduced in **Appendix C** for ease of reference) indicated that construction noise emissions would exceed the Project NMLs at a number of locations during each scenario. The magnitude by which they exceeded the NML did however vary depending on the work phase and necessary equipment. The extent by which they exceeded the NML is constrained to the closest receptors; although elevated levels are predicted at other more distant locations, the highest impacts are limited to those directly adjacent the site.

The highest predicted noise levels are associated with the demolition of the Bounce Hotel occurring in SCN23. Other scenarios with the highest predicted noise levels at receptors are associated with the construction of the East Entrance (i.e. SCN24 to SCN28) where works are being undertaken in close proximity to sensitive receptors. These noise levels are predicted at the nearest receptors located in generally the first row of buildings with direct line of sight to CSM works.

Based on these general construction noise levels exceeding the NML it is also considered likely that sleep disturbance screening criteria will be exceeded at the nearest and most sensitive residential/dwelling receptors during OOHW**.**

Some noise from construction sites is inevitable, such that the ICNG focuses on minimising construction noise impacts, rather than only on achieving numeric noise levels. These results and noted exceedances identify that best-practice construction noise management and control techniques will be required to reduce noise levels as far as practicable. To minimise impacts additional noise control, mitigation and management measures may also be warranted, refer **Section 8**. These will need to be implemented in conjunction with community and stakeholder consultation and notification processes outlined in the AMMM in **Section 8.2**.

In accordance with **CoA - E35**, LOR will review alternative methods to rock hammering for excavation and demolition as part of the detailed construction planning with a view of adopting methods that minimise impacts on sensitive receptors. No blasting will be used on the project. The CNVIS will be updated as required for each location or activity to adopt the least impact alternative in any given location unless it can be demonstrated, to the satisfaction of the AA, why it should not be adopted.

Under **CoA – E37, E38, E41** and **E42** LOR will identify and consult with all receptors likely to experience internal noise levels greater than $L_{eq\ 15\ minute}$ 60 dBA, regenerated (ground-borne) noise or a perceptible

level of vibration, with the objective of determining appropriate hours of respite. These receptors will be offered additional mitigation in accordance with AMMM in **Section 8.2.**

Note: With reference to the predicted noise levels presented in **Appendix C**, where values exceed the applicable NML (NML varies dependent on whether scenario is to be conducted during day or night time) a comparison to the RBL to align with the AMMM outlined in **Section 8.2**. Values that exceed the Highly Noise Affected Management Level (fixed at 75dBA for residential receptors during standard construction hours and during the daytime period only) are highlighted in **bold and underlined** typeset. Refer to CNVIS for background discussion.

It is possible to estimate internal noise levels based on the predicted values presented in **Appendix C** for each scenario by deducting 10 dBA from these external values to represent windows being partially open and by deducting 20 dBA to represent windows being closed.

Comparing the estimated internal noise levels to the **CoA – E37/E38** and **E41/E42** requirements (i.e. respite/additional mitigation must be offered to residents that experience internal noise levels of $L_{Aeq,\ 15\ minute}$, 60 dBA, $L_{Aeq,\ 15\ minute}$, 55 dBA or $L_{Aeq,\ 15\ minute}$, 45 dBA) identifies that noise levels will generally be in compliance for the broader community but levels are likely to exceed the **CoA – E37/E38** and **E41/E42** thresholds at the first row of buildings around the works. This trend is likely to occur during most scenarios but is most significant for SCN23 (Demolition of the Bounce Hotel) where the highest levels are predicted. SCN23 will be conducted during the approved standard construction hours, however, works outside the approved standard construction hours will be required for other scenarios, refer **Appendix B**.

Potential Effects of Concurrent Work

Air-borne noise levels have been predicted via 3D noise modelling for a range of works and activities associated with the project's construction. These predicted noise levels are detailed in **Appendix C** of this CNVMP and address each work area/activity so that any additional mitigation and management measures (to those already incorporated into the construction design and noise modelling) may be defined for each representative worst-case assessment scenario.

This method is typical of NSW construction projects especially those of the scale of CSM where there is a large spatial area (approximately 8.5 hectares) and temporal boundary (approximately five-year construction program). In these cases, there is limited potential for significantly increased noise levels and associated impacts to occur due to concurrent works.

This is primarily due to the dominant influence of the works conducted at or near the most affected receptor (on which the CNVIS and CNVMP is based), which will mask the influence of other works occurring at the time. The construction schedule / timing of works is also an influence when considering this potential as in many cases there are different activities that will be undertaken at the same location over the course of the construction schedule i.e., they will not occur concurrently.

The conservative nature of the predictive inputs that consider all plant, equipment and/or machinery operating concurrently for each scenario are also an influence when considering this feature. The predicted values do not represent a constant noise emission that would be experienced by the community on a daily basis throughout the project's construction schedule, they will only be experienced for limited periods of time when those specific activities are occurring, and they will not be experienced over the whole daytime, evening or night time period.

When evaluating potential effects of concurrent work, it is also important to consider how noise levels add together. For example, if two separate activities are occurring and the noise level from each is 55 dBA at the receptor, then the resultant noise level is 58 dBA. This increase in noise level (3 dBA) will be just perceptible and a significant change in impact unlikely. If two separate activities are occurring and the noise level from one is 55 dBA and the other is 53 dBA, then the resultant noise level is 57 dBA. This increase in noise level (2 dBA) will be hardly perceptible in practice and a significant change in impact is highly unlikely.

Based on the information presented above a set of provisions, safeguards and monitoring contingencies are provided in the unlikely event that additional issues associated with concurrent works are identified and further mitigation is required. These provisions, safeguards and contingencies are outlined in **Section 10.2.3**.

7.2.2 Potential Ground-Borne Noise Impacts

With respect to the construction plant identified in the assessment scenarios presented in **Appendix C**, the highest levels of ground-borne noise would be expected to occur due to construction activities involving excavators with hydraulic hammers / rock breakers and road headers. These activities have been identified to occur during the following above ground scenarios; SCN16 – SCN20 and SCN23. Potential ground-borne noise generating activities have also been identified in the following underground scenarios; U-SCN01, U-SCN03, U-SCN05 and U-SCN09. A summary of these Scenarios is provided in **Table 7.1** below.

Table 7.1 Summary of Ground-Borne Noise Scenarios

SCN ID	Area Of Works	Description	Schedule
SCN16D SCN16E	Central Walk	Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	Standard + OOHW Jul 2018 - Dec 2018
SCN17		Construction of the new Standby Guards Rooms / demolition of existing standby guards rooms	OOHW Jan 2019 - May 2019
SCN18		Construction of Platform Canopy Support System to Platforms 16 to 23 and Excavation of Launch Chambers	OOHW May 2019 - Oct 2021
SCN19		Platform works including works below the top slab	OOHW May2020 - Sept 2021
SCN20		Platform Remodelling works including platform canopy modifications	OOHW Dec 2021 - Sept 2022
SCN23	East Entrance	Demolition of the Bounce Hotel	Standard Hours Oct 2018 - Aug 2019
U-SCN01	Metro Box	Excavation to underside of Metro Concourse	Standard + OOHW Apr 2019 - Sept 2019
U-SCN03	Metro Box	Excavation to B2 Level	Standard + OOHW Nov 2019 - Apr 2020
U-SCN05	Metro Box	Excavation to B4	Standard + OOHW Aug 2020 - Oct 2020
U-SCN09	Central Walk	Excavation of the Central walk and Escalator Adits + FRP works	Standard + OOHW Aug 2020 - Sep 2022

Ground-borne noise was assessed in the CNVIS by predicting safe work distances utilising the indicative ground-borne noise levels identified in the EIS for road headers and rock breakers. These safe working distances are outlined in **Section 8.1.2**. Based on the safe working distances, figures have been produced and provided in **Appendix D** which display indicative safe working distances from the area of works that have been identified in **Table 7.1**.

Based on the indicative ground-borne noise levels identified in the EIS for road headers and rock breakers, the CNVIS predicted ground-borne noise levels for a range of slant distances from the ground-borne noise source (point of impact) to the receptor are presented in **Table 7.2** below.

Unlike air-borne noise (refer **Section 7.2.1**), there is no specialised modelling software packages readily available that can predict vibration and resultant ground-borne noise. In the absence of specialised software, it is common acoustics practice to therefore predict ground-borne noise via spreadsheet calculations.

These calculations are generally based on either a) calculative method defined by international standards e.g. BS 5228:2, or b) calculative methods based on measured data and resultant site laws, trends, or slant distances, adapted for select activities. These spreadsheet methods provide an understanding of potential ground-borne noise levels and often provide for conservative (often highly conservative) results, as the predictions avoid accounting for differing substratum conditions which affects and commonly reduces how vibration propagates between the source and the receptor.

As a result, there is an inherent level of uncertainty associated with predicted ground-borne noise such that providing a set of provisions, safeguards and monitoring contingencies is a feature of the CNVMP. These measures are outlined in **Section 10.2.4** below.

Table 7.2 Predicted Ground-Borne Noise Levels

Slant Distance from Source to Receptor (m)	Ground-Borne Noise Level LAeq (dBA)	
	Rock Breaker	Road Header
5	90	50
10	75	45
15	66	41
20	62	38
25	57	37
30	53	35
35	50	33
40	48	32
45	45	31
50	43	30
55	40	29
60	39	28
65	37	27
70	37	27
75	35	26
80	33	26
85	32	25
90	30	25
95	29	25
100	28	24

Source: CNVIS, EIS

As noted above high risk ground-borne noise activates are identified in a number of work scenarios. Based on the safe work distances (**Table 8.2**) the highest risk activity is associated with SCN23 (Demolition of the Bounce Hotel). This is due to the close proximity to the nearest sensitive receptors.

Where reasonable and feasible all works with the potential to generate ground-borne noise will be undertaken outside the safe working distances to avoid ground-borne noise impacts. However, due to the nature of the CSM project, complying with the recommended safe working distances presented in **Table 8.2** may not be possible in all cases. This is typical of construction and demolition works in close proximity to other buildings and highlights the need to monitor and establish compliant levels during the early stages of ground-borne noise generating activities.

To minimise impacts, mitigation and management measures will be required. Where safe working distances are not achievable during the construction works, additional mitigation and management measures will also be warranted. These will need to be implemented in conjunction with community and stakeholder consultation and notification processes outlined in the AMMM for Ground-borne noise in **Section 8.2**.

For works outside the recommended standard hours for construction, letterbox drops, monitoring, respite offers and a range of other additional mitigation measures from the AMMM will be required at the most affected locations during select construction activities associated with CSM.

Under **CoA – E37, E38, E41** and **E42**, LOR will identify and consult with all receptors likely to experience internal noise levels greater than $L_{eq\ 15\ minute}$ 60 dBA, regenerated (ground-borne) noise or a perceptible

level of vibration, with the objective of determining appropriate hours of respite. These receptors must be offered additional mitigation in accordance with AMMM in **Section 8.2**.

7.2.3 Potential Ground-Borne Vibration Impacts

Activities undertaken on the site during construction may generate ground-borne vibration. With respect to the construction plant identified in **Appendix B**, the highest levels of vibration would be expected to occur due to construction activities involving vibratory rollers, jack hammers, sheet piling, excavators with hydraulic hammers / rock breakers and road headers. These activities have been identified to occur during the following above ground scenarios; SCN06, SCN08, SCN10, SCN14, SCN16 – SCN23, SCN29, SCN30, SCN32, SCN34 and SCN36. Vibration generating activities have also been identified in the following underground scenarios; U-SCN01, U-SCN03, U-SCN05 and U-SCN09. A summary of these Scenarios is provided in Table **7.3** below.

Table 7.3 Summary of Vibration Scenarios

SCN ID	Area Of Works	Description	Schedule
SCN06	Platforms & Sydney Yard	Stage 13	Standard Hours Oct 2018
SCN08		Stage 15,17 & 19	Standard Hours Oct 2018
SCN10	Metro Box	FRP Capping Beam	Standard Hours Nov 2018 - Feb 2019
SCN14		Excavation to underside of Metro Concourse	Standard + OOHW Sept 2019 - Dec 2022
SCN16D SCN16E	Central Walk	Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	Standard + OOHW Jul 2018 - Dec 2018
SCN17		Construction of the new Standby Guards Rooms / demolition of existing standby guards rooms	OOHW Jan 2019 - May 2019
SCN18		Construction of Platform Canopy Support System to Platforms 16 to 23 and Excavation of Launch Chambers	OOHW May 2019 - Oct 2021
SCN19		Platform works including works below the top slab	OOHW May2020 - Sept 2021
SCN20		Platform Remodelling works including platform canopy modifications	OOHW Dec 2021 - Sept 2022
SCN23	East Entrance	Demolition of the Bounce Hotel	Standard Hours Oct 2018 - Aug 2019
SCN29	Grand Concourse	Piling in Grand Concourse	OOHW Aug 2019 - Sep 2019
SCN30		FRP Pile caps	
SCN34	Northern Concourse	Demolition Southern Half	Standard Hours Mar 2020 - May 2020
SCN36		Demolition Northern Half	Standard Hours Feb 2021 - Mar2021
U-SCN01	Metro Box	Excavation to underside of Metro Concourse	Standard + OOHW Apr 2019 - Sept 2019
U-SCN03	Metro Box	Excavation to B2 Level	Standard + OOHW Nov 2019 - Apr 2020

SCN ID	Area Of Works	Description	Schedule
U-SCN05	Metro Box	Excavation to B4	Standard + OOHW Aug 2020 - Oct 2020
U-SCN09	Central Walk	Excavation of the Central walk and Escalator Adits + FRP works	Standard + OOHW Aug 2020 - Sep 2022

The CNVIS noted that other construction activities were considered and deemed to produce insignificant levels of vibration with limited or no risk in terms of human comfort and certainly no risk of building damage issues. To assess potential vibration impacts the CNVIS adopted a combined approach of guideline reference and predictive methods. The guideline reference involved the applicable safe work distances published in the TfNSW CNS. These safe working distances are outlined in **Section 8.1.3**. The predictive method adopted the Table E.1 empirical predictors for ground-borne vibration arising from mechanized construction works as presented in British Standard – BS5228-2:2009+A1:2014 (BS5228) – *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration*.

BS5228 presents methods to estimate vibration due to vibratory piling, which in this case has been selected to best represent the sheet piling activity. A conservative method was applied based on the specified calculative inputs and distance offsets to estimate potential vibration levels, PPV in mm/s. All calculative inputs are summarised in CNVIS. Due to the predictive method adopted of predicting vibration there is an inherent level of uncertainty associated with predicted levels. Therefore, vibration monitoring will be required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity.

Refer predicted vibration levels in **Table 7.4** below. For example, the CNVIS concluded that predicted values complied with the most stringent BS 7385 criteria (15 mm/s) at distances of 11 m and beyond for the sheet piling activity. This prediction therefore provides a more accurately defined safe working distance of 11m for the sheet piling activity, compared to the TfNSW CNS safe work distance of 2m to 20m.

Table 7.4 Predicted PPV (mm/s) Vibration Levels (Sheet Piling)

Distance, m	Predicted PPV, mm/s
1.0	266.0
2.0	115.8
3.0	71.2
4.0	50.4
5.0	38.6
6.0	31.0
7.0	25.7
8.0	21.9
9.0	19.0
10.0	16.8
11.0	**15.0**
12.0	13.5
13.0	12.3
14.0	11.2
15.0	10.3
16.0	9.5
17.0	8.9

Distance, m	Predicted PPV, mm/s
18.0	8.3
19.0	7.8
20.0	7.3
21.0	6.9
22.0	6.5
23.0	6.2
24.0	5.9
25.0	5.6
50.0	2.4
75.0	1.5
100.0	1.1
200.0	0.5
Source: CNVIS, BS 5228	

Based on the safe working distances presented in **Section 8.1.3**, figures have been produced and provided in **Appendix D** which display indicative safe working distances from the area of works that have been identified in **Table 7.3**.

Where reasonable and feasible all vibration intensive works will be undertaken outside the cosmetic damage (BS7385) safe working distances to avoid structural vibration impacts. The CNVIS concluded that given the minimal setback distances to nearby sensitive receptors complying with the recommended safe working distances from the TfNSW CNS for vibration intensive plant presented **Table 8.3** may not be possible in all cases.

This identifies that best-practice construction vibration management and control techniques will be required to reduce vibration levels as far as practicable. For example, vibration intensive activities may start at a position far away from a receptor and move closer as compliant levels are verified. To minimise impacts additional mitigation and management measures may also be warranted. These will need to be implemented in conjunction with community and stakeholder consultation and notification processes outlined in the AMMM for Ground-borne Vibration in **Section 8.2** of this CNVMP.

In accordance with the CNVS, attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity. Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receptors whenever vibration generating activities need to take place inside the calculated safe-working distances.

As outlined in the CNVS, where it is anticipated that an item of plant will exceed the cosmetic damage criteria outlined in **Section 5.4**, vibration monitoring will be required at the nearest affected receiver. Where it is anticipated that an item of plant will exceed the human response / ground borne noise criteria and concerns have been raised regarding vibration, vibration monitoring would also be required at the receptor(s) under question.

The Central Station buildings have been identified in the CNVIS as state significant heritage structures in close proximity to the site and therefore monitoring will be required in the early stages of work to confirm that vibration levels satisfy the cosmetic damage criteria outlined in **Section 5.4** of this CNVMP, in accordance with the CNVS. Vibration monitoring devices will be required on sensitive buildings and rail infrastructure throughout vibration intensive works.

These cosmetic/structural damage and human annoyance outcomes are typical of construction and demolition works in close proximity to other buildings and highlights the need to monitor and establish compliant levels during the early stages of vibration significant activities.

The monitoring and compliance assessment focus on all scenarios with the potential to generate high levels of vibration. During the works, impacts from vibration will be considered both in terms of the effects on building occupants (human comfort) and the effects on the building structures (structural/cosmetic damage).

The applicable criteria (outlined in **Section 5.4**) will be evaluated, selected and applied based on the receptor type and potential impacts:

- **Human comfort criteria** will be applied on a case by case basis, where necessary (i.e. if impacts have the potential to occur) and where appropriate to the vibration type being generated by the activity under assessment. The vibration type (impulsive, continuous or intermittent) and application of the relevant criteria will be evaluated and selected by a suitably experienced person or in consultation with a qualified technical specialist; and
- **Structural damage criteria** will be applied on a case by case basis, where necessary (i.e. if impacts have the potential to occur) and where appropriate to the structure under assessment. The structure type and application of the relevant criteria will be evaluated and selected by a suitably experienced person or in consultation with a qualified technical specialist.

In accordance with the CNVS, all vibration monitoring results will be assessed against the nominated vibration goals and compiled into a report to be forwarded to the construction contractor and project manager. Reporting will be submitted to the construction contractor and project manager within one week of being undertaken or at weekly intervals for continuous monitoring. All vibration monitoring reports would also be made available to the public through the publicly accessible website.

In accordance with **CoA - E35**, LOR will review alternative methods to rock hammering for excavation and demolition as part of the detailed construction planning with a view to adopting methods that minimise impacts on sensitive receptors. No blasting is required for the Project. The Construction Noise and Vibration Impact Statement will be updated as required for each location or activity to adopt the least impact alternative in any given location unless it can be demonstrated, to the satisfaction of the AA, why it should not be adopted.

In accordance with **CoA – E37**, LOR must identify all receivers likely to experience a perceptible level of vibration if rock breaking or any other annoying activity is planned (including works associated with utility adjustments), between 7am – 8pm.

As the potentially sensitive residential receptors identified for the CSM project have been identified to occur outside a residential zone (i.e mixed use and metropolitan centre), **CoA – E41** takes precedence over **CoA – E42**. Therefore, the proponent must ensure that residential receptors, located in non-residential zones, likely to experience a perceptible level of vibration if rock breaking or any other annoying activity is planned (including works associated with utility adjustments) must be offered additional mitigation in accordance with the Sydney Metro City and Southwest Noise and Vibration Strategy referenced in **CoA - E32**.

8. Mitigation and Management Measures

This section describes the overall approach to managing and mitigating noise and vibration impacts as a result of the CSM works based on the predicted impacts as summarised this CNVMP.

The management measures discussed in this section are based on the applicable compliance matrices for the relevant Project Approval as well as the requirements of the ICNG and standards of LOR, including application of the CNVS as relevant to the works. These measures have been informed further by the outcomes and recommendations of the CNVIS.

The CNVS was developed to address the assessment requirements documented in the ICNG. It also identifies the thresholds by which impacts can be qualified and the level of mitigation and management that is required for each stage of works.

The mitigation and management measures are consistent with the intent and recommendations of the ICNG for own best-practice techniques to be developed for managing construction noise and vibration and implementing feasible and reasonable mitigation measures.

Some activities (Sheet Piling and Demolition) are expected to generate levels in excess of 75 dBA however they will only occur for very short periods of time and hence the duration of the potential impact will be considered when selecting any standard or additional mitigation measures.

In accordance with the CNVS, where noise levels have been predicted above the noise management levels, the AMMM identified in **Section 8.2** is to be implemented. This will involve various methods of community consultation which are outlined in **Table 8.4**. All community consultation will be in accordance with Sydney Metro Stakeholder and Community Strategies. Consultation with businesses will be in accordance with the Sydney Metro Business Management Plan (BMP) and the small business owners support program.

The CSM contractor in accordance with **CoA - E39** will consult with other proponents of construction activities located in and around the CSM project site. Specifically, this will include the Tunnels and Station Excavation Works (TSE) contractor, Sydney Light Rail, Sydney Trains and any other contractors that will undertake works within the CSM project area. Cumulative impacts associated with nearby construction works will be managed through the community consultation process. Sydney Trains take the lead on communications that are occurring within Sydney Train land and LOR project works will be included as a combined notification. Further detail of the community consultation process is detailed in the overarching Stakeholder and Community Involvement Plan (Sydney Metro Community Consultation Strategy).

The CSM contractor attends ongoing construction interface meetings with other contractors to understand the scope and extent of impacts and works with Sydney Metro and the AA to modify works based on noise assessment results of the CSM contractor and other contractors if known. The approach allows each contractor to provide the required respite periods identified in accordance with **CoA - E40** and minimise impacts to sensitive receivers through the application of additional mitigation in accordance with the Sydney Metro City and South West Noise and Vibration Strategy referenced in **CoA - E32**.

In accordance with **CoA – E33**, consultation with sensitive receptors will be undertaken as the project progresses where sensitive periods can be refined based on the type of activities, expected impacts and the particular circumstances of the receptor at that time. All consultation will be undertaken prior to the start of the relevant portion of works predicted to affect those receptors. Mitigation measures can then be tailored based on the consultation feedback. The updated information will be included in a revised version of the CNVIS and made available to the AA and ER for endorsement at least four weeks prior to commencement of that scenario. Mitigation Consultation will be undertaken at receptors to which it applies prior to the activity commencing which has triggered it.

The following project-specific mitigation measures identified in the CNVIS will be implemented to minimise impacts as far as is feasible and reasonable:

- Alternative demolition techniques (i.e. Bounce Hotel) that minimise noise and vibration levels will be investigated and implemented where feasible and reasonable. In accordance with **REMM NV7** this will include consideration of:
    - The use of hydraulic concrete shears in lieu of hammers/rock breakers.
    - Installing sound barrier screening to scaffolding facing noise sensitive neighbours.

  - Sequencing works to shield noise sensitive receptors by retaining scaffolding where reasonable and feasible.
  - Locating demolition load out areas away from the nearby noise sensitive receptors.
  - Providing respite periods for noise intensive works (in accordance with **CoA – E37 to E42**).
  - Methods to minimise structure-borne noise to adjacent buildings including separating the structural connection prior to demolition through saw-cutting and propping, using handheld splitters and pulverisers or hand demolition.
  - Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods.

- Construction hoarding should be erected around the following work areas as per the current construction design: Metro Box, Central Walk, and ESR.
- Any site buildings, equipment or other useful obstacles/objects will be positioned to act as a temporary barrier to minimise noise emissions towards the residential receptors situated in the first row of buildings surrounding the CSM project. Other barriers such as hoardings or temporary enclosures will also be used. Site emissions may be reduced by these barriers by between approximately 5 and 10 dBA.
- All mechanical plant and equipment is to be selected to provide quieter and less vibration emitting construction methods where feasible and reasonable.
- All mechanical plant and equipment is to be silenced by the best practical means using current technology. Mechanical plant, including noise-suppression devices, will be maintained to the manufacturer's specifications. In accordance with REMM NV1, residential grade mufflers will be fitted to all mobile plant.
- Extended periods of high noise level generating plant, equipment or machinery (excavators, hand tools, grinders etc.) will be avoided.
- The site be proactively managed to avoid un-necessary clustering of plant, equipment or machinery near receptors.
- The site will be orientated to minimise the need for reversing of equipment or vehicles, particularly during any out-of-hours work. Furthermore, in accordance with REMM NV1, Non-tonal reversing alarms will be fitted to all permanent mobile plant. Occupational health and safety requirements for use of warning systems must be followed.
- All plant, equipment or machinery (and heavy vehicles, trucks etc.) will be turned off when not being used.
- In accordance with **CoA – E34** noise generating works in the vicinity of potentially-affected, religious, educational, community institutions and noise and vibration-sensitive businesses and critical working areas (such as theatres, laboratories and operating theatres) must not be timetabled within sensitive periods, unless other reasonable arrangements to the affected institutions are made at no cost to the affected institution or as otherwise approved by the Secretary.
- In accordance with **CoA – E33**, consultation with sensitive receptors will be undertaken as the project progresses where sensitive periods can be refined based on the type of activities, expected impacts and the particular circumstances of the receptor at that time. All consultation will be undertaken prior to the start of the relevant portion of works predicted to affect those receptors. Mitigation measures can then be tailored based on the consultation feedback. Consultation should be undertaken at receptors to which it applies prior to the activity commencing which has triggered it. In response to consultation, the CNVIS will be updated and reissued to the AA and ER for endorsement at least four weeks prior to commencement of a particular scenario as the project progresses and consultation continues over the life of the project.
- Traffic management strategies will be developed prior to the commencement of construction for each site area and access/egress points to manage the impacts of construction road traffic noise.

- The following construction road traffic noise mitigation and management measures will be implemented: keep truck drivers informed of the designated vehicle routes, parking locations, acceptable delivery hours; instruct truck drivers to travel through local roads without stopping unless absolutely necessary. If for whatever reason, truck drivers need to stop on local roads they will position the vehicle away from residential dwellings and limit extended periods of engine idling; and instruct truck drivers to limit engine revving and use of exhaust brakes when travelling to and from site, especially whilst travelling on local roads.
- Noise monitoring will be conducted across all works as required in accordance with CNVIS, including the night-time period where sleep disturbance impacts are to be monitored. Where high noise impacts are anticipated, the focus of monitoring will be operator attended noise monitoring which will allow real time feedback of noise levels. Noise monitoring is further outlined in **Section 10** of this CNVMP.
- Where vibration intensive works are scheduled, vibration monitoring will be undertaken at sensitive buildings and rail infrastructure. Vibration monitoring is further outlined in **Section 10** of this CNVMP.
- Vibration monitoring is recommended at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity. Where there is potential for exceedances of the criteria, further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms will be conducted at the nearest sensitive receivers whenever vibration generating activities need to take place inside the calculated safe-working distances.

8.1 Standard Mitigation Measures

The standard mitigation measures that will be adopted during CSM works (in accordance with the CNVS) are described in **Table 8.1** and will be implemented for the works to manage and potentially reduce construction noise and vibration impacts. The predicted noise levels presented in Appendix C are inclusive of the standard mitigation measures. Appendix C also provides additional mitigation measures where there is residual noise after the application of standard mitigation measures in accordance with the AMMM. For each item the CSM personnel responsible is nominated. For each item a unique identification number (ID) is provided, which correlates to the document references shown in the traceability matrix.

Sydney Metro has also developed principles for managing construction noise and vibration. These principles will apply to the CSM project and are listed below:

- All personnel and community will be informed of the effort and methods undertaken to reduce noise and vibration for the works undertaken.
- Good engagement with the community will be maintained to facilitate effective project delivery with balanced community impacts.
- Construction noise and vibration levels at sensitive receivers will be minimised where feasible and reasonable.
- Feasible and reasonable mitigation will reflect the time of day, and the degree and duration of the impact.
- The community will be informed of the dates for the intended works, sequencing and timing of noisy events. Where possible this will include an indicative schedule over a 24-hour period.
- Minimising construction noise and vibration will be viewed as a continuous improvement exercise that is inclusive of stakeholders where no idea is too small to be considered.
- Any operational noise and vibration improvements resulting from the works will be promoted to the community.

Table 8.1 Standard Noise and Vibration Mitigation Measures

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
CNV1	Management	Implement community consultation measures	Noise and Vibration	The Community Liaison Manager must consult with all receptors identified in accordance with **CoA - E37** and **CoA – E38** with the objective of determining appropriate hours of respite so that construction noise (including ground-borne noise), does not exceed internal noise levels of $L_{eq,\ 15\ minute}$ 60 dBA In accordance with **CoA – E33,** Mitigation consultation will be undertaken at receptors to which it applies prior to the activity commencing which has triggered it. Mitigation measures can then be tailored based on the consultation feedback. In accordance with **CoA – E29** owners of properties at risk of exceeding the screening criteria for cosmetic damage must be notified before construction that generates vibration commences in the vicinity of those properties. In accordance with **CoA - E39** Community Liaison Manager must consult with proponents of other construction works in the vicinity of the CSSI and take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receptors. Consultation is also a requirement under **CoA - E44** and **CoA - E45** where variations to standard construction hours occur. On becoming aware of the need for emergency construction in accordance with **CoA - E44(b)**,	Community Liaison Manager	All scenarios. The highest impacts are predicted in SCN23, directly adjacent to the demolition of the Bounce Hotel.	Ensures stakeholders know what to expect and keeps stakeholders informed of the likely impact. Community may identify solution to assist in managing impacts

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				LOR must notify the AA and the ER of the need for those activities or work. In accordance with **CoA - E41** and **E42**, Consultation will be undertaken at receptors exceeding the CoA internal noise levels with a focus on offering additional mitigation. The Proponent must also use best endeavours to notify all affected sensitive receptors of the likely impact and duration of those works. A register of all noise and vibration sensitive receptors will be kept on site. This register will include the address, category, contact name and phone number for each receptor.			
CNV2	Management	Site Inductions	Noise and Vibration	In accordance with **CoA – C2 (k)**, a site-specific induction will be provided to all site personnel, contractors and sub-contractors with an emphasis on understanding and managing noise impacts form the work activities being undertaken. This will include the location of receptors, specific mitigation measures, site hours of operation, noise complaints procedure, etc. as well as the consequences of not complying with these mitigation measures. The following behavioural practices will also be enforced: - No swearing or unnecessary shouting or loud stereos/radios; on site. - No dropping of materials from height; throwing of metal items; and slamming of doors.	Environment Manager	All Scenarios	Keeps construction workforce informed of actions required to minimise noise and vibration impact
CNV3	Management	Behavioural Practices	Noise and Vibration		Environment Manager	All Scenarios	0-20dB reduction Reduce annoyance + sleep disturbance

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				- No excessive revving of plant and vehicle engines. - Controlled release of compressed air. At no time can noise generated by construction exceed the National Standard for exposure to noise in the occupational environment of an eight-hour equivalent continuous A-weighted sound pressure level of Leq,8h of 85dBA for any employee working at a location near the Project. Refer to **Section 9** of this Plan for further detail.			
CNV4	Management	Noise Monitoring	Noise	Refer to **Section 10** of this Plan for further detail. Operator attended noise monitoring and vibration monitoring will be undertaken during in the early phases of work to verify predicted noise levels and confirm that vibration levels satisfy the criteria. This will determine the appropriate mitigation and management measures required for remaining works. In accordance with **CoA – C11** real time noise and vibration monitoring must be undertaken for the CSM project. The real time data must be available to the construction team, Proponent, ER and AA in real time. The Department and EPA must be provided with access to the real time monitoring data in real time. In accordance with **CoA – E37 and 38**, the ICNG penalties identified for 'particularly annoying' activities (that require the addition of 5dBA to the predicted level before comparing to the construction NML) will be applied.	Environment Manager	The focus will be for all scenarios in the early stages of work to verify predicted noise levels and confirm that noise levels satisfy the criteria. Real-time noise monitoring will be conducted across all works, including the night-time period where sleep disturbance impacts will be monitored. Where high noise impacts are anticipated, the focus of monitoring will be operator attended noise monitoring. Noise monitoring is	Minimises noise and vibration impact

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				In accordance with **CoA – E30** LOR must conduct vibration testing before and during vibration generating activities that have the potential to impact on heritage items (i.e. Central Station Buildings) to identify minimum working distances to prevent cosmetic damage.		further outlined in Section 10 of this CNVMP.	
CNV5	Management	Vibration Monitoring	Vibration		Environment Manager	Vibration monitoring devices will be located on sensitive buildings and rail infrastructure in Central Station where vibration intensive works occur within safe work distances. Human Comfort monitoring will focus on SCN23 (Demolition of Bounce Hotel).	Reduces vibration impact + risk of building damage
CNV6	Source Control	Construction Hours and Scheduling	Noise and Vibration	Where feasible and reasonable, construction will be carried out during the standard daytime working hours. The approved **CoA – E36** and **EPL - 12208** standard construction hours are as follows: All general construction works, and activity will be scheduled to occur between these hours, unless OOHW becomes necessary: • 7:00am to 6:00pm Mondays to Fridays, inclusive • 8:00am to 1:00pm Saturdays; and • at no time on Sundays or public holidays. High noise generating activities will be scheduled for less sensitive period considering the nearby receptors as per **REMM NV1**	Environment Manager Site Supervisor	All Scenarios (The Sydney Metro OOHW Protocol and OOHW Application Form will also be applied for any work outside the approved hours)	Minimise high noise impact and reduce risk of annoyance.

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				Modifying demolition works sequencing / hours to minimise impacts during peak pedestrian times and / or adjoining neighbour outdoor activity periods as per **REMM NV7.** Sequencing works to shield noise sensitive receptors by retaining building wall elements as per **REMM NV7.** In accordance with **CoA - E46** rock breaking and other particularly annoying activities are not permitted outside of standard construction hours (except at Central, excluding Central Walk Works at 20-28 Chalmers St), unless the noise management level derived from the ICNG can be achieved at sensitive receptors. Refer **Section 5** of this plan for further detail.			
CNV7	Source Control	Construction Respite Period	Noise and Vibration	LOR will obtain their own EPL prior to construction works commencing which will include provisions for high noise generating activities that need to be undertaken outside standard working hours. In accordance with **CoA – E37,** all receptors with the potential to experience internal noise levels of $L_{eq\ 15\ minute}$ 60 dBA from construction works and activities will be identified and where applicable works scheduled to occur between these hours 7am and 8pm to meet this criterion (refer to CNVIS for background information). In accordance with **CoA – E38, CoA – E39 and CoA - E40** LOR will take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receptor	Environment Manager Site Supervisor	All scenarios where high airborne/ground-borne noise and vibration generating activities are planned	Minimise noise and vibration impact and reduce risk of annoyance

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				In accordance with **CoA 46** rock breaking and other particularly annoying activities are not permitted outside of standard construction hours, except at Central, unless the noise management level derived from the Interim Construction Noise Guideline can be achieved at sensitive receptors. Refer **Section 5** of this plan for further detail.			
CNV8	Source Control	Equipment Selection	Noise	Quieter and less vibration emitting construction methods will be used where feasible and reasonable. The following will occur: • Selection of plant and equipment based on least noise emission levels where reasonable • Select materials which require lower vibration generating activities to occur e.g. less compaction etc. • Using noise source controls, such as the use of residential class mufflers, to reduce noise from all plant and equipment including excavators and trucks • Plant and equipment will be regularly maintained and repaired or replaced if it becomes noisy • Silenced generators and compressors will be used where possible • Quiet plant and processes will be selected wherever feasible, specifically, reversing alarms will be procured or retrofitted that are quieter and display less annoying characteristics. Such alarms will include	Environment Manager Site Supervisor	All Scenarios – these measures will be considered on a case by case basis and incorporated into the construction design if feasible and reasonable.	0-20dB reduction depending on selected equipment Less vibration impact + risk of annoyance

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				"smart alarms" and "quacker alarms" will occur where possible. • Maximise use of hydraulic concrete shears in lieu of dampened hammers/rock breakers during demolition as per **REMM NV7**.			
CNV9	Source Control	Maximum Noise Levels	Noise	The noise levels of plant and equipment will be selected to have operating Sound Power Levels compliant with the values presented in **Appendix B** of this Plan. Table 11 and 12 of the CNVS (or AS2436) will be utilised where necessary e.g. new equipment are introduced to the works.	Environment Manager	All Scenarios	Varies depending on plant sound power level
CNV10	Source Control	Rental Plant and Equipment	Noise		Environment Manager	All Scenarios	Varies depending on plant sound power level Noisy equipment replaced
CNV11	Source Control	Plan worksites and activities to minimise noise and vibration.	Noise	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.	Environment Manager	All scenarios	Reduce noise/ vibration impact + risk of annoyance
CNV12	Source Control	Non-tonal reversing alarms.	Noise	Non-tonal reversing beepers (or an equivalent mechanism) will be fitted and used on all construction vehicles and mobile plant regularly used on site (and for any out of hours work) where appropriate.	Site Supervisor	All Scenarios	5-10dB reduction
CNV13	Source Control	Use and siting of plant.	Noise and Vibration	The Construction Noise and Vibration Strategy would be implemented with the aim of achieving the noise management levels where feasible and reasonable. This would include the following example standard mitigation measures where feasible and reasonable:	Environment Manager Site Supervisor	All Scenarios	Reduce noise/vibration impact + risk of annoyance Reduce annoyance + sleep disturbance

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				• Provision of hoarding or noise barriers around the site where reasonable and feasible. • Where feasible, simultaneous operation of noisy plant would be avoided. • The offset distance between noisy plant and adjacent sensitive receptors will be maximised. • Plant used intermittently to be throttled down or shut down. • Noise-emitting plant to be directed away from sensitive receptors. • Select and use lower vibrating generating equipment. • Adhere to the safe working distances identified in Section 6.1.2 where reasonable and feasible. • Residential grade mufflers will be fitted to all mobile plant. • Maximise use of hydraulic concrete shears in lieu of dampened rock hammers as per **REMM NV7.** • Non-tonal reversing alarms will be fitted to all permanent mobile plant. • The layout of construction sites will consider opportunities to shield receptors from noise.			
CNV14	Source Control	Minimise disturbance arising from delivery of goods to construction sites.	Noise	Construction vehicles will be operated so as to minimise any construction noise impacts from the construction site. To achieve this the following will occur:	Environment Manager Site Supervisor	All Scenarios	Reduce noise/ vibration impact + risk of annoyance

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				• Loading and unloading of materials/deliveries will occur as far as possible from receptors. • Site access points and roads will be selected as far as possible away from receptors. • Dedicated loading/unloading areas to be shielded if close to receptors. • Delivery vehicles will be fitted with straps rather than chains for unloading, wherever reasonable and feasible. • Delivery personnel and truck drivers to be made aware of approved haulage routes and access in and out of the construction site. • Prevention of vehicles and plant queuing and idling outside the site prior to the morning start time. • Pre-determined delivery times will be issued to suppliers and radio communication will be used to confirm status of the delivery. • Any unsatisfactory noise performance for specific vehicles and/or the operators will be dealt with on a case by case basis.			Reduce annoyance + sleep disturbance
CNV15	Emission Path (source to receptor)	Shield stationary noise sources such as Cranes and Concrete Pumps etc.	Noise	This may include a site boundary fence optimised to reduce construction noise. Where item specific shielding becomes necessary, stationary noise sources will be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.	Environment Manager	All Scenarios – this measure will be considered on a case by case basis and incorporated into the construction design if	5-10dB reduction

ID	Measure	Action Required	Applies To	Details	Responsible	Applicable Work Phase or Activity	Estimated benefit
				Guidance for noise reducing shielding/barriers will be taken from AS2436 or other relevant standards where necessary.		feasible and reasonable.	
CNV16	Emission Path (source to receptor)	Shield sensitive receptors from noisy activities.	Noise	This may include a site boundary fence optimised to reduce construction noise. Where shielding becomes necessary, structures will be used to shield residential receptors from noise. This may include site shed placement; fencing, when situating plant. Guidance for noise reducing shielding/barriers will be taken from AS2436 or other relevant standards where necessary.	Environment Manager	All Scenarios – this measure will be considered on a case by case basis and incorporated into the construction design if feasible and reasonable.	5-10dB reduction
CNV17	Emission Path (source to receptor)	Safe Working Distances	Vibration	Refer **Section 6.1.2**	Environmental Manager	Aboveground Scenarios: SCN06, SCN08, SCN10, SCN14, SCN16 – SCN23, SCN29, SCN30, SCN32, SCN34 and SCN36. Underground scenarios: U-SCN01, U-SCN03, U-SCN05 and U-SCN09. (Refer to Table 8.3)	Limits building damage and risk of annoyance to receivers

8.1.1 Construction Observed to Exceed Management Levels

Where construction is observed to exceed management levels for air-borne noise, ground-borne noise or vibration, the following will occur:

- Alternate work methodologies and plant will be investigated and considered to lower noise levels of construction works at the relevant receptors
- Excessively noisy or vibration generating activities would cease or reduced under direction of the Environment Manager or Site Supervisor. Remedial measures would be implemented prior to recommencing work, and monitoring undertaken to verify noise or vibration levels if necessary
- Plant and machinery will be checked and verified for noise levels and appropriate exhaust/fittings/noise attenuators.
- In the event of appreciable vibration levels arising, measures would be put in place to reduce vibration to within acceptable levels. Such measures may include reducing equipment size, changing operational settings, using other plant in lieu of that which is generating the vibration or a combination of these.
- Where vibration levels are predicted to exceed the screening criteria, a more detailed assessment of the structure and attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure. The prediction of an exceedance of vibration levels will be the trigger for the implementation of mitigation measures, in accordance with NV3.
- For heritage items, the more detailed assessment would specifically consider the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.

These actions are the responsibility of the Environment Manager and Site Supervisor and will be documented with the monthly environmental reporting refer **Section 12.1.**

8.1.2 Ground-Borne Noise – Safe Working Distances

Ground-borne noise was assessed in the CNVIS by predicting safe work distances utilising the indicative ground-borne noise levels identified in the EIS for road headers and rock breakers. These safe working distances are outlined in **Table 8.2** below.

Table 8.2 Ground-Borne Noise Safe Working Distances

Plant Item	Safe Working Distance – metres (m)			
	Residential Day	Residential Evening	Residential Night	Commercial Day
Rock Breakers	45 m	55 m	75 m	35 m
Road Headers	10 m	20 m	30 m	5 m

Source: CNVIS

1. Daytime means between 7:00am and 6:00pm, Monday to Sunday inclusive
2. Evening means between 6:00pm and 10:00pm, Monday to Sunday inclusive; and
3. Night-time means between 10:00pm to 7:00am, Monday to Sunday inclusive.

8.1.3 Ground-Borne Vibration – Safe Working Distances

In accordance with the CNVS, attended vibration measurements are required at the commencement of vibration generating activities to confirm that vibration levels satisfy the criteria for that vibration generating activity. Where there is potential for exceedances of the criteria further vibration site law investigations would be undertaken to determine the site-specific safe working distances for that vibration generating activity. Continuous vibration monitoring with audible and visible alarms would be conducted at the nearest sensitive receptors whenever vibration generating activities need to take place inside the calculated safe-working distances.

The TfNSW CNS defines safe working distances for vibration intensive activities. As was adopted for the CNVIS and reproduced in **Table 8.3.** These safe work distances will be adopted during CSM works as a guideline to determine further mitigation. The safe working distances are defined for both cosmetic damage (BS 7385) and human comfort (the NSW Vibration Guideline).

Table 8.3 Ground-Borne Vibration Safe Working Distances

Plant Item	Rating/Description	Safe Working Distance – metres (m)	
		Cosmetic Damage (BS 7385)	Human Comfort (the NSW Vibration Guideline)
Vibratory Roller	< 50 kN (Typically 1-2 tonnes)	5 m	15 m to 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (> 18 tonnes)	25 m	100 m
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2 m	7 m
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7 m	23 m
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	20 m
Pile Boring	≤ 800 mm	2 m (nominal)	n/a
Jackhammer	Handheld	1 m (nominal)	Avoid contact with structure

Source: CNS

These safe working distances are indicative only and will vary depending on the particular item of plant and local geotechnical conditions. They apply to cosmetic damage of typical buildings under typical geotechnical conditions.

For significant equipment not listed above or for any highly sensitive receptors identified during works, specific assessment may be undertaken during works to ensure satisfactory operation of the equipment and to determine if any other mitigation or management measures are required to minimise the potential impacts.

In relation to human comfort, the safe working distances above relate to continuous vibration. For most construction activities, vibration emissions are intermittent in nature and for this reason, higher vibration levels, occurring over shorter periods may be allowed. A targeted assessment may be undertaken during works to evaluate any decrease in human comfort safe work distance offsets and to determine if any other mitigation or management measures are required to minimise the potential impacts.

The CNS safe work distances were derived from BS7385 as relevant to cosmetic damage to buildings. BS7385 is a frequency (Hz) dependant criterion (less stringent at higher frequencies) and as such, works and activities may be able to occur at distances closer than those nominated in **Table 8.3** without any cosmetic or structural damage impacts occurring. This is typical of construction and demolition works in close proximity to other buildings and highlights the need to monitor and establish compliant levels during the early stages of vibration significant activities. Refer to **Section 10** for vibration monitoring requirements.

8.1.4 Managing Potential Impacts to Heritage Structures

Details of specific monitoring requirements for heritage structures are described in **Section 10**. The monitoring is designed to prevent damage to any heritage items and includes procedures for identifying minimum working distances.

Impacts to heritage structures are not expected, such that detailed options for any alteration of construction methodology will be evaluated and implemented on a case-by-case basis and if specific circumstances arise that deem it necessary.

This management practice will be based on the monitoring procedures described in **Section 10** of this CNVMP. The Central Station buildings have been identified as state significant heritage structures in close proximity to the site and monitoring will therefore be required in the early stages of work to confirm that vibration levels satisfy the cosmetic damage criteria outlined in Section 6.4 of this report, in accordance with the CNVS. Vibration monitoring devices will be located on sensitive buildings and rail infrastructure where vibration intensive works occur within the safe work distances outlined in **Section 8.1.4**.

8.2 Additional Mitigation Measures

The CNVIS has concluded that noise and vibration impacts associated with CSM works are likely to occur. A range of feasible and reasonable mitigation measures designed to minimise noise and vibration levels at the nearest receptors have been established as documented in **Section 8.1** of this CNVMP. These standard measures will be implemented during CSM works in accordance with Section 7 of the CNVS, consistent with the intent of the ICNG and to achieve all CoA.

The implementation of the standard mitigation measures and community consultation should significantly reduce the noise and vibration impacts on nearby sensitive receptors. Nevertheless, due to the highly variable nature of activities associated with the CSM construction; noise and vibration exceedances could occur under exceptional circumstances.

As this potential exists, a number of additional measures to mitigate such exceedances (primarily aimed at proactive engagement with affected sensitive receptors) should be explored as per the requirements of Section 8 of the CNVS and have been included in this CNVMP. The additional mitigation measures are outlined in **Table 8.4** below. Additional mitigation measures will apply to residential receivers located in non-residential zones if the noise and vibration levels outlined in **CoA E41** are reached, and residential receivers located in residential zones if the noise and vibration levels outlined in **CoA E42** are reached.

Table 8.4 Additional Mitigation Measures

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

Source: CNVS

In circumstances where, after the application of the standard mitigation measures, the construction noise and vibration levels are still predicted to exceed the noise or vibration objectives, the relevant Additional Mitigation Measures Matrix (AMMM) from the CNVS are to be used to determine the additional measures to be implemented. Using the relevant AMMM, the following steps will be carried out to determine the additional mitigation measures that will be implemented prior to the commencement of construction activities:

- Determine the time period when the work is to be undertaken
- Determine the level of exceedance; and
- Identify the relevant additional mitigation measures from **Table 8.4, Table 8.5, Table 8.6** and **Table 8.7**.

The relevant AMMM for airborne noise is reproduced in **Table 8.5** and the relevant AMMM for the ground-borne noise and ground-borne vibration are reproduced in **Table 8.6** and **Table 8.7**.

Table 8.5 Additional Mitigation Measures Matrix (AMMM) – (Airborne Noise)

Time Period		Mitigation Measures $L_{eq, 15minute}$ Noise Level above Background (RBL) in dBA			
		0 to 10	11 to 20	21 to 30	>30
		Noticeable	Clearly Audible	Moderately Intrusive	Highly Intrusive
Standard	Mon-Fri (7am-6pm)	-	-	M, LB	M, LB
	Sat (8am-6pm)				
	Sun/Pub Hol (Nil)				
OOHW Period 1	Mon-Fri (6pm-10pm)	-	LB	M, LB	M, IB, LB, PC, RO, SN
	Sat (6pm-10pm)				
	Sun/Pub Hol (8am-6pm)				
OOHW Period 2	Mon-Fri (10pm-7am)	-	M, LB	M, IB, LB, PC, RO, SN	AA, M, IB, LB, PC, RO, SN
	Sat (10pm-8am)				
	Sun/Pub Hol (6pm-7am)				
Source: CNVS					

Table 8.6 Additional Mitigation Measures Matrix (AMMM) – (Ground-borne Noise)

Time Period		Mitigation Measures $L_{Aeq, 15minute}$ Noise Level above Background (RBL) in dBA		
		0 to 10	10 to 20	>20
Standard	Mon-Fri (7am-6pm)	LB	LB	M, LB, SN
	Sat (8am-6pm)			
	Sun/Pub Hol (Nil)			
OOHW Period 1	Mon-Fri (6pm-10pm)	LB	M, LB, SN	M, IB, LB, PC, RO, SN
	Sat (7am-8am & 6pm-10pm)			
	Sun/Pub Hol (8am-6pm)			
OOHW Period 2	Mon-Fri (10pm-7am)	M, LB, SN	AA, M, IB, LB, PC, RO, SN	AA, M, IB, LB, PC, RO, SN
	Sat (10pm-8am)			
	Sun/Pub Hol (6pm-7am)			
Source: CNVS				

Table 8.7 Additional Mitigation Measures Matrix (AMMM) – (Ground-borne Vibration)

Time Period		Mitigation Measures Predicted Vibration Levels Exceed Human Comfort Criteria (BS 6472:1992, refer Section 6)
Standard	Mon-Fri (7am-6pm)	M, LB, RO
	Sat (8am-6pm)	
	Sun/Pub Hol (Nil)	
OOHW Period 1	Mon-Fri (6pm-10pm)	M, IB, LB, PC, RO, SN
	Sat (7am-8am & 6pm-10pm)	
	Sun/Pub Hol (8am-6pm)	
OOHW Period 2	Mon-Fri (10pm-7am)	AA, M, IB, LB, PC, RO, SN
	Sat (10pm-8am)	
	Sun/Pub Hol (6pm-7am)	
Source: CNVS		

9. Training

As per the **CoA – C2 (k)**, recommendations of the CNVIS and commitments made in the EIS, training will be undertaken in accordance with the CSM CEMP and any additional measures set out in the CSM sub-plans, including this CNVMP.

In summary, all site personnel, contractors and sub-contractors shall undergo site specific induction training, which will include noise and vibration management training developed with an emphasis on understanding and managing impacts from the work activities being undertaken.

This site-specific induction training will include:

- the location of potentially sensitive receptors
- site hours of operation i.e. the permissible hours of work, including deliveries
- any limitations on high noise generating activities
- construction employee parking areas
- details of the complaints handling procedure; and
- details of the environmental incident procedures.

The site-specific induction will also outline the consequences of not complying with these measures.

Toolbox meetings will also be undertaken as and when required; covering specific environmental issues and will include noise and vibration control measures where required, including but not limited to:

- Ensuring work occurs within approved hours
- Relevant noise and vibration mitigation measures
- Locating noisy equipment away from sensitive receptors
- Ensuring plant and equipment is well maintained and not making excessive noise
- Emphasis that there should be no swearing, shouting or loud stereos/radios on site
- Turning off machinery when not in use; and
- Designated loading/unloading areas and procedures.

Toolbox training on noise and vibration management requirements and measures will be completed by the Environmental Manager (or nominated delegate) during the CSM project.

Personnel directly involved in implementing noise and vibration control measures on site will be given specific training in the various measures to be implemented. Records of all training will be filed in accordance with LOR project filing system.

10. Noise and Vibration Monitoring Program

Monitoring for CSM works will be implemented at the commencement of works and at regular intervals throughout the project (i.e. when new construction activities commence) to quantify the airborne noise, ground-borne noise and vibration levels associated with construction activities. Monitoring will also be required in the event of a complaint being received or during OOHW where the AMMM has identified monitoring.

Where it has been identified that specific construction activities are likely to exceed the relevant noise or vibration goals (as is the case for select project works), noise or vibration monitoring may be conducted at the affected receptor(s) or a nominated representative location (typically the nearest receptor where more than one receptor have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the noise or vibration goal is being approached so that work methodology or equipment being used can be altered, and / or additional management measures may be implemented.

In accordance with **CoA – C13**, this Construction Monitoring Program must be endorsed by the ER and then submitted to the Secretary for approval at least one month before commencement of construction or within another timeframe agreed with the Secretary. **CoA– C14** also specifies that construction must not commence until the Secretary has approved the Construction Monitoring Program, and all relevant baseline data for the specific construction activity has been collected.

This Construction Monitoring Program, as outlined in **CoA – C15** must be implemented for the duration of construction and for any longer period set out in the monitoring program or specified by the Secretary, whichever is the greater.

10.1 Baseline data

The existing noise environment have been quantified (via measurement) at the closest and/or potentially most affected receptors situated surrounding the CSM site. This is detailed in **Section 3** of this CNVMP. RBLs representative of each of the potentially sensitive receptors identified for this CNVMP are presented in **Table 3.1** for the day, evening and night-time periods.

Based on the ICNG and CNVS methodology summarised in **Section 4**, construction NMLs will apply to the CSM works as presented in **Table 5.1**.

As noted in **Section 4** the ICNG defines fixed management levels for other sensitive receptors and non-residential sensitive land uses. These values are reproduced in **Table 4.2**.

10.2 General Monitoring Requirements

All construction noise and vibration monitoring will be undertaken generally in accordance with the construction noise and vibration monitoring guideline which is included in Appendix A of the CNVS (refer Appendix G of this CNVMP). This outlines the minimum requirements for contractors undertaking monitoring on the Sydney Metro Project. Requirements for further consultation are detailed in **Sections 5**, **11** and **12** of this CNVMP:

In accordance with **CoA - C11** unattended real-time noise and vibration monitoring will the focus of monitoring however attended noise and vibration monitoring may be undertaken where specific circumstances warrant. Vibration monitoring devices will be installed at all sensitive buildings and rail infrastructure in close proximity to CSM works. Unattended real-time noise monitoring devices will be installed at locations representative of the nearest and potentially most affect receptors.

Unattended real-time noise monitoring devices may be supplemented with operator attended noise monitoring. The benefit of attended noise monitoring is that the results can be fed back directly to the CSM project team and actions taken without delay. For vibration it is typical that unattended monitoring is undertaken, however the device may be observed by LOR (or their specialist) during the early stages of certain works to provide real time feedback of results to the CSM project team, based on which actions can be taken without delay.

As per **CoA - C11** real time monitoring data will be available to the construction team, LOR, ER, AA, the DPE and the EPA in real time, as required. Unattended monitoring will continuously measure noise or vibration

levels for the duration of the monitoring period, except during device maintenance or down time. Further detail on noise and vibration requirements are outlined below.

All attended measurements will be conducted by appropriately trained personnel in the measurement and assessment of construction noise and vibration. They will be familiar with the requirements of the relevant standards and procedures.

10.2.1 Noise Measurement Requirements

Attended noise measurements will be conducted by an operator using a handheld Type 1 or Type 2 'integrating-averaging' sound level meter. A calibration check will be conducted prior to and after all measurement rounds. Measurements will be completed with the sound level meter mounted to a tripod (if possible) and with a windscreen fitted. Instantaneous noise levels for all noted noise emission sources (extraneous or otherwise), meteorological conditions (average and maximum wind speeds, temperature, precipitation and cloud cover etc.) shall be recorded during all measurements. The location of monitoring, time of measurement and all relevant measurement parameters (i.e. LAeq, LAmin, LAmax, LA1, LA10 and LA90) should also be recorded.

Unattended noise measurements would be conducted using a Type 1 or Type 2 environmental noise logger. The device will be calibrated prior to and after installation (and periodically during the monitoring period), with any change in calibration levels noted. Measurements will be completed with a windscreen fitted.

Noise monitoring will not be completed within 3 m of any reflective structure or wall, if possible. Where it is not possible to measure more than 3 m from any reflective structure or wall, a reduction of up to 2.5 dB will be applied to the measured ambient and site noise contribution (LAeq, 15 minute) to account for the likely increase in noise associated with reflective surfaces. No noise monitoring will be completed during periods where wind speeds exceed 5 m/s at the microphone or during any rain events.

Monitoring will be conducted as per the requirements of this CNVMP and with due regard to AS1055; AS61672, AS1259 (or similar); IEC60942; or the NSW Vibration Guideline as relevant to the monitoring being conducted as well as As 2659.1-1998 *Guide to the use of sound measuring equipment – portable sound level meters,* or any revisions of that standard which may be made by Standards Australia, and the compliance monitoring guidance provided in the NSW INP in accordance with Condition M7.1 of the EPL.

All noise samples shall be recorded using the "fast" time response of the sound level meter.

Site activity records will be maintained during any noise (or vibration) monitoring events.

The licensee must undertake noise and vibration monitoring as directed by an authorised officer of the EPA in accordance with Condition M7.3 of the Project EPL.

10.2.2 Vibration Measurement Requirements

Any vibration monitoring must be undertaken in accordance with the technical guidance provided in the *Environmental Noise Management Assessing Vibration: A Technical Guideline* (DECC, 2006). All vibration monitoring results may be assessed and reported against the acceptable values of human exposure to vibration set out in Tables 2.2 and 2.4 of the guideline.

Unattended vibration monitoring will be undertaken with due regard to and in accordance with the requirements of the CNVS and ICNG using a calibrated vibration logger.

When vibration intensive activities are required e.g. vibratory compaction, sheet piling and demolition, the device will be placed (fixed to the structure or embedded in the ground nearby the structure) at the potentially most affected receptor or structure prior to works commencing.

Where other activities are identified to include risk that levels may exceed structural damage criteria attended vibration monitoring will also be conducted, with measured values to be observed during the first 30 minutes of works to ensure structural damage criteria are not exceeded.

The device will be set to continuously record vibration levels (PPV data in mm/s) at sample intervals (e.g. 5 second, 15 second or 1 minute) appropriate to the activity. Vibration Dose Values (VDV, m/s^2) are reliant on 1) the duration of vibration events and 2) the component frequency (in Hz) associated with the vibration being

generated. Hence VDV will be estimated and evaluated regularly during the early stages of the activity and monitoring period. A PPV trigger level will be established during these early stages to inform the real time management of vibration (e.g. alternate construction methods or respite).

10.2.3 Noise Monitoring in the Community

Attended noise measurements will be undertaken at the closest and potentially most affected receptors (for each scenario) identified in the CNVIS (refer **Figure 3.1** to **3.5**.) from the commencement of construction activities to confirm that the noise levels in the adjacent community are consistent with the predictions the CNVIS as reproduced in this CNVMP. Other potentially affected receptors will also be considered as part of the monitoring regime depending on the phase of works.

Noise monitoring will be undertaken on all work phases as detailed in **Table 9.1**. Monitoring for the CSM project will be required at the commencement of works and throughout the Project (i.e. when new construction activities commence) to quantify the airborne noise, ground borne noise and vibration levels associated with construction activities. Monitoring would also be required in the event of a complaint being received and would be conducted at the most affected receptor in accordance with Appendix A of the CNVS.

In accordance with **CoA - C11** unattended real-time noise monitoring will be undertaken throughout the project at the most affected receptor locations or at representative locations where site noise level contributions at the nearest sensitive receptors can be monitored.

Community noise monitoring will ensure the $L_{Aeq,\ 15minute}$ and $L_{A90,\ 15minute}$ parameters are recorded as a minimum. The site noise level contribution ($L_{Aeq,\ 15minute}$) shall be determined in the absence of any influential source not associated with the CSM works for direct comparison to the relevant criteria. The L_{Amax}, L_{Amin}, L_{A1} and L_{A10} parameters should be recorded for each measurement with the $L_{A1,\ 1minute}$ parameter measured directly or calculated where possible and if applicable.

The community noise measurement sample height will be 1.5 m above ground level. The duration of each community noise measurement sample will be 15 minutes. All measurements will be completed with the sound level meter mounted to a tripod (if possible) and with a windscreen fitted. The devices microphone will be focused on the noise emission centre of the equipment being tested.

If community noise monitoring identified that predicted noise levels are being exceeded, LOR will revisit construction practices/sequencing etc. in order to reduce noise levels, minimise impacts and to enable provision of information on noise levels to surrounding and potentially affected residents should this be required (i.e. on request or following a complaint).

Where OOHW is approved and monitoring is determined to be required, attended noise measurements will be conducted at the most affected receptors following the general and community monitoring requirements specified above.

A summary of the CSM noise monitoring program is given below in **Table 10.1**.

Table 10.1 - CSM noise monitoring program summary

ID	Description	Target Locations Attended or Unattended	Frequency (as per AMMM)
SCN 01	Platforms & Sydney Yard: Stage 6 – Installing Services/Wiring	R24, R29, R31 R38	During OOH works.
SCN 02	Platforms & Sydney Yard: Stage 7 – Installing Services / Hoarding / Offices	R17, R20	Daytime standard construction hours.
		R17, R20, R24, R29, R31	During OOH works.
SCN 04	Platforms & Sydney Yard: Stage 8 & 10 - OHW on Platform 11/12 / Replace Track	R17, R18, R21, R24, R29, R31	During OOH works.

ID	Description	Target Locations Attended or Unattended	Frequency (as per AMMM)
	Country End 12/13 / Installing CSR		
SCN 05	Stage 12 - Piling Works / Removing Track	R17, R22, R24, R25, R29, R31, R35, R38, R39, R41, R43	During OOH works.
SCN 12	Metro Box: FRP Platform and Intercity slab	R17	Daytime standard construction hours.
SCN 13	Metro Box: Excavation to underside of Metro Concourse	R17, R22, R24, R29, R31, R35, R38, R39, R41, R43	During OOH works.
SCN 14	Metro Box: Ongoing Logistical support of Box Construction	R21, R33, R17, R18, R24, R29, R31, R23	During OOH works.
SCN 16A	Central Walk: Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	R24, R29, R31	During OOH works.
SCN 16B		R17, R24, R29, R31	
SCN 16C		R17, R24, R29, R31	
SCN 16D		R17, R24, R29, R31	
SCN 17	Central Walk: Construction of the new Standby Guards Rooms / demolition of existing standby guards' rooms	R21	Daytime standard construction hours.
		R17, R21, R23, R24, R29, R31, R35, R38, R39, R41, R43	During OOH works.
SCN 18	Central Walk: Construction of Platform Canopy Support System to Platforms 16 to 23 and Excavation of Launch Chambers	R17, R24, R29, R31, R35, R38, R39, R41, R43	During OOH works.
SCN 19	Central Walk: Platform works including works below the top slab	R24, R29, R31	During OOH works.
SCN 20	Central Walk: Platform Remodelling works including platform canopy modifications	R17, R24, R29, R31, R35, R38, R41	During OOH works.
SCN 22	ESR: Surface Works and Underground works	R17, R24, R29, R31	During OOH works.
SCN 23	East Entrance: Demolition of the Bounce Hotel	R21, R22, R23, R24, R26, R30	Daytime standard construction hours.
SCN 24	East Entrance: Piling for East Entrance	R21, R22, R23, R24, R26, R30	Daytime standard construction hours.
SCN 25	East Entrance: Excavation of East Entrance	R21, R22, R23, R24, R26	Daytime standard construction hours.
SCN 26	East Entrance: Excavation of Adit to ESR Concourse including Canopy Tube installation	R21, R22, R23, R24, R26, R30	Daytime standard construction hours.
SCN 27	East Entrance: FRP works to East Entrance	R21, R22, R23, R24, R26	Daytime standard construction hours.
SCN 28	East Entrance: East Entrance Works and Underground Works	R21, R22, R23, R26	Daytime standard construction hours.

ID	Description	Target Locations Attended or Unattended	Frequency (as per AMMM)
SCN 29	Grand Concourse: Piling in Grand Concourse	R17, R24, R29, R31, R41, R43, R50	During OOH works.
SCN 30	Grand Concourse: FRP Pile caps	R17, R20	Daytime standard construction hours.
		R16, R17, R20, R21, R24, R29, R31, R41, R42, R43, R50	During OOH works.
SCN 31	Grand Concourse: Removal of Existing Canopies	R17, R24, R29, R31	During OOH work.
SCN 32	Grand Concourse: Installation of precast / insitu columns and arches	R17, R20	Daytime standard construction hours.
		R16, R17, R20, R24, R29, R31, R41, R42, R43, R50	During OOH works.
SCN 34	Northern Concourse & North Entry: Demolition Southern Half	R17, R18, R21	Daytime standard construction hours.
SCN 35	Northern Concourse & North Entry: FRP of Structure (Floor, retaining wall, Columns)	R17, R18, R20, R21, R24, R31	Daytime standard construction hours.
SCN 36	Northern Concourse & North Entry: Demolition Northern Half	R17, R18, R21	Daytime standard construction hours.
SCN 37	Northern Concourse & North Entry: FRP of Structure (Floor, retaining wall, Columns)	R17, R18, R20, R21, R24, R31	Daytime standard construction hours.
SCN 38	Northern Concourse & North Entry: Installation of remaining precast columns and Arches	R17, R18, R21, R24	Daytime standard construction hours.
SCN 39	Sydney Yard Access Bridge: Heavy Vehicle Traffic on the SYAB	R43	Daytime standard construction hours.
		R25, R35, R38, R39, R41, R42, R43, R50	During OOH works.
Source: Appendix B, Appendix C.			

Provisions, Safeguards and Monitoring Contingencies (Concurrent Works)

The purpose of this monitoring contingency is consistent with that of the overall noise monitoring program documented in **Section 10** of this CNVMP: it will inform the relevant personnel if the noise management levels are being approached (or exceeded) so that the work methodology or equipment being used can be altered, and / or additional management measures may be implemented. This will assist to reduce emissions and avoid/minimise any impacts (or future increase in impact to those addressed by this CNVMP) so that the surrounding community and broader acoustics environment are safeguarded against further nuisance, or temporary reduction in amenity.

As recommended by the CNVIS and addressed as commitments in this CNVMP, noise monitoring will occur as per the requirements and specification presented in **Section 10**.

This monitoring will already occur for specific CSM construction activities that are likely to exceed the relevant noise management levels, as per the AMMM requirements, and in the form of either unattended monitoring or operator attended measurements.

All monitoring will enable the site noise level to be established in the absence of any influential source not associated with the CSM project, and comparison to the predicted values (refer **Appendix C**) and criteria presented in **Section 5** of this CNVMP. Monitoring will consider all CSM works occurring at the time “i.e.

concurrent works" so that the overall site noise level contribution is established before further evaluation. Should circumstances arise during the works that the potential for increased air-borne noise emissions are identified, or valid complaints are received on this regard; additional noise monitoring will occur. The processes for measuring and evaluating the noise data as presented in **Section 10** will be adhered to.

10.2.4 Ground-Borne Noise

The highest levels of ground-borne noise are expected to occur due to construction activities involving excavators with hydraulic hammers / rock breakers and road headers. These activities have been identified to occur during the following above ground scenarios; SCN14, SCN16 – SCN20 and SCN23. Potential ground-borne noise generating activities have also been identified in the following underground scenarios; U-SCN01, U-SCN03, U-SCN05 and U-SCN09. Where ground-borne noise generating activities are identified to occur within the safe working distances outlined in **Section 8.1.2** noise monitoring in the community will be undertaken to verify the noise level contribution from ground-borne noise generating activities.

Provisions, Safeguards and Monitoring Contingencies (Ground-borne Noise)

The purpose of this ground-borne noise monitoring contingency is consistent with that of the overall program documented in **Section 10** of this CNVMP: it will inform the relevant personnel if the management levels are being approached (or exceeded) so that the work methodology or equipment being used can be altered, and / or additional management measures may be implemented. This will assist to reduce emissions and avoid/minimise impacts so that the surrounding community and broader acoustics environment are safeguarded against further nuisance, or temporary reduction in amenity.

Should circumstances arise during the works where the potential for increased ground-borne noise emissions are identified, or valid complaints are received in this regard; noise monitoring will occur. The processes for measuring and evaluating the measured data presented in **Section 10** of this CNVMP will be adhered to. Specific to ground-borne noise, internal noise measurements i.e. inside the affected receptors property will occur, where access is granted. This monitoring will occur in the form of operator attended noise measurements.

Ground-borne noise monitoring will enable the site noise level to be established in the absence of any influential source not associated with the CSM project, and comparison to the predicted values (detailed in **Section 7.2.2**) and management levels presented in **Section 5** of this CNVMP.

10.2.5 Vibration Monitoring in the Community

Vibration monitoring will be undertaken at the potentially most affected receptors identified in the CNVIS from the commencement of vibration generating activities to confirm that the vibration levels at the nearest sensitive receptor are compliant with the criteria outlined the CNVIS and **Section 4.3** of this CNVMP. Vibration monitoring devices will be located on sensitive buildings and rail infrastructure in Central Station vibration intensive works occur within the safe working distances outlined in Section 8.1.2 and visually presented in **Appendix D**. Vibration monitoring will also be required at the Dental Hospital with a focus on impact to sensitive medical equipment during demolition of the Bounce Hotel.

In accordance with **CoA - C11** unattended real-time vibration monitoring will be undertaken throughout the project at the most affected receptor/structure locations or at representative locations where site vibration level contributions at the nearest sensitive receptors/structures can be monitored.

Where there is potential for levels to exceed criteria, further vibration site law investigations will be undertaken to determine the site-specific safe working distances for that vibration generating activity. Additionally, noise and/or vibration monitoring will be required at any receptor in response to a complaint which may arise at any stage during the construction works.

If and when site specific safe working distances are established, continuous unattended vibration monitoring will be conducted at the nearest sensitive receptors whenever vibration generating activities need to take place inside the calculated site specific safe-working distances.

At this stage vibration monitoring for human comfort will target SCN23 (Demolition of the Bounce Hotel) with monitoring of other work phases and activities being considered on a case by case basis, as detailed in **Table 8.1**.

The implementation of all noise and vibration mitigation measures will be monitored regularly throughout the works and audited as per the CEMP audit cycle. Where vibration levels are measured and verified to be compliant, no further vibration monitoring would be undertaken, unless for example complaints for human comfort are received.

No buildings were identified in proximity to the CSM project as structurally unsound in the tender documents. During the preparation of this CNVMP, heritage buildings within close proximity to the CSM project were being assessed by a structural engineer as part of the pre-construction surveys. In the unlikely event that a building is deemed structurally unsound during these surveys then the DIN4150 heritage criteria will be applied. However, at this stage it is considered that the heritage buildings in close proximity to the CSM works are structurally sound.

Heritage buildings and structures will be assessed as per the screening criteria in **Table 5.6** as they should not be assumed to be more sensitive to vibration unless they are found to be structurally unsound.

In accordance with **CoA - E31**, LOR will the advice of a heritage specialist on methods and locations for installing equipment used for vibration, movement and noise monitoring of heritage-listed structures.

Vibration is expected to occur due to construction activities involving vibratory rollers, excavators with hydraulic hammers / rock breakers and road headers. These activities have been identified to occur during the following above ground scenarios; SCN06, SCN08, SCN10, SCN14, SCN16 – SCN23, SCN29, SCN30, SCN32, SCN34 and SCN36. Vibration generating activities have also been identified in the following underground scenarios; U-SCN01, U-SCN03, U-SCN05 and U-SCN09.

10.2.6 Actions Following Monitoring in the Community

Actions to mitigate or manage noise or vibration emissions will be considered as per the measures described in **Section 8** of this CNVMP and the overall monitoring protocol identified in **Figure 10.1** below. The Environment Manager / Site Supervisor will be responsible for implementing the Monitoring and Action Protocol outlined below.

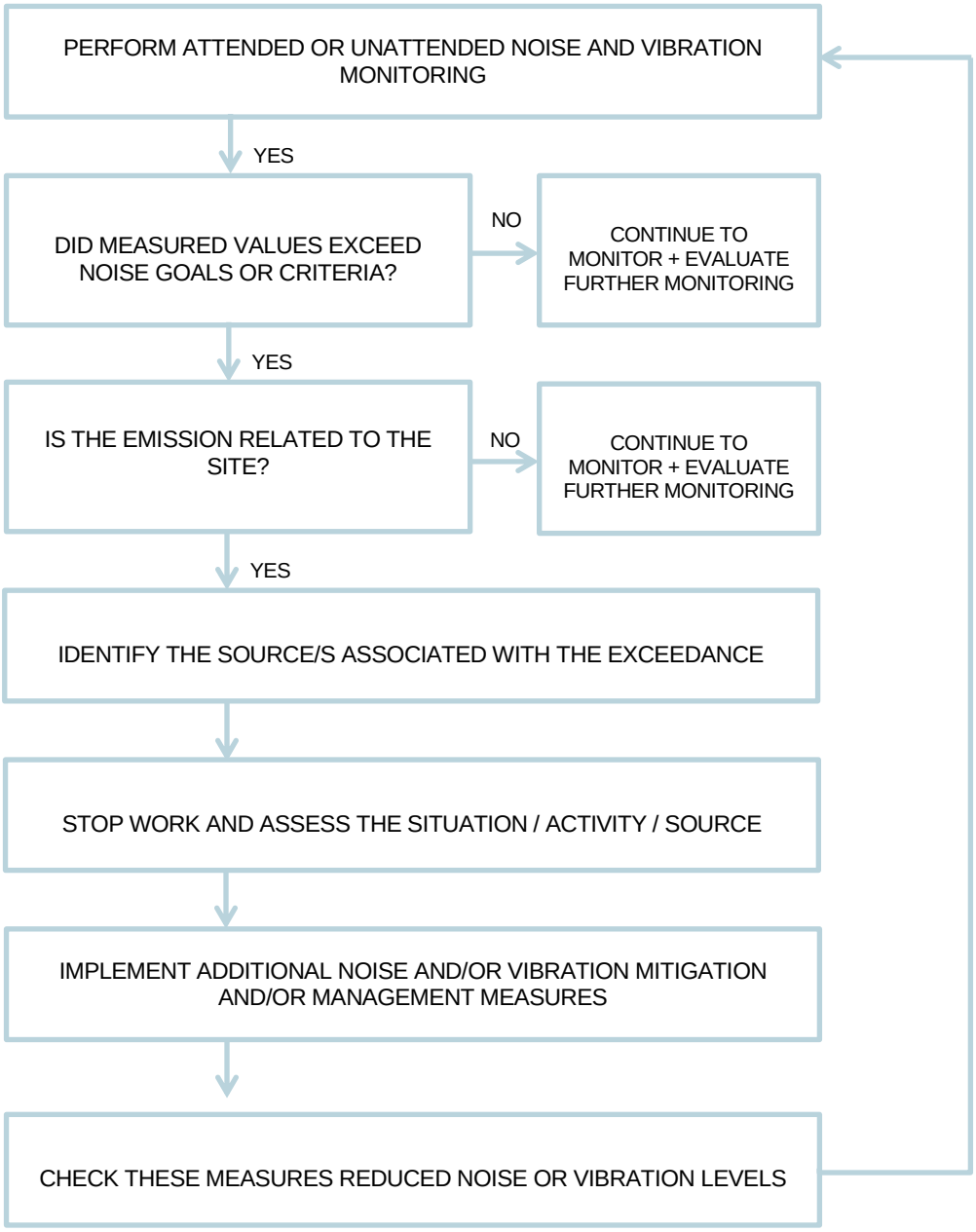


Figure 10.1 - Monitoring and Action Protocol

10.2.7 Maximum Noise Levels for Plant and Equipment

All significant noise generating items of plant, that are suspected of having an exceedance of the maximum allowable plant sound power levels listed in Table 11 of the CNVS, would have noise audits conducted in accordance with Section 9 of the CNVS. Where required, plant and equipment would be measured while operating under typical conditions. If this is not practical, it may be appropriate to conduct a stationary test at high idle. In the case of a sound power level exceeding the values identified in **Appendix B** (or Table 11 and 12 of the CNVS) the item of plant would either be replaced, or the advice of an acoustic consultant would be sought to provide suitable mitigation measures.

10.2.8 Noise and Vibration Reporting

All noise and vibration monitoring results will be assessed against the nominated goals. Noise and vibration monitoring data, and any other relevant information, will be provided to the AA to assist the AA in producing the monthly Noise and Vibration Report as required under **CoA** — **A25** and **A27vi**. As per **CoA - C16**, the results of the Construction Monitoring Program must be submitted in a Construction Monitoring Report to EPA and the City of Sydney Council and the DPE for information on a six-monthly basis. Reports will be prepared on a 6-monthly basis. Once finalised and endorsed, they will be submitted to the EPA, CoS, and DPE for information.

In accordance with CoA A28-A30 and the MR- E, within five business days of each Calendar Quarter Date, a register of ongoing Environmental Compliance Requirements (ECRs) must be submitted to the Environmental Representative for review in accordance with the Contract, which identifies progress and evidence of compliance against each ECR. The register of ECRs must classify each ECR as:

i. Ongoing or Complete, to indicate their progress; and
ii. Compliant or Non-Compliant, to indicate compliance.

To avoid confusion, the ECR is the same as the Compliance Tracking Program (CTP). The requirements are similar, and the report will be adapted to comply with any potential minor discrepancies.

Noise and vibration reports will be produced to demonstrate compliance with noise and vibration project objectives and will be generally in accordance with the CNVS Guideline. Refer to Appendix G. The following should be included in as a minimum (where relevant) in noise/vibration monitoring reports for individual monitoring events:

- The type of monitoring conducted (for example, at a particular project stage or following complaints) and a brief statement of the measurement method
- The noise/vibration conditions on the consent / licence, or the relevant noise management objectives
- Descriptions of the nearest affected residences and other sensitive land uses or, in the case of complaints, description of the complainant location and complaint
- Description of the instrumentation used
- The results of monitoring at each monitoring location, including a comparison with the consent conditions or relevant noise management objectives
- Vibration monitoring results summary together with notes describing any vibration intensive activities (if applicable)
- Summary of measurements exceeding the vibration criteria levels and descriptions of the plant or operations causing these exceedances (if available)
- Details of corrective action applicable to vibration criteria exceedances and confirmation of its successful implementation. Where corrective action has not yet been implemented, it may be shown as pending and the status of its implementation will be carried forward to following reports
- The location of the construction works in relation to the monitoring position. (sketch plan & sections, photos)
- Details of the various construction equipment in use during the measurement period
- Details as to the likely dominant noise sources

- Meteorological conditions (i.e. temperature, humidity, cloud cover, and wind speed and direction)
- A clear statement outlining the Project's compliance or non-compliance with the conditions or objectives where the monitored level is higher than the conditions or objectives; and
- The reasons for non-compliance should be stated, strategies for minimising noise identified and stated, and the appropriate actions to implement the mitigation and or management strategies.

11. Enquiries, Complaints and Incident Management

All complaints handling would be in accordance with the Sydney Metro Construction Complaints Management System. All community consultation would be in accordance with Sydney Metro Overarching Stakeholder and Community Involvement Plan and the Community Communications Strategy (as per **CoA – B2**). Various lines of communication will be made available for enquiries and complaints during construction of the Project with suitably qualified or experienced personnel made available to manage and respond, refer **Table 12.2**.

Complaints arising from CSM works will be treated sensitively and in a manner that recognises the potential for noise and vibration to cause environmental impacts. Special consideration will be given to complaints related to noise and vibration during highly intrusive works (particularly those activities when increased impacts are predicted) in order that any necessary additional mitigation can be implemented in a timely manner.

11.1 Project EPL 21148 CNVMP Administration

Specific operational controls to manage environmental issues are defined in the CEMP. Additional controls and criteria will be established and maintained where the absence of such could result in the environmental policy, objectives and targets not being met.

Under Condition 6.5M of EPL 21148, Noise and Vibration Complaints will be investigated within 2 hours of a complaint. This process will include the offer of monitoring if representative data is not available as soon as practicable or as agreed with the complainant. In accordance with R4.1 LOR will issue a report of complaints to the EPA by 2:00pm the following business day. In accordance with R4.2 a Preliminary Investigation Report may be requested by the EPA in respect of any noise or vibration monitoring undertaken in accordance with the requirements of Condition M6.5 and must be submitted to the EPA by 4:30pm on the afternoon of the following working day. A follow-Up Investigation Report will be submitted to the EPA within 5 working days.

12. Compliance Requirements and Hold Points

The activities outlined in the table below are not to proceed without objective review and approval by the nominated authority. These hold points should be incorporated into the working plans for the project (SWMS, work instructions, construction methodologies, etc.). Hold points are presented in **Table 12.1** below.

Table 12.1 Hold Points

Item	Process Held	Acceptance Criteria	Approval Authority
Construction Environmental Management Plan (CEMP) and sub-plans	Site activities	Site specific CEMP and sub-plans have been developed, reviewed and approved.	Department of Planning Industry and Environment.
Out of Hours Work (OOHW)	Works to be performed outside of approved construction hours	OOHW Protocol and Community Notification EPL 21148	LOR Environmental Manager ER, AA, TfNSW approval for works outside of EPL boundary

Source: CEMP

12.1 Roles and Responsibilities

Relevant roles and responsibilities associated with this CNVMP are presented in **Table 12.2**.

Table 12.2 Roles and responsibilities

Roles	Responsibilities
Environment Manager / Site Supervisor	• Oversee the overall implementation of this CNVMP. • Ensure that sufficient resources are allocated for the implementation of this CNVMP. • Consider and advise senior management on compliance obligations. • Ensure that the outcomes of compliance monitoring / incident reporting are systematically evaluated as part of ongoing management of construction activities. • Ensure all appropriate noise and vibration mitigation measures are implemented. • Where standard mitigation measures are deemed insufficient, undertake reasonable steps to manage adverse impacts and implement all additional measures. • Authorise cessation of construction activities on-site if exceedances are identified. • Ensure construction activity records / monitoring records/ incident reports are kept and maintained on-site. • Ensure audits of construction site activity records / monitoring records/ incident reports are undertaken as needed, findings are shared with relevant site personnel and corrective actions are implemented. • Ensure all relevant personnel have and understand the most up-to-date copy of this CNVMP. • Ensure that all requirements of this CNVMP are effectively implemented. • Ensure that any required actions arising from incident investigation processes during compliance construction monitoring are reported to the

Roles	Responsibilities
	relevant personnel for further action and ensure that the actions are effectively implemented. • Coordinate the implementation of monitoring requirements and corrective actions. • Ensure that experienced, trained or qualified personnel conduct the noise (or vibration) monitoring. • Ensure all monitoring reporting requirements are met and maintained on site. • Acts as a primary site contact for any valid complaints received via the Community Place Manager. • Authorise all monitoring reports and any revisions to this CNVMP.
Site personnel and subcontractors	• Understand and implement mitigation as required in the CNVMP and any additional required measures identified during construction. • Participate (or conduct if authorised) in relevant training to implement the requirements of this CNVMP.
Noise and Vibration Monitoring Personnel (LOR / consultants)	• Undertake relevant training to implement the requirements of this CNVMP. • Undertake all monitoring activities in accordance with this CNVMP. • Ensure regular maintenance of monitoring equipment. • Ensure all relevant monitoring quality control / assurance procedures are effectively implemented.
Community Place Manager	• Provide key stakeholders and the community with information about construction progress. • Ensure people understand the scope of the works and mitigation measures. • Ensure key stakeholders and the community understand the proposed timing of the works. • Take steps to minimise potential impacts from construction works. • Work closely with the CSM project team to coordinate consultation activities with the community and other stakeholders. • Be the single point of contact for affected stakeholder and the community and the project team, who will proactively doorknock properties and also respond quickly to any issues or complaints raised. • Be available at all times that any activities are being performed on any construction site to answer any questions, concerns, complaints or enquires in relation to activities. • Produce and distribute all community notifications relating to contractor activities. • Develop, produce and distribute site specific quarterly newsletters to inform the community of the progress and key milestones or activities taking place during the following three months. • Distribute newsletters to all affected commercial and residential properties within a minimum of 500 metre radius of the construction site. • Record all interactions with stakeholders on Consultation. • Provide an initial response to email/written correspondence (letters/faxes) within 48 hours. • Provide feedback to requests for information from the Sydney Metro Communication and Engagement team Sydney Metro Communication and Engagement team within two hours. • Refer enquiries not associated with contractor activities to Sydney Metro Project Communications team immediately. • Record all interactions with stakeholders in accordance with Consultation Manager data entry procedure within 48 hours. • Manage calls to the community information line and redirect to appropriate team members or contractors.

Roles	Responsibilities
	• Provide at least an oral response to calls forwarded from the community information line within two hours unless otherwise agreed. • Lead or be involved in any consultation activities arising from community enquiries as notified by the contractor.
Environment Representative	In accordance with **CoA - A24** the ER has the following roles and responsibilities: • receive and respond to communications from the Secretary in relation to the environmental performance of the CSSI. • consider and inform the Secretary on matters specified in the terms of this approval. • consider and recommend any improvements that may be made to work practices to avoid or minimise adverse impact to the environment and to the community. Review documents identified in Conditions C1, C3 and C9 and any other documents that are identified by the Secretary, to ensure they are consistent with requirements in or under this approval and if so: • make a written statement to this effect before submission of such documents to the Secretary (if those documents are required to be approved by the Secretary), or • make a written statement to this effect before the implementation of such documents (if those documents are required to be submitted to the Secretary for information or are not required to be submitted to the Secretary); regularly monitor the implementation of environmental management related documents to ensure implementation is being carried out in accordance with what is stated in the document and the terms of this approval • review the Proponent's notification of incidents in accordance with **CoA - A41.** • as may be requested by the Secretary, help plan, attend or undertake Department audits of the CSSI, briefings, and site visits. • if conflict arises between LOR and the community in relation to the environmental performance of the CSSI, follow the procedure in the Community Communication Strategy approved under **CoA - B3** to attempt to resolve the conflict, and if it cannot be resolved, notify the Secretary. • review any draft consistency assessment that may be carried out by LOR and provide advice on any additional mitigation measures required to minimise the impact of the work. • consider any minor amendments to be made to the documents listed in Conditions **C1**, **C3** and **C9** and any document that requires the approval of the Secretary (excluding noise and vibration documents) that comprise updating or are of an administrative or minor nature, and are consistent with the terms of this approval and the documents listed in Conditions **C1**, **C3** and **C9** or other documents approved by the Secretary and, if satisfied such amendment is necessary, approve the amendment. This does not include any modifications to the terms of the CoA. • assess the impacts of minor ancillary facilities as required by **CoA - A18.** • prepare and submit to the Secretary and other relevant regulatory agencies, for information, a monthly Environmental Representative Report detailing the ER's actions and decisions on matters for which the ER was responsible in the preceding month (or other timeframe agreed with the Secretary). The Environmental Representative Report must be submitted within seven days following the end of each month for the duration of works and construction of the CSSI, or as otherwise agreed with the Secretary.

Roles	Responsibilities
Acoustics Advisor	In accordance with **CoA - A25**, **CoA - A27** and **NV6** the AA has the following roles and responsibilities: • assurance of contractor noise and vibration planning, modelling, management and monitoring practices. • verification of compliance with relevant guidelines and approval requirements. • audit noise and vibration management practices. • receive and respond to communication from the Secretary in relation to the performance of the CSSI in relation to noise and vibration. • consider and inform the Secretary on matters specified in the terms of this approval relating to noise and vibration. • consider and recommend, to LOR, improvements that may be made to work practices to avoid or minimise adverse noise and vibration impacts. • review all noise and vibration documents required to be prepared under the terms of this approval and, should they be consistent with the CoA, endorse them before submission to the Secretary (if required to be submitted to the Secretary) or before implementation (if not required to be submitted to the Secretary). • regularly monitor the implementation of all noise and vibration documents required to be prepared under the terms of this approval to ensure implementation is in accordance with what is stated in the document and the terms of this approval. • notify the Secretary of noise and vibration incidents in accordance with **CoA - A41**. In conjunction with the ER, the AA must: • as may be requested by the Secretary or Complaints Commissioner, help plan, attend or undertake audits of noise and vibration management of the CSSI including briefings, and site visits. • if conflict arises between LOR and the community in relation to the noise and vibration performance during construction of the CSSI, follow the procedure in the Community Communication Strategy approved under **CoA - B3** to attempt to resolve the conflict, and if it cannot be resolved, notify the Secretary. • consider relevant minor amendments made to the CEMP, relevant sub-plans and noise and vibration monitoring programs that require updating or are of an administrative nature, and are consistent with the terms of CoA and the management plans and monitoring programs approved by the Secretary and, if satisfied such amendment is necessary, endorse the amendment. This does not include any modifications to the terms of the CoA. • assess the noise impacts of minor ancillary facilities as required by **CoA – A18**. • prepare and submit to the Secretary and other relevant regulatory agencies, for information, a monthly Noise and Vibration Report detailing the AAs actions and decisions on matters for which the AA was responsible in the preceding month (or other timeframe agreed with the Secretary). The Noise and Vibration Report must be submitted within seven (7) days following the end of each month for the duration of construction of the CSSI, or as otherwise agreed with the Secretary.

12.2 CNVMP Review

The CNVMP will be reviewed on a case by case basis and where circumstances arise during the works that require amendments to the plan. The type of circumstances that may trigger a CNVMP review could include, but are not limited to, significant changes in construction procedures, management protocols or environmental requirements; trends in validated noise or vibration complaints are identified; and/or an increase in noise and vibration impacts is identified.

The CNVIS will be updated to address changes in sensitive receivers and where noise or vibration levels are repeatedly identified (e.g. via monitoring) to be above the predicted values. The following steps will be completed:

- review and identify the cause of any noise (or vibration) exceedances. This should focus on the plant, equipment or machinery in use at the time, or activities undertaken so that any trends can be identified
- confirm the type and extent of any mitigation or corrective actions implemented during the non-compliant events
- identify, develop and implement any opportunities for improvement or additional mitigation or management measures that will assist to minimise impacts associated with any trends; and
- revise this management plan document or supplement this plan (e.g. with separate work instructions) to reflect the outcomes of the review.

The revised management plan (or supplementary documentation) will be developed to the satisfaction of the Environmental Manager, Environmental Representative and the Acoustics Advisor, so that the management strategy and management measures continue to assist to minimise impacts at receptors and to ensure that the plan remains an effective instrument for noise management and mitigation. Any review of the CNVMP will also be undertaken in consultation with relevant government agencies (i.e. Sydney City Council and EPA).

The CNVMP review will reflect these considerations and upon final approval of the revised CNVMP, the document will be circulated to relevant personnel. Updates to this plan will be numbered consecutively and issued to holders of controlled copies. The CNVMP will be reviewed by the AA and endorsed by the ER and will be submitted to the Secretary no later than one month before commencement of construction. The CEMP and sub-plans, as approved by the Secretary, including any minor amendments approved by the ER, must be implemented for the duration of construction. Revised versions of the CEMP and sub-plans will be updated on Teambinder and notifications sent to the Project team. Minor amendments will be endorsed by the AA and ER.

12.3 Control of Records

Records will be controlled in accordance with the requirements detailed in the CEMP. Further details regarding document review and control are outlined in Section 2.1 of the CEMP.

13. References

British Standard – BS5228-2:2009+A1:2014 (BS5228) – **Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration**, dated 2014

British Standard (BS 6472–1992) – **Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)** dated 1992

British Standard BS7385: Part 2-1993 (BS 7385) - **Evaluation and Measurement for Vibration in Buildings — Part 2 – Guide to Damage Levels from Ground-borne Vibration**, dated 1993

Degnan Constructions Pty Ltd - **Sydney to Burwood Compressor House Detailed Design Operational Noise Assessment**, prepared by GHD Pty Ltd, dated November 2012

Environmental Resources Management (ERM) - Central Station Main Works - **Construction Noise and Vibration Impact Statement** (CNVIS), prepared for Laing O'Rourke, dated April 2018

German Institute for Standardisation – DIN 4150 (1999-02) Part 3 (DIN4150:3) – **Structural Vibration - Effects of Vibration on Structures**, dated 1999

Laing O'Rourke - Sydney Metro City and Southwest Central Station Main Works (K51) Draft **Construction Environmental Management Plan (CEMP),** dated April 2018

NSW Department of Environment and Climate Change – **NSW Interim Construction Noise Guideline** (ICNG), July 2009

NSW Department of Environment and Conservation – **NSW Environmental Noise Management – Assessing Vibration: a Technical Guideline** (the NSW Vibration Guideline), February 2006;

NSW Department of Environment, Climate Change and Water – **NSW Road Noise Policy** (RNP), March 2011

NSW Environment Protection Authority – **NSW Environmental Noise Management – Industrial Noise Policy** (INP), January 2000 and relevant application notes

NSW Government – Transport for NSW (TfNSW) - **Sydney Metro Construction Noise and Vibration Strategy** (CNVS), August 2016 and CNVS Addendum August 2017.

NSW Government – Transport for NSW (TfNSW) **Construction Noise Strategy** (CNS), April 2013

Standards Australia AS 2436–2010™ (AS2436) – **Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites**

Standards Australia AS1055–1997™ (AS1055) – **Description and Measurement of Environmental Noise**

Standards Australia AS IEC 61672.1–2004™ (AS61672) – **Electro Acoustics - Sound Level Meters Specifications Monitoring** or Standards Australia AS1259.2-1990™ (AS1259) – **Acoustics – Sound Level Meters – Integrating/Averaging** as appropriate to the device

Standards Australia AS/IEC 60942:2004/IEC 60942:2003 (IEC60942) – Australian Standard™ – **Electroacoustic – Sound Calibrators**

Sydney Yard Access Bridge (SYAB) – **Noise Monitoring Summary Report**, prepared by Environmental Resources Management (ERM) Pty Ltd, dated April 2018

TfNSW - Sydney Metro - Chatswood to Sydenham **Construction Environmental Management Framework (CEMF)** – Appendix B of SPIR, dated August 2016

TfNSW - Sydney Metro - Chatswood to Sydenham **Environmental Impact Statement (EIS)** – **Chapter 10: Construction Noise and Vibration**, dated May 2016

TfNSW - Sydney Metro - Chatswood to Sydenham **Environmental Impact Statement (EIS)** – **Technical Paper 2 Noise and Vibration**, Prepared by SLR, dated April 2016

TfNSW - Sydney Metro - Chatswood to Sydenham **Management Requirements - Environment – Central Station Main Works (MR-E)**, dated February 2018

TfNSW - Sydney Metro City & Southwest - **Chatswood to Sydenham: Staging Report,** dated February 2018;

TfNSW - Sydney Metro - Chatswood to Sydenham **Submissions and Preferred Infrastructure Report (SPIR)**, dated October 2016

TfNSW – Power supply Upgrade Program – *Lee Street Substation Noise and Vibration Assessment* prepared by GHD Pty Ltd, dated February 2014

Appendix A – Acoustics: Glossary of Terms and Definitions

Noise is often defined as a sound, especially one that is loud or unpleasant or that causes disturbance or simply as unwanted sound, but technically, noise is the perception of a series of compressions and rarefactions above and below normal atmospheric pressure.

Vibration refers to the oscillating movement of any object. In a sense noise is the movement of air particles and is essentially vibration, though in regard to an environmental assessment vibration is typically taken to refer to the oscillation of a solid object(s). The impact of noise on objects can lead to vibration of the object, or vibration can be experienced by direct transmission through the ground, this is known as ground-borne vibration.

Essentially, noise can be described as what a person hears, and vibration as what they feel.

What Factors Contribute to Environmental Noise?

The noise from an activity, like construction works, at any location can be affected by a number of factors, the most significant being:

- How loud the activity is
- How far away the activity is from the receptor
- What type of ground is between the activity and the receptor location e.g. concrete, grass or water
- How the ground topography varies between the activity and the receptor (is it flat, hilly, mountainous) as blocking the line of sight to a noise source will generally reduce the level of noise; and
- Any other obstacles that block the line of sight between the sources to receptor e.g. buildings or purpose-built noise walls.

How to Measure And Describe Noise?

Noise is measured using a specially designed 'sound level' meter which must meet internationally recognised performance standards. Audible sound pressure levels vary across a range of 107 Pascals (Pa), from the threshold of hearing at 20 µPa to the threshold of pain at 200 Pa. Scientists have defined a statistically described logarithmic scale called Decibels (dB) to more manageably describe noise.

To demonstrate how this scale works, the following points give an indication of how the noise levels and differences are perceived by an average person:

- 0 dB - represents the threshold of human hearing (for a young person with ears in good condition);
- 50 dB – represents average conversation
- 70 dB – represents average street noise, local traffic etc.
- 90 dB – represents the noise inside an industrial premises or factory; and
- 140 dB - represents the threshold of pain – the point at which permanent hearing damage may occur.

Human Response to Changes in Noise Levels

The following concepts offer qualitative guidance in respect of the average response to changes in noise levels:

- Differences in noise levels of less than approximately 2 dBA are generally imperceptible in practice, an increase of 2 dB is hardly perceivable
- Differences in noise levels of around 5 dBA are considered to be significant
- Differences in noise levels of around 10 dBA are generally perceived to be a doubling (or halving) of the perceived loudness of the noise. An increase of 10 dB is perceived as twice as loud. Therefore, an increase of 20 dB is four times as loud and an increase of 30 dB is eight times as loud etc.
- The addition of two identical noise levels will increase the dB level by about 3 dB. For example, if one car is idling at 40 dB and then another identical car starts idling next to it, the total dB level will be about 43 dB

- The addition of a second noise level of similar character which is at least 8 dB lower than the existing noise level will not add significantly to the overall dB level; and
- A doubling of the distance between a noise source and a receptor results approximately in a 3 dB decrease for a line source (for example, vehicles travelling on a road); and a 6 dB decrease for a point source (for example, the idling car discussed above). A doubling of traffic volume for a line source results approximately in a 3 dB increase in noise, halving the traffic volume for a line source results approximately in a 3 dB decrease in noise.

Terms to Describe the Perception of Noise

The following terms offer quantitative and qualitative guidance in respect of the audibility of a noise source:

- **Inaudible / Not Audible**: the noise source and/or event could not be heard by the operator, masked by extraneous noise sources not associated with the source. If a noise source is 'inaudible' its noise level may be quantified as being less than the measured LA90 background noise level, potentially by 10 dB or greater
- **Barely Audible**: the noise source and/or event are difficult to define by the operator, typically masked by extraneous noise sources not associated with the source. If a source is 'barely audible' its noise level may be quantified as being 5 - 7 dB below the measured LA90 or LAeq noise level, depending on the nature of the source e.g. constant or intermittent
- **Just Audible**: the noise source and/or event may be defined by the operator. However, there are a number of extraneous noise sources contributing to the measurement. The noise level should be quantified based on instantaneous noise level contributions, noted by the operator
- **Audible**: the noise source and/or event may be easily defined by the operator. There may be a number of extraneous noise sources contributing to the measurement. The noise level should be quantified based on instantaneous noise level contributions, noted by the operator; and
- **Dominant**: the noise source and/or event are noted by the operator to be significantly 'louder' than all other noise sources. The noise level should be quantified based on instantaneous noise level contributions, noted by the operator.

The following terms offer qualitative guidance in respect of acoustic terms used to describe the frequency of occurrence of a noise source during an operator attended environmental noise measurements:

- **Constant**: this indicates that the operator has noted the noise source(s) and/or event to be constantly audible for the duration of the noise measurement e.g. an air-conditioner that runs constantly during the measurement
- **Intermittent**: this indicates that the operator has noted the noise source(s) and/or event to be audible, stopping and starting intervals for the duration of the noise measurement e.g. car pass-bys; and
- **Infrequent**: this indicates that the operator has noted the noise source(s) and/or event to be constantly audible, however; not occurring regularly or at intervals for the duration of the noise measurement e.g. a small number of aircraft are noted during the measurement.

How to Calculate or Model Noise Levels?

There are two recognised methods which are commonly adopted to determine the noise at particular location from a proposed activity. The first is to undertake noise measurements whilst the activity is in progress and measure the noise, the second is to calculate the noise based on known noise emission data for the activity in question.

The second option is preferred as the first option is largely impractical in terms of cost and time constraints, notwithstanding the meteorological factors that may also influence its quantification. Furthermore, it is also generally considered unacceptable to create an environmental impact simply to measure it. In addition, the most effective mitigation measures are determined and implemented during the design phase and often cannot be readily applied during or after the implementation phase of a project.

Because a number of factors can affect how 'loud' a noise is at a certain location, the calculations can be very complex. The influence of other ambient sources and the contribution from a particular source in question can be difficult to ascertain. To avoid these issues, and to quantify the direct noise contribution from

a source/site in question, the noise level is often calculated using noise modelling software packages. The noise emission data used in each noise model of this assessment has been obtained from ERM's database of measured noise emissions.

Acoustics Terminology and Statistical Noise Descriptors

Environmental noise levels such as noise generated by industry, construction and road traffic are commonly expressed in dBA. The A-weighting scale follows the average human hearing response and enables comparison of the intensity of noise with different frequency characteristics. Time varying noise sources are often described in terms of statistical noise descriptors. The following descriptors are commonly used when assessing noise and are referred to throughout this acoustic assessment:

- **Decibel (dB is the adopted abbreviation for the decibel)**: the unit used to describe sound levels and noise exposure. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure
- **dBA**: the unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear
- **dBC**: the unit used to measure 'A-weighted' sound pressure levels. C-weighting is an adjustment made to sound-level measurements which takes account of low-frequency components of noise within the audibility range of humans
- **dBZ** or **dBL**: the unit used to measure 'Z-weighted' sound pressure levels with no weighting applied, linear
- **Hertz (Hz)**: the measure of frequency of sound wave oscillations per second. 1 oscillation per second equals 1 hertz
- **Octave**: a division of the frequency range into bands, the upper frequency limit
- **1/3 Octave**: single octave bands divided into three parts
- **L_{eq}**: this level represents the equivalent or average noise energy during a measurement period. The $L_{eq, 15minute}$ noise descriptor simply refers to the L_{eq} noise level calculated over a 15-minute period. Indeed, any of the below noise descriptors may be defined in this way, with an accompanying time period (e.g. $L_{10, 15\ minute}$) as required
- **L_{max}**: the absolute maximum noise level in a noise sample
- **L_N**: the percentile sound pressure level exceeded for N% of the measurement period calculated by statistical analysis
- **L_{10}**: the noise level exceeded for 10 per cent of the time and is approximately the average of the maximum noise levels
- **L_{90}**: the noise level exceeded for 90 per cent of the time and is approximately the average of the minimum noise levels. The L_{90} level is often referred to as the "background" noise level and is commonly used as a basis for determining noise criteria for assessment purposes
- **Sound Power Level (L_W)**: this is a measure of the total power radiated by a source. The Sound Power of a source is a fundamental property of the source and is independent of the surrounding environment
- **Sound Pressure Level (L_P)**: the level of sound pressure as measured at a distance by a standard sound level meter with a microphone. This differs from LW in that this is the received sound as opposed to the sound 'intensity' at the source
- **Background noise**: the underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor
- **Ambient noise**: the all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far
- **Cognitive noise**: the noise in which the source is recognised as being annoying

- **Masking**: the phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
- **Assessment Background Level (ABL)**: is defined in the INP as a single figure background level representing each assessment period (day, evening and night). Its determination is by the tenth percentile method (of the measured L_{A90} statistical noise levels) described in Appendix B on the INP
- **Rating Background Level (RBL)**: is defined in the INP as the overall single figure background level representing each assessment period (day, evening and night) over the whole monitoring period (as opposed to over each 24hr period used for the ABL). This is the level used for assessment purposes. It is defined as the median value of:
  - all the day assessment background levels over the monitoring period for the day;
  - all the evening assessment background levels over the monitoring period for the evening; and
  - all the night assessment background levels over the monitoring period for the night.
- **Extraneous noise**: the noise resulting from activities that are not typical of the area. Atypical INP activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous
- **Most affected location(s)**: locations that experience (or will experience) the greatest noise impact from the noise source under consideration. In determining these locations, one needs to consider existing background levels, exact noise source location(s), distance from source (or proposed source) to receptor, and any shielding between source and receptor
- **Feasible and Reasonable measures**: feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors:
  - noise mitigation benefits (amount of noise reduction provided; number of people protected)
  - cost of mitigation (cost of mitigation versus benefit provided)
  - community views (aesthetic impacts and community wishes); and
  - noise levels for affected land uses (existing and future levels, and changes in noise levels).

How to Measure and Control Vibration

Vibration refers to the oscillating movement of any object. In relation to construction projects, ground-borne vibration is the most likely outcome of works and potentially has three (3) effects on vibration sensitive Receptors, these are:

- ground-borne vibration that may cause annoyance
- ground-borne vibration that may have adverse effect on a structure e.g. a building; and
- regenerated noise due to ground-borne vibration.

Each of these potential effects can be assessed in accordance with the relevant standard. Perceptible levels of vibration often create concern for the surrounding community at levels well below structural damage guideline values; this issue needs to be managed as part of the vibration monitoring program.

Vibration is typically measured using specific devices that record the velocity or acceleration at a designated receptor location – usually being the closest premises to works. Modern vibration monitoring devices will typically capture amplitude data for the three (3) orthogonal axes being, the transverse, longitudinal and vertical and also the frequency at which the measured vibration event occurs. Monitoring of this level of detail enables analysis of significant vibration events to determine compliance with relevant guidelines.

Vibration propagates in a different manner to noise and can be difficult to control depending on the frequency of the source in question, although identifying the strategy best suited to controlling vibration follows a similar approach to that of noise. This includes elimination, control at the source, control along the propagation path and control at the receptor and/or a combination of these, such as no work/respite periods.

Vibration Descriptors

The following terms are often used to describe measured vibration levels.

- **Parameter**: an attribute with a value - for example, weighting
- **Particle Velocity**: the instantaneous value of the distance travelled by a particle per unit time in a medium that is displaced from its equilibrium state by the passage of a sound or vibration wave
- **Peak Particle Velocity (PPV)**: is the highest (maximum or peak) particle velocity which is recorded during a particular vibration event over the three (3) axes. PPV is measured in the unit, mm/s
- **Phase**: the relative position of a sound wave to some reference point, the phase of a wave is given in radians, degrees, or fractions of a wavelength
- **Acceleration**: the change in velocity over time. Acceleration is dependent on the velocity and the frequency of the vibration event (velocity is a vector), as such acceleration changes in two ways - magnitude and/or direction. Acceleration is measured in the unit; m/s2
- **Perceptible**: vibration levels that a receptor of building occupant may 'feel'. 0.2 mm/s is typically considered to be the human threshold for perception of vibration
- **Geophone or accelerometer**: the transducer/device typically used to measure vibration
- **Damage**: is defined in DIN 4150-3 (1999-02) Structural vibration - Effects of vibration on structures to include minor non-structural effects such as cosmetic damage or superficial cracking in paint or cement render, the enlargement of cracks already present, and the separation of partitions or intermediate walls from load bearing walls; and
- Vibration Dose Value (VDV): a concept outlined in the NSW Vibration Guideline which is a calculative approach to assessing the impact of intermittent vibration or extended periods of impulsive vibration. VDV require the measurement of the overall weighted RMS (Root Mean Square) acceleration levels over the frequency range 1Hz to 80Hz.

To calculate VDV the following formula (refer section 2.4.1 of "the guideline") is used:

$$VDV = \left[\int_0^T a^4(t)dt \right]^{0.25}$$

Where VDV is the vibration dose value in m/s1.75, a (t) is the frequency-weighted RMS of acceleration in m/s2 and T is the total period of the day (in seconds) during which vibration may occur.

Appendix B – Assessment Scenarios (CNVIS)

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impacts	Equipment	LW, Actual	Quantity	Penalty	Duty Factor	LW, Modified (Q / P / DF)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)								
												31.5	63	125	250	500	1000	2000	4000	80000
Aug 2018	WE06 Track Possession	Platforms & Sydney Yard	Stage 6 - Installing Services/Wiring	SCN 01-A	AB Noise	Hi Rail Truck	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 01-B	AB Noise	Hi Rail Manitou	104.0	1.0	0.0	100%	104.0	51.7	73.9	83.0	89.5	99.9	100.1	95.3	87.1	85.0
				SCN 01-C	AB Noise	5t Excavator	95.0	2.0	0.0	100%	98.0	55.5	76.2	84.9	87.5	92.8	93.8	89.1	83.8	76.6
				SCN 01-D	AB Noise	16t Excavator	105.0	1.0	0.0	100%	105.0	62.5	83.2	91.9	94.5	99.8	100.8	96.1	90.8	83.6
				SCN 01-E	AB Noise	Track Trolleys	90.0	2.0	0.0	50%	90.0	47.5	68.2	76.9	79.5	84.8	85.8	81.1	75.8	68.6
				SCN 01-F	AB Noise	Light Vehicles (Utes)	106.0	2.0	0.0	50%	106.0	75.1	83.1	91.2	93.6	98.9	101.6	100.1	94.3	89.0
Aug 2018	**WE06 Track Possession**	**Platforms & Sydney Yard**	**Stage 6 - Installing Services/Wiring**	**SCN 01**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**111.8**	**-**	**-**	**-**	**111.1**	**75.5**	**89.1**	**96.3**	**100.2**	**105.7**	**106.4**	**104.1**	**97.2**	**91.8**
Aug 2018	Weekend work	Platform 0	Stage 7 - Installing Services / Hoarding / Offices	SCN 02-A	AB Noise	6t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 02-B	AB Noise	Concrete Agitator	109.0	2.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 02-C	AB Noise	120t Crane	105.0	1.0	0.0	50%	102.0	61.4	80.1	88.3	88.9	99.8	94.7	90.9	86.1	79.6
Aug 2018	**Weekend work**	**Platform 0**	**Stage 7 - Installing Services / Hoarding / Offices**	**SCN 02**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**110.6**	**-**	**-**	**-**	**112.5**	**72.0**	**88.4**	**96.6**	**98.0**	**105.5**	**109.6**	**104.8**	**98.3**	**91.8**
Aug - Oct 2018	Standard Construction Hours	Platforms & Sydney Yard	Stage 7, 9 & 11 - Combine Services Route / Demolition of Sydney Yard Buildings / Salvage Canopy / Remove Track / Remove Waste	SCN 03-A	AB Noise	6t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 03-B	AB Noise	Elevated Work Platform (EWP)	105.0	1.0	0.0	50%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
				SCN 03-C	AB Noise	20t Excavator With Munchers	105.0	2.0	5.0	100%	113.0	70.5	91.2	99.9	102.5	107.8	108.8	104.1	98.8	91.6
				SCN 03-D	AB Noise	Scissor Lift	90.0	2.0	0.0	50%	90.0	55.9	78.1	82.4	78.4	83.7	82.2	83.2	78.8	69.6
				SCN 03-E	AB Noise	Front End Loader	113.0	1.0	0.0	100%	113.0	74.2	85.4	101.5	106.7	105.5	106.7	106.7	98.3	94.2
				SCN 03-F	AB Noise	Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
Aug - Oct 2018	**Standard Construction Hours**	**Platforms & Sydney Yard**	**Stage 7, 9 & 11 - Combine Services Route / Demolition of Sydney Yard Buildings / Salvage Canopy / Remove Track / Remove Waste**	**SCN 03**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**115.0**	**-**	**-**	**-**	**116.7**	**76.6**	**95.3**	**104.6**	**108.7**	**110.6**	**111.3**	**109.6**	**102.3**	**96.5**
Sept 2018	WE10/11 Track Possession	Platforms 11/12/13	Stage 8 & 10 - OHW on Platform 11/12 / Replace Track Country End 12/13 / Installing CSR	SCN 04-A	AB Noise	6t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 04-B	AB Noise	16t Excavator	105.0	1.0	0.0	100%	105.0	62.5	83.2	91.9	94.5	99.8	100.8	96.1	90.8	83.6
				SCN 04-C	AB Noise	Front End Loader	113.0	1.0	0.0	100%	113.0	74.2	85.4	101.5	106.7	105.5	106.7	106.7	98.3	94.2
				SCN 04-D	AB Noise	Elevated Work Platform (EWP)	105.0	2.0	0.0	50%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 04-E	AB Noise	Hi Rail Elevated Work Platform (EWP)	105.0	2.0	0.0	50%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 04-F	AB Noise	Hi Rail Truck	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
Sept 2018	**WE10/11 Track Possession**	**Platforms 11/12/13**	**Stage 8 & 10 - OHW on Platform 11/12 / Replace Track Country End 12/13 / Installing CSR**	**SCN 04**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**115.4**	**-**	**-**	**-**	**115.4**	**77.4**	**97.3**	**104.6**	**107.9**	**108.8**	**109.0**	**108.9**	**101.4**	**95.7**
Oct 2018	WE15 Track Possession	Platforms & Sydney Yard	Stage 12 - Piling Works / Removing Track	SCN 05-A	AB Noise	6t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 05-B	AB Noise	16t Excavator	105.0	1.0	0.0	100%	105.0	62.5	83.2	91.9	94.5	99.8	100.8	96.1	90.8	83.6
				SCN 05-C	AB Noise	Piling Rig (Auger)	110.0	2.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
				SCN 05-D	AB Noise	Front End Loader	113.0	2.0	0.0	100%	116.0	77.2	88.4	104.5	109.7	108.5	109.7	109.7	101.3	97.2
Oct 2018	**WE15 Track Possession**	**Platforms & Sydney Yard**	**Stage 12 - Piling Works / Removing Track**	**SCN 05**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**115.2**	**-**	**-**	**-**	**120.3**	**78.3**	**91.1**	**109.4**	**112.4**	**112.5**	**115.2**	**114.0**	**105.3**	**99.8**
Oct 2018	Standard Construction Hours	Platforms & Sydney Yard	Stage 13	SCN 06-A	AB Noise	20t Excavator With Munchers	105.0	2.0	5.0	100%	113.0	70.5	91.2	99.9	102.5	107.8	108.8	104.1	98.8	91.6
				SCN 06-B	AB Noise	5t Excavator	95.0	2.0	0.0	100%	98.0	55.5	76.2	84.9	87.5	92.8	93.8	89.1	83.8	76.6
				SCN 06-C	AB Noise / GB Vibration	Vibratory Roller	108.0	2.0	5.0	100%	116.0	65.4	83.6	98.7	109.2	109.6	110.8	109.0	100.8	94.7
Oct 2018	**Standard Construction Hours**	**Platforms & Sydney Yard**	**Stage 13**	**SCN 06**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**109.9**	**-**	**-**	**-**	**117.8**	**71.7**	**92.0**	**102.4**	**110.1**	**111.8**	**113.0**	**110.3**	**103.0**	**96.5**
Oct 2018	Standard Construction Hours	Platforms & Sydney Yard	Stage 14, 16, 18 & 20	SCN 07-A	AB Noise	6t Excavator	95.0	2.0	0.0	100%	98.0	55.5	76.2	84.9	87.5	92.8	93.8	89.1	83.8	76.6
				SCN 07-B	AB Noise	16t Excavator	105.0	2.0	0.0	100%	108.0	65.5	86.2	94.9	97.5	102.8	103.8	99.1	93.8	86.6
				SCN 07-C	AB Noise	Piling Rig (Auger)	110.0	2.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
Oct 2018	**Standard Construction Hours**	**Platforms & Sydney Yard**	**Stage 14, 16, 18 & 20**	**SCN 07**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**111.3**	**-**	**-**	**-**	**118.5**	**72.2**	**89.2**	**107.7**	**109.1**	**110.7**	**114.0**	**112.1**	**103.4**	**96.5**
Oct 2018	Standard Construction Hours	Platforms & Sydney Yard	Stage 15,17 & 19	SCN 08-A	AB Noise	20t Excavator With Munchers	105.0	1.0	5.0	100%	110.0	67.5	88.2	96.9	99.5	104.8	105.8	101.1	95.8	88.6
				SCN 08-B	AB Noise	5t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 08-C	AB Noise / GB Vibration	Vibratory Roller	108.0	1.0	5.0	100%	113.0	62.4	80.6	95.7	106.2	106.6	107.8	106.0	97.8	91.7
				SCN 08-D	AB Noise	Piling Rig (Auger)	110.0	2.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
Oct 2018	**Standard Construction Hours**	**Platforms & Sydney Yard**	**Stage 15,17 & 19**	**SCN 08**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**113.0**	**-**	**-**	**-**	**119.7**	**73.0**	**90.7**	**108.1**	**111.0**	**112.4**	**115.1**	**113.2**	**104.6**	**97.9**
Oct 2018 - Feb 2019	Standard Construction Hours	Metro Box	Piling for the box perimeter and the plunge columns	SCN 09-A	AB Noise	Drill Rig (Bg-30)	113.0	4.0	5.0	100%	124.0	77.0	91.7	113.5	114.8	115.9	119.5	117.9	108.8	102.0
				SCN 09-B	AB Noise	14t Excavators	105.0	4.0	0.0	100%	111.0	68.5	89.2	97.9	100.5	105.8	106.8	102.1	96.8	89.6
				SCN 09-C	AB Noise	60t Crawler Crane	104.0	1.0	0.0	50%	101.0	63.4	74.5	84.1	86.3	94.0	94.0	89.9	97.3	86.9
				SCN 09-D	AB Noise	Concrete Agitator	112.0	3.0	0.0	100%	116.8	85.9	93.9	102.0	104.4	109.7	112.4	110.9	105.1	99.8
				SCN 09-E	AB Noise	Concrete Line Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 09-F	AB Noise	Truck And Dogs	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 09-G	AB Noise	Delivery Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
Oct 2018 - Feb 2019	**Standard Construction Hours**	**Metro Box**	**Piling for the box perimeter and the plunge columns**	**SCN 09**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**117.7**	**-**	**-**	**-**	**125.2**	**86.6**	**98.1**	**114.0**	**115.5**	**117.5**	**120.7**	**119.0**	**110.9**	**104.5**
Nov 2018 - Feb 2019	Standard Construction Hours	Metro Box	FRP Capping Beam	SCN 10-A	AB Noise	20t Excavator	105.0	1.0	0.0	100%	105.0	62.5	83.2	91.9	94.5	99.8	100.8	96.1	90.8	83.6
				SCN 10-B	AB Noise / GB Vibration	Jackhammer	113.0	4.0	5.0	100%	124.0	85.1	99.9	112.6	115.3	116.8	118.7	117.8	110.9	103.2
				SCN 10-C	AB Noise	5t Excavators	95.0	2.0	0.0	100%	98.0	55.5	76.2	84.9	87.5	92.8	93.8	89.1	83.8	76.6
				SCN 10-D	AB Noise	Concrete Agitator	112.0	2.0	0.0	100%	115.0	84.1	92.1	100.2	102.6	107.9	110.6	109.1	103.3	98.0
				SCN 10-E	AB Noise	20m Boom Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 10-F	AB Noise	Hand Held Vibrators	113.0	2.0	5.0	100%	121.0	70.4	88.6	103.7	114.2	114.6	115.8	114.0	105.8	99.7
				SCN 10-G	AB Noise	Hand Held Masonry Drills	102.0	3.0	0.0	100%	106.8	63.5	87.2	92.3	92.0	102.6	102.7	98.0	86.3	76.2
				SCN 10-H	AB Noise	Fuel Trucks	107.0	2.0	0.0	50%	107.0	60.0	79.2	91.3	99.8	101.2	102.4	98.6	91.4	78.3
Nov 2018 - Feb 2019	**Standard Construction Hours**	**Metro Box**	**FRP Capping Beam**	**SCN 10**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**118.7**	**-**	**-**	**-**	**126.4**	**87.8**	**101.2**	**113.5**	**118.1**	**119.5**	**121.3**	**119.9**	**112.8**	**105.7**

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impacts	Equipment	LW, Actual	Quantity	Penalty	Duty Factor	LW, Modified (Q / P / DF)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)								
												31.5	63	125	250	500	1000	2000	4000	80000
Jan 2019 - Jun 2019	Standard Construction Hours	Metro Box	Excavation to underside of Intercity Slab	SCN 11-A	AB Noise	20t Excavators	105.0	6.0	0.0	100%	112.8	70.3	91.0	99.7	102.3	107.6	108.6	103.9	98.6	91.4
				SCN 11-B	AB Noise	Truck And Dog	107.0	3.0	0.0	50%	108.8	64.5	89.9	94.2	100.6	103.9	101.2	103.2	92.2	85.4
				SCN 11-C	AB Noise	Water Cart	107.0	1.0	0.0	50%	104.0	66.8	83.3	84.0	84.4	89.6	103.2	93.2	87.6	78.6
				SCN 11-D	AB Noise	Pozi Track	104.0	1.0	0.0	100%	104.0	51.7	73.9	83.0	89.5	99.9	100.1	95.3	87.1	85.0
				SCN 11-E	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	81.1	89.1	97.2	99.6	104.9	107.6	106.1	100.3	95.0
				SCN 11-F	AB Noise	Shotcrete Machine	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 11-G	AB Noise	10l/S Water Treatment Plant	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 11-H	AB Noise	2 Inch Dewatering Pumps	91.0	10.0	0.0	100%	101.0	60.5	76.5	84.7	86.2	93.0	98.4	93.6	86.9	80.4
				SCN 11-I	AB Noise	Sucker Truck	116.0	1.0	5.0	100%	121.0	78.7	99.9	109.0	110.5	113.9	116.1	115.3	106.1	101.0
Jan 2019 - Jun 2019	**Standard Construction Hours**	**Metro Box**	**Excavation to underside of Intercity Slab**	**SCN 11**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**119.4**	**-**	**-**	**-**	**122.8**	**83.8**	**101.4**	**110.1**	**112.0**	**116.0**	**118.3**	**116.7**	**108.4**	**102.9**
Feb 2019 - Jul 2019	Standard Construction Hours	Metro Box	FRP Platform and Intercity slab	SCN 12-A	AB Noise	20m Boom Pump	109.0	1.0	0.0	100%	109.0	66.5	87.2	95.9	98.5	103.8	104.8	100.1	94.8	87.6
				SCN 12-B	AB Noise	Concrete Agitator	112.0	3.0	0.0	100%	116.8	85.9	93.9	102.0	104.4	109.7	112.4	110.9	105.1	99.8
				SCN 12-C	AB Noise	Concrete Vibrators	103.0	3.0	5.0	100%	112.8	72.3	88.3	96.5	98.0	104.8	110.2	105.4	98.7	92.2
				SCN 12-D	AB Noise	Concrete Helicopter / Finishing Machine	106.0	1.0	0.0	100%	106.0	65.5	81.5	89.7	91.2	98.0	103.4	98.6	91.9	85.4
				SCN 12-E	AB Noise	60t Crawler	104.0	1.0	0.0	50%	101.0	63.4	74.5	84.1	86.3	94.0	94.0	89.9	97.3	86.9
				SCN 12-F	AB Noise	Telehandlers	113.0	2.0	0.0	100%	116.0	77.2	88.4	104.5	109.7	108.5	109.7	109.7	101.3	97.2
				SCN 12-G	AB Noise	Welding Machines	105.0	2.0	0.0	50%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 12-H	AB Noise	6 Inch Circular Saw	117.0	10.0	5.0	50%	129.0	81.9	96.6	120.7	119.7	120.7	124.2	122.5	113.4	106.8
				SCN 12-I	AB Noise	130 Cfm Compressor	100.0	3.0	0.0	100%	104.8	78.5	87.7	93.8	96.3	98.7	97.9	99.1	89.9	83.8
				SCN 12-J	AB Noise	Explosive Nail Guns	116.0	5.0	0.0	100%	123.0	84.1	98.9	111.6	114.3	115.8	117.7	116.8	109.9	102.2
				SCN 12-K	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	3.0	0.0	100%	103.8	60.5	84.2	89.3	89.0	99.6	99.7	95.0	83.3	73.2
Feb 2019 - Jul 2019	**Standard Construction Hours**	**Metro Box**	**FRP Platform and Intercity slab**	**SCN 12**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**121.7**	**-**	**-**	**-**	**130.5**	**89.8**	**103.0**	**121.4**	**121.3**	**122.5**	**125.6**	**124.1**	**115.9**	**109.2**
Apr 2019 - Sept 2019	Day and Night Works	Metro Box	Excavation to underside of Metro Concourse	SCN 13-A	AB Noise	20t Excavators	109.0	5.0	0.0	100%	116.0	73.5	94.2	102.9	105.5	110.8	111.8	107.1	101.8	94.6
				SCN 13-B	AB Noise	Truck And Dog	107.0	3.0	0.0	50%	108.8	64.5	89.9	94.2	100.6	103.9	101.2	103.2	92.2	85.4
				SCN 13-C	AB Noise	Ventilation System (50 Inch Blowers / Extraction Fans	95.0	3.0	0.0	100%	99.8	64.9	81.4	96.6	90.3	93.7	89.6	84.7	77.1	71.5
				SCN 13-D	AB Noise	10l/S Water Treatment Plant	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 13-E	AB Noise	2 Inch Dewatering Pumps	91.0	10.0	0.0	100%	101.0	60.5	76.5	84.7	86.2	93.0	98.4	93.6	86.9	80.4
				SCN 13-F	AB Noise	Sucker Truck	116.0	1.0	5.0	100%	121.0	78.7	99.9	109.0	110.5	113.9	116.1	115.3	106.1	101.0
				SCN 13-G	AB Noise	Telehandlers	113.0	2.0	0.0	100%	116.0	77.2	88.4	104.5	109.7	108.5	109.7	109.7	101.3	97.2
Apr 2019 - Sept 2019	**Day and Night Works**	**Metro Box**	**Excavation to underside of Metro Concourse**	**SCN 13**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**119.1**	**-**	**-**	**-**	**123.5**	**82.1**	**101.7**	**111.4**	**114.1**	**116.8**	**118.6**	**117.2**	**108.7**	**103.4**
Sept 2019 - Dec 2022	Day and Night Works	Metro Box	Ongoing Logistical support of Box Construction	SCN 14-A	AB Noise	10l/S Water Treatment Plant	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 14-B	AB Noise	2 Inch Dewatering Pumps	91.0	10.0	0.0	100%	101.0	60.5	76.5	84.7	86.2	93.0	98.4	93.6	86.9	80.4
				SCN 14-C	AB Noise	Sucker Truck	116.0	3.0	5.0	100%	125.8	83.5	104.7	113.8	115.3	118.7	120.9	120.1	110.9	105.8
				SCN 14-D	AB Noise	Telehandlers	113.0	2.0	0.0	100%	116.0	77.2	88.4	104.5	109.7	108.5	109.7	109.7	101.3	97.2
				SCN 14-E	AB Noise	Ventilation System (50 Inch Blowers / Extraction Fans	95.0	3.0	0.0	100%	99.8	64.9	81.4	96.6	90.3	93.7	89.6	84.7	77.1	71.5
				SCN 14-F	AB Noise	160t Crawler Cranes	104.0	3.0	0.0	50%	105.8	68.2	79.3	88.9	91.1	98.8	98.8	94.7	102.1	91.7
				SCN 14-G	AB Noise	Concrete Trucks	112.0	3.0	0.0	100%	116.8	85.9	93.9	102.0	104.4	109.7	112.4	110.9	105.1	99.8
				SCN 14-H	AB Noise	Line Pumps	109.0	2.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 14-I	AB Noise	Rubbish Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 14-J	AB Noise	Flat Bed Delivery Trucks	107.0	3.0	0.0	50%	108.8	64.5	89.9	94.2	100.6	103.9	101.2	103.2	92.2	85.4
				SCN 14-K	AB Noise	Truck And Dogs	107.0	3.0	0.0	50%	108.8	64.5	89.9	94.2	100.6	103.9	101.2	103.2	92.2	85.4
				SCN 14-L	AB Noise	60t Roughie Crane	104.0	1.0	5.0	50%	106.0	68.4	79.5	89.1	91.3	99.0	99.0	94.9	102.3	91.9
				SCN 14-M	AB Noise	Small Tools (Hammers, Drills, Rattle Guns Etc)	102.0	2.0	0.0	100%	105.0	61.7	85.4	90.5	90.2	100.8	100.9	96.2	84.5	74.4
				SCN 14-N	AB Noise	Site Accommodation Facilities	90.0	1.0	0.0	100%	90.0	63.7	72.9	79.0	81.5	83.9	83.1	84.3	75.1	69.0
				SCN 14-O	AB Noise	Lighting Towers	80.0	10.0	0.0	100%	90.0	63.7	72.9	79.0	81.5	83.9	83.1	84.3	75.1	69.0
				SCN 14-P	AB Noise / GB Vibration / GB Noise	Ongoing Works Below The Top Slab	114.6	1.0	0.0	100%	114.6	73.6	92.7	101.1	102.6	111.7	108.5	104.4	99.3	92.6
Sept 2019 - Dec 2022	**Day and Night Works**	**Metro Box**	**Ongoing Logistical support of Box Construction**	**SCN 14**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**121.5**	**-**	**-**	**-**	**127.4**	**88.7**	**105.9**	**115.1**	**117.2**	**120.8**	**122.5**	**121.4**	**113.5**	**107.9**
Jun 2018 - Feb 2019	5 x WE Possessions (Daytime Only)	Central Walk	Site investigation Works (Tracks 16- 23)	SCN 15-A	AB Noise	Hi Rail Vac Tuck	107.0	2.0	5.0	100%	115.0	77.8	94.3	95.0	95.4	100.6	114.2	104.2	98.6	89.6
				SCN 15-B	AB Noise	6t Excavator	95.0	2.0	0.0	100%	98.0	55.5	76.2	84.9	87.5	92.8	93.8	89.1	83.8	76.6
Jun 2018 - Feb 2019	**5 x WE Possessions (Daytime Only)**	**Central Walk**	**Site investigation Works (Tracks 16- 23)**	**SCN 15**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**107.3**	**-**	**-**	**-**	**115.1**	**77.8**	**94.3**	**95.4**	**96.0**	**101.2**	**114.2**	**104.4**	**98.8**	**89.8**
Jul 2018 - Dec 2018	Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding	Central Walk	Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN 16A-A	AB Noise	Piling Rig (Auger)	110.0	2.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
				SCN 16A-B	AB Noise	Electric Pallet Truck	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 16A-C	AB Noise	Hi Rail Flat Bed	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 16A-D	AB Noise	10t Forklift	106.0	1.0	0.0	50%	103.0	74.9	80.9	86.9	93.9	95.9	97.9	96.9	90.9	86.9
				SCN 16A-E	AB Noise	100 KVA Generator	99.0	2.0	0.0	100%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
Jul 2018 - Dec 2018	**Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding**	**Central Walk**	**Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23**	**SCN 16A**	**AB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**113.9**	**-**	**-**	**-**	**118.9**	**77.3**	**94.5**	**108.0**	**109.8**	**111.4**	**114.0**	**112.8**	**103.7**	**97.1**
Jul 2018 - Dec 2018	Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding	Central Walk	Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN 16B-A	AB Noise	Piling Rig (Auger)	110.0	2.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
				SCN 16B-B	AB Noise	Concrete Saw	117.0	1.0	5.0	50%	119.0	71.9	86.6	110.7	109.7	110.7	114.2	112.5	103.4	96.8
				SCN 16B-C	AB Noise	Concrete Coring Drill	117.0	1.0	5.0	50%	119.0	71.9	86.6	110.7	109.7	110.7	114.2	112.5	103.4	96.8
				SCN 16B-D	AB Noise	100 KVA Generator	99.0	2.0	0.0	100%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
				SCN 16B-E	AB Noise	Electric Pallet Truck	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 16B-F	AB Noise	Hi Rail Flat Bed	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 16B-G	AB Noise	10t Forklift	106.0	1.0	0.0	50%	103.0	74.9	80.9	86.9	93.9	95.9	97.9	96.9	90.9	86.9
Jul 2018 - Dec 2018	**Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding**	**Central Walk**	**Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23**	**SCN 16B**	**AB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**121.0**	**-**	**-**	**-**	**123.7**	**79.3**	**95.7**	**114.8**	**114.5**	**115.7**	**118.9**	**117.4**	**108.3**	**101.7**
Jul 2018 - Dec 2018	Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding	Central Walk	Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN 16C-A	AB Noise / GB Vibration / GB Noise	5t Brokk (Rock Breaking)	118.0	2.0	5.0	50%	123.0	82.4	101.1	109.3	109.9	120.8	115.7	111.9	107.1	100.6
				SCN 16C-B	AB Noise	100 KVA Generator	99.0	2.0	0.0	100%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
				SCN 16C-C	AB Noise	Electric Pallet Truck	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 16C-D	AB Noise	4t Electric Hoist	100.0	2.0	0.0	50%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 16C-E	AB Noise	Hi Rail Flat Bed	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 16C-F	AB Noise	10t Forklift	106.0	1.0	0.0	50%	103.0	74.9	80.9	86.9	93.9	95.9	97.9	96.9	90.9	86.9
Jul 2018 - Dec 2018	**Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding**	**Central Walk**	**Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23**	**SCN 16C**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**119.0**	**-**	**-**	**-**	**123.3**	**83.8**	**101.9**	**109.7**	**110.7**	**121.0**	**116.0**	**112.9**	**107.5**	**101.0**

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impacts	Equipment	LW, A,total	Quantity	Penalty	Duty Factor	LW, Modified (Q, / P / DF)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)								
												31.5	63	125	250	500	1000	2000	4000	8000
Jul 2018 - Dec 2018	Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding	Central Walk	Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN 16D-A	AB Noise	Hi Rail Concrete Agitator	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 16D-B	AB Noise	100 KVA Generator	99.0	2.0	0.0	100%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
				SCN 16D-C	AB Noise	4t Electric Hoist	100.0	2.0	0.0	50%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 16D-D	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 16D-E	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	81.1	89.1	97.2	99.6	104.9	107.6	106.1	100.3	95.0
				SCN 16D-F	AB Noise	Shotcrete Machine	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 16D-G	AB Noise	Electric Grout Mixer	102.0	1.0	0.0	100%	102.0	58.7	82.4	87.5	87.2	97.8	97.9	93.2	81.5	71.4
				SCN 16D-H	AB Noise	10t Forklift	106.0	1.0	0.0	50%	103.0	74.9	80.9	86.9	93.9	95.9	97.9	96.9	90.9	86.9
				SCN 16D-I	AB Noise / GB Vibration / GB Noise	5t Brokk (Rock Breaking)	118.0	1.0	5.0	50%	120.0	79.4	98.1	106.3	106.9	117.8	112.7	108.9	104.1	97.6
Jul 2018 - Dec 2018	**Weekend Possessions and Week Night Works / 24 hours once project EPL in place. Behind Hoarding**	**Central Walk**	**Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23**	**SCN 16D**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**120.4**	-	-	-	**121.6**	**84.8**	**99.9**	**107.7**	**108.5**	**118.4**	**115.9**	**112.4**	**106.9**	**100.7**
Jan 2019 - May 2019	Week Night Works, behind hoarding	Central Walk	Construction of the new Standby Guards Rooms / demolition of existing standby guards rooms	SCN 17-A	AB Noise	Hi Rail Flat Bed	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 17-B	AB Noise	Hi Rail Crane 10t	104.0	2.0	0.0	50%	104.0	66.4	77.5	87.1	89.3	97.0	97.0	92.9	100.3	89.9
				SCN 17-C	AB Noise	Wire Saw Concrete Cutting Rig	117.0	2.0	5.0	50%	122.0	74.9	89.6	113.7	112.7	113.7	117.2	115.5	106.4	99.8
				SCN 17-D	AB Noise / GB Vibration / GB Noise	5t Excavator (Hydraulic Breaker)	118.0	2.0	5.0	100%	126.0	83.5	104.2	112.9	115.5	120.8	121.8	117.1	111.8	104.6
				SCN 17-E	AB Noise	10t Forklift	106.0	2.0	0.0	50%	106.0	77.9	83.9	89.9	96.9	98.9	100.9	99.9	93.9	89.9
				SCN 17-F	AB Noise	Electric Pallet Truck	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
Jan 2019 - May 2019	**Week Night Works, behind hoarding**	**Central Walk**	**Construction of the new Standby Guards Rooms / demolition of existing standby guards rooms**	**SCN 17**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**121.1**	-	-	-	**127.6**	**85.1**	**104.6**	**116.4**	**117.5**	**121.7**	**123.2**	**119.6**	**113.2**	**106.1**
May 2019 - Oct 2021	Weekend and Weeknight Possessions + weekday works behind hoarding	Central Walk	Construction of Platform Canopy Support System to Platforms 16 to 23 and Excavation of Launch Chambers	SCN 18-A	AB Noise	Hi Rail Flat Bed	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 18-B	AB Noise	Hi Rail Crane 25t	104.0	1.0	0.0	50%	101.0	63.4	74.5	84.1	86.3	94.0	94.0	89.9	97.3	86.9
				SCN 18-C	AB Noise	Hi Rail Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 18-D	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 18-E	AB Noise	5t Electric Hoist	100.0	1.0	0.0	50%	97.0	70.7	79.9	86.0	88.5	90.9	90.1	91.3	82.1	76.0
				SCN 18-F	AB Noise	5t Excavator	95.0	2.0	0.0	100%	98.0	55.5	76.2	84.9	87.5	92.8	93.8	89.1	83.8	76.6
				SCN 18-G	AB Noise	Truck And Dogs	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 18-H	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 18-I	AB Noise	25t Mobile Crane	104.0	1.0	0.0	50%	101.0	63.4	74.5	84.1	86.3	94.0	94.0	89.9	97.3	86.9
				SCN 18-J	AB Noise	10t Forklift	106.0	1.0	0.0	100%	106.0	77.9	83.9	89.9	96.9	98.9	100.9	99.9	93.9	89.9
				SCN 18-K	AB Noise	Floor Saw	117.0	1.0	5.0	100%	122.0	74.9	89.6	113.7	112.7	113.7	117.2	115.5	106.4	99.8
				SCN 18-L	AB Noise / GB Vibration / GB Noise	5t Brokk (Rock Breaking)	118.0	1.0	5.0	100%	123.0	82.4	101.1	109.3	109.9	120.8	115.7	111.9	107.1	100.6
May 2019 - Oct 2021	**Weekend and Weeknight Possessions + weekday works behind hoarding**	**Central Walk**	**Construction of Platform Canopy Support System to Platforms 16 to 23 and Excavation of Launch Chambers**	**SCN 18**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**122.1**	-	-	-	**126.0**	**84.9**	**102.2**	**115.2**	**114.9**	**121.8**	**120.3**	**117.8**	**110.8**	**104.1**
May2020 - Sept 2021	Weekend and Weeknight Possessions + weekday works behind hoarding	Central Walk	Platform works including works below the top slab	SCN 19-A	AB Noise	Hi Rail Flat Bed	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 19-B	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 19-C	AB Noise	Scissor Lifts	90.0	2.0	0.0	50%	90.0	55.9	78.1	82.4	78.4	83.7	82.2	83.2	78.8	69.6
				SCN 19-D	AB Noise	Grout / Screed Pump	99.0	1.0	0.0	100%	99.0	64.9	87.1	91.4	87.4	92.7	91.2	92.2	87.8	78.6
				SCN 19-E	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 19-F	AB Noise	Tower Crane	105.0	1.0	0.0	50%	102.0	61.4	80.1	88.3	88.9	99.8	94.7	90.9	86.1	79.6
				SCN 19-G	AB Noise	5t Electric Hoist In Lift Shafts	100.0	1.0	0.0	50%	97.0	70.7	79.9	86.0	88.5	90.9	90.1	91.3	82.1	76.0
				SCN 19-H	AB Noise / GB Vibration / GB Noise	Ongoing Works Below The Surface	109.0	1.0	0.0	100%	109.0	66.7	87.3	95.9	98.6	103.7	104.8	100.2	94.8	87.6
May2020 - Sept 2021	**Weekend and Weeknight Possessions + weekday works behind hoarding**	**Central Walk**	**Platform works including works below the top slab**	**SCN 19**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**115.9**	-	-	-	**115.0**	**75.7**	**94.0**	**100.8**	**103.5**	**108.9**	**111.2**	**107.6**	**100.6**	**93.8**
Dec 2021 - Sept 2022	Weekend Possessions, Week Night Possessions	Central Walk	Platform Remodelling works including platform canopy modifications	SCN 20-A	AB Noise	Hi Rail Flat Bed	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 20-B	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 20-C	AB Noise	Floor Saw	117.0	1.0	5.0	50%	119.0	71.9	86.6	110.7	109.7	110.7	114.2	112.5	103.4	96.8
				SCN 20-D	AB Noise / GB Vibration / GB Noise	5t Excavator (Hydraulic Breaker)	118.0	1.0	5.0	100%	123.0	82.4	101.1	109.3	109.9	120.8	115.7	111.9	107.1	100.6
				SCN 20-E	AB Noise	Scissor Lifts	90.0	2.0	0.0	50%	90.0	55.9	78.1	82.4	78.4	83.7	82.2	83.2	78.8	69.6
				SCN 20-F	AB Noise	Grout / Screed Pump	99.0	1.0	0.0	100%	99.0	64.9	87.1	91.4	87.4	92.7	91.2	92.2	87.8	78.6
				SCN 20-G	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 20-H	AB Noise	Tower Crane	105.0	1.0	0.0	50%	102.0	61.4	80.1	88.3	88.9	99.8	94.7	90.9	86.1	79.6
				SCN 20-I	AB Noise	5t Electric Hoist In Lift Shafts	100.0	1.0	0.0	50%	97.0	70.7	79.9	86.0	88.5	90.9	90.1	91.3	82.1	76.0
Dec 2021 - Sept 2022	**Weekend Possessions, Week Night Possessions**	**Central Walk**	**Platform Remodelling works including platform canopy modifications**	**SCN 20**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**121.6**	-	-	-	**124.8**	**83.5**	**101.9**	**113.3**	**113.1**	**121.4**	**118.6**	**115.8**	**109.1**	**102.6**
Oct 2018 - Jun 2019	Standard Construction Hours, behind hoarding	ESR	Construction of Shaft to ESR Ghost Platform	SCN 21-A	AB Noise	Floor Saw	117.0	1.0	5.0	50%	119.0	71.9	86.6	110.7	109.7	110.7	114.2	112.5	103.4	96.8
				SCN 21-B	AB Noise / GB Vibration	Sheet Piling Rig	121.0	1.0	5.0	30%	120.8	73.7	88.4	112.5	111.5	112.5	116.0	114.3	105.2	98.6
				SCN 21-C	AB Noise	10t Excavator	100.0	1.0	0.0	100%	100.0	57.5	78.2	86.9	89.5	94.8	95.8	91.1	85.8	78.6
				SCN 21-D	AB Noise	Truck And Dogs	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 21-E	AB Noise	Wire Saw Concrete Cutting Rig	117.0	1.0	5.0	100%	122.0	74.9	89.6	113.7	112.7	113.7	117.2	115.5	106.4	99.8
				SCN 21-F	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 21-G	AB Noise	Concrete Agitators	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 21-H	AB Noise	Scissor Lifts	90.0	1.0	0.0	50%	87.0	52.9	75.1	79.4	75.4	80.7	79.2	80.2	75.8	66.6
				SCN 21-I	AB Noise	10t Hoist	100.0	1.0	0.0	50%	97.0	70.7	79.9	86.0	88.5	90.9	90.1	91.3	82.1	76.0
Oct 2018 - Jun 2019	**Standard Construction Hours, behind hoarding**	**ESR**	**Construction of Shaft to ESR Ghost Platform**	**SCN 21**	**AB Noise / GB Vibration**	**TOTAL EMISSION (LW, 15minute in dBA)**	**124.1**	-	-	-	**125.9**	**80.2**	**95.3**	**117.3**	**116.4**	**117.6**	**121.2**	**119.3**	**110.4**	**103.8**
Oct 2018 - Dec 2020	Day Time Normal Hours and Weeknight Non operational Hours, behind hoarding	ESR	Surface Works and Underground works	SCN 22-A	AB Noise	Floor Saw	117.0	1.0	5.0	50%	119.0	71.9	86.6	110.7	109.7	110.7	114.2	112.5	103.4	96.8
				SCN 22-B	AB Noise	10t Excavator	100.0	1.0	0.0	100%	100.0	57.5	78.2	86.9	89.5	94.8	95.8	91.1	85.8	78.6
				SCN 22-C	AB Noise	Truck And Dogs	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 22-D	AB Noise	Wire Saw Concrete Cutting Rig	117.0	1.0	5.0	100%	122.0	74.9	89.6	113.7	112.7	113.7	117.2	115.5	106.4	99.8
				SCN 22-E	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 22-F	AB Noise	Concrete Agitators	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 22-G	AB Noise	Scissor Lifts	90.0	1.0	0.0	50%	87.0	52.9	75.1	79.4	75.4	80.7	79.2	80.2	75.8	66.6
				SCN 22-H	AB Noise	10t Hoist	100.0	1.0	0.0	50%	97.0	70.7	79.9	86.0	88.5	90.9	90.1	91.3	82.1	76.0
				SCN 22-I	AB Noise	Ongoing Works Below The Surface	103.8	1.0	0.0	100%	103.8	61.6	76.6	94.7	94.5	95.9	99.0	97.4	89.1	82.2
Oct 2018 - Dec 2020	**Day Time Normal Hours and Weeknight Non operational Hours, behind hoarding**	**ESR**	**Surface Works and Underground works**	**SCN 22**	**AB Noise / GB Vibration**	**TOTAL EMISSION (LW, 15minute in dBA)**	**121.3**	-	-	-	**124.3**	**79.2**	**94.4**	**115.6**	**114.7**	**116.0**	**119.7**	**117.7**	**108.9**	**102.3**
Oct 2018 - Aug 2019	Standard Construction Hours	East Entrance	Demolition of the Bounce Hotel	SCN 23-A	AB Noise	25t Mobile Crane	105.0	1.0	0.0	50%	102.0	61.4	80.1	88.3	88.9	99.8	94.7	90.9	86.1	79.6
				SCN 23-B	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 23-C	AB Noise	Truck And Dogs	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 23-D	AB Noise	Wire Saw Concrete Cutting Rig	117.0	1.0	5.0	100%	122.0	74.9	89.6	113.7	112.7	113.7	117.2	115.5	106.4	99.8
				SCN 23-E	AB Noise / GB Vibration / GB Noise	5t Excavator (Hydraulic Breaker)	118.0	1.0	5.0	100%	123.0	82.4	101.1	109.3	109.9	120.8	115.7	111.9	107.1	100.6
				SCN 23-F	AB Noise / GB Vibration / GB Noise	10t Excavator (Hydraulic Breaker)	118.0	1.0	5.0	100%	123.0	82.4	101.1	109.3	109.9	120.8	115.7	111.9	107.1	100.6
				SCN 23-G	AB Noise	Road Sweeper	107.0	1.0	0.0	100%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 23-H	AB Noise	Dust Suppression Plant	104.0	1.0	0.0	100%	104.0	69.9	92.1	96.4	92.4	97.7	96.2	97.2	92.8	83.6
Oct 2018 - Aug 2019	**Standard Construction Hours**	**East Entrance**	**Demolition of the Bounce Hotel**	**SCN 23**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**122.9**	-	-	-	**127.6**	**86.0**	**104.9**	**116.2**	**116.1**	**124.3**	**121.1**	**118.5**	**111.8**	**105.3**

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impacts	Equipment	LW - Actual	Quantity	Penalty	Duty Factor	LW - Modified (Q / P / DF)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)								
												31.5	63	125	250	500	1000	2000	4000	8000
Sept 2019 - Dec 2019	Standard Construction Hours	East Entrance	Piling for East Entrance	SCN 24-A	AB Noise	Piling Rig (Auger)	110.0	1.0	5.0	100%	115.0	68.0	82.7	104.5	105.8	106.9	110.5	108.9	99.8	93.0
				SCN 24-B	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 24-C	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 24-D	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 24-E	AB Noise / GB Vibration / GB Noise	10t Excavator (Hydraulic Breaker)	118.0	1.0	5.0	100%	123.0	82.4	101.1	109.3	109.9	120.8	115.7	111.9	107.1	100.6
				SCN 24-F	AB Noise	Bob Cat	104.0	1.0	0.0	100%	104.0	51.7	73.9	83.0	89.5	99.9	100.1	95.3	87.1	85.0
				SCN 24-G	AB Noise	200cfm Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 24-H	AB Noise	Truck And Dogs	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
Sept 2019 - Dec 2019	**Standard Construction Hours**	**East Entrance**	**Piling for East Entrance**	**SCN 24**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**120.4**	**-**	**-**	**-**	**124.3**	**83.6**	**101.9**	**110.9**	**112.1**	**121.3**	**118.1**	**114.9**	**108.6**	**102.1**
Dec 2019 - Apr 2020	Standard Construction Hours	East Entrance	Excavation of East Entrance	SCN 25-A	AB Noise	20t Excavator	105.0	1.0	0.0	100%	105.0	62.5	83.2	91.9	94.5	99.8	100.8	96.1	90.8	83.6
				SCN 25-B	AB Noise	Bob Cat	104.0	1.0	0.0	100%	104.0	51.7	73.9	83.0	89.5	99.9	100.1	95.3	87.1	85.0
				SCN 25-C	AB Noise	Truck And Dogs	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 25-D	AB Noise	Drilling Rig For Ground Anchors	113.0	1.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
				SCN 25-E	AB Noise	Shotcrete Machine	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 25-F	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 25-G	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 25-H	AB Noise	200kva Generator (Diesel)	99.0	1.0	0.0	100%	99.0	64.9	87.1	91.4	87.4	92.7	91.2	92.2	87.8	78.6
				SCN 25-I	AB Noise	Water Pump (4 Inch)	91.0	1.0	0.0	100%	91.0	50.5	66.5	74.7	76.2	83.0	88.4	83.6	76.9	70.4
				SCN 25-J	AB Noise	200 CFM Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
Dec 2019 - Apr 2020	**Standard Construction Hours**	**East Entrance**	**Excavation of East Entrance**	**SCN 25**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**118.1**	**-**	**-**	**-**	**120.3**	**78.5**	**94.9**	**108.4**	**110.0**	**112.7**	**116.4**	**113.8**	**105.5**	**98.9**
Dec 2019 - Apr 2020	Standard Construction Hours	East Entrance	Excavation of Adit to ESR Concourse including Canopy Tube installation	SCN 26-A	AB Noise	Canopy Tube Boring Machines (Horizontal)	110.0	1.0	5.0	100%	115.0	68.0	82.7	104.5	105.8	106.9	110.5	108.9	99.8	93.0
				SCN 26-B	AB Noise	Hi Rail Flat Bed Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 26-C	AB Noise	Hi Rail Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 26-D	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 26-E	AB Noise	25t Crane	105.0	1.0	0.0	50%	102.0	61.4	80.1	88.3	88.9	99.8	94.7	90.9	86.1	79.6
				SCN 26-F	AB Noise	Truck And Dogs	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 26-G	AB Noise	Arc Welding Machine	105.0	1.0	0.0	100%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 26-H	AB Noise	Drilling Rig	113.0	1.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
				SCN 26-I	AB Noise	Ventilation Fans (1m Dia)	95.0	2.0	0.0	100%	98.0	63.2	79.7	94.9	88.6	92.0	87.9	83.0	75.4	69.8
				SCN 26-J	AB Noise	Water Pump (4 Inch)	91.0	1.0	0.0	100%	91.0	50.5	66.5	74.7	76.2	83.0	88.4	83.6	76.9	70.4
Dec 2019 - Apr 2020	**Standard Construction Hours**	**East Entrance**	**Excavation of Adit to ESR Concourse including Canopy Tube installation**	**SCN 26**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**118.5**	**-**	**-**	**-**	**121.3**	**77.8**	**96.9**	**110.1**	**111.5**	**113.7**	**116.9**	**114.9**	**106.3**	**99.5**
May 2020 - Jan 2021	Standard Construction Hours	East Entrance	FRP works to East Entrance	SCN 27-A	AB Noise	Tower Crane	105.0	1.0	0.0	50%	102.0	61.4	80.1	88.3	88.9	99.8	94.7	90.9	86.1	79.6
				SCN 27-B	AB Noise	Arc Welding Machines	105.0	2.0	0.0	100%	108.0	73.9	96.1	100.4	96.4	101.7	100.2	101.2	96.8	87.6
				SCN 27-C	AB Noise	Waterproof Welding Machine	105.0	1.0	0.0	100%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 27-D	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 27-E	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 27-F	AB Noise	Concrete Skip	99.0	2.0	0.0	100%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
				SCN 27-G	AB Noise	All Terrain Scissor Lifts	90.0	2.0	0.0	50%	90.0	55.9	78.1	82.4	78.4	83.7	82.2	83.2	78.8	69.6
				SCN 27-H	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
May 2020 - Jan 2021	**Standard Construction Hours**	**East Entrance**	**FRP works to East Entrance**	**SCN 27**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**115.9**	**-**	**-**	**-**	**116.2**	**78.3**	**99.5**	**104.4**	**103.8**	**109.5**	**112.1**	**109.1**	**102.8**	**95.3**
May 2020 - Jul 2021	Standard Construction Hours	East Entrance	East Entrance Works and Underground Works	SCN 28-A	AB Noise	Tower Crane	105.0	1.0	0.0	50%	102.0	61.4	80.1	88.3	88.9	99.8	94.7	90.9	86.1	79.6
				SCN 28-B	AB Noise	Arc Welding Machines	105.0	2.0	0.0	100%	108.0	73.9	96.1	100.4	96.4	101.7	100.2	101.2	96.8	87.6
				SCN 28-C	AB Noise	Waterproof Welding Machine	105.0	1.0	0.0	100%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 28-D	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 28-E	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 28-F	AB Noise	Concrete Skip	99.0	2.0	0.0	100%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
				SCN 28-G	AB Noise	All Terrain Scissor Lifts	90.0	2.0	0.0	50%	90.0	55.9	78.1	82.4	78.4	83.7	82.2	83.2	78.8	69.6
				SCN 28-H	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	50%	107.0	62.7	88.1	92.4	98.8	102.1	99.4	101.4	90.4	83.6
				SCN 28-I	AB Noise	Ongoing Works Below The Surface	91.9	1.0	0.0	100%	91.9	53.2	73.2	79.6	83.3	87.3	84.3	85.8	75.5	68.7
May 2020 - Jul 2021	**Standard Construction Hours**	**East Entrance**	**East Entrance Works and Underground Works**	**SCN 28**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**115.9**	**-**	**-**	**-**	**116.2**	**78.3**	**99.5**	**104.4**	**103.8**	**109.5**	**112.1**	**109.1**	**102.8**	**95.3**
Aug 2019 - Sep 2019	Nights between hours 10pm to 4am	Grand Concourse	Piling in Grand Concourse	SCN 29-A	AB Noise	Soilmec 75	113.0	1.0	5.0	100%	118.0	71.0	85.7	107.5	108.8	109.9	113.5	111.9	102.8	96.0
				SCN 29-B	AB Noise	8t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 29-C	AB Noise	Demo Saw	117.0	1.0	5.0	100%	122.0	74.9	89.6	113.7	112.7	113.7	117.2	115.5	106.4	99.8
				SCN 29-D	AB Noise / GB Vibration	Jackhammer	113.0	1.0	5.0	100%	118.0	79.1	93.9	106.6	109.3	110.8	112.7	111.8	104.9	97.2
				SCN 29-E	AB Noise	Concrete Line Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 29-F	AB Noise	Trucks For Spoil	107.0	1.0	0.0	50%	104.0	59.7	85.1	89.4	95.8	99.1	96.4	98.4	87.4	80.6
				SCN 29-G	AB Noise	Sucker Truck	116.0	1.0	5.0	100%	121.0	78.7	99.9	109.0	110.5	113.9	116.1	115.3	106.1	101.0
				SCN 29-H	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	71.5	87.5	95.7	97.2	104.0	109.4	104.6	97.9	91.4
				SCN 29-I	AB Noise	Lighting Tower	80.0	1.0	0.0	100%	80.0	53.7	62.9	69.0	71.5	73.9	73.1	74.3	65.1	59.0
				SCN 29-J	AB Noise	Small Tools	102.0	1.0	0.0	100%	102.0	58.7	82.4	87.5	87.2	97.8	97.9	93.2	81.5	71.4
				SCN 29-K	AB Noise	Delivery Trucks	107.0	1.0	0.0	50%	104.0	57.0	76.2	88.3	96.8	98.2	99.4	95.6	88.4	75.3
Aug 2019 - Sep 2019	**Nights between hours 10pm to 4am**	**Grand Concourse**	**Piling in Grand Concourse**	**SCN 29**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**122.2**	**-**	**-**	**-**	**126.4**	**83.5**	**101.8**	**116.3**	**116.8**	**118.8**	**121.7**	**120.3**	**111.6**	**105.3**
Aug 2019 - Sep 2019	Nights between hours 10pm to 4am	Grand Concourse	FRP Pile caps	SCN 30-A	AB Noise	8t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 30-B	AB Noise / GB Vibration	Jackhammer	113.0	2.0	5.0	100%	121.0	82.1	96.9	109.6	112.3	113.8	115.7	114.8	107.9	100.2
				SCN 30-C	AB Noise	Welding Machine	105.0	1.0	0.0	100%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 30-D	AB Noise	Concrete Agitator	112.0	2.0	0.0	100%	115.0	74.5	90.5	98.7	100.2	107.0	112.4	107.6	100.9	94.4
				SCN 30-E	AB Noise	20m Concrete Line Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 30-F	AB Noise	Hand Held Vibrators	113.0	2.0	5.0	100%	121.0	70.4	88.6	103.7	114.2	114.6	115.8	114.0	105.8	99.7
				SCN 30-G	AB Noise	Hand Held Masonry Drills	102.0	3.0	0.0	100%	106.8	62.5	87.9	92.2	98.6	101.9	99.2	101.2	90.2	83.4
				SCN 30-H	AB Noise	Truck For Deliveries	107.0	1.0	0.0	50%	104.0	57.0	76.2	88.3	96.8	98.2	99.4	95.6	88.4	75.3
				SCN 30-I	AB Noise	6 Inch Circular Saw	117.0	4.0	5.0	100%	128.0	83.7	109.1	113.4	119.8	123.1	120.4	122.4	111.4	104.6
				SCN 30-J	AB Noise	130 CFM Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 30-K	AB Noise	Explosive Nail Guns	116.0	2.0	5.0	100%	124.0	85.1	99.9	112.6	115.3	116.8	118.7	117.8	110.9	103.2
				SCN 30-L	AB Noise	Lighting Tower	80.0	1.0	0.0	100%	80.0	53.7	62.9	69.0	71.5	73.9	73.1	74.3	65.1	59.0
				SCN 30-M	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	60.7	86.1	90.4	96.8	100.1	97.4	99.4	88.4	81.6
Aug 2019 - Sep 2019	**Nights between hours 10pm to 4am**	**Grand Concourse**	**FRP Pile caps**	**SCN 30**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**122.2**	**-**	**-**	**-**	**130.8**	**89.1**	**110.1**	**117.3**	**122.5**	**125.0**	**124.6**	**124.8**	**115.8**	**108.7**
Sept 2019 - Oct 2019	Nights between hours 10pm to 4am	Grand Concourse	Removal of Existing Canopies	SCN 31-A	AB Noise	Oxy Sets	105.0	3.0	0.0	100%	109.8	67.3	88.0	96.7	99.3	104.6	105.6	100.9	95.6	88.4
				SCN 31-B	AB Noise	Cherry Pickers	105.0	3.0	0.0	50%	106.8	72.7	94.9	99.2	95.2	100.5	99.0	100.0	95.6	86.4
				SCN 31-C	AB Noise	30t Crawler Crane / Spider Crane	104.0	1.0	0.0	50%	101.0	63.4	74.5	84.1	86.3	94.0	94.0	89.9	97.3	86.9
				SCN 31-D	AB Noise	Scissor Lift	90.0	1.0	0.0	50%	87.0	44.5	65.2	73.9	76.5	81.8	82.8	78.1	72.8	65.6
				SCN 31-E	AB Noise	Lighting Tower	80.0	1.0	0.0	100%	80.0	53.7	62.9	69.0	71.5	73.9	73.1	74.3	65.1	59.0
				SCN 31-F	AB Noise	Trucks	107.0	2.0	0.0	50%	107.0	60.0	79.2	91.3	99.8	101.2	102.4	98.6	91.4	78.3
Sept 2019 - Oct 2019	**Nights between hours 10pm to 4am**	**Grand Concourse**	**Removal of Existing Canopies**	**SCN 31**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**111.4**	**-**	**-**	**-**	**113.1**	**74.4**	**95.9**	**101.7**	**103.4**	**107.4**	**108.1**	**104.9**	**101.5**	**92.3**

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impacts	Equipment	LW, Actual	Quantity	Penalty	Duty Factor	LW, Modified (Q / P / DF)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)								
												31.5	63	125	250	500	1000	2000	4000	80000
Nov 2019 - Jan 2020	Nights between hours 10pm to 4am	Grand Concourse	Installation of precast / insitu columns and arches	SCN 32-A	AB Noise	8t Excavator	95.0	1.0	0.0	100%	95.0	52.5	73.2	81.9	84.5	89.8	90.8	86.1	80.8	73.6
				SCN 32-B	AB Noise / GB Vibration	Jackhammer	113.0	2.0	5.0	100%	121.0	82.1	96.9	109.6	112.3	113.8	115.7	114.8	107.9	100.2
				SCN 32-C	AB Noise	Welding Machine	105.0	1.0	0.0	100%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 32-D	AB Noise	Concrete Agitator	112.0	2.0	0.0	100%	115.0	74.5	90.5	98.7	100.2	107.0	112.4	107.6	100.9	94.4
				SCN 32-E	AB Noise	20m Concrete Line Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 32-F	AB Noise	Hand Held Vibrators	113.0	2.0	5.0	100%	121.0	70.4	88.6	103.7	114.2	114.6	115.8	114.0	105.8	99.7
				SCN 32-G	AB Noise	Hand Held Masonry Drills	102.0	3.0	0.0	100%	106.8	62.5	87.9	92.2	98.6	101.9	99.2	101.2	90.2	83.4
				SCN 32-H	AB Noise	Truck For Deliveries	107.0	1.0	0.0	50%	104.0	57.0	76.2	88.3	96.8	98.2	99.4	95.6	88.4	75.3
				SCN 32-I	AB Noise	6 Inch Circular Saw	117.0	4.0	5.0	100%	128.0	83.7	109.1	113.4	119.8	123.1	120.4	122.4	111.4	104.6
				SCN 32-J	AB Noise	130 CFM Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 32-K	AB Noise	Explosive Nail Guns	116.0	2.0	5.0	100%	124.0	85.1	99.9	112.6	115.3	116.8	118.7	117.8	110.9	103.2
				SCN 32-L	AB Noise	Lighting Tower	80.0	1.0	0.0	100%	80.0	53.7	62.9	69.0	71.5	73.9	73.1	74.3	65.1	59.0
Nov 2019 - Jan 2020	**Nights between hours 10pm to 4am**	**Grand Concourse**	**Installation of precast / insitu columns and arches**	**SCN 32**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**122.2**	**-**	**-**	**-**	**130.8**	**89.0**	**110.1**	**117.3**	**122.5**	**125.0**	**124.5**	**124.8**	**115.8**	**108.7**
Jul 2020 - Aug 2021	Nights between hours 10pm to 4am	Grand Concourse	Installation of Roof Structure	SCN 33-A	AB Noise	Elevated Work Platform (EWP)	105.0	3.0	0.0	50%	106.8	72.7	94.9	99.2	95.2	100.5	99.0	100.0	95.6	86.4
				SCN 33-B	AB Noise	120t Crawler	104.0	1.0	0.0	50%	101.0	63.4	74.5	84.1	86.3	94.0	94.0	89.9	97.3	86.9
				SCN 33-C	AB Noise	Delivery Trucks	107.0	1.0	0.0	50%	104.0	57.0	76.2	88.3	96.8	98.2	99.4	95.6	88.4	75.3
				SCN 33-D	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	60.7	86.1	90.4	96.8	100.1	97.4	99.4	88.4	81.6
				SCN 33-E	AB Noise	130 CFM Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 33-F	AB Noise	Lighting Tower	80.0	3.0	0.0	100%	84.8	58.5	67.7	73.8	76.3	78.7	77.9	79.1	69.9	63.8
Jul 2020 - Aug 2021	**Nights between hours 10pm to 4am**	**Grand Concourse**	**Installation of Roof Structure**	**SCN 33**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**111.2**	**-**	**-**	**-**	**111.0**	**76.7**	**95.8**	**100.5**	**101.7**	**105.2**	**104.3**	**104.2**	**100.3**	**90.8**
Mar 2020 - May 2020	Standard Construction Hours	Northern Concourse & North Entry	Demolition Southern Half	SCN 34-A	AB Noise	20t Excavator With Muncher	105.0	1.0	5.0	100%	110.0	67.5	88.2	96.9	99.5	104.8	105.8	101.1	95.8	88.6
				SCN 34-B	AB Noise	Demo Saws	117.0	2.0	5.0	100%	125.0	80.7	106.1	110.4	116.8	120.1	117.4	119.4	108.4	101.6
				SCN 34-C	AB Noise / GB Vibration	Jackhammer	113.0	4.0	5.0	100%	124.0	85.1	99.9	112.6	115.3	116.8	118.7	117.8	110.9	103.2
				SCN 34-D	AB Noise	Oxy Sets	105.0	3.0	0.0	100%	109.8	75.7	97.9	102.2	98.2	103.5	102.0	103.0	98.6	89.4
				SCN 34-E	AB Noise	Trucks	107.0	3.0	0.0	50%	108.8	61.8	81.0	93.1	101.6	103.0	104.2	100.4	93.2	80.1
				SCN 34-F	AB Noise	130 CFM Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 34-G	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	60.7	86.1	90.4	96.8	100.1	97.4	99.4	88.4	81.6
				SCN 34-H	AB Noise	Elevated Work Platform (EWP)	105.0	1.0	0.0	50%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
Mar 2020 - May 2020	**Standard Construction Hours**	**Northern Concourse & North Entry**	**Demolition Southern Half**	**SCN 34**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**119.4**	**-**	**-**	**-**	**127.8**	**87.1**	**107.7**	**115.0**	**119.3**	**122.0**	**121.4**	**121.9**	**113.2**	**105.7**
Jun 2020 - Aug 2020	Standard Construction Hours	Northern Concourse & North Entry	FRP of Structure (Floor, retaining wall, Columns)	SCN 35-A	AB Noise	Hand Held Vibrators	113.0	2.0	5.0	100%	121.0	74.0	88.7	110.5	111.8	112.9	116.5	114.9	105.8	99.0
				SCN 35-B	AB Noise	Hand Held Masonry Drills	102.0	3.0	0.0	100%	106.8	64.3	85.0	93.7	96.3	101.6	102.6	97.9	92.6	85.4
				SCN 35-C	AB Noise	Delivery Trucks	107.0	2.0	0.0	50%	107.0	59.9	74.6	98.7	97.7	98.7	102.2	100.5	91.4	84.8
				SCN 35-D	AB Noise	6 Inch Circular Saw	117.0	4.0	5.0	100%	128.0	89.1	103.9	116.6	119.3	120.8	122.7	121.8	114.9	107.2
				SCN 35-E	AB Noise	130 CFM Compressor	100.0	1.0	0.0	100%	100.0	59.5	75.5	83.7	85.2	92.0	97.4	92.6	85.9	79.4
				SCN 35-F	AB Noise	Explosive Nail Guns	116.0	2.0	5.0	50%	121.0	76.7	102.1	106.4	112.8	116.1	113.4	115.4	104.4	97.6
				SCN 35-G	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	60.7	86.1	90.4	96.8	100.1	97.4	99.4	88.4	81.6
				SCN 35-H	AB Noise	160t Crawler Crane	104.0	1.0	0.0	50%	101.0	60.5	76.5	84.7	86.2	93.0	98.4	93.6	86.9	80.4
				SCN 35-I	AB Noise	Concrete Line Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 35-J	AB Noise	Elevated Work Platform (EWP)	105.0	1.0	0.0	50%	102.0	58.7	82.4	87.5	87.2	97.8	97.9	93.2	81.5	71.4
				SCN 35-K	AB Noise	Concrete Agitator	112.0	3.0	0.0	100%	116.8	85.9	93.9	102.0	104.4	109.7	112.4	110.9	105.1	99.8
Jun 2020 - Aug 2020	**Standard Construction Hours**	**Northern Concourse & North Entry**	**FRP of Structure (Floor, retaining wall, Columns)**	**SCN 35**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**121.7**	**-**	**-**	**-**	**129.8**	**91.1**	**106.6**	**118.1**	**120.9**	**122.9**	**124.5**	**123.7**	**116.2**	**108.9**
Feb 2021 - Mar2021	Standard Construction Hours	Northern Concourse & North Entry	Demolition Northern Half	SCN 36-A	AB Noise	20t Excavator With Muncher	105.0	1.0	5.0	100%	110.0	67.5	88.2	96.9	99.5	104.8	105.8	101.1	95.8	88.6
				SCN 36-B	AB Noise	Demo Saws	117.0	2.0	5.0	100%	125.0	80.7	106.1	110.4	116.8	120.1	117.4	119.4	108.4	101.6
				SCN 36-C	AB Noise / GB Vibration	Jackhammer	113.0	4.0	5.0	100%	124.0	85.1	99.9	112.6	115.3	116.8	118.7	117.8	110.9	103.2
				SCN 36-D	AB Noise	Oxy Sets	105.0	3.0	0.0	100%	109.8	75.7	97.9	102.2	98.2	103.5	102.0	103.0	98.6	89.4
				SCN 36-E	AB Noise	Trucks	107.0	3.0	0.0	50%	108.8	61.8	81.0	93.1	101.6	103.0	104.2	100.4	93.2	80.1
				SCN 36-F	AB Noise	130 CFM Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
				SCN 36-G	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	60.7	86.1	90.4	96.8	100.1	97.4	99.4	88.4	81.6
				SCN 36-H	AB Noise	Elevated Work Platform (EWP)	105.0	1.0	0.0	50%	102.0	67.9	90.1	94.4	90.4	95.7	94.2	95.2	90.8	81.6
Feb 2021 - Mar2021	**Standard Construction Hours**	**Northern Concourse & North Entry**	**Demolition Northern Half**	**SCN 36**	**AB Noise / GB Vibration**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**119.4**	**-**	**-**	**-**	**127.8**	**87.1**	**107.7**	**115.0**	**119.3**	**122.0**	**121.4**	**121.9**	**113.2**	**105.7**

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impacts	Equipment	LW, Actual	Quantity	Penalty	Duty Factor	LW, Modified (Q, / P / DF)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)								
												31.5	63	125	250	500	1000	2000	4000	8000
Mar 2021 - Jun 2021	Standard Construction Hours	Northern Concourse & North Entry	FRP of Structure (Floor, retaining wall, Columns)	SCN 37-A	AB Noise	Hand Held Vibrators	113.0	2.0	5.0	100%	121.0	74.0	88.7	110.5	111.8	112.9	116.5	114.9	105.8	99.0
				SCN 37-B	AB Noise	Hand Held Masonry Drills	102.0	3.0	0.0	100%	106.8	64.3	85.0	93.7	96.3	101.6	102.6	97.9	92.6	85.4
				SCN 37-C	AB Noise	Truck For Deliveries	107.0	2.0	0.0	50%	107.0	59.9	74.6	98.7	97.7	98.7	102.2	100.5	91.4	84.8
				SCN 37-D	AB Noise	6 Inch Circular Saw	117.0	4.0	5.0	100%	128.0	89.1	103.9	116.6	119.3	120.8	122.7	121.8	114.9	107.2
				SCN 37-E	AB Noise	130 Cfm Compressor	100.0	1.0	0.0	100%	100.0	59.5	75.5	83.7	85.2	92.0	97.4	92.6	85.9	79.4
				SCN 37-F	AB Noise	Explosive Nail Guns	116.0	2.0	5.0	50%	121.0	76.7	102.1	106.4	112.8	116.1	113.4	115.4	104.4	97.6
				SCN 37-G	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	60.7	86.1	90.4	96.8	100.1	97.4	99.4	88.4	81.6
				SCN 37-H	AB Noise	160t Crawler Crane	104.0	1.0	0.0	50%	101.0	60.5	76.5	84.7	86.2	93.0	98.4	93.6	86.9	80.4
				SCN 37-I	AB Noise	Concrete Line Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 37-J	AB Noise	Elevated Work Platform (EWP)	105.0	1.0	0.0	50%	102.0	58.7	82.4	87.5	87.2	97.8	97.9	93.2	81.5	71.4
				SCN 37-K	AB Noise	Concrete Agitator	112.0	3.0	0.0	100%	116.8	85.9	93.9	102.0	104.4	109.7	112.4	110.9	105.1	99.8
Mar 2021 - Jun 2021	**Standard Construction Hours**	**Northern Concourse & North Entry**	**FRP of Structure (Floor, retaining wall, Columns)**	**SCN 37**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**121.7**	**-**	**-**	**-**	**129.8**	**91.1**	**106.6**	**118.1**	**120.9**	**122.9**	**124.5**	**123.7**	**116.2**	**108.9**
Jun 2021 - Jul 2021	Standard Construction Hours	Northern Concourse & North Entry	Installation of remaining precast columns and Arches	SCN 38-A	AB Noise	160t Crawler Crane	104.0	1.0	0.0	50%	101.0	60.5	76.5	84.7	86.2	93.0	98.4	93.6	86.9	80.4
				SCN 38-B	AB Noise	Elevated Work Platform (EWP)	105.0	2.0	0.0	50%	105.0	61.7	85.4	90.5	90.2	100.8	100.9	96.2	84.5	74.4
				SCN 38-C	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	60.7	86.1	90.4	96.8	100.1	97.4	99.4	88.4	81.6
				SCN 38-D	AB Noise	6 Inch Circular Saw	117.0	4.0	5.0	100%	128.0	89.1	103.9	116.6	119.3	120.8	122.7	121.8	114.9	107.2
				SCN 38-E	AB Noise	Truck For Deliveries	107.0	2.0	0.0	50%	107.0	59.9	74.6	98.7	97.7	98.7	102.2	100.5	91.4	84.8
				SCN 38-F	AB Noise	Hand Held Vibrators	113.0	2.0	5.0	100%	121.0	74.0	88.7	110.5	111.8	112.9	116.5	114.9	105.8	99.0
				SCN 38-G	AB Noise	Concrete Line Pump	109.0	1.0	0.0	100%	109.0	68.5	84.5	92.7	94.2	101.0	106.4	101.6	94.9	88.4
				SCN 38-H	AB Noise	Concrete Agitator	112.0	2.0	0.0	100%	115.0	84.1	92.1	100.2	102.6	107.9	110.6	109.1	103.3	98.0
				SCN 38-I	AB Noise	Welding Machines	105.0	1.0	0.0	100%	105.0	70.9	93.1	97.4	93.4	98.7	97.2	98.2	93.8	84.6
				SCN 38-J	AB Noise	130 CFM Compressor	100.0	1.0	0.0	100%	100.0	73.7	82.9	89.0	91.5	93.9	93.1	94.3	85.1	79.0
Jun 2021 - Jul 2021	**Standard Construction Hours**	**Northern Concourse & North Entry**	**Installation of remaining precast columns and Arches**	**SCN 38**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**120.4**	**-**	**-**	**-**	**129.1**	**90.6**	**104.8**	**117.7**	**120.2**	**121.8**	**124.0**	**122.9**	**115.8**	**108.3**
Jun 2019 - Oct 2020	24 Hours / Day	Sydney Yard Access Bridge	Heavy Vehicle Traffic on the SYAB	SCN 39-A	AB Noise	Inbound Heavy Vehicles	107.0	9.0	0.0	100%	116.5	72.2	97.6	101.9	108.3	111.6	108.9	110.9	99.9	93.1
				SCN 39-B	AB Noise	Outbound Heavy Vehicles	107.0	9.0	0.0	100%	116.5	72.2	97.6	101.9	108.3	111.6	108.9	110.9	99.9	93.1
Jun 2019 - Oct 2020	**24 Hours / Day**	**Sydney Yard Access Bridge**	**Heavy Vehicle Traffic on the SYAB**	**SCN 39**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**110.0**	**-**	**-**	**-**	**119.6**	**75.2**	**100.6**	**104.9**	**111.3**	**114.6**	**111.9**	**113.9**	**102.9**	**96.1**

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impact/s	Equipment	LW, Actual	Quantity	Penalty	Duty Factor	LW, Modified (Q / P / DF)	Calculations for Underground Works (+10dB for reverb noise / -30dB for shielding)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)							
													31.5	63	125	250	500	1000	2000	4000	8000
Apr 2019 - Sept 2019	Day and Night Works	Metro Box - Under the Top Slab	Excavation to underside of Metro Concourse	U-SCN 01-A	AB Noise / GB Vibration / GB Noise	14t Excavators With Hammers	118.0	5.0	5.0	100%	130.0	110.0	69.4	88.1	96.3	96.9	107.8	102.7	98.9	94.1	87.6
				U-SCN 01-B	AB Noise	14t Excavators With Buckets	105.0	5.0	0.0	100%	112.0	92.0	49.5	70.2	78.9	81.5	86.8	87.8	83.1	77.8	70.6
				U-SCN 01-C	AB Noise	Front End Loaders (Cat 918m Or Equivalent)	113.0	5.0	0.0	100%	120.0	100.0	61.2	72.4	88.5	93.7	92.5	93.7	93.7	85.3	81.2
				U-SCN 01-D	AB Noise	Shotcrete Machines	109.0	3.0	0.0	100%	113.8	93.8	53.3	69.3	77.5	79.0	85.8	91.2	86.4	79.7	73.2
Apr 2019 - Sept 2019	**Day and Night Works**	**Metro Box - Under the Top Slab**	**Excavation to underside of Metro Concourse**	**U-SCN 01**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**119.7**	**-**	**-**	**-**	**130.6**	**110.6**	**70.1**	**88.4**	**97.1**	**98.7**	**108.0**	**103.6**	**100.3**	**94.8**	**88.7**
Jun 2019 - Feb 2020	Day and Night Works	Metro Box - Under the Top Slab	FRP North South Concourse	U-SCN 02-A	AB Noise	Concrete Vibrators	103.0	3.0	5.0	100%	112.8	92.8	52.3	68.3	76.5	78.0	84.8	90.2	85.4	78.7	72.2
				U-SCN 02-B	AB Noise	Concrete Helicopter / Finishing Machine	106.0	1.0	5.0	100%	111.0	91.0	50.5	66.5	74.7	76.2	83.0	88.4	83.6	76.9	70.4
				U-SCN 02-C	AB Noise	Telehandlers	113.0	2.0	0.0	100%	116.0	96.0	57.2	68.4	84.5	89.7	88.5	89.7	89.7	81.3	77.2
				U-SCN 02-D	AB Noise	Welding Machines	105.0	2.0	0.0	100%	108.0	88.0	53.9	76.1	80.4	76.4	81.7	80.2	81.2	76.8	67.6
				U-SCN 02-E	AB Noise	6 Inch Circular Saw	117.0	10.0	0.0	100%	127.0	107.0	59.9	74.6	98.7	97.7	98.7	102.2	100.5	91.4	84.8
				U-SCN 02-F	AB Noise	130 CFM Compressor	100.0	3.0	0.0	100%	104.8	84.8	58.5	67.7	73.8	76.3	78.7	77.9	79.1	69.9	63.8
				U-SCN 02-G	AB Noise	Explosive Nail Guns	116.0	5.0	5.0	100%	128.0	108.0	69.1	83.9	96.6	99.3	100.8	102.7	101.8	94.9	87.2
				U-SCN 02-H	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	85.0	41.7	65.4	70.5	70.2	80.8	80.9	76.2	64.5	54.4
Jun 2019 - Feb 2020	**Day and Night Works**	**Metro Box - Under the Top Slab**	**FRP North South Concourse**	**U-SCN 02**	**AB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**120.8**	**-**	**-**	**-**	**130.8**	**110.8**	**70.4**	**85.4**	**101.0**	**101.9**	**103.2**	**105.8**	**104.5**	**96.8**	**89.6**
Nov 2019 - Apr 2020	Day and Night Works	Metro Box - Under the Top Slab	Excavation to B2 Level	U-SCN 03-A	AB Noise / GB Vibration / GB Noise	300kw Road Headers	120.0	2.0	5.0	100%	128.0	108.0	65.5	86.2	94.9	97.5	102.8	103.8	99.1	93.8	86.6
				U-SCN 03-B	AB Noise	30t Excavators With Breakers And Rock Saws	122.0	2.0	5.0	100%	130.0	110.0	69.4	88.1	96.3	96.9	107.8	102.7	98.9	94.1	87.6
				U-SCN 03-C	AB Noise	Front End Loaders (Cat 918m Or Equivalent)	113.0	5.0	0.0	100%	120.0	100.0	61.2	72.4	88.5	93.7	92.5	93.7	93.7	85.3	81.2
				U-SCN 03-D	AB Noise	Shotcrete Machines	109.0	1.0	0.0	100%	109.0	89.0	48.5	64.5	72.7	74.2	81.0	86.4	81.6	74.9	68.4
				U-SCN 03-E	AB Noise	Rock Bolting Rigs (Small)	120.0	2.0	0.0	100%	123.0	103.0	60.5	81.2	89.9	92.5	97.8	98.8	94.1	88.8	81.6
Nov 2019 - Apr 2020	**Day and Night Works**	**Metro Box - Under the Top Slab**	**Excavation to B2 Level**	**U-SCN 03**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**125.9**	**-**	**-**	**-**	**132.9**	**112.9**	**71.7**	**90.9**	**99.6**	**101.7**	**109.4**	**107.2**	**103.2**	**97.8**	**91.2**
Feb 2020 - Sept 2020	Day and Night Works	Metro Box - Under the Top Slab	FRP B1 to B2 structure	U-SCN 04-A	AB Noise	Concrete Vibrators	103.0	3.0	5.0	100%	112.8	92.8	52.3	68.3	76.5	78.0	84.8	90.2	85.4	78.7	72.2
				U-SCN 04-B	AB Noise	Concrete Helicopter / Finishing Machine	106.0	1.0	5.0	100%	111.0	91.0	50.5	66.5	74.7	76.2	83.0	88.4	83.6	76.9	70.4
				U-SCN 04-C	AB Noise	Telehandlers	113.0	2.0	0.0	100%	116.0	96.0	57.2	68.4	84.5	89.7	88.5	89.7	89.7	81.3	77.2
				U-SCN 04-D	AB Noise	Welding Machines	105.0	2.0	0.0	100%	108.0	88.0	53.9	76.1	80.4	76.4	81.7	80.2	81.2	76.8	67.6
				U-SCN 04-E	AB Noise	6 Inch Circular Saw	117.0	10.0	0.0	100%	127.0	107.0	59.9	74.6	98.7	97.7	98.7	102.2	100.5	91.4	84.8
				U-SCN 04-F	AB Noise	130 CFM Compressor	100.0	3.0	0.0	100%	104.8	84.8	58.5	67.7	73.8	76.3	78.7	77.9	79.1	69.9	63.8
				U-SCN 04-G	AB Noise	Explosive Nail Guns	116.0	5.0	5.0	100%	128.0	108.0	69.1	83.9	96.6	99.3	100.8	102.7	101.8	94.9	87.2
				U-SCN 04-H	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	85.0	41.7	65.4	70.5	70.2	80.8	80.9	76.2	64.5	54.4
				U-SCN 04-I	AB Noise	Scissor Lifts	90.0	4.0	0.0	50%	93.0	73.0	30.5	51.2	59.9	62.5	67.8	68.8	64.1	58.8	51.6
				U-SCN 04-J	AB Noise	Elevated Work Platform (EWP)	105.0	4.0	0.0	50%	108.0	88.0	53.9	76.1	80.4	76.4	81.7	80.2	81.2	76.8	67.6
				U-SCN 04-K	AB Noise	40t Roughie Crane	104.0	1.0	0.0	50%	101.0	81.0	43.4	54.5	64.1	66.3	74.0	74.0	69.9	77.3	66.9
Feb 2020 - Sept 2020	**Day and Night Works**	**Metro Box - Under the Top Slab**	**FRP B1 to B2 structure**	**U-SCN 04**	**AB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**121.1**	**-**	**-**	**-**	**130.9**	**110.9**	**70.5**	**85.8**	**101.0**	**101.9**	**103.3**	**105.8**	**104.5**	**96.9**	**89.7**
Aug. 2020 - Oct 2020	Day and Night Works	Metro Box - Under the Top Slab	Excavation to B4	U-SCN 05-A	AB Noise / GB Vibration / GB Noise	300kw Road Headers	120.0	2.0	5.0	100%	128.0	108.0	65.5	86.2	94.9	97.5	102.8	103.8	99.1	93.8	86.6
				U-SCN 05-B	AB Noise / GB Vibration / GB Noise	30t Excavators With Breakers And Rock Saws	122.0	2.0	5.0	100%	130.0	110.0	69.4	88.1	96.3	96.9	107.8	102.7	98.9	94.1	87.6
				U-SCN 05-C	AB Noise / GB Vibration / GB Noise	20t Excavators With Hammers	122.0	2.0	5.0	100%	130.0	110.0	69.4	88.1	96.3	96.9	107.8	102.7	98.9	94.1	87.6
				U-SCN 05-D	AB Noise	Front End Loaders (Cat 918m Or Equivalent)	113.0	2.0	0.0	100%	116.0	96.0	57.2	68.4	84.5	89.7	88.5	89.7	89.7	81.3	77.2
				U-SCN 05-E	AB Noise	Shotcrete Machines	109.0	1.0	0.0	100%	109.0	89.0	48.5	64.5	72.7	74.2	81.0	86.4	81.6	74.9	68.4
				U-SCN 05-F	AB Noise	Rock Bolting Rigs (Small)	120.0	2.0	0.0	100%	123.0	103.0	60.5	81.2	89.9	92.5	97.8	98.8	94.1	88.8	81.6
Aug. 2020 - Oct 2020	**Day and Night Works**	**Metro Box - Under the Top Slab**	**Excavation to B4**	**U-SCN 05**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**127.4**	**-**	**-**	**-**	**134.6**	**114.6**	**73.6**	**92.7**	**101.1**	**102.6**	**111.7**	**108.5**	**104.4**	**99.3**	**92.6**
Nov 2020 - Jun 2021	Day and Night Works	Metro Box - Under the Top Slab	FRP of B4 to B3 Structure	U-SCN 06-A	AB Noise	Concrete Vibrators	103.0	3.0	5.0	100%	112.8	92.8	52.3	68.3	76.5	78.0	84.8	90.2	85.4	78.7	72.2
				U-SCN 06-B	AB Noise	Concrete Helicopter / Finishing Machine	106.0	1.0	5.0	100%	111.0	91.0	50.5	66.5	74.7	76.2	83.0	88.4	83.6	76.9	70.4
				U-SCN 06-C	AB Noise	Telehandlers	113.0	2.0	0.0	100%	116.0	96.0	57.2	68.4	84.5	89.7	88.5	89.7	89.7	81.3	77.2
				U-SCN 06-D	AB Noise	Welding Machines	105.0	2.0	0.0	100%	108.0	88.0	53.9	76.1	80.4	76.4	81.7	80.2	81.2	76.8	67.6
				U-SCN 06-E	AB Noise	6 Inch Circular Saw	117.0	10.0	0.0	100%	127.0	107.0	59.9	74.6	98.7	97.7	98.7	102.2	100.5	91.4	84.8
				U-SCN 06-F	AB Noise	130 Cfm Compressor	100.0	3.0	0.0	100%	104.8	84.8	58.5	67.7	73.8	76.3	78.7	77.9	79.1	69.9	63.8
				U-SCN 06-G	AB Noise	Explosive Nail Guns	116.0	5.0	5.0	100%	128.0	108.0	69.1	83.9	96.6	99.3	100.8	102.7	101.8	94.9	87.2
				U-SCN 06-H	AB Noise	Small Tools (Hammers, Drills Etc)	102.0	2.0	0.0	100%	105.0	85.0	41.7	65.4	70.5	70.2	80.8	80.9	76.2	64.5	54.4
				U-SCN 06-I	AB Noise	40t Roughie Crane	104.0	2.0	0.0	50%	104.0	84.0	46.4	57.5	67.1	69.3	77.0	77.0	72.9	80.3	69.9
				U-SCN 06-J	AB Noise	Scissor Lifts	90.0	4.0	0.0	50%	93.0	73.0	30.5	51.2	59.9	62.5	67.8	68.8	64.1	58.8	51.6
				U-SCN 06-K	AB Noise	Elevated Work Platform (EWP)	105.0	4.0	0.0	50%	108.0	88.0	53.9	76.1	80.4	76.4	81.7	80.2	81.2	76.8	67.6
Nov 2020 - Jun 2021	**Day and Night Works**	**Metro Box - Under the Top Slab**	**FRP of B4 to B3 Structure**	**U-SCN 06**	**AB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**121.1**	**-**	**-**	**-**	**130.9**	**110.9**	**70.5**	**85.8**	**101.0**	**101.9**	**103.3**	**105.8**	**104.5**	**96.9**	**89.7**
Jun 2021 - Dec 2021	Day and Night Works	Metro Box - Under the Top Slab	Finishing Works / Linewide fitout	U-SCN 07-A	AB Noise	Elevated Work Platform (EWP)	105.0	4.0	0.0	50%	108.0	88.0	53.9	76.1	80.4	76.4	81.7	80.2	81.2	76.8	67.6
				U-SCN 07-B	AB Noise	Scissor Lifts	90.0	4.0	0.0	50%	93.0	73.0	30.5	51.2	59.9	62.5	67.8	68.8	64.1	58.8	51.6
				U-SCN 07-C	AB Noise	Tile / Block Saws	117.0	4.0	5.0	100%	128.0	108.0	60.9	75.6	99.7	98.7	99.7	103.2	101.5	92.4	85.8
				U-SCN 07-D	AB Noise	Small Tools	102.0	2.0	0.0	100%	105.0	85.0	41.7	65.4	70.5	70.2	80.8	80.9	76.2	64.5	54.4
Jun 2021 - Dec 2021	**Day and Night Works**	**Metro Box - Under the Top Slab**	**Finishing Works / Linewide fitout**	**U-SCN 07**	**AB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**117.4**	**-**	**-**	**-**	**128.1**	**108.1**	**61.7**	**79.1**	**99.8**	**98.7**	**99.8**	**103.2**	**101.6**	**92.6**	**85.9**
May 2020 - May 2021	Weekend and Weeknight Possessions + weekday works behind hoarding	Central Walk	Installation of Canopy Tubes and Construction of Anchor Blocks	U-SCN 08-A	AB Noise	Canopy Tube Boring Machines (Horizontal)	110.0	2.0	5.0	100%	118.0	98.0	51.0	65.7	87.5	88.8	89.9	93.5	91.9	82.8	76.0
				U-SCN 08-B	AB Noise	Hi Rail Flat Bed	107.0	2.0	0.0	50%	107.0	87.0	42.7	68.1	72.4	78.8	82.1	79.4	81.4	70.4	63.6
				U-SCN 08-C	AB Noise	Hi Rail Concrete Agitator	112.0	1.0	0.0	100%	112.0	92.0	51.5	67.5	75.7	77.2	84.0	89.4	84.6	77.9	71.4
				U-SCN 08-D	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	89.0	48.5	64.5	72.7	74.2	81.0	86.4	81.6	74.9	68.4
				U-SCN 08-E	AB Noise	25t Crane / Tower Crane In Sydney Yard	105.0	1.0	0.0	50%	102.0	82.0	41.4	60.1	68.3	68.9	79.8	74.7	70.9	66.1	59.6
				U-SCN 08-F	AB Noise	10t Forklift	106.0	1.0	0.0	50%	103.0	83.0	54.9	60.9	66.9	73.9	75.9	77.9	76.9	70.9	66.9
				U-SCN 08-G	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	84.0	39.7	65.1	69.4	75.8	79.1	76.4	78.4	67.4	60.6
				U-SCN 08-H	AB Noise	5t Electric Hoist	100.0	1.0	0.0	50%	97.0	77.0	50.7	59.9	66.0	68.5	70.9	70.1	71.3	62.1	56.0
				U-SCN 08-I	AB Noise	Truck And Dogs	107.0	2.0	0.0	50%	107.0	87.0	42.7	68.1	72.4	78.8	82.1	79.4	81.4	70.4	63.6
				U-SCN 08-J	AB Noise	Arc Welding Machines	105.0	3.0	0.0	100%	109.8	89.8	55.7	77.9	82.2	78.2	83.5	82.0	83.0	78.6	69.4
				U-SCN 08-K	AB Noise	Drilling Rig	113.0	1.0	5.0	50%	115.0	95.0	48.0	62.7	84.5	85.8	86.9	90.5	88.9	79.8	73.0
				U-SCN 08-L	AB Noise	Ventilation Fans (1m Dia)	95.0	2.0	0.0	100%	98.0	78.0	43.2	59.7	74.9	68.6	72.0	67.9	63.0	55.4	49.8
				U-SCN 08-M	AB Noise	Water Pump (4 Inch)	91.0	1.0	0.0	100%	91.0	71.0	30.5	46.5	54.7	56.2	63.0	68.4	63.6	56.9	50.4
May 2020 - May 2021	**Weekend and Weeknight Possessions + weekday works behind hoarding**	**Central Walk**	**Installation of Canopy Tubes and Construction of Anchor Blocks**	**U-SCN 08**	**AB Noise**	**TOTAL EMISSION (LW, 15minute in dBA)**	**119.1**	**-**	**-**	**-**	**121.6**	**101.6**	**61.1**	**79.8**	**90.6**	**91.8**	**94.2**	**97.1**	**95.3**	**87.0**	**80.1**

Proposed Timeframe	Timing Details	Area of Works	Activity	Assessment Scenario ID	Potential Impact/s	Equipment	LW, Actual	Quantity	Penalty	Duty Factor	LW, Modified (Q1 / P / DF)	Calculations for Underground Works (+10dB for reverberation / -30dB for shielding)	Spectral Data - dBA per 1/1 Octave - Frequency in Hertz (Hz)							
													31.5	63	125	250	500	1000	2000	4000	8000
Aug 2020 - Apr 2022	Weekend Possessions and Weekday Standard hours	Central Walk	Excavation of the Central walk and Escalator Adits + FRP works	U-SCN 09-A	AB Noise / GB Vibration / GB Noise	Road Header	120.0	1.0	5.0	100%	125.0	105.0	62.5	83.2	91.9	94.5	99.8	100.8	96.1	90.8	83.6
				U-SCN 09-B	AB Noise / GB Vibration / GB Noise	10t Excavator (Hydraulic Breaker)	118.0	2.0	5.0	100%	126.0	106.0	63.5	84.2	92.9	95.5	100.8	101.8	97.1	91.8	84.6
				U-SCN 09-C	AB Noise	10t Loader	113.0	1.0	0.0	100%	113.0	93.0	54.2	65.4	81.5	86.7	85.5	86.7	86.7	78.3	74.2
				U-SCN 09-D	AB Noise	Truck And Dogs	107.0	1.0	0.0	50%	104.0	84.0	39.7	65.1	69.4	75.8	79.1	76.4	78.4	67.4	60.6
				U-SCN 09-E	AB Noise	Tower Crane	105.0	1.0	0.0	50%	102.0	82.0	41.4	60.1	68.3	68.9	79.8	74.7	70.9	66.1	59.6
				U-SCN 09-F	AB Noise	Arc Welding Machines	105.0	2.0	0.0	50%	105.0	85.0	50.9	73.1	77.4	73.4	78.7	77.2	78.2	73.8	64.6
				U-SCN 09-G	AB Noise	Waterpoof Welding Machine	105.0	1.0	0.0	50%	102.0	82.0	47.9	70.1	74.4	70.4	75.7	74.2	75.2	70.8	61.6
				U-SCN 09-H	AB Noise	Grout Injection Pump Set	99.0	1.0	0.0	50%	96.0	76.0	41.9	64.1	68.4	64.4	69.7	68.2	69.2	64.8	55.6
				U-SCN 09-I	AB Noise	Concrete Pump	109.0	1.0	0.0	100%	109.0	89.0	48.5	64.5	72.7	74.2	81.0	86.4	81.6	74.9	68.4
				U-SCN 09-J	AB Noise	Concrete Agitator	112.0	1.0	0.0	100%	112.0	92.0	51.5	67.5	75.7	77.2	84.0	89.4	84.6	77.9	71.4
				U-SCN 09-K	AB Noise	Concrete Skip	99.0	1.0	0.0	100%	99.0	79.0	44.9	67.1	71.4	67.4	72.7	71.2	72.2	67.8	58.6
				U-SCN 09-L	AB Noise	4no. Ventilation Fans (1m Dia)	95.0	4.0	0.0	100%	101.0	81.0	46.2	62.7	77.9	71.6	75.0	70.9	66.0	58.4	52.8
				U-SCN 09-M	AB Noise	All Terrain Scissor Lifts	90.0	1.0	0.0	50%	87.0	67.0	32.9	55.1	59.4	55.4	60.7	59.2	60.2	55.8	46.6
				U-SCN 09-N	AB Noise	Water Pump (4 Inch)	91.0	2.0	0.0	100%	94.0	74.0	33.5	49.5	57.7	59.2	66.0	71.4	66.6	59.9	53.4
Aug 2020 - Apr 2022	**Weekend Possessions and Weekday Standard hours**	**Central Walk**	**Excavation of the Central walk and Escalator Adits + FRP works**	**U-SCN 09**	**AB Noise / GB Vibration / GB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**123.5**	**-**	**-**	**-**	**128.9**	**108.9**	**66.8**	**87.2**	**95.9**	**98.5**	**103.5**	**104.6**	**100.2**	**94.7**	**87.5**
Jun 2021 - Sept 2021	Weekday Standard hours	Central Walk	MEP and Fitout of Central Walk	U-SCN 10-A	AB Noise	Hydraulic Jack System For Lift Frames	100.0	1.0	0.0	50%	97.0	77.0	42.9	65.1	69.4	65.4	70.7	69.2	70.2	65.8	56.6
				U-SCN 10-B	AB Noise	10t Hoists For Escalator Truss Installation	100.0	1.0	0.0	50%	97.0	77.0	50.7	59.9	66.0	68.5	70.9	70.1	71.3	62.1	56.0
				U-SCN 10-C	AB Noise	Scissor Lifts	90.0	4.0	0.0	50%	93.0	73.0	38.9	61.1	65.4	61.4	66.7	65.2	66.2	61.8	52.6
				U-SCN 10-D	AB Noise	Ventilation Fans (1m Dia)	95.0	4.0	0.0	100%	101.0	81.0	46.2	62.7	77.9	71.6	75.0	70.9	66.0	58.4	52.8
				U-SCN 10-E	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	84.0	39.7	65.1	69.4	75.8	79.1	76.4	78.4	67.4	60.6
				U-SCN 10-F	AB Noise	Tower Crane	105.0	1.0	0.0	100%	105.0	85.0	44.4	63.1	71.3	71.9	82.8	77.7	73.9	69.1	62.6
Jun 2021 - Sept 2021	**Weekday Standard hours**	**Central Walk**	**MEP and Fitout of Central Walk**	**U-SCN 10**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**110.2**	**-**	**-**	**-**	**109.1**	**89.1**	**53.5**	**71.0**	**80.0**	**79.0**	**85.2**	**81.4**	**81.0**	**73.3**	**66.2**
Jan 2019 - Dec 2020	Day and Night Works, underground inside the ESR	ESR	FRP works in the ESR Ghost Platform	U-SCN 11-A	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	84.0	39.7	65.1	69.4	75.8	79.1	76.4	78.4	67.4	60.6
				U-SCN 11-B	AB Noise	Scissor Lift	90.0	1.0	0.0	50%	87.0	67.0	32.9	55.1	59.4	55.4	60.7	59.2	60.2	55.8	46.6
				U-SCN 11-C	AB Noise	2t Hoists	100.0	1.0	0.0	50%	97.0	77.0	50.7	59.9	66.0	68.5	70.9	70.1	71.3	62.1	56.0
				U-SCN 11-D	AB Noise	Ventilation Fans (1m Dia)	95.0	4.0	0.0	100%	101.0	81.0	46.2	62.7	77.9	71.6	75.0	70.9	66.0	58.4	52.8
				U-SCN 11-E	AB Noise	Wire Saw Concrete Cutting Rig	117.0	1.0	5.0	50%	119.0	99.0	51.9	66.6	90.7	89.7	90.7	94.2	92.5	83.4	76.8
				U-SCN 11-F	AB Noise	Floor Saw	117.0	1.0	5.0	50%	119.0	99.0	51.9	66.6	90.7	89.7	90.7	94.2	92.5	83.4	76.8
				U-SCN 11-G	AB Noise	Jackhammer	113.0	1.0	5.0	100%	118.0	98.0	59.1	73.9	86.6	89.3	90.8	92.7	91.8	84.9	77.2
				U-SCN 11-H	AB Noise	Grout Mixer	112.0	1.0	0.0	100%	112.0	92.0	51.5	67.5	75.7	77.2	84.0	89.4	84.6	77.9	71.4
Jan 2019 - Dec 2020	**Day and Night Works, underground inside the ESR**	**ESR**	**FRP works in the ESR Ghost Platform**	**U-SCN 11**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**121.5**	**-**	**-**	**-**	**123.8**	**103.8**	**61.6**	**76.6**	**94.7**	**94.5**	**95.9**	**99.0**	**97.4**	**89.1**	**82.2**
Oct 2018 - Oct 2019	Standard Construction Hours, inside ESR	ESR	Construction of Mini Tunnel from Grand Concourse to Ghost Platform	U-SCN 12-A	AB Noise	10t Hoist In Access Shaft	100.0	1.0	0.0	50%	97.0	77.0	50.7	59.9	66.0	68.5	70.9	70.1	71.3	62.1	56.0
				U-SCN 12-B	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	50%	107.0	87.0	42.7	68.1	72.4	78.8	82.1	79.4	81.4	70.4	63.6
				U-SCN 12-C	AB Noise	Jacking Frame For Micro Tunnel Machine	100.0	1.0	0.0	50%	97.0	77.0	42.9	65.1	69.4	65.4	70.7	69.2	70.2	65.8	56.6
				U-SCN 12-D	AB Noise	De Sanding Slurry Plant Equipment	100.0	1.0	0.0	100%	100.0	80.0	45.9	68.1	72.4	68.4	73.7	72.2	73.2	68.8	59.6
				U-SCN 12-E	AB Noise	Hydraulic Power Pack	100.0	1.0	0.0	50%	97.0	77.0	42.9	65.1	69.4	65.4	70.7	69.2	70.2	65.8	56.6
				U-SCN 12-F	AB Noise	Microtunnel Machine (900mm Dia) With Control Cabin	110.0	1.0	5.0	100%	115.0	95.0	48.0	62.7	84.5	85.8	86.9	90.5	88.9	79.8	73.0
				U-SCN 12-G	AB Noise	Water Pump (4 Inch)	91.0	1.0	0.0	100%	91.0	71.0	30.5	46.5	54.7	56.2	63.0	68.4	63.6	56.9	50.4
Oct 2018 - Oct 2019	**Standard Construction Hours, inside ESR**	**ESR**	**Construction of Mini Tunnel from Grand Concourse to Ghost Platform**	**U-SCN 12**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**112.8**	**-**	**-**	**-**	**115.9**	**95.9**	**54.4**	**73.5**	**85.3**	**86.8**	**88.5**	**91.0**	**89.9**	**80.9**	**73.9**
Jul 2019 - Sept 2022	Standard Construction Hours, inside ESR	ESR	MEP Fitout of the Ghost Platform	U-SCN 13-A	AB Noise	10t Hoist In Access Shaft	100.0	1.0	0.0	50%	97.0	77.0	50.7	59.9	66.0	68.5	70.9	70.1	71.3	62.1	56.0
				U-SCN 13-B	AB Noise	Temp Works For Moving Of Transformers	100.0	1.0	0.0	100%	100.0	80.0	45.9	68.1	72.4	68.4	73.7	72.2	73.2	68.8	59.6
				U-SCN 13-C	AB Noise	Scissor Lifts	90.0	1.0	0.0	50%	87.0	67.0	32.9	55.1	59.4	55.4	60.7	59.2	60.2	55.8	46.6
				U-SCN 13-D	AB Noise	Elevated Working Platforms (EWP)	105.0	1.0	0.0	50%	102.0	82.0	47.9	70.1	74.4	70.4	75.7	74.2	75.2	70.8	61.6
				U-SCN 13-E	AB Noise	Grout And Screed Mixers	112.0	1.0	0.0	100%	112.0	92.0	51.5	67.5	75.7	77.2	84.0	89.4	84.6	77.9	71.4
				U-SCN 13-F	AB Noise	Ventilation Fans (1m Dia)	95.0	6.0	0.0	100%	102.8	82.8	48.0	64.5	79.7	73.4	76.8	72.7	67.8	60.2	54.6
Jul 2019 - Sept 2022	**Standard Construction Hours, inside ESR**	**ESR**	**MEP Fitout of the Ghost Platform**	**U-SCN 13**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**113.3**	**-**	**-**	**-**	**113.2**	**93.2**	**56.3**	**74.2**	**82.6**	**80.0**	**85.7**	**89.8**	**85.6**	**79.3**	**72.3**
Oct 2018 - Oct 2020	Daytime Normal Operating Hours and Station Non operating hours, on ESR concourse	ESR	Remodeling of the ESR Concourse Rooms including MEP and Fitout	U-SCN 14-A	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	84.0	39.7	65.1	69.4	75.8	79.1	76.4	78.4	67.4	60.6
				U-SCN 14-B	AB Noise	Scissor Lifts	90.0	1.0	0.0	100%	90.0	70.0	35.9	58.1	62.4	58.4	63.7	62.2	63.2	58.8	49.6
				U-SCN 14-C	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	50%	107.0	87.0	42.7	68.1	72.4	78.8	82.1	79.4	81.4	70.4	63.6
Oct 2018 - Oct 2020	**Daytime Normal Operating Hours and Station Non operating hours, on ESR concourse**	**ESR**	**Remodeling of the ESR Concourse Rooms including MEP and Fitout**	**U-SCN 14**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**110.1**	**-**	**-**	**-**	**108.8**	**88.8**	**45.0**	**70.2**	**74.5**	**80.6**	**83.9**	**81.2**	**83.2**	**72.4**	**65.5**
Oct 2018 - Oct 2020	Daytime Normal Operating Hours and Station Non operating hours	ESR	Breakthroughs from the ESR Concourse to the Central Walk and East Entrance	U-SCN 15-A	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	100%	110.0	90.0	45.7	71.1	75.4	81.8	85.1	82.4	84.4	73.4	66.6
				U-SCN 15-B	AB Noise	Wire Saw Concrete Cutting Rig	117.0	1.0	5.0	100%	122.0	102.0	54.9	69.6	93.7	92.7	93.7	97.2	95.5	86.4	79.8
				U-SCN 15-C	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	84.0	39.7	65.1	69.4	75.8	79.1	76.4	78.4	67.4	60.6
				U-SCN 15-D	AB Noise	2t Electric Hoist	100.0	1.0	0.0	50%	97.0	77.0	50.7	59.9	66.0	68.5	70.9	70.1	71.3	62.1	56.0
Oct 2018 - Oct 2020	**Daytime Normal Operating Hours and Station Non operating hours**	**ESR**	**Breakthroughs from the ESR Concourse to the Central Walk and East Entrance**	**U-SCN 15**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**117.9**	**-**	**-**	**-**	**122.3**	**102.3**	**56.8**	**74.2**	**93.8**	**93.1**	**94.4**	**97.3**	**95.9**	**86.7**	**80.1**
Oct 2020 - Jul 2021	Standard Construction Hours	East Entrance	MEP and Fitout of East Entrance	U-SCN 16-A	AB Noise	10t Hoists For Escalator Truss Installation	100.0	1.0	0.0	50%	97.0	77.0	50.7	59.9	66.0	68.5	70.9	70.1	71.3	62.1	56.0
				U-SCN 16-B	AB Noise	Scissor Lifts	90.0	3.0	0.0	100%	94.8	74.8	40.7	62.9	67.2	63.2	68.5	67.0	68.0	63.6	54.4
				U-SCN 16-C	AB Noise	Ventilation Fans (1m Dia)	95.0	2.0	0.0	100%	98.0	78.0	43.2	59.7	74.9	68.6	72.0	67.9	63.0	55.4	49.8
				U-SCN 16-D	AB Noise	Electric Pallet Truck	107.0	1.0	0.0	50%	104.0	84.0	39.7	65.1	69.4	75.8	79.1	76.4	78.4	67.4	60.6
				U-SCN 16-E	AB Noise	Tower Crane	105.0	1.0	0.0	50%	102.0	82.0	41.4	60.1	68.3	68.9	79.8	74.7	70.9	66.1	59.6
				U-SCN 16-F	AB Noise	Flat Bed Rigid Delivery Trucks	107.0	2.0	0.0	100%	110.0	90.0	45.7	71.1	75.4	81.8	85.1	82.4	84.4	73.4	66.6
Oct 2020 - Jul 2021	**Standard Construction Hours**	**East Entrance**	**MEP and Fitout of East Entrance**	**U-SCN 16**	**AB Noise**	**TOTAL EMISSION (Lw, 15minute in dBA)**	**111.6**	**-**	**-**	**-**	**111.9**	**91.9**	**53.2**	**73.2**	**79.6**	**83.3**	**87.3**	**84.3**	**85.8**	**75.5**	**68.7**

Appendix C – Predicted Noise Levels (CNVIS)

Table C.1	Platforms & Sydney Yard: Stage 6 - Installing Services/Wiring	SCN01	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	34	-27	-22	-21	-20	-	-	-	-	-	-	-	-
R09	Church - 812 George St	32	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	42	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	39	-22	-17	-16	-15	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	35	-26	-21	-20	-19	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	58	-6	-1	1	4	-	-	6	9	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	57	2	2	2	2	1	1	-	-	-	-	-	-
R19	Commercial - 18 Lee St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	58	3	3	3	3	2	2	-	-	-	-	-	-
R22	Residential - 1 Randle St	47	-19	-14	-11	-3	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	57	-9	-4	-1	7	-	-	-	12	-	-	-	M, LB
R25	Residential - 34 Regent St	54	-10	-5	-3	3	-	-	-	8	-	-	-	-
R26	Commercial (Various) - 11 Randle St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	57	-9	-4	-1	7	-	-	-	12	-	-	-	M, LB
R30	Commercial (Mils Gallery) - 15 Randle St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	57	-9	-4	-1	7	-	-	-	12	-	-	-	M, LB
R32	Commercial - 419 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	53	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	55	-9	-4	-2	4	-	-	-	9	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	50	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	60	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB
R39	Residential - 73 Regent St	55	-9	-4	-2	4	-	-	-	9	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	59	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	53	-7	-2	-2	4	-	-	-	9	-	-	-	-
R42	Residential - 105 Regent St	34	-30	-25	-23	-17	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	53	-7	-2	-2	4	-	-	-	9	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	44	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	50	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	51	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	46	-18	-13	-11	-5	-	-	-	-	-	-	-	-

Table C.2	Platforms & Sydney Yard: Stage 7 - Installing Services / Hoarding / Offices	SCN02	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	36	-34	-34	-34	-34	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	36	-34	-34	-34	-34	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	35	-26	-21	-20	-19	-	-	-	-	-	-	-	-
R09	Church - 812 George St	33	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	34	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	39	-22	-17	-16	-15	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	43	-18	-13	-12	-11	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	**81**	17	22	24	27	27	27	29	32	M, LB	M, LB	M, LB	AA, M, IB, LB, PC, RO, SN
R18	Dental Hospital_A (north) - 2 Chalmers St	57	2	2	2	2	1	1	-	-	-	-	-	-
R19	Commercial - 18 Lee St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	74	4	4	4	4	20	20	-	-	M, LB	M, LB	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	57	2	2	2	2	1	1	-	-	-	-	-	-
R22	Residential - 1 Randle St	35	-31	-26	-23	-15	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	57	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	58	-8	-3	0	8	-	-	-	13	-	-	-	M, LB
R25	Residential - 34 Regent St	33	-31	-26	-24	-18	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	58	-8	-3	0	8	-	-	-	13	-	-	-	M, LB
R30	Commercial (Mils Gallery) - 15 Randle St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	57	-9	-4	-1	7	-	-	-	12	-	-	-	M, LB
R32	Commercial - 419 Elizabeth St	31	-39	-39	-39	-39	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	31	-33	-28	-26	-20	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	52	-8	-8	-8	-8	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	59	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	32	-32	-27	-25	-19	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	30	-34	-29	-27	-21	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	57	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	36	-24	-19	-19	-13	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	30	-34	-29	-27	-21	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	41	-19	-14	-14	-8	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	25	-45	-45	-45	-45	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	30	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	49	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	49	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	41	-23	-18	-16	-10	-	-	-	-	-	-	-	-

Table C.3	Platforms & Sydney Yard: Stage 7, 9 & 11 - Combine Services Route / Demolition of Sydney Yard Buildings / Salvage Canopy / Remove Track / Remove Waste	SCN03	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	38	-32	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	41	-29	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	41	-20	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	39	-16	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	48	-12	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	52	-18	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	46	-15	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	42	-19	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	63	-1	-	-	-	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	62	7	-	-	-	6	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	64	-6	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	63	8	-	-	-	7	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	52	-14	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	61	1	-	-	-	5	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	63	-3	-	-	-	-	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	53	-17	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	61	-9	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	65	-5	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	63	-3	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	62	-4	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	58	-2	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	61	-3	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	56	-4	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	66	-9	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	61	-3	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	64	-11	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	59	-1	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	41	-23	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	58	-2	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	61	-9	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	50	-10	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	55	-10	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	57	2	-	-	-	9	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	51	-13	-	-	-	-	-	-	-	-	-	-	-

Table C.4	Platforms & Sydney Yard: Stage 8 & 10 - OHW on Platform 11/12 / Replace Track Country End 12/13 / Installing CSR	SCN04	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	40	-21	-16	-15	-14	-	-	-	-	-	-	-	-
R09	Church - 812 George St	39	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	47	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	46	-15	-10	-9	-8	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	60	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	43	-18	-13	-12	-11	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	65	1	6	8	11	11	11	13	16	-	LB	LB	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	63	8	8	8	8	7	7	-	-	-	-	-	-
R19	Commercial - 18 Lee St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	64	9	9	9	9	8	8	-	-	-	-	-	-
R22	Residential - 1 Randle St	46	-20	-15	-12	-4	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	62	2	2	2	2	6	6	9	-	-	-	-	-
R24	Residential - 30 Chalmers St	63	-3	2	5	13	-	7	10	18	-	-	LB	M, LB
R25	Residential - 34 Regent St	34	-30	-25	-23	-17	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	63	-3	2	5	13	-	7	10	18	-	-	LB	M, LB
R30	Commercial (Mils Gallery) - 15 Randle St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	63	-3	2	5	13	-	7	10	18	-	-	LB	M, LB
R32	Commercial - 419 Elizabeth St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	60	0	0	0	0	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	51	-13	-8	-6	0	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	62	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	54	-10	-5	-3	3	-	-	-	8	-	-	-	-
R39	Residential - 73 Regent St	53	-11	-6	-4	2	-	-	-	7	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	57	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	51	-9	-4	-4	2	-	-	-	7	-	-	-	-
R42	Residential - 105 Regent St	42	-22	-17	-15	-9	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	52	-8	-3	-3	3	-	-	-	8	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	42	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	46	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	51	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	46	-18	-13	-11	-5	-	-	-	-	-	-	-	-

Table C.5	Platforms & Sydney Yard: Stage 12 - Piling Works / Removing Track	SCN05	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	44	-17	-12	-11	-10	-	-	-	-	-	-	-	-
R09	Church - 812 George St	42	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	52	-8	-8	-8	-8	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	49	-12	-7	-6	-5	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	45	-16	-11	-10	-9	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	67	3	8	10	13	13	13	15	18	-	LB	LB	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	66	11	11	11	11	10	10	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	68	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	67	12	12	12	12	11	11	-	-	-	LB	-	-
R22	Residential - 1 Randle St	56	-10	-5	-2	6	-	-	-	11	-	-	-	M, LB
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	65	5	5	5	5	9	9	12	-	-	-	LB	-
R24	Residential - 30 Chalmers St	67	1	6	9	17	11	11	14	22	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	63	-1	4	6	12	-	9	11	17	-	-	LB	M, LB
R26	Commercial (Various) - 11 Randle St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	68	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	67	1	6	9	17	11	11	14	22	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	66	0	5	8	16	-	10	13	21	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	70	0	0	0	0	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	62	2	2	2	2	6	6	9	-	-	-	-	-
R35	Residential - 53 Regent St	65	1	6	8	14	11	11	13	19	-	LB	LB	M, LB
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	60	0	0	0	0	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	69	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	65	1	6	8	14	11	11	13	19	-	LB	LB	M, LB
R39	Residential - 73 Regent St	64	0	5	7	13	-	10	12	18	-	LB	LB	M, LB
R40	Industrial – Sydney Trains, Chalmers St	68	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	63	3	8	8	14	13	13	13	19	-	LB	LB	M, LB
R42	Residential - 105 Regent St	45	-19	-14	-12	-6	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	62	2	7	7	13	12	12	12	18	-	LB	LB	M, LB
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	65	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	53	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	59	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	60	5	5	5	5	12	12	12	-	-	LB	LB	-
R50	Residential - 141 Regent St	55	-9	-4	-2	4	-	-	-	9	-	-	-	-

Table C.6	Platforms & Sydney Yard: Stage 13	SCN06	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	38	-32	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	41	-29	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	41	-20	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	39	-16	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	49	-11	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	53	-17	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	46	-15	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	60	-10	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	42	-19	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	65	1	-	-	-	11	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	63	8	-	-	-	7	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	65	-5	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	64	9	-	-	-	8	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	53	-13	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	62	2	-	-	-	6	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	64	-2	-	-	-	-	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	61	-3	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	64	-2	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	63	-3	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	59	-1	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	62	-2	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	57	-3	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	67	-8	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	62	-2	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	61	-3	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	65	-10	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	60	0	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	41	-23	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	59	-1	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	51	-9	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	57	-8	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	58	3	-	-	-	10	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-

Table C.7	Platforms & Sydney Yard: Stage 14, 16, 18 & 20	SCN07	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	42	-28	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	42	-19	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	40	-15	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	50	-10	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	53	-17	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	47	-14	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	53	-17	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	61	-9	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	43	-18	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	66	2	-	-	-	12	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	64	9	-	-	-	8	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	65	10	-	-	-	9	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	54	-12	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	63	3	-	-	-	7	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	65	-1	-	-	-	-	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	62	-2	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	65	-1	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	64	-2	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	68	-2	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	60	0	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	63	-1	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	58	-2	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	68	-7	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	63	-1	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	62	-2	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	66	-9	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	61	1	-	-	-	11	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	42	-22	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	60	0	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	51	-9	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	58	-7	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	59	4	-	-	-	11	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-

Table C.8	Platforms & Sydney Yard: Stage 15,17 & 19	SCN08	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	43	-27	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	43	-18	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	41	-14	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	51	-9	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	55	-15	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	48	-13	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	44	-17	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	67	3	-	-	-	13	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	66	11	-	-	-	10	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	67	12	-	-	-	11	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	56	-10	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	64	4	-	-	-	8	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	66	0	-	-	-	-	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	63	-1	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	64	-6	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	68	-2	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	66	0	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	65	-1	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	69	-1	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	61	1	-	-	-	5	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	64	0	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	59	-1	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	69	-6	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	64	0	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	64	0	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	67	-8	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	62	2	-	-	-	12	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	44	-20	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	61	1	-	-	-	11	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	64	-6	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	53	-7	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	59	-6	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	60	5	-	-	-	12	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	55	-9	-	-	-	-	-	-	-	-	-	-	-

Table C.9	Metro Box: Piling for the box perimeter and the plunge columns	SCN09	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	44	-26	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	43	-18	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	42	-13	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	55	-5	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	58	-12	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	50	-11	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	46	-15	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	69	5	-	-	-	15	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	69	14	-	-	-	13	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	70	15	-	-	-	14	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	55	-11	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	68	8	-	-	-	12	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	38	-26	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	70	0	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	65	5	-	-	-	9	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	62	2	-	-	-	6	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	68	-7	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	62	-13	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	56	-4	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	43	-21	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	47	-13	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	51	-14	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	56	1	-	-	-	8	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-

Table C.10	Metro Box: FRP Capping Beam	SCN10	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	44	-26	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	43	-18	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	42	-13	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	55	-5	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	58	-12	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	50	-11	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	46	-15	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	69	5	-	-	-	15	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	69	14	-	-	-	13	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	70	15	-	-	-	14	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	55	-11	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	68	8	-	-	-	12	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	38	-26	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	70	0	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	65	5	-	-	-	9	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	62	2	-	-	-	6	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	68	-7	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	62	-13	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	56	-4	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	43	-21	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	47	-13	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	51	-14	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	56	1	-	-	-	8	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-

Table C.11	Metro Box: Excavation to underside of Intercity Slab	SCN11	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	44	-26	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	43	-18	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	42	-13	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	55	-5	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	58	-12	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	50	-11	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	46	-15	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	69	5	-	-	-	15	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	69	14	-	-	-	13	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	70	15	-	-	-	14	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	55	-11	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	68	8	-	-	-	12	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	38	-26	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	69	3	-	-	-	13	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	70	0	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	65	5	-	-	-	9	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	62	2	-	-	-	6	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	68	-7	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	62	-13	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	56	-4	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	43	-21	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	47	-13	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	51	-14	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	56	1	-	-	-	8	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-

Table C.12	Metro Box: FRP Platform and Intercity slab	SCN12	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	51	-19	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	49	-12	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	48	-7	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	60	0	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	63	-7	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	56	-5	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	65	-5	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	71	1	-	-	-	15	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	52	-9	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	74	10	-	-	-	20	-	-	-	M, LB	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	74	19	-	-	-	18	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	73	3	-	-	-	19	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**75**	20	-	-	-	19	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	60	-6	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	73	13	-	-	-	17	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	44	-20	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	64	-6	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	71	1	-	-	-	17	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	**75**	5	-	-	-	19	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	71	11	-	-	-	15	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	63	-1	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	67	7	-	-	-	11	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	73	-2	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	65	1	-	-	-	11	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	64	0	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	67	-8	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	62	2	-	-	-	12	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	49	-15	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	62	2	-	-	-	12	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	53	-7	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	60	-10	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	57	-8	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	61	6	-	-	-	13	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-

Table C.13	Metro Box: Excavation to underside of Metro Concourse	SCN13	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	41	-20	-15	-14	-13	-	-	-	-	-	-	-	-
R09	Church - 812 George St	41	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	53	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	56	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	48	-13	-8	-7	-6	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	58	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	44	-17	-12	-11	-10	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	67	3	8	10	13	13	13	15	18	-	LB	LB	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	67	12	12	12	12	11	11	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	66	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	68	13	13	13	13	12	12	-	-	-	LB	-	-
R22	Residential - 1 Randle St	53	-13	-8	-5	3	-	-	-	8	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	66	6	6	6	6	10	10	13	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	67	1	6	9	17	11	11	14	22	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	36	-28	-23	-21	-15	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	67	1	6	9	17	11	11	14	22	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	67	1	6	9	17	11	11	14	22	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	68	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	64	4	4	4	4	8	8	11	-	-	-	LB	-
R35	Residential - 53 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	60	0	0	0	0	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	66	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	58	-6	-1	1	7	-	-	6	12	-	-	-	M, LB
R39	Residential - 73 Regent St	57	-7	-2	0	6	-	-	-	11	-	-	-	M, LB
R40	Industrial – Sydney Trains, Chalmers St	60	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	55	-5	0	0	6	-	-	-	11	-	-	-	M, LB
R42	Residential - 105 Regent St	41	-23	-18	-16	-10	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	55	-5	0	0	6	-	-	-	11	-	-	-	M, LB
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	46	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	50	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	54	-1	-1	-1	-1	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	51	-13	-8	-6	0	-	-	-	-	-	-	-	-

Table C.14	Metro Box: Ongoing Logistical support of Box Construction	SCN14	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	45	-16	-11	-10	-9	-	-	-	-	-	-	-	-
R09	Church - 812 George St	44	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	57	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	60	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	52	-9	-4	-3	-2	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	62	-8	-8	-8	-8	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	68	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	48	-13	-8	-7	-6	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	71	7	12	14	17	17	17	19	22	-	LB	LB	M, IB, LB, PC, RO, SN
R18	Dental Hospital_A (north) - 2 Chalmers St	71	16	16	16	16	15	15	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	69	-1	-1	-1	-1	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	72	17	17	17	17	16	16	-	-	-	LB	-	-
R22	Residential - 1 Randle St	57	-9	-4	-1	7	-	-	-	12	-	-	-	M, LB
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	70	10	10	10	10	14	14	17	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	71	5	10	13	21	15	15	18	26	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	40	-24	-19	-17	-11	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	68	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	71	5	10	13	21	15	15	18	26	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	71	5	10	13	21	15	15	18	26	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	72	2	2	2	2	16	16	-	-	-	LB	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	68	8	8	8	8	12	12	15	-	-	LB	LB	-
R35	Residential - 53 Regent St	60	-4	1	3	9	-	6	8	14	-	-	-	M, LB
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	64	4	4	4	4	8	8	11	-	-	-	LB	-
R37	Industrial (Substation) - Chalmers St	70	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	62	-2	3	5	11	-	8	10	16	-	-	LB	M, LB
R39	Residential - 73 Regent St	60	-4	1	3	9	-	6	8	14	-	-	-	M, LB
R40	Industrial – Sydney Trains, Chalmers St	64	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	58	-2	3	3	9	-	8	8	14	-	-	-	M, LB
R42	Residential - 105 Regent St	45	-19	-14	-12	-6	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	59	-1	4	4	10	-	9	9	15	-	-	-	M, LB
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	50	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	54	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	58	3	3	3	3	10	10	10	-	-	LB	LB	-
R50	Residential - 141 Regent St	55	-9	-4	-2	4	-	-	-	9	-	-	-	-

Table C.15	Central Walk: Site investigation Works (Tracks 16- 23)	SCN15	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	34	-36	-36	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	46	-24	-24	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	32	-38	-38	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	43	-27	-27	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	35	-35	-35	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	35	-35	-35	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	50	-20	-20	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	34	-27	-22	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	35	-20	-20	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	53	-7	-7	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	52	-18	-18	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	42	-19	-14	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	52	-18	-18	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	55	-15	-15	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	63	-7	-7	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	37	-24	-19	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	62	-2	3	-	-	-	8	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	67	12	12	-	-	11	11	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	37	-33	-33	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	61	-9	-9	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	72	17	17	-	-	16	16	-	-	-	LB	-	-
R22	Residential - 1 Randle St	45	-21	-16	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	69	9	9	-	-	13	13	-	-	-	LB	-	-
R24	Residential - 30 Chalmers St	72	6	11	-	-	16	16	-	-	-	LB	-	-
R25	Residential - 34 Regent St	30	-34	-29	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	55	-15	-15	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	31	-39	-39	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	59	-11	-11	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	69	3	8	-	-	13	13	-	-	-	LB	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	42	-28	-28	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	68	2	7	-	-	12	12	-	-	-	LB	-	-
R32	Commercial - 419 Elizabeth St	40	-30	-30	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	64	-6	-6	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	57	-3	-3	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	55	-9	-4	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	62	2	2	-	-	6	6	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	61	-14	-14	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	55	-9	-4	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	54	-10	-5	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	56	-19	-19	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	53	-7	-2	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	33	-31	-26	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	52	-8	-3	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	36	-34	-34	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	52	-18	-18	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	43	-17	-17	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	51	-19	-19	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	49	-16	-16	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	51	-4	-4	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	48	-16	-11	-	-	-	-	-	-	-	-	-	-

Table C.16	Central Walk: Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN16A	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	27	-43	-43	-43	-43	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	28	-33	-28	-27	-26	-	-	-	-	-	-	-	-
R09	Church - 812 George St	29	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	47	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	37	-24	-19	-18	-17	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	58	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	32	-29	-24	-23	-22	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	56	-8	-3	-1	2	-	-	-	7	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	62	7	7	7	7	6	6	-	-	-	-	-	-
R19	Commercial - 18 Lee St	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	67	12	12	12	12	11	11	-	-	-	LB	-	-
R22	Residential - 1 Randle St	40	-26	-21	-18	-10	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	64	4	4	4	4	8	8	11	-	-	-	LB	-
R24	Residential - 30 Chalmers St	67	1	6	9	17	11	11	14	22	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	24	-40	-35	-33	-27	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	24	-46	-46	-46	-46	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	64	-2	3	6	14	-	8	11	19	-	-	LB	M, LB
R30	Commercial (Mils Gallery) - 15 Randle St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	63	-3	2	5	13	-	7	10	18	-	-	LB	M, LB
R32	Commercial - 419 Elizabeth St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	58	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	51	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	48	-16	-11	-9	-3	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	56	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	48	-16	-11	-9	-3	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	47	-17	-12	-10	-4	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	50	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	46	-14	-9	-9	-3	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	28	-36	-31	-29	-23	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	45	-15	-10	-10	-4	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	37	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	42	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	44	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	40	-24	-19	-17	-11	-	-	-	-	-	-	-	-

Table C.16	Central Walk: Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN16B	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	34	-27	-22	-21	-20	-	-	-	-	-	-	-	-
R09	Church - 812 George St	34	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	52	-8	-8	-8	-8	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	43	-18	-13	-12	-11	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	62	-8	-8	-8	-8	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	37	-24	-19	-18	-17	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	61	-3	2	4	7	-	7	9	12	-	-	-	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	67	12	12	12	12	11	11	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	72	17	17	17	17	16	16	-	-	-	LB	-	-
R22	Residential - 1 Randle St	46	-20	-15	-12	-4	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	69	9	9	9	9	13	13	16	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	71	5	10	13	21	15	15	18	26	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	29	-35	-30	-28	-22	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	58	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	69	3	8	11	19	13	13	16	24	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	67	1	6	9	17	11	11	14	22	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	53	-11	-6	-4	2	-	-	-	7	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	61	1	1	1	1	5	5	8	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	61	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	53	-11	-6	-4	2	-	-	-	7	-	-	-	-
R39	Residential - 73 Regent St	52	-12	-7	-5	1	-	-	-	6	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	54	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	51	-9	-4	-4	2	-	-	-	7	-	-	-	-
R42	Residential - 105 Regent St	33	-31	-26	-24	-18	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	50	-10	-5	-5	1	-	-	-	6	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	42	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	47	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	49	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	45	-19	-14	-12	-6	-	-	-	-	-	-	-	-

Table C.16	Central Walk: Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN16C	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	32	-29	-24	-23	-22	-	-	-	-	-	-	-	-
R09	Church - 812 George St	34	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	53	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	41	-20	-15	-14	-13	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	36	-25	-20	-19	-18	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	61	-3	2	4	7	-	7	9	12	-	-	-	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	67	12	12	12	12	11	11	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	60	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	72	17	17	17	17	16	16	-	-	-	LB	-	-
R22	Residential - 1 Randle St	44	-22	-17	-14	-6	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	69	9	9	9	9	13	13	16	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	71	5	10	13	21	15	15	18	26	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	29	-35	-30	-28	-22	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	69	3	8	11	19	13	13	16	24	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	68	2	7	10	18	12	12	15	23	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	57	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	54	-10	-5	-3	3	-	-	-	8	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	62	2	2	2	2	6	6	9	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	61	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	54	-10	-5	-3	3	-	-	-	8	-	-	-	-
R39	Residential - 73 Regent St	53	-11	-6	-4	2	-	-	-	7	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	55	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	52	-8	-3	-3	3	-	-	-	8	-	-	-	-
R42	Residential - 105 Regent St	32	-32	-27	-25	-19	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	51	-9	-4	-4	2	-	-	-	7	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	43	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	48	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	51	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	47	-17	-12	-10	-4	-	-	-	-	-	-	-	-

Table C.16	Central Walk: Construction of Olympic Stairs (Temp) - Platform 20/21 and 22/23	SCN16D	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	31	-30	-25	-24	-23	-	-	-	-	-	-	-	-
R09	Church - 812 George St	32	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	51	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	40	-21	-16	-15	-14	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	35	-26	-21	-20	-19	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	60	-4	1	3	6	-	6	8	11	-	-	-	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	66	11	11	11	11	10	10	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	70	15	15	15	15	14	14	-	-	-	LB	-	-
R22	Residential - 1 Randle St	43	-23	-18	-15	-7	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	68	8	8	8	8	12	12	15	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	70	4	9	12	20	14	14	17	25	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	27	-37	-32	-30	-24	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	28	-42	-42	-42	-42	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	68	2	7	10	18	12	12	15	23	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	66	0	5	8	16	-	10	13	21	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	62	-8	-8	-8	-8	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	55	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	53	-11	-6	-4	2	-	-	-	7	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	60	0	0	0	0	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	60	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	53	-11	-6	-4	2	-	-	-	7	-	-	-	-
R39	Residential - 73 Regent St	51	-13	-8	-6	0	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	54	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	51	-9	-4	-4	2	-	-	-	7	-	-	-	-
R42	Residential - 105 Regent St	31	-33	-28	-26	-20	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	50	-10	-5	-5	1	-	-	-	6	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	41	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	46	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	49	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	45	-19	-14	-12	-6	-	-	-	-	-	-	-	-

Table C.17	Central Walk: Construction of the new Standby Guards Rooms / demolition of existing standby guards rooms	SCN17	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	41	-20	-15	-14	-13	-	-	-	-	-	-	-	-
R09	Church - 812 George St	42	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	57	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	56	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	50	-11	-6	-5	-4	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	56	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	67	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	45	-16	-11	-10	-9	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	66	2	7	9	12	12	12	14	17	-	LB	LB	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	71	16	16	16	16	15	15	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**76**	21	21	21	21	20	20	-	-	M, LB	M, LB	-	-
R22	Residential - 1 Randle St	53	-13	-8	-5	3	-	-	-	8	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	73	13	13	13	13	17	17	20	-	-	LB	M, LB	-
R24	Residential - 30 Chalmers St	**75**	9	14	17	25	19	19	22	30	-	LB	M, LB	AA, M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	36	-28	-23	-21	-15	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	60	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	73	7	12	15	23	17	17	20	28	-	LB	M, LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	72	6	11	14	22	16	16	19	27	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	67	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	61	1	1	1	1	5	5	8	-	-	-	-	-
R35	Residential - 53 Regent St	58	-6	-1	1	7	-	-	6	12	-	-	-	M, LB
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	66	6	6	6	6	10	10	13	-	-	LB	LB	-
R37	Industrial (Substation) - Chalmers St	65	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	59	-5	0	2	8	-	-	7	13	-	-	-	M, LB
R39	Residential - 73 Regent St	57	-7	-2	0	6	-	-	-	11	-	-	-	M, LB
R40	Industrial – Sydney Trains, Chalmers St	59	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	56	-4	1	1	7	-	6	6	12	-	-	-	M, LB
R42	Residential - 105 Regent St	41	-23	-18	-16	-10	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	55	-5	0	0	6	-	-	-	11	-	-	-	M, LB
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	48	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	52	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	55	0	0	0	0	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	51	-13	-8	-6	0	-	-	-	-	-	-	-	-

Table C.18	Central Walk: Construction of Platform Canopy Support System to Platforms 16 to 23 and Excavation of Launch Chambers	SCN18	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	40	-21	-16	-15	-14	-	-	-	-	-	-	-	-
R09	Church - 812 George St	40	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	48	-13	-8	-7	-6	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	58	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	65	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	43	-18	-13	-12	-11	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	64	0	5	7	10	-	10	12	15	-	LB	LB	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	70	15	15	15	15	14	14	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	63	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	74	19	19	19	19	18	18	-	-	-	LB	-	-
R22	Residential - 1 Randle St	51	-15	-10	-7	1	-	-	-	6	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	71	11	11	11	11	15	15	18	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	73	7	12	15	23	17	17	20	28	-	LB	M, LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	35	-29	-24	-22	-16	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	58	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	71	5	10	13	21	15	15	18	26	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	70	4	9	12	20	14	14	17	25	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	66	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	59	-1	-1	-1	-1	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	57	-7	-2	0	6	-	-	-	11	-	-	-	M, LB
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	64	4	4	4	4	8	8	11	-	-	-	LB	-
R37	Industrial (Substation) - Chalmers St	63	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	57	-7	-2	0	6	-	-	-	11	-	-	-	M, LB
R39	Residential - 73 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB
R40	Industrial – Sydney Trains, Chalmers St	58	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	55	-5	0	0	6	-	-	-	11	-	-	-	M, LB
R42	Residential - 105 Regent St	39	-25	-20	-18	-12	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	54	-6	-1	-1	5	-	-	-	10	-	-	-	M, LB
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	47	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	51	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	53	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	50	-14	-9	-7	-1	-	-	-	-	-	-	-	-

Table C.19	Central Walk: Platform works including works below the top slab	SCN19	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	27	-43	-43	-43	-43	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	36	-34	-34	-34	-34	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	28	-33	-28	-27	-26	-	-	-	-	-	-	-	-
R09	Church - 812 George St	29	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	44	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	36	-25	-20	-19	-18	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	31	-30	-25	-24	-23	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	53	-11	-6	-4	-1	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	58	3	3	3	3	2	2	-	-	-	-	-	-
R19	Commercial - 18 Lee St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	63	8	8	8	8	7	7	-	-	-	-	-	-
R22	Residential - 1 Randle St	39	-27	-22	-19	-11	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	60	0	0	0	0	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	62	-4	1	4	12	-	6	9	17	-	-	-	M, LB
R25	Residential - 34 Regent St	23	-41	-36	-34	-28	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	24	-46	-46	-46	-46	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	60	-6	-1	2	10	-	-	7	15	-	-	-	M, LB
R30	Commercial (Mils Gallery) - 15 Randle St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	59	-7	-2	1	9	-	-	6	14	-	-	-	M, LB
R32	Commercial - 419 Elizabeth St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	48	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	46	-18	-13	-11	-5	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	53	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	52	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	46	-18	-13	-11	-5	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	45	-19	-14	-12	-6	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	47	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	44	-16	-11	-11	-5	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	28	-36	-31	-29	-23	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	43	-17	-12	-12	-6	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	35	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	40	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	42	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	38	-26	-21	-19	-13	-	-	-	-	-	-	-	-

Table C.20	Central Walk: Platform Remodelling works including platform canopy modifications	SCN20	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	38	-23	-18	-17	-16	-	-	-	-	-	-	-	-
R09	Church - 812 George St	39	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	54	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	46	-15	-10	-9	-8	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	41	-20	-15	-14	-13	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	63	-1	4	6	9	-	9	11	14	-	-	LB	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	68	13	13	13	13	12	12	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	73	18	18	18	18	17	17	-	-	-	LB	-	-
R22	Residential - 1 Randle St	49	-17	-12	-9	-1	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	70	10	10	10	10	14	14	17	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	72	6	11	14	22	16	16	19	27	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	33	-31	-26	-24	-18	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	60	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	70	4	9	12	20	14	14	17	25	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	69	3	8	11	19	13	13	16	24	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	65	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	58	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	63	3	3	3	3	7	7	10	-	-	-	LB	-
R37	Industrial (Substation) - Chalmers St	62	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB
R39	Residential - 73 Regent St	54	-10	-5	-3	3	-	-	-	8	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	56	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	54	-6	-1	-1	5	-	-	-	10	-	-	-	M, LB
R42	Residential - 105 Regent St	37	-27	-22	-20	-14	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	53	-7	-2	-2	4	-	-	-	9	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	45	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	50	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	52	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	48	-16	-11	-9	-3	-	-	-	-	-	-	-	-

Table C.21	ESR: Construction of Shaft to ESR Ghost Platform	SCN21	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	42	-28	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	53	-17	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	40	-21	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	41	-14	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	56	-4	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	55	-15	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	48	-13	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	44	-17	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	64	0	-	-	-	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	70	15	-	-	-	14	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**75**	20	-	-	-	19	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	52	-14	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	72	12	-	-	-	16	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	35	-29	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	36	-34	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	71	5	-	-	-	15	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	70	4	-	-	-	14	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	66	-4	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	60	0	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	65	5	-	-	-	9	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	64	-11	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	56	-8	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	58	-17	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	55	-5	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	40	-24	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	54	-6	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	46	-14	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	51	-14	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	54	-1	-	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	50	-14	-	-	-	-	-	-	-	-	-	-	-

Table C.22	ESR: Surface Works and Underground works	SCN22	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	38	-23	-18	-17	-16	-	-	-	-	-	-	-	-
R09	Church - 812 George St	39	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	54	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	46	-15	-10	-9	-8	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	56	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	42	-19	-14	-13	-12	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	62	-2	3	5	8	-	8	10	13	-	-	LB	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	68	13	13	13	13	12	12	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	73	18	18	18	18	17	17	-	-	-	LB	-	-
R22	Residential - 1 Randle St	50	-16	-11	-8	0	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	70	10	10	10	10	14	14	17	-	-	LB	LB	-
R24	Residential - 30 Chalmers St	72	6	11	14	22	16	16	19	27	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	33	-31	-26	-24	-18	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	56	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	60	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	69	3	8	11	19	13	13	16	24	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	68	2	7	10	18	12	12	15	23	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	58	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	55	-9	-4	-2	4	-	-	-	9	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	63	3	3	3	3	7	7	10	-	-	-	LB	-
R37	Industrial (Substation) - Chalmers St	62	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	55	-9	-4	-2	4	-	-	-	9	-	-	-	-
R39	Residential - 73 Regent St	54	-10	-5	-3	3	-	-	-	8	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	56	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	53	-7	-2	-2	4	-	-	-	9	-	-	-	-
R42	Residential - 105 Regent St	38	-26	-21	-19	-13	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	52	-8	-3	-3	3	-	-	-	8	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	39	-31	-31	-31	-31	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	44	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	49	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	52	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	48	-16	-11	-9	-3	-	-	-	-	-	-	-	-

Table C.23	East Entrance: Demolition of the Bounce Hotel	SCN23	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	48	-22	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	49	-12	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	46	-9	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	68	8	-	-	-	17	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	54	-16	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	57	-4	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	50	-11	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	71	7	-	-	-	17	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	67	12	-	-	-	11	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	70	0	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**89**	34	-	-	-	33	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	**90**	24	-	-	-	34	-	-	-	M, LB	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	**98**	38	-	-	-	42	-	-	-	M, LB	-	-	-
R24	Residential - 30 Chalmers St	**88**	22	-	-	-	32	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	44	-20	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	**93**	23	-	-	-	37	-	-	-	M, LB	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	69	-1	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	66	0	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	**82**	12	-	-	-	26	-	-	-	M, LB	-	-	-
R31	Residential - 46 Chalmers St	59	-7	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	70	10	-	-	-	14	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	65	1	-	-	-	11	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	55	-5	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	56	-19	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	64	0	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	63	-1	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	56	-19	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	61	1	-	-	-	11	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	43	-21	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	60	0	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	54	-6	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	52	-13	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	53	-2	-	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	52	-12	-	-	-	-	-	-	-	-	-	-	-

Table C.24	East Entrance: Piling for East Entrance	SCN24	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	45	-25	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	53	-17	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	45	-16	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	42	-13	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	64	4	-	-	-	13	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	51	-19	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	53	-8	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	47	-14	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	68	4	-	-	-	14	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	64	9	-	-	-	8	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**86**	31	-	-	-	30	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	**87**	21	-	-	-	31	-	-	-	M, LB	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	**95**	35	-	-	-	39	-	-	-	M, LB	-	-	-
R24	Residential - 30 Chalmers St	**85**	19	-	-	-	29	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	41	-23	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	**90**	20	-	-	-	34	-	-	-	M, LB	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	65	-5	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	63	-3	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	**79**	9	-	-	-	23	-	-	-	M, LB	-	-	-
R31	Residential - 46 Chalmers St	56	-10	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	67	7	-	-	-	11	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	62	-2	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	52	-8	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	53	-22	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	61	-3	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	53	-22	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	58	-2	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	40	-24	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	51	-9	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	49	-16	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	50	-5	-	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	49	-15	-	-	-	-	-	-	-	-	-	-	-

Table C.25	East Entrance: Excavation of East Entrance	SCN25	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	41	-29	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	41	-20	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	38	-17	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	61	1	-	-	-	10	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	46	-24	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	49	-12	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	43	-18	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	64	0	-	-	-	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	60	5	-	-	-	4	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	38	-32	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**82**	27	-	-	-	26	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	**83**	17	-	-	-	27	-	-	-	M, LB	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	**91**	31	-	-	-	35	-	-	-	M, LB	-	-	-
R24	Residential - 30 Chalmers St	**81**	15	-	-	-	25	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	37	-27	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	**86**	16	-	-	-	30	-	-	-	M, LB	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	37	-33	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	61	-9	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	59	-7	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	**75**	5	-	-	-	19	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	51	-15	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	63	3	-	-	-	7	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	48	-12	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	48	-27	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	56	-8	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	49	-26	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	53	-7	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	36	-28	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	53	-7	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	46	-14	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	44	-21	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	46	-9	-	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	44	-20	-	-	-	-	-	-	-	-	-	-	-

Table C.26	East Entrance: Excavation of Adit to ESR Concourse including Canopy Tube installation	SCN26	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	42	-28	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	42	-19	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	39	-16	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	61	1	-	-	-	10	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	47	-23	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	50	-11	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	60	-10	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	44	-17	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	65	1	-	-	-	11	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	61	6	-	-	-	5	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	40	-30	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	64	-6	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**82**	27	-	-	-	26	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	**84**	18	-	-	-	28	-	-	-	M, LB	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	**92**	32	-	-	-	36	-	-	-	M, LB	-	-	-
R24	Residential - 30 Chalmers St	**82**	16	-	-	-	26	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	38	-26	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	**87**	17	-	-	-	31	-	-	-	M, LB	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	38	-32	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	60	-6	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	**76**	6	-	-	-	20	-	-	-	M, LB	-	-	-
R31	Residential - 46 Chalmers St	53	-13	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	64	4	-	-	-	8	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	49	-11	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	50	-25	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	50	-25	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	54	-6	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	37	-27	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	54	-6	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	47	-13	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	45	-20	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	47	-8	-	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	45	-19	-	-	-	-	-	-	-	-	-	-	-

Table C.27	East Entrance: FRP works to East Entrance	SCN27	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	36	-34	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	41	-29	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	35	-35	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	36	-34	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	38	-23	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	34	-21	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	53	-7	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	40	-30	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	45	-16	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	33	-37	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	34	-36	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	43	-27	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	39	-22	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	52	-3	-	-	-	-	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	35	-35	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**76**	21	-	-	-	20	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	**78**	12	-	-	-	22	-	-	-	M, LB	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	**87**	27	-	-	-	31	-	-	-	M, LB	-	-	-
R24	Residential - 30 Chalmers St	**80**	14	-	-	-	24	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	33	-31	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	**83**	13	-	-	-	27	-	-	-	M, LB	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	34	-36	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	55	-11	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	73	3	-	-	-	17	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	48	-18	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	59	-1	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	54	-10	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	45	-15	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	46	-29	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	45	-30	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	51	-9	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	33	-31	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	50	-10	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	38	-32	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	44	-16	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	41	-24	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	42	-13	-	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	42	-22	-	-	-	-	-	-	-	-	-	-	-

Table C.28	East Entrance: East Entrance Works and Underground Works	SCN28	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	36	-34	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	37	-33	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	38	-23	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	34	-21	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	58	-2	-	-	-	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	44	-26	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	45	-16	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	35	-35	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	35	-35	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	39	-22	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	56	1	-	-	-	0	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	35	-35	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**81**	26	-	-	-	25	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	**81**	15	-	-	-	25	-	-	-	M, LB	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	**87**	27	-	-	-	31	-	-	-	M, LB	-	-	-
R24	Residential - 30 Chalmers St	**75**	9	-	-	-	19	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	33	-31	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	**81**	11	-	-	-	25	-	-	-	M, LB	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	34	-36	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	54	-12	-	-	-	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	69	-1	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	48	-18	-	-	-	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	59	-1	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	53	-11	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	45	-15	-	-	-	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	43	-32	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	52	-12	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	51	-13	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	41	-34	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	47	-13	-	-	-	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	31	-33	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	47	-13	-	-	-	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	36	-34	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	39	-31	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	40	-20	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	36	-29	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	39	-16	-	-	-	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	37	-27	-	-	-	-	-	-	-	-	-	-	-

Table C.29	Grand Concourse: Piling in Grand Concourse	SCN29	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	52	-9	-4	-3	-2	-	-	-	-	-	-	-	-
R09	Church - 812 George St	51	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	52	-8	-8	-8	-8	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	53	-8	-3	-2	-1	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	56	-5	0	1	2	-	-	6	7	-	-	-	-
R17	YHA Hostel - 10 Lee St	72	8	13	15	18	18	18	20	23	-	LB	M, LB	M, IB, LB, PC, RO, SN
R18	Dental Hospital_A (north) - 2 Chalmers St	64	9	9	9	9	8	8	-	-	-	-	-	-
R19	Commercial - 18 Lee St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	70	0	0	0	0	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	70	15	15	15	15	14	14	-	-	-	LB	-	-
R22	Residential - 1 Randle St	46	-20	-15	-12	-4	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	69	3	8	11	19	13	13	16	24	-	LB	LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	42	-22	-17	-15	-9	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	65	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	68	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	68	2	7	10	18	12	12	15	23	-	LB	LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	69	3	8	11	19	13	13	16	24	-	LB	LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	69	-1	-1	-1	-1	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	43	-21	-16	-14	-8	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	66	6	6	6	6	10	10	13	-	-	LB	LB	-
R37	Industrial (Substation) - Chalmers St	68	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	45	-19	-14	-12	-6	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	45	-19	-14	-12	-6	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	65	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	55	-5	0	0	6	-	-	-	11	-	-	-	M, LB
R42	Residential - 105 Regent St	51	-13	-8	-6	0	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	60	0	5	5	11	-	10	10	16	-	LB	LB	M, LB
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	51	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	58	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	61	6	6	6	6	13	13	13	-	-	LB	LB	-
R50	Residential - 141 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB

Table C.30	Grand Concourse: FRP Pile caps	SCN30	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	56	-5	0	1	2	-	-	6	7	-	-	-	-
R09	Church - 812 George St	55	0	0	0	0	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	57	-4	1	2	3	-	6	7	8	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	60	-1	4	5	6	-	9	10	11	-	-	LB	M, LB
R17	YHA Hostel - 10 Lee St	**76**	12	17	19	22	22	22	24	27	M, LB	M, LB	M, LB	M, IB, LB, PC, RO, SN
R18	Dental Hospital_A (north) - 2 Chalmers St	68	13	13	13	13	12	12	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	74	4	4	4	4	20	20	-	-	M, LB	M, LB	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	74	19	19	19	19	18	18	-	-	-	LB	-	-
R22	Residential - 1 Randle St	51	-15	-10	-7	1	-	-	-	6	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	60	0	0	0	0	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	73	7	12	15	23	17	17	20	28	-	LB	M, LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	46	-18	-13	-11	-5	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	69	-1	-1	-1	-1	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	72	2	2	2	2	18	18	-	-	-	LB	-	-
R29	Residential - 38 Chalmers St	73	7	12	15	23	17	17	20	28	-	LB	M, LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	73	7	12	15	23	17	17	20	28	-	LB	M, LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	74	4	4	4	4	18	18	-	-	-	LB	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	60	0	0	0	0	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	47	-17	-12	-10	-4	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	70	10	10	10	10	14	14	17	-	-	LB	LB	-
R37	Industrial (Substation) - Chalmers St	72	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	49	-15	-10	-8	-2	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	49	-15	-10	-8	-2	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	69	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	59	-1	4	4	10	-	9	9	15	-	-	-	M, LB
R42	Residential - 105 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB
R43	Residential - 54 Regent St	64	4	9	9	15	14	14	14	20	-	LB	LB	M, IB, LB, PC, RO, SN
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	65	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	62	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	65	10	10	10	10	17	17	17	-	-	LB	LB	-
R50	Residential - 141 Regent St	60	-4	1	3	9	-	6	8	14	-	-	-	M, LB

Table C.31	Grand Concourse: Removal of Existing Canopies	SCN31	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	31	-39	-39	-39	-39	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	31	-39	-39	-39	-39	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	39	-22	-17	-16	-15	-	-	-	-	-	-	-	-
R09	Church - 812 George St	38	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	39	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	40	-21	-16	-15	-14	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	35	-35	-35	-35	-35	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	43	-18	-13	-12	-11	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	59	-5	0	2	5	-	-	7	10	-	-	-	M, LB
R18	Dental Hospital_A (north) - 2 Chalmers St	50	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	44	-26	-26	-26	-26	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	57	2	2	2	2	1	1	-	-	-	-	-	-
R22	Residential - 1 Randle St	34	-32	-27	-24	-16	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	43	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	55	-11	-6	-3	5	-	-	-	10	-	-	-	M, LB
R25	Residential - 34 Regent St	29	-35	-30	-28	-22	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	28	-42	-42	-42	-42	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	55	-11	-6	-3	5	-	-	-	10	-	-	-	M, LB
R30	Commercial (Mils Gallery) - 15 Randle St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	56	-10	-5	-2	6	-	-	-	11	-	-	-	M, LB
R32	Commercial - 419 Elizabeth St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	56	-14	-14	-14	-14	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	43	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	30	-34	-29	-27	-21	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	53	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	55	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	32	-32	-27	-25	-19	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	33	-31	-26	-24	-18	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	52	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	42	-18	-13	-13	-7	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	38	-26	-21	-19	-13	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	47	-13	-8	-8	-2	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	32	-38	-38	-38	-38	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	39	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	45	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	48	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	43	-21	-16	-14	-8	-	-	-	-	-	-	-	-

Table C.32	Grand Concourse: Installation of precast / insitu columns and arches	SCN32	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	47	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	48	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	56	-5	0	1	2	-	-	6	7	-	-	-	-
R09	Church - 812 George St	55	0	0	0	0	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	57	-4	1	2	3	-	6	7	8	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	52	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	57	-13	-13	-13	-13	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	60	-1	4	5	6	-	9	10	11	-	-	LB	M, LB
R17	YHA Hostel - 10 Lee St	**76**	12	17	19	22	22	22	24	27	M, LB	M, LB	M, LB	M, IB, LB, PC, RO, SN
R18	Dental Hospital_A (north) - 2 Chalmers St	68	13	13	13	13	12	12	-	-	-	LB	-	-
R19	Commercial - 18 Lee St	61	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	74	4	4	4	4	20	20	-	-	M, LB	M, LB	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	74	19	19	19	19	18	18	-	-	-	LB	-	-
R22	Residential - 1 Randle St	51	-15	-10	-7	1	-	-	-	6	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	60	0	0	0	0	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	73	7	12	15	23	17	17	20	28	-	LB	M, LB	M, IB, LB, PC, RO, SN
R25	Residential - 34 Regent St	46	-18	-13	-11	-5	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	69	-1	-1	-1	-1	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	72	2	2	2	2	18	18	-	-	-	LB	-	-
R29	Residential - 38 Chalmers St	73	7	12	15	23	17	17	20	28	-	LB	M, LB	M, IB, LB, PC, RO, SN
R30	Commercial (Mils Gallery) - 15 Randle St	50	-20	-20	-20	-20	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	74	8	13	16	24	18	18	21	29	-	LB	M, LB	M, IB, LB, PC, RO, SN
R32	Commercial - 419 Elizabeth St	51	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	73	3	3	3	3	17	17	-	-	-	LB	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	60	0	0	0	0	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	47	-17	-12	-10	-4	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	70	10	10	10	10	14	14	17	-	-	LB	LB	-
R37	Industrial (Substation) - Chalmers St	72	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	49	-15	-10	-8	-2	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	49	-15	-10	-8	-2	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	69	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	59	-1	4	4	10	-	9	9	15	-	-	-	M, LB
R42	Residential - 105 Regent St	56	-8	-3	-1	5	-	-	-	10	-	-	-	M, LB
R43	Residential - 54 Regent St	64	4	9	9	15	14	14	14	20	-	LB	LB	M, IB, LB, PC, RO, SN
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	65	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	56	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	62	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	65	10	10	10	10	17	17	17	-	-	LB	LB	-
R50	Residential - 141 Regent St	60	-4	1	3	9	-	6	8	14	-	-	-	M, LB

Table C.33	Grand Concourse: Installation of Roof Structure	SCN33	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	29	-41	-41	-41	-41	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	36	-34	-34	-34	-34	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	38	-23	-18	-17	-16	-	-	-	-	-	-	-	-
R09	Church - 812 George St	37	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	37	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	38	-23	-18	-17	-16	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	41	-20	-15	-14	-13	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	56	-8	-3	-1	2	-	-	-	7	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	48	-7	-7	-7	-7	-	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	42	-28	-28	-28	-28	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	55	0	0	0	0	-	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	32	-34	-29	-26	-18	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	42	-18	-18	-18	-18	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	53	-13	-8	-5	3	-	-	-	8	-	-	-	-
R25	Residential - 34 Regent St	28	-36	-31	-29	-23	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	26	-44	-44	-44	-44	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	53	-17	-17	-17	-17	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	53	-13	-8	-5	3	-	-	-	8	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	30	-40	-40	-40	-40	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	54	-12	-7	-4	4	-	-	-	9	-	-	-	-
R32	Commercial - 419 Elizabeth St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	41	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	28	-36	-31	-29	-23	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	51	-9	-9	-9	-9	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	52	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	31	-33	-28	-26	-20	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	31	-33	-28	-26	-20	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	50	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	40	-20	-15	-15	-9	-	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	36	-28	-23	-21	-15	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	44	-16	-11	-11	-5	-	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	31	-39	-39	-39	-39	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	37	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	40	-30	-30	-30	-30	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	43	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	45	-10	-10	-10	-10	-	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	40	-24	-19	-17	-11	-	-	-	-	-	-	-	-

Table C.34	Northern Concourse & North Entry: Demolition Southern Half	SCN34	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	50	-20	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	52	-9	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	51	-4	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	61	1	-	-	-	10	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	61	-9	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	58	-3	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	61	-9	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	54	-7	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	74	10	-	-	-	20	-	-	-	M, LB	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	**77**	22	-	-	-	21	-	-	-	M, LB	-	-	-
R19	Commercial - 18 Lee St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	72	2	-	-	-	18	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**76**	21	-	-	-	20	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	51	-15	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	67	7	-	-	-	11	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	43	-21	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	70	0	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	70	0	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	73	7	-	-	-	17	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	72	2	-	-	-	16	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	55	-5	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	47	-17	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	70	10	-	-	-	14	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	70	-5	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	56	-8	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	66	-9	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	61	1	-	-	-	11	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	63	3	-	-	-	13	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	55	-5	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	58	-7	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	62	7	-	-	-	14	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-

Table C.35	Northern Concourse & North Entry: FRP of Structure (Floor, retaining wall, Columns)	SCN35	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	52	-18	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	54	-7	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	52	-3	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	63	3	-	-	-	12	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	63	-7	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	60	-1	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	60	-10	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	69	-1	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	56	-5	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	**76**	12	-	-	-	22	-	-	-	M, LB	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	**79**	24	-	-	-	23	-	-	-	M, LB	-	-	-
R19	Commercial - 18 Lee St	60	-10	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	74	4	-	-	-	20	-	-	-	M, LB	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**79**	24	-	-	-	23	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	53	-13	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	69	9	-	-	-	13	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	**76**	10	-	-	-	20	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	44	-20	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	73	3	-	-	-	17	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	72	2	-	-	-	18	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	**75**	9	-	-	-	19	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	**76**	10	-	-	-	20	-	-	-	M, LB	-	-	-
R32	Commercial - 419 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	74	4	-	-	-	18	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	49	-15	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	72	12	-	-	-	16	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	73	-2	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	62	-2	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	69	-6	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	63	3	-	-	-	13	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	59	-5	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	65	5	-	-	-	15	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	65	-5	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	60	-5	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	64	9	-	-	-	16	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	59	-5	-	-	-	-	-	-	-	-	-	-	-

Table C.36	Northern Concourse & North Entry: Demolition Northern Half	SCN36	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	55	-15	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	47	-23	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	50	-20	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	52	-9	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	51	-4	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	61	1	-	-	-	10	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	61	-9	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	58	-3	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	61	-9	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	67	-3	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	54	-7	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	74	10	-	-	-	20	-	-	-	M, LB	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	**77**	22	-	-	-	21	-	-	-	M, LB	-	-	-
R19	Commercial - 18 Lee St	58	-12	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	72	2	-	-	-	18	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**76**	21	-	-	-	20	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	51	-15	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	67	7	-	-	-	11	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	43	-21	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	70	0	-	-	-	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	42	-28	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	70	0	-	-	-	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	73	7	-	-	-	17	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	74	8	-	-	-	18	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	52	-18	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	72	2	-	-	-	16	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	55	-5	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	47	-17	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	70	10	-	-	-	14	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	70	-5	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	56	-8	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	60	-4	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	66	-9	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	61	1	-	-	-	11	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	63	3	-	-	-	13	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	55	-5	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	58	-7	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	62	7	-	-	-	14	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-

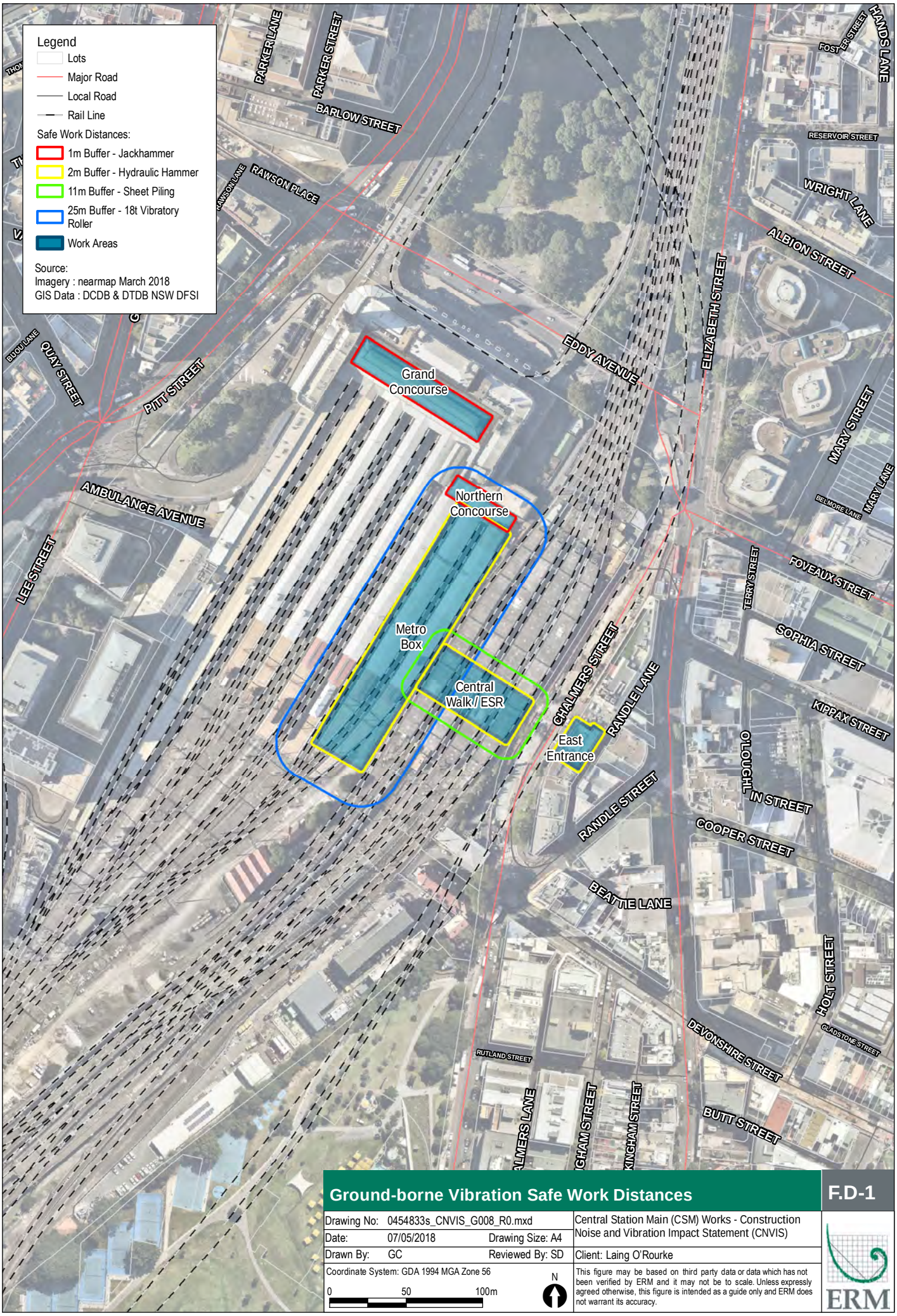
Table C.37	Northern Concourse & North Entry: FRP of Structure (Floor, retaining wall, Columns)	SCN37	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	57	-13	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	52	-18	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	54	-7	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	52	-3	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	63	3	-	-	-	12	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	63	-7	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	60	-1	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	60	-10	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	63	-7	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	69	-1	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	56	-5	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	**76**	12	-	-	-	22	-	-	-	M, LB	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	**79**	24	-	-	-	23	-	-	-	M, LB	-	-	-
R19	Commercial - 18 Lee St	60	-10	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	74	4	-	-	-	20	-	-	-	M, LB	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**79**	24	-	-	-	23	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	53	-13	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	69	9	-	-	-	13	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	**76**	10	-	-	-	20	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	44	-20	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	73	3	-	-	-	17	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	72	2	-	-	-	18	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	**75**	9	-	-	-	19	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	51	-19	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	**76**	10	-	-	-	20	-	-	-	M, LB	-	-	-
R32	Commercial - 419 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	74	4	-	-	-	18	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	49	-15	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	72	12	-	-	-	16	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	73	-2	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	62	-2	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	69	-6	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	63	3	-	-	-	13	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	59	-5	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	65	5	-	-	-	15	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	65	-5	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	60	-5	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	64	9	-	-	-	16	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	59	-5	-	-	-	-	-	-	-	-	-	-	-

Table C.38	Northern Concourse & North Entry: Installation of remaining precast columns and Arches	SCN38	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	46	-24	-	-	-	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	48	-22	-	-	-	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	45	-25	-	-	-	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	56	-14	-	-	-	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	51	-19	-	-	-	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	54	-16	-	-	-	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	53	-8	-	-	-	-	-	-	-	-	-	-	-
R09	Church - 812 George St	52	-3	-	-	-	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	63	3	-	-	-	12	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	62	-8	-	-	-	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	59	-2	-	-	-	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	62	-8	-	-	-	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	69	-1	-	-	-	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	56	-5	-	-	-	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	**76**	12	-	-	-	22	-	-	-	M, LB	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	**78**	23	-	-	-	22	-	-	-	M, LB	-	-	-
R19	Commercial - 18 Lee St	59	-11	-	-	-	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	73	3	-	-	-	19	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	**78**	23	-	-	-	22	-	-	-	M, LB	-	-	-
R22	Residential - 1 Randle St	52	-14	-	-	-	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	68	8	-	-	-	12	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	**76**	10	-	-	-	20	-	-	-	M, LB	-	-	-
R25	Residential - 34 Regent St	44	-20	-	-	-	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	72	2	-	-	-	16	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	44	-26	-	-	-	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	72	2	-	-	-	18	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	**75**	9	-	-	-	19	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	50	-20	-	-	-	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	**75**	9	-	-	-	19	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	53	-17	-	-	-	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	73	3	-	-	-	17	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	57	-3	-	-	-	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	48	-16	-	-	-	-	-	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	71	11	-	-	-	15	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	72	-3	-	-	-	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	57	-7	-	-	-	-	-	-	-	-	-	-	-
R39	Residential - 73 Regent St	61	-3	-	-	-	-	-	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	68	-7	-	-	-	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	62	2	-	-	-	12	-	-	-	-	-	-	-
R42	Residential - 105 Regent St	58	-6	-	-	-	-	-	-	-	-	-	-	-
R43	Residential - 54 Regent St	64	4	-	-	-	14	-	-	-	-	-	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	49	-21	-	-	-	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	64	-6	-	-	-	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	56	-4	-	-	-	-	-	-	-	-	-	-	-
R47	Commercial - 70 Regent St	61	-9	-	-	-	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	59	-6	-	-	-	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	64	9	-	-	-	16	-	-	-	-	-	-	-
R50	Residential - 141 Regent St	59	-5	-	-	-	-	-	-	-	-	-	-	-

Table C.39	Sydney Yard Access Bridge: Heavy Vehicle Traffic on the SYAB	SCN39	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	33	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	37	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	38	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	34	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	36	-25	-20	-19	-18	-	-	-	-	-	-	-	-
R09	Church - 812 George St	32	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	38	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth S	41	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	29	-32	-27	-26	-25	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	43	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	49	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	30	-31	-26	-25	-24	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	52	-12	-7	-5	-2	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	50	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	28	-42	-42	-42	-42	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	55	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	49	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	37	-29	-24	-21	-13	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	44	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	49	-17	-12	-9	-1	-	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	57	-7	-2	0	6	-	-	-	11	-	-	-	M, LB
R26	Commercial (Various) - 11 Randle St	46	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	59	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	58	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	46	-20	-15	-12	-4	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	27	-43	-43	-43	-43	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	45	-21	-16	-13	-5	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	45	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	54	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	45	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	60	-4	1	3	9	-	6	8	14	-	-	-	M, LB
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers S	44	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	56	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	61	-3	2	4	10	-	7	9	15	-	-	-	M, LB
R39	Residential - 73 Regent St	61	-3	2	4	10	-	7	9	15	-	-	-	M, LB
R40	Industrial – Sydney Trains, Chalmers St	60	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	68	8	13	13	19	18	18	18	24	-	LB	LB	M, IB, LB, PC, RO, SN
R42	Residential - 105 Regent St	62	-2	3	5	11	-	8	10	16	-	-	LB	M, LB
R43	Residential - 54 Regent St	71	11	16	16	22	21	21	21	27	M, LB	M, LB	M, LB	M, IB, LB, PC, RO, SN
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	68	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	64	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	65	5	5	5	5	11	11	13	-	-	LB	LB	-
R47	Commercial - 70 Regent St	67	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	61	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	62	7	7	7	7	14	14	14	-	-	LB	LB	-
R50	Residential - 141 Regent St	58	-6	-1	1	7	-	-	6	12	-	-	-	M, LB

Table C.39	Sydney Yard Access Bridge: Heavy Vehicle Traffic on the SYAB	SCN39B	Comparison to NML				If NML Exceeded - Comparison to RBL				Mitigation / Management (AMMM)			
Location ID	Description	Predicted Noise Level	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night	Day Standard	Day Non-Standard	Evening	Night
R01	Commercial - 138 Hay St	40	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R02	Commercial - 323 Castlereagh St	41	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R03	Commercial - 467 Pitt St	36	-37	-37	-37	-37	-	-	-	-	-	-	-	-
R04	Commercial - 228 Elizabeth St	41	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R05	Commercial - 477 Pitt St	40	-33	-33	-33	-33	-	-	-	-	-	-	-	-
R06	Commercial - 24 Rawson Pl	41	-32	-32	-32	-32	-	-	-	-	-	-	-	-
R07	Commercial - 242 Elizabeth St	37	-36	-36	-36	-36	-	-	-	-	-	-	-	-
R08	YHA Hostel - 11 Rawson Pl	39	-25	-20	-19	-18	-	-	-	-	-	-	-	-
R09	Church - 812 George St	35	-23	-23	-23	-23	-	-	-	-	-	-	-	-
R10	Recreational - Belmore Park	41	-22	-22	-22	-22	-	-	-	-	-	-	-	-
R11	Commercial (China Investment Corporation) - 250 Elizabeth St	44	-29	-29	-29	-29	-	-	-	-	-	-	-	-
R12	Hostel (Wake up Sydney) - 509 Pitt St	32	-32	-27	-26	-25	-	-	-	-	-	-	-	-
R13	Commercial (Various) - 280 Elizabeth St	46	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R14	Commercial (Various) - 300 Elizabeth St	46	-27	-27	-27	-27	-	-	-	-	-	-	-	-
R15	Commercial (Retail; Woolworths) - 302 Elizabeth St	52	-21	-21	-21	-21	-	-	-	-	-	-	-	-
R16	Adina Hotel - 2 Lee St	33	-31	-26	-25	-24	-	-	-	-	-	-	-	-
R17	YHA Hostel - 10 Lee St	55	-12	-7	-5	-2	-	-	-	-	-	-	-	-
R18	Dental Hospital_A (north) - 2 Chalmers St	53	-5	-5	-5	-5	-	-	-	-	-	-	-	-
R19	Commercial - 18 Lee St	31	-42	-42	-42	-42	-	-	-	-	-	-	-	-
R20	Commercial - 14 Lee St	58	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R21	Dental Hospital_B (south) - 2 Chalmers St	52	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R22	Residential - 1 Randle St	40	-29	-24	-21	-13	-	-	-	-	-	-	-	-
R23	Commercial (Bar; Ding Dong Dang) - 7 Randle St	47	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R24	Residential - 30 Chalmers St	52	-17	-12	-9	-1	-	-	-	-	-	-	-	-
R25	Residential - 34 Regent St	60	-7	-2	0	6	-	-	-	-	-	-	-	-
R26	Commercial (Various) - 11 Randle St	49	-24	-24	-24	-24	-	-	-	-	-	-	-	-
R27	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	62	-11	-11	-11	-11	-	-	-	-	-	-	-	-
R28	Commercial (Offices; Dept. of Foreign Affairs) - 26 Lee St	61	-12	-12	-12	-12	-	-	-	-	-	-	-	-
R29	Residential - 38 Chalmers St	49	-20	-15	-12	-4	-	-	-	-	-	-	-	-
R30	Commercial (Mils Gallery) - 15 Randle St	30	-43	-43	-43	-43	-	-	-	-	-	-	-	-
R31	Residential - 46 Chalmers St	48	-21	-16	-13	-5	-	-	-	-	-	-	-	-
R32	Commercial - 419 Elizabeth St	48	-25	-25	-25	-25	-	-	-	-	-	-	-	-
R33	Commercial (Retail; Interface Australia HQ) - 101 Chalmers St	57	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R34	Commercial (Bar; Madison Hotel) - 52 Devonshire St	48	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R35	Residential - 53 Regent St	63	-4	1	3	9	-	6	-	-	-	-	-	-
R36	Commercial (Bar; Royal Exhibition Hotel) - 88 Chalmers St	47	-16	-16	-16	-16	-	-	-	-	-	-	-	-
R37	Industrial (Substation) - Chalmers St	59	-19	-19	-19	-19	-	-	-	-	-	-	-	-
R38	Residential - 65 Regent St	64	-3	2	4	10	-	7	-	-	-	-	-	-
R39	Residential - 73 Regent St	64	-3	2	4	10	-	7	-	-	-	-	-	-
R40	Industrial – Sydney Trains, Chalmers St	63	-15	-15	-15	-15	-	-	-	-	-	-	-	-
R41	Residential - 52 Regent St	71	8	13	13	19	18	18	-	-	-	LB	-	-
R42	Residential - 105 Regent St	65	-2	3	5	11	-	8	-	-	-	-	-	-
R43	Residential - 54 Regent St	74	11	16	16	22	21	21	-	-	M, LB	M, LB	-	-
R44	Commercial (Retail; Café Ideas) - 88 Meagher St	71	-2	-2	-2	-2	-	-	-	-	-	-	-	-
R45	Commercial – Sydney Trains, Chalmers St	67	-6	-6	-6	-6	-	-	-	-	-	-	-	-
R46	Commercial (Bar; Lord Gladstone Hotel) - 115 Regent St	68	5	5	5	5	11	11	-	-	-	LB	-	-
R47	Commercial - 70 Regent St	70	-3	-3	-3	-3	-	-	-	-	-	-	-	-
R48	Recreational - Prince Alfred Park	64	-4	-4	-4	-4	-	-	-	-	-	-	-	-
R49	Church - 242 Cleveland St	65	7	7	7	7	14	14	-	-	-	LB	-	-
R50	Residential - 141 Regent St	61	-6	-1	1	7	-	-	-	-	-	-	-	-

Appendix D – Safe Work Distance Figures



Ground-borne Vibration Safe Work Distances

F.D-1

Drawing No:	0454833s_CNVIS_G008_R0.mxd		Central Station Main (CSM) Works - Construction Noise and Vibration Impact Statement (CNVIS)
Date:	07/05/2018	Drawing Size: A4	
Drawn By:	GC	Reviewed By: SD	Client: Laing O'Rourke

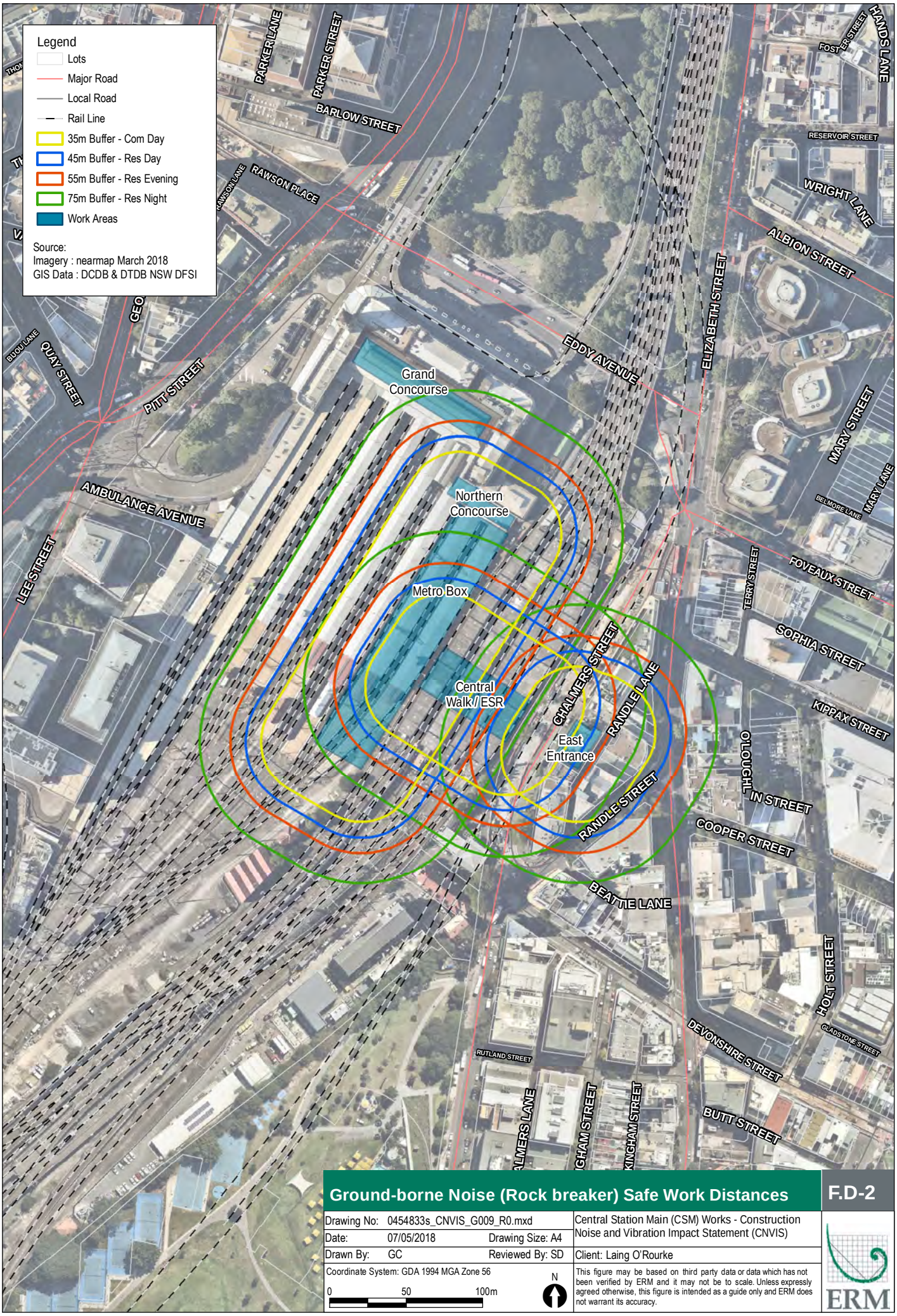
Coordinate System: GDA 1994 MGA Zone 56

0 50 100m

N

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM



Ground-borne Noise (Rock breaker) Safe Work Distances

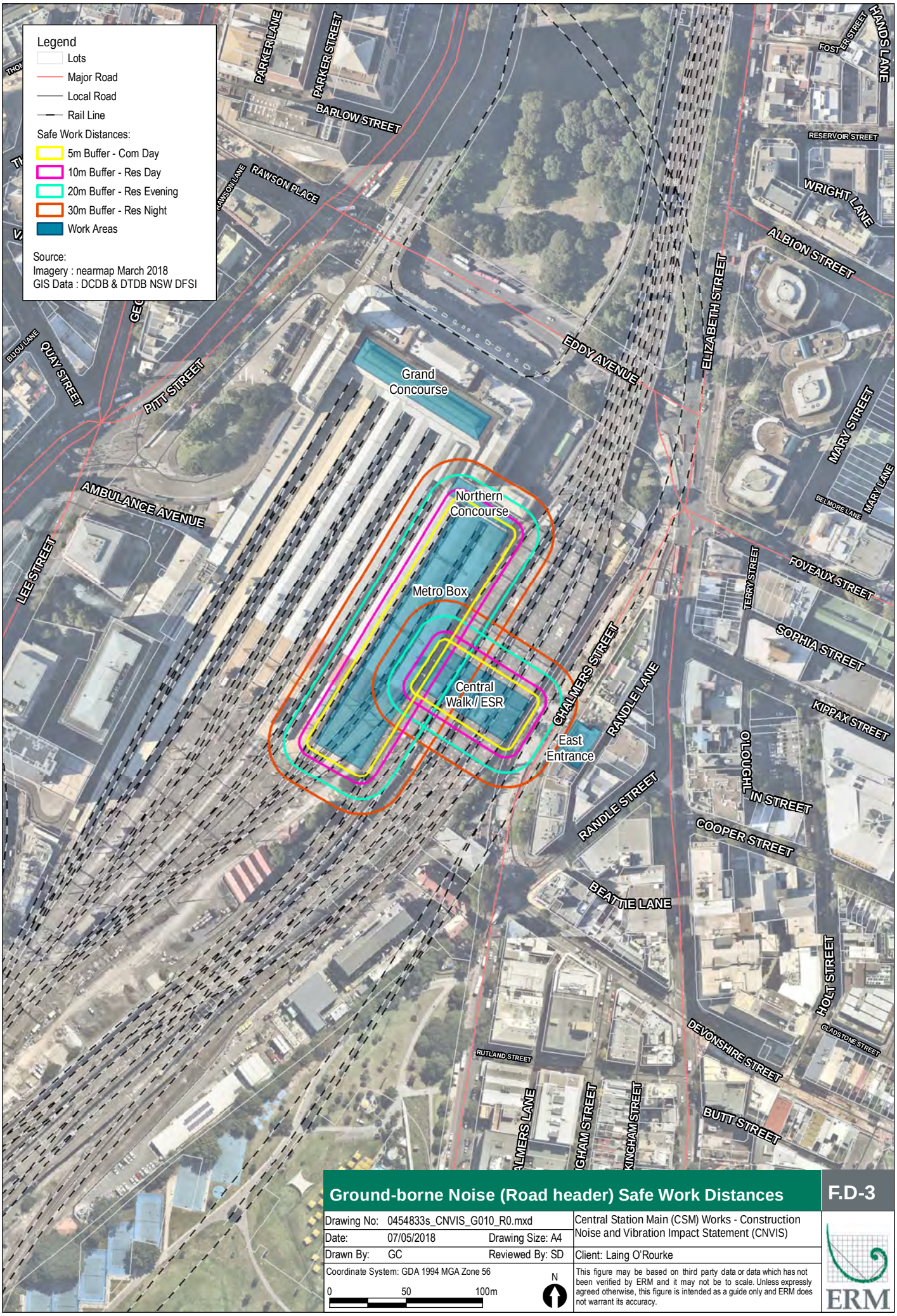
F.D-2

Drawing No:	0454833s_CNVIS_G009_R0.mxd		Central Station Main (CSM) Works - Construction Noise and Vibration Impact Statement (CNVIS)
Date:	07/05/2018	Drawing Size: A4	
Drawn By:	GC	Reviewed By: SD	Client: Laing O'Rourke

Coordinate System: GDA 1994 MGA Zone 56

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM



Ground-borne Noise (Road header) Safe Work Distances

F.D-3

Drawing No:	0454833s_CNVIS_G010_R0.mxd		Central Station Main (CSM) Works - Construction Noise and Vibration Impact Statement (CNVIS)
Date:	07/05/2018	Drawing Size: A4	
Drawn By:	GC	Reviewed By: SD	Client: Laing O'Rourke

Coordinate System: GDA 1994 MGA Zone 56

0 50 100m

N

ERM

Appendix E – Sydney Metro Out of Hours Works Protocol

Integrated Management System

City and Southwest Chatswood to Sydenham Out of Hours Work Protocol

SM ES-PW-317

Sydney Metro Integrated Management System (IMS)

Applicable to:	Sydney Metro City & Southwest
Document Owner:	Adam Koutsamanis
System Owner:	Fil Cerone
Status:	Final
Version:	2.0
Date of issue:	14 July 2017
Review date:	14 July 2018

Table of Contents

1. Introduction

This protocol outlines the process for preparing, assessing, managing and approving work on the Chatswood to Sydenham portion of the City & Southwest project that is undertaken outside of standard construction hours (i.e. Out of Hours).

1.1. Purpose

This protocol has been developed to comply with Condition E47 Out of Hours Work Protocol of the City & Southwest Chatswood to Sydenham planning approval. This condition (and other conditions that relate to Out of Hours work) is addressed in accordance with Table 1.

Table 1: Chatswood to Sydenham Out of Hours Work Planning Approval Conditions

Condition Number	Condition	Where this condition is addressed
A27(g)i.	The approved AA must in conjunction with the ER… consider requests for out of hours construction activities and determine whether to endorse the proposed activities in accordance with Condition E47.	Section 3.1.2.4 and Figure 1.
E36	Construction, except as allowed by Condition E48 (excluding cut and cover tunnelling), must only be undertaken during the following standard construction hours: (a) 7:00am to 6:00pm Mondays to Fridays, inclusive; (b) 8:00am to 1:00pm Saturdays; and (c) at no time on Sundays or public holidays.	Section 2.
E37	The Proponent must identify all receivers at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street and Central likely to experience internal noise levels greater than $L_{eq(15\ minute)}$ 60 dB(A) inclusive of a 5 dB penalty, if rock breaking or any other annoying activity likely to result in regenerated (ground-borne) noise or a perceptible level of vibration is planned (including works associated with utility adjustments), between 7am – 8pm.	Construction Noise and Vibration Impact Statements.
E38	The Proponent must consult with all receivers identified in accordance with Condition E37 with the objective of determining appropriate hours of respite so that construction noise (including ground-borne noise), does not exceed internal noise levels of: (a) $L_{eq(15\ minute)}$ 60 dB(A) inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am – 8pm for more than 50 percent of the time; and (b) $L_{eq(15\ minute)}$ 55 dB(A) inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned between 7am – 8pm for more than 25 percent of the time, unless an agreement is reached with those receivers. This condition does not apply to noise associated with the cutting surface of a TBM [Tunnel Boring Machine] as it passes under receivers. *Note this condition requires that noise levels be less than $L_{eq(15\ minute)}$ 60 dB(A) for at least 6.5 hours between 7am and 8pm, of which at least 3.25 hours must be below $L_{aeq(15\ minute)}$ 55 dB(A). Noise equal to or above $L_{eq(15\ minutes)}$ 60 dB(A) is allowed for the remaining 6.5 hours between 7am and 8pm.*	Construction Noise and Vibration Management Plans and each OOH application as relevant (supported by a Construction Noise and Vibration Impact Statement or other type of quantitative impact assessment).

Condition Number	Condition	Where this condition is addressed
E41	The Proponent must ensure that residential receivers, located in non-residential zones, likely to experience an internal noise level exceeding $L_{eq(15\ minute)}$ 60 dB between 8pm and 9pm or $L_{eq(15\ minute)}$ 45 dB between 9pm and 7am (inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in regenerated noise, or a perceptible level of vibration is planned (including works associated with utility adjustments)) must be offered additional mitigation in accordance with the *Sydney Metro City and South West Noise and Vibration Strategy* referenced in Condition E32.	Construction Noise and Vibration Management Plans and each OOH application as relevant (supported by a Construction Noise and Vibration Impact Statement or other type of quantitative impact assessment).
E42	The Proponent must ensure that residential receivers in residential zones likely to experience an internal noise level of $L_{eq(15\ minute)}$ 45 dB or greater between 8pm and 7am (inclusive of a 5 dB penalty if rock breaking or any other annoying activity likely to result in ground-borne noise, or a perceptible level of vibration is planned (including works associated with utility adjustments)) must be offered additional mitigation in accordance with the *Sydney Metro City and South West Noise and Vibration Strategy* referenced in Condition E32.	Construction Noise and Vibration Management Plans and each OOH application as relevant (supported by a Construction Noise and Vibration Impact Statement or other type of quantitative impact assessment).

Condition Number	Condition	Where this condition is addressed
E44	Notwithstanding Condition E36 construction associated with the CSSI [Critical State Significant Infrastructure] may be undertaken outside the hours specified under those conditions in the following circumstances: (a) for the delivery of materials required by the NSW Police Force or other authority for safety reasons; or (b) where it is required in an emergency to avoid injury or the loss of life, to avoid damage or loss of property or to prevent environmental harm; or (c) where different construction hours are permitted or required under an EPL in force in respect of the construction; or (d) construction that causes $L_{Aeq(15\ minute)}$ noise levels: i. no more than 5 dB(A) above the rating background level at any residence in accordance with the *Interim Construction Noise Guideline* (DECC, 2009), and ii. no more than the noise management levels specified in Table 3 of the *Interim Construction Noise Guideline* (DECC, 2009) at other sensitive land uses, and iii. continuous or impulsive vibration values, measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.2 of *Assessing Vibration: a technical guideline* (DEC, 2006), and iv. intermittent vibration values measured at the most affected residence are no more than those for human exposure to vibration, specified in Table 2.4 of *Assessing Vibration: a technical guideline* (DEC, 2006); or (e) where a negotiated agreement has been reached with a substantial majority of sensitive receivers who are within the vicinity of and may be potentially affected by the particular construction, and the noise management levels and/or limits for ground-borne noise and vibration (human comfort) cannot be achieved. All agreements must be in writing and a copy forwarded to the Secretary at least one (1) week before the works commencing; or (f) construction approved through an **Out of Hours Work Protocol** referred to in Condition E47, provided the relevant council, local residents and other affected stakeholders and sensitive receivers are informed of the timing and duration at least five (5) days and no more than 14 days before the commencement of the works.	Sections 1.5.3, 2, 3.1, 3.2.1 and 3.3.
E45	On becoming aware of the need for emergency construction in accordance with Condition E44(b), the Proponent must notify the AA, the ER and the EPA (if an EPL applies) of the need for those activities or work. The Proponent must also use best endeavours to notify all affected sensitive receivers of the likely impact and duration of those works.	Section 3.3 and Figure 2.
E46	Notwithstanding Conditions E44 and E48, rock breaking and other particularly annoying activities are not permitted outside of standard construction hours, except at Central, unless the noise management level derived from the *Interim Construction Noise Guideline* can be achieved at sensitive receivers.	Section 2 and each OOH application as relevant (supported by a Construction Noise and Vibration Impact Statement or other type of quantitative impact assessment).

Condition Number	Condition	Where this condition is addressed
E47	An **Out of Hours Work Protocol** for the assessment, management and approval of work outside of standard construction hours, as defined in Condition E36 of this approval, must be prepared in consultation with the EPA [NSW Environment Protection Authority] and submitted to the Secretary [of the NSW Department of Planning and Environment] for approval before construction commences for works not subject to an EPL [Environment Protection Licence]. The protocol must include: (a) the identification of low and high risk construction activities; (b) a risk assessment process in which the AA [Acoustic Advisor] reviews all proposed out of hours activities and identifies their risk levels; (c) a process for the endorsement of out of hours activities by the AA and approval by the ER [Environmental Representative] for construction activities deemed to be of: i. low environmental risk; or ii. high risk where all construction works cease by 9pm. All other high risk out of hours construction must be submitted to the Secretary for approval unless otherwise approved through an EPL. The protocol must detail standard assessment, mitigation and notification requirements for high and low risk out of hours works, and detail a standard protocol for referring applications to the Secretary.	This document; particularly Sections 1.2, 3.1.2.3 and 3.1.2.4, Figure 1 and the Out of Hours Work Application Forms.
E48	Notwithstanding Condition E36 of this approval and subject to Condition E47, the following activities may be undertaken 24 hours per day, seven (7) days per week: (a) tunnelling and associated support activities (excluding cut and cover tunnelling); (b) excavation within an acoustic enclosure; (c) excavation at Central without an acoustic enclosure; (d) station and tunnel fit out; and (e) haulage and delivery of spoil and materials.	Section 2 and each OOH application as relevant (supported by a Construction Noise and Vibration Impact Statement or other type of quantitative impact assessment).

1.2. Protocol Consultation, Endorsement and Approval

In accordance with Condition E47 of the Chatswood to Sydenham planning approval, this protocol must be prepared in consultation with the NSW Environment Protection Authority (EPA) and approved by the Secretary of the NSW Department of Planning and Environment (the Secretary).

The protocol is also required to receive endorsement from the Environmental Representative and the Acoustic Advisor in accordance with Conditions A24(d) and A27(d) respectively, prior to submission to the Secretary.

1.2.1. Consultation

A draft version of this protocol was provided to the EPA for consultation and comment on 7 March 2017. Given that the protocol (and Condition E47) is aimed at addressing work that is 'not subject to an EPL', the EPA responded on 21 March 2017 to state that "the EPA does not have comments on this protocol".

In the event that the protocol is revised to address work that is subject to an Environment Protection Licence (EPL), TfNSW will re-consult with the EPA.

1.2.2. Endorsement

Both the Environmental Representative and the Acoustic Advisor have reviewed and left comments on drafts of this protocol. All comments have been satisfactorily addressed in this final OOH Work Protocol.

Appendix A provides endorsements of this OOH Work Protocol from the Environmental Representative and the Acoustic Advisor.

1.2.3. Approval

Appendix B provides approval of this OOH Work Protocol by the Secretary.

Construction activities on the Chatswood to Sydenham portion of the City & Southwest project will not be undertaken outside of standard construction hours for works that are not subject to an EPL until this protocol has been approved by the Secretary. Following approval from the Secretary, all works on the Chatswood to Sydenham portion of the City & Southwest project that are not subject to an EPL (irrespective of whether the works are defined as 'construction' in accordance with the Chatswood to Sydenham planning approval) will be subject to this protocol.

1.3. Accountabilities

The Principal Manager, Sustainability, Environment & Planning, City & Southwest is accountable for this protocol. Accountability includes authorising the document, monitoring its effectiveness and performing a formal document review.

Roles reporting to the Principal Manager are accountable for ensuring the requirements of this document are implemented within their area of responsibility. The roles that are accountable for specific projects/programs are accountable for ensuring associated contractors comply with the requirements of this document.

1.4. Definitions and Acronyms

All terminology in this Protocol is taken to mean the generally accepted or dictionary definition, unless stated otherwise in accordance with the Definitions section of the Chatswood to Sydenham planning approval or the *Sydney Metro Integrated Management System Glossary*.

Acronyms and terminology specifically used throughout this Protocol are listed below.

	Definitions
AA	Acoustics Advisor
BMP	Business Management Plan
CEMF	Construction Environmental Management Framework (for the City & Southwest project)
CNVIS	Construction Noise and Vibration Impact Statement
CNVS	Construction Noise and Vibration Strategy (for the City & Southwest project)
CSSI	Critical State Significant Infrastructure
EPA	Environment Protection Authority (of New South Wales)
EPL	Environment Protection Licence
ER	Environmental Representative
ICNG	*Interim Construction Noise Guideline* (DECC, 2009)
OOH	Out of Hours (i.e. outside of the standard construction hours stipulated in planning approval conditions)
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
Secretary	The Secretary of the New South Wales Department of Planning and Environment
SPIR	Submissions and Preferred Infrastructure Report

1.5. Governance

This OOH Work Protocol should be used in conjunction with the Sydney Metro *Construction Environment Management Framework*, the *City & Southwest Construction Noise and Vibration Strategy* and any applicable Environment Protection Licences. These documents establish minimum requirements for managing noise and vibration impacts on the City & Southwest project.

1.5.1. Construction Environment Management Framework

The Chatswood to Sydenham Submissions and Preferred Infrastructure Report (SPIR) contains the *Sydney Metro Construction Environmental Management Framework* (CEMF) as Appendix B. The CEMF represents Sydney Metro's minimum requirements for environmental management and specifies a standard framework that each contractor must establish and document in their Construction Environmental Management Plan and sub-plans. These requirements include those relating to construction noise and vibration management as specified in Chapter 9.

1.5.2. Construction Noise and Vibration Strategy

Sydney Metro has developed a *Construction Noise and Vibration Strategy* (CNVS) for the City & Southwest project. The strategy:

- Establishes a framework for managing construction noise and vibration impacts and adopting appropriate mitigation measures (including minimum requirements),
- Forms Appendix C of the Chatswood to Sydenham SPIR,
- Forms part of the contract requirements that contractors must comply with, and
- Sets minimum requirements for all OOH work, including the need for and development of Construction Noise and Vibration Impact Statements.

1.5.2.1. Construction Noise and Vibration Impact Statements

A Construction Noise and Vibration Impact Statement (CNVIS) is a report that assesses and documents the anticipated noise and vibration impacts at sensitive receivers of proposed construction activities. In accordance with Condition E33 of the Chatswood to Sydenham planning approval, a CNVIS is to be prepared for each construction site before construction noise and vibration impacts commence and include specific mitigation measures identified through consultation with affected sensitive receivers.

1.5.3. Environment Protection Licence

An Environment Protection Licence (EPL) is a regulatory approval issued to strategically control the localised, cumulative and acute impacts of pollution. The NSW Environment Protection Authority (EPA) is responsible for issuing EPLs for 'scheduled activities' under the *Protection of the Environment Operations (POEO) Act 1997* (NSW).

Some aspects of the City & Southwest construction and operation works will constitute 'scheduled activities' under the POEO Act and therefore need to be subject to an EPL. City & Southwest contractors are required to obtain and comply with any EPLs as applicable to their scope of works.

The process for approving OOH work outside of those already permitted in accordance with an EPL, is governed by the conditions of the EPL. In order for these types of OOH work to be approved, an application to vary the EPL is to be prepared and submitted to the EPA for approval. The application is to be in accordance with the CNVS and EPL requirements.

OOH work that is subject to an EPL do not require approval in accordance with Condition E47 of the Chatswood to Sydenham planning approval (i.e. this protocol).

1.6. Roles and Responsibilities

1.6.1. TfNSW Place Manager

A TfNSW Place Manager will be allocated to each site on the Chatswood to Sydenham portion of the City & Southwest project. The Place Manager is responsible for ensuring that all project communication requirements with the surrounding community are being complied with.

1.6.2. TfNSW Environment Manager

A TfNSW Environment Manager will be allocated to each contract package on the Chatswood to Sydenham portion of the City & Southwest project. The Environment Manager is responsible for ensuring that all environmental management requirements associated with their contract package are being complied with.

1.6.3. Independent Environmental Representative

Condition A22 of the Chatswood to Sydenham planning approval requires an Environmental Representative (ER) to be appointed to the project to represent the NSW Department of Planning and Environment. The ER is to act as the Secretary's independent point of contact for all environmental and planning approval compliance matters. Refer to Condition A24 of the Chatswood to Sydenham planning approval for a comprehensive list of the ER's responsibilities.

Sections 3.1.2.3 and 3.1.2.4 include descriptions of the ER's responsibilities with respect to reviewing and approving OOH work.

1.6.4. Acoustic Advisor

Condition A25 of the Chatswood to Sydenham planning approval requires an Acoustic Advisor (AA) to be appointed to the project. The AA is to act as the Secretary's independent point of contact for all noise and vibration matters on the project. Refer to Conditions A25 and A27 for a comprehensive description of the AA's responsibilities.

Sections 3.1.2.3 and 3.1.2.4 include descriptions of the AA's responsibilities with respect to reviewing, identifying risk level, endorsing and deferring OOH work.

2. Standard Hours

Condition E36 of the Chatswood to Sydenham planning approval defines standard construction hours as:

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

(b) 8:00am to 1:00pm Saturdays; and

(c) at no time on Sundays or public holidays.

These hours are consistent with:

- The EPA's *Interim Construction Noise Guideline* (ICNG) 2009 'recommended standard hours' for construction in NSW, and
- The *City & Southwest Construction Noise and Vibration Strategy* (CNVS) 'standard daytime construction hours' (which were adopted by TfNSW as recommended by the ICNG).

Unless undertaken in accordance with Conditions E44, E46 or E48 of the Chatswood to Sydenham planning approval, construction is only permitted to be undertaken during standard construction hours.

If OOH work is to be undertaken in accordance with one or more of these conditions at the Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street or Central sites, the work must also comply with the specific requirements of Conditions E37 and E38 of the Chatswood to Sydenham planning approval. It should be noted however that the intent of Conditions E37 and E38 is to support certain types of work at these sites between 7am and 8pm. This should be considered when identifying risk levels for OOH work applications (refer to Section 3.1.2.3).

3. OOH Work

Out of hours (OOH) work is defined as any work that is undertaken outside of standard construction hours.

Some OOH work is permitted to be undertaken on the City & Southwest project in accordance with Conditions E44, E46 and E48 of the Chatswood to Sydenham planning approval. These works include:

- Delivery of materials as required by an authority for safety reasons,
- Emergency works,
- Works that are subject to different construction hours as permitted (or required) under an EPL,
- Low noise impact works,
- Works that are subject to a negotiated agreement with the substantial majority of affected sensitive receivers,
- Works undertaken in accordance with an Out of Hours Work Protocol approval and are the subject of a notification to the relevant council, local residents and other affected stakeholders and receivers at least five days prior to the works commencing and no more than 14 days prior to the works commencing.
- Rock breaking and other particularly annoying activities at the Central Station Site or, provided that the noise management level can be achieved at sensitive receivers, at any other site,
- 24 hour construction works in accordance with Condition E48, comprising:
    - Tunnelling and associated support activities (excluding cut and cover tunnelling),
    - Excavation within an acoustic enclosure,
    - Excavation at the Central Station Site without an acoustic enclosure,
    - Station and tunnel fit out, and
    - Haulage and delivery of spoil and materials,

In accordance with Condition E47 of the Chatswood to Sydenham planning approval and with the exception of OOH work that is subject to an EPL, all OOH work requires endorsement by the AA and approval by either the ER, or in the case of ‘high risk’ works undertaken after 9pm, the Secretary. This includes all work subject to Conditions E37, E38 and E48 of the Chatswood to Sydenham planning approval. The requirements of these conditions are to be specifically addressed in each OOH application (refer to Section 3.1.2) as relevant.

3.1. OOH Work Approval Process

Figure 1 provides the OOH work approval process for the Chatswood to Sydenham portion of the City & Southwest project. This includes a requirement to prepare an application that covers the assessment of noise and vibration impacts, mitigation measures (including community notification requirements), review and approval for all proposed OOH work.

All OOH work applications that are not subject to an EPL will be submitted to the TfNSW Place Manager, TfNSW Environment Manager, AA and ER for review and comment. These reviews will take into consideration a range of aspects, including reviewer experience and expert understanding, local knowledge of the area, current understanding of sensitive receiver requirements and other relevant documents (for example, the applicable Business Management Plan detailing predicted impacts to affected businesses, key issues and appropriate mitigation measures for implementation). This review process is further explained in section 3.1.2.3.

3.1.1. OOH Work subject to an EPL

For OOH work that is subject to an EPL, the EPL conditions will dictate the approval process. As a minimum however, for proposed OOH work that is not approved in the EPL and a variation is required, the contractor is expected to:

- Prepare an application to the EPA in accordance with the CNVS and EPL requirements,
- Submit the revised application to the EPA for approval and submit the application to the TfNSW Place Manager, TfNSW Environment Manager, AA and ER for information,
- Notify TfNSW, the AA and ER upon receiving EPA approval, and
- Ensure any required community notifications have been issued (by either TfNSW or the contractor directly) at least seven days prior to the works commencing.

3.1.2. OOH Work not subject to an EPL

For OOH work that is not subject to an EPL, the approval process is dictated by the requirements of Condition E47 of the Chatswood to Sydenham planning approval.

Contractors are required to prepare an OOH application using:

- A form consistent with the Sydney Metro *City & Southwest OOH Work Application Form* for proposed OOH work that is within the scope of a CNVIS, or
- A form consistent with the Sydney Metro *OOH Work Application Form* for proposed OOH work that is not within the scope of a CNVIS (or is within the scope of a CNVIS that is yet to be prepared).

Both of these forms require a noise and vibration impact assessment to be undertaken and contain a consolidated and conservative version of Table 14 from the CNVS. This facilitates simpler consideration of applicable additional noise and vibration mitigation measures to implement. The forms also require demonstration of how additional noise and vibration mitigation measures have been considered for implementation (including community notifications) in accordance with the CNVS.

3.1.2.1. OOH Work within the Scope of a CNVIS

The majority of OOH applications subject to this protocol are anticipated to be undertaken within the scope of a CNVIS.

For proposed OOH work that is within the scope of a CNVIS, the OOH application will outline the associated noise and vibration impacts of the proposed OOH work, based on the outcomes of the CNVIS. The applicable sections of the CNVIS are required to be appended to the OOH application.

The associated noise and vibration impacts will guide the consideration of standard and additional mitigation measures to implement, in accordance with the CNVS.

3.1.2.2. OOH Work not within the scope of a CNVIS

In some circumstances, OOH work may be required that is not within the scope of a CNVIS. Examples of these situations include OOH works that:

- Are not defined as 'construction' under the Chatswood to Sydenham planning approval,
- Are not confined to a 'construction site' (e.g. power supply works, in-tunnel works, etc.), and
- Were not anticipated in a CNVIS at the time it was prepared.

For proposed OOH work that is not within the scope of a CNVIS (or is within the scope of a CNVIS that is yet to be prepared), the noise and vibration impacts of the proposed OOH work will generally have less certainty than those that are within the scope of a CNVIS. Therefore, greater due diligence is required in completing the OOH application form.

To ensure an adequate level of due diligence is applied to reviewing proposed OOH work that is not within the scope of a CNVIS, a form consistent with the generic Sydney Metro *OOH Work Application Form* is to be used. This form has been developed by TfNSW to ensure consistency with the *Interim Construction Noise Guideline* (DECC, 2009) and requires applicants to:

- Provide justification for the works to be undertaken OOH,
- Adequately assess the noise and vibration impacts at nearest sensitive receivers,
- Consider standard and additional noise and vibration mitigation measures to implement in accordance with the CNVS, and
- Request formal review, endorsement and approval for the proposed OOH work prior to their commencement.

Furthermore, the Sydney Metro *OOH Work Application Form* requires a preliminary quantitative noise assessment to be undertaken in accordance with the *Interim Construction Noise Guideline* (ICNG) as a minimum. For assessments indicating that noise exceedance levels are greater than 10 dBA for more than 10 occasions at the same sensitive receiver, the need to undertake a detailed quantitative noise assessment will be considered by TfNSW, the contractor, the AA and the ER collectively. The term 'occasion' is defined in the *OOH Work Application Form*.

3.1.2.3. Review, TfNSW Endorsement and Identification of Risk Level

Review

Once the contractor has prepared an OOH work application, the application is submitted to the TfNSW Place Manager, TfNSW Environment Manager, AA and ER for review. Following their reviews, TfNSW, the AA and the ER may provide comments on the application, which need to be adequately addressed by the contractor in a resubmitted application to the satisfaction of the comment provider(s).

Prior to the TfNSW Principal Manager (Stakeholder & Community Liaison) indicating their endorsement (or otherwise) on the application, reference will be made to the applicable Business Management Plan (BMP) in accordance with Condition E64 of the Chatswood to Sydenham planning approval. The BMP will:

- Identify business stakeholders that may be affected by the project works and the issues specific to each business,
- Detail the strategies and activities to be used to facilitate open communication and engagement with businesses,
- Explain mitigation measures for identified business-related impacts, and
- Define roles and tools to enable TfNSW Place Managers to implement the BMP.

TfNSW Endorsement and Identification of Default Risk Level

Following endorsement from the TfNSW Principal Manager (Stakeholder & Community Liaison), the AA is required to identify a risk level for the proposed OOH work in accordance with Condition E47 of the Chatswood to Sydenham planning approval. This risk level will be categorised as either ‘Low risk’ or ‘High risk’.

As a default risk level, the AA will identify OOH work as ‘high risk’ if all of the following three criteria apply:

- The type and sensitivity of the affected noise sensitive receivers is categorised as either Moderate Impact receivers (e.g. standard residential / typical density) or High Impact receivers (e.g. elderly / high density / persistent complainers / residents experiencing construction noise fatigue), and
- The predicted noise level of the OOH work has a likelihood for potential sleep disturbance (i.e. Rating Background Level + 15 dB or more), and
- The type of and intensity of noise emitted from the OOH work is categorised as High Impact (e.g. prolonged high noise and/or vibration intensive activities).

These criteria are based on Section 6.4 General Assessment Procedure of the CNVS.

For non-residential receivers the AA may consider OOH work as ‘high risk’ if undertaken during trading hours and in close proximity to their place of business (for example, during Saturday afternoon trading hours). Since each non-residential receiver has different business needs, it is imperative that the AA discusses each OOH work application with the TfNSW Place Manager to better understand how the proposed OOH works would impact the business.

Modification of Default Risk Level

Using the default risk level as a 'starting point', the AA will consider all other relevant factors in order to identify a final risk level. These relevant factors include:

- Those identified on Pages 24 and 25 in Section 6.4 of the CNVS (noting that the reference to 'impact levels' is independent of the 'risk rating' identified by the AA for the purposes of complying with Condition E47(c) of the Chatswood to Sydenham planning approval),
- Those listed in Table 2, and
- Any other factors the AA considers relevant in its professional opinion.

These factors may be cause for the AA to modify the default risk rating from either 'high risk' to 'low risk', or 'low risk' to 'high risk', as the AA deems appropriate in its professional opinion.

Table 2: Risk Level Considerations

	Risk Level Considerations
Predicted Noise Exceedance	Degree of predicted noise level exceedance above the Rating Background Level or Noise Management Level as appropriate
Specific Scope of Work	Works that are not subject to Conditions E37 and E38
5 dBA Penalty	If 5 dBA penalty is required in accordance with Conditions E37, E38, E41 and E42
Certainty	Rating background levels, noise management levels or predicted noise impacts are not well understood
Past Experience	Nature of works are new, in a new location or have not been undertaken by the contractor on the project already
Negotiated Agreement with Sensitive Receivers	No negotiated agreement with sensitive receivers has been obtained in accordance with Condition E44(e)
Potential Sleep Disturbance	Likely to generate potential sleep disturbance (RBL + 15dB or greater)
Non-Residential Receivers	Impacted non-residential receivers operate during same period of proposed OOH works
Special Events	The timing and location of special events in the area of the proposed OOH works may be scheduled at the same time or immediately before or after the special event (e.g. festivals, public gatherings, etc.)
TfNSW Place Manager Feedback	Feedback from the Place Manager for the area will provide the AA an understanding of the types and requirements of surrounding sensitive receivers.
Sensitive Receivers	Moderate impact sensitive receivers (e.g. standard residential, medium density receivers) or high impact sensitive receivers (e.g. residential home for the elderly, high density unit blocks, persistent complainers, residents deemed to have 'construction noise fatigue')
High Impact Works	Prolonged high noise or vibration intensive activities
Other Impacts	Impacts other than noise and vibration impacts are likely to be generated (e.g. lighting, traffic, etc.)

Once the AA has identified a final risk level for the OOH work application, the AA indicates the risk level on the application (including any risk identification commentary), as well as whether the application includes works after 9pm, and signs and dates the application.

3.1.2.4. Endorsement and Approval

Figure 1 includes a process for the endorsement and approval of OOH work.

Following the identification of risk level by the AA, the AA endorses the OOH work application and provides any conditions or comments. If the AA identifies that the OOH work application is high risk and includes works after 9pm, the application is forwarded to the ER for endorsement only. Following the ER's endorsement, the application is then formally submitted by TfNSW via email to the Secretary for approval in accordance with Condition E47 of the Chatswood to Sydenham planning approval. For all other applications, the ER indicates their approval (or otherwise) on the application, including any conditions or comments, and forwards directly to TfNSW, the contractor and AA.

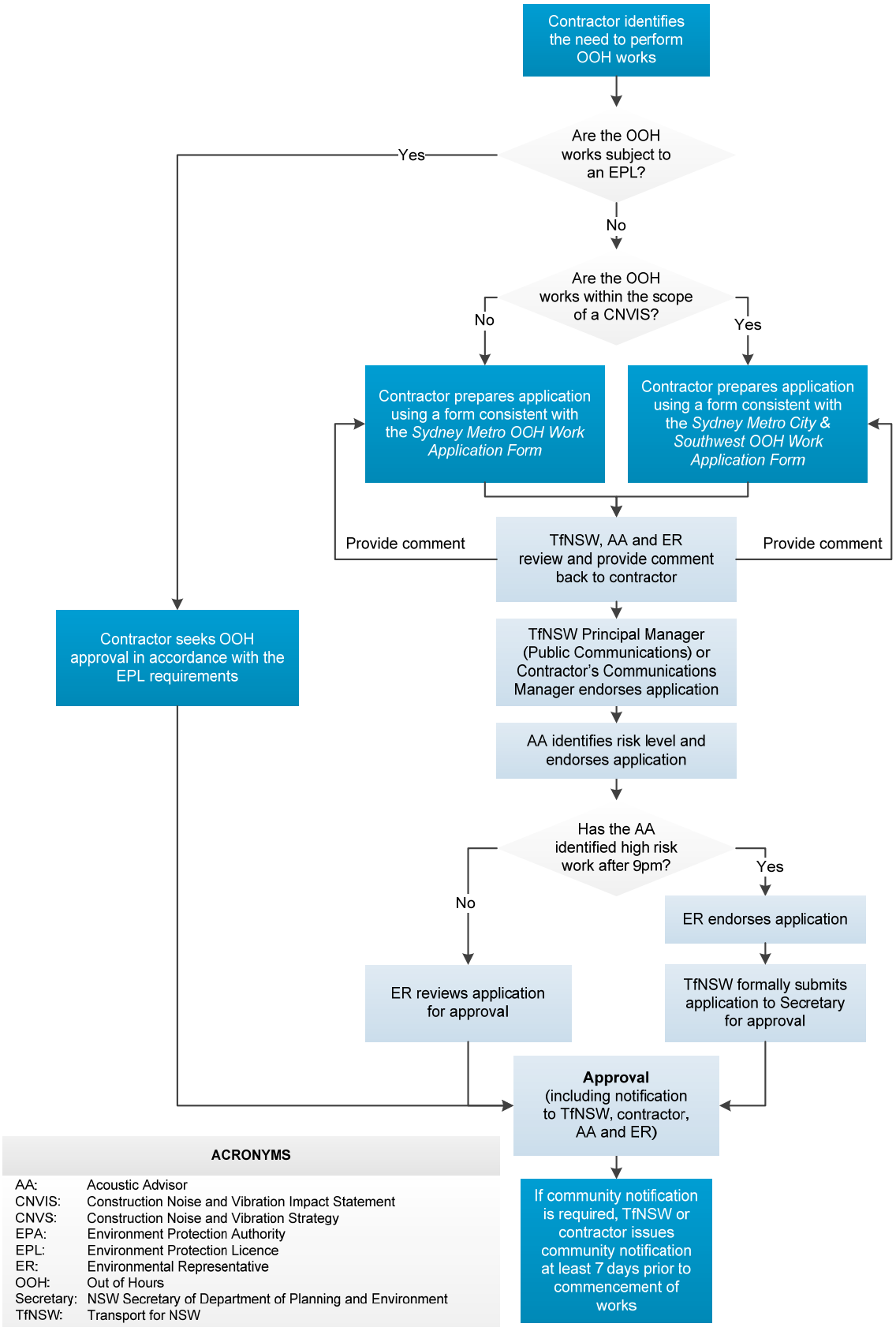


Figure 1: OOH Work Approval Process

3.2. Community Notifications

Community notifications can be used as a mitigation measure for receivers of noise and vibration impacts from OOH work.

Community notifications usually comprise of letterbox-dropped or hand-distributed notification letters to identified stakeholders prior to the commencement of works. Communities are more likely to understand and accept the impacts from noise and vibration if they are provided with honest detailed information and commitments on mitigation measures to be implemented that are adhered to by the project prior to the works commencing.

Community notification requirements are included in the CNVS and outlined in the *Community Communications Strategy* for the City & Southwest project in accordance with Condition B1 of the Chatswood to Sydenham planning approval.

Community notification is an example of an additional mitigation measure that may be considered for implementation in accordance with the CNVS and the additional mitigation measure tables contained in the OOH Work Application Forms. In the event that community notification is required as a mitigation measure prior to OOH work commencing, community notification is to be undertaken at least seven days prior to the works commencing.

3.2.1. Negotiated Agreements with Sensitive Receivers

Occasionally, a negotiated agreement for particular OOH work will be formed with the potentially affected sensitive receivers in accordance with Condition E44(e) of the Chatswood to Sydenham planning approval. These negotiated agreements would be undertaken and documented by either the contractor or TfNSW as part of an OOH application.

The negotiated agreement needs to reach a minimum 65% acceptance rate of those sensitive receivers that are contactable. 'Contactable' is defined as having received correspondence (either verbal or written) from receivers within a two week timeframe. The CNVIS process and the TfNSW Place Manager will advise of potentially affected sensitive receivers to be contacted.

Upon ER approval of any OOH applications containing negotiated agreements, TfNSW will forward the negotiated agreement documentation to the Secretary for information at least one week prior to the OOH work commencing. In the event that community notification is required as a mitigation measure prior to the OOH work commencing, this would be undertaken at the same time (i.e. at least seven days prior to the works commencing).

3.3. Emergency Works

Occasionally there may be a need to undertake emergency works outside of standard work hours. In this situation, the works are permitted to proceed without prior approval, provided that the works were:

- Unforeseen, and
- Required to avoid the loss of life, damage to property or prevent environmental harm.

Figure 2 outlines the emergency work process.

On becoming aware of the need to undertake emergency works in accordance with Condition E44(b) of the Chatswood to Sydenham planning approval, contractors must notify TfNSW, the AA, the ER and the EPA (if it is required under an EPL if relevant) of the need to undertake the works. This notification should be in the form of a written email or text message to TfNSW, the AA and the ER. The requirements for notifying the EPA will be dictated in the conditions of the EPL if relevant.

As a form of mitigation, community notification is to be undertaken within two hours of the commencement of emergency works. These notifications will generally be prepared by the contractor using a small hand-completed Sydney Metro card template for distribution to the immediate surrounding community. These cards will include the following details as a minimum:

- Scope,
- Location,
- Hours,
- Duration,
- Types of equipment to be used, and
- Likely impacts.

The day after any emergency works, the applicant is to provide a written emergency works report to TfNSW. The emergency works report is to include as a minimum:

- Date, time, duration and cause of the emergency,
- Description of emergency works undertaken,
- Mitigation measures implemented to address the impacts of the emergency works, and
- Actions/Measures taken or to be taken to prevent or mitigate recurrence of the emergency. If there are no appropriate actions/measures to be taken, explanation is to be provided as to why.

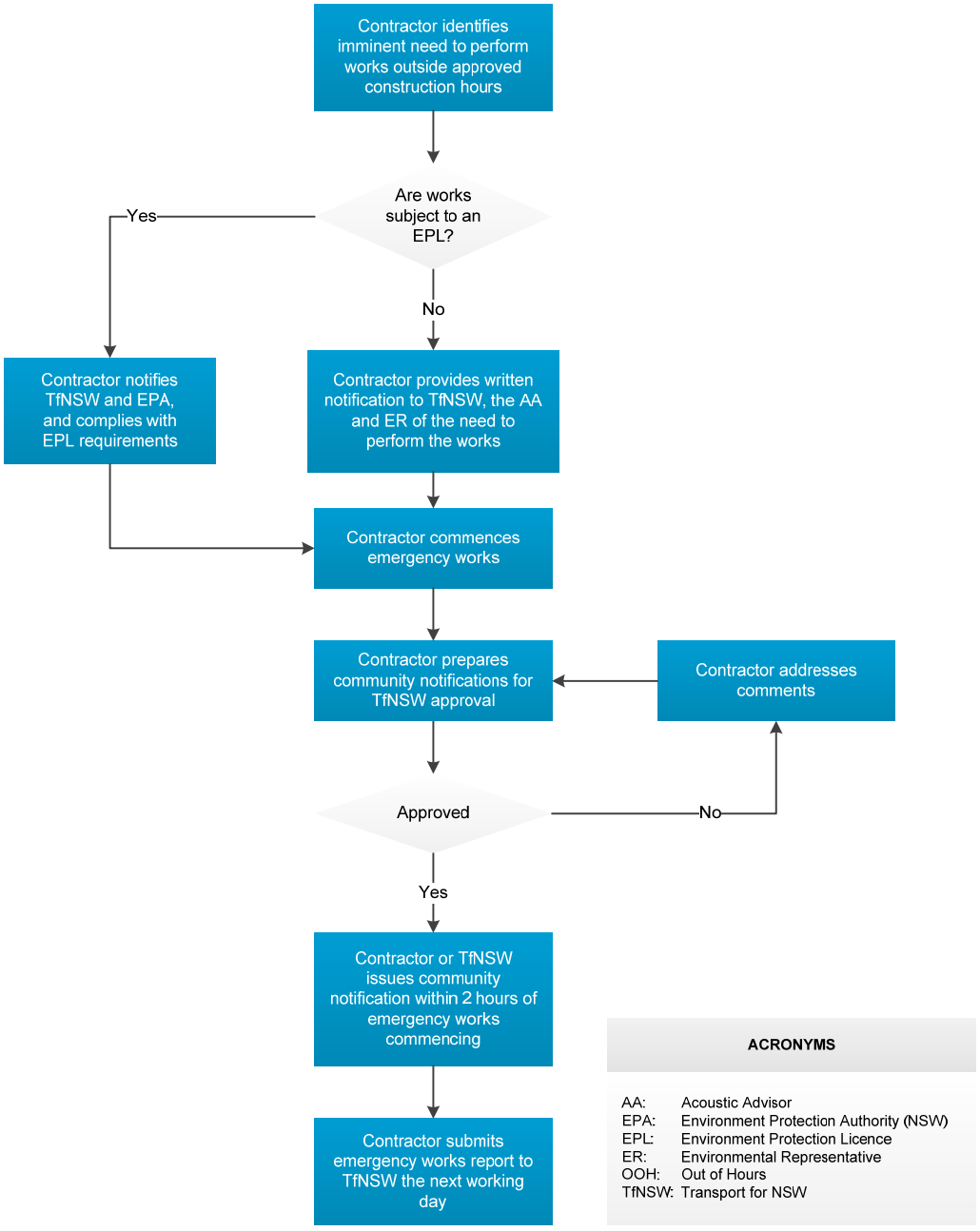


Figure 2: Emergency Work Process

4. Related Documents and References

Related Documents and References
• SM ES-MM-101 Environment & Sustainability Management Manual • SM ES-ST-204 Construction Environment Management Framework • SM ES-ST-210 City & Southwest Construction Noise and Vibration Strategy • SM ES-FT-443 City & Southwest Out of Hours Work Application Form • SM ES-FT-419 Out of Hours Work Application Form • SM SC-ST-202 Overarching Community Communications Strategy • SM QM-FT-435 Integrated Management System (IMS) Glossary • EPA Interim Construction Noise Guideline

5. Superseded Documents

Superseded Documents
There are no documents superseded as a result of this document.

6. Document History

Version	Date of approval	Summary of change
1.0	28/3/2015	New document
2.0	14/7/2017	Edits to address DP&E comments

Appendix A: OOH Work Protocol Endorsements

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28 March 2017

Ref:170108_OOHW Protocol

Dear Stuart

RE: Endorsement of Sydney Metro City & Southwest Out of Hours Work Protocol

Thank you for providing the following document for Environmental Representative (ER) review and endorsement as required by the Condition of Approval A24 (d) of the Sydney Metro City & Southwest project (SSI – 15_7400 January 9 2017).

- Sydney Metro City & Southwest City & Southwest Out of Hours Work Protocol (SM ES-PW-317/1.0)

As an approved ER for the Sydney Metro City & Southwest project, I have reviewed and provided comment on these documents. As required under A27 (d), the Acoustic Advisor has also been involved in this process and has provided separate endorsement.

I now consider this Protocol appropriate for submission to the Secretary notwithstanding that the required Specific Out of hours Works Application Forms will continue to be developed, reviewed by Acoustic Advisor, endorsed by the ER, and submitted to the Secretary for approval as required.

Yours sincerely

Jo Robertson
Environmental Representative – Sydney Metro – City and South West

ENDORSEMENT

CITY & SOUTHWEST ACOUSTIC ADVISOR (Interim)

Review of	**Out of Hours Work Protocol**	**Document reference:**	Sydney Metro City & Southwest City & Southwest Out of Hours Work Protocol Document number SM ES-PW-317, version 1.0, 28 March 2017
Prepared by:	Dave Anderson		
Date of issue:	28 March 2017		

As approved (interim) Acoustic Advisor for the Sydney Metro City & Southwest project, I have reviewed and provided comment on the Out of Hours Work Protocol, as required under A27 (d) of the project approval conditions.

I consider that this Protocol is appropriate for submission to the Secretary, noting that the required Specific Out of hours Works Application Forms will continue to be developed, including review by the Acoustic Advisor and endorsement by the ER.

Dave Anderson, interim City & Southwest Acoustic Advisor

Appendix B: OOH Work Protocol Approval from the Secretary

NSW GOVERNMENT | Planning & Environment

Contact: Jacqui McLeod
Phone: 9274 6454
Email: Jacqui.mcleod@planning.nsw.gov.au

Our ref: SSI 15_7400

Mr Stephen Jones
Executive Director
Safety, Sustainability and Environment
Sydney Metro, Transport for NSW
PO Box 588
North Ryde BC NSW 1670

Dear Mr Jones

Sydney Metro City & Southwest Chatswood to Sydenham (SSI 15_7400): Approval of the Out of Hours Work Protocol under condition E47.

Thank you for your correspondence dated 30 March 2017, submitting the Out of Hours Work Protocol in accordance with Condition E47 for the Secretary's approval. I also note further revisions to this document, responding to the Department's detailed comments and requirements. The Department has reviewed the updated Out of Hours Work Protocol (Rev 1.3 dated 4 July 2017) and considers that it satisfactorily addresses the requirements of Condition E47. Therefore, in accordance with Condition E47, I approve the Out of Hours Work Protocol (Rev 1.3 dated 4 July 2017).

Please note that under condition E47, all out of hours construction that is not subject to an EPL, that the Acoustic Advisor deems to be "High Risk", and that occurs after 9pm must be submitted to the Secretary for approval.

If you have any further queries or require clarification on this matter, please contact me on 9274 6454 or by email jacqui.mcleod@planning.nsw.gov.au.

Yours sincerely

Jacqui McLeod 14/7/17

Jacqui McLeod
Acting Director Infrastructure Management
as delegate of the Secretary

Out of Hours (OOH) Work Application Form

This Form is to be used for formal review and approval of Sydney Metro OOH work as it may affect Residential and non-Residential receivers. For City & Southwest OOH work that is within the scope of a Construction Noise and Vibration Impact Statement, the project-specific SM ES-FT-443 C&SW Out of Hours Works Application Form is to be used. For all other OOH applications, this Form can be used. This form can be used in accordance with the SM ES-PW-317 City & Southwest Out of Hours Work Protocol. This application and all applicable appendices must be submitted to TfNSW as one PDF file at least 15 business days prior to the commencement of the proposed OOH work.

1. OOH Application	
Contractor:	
Project:	
Application Title: E.g. 'Smith St service relocation works'	
Application Number: E.g. 1, 2, 3, etc.	
Application Date: Original submission date (resubmission date in parentheses if applicable)	
2. Proposed OOH Work Details	
Description of works: Including: • Work methodologies. • List of plant/equipment to be used (worst case scenario). • Map (and/or ECM) attached as Appendix 1 indicating location of works, plant/equipment locations and sensitive receivers (including distance to nearest sensitive receiver for noisiest plant/equipment). • Traffic Management Plan or Traffic Control Plan if applicable as Appendix 2. • Road Occupancy License and/or Road Opening Permit application or approval if applicable as Appendix 3.	
Timing of works: Including the proposed dates and times where works are anticipated to be undertaken outside standard hours.*	
Occasions: Refer to Section 3 and state the number of occasions anticipated (worst-case).	
Justification: Explain the need for the works to be undertaken during the proposed OOH periods and justify why works cannot occur during standard hours* or extended hours as per E37 and E38.	

* Unless specified otherwise in project specific documentation, work time periods are as follows:
- **Standard Hours:** 7am to 6pm weekdays and 8am to 1pm Saturdays.
- **Daytime OOH:** 1pm to 6pm Saturdays and 8am to 6pm Sundays and Public Holidays.
- **Evening OOH:** 6pm to 10pm every day.
- **Night Time OOH:** 10pm to 7am weekday mornings and 10pm to 8am weekend and Public Holiday mornings.

3. Noise and Vibration Assessment

A quantitative noise assessment for OOH work is to be carried out in accordance with the *Interim Construction Noise Guideline* (DECC, 2009). This section allows applicants to address these requirements through the following steps:

1) Establishing Rating Background Levels (RBLs) and Noise Management Levels (NMLs).
2) Predicting the anticipated noise levels using a quantitative noise assessment:
   a. Works that are not likely to generate high noise impacts for a significant duration may use a preliminary quantitative noise assessment (facilitated within this form). This ensures that all applications, as a minimum, include a preliminary quantitative noise assessment in accordance with the *Interim Construction Noise Guideline* (ICNG).
   b. Works that are likely to generate high noise impacts for a significant duration may require a detailed quantitative noise assessment (i.e. Construction Noise and Vibration Impact Statement) to be undertaken.
   c. Works that are likely to generate ground-borne or structure-borne vibration and/or noise require specialist advice and assessment.
3) Comparing predicted noise levels against NMLs and applying standard mitigation measures as appropriate.
4) Considering additional mitigation when predicted noise levels exceed NMLs.

The need for a detailed quantitative noise and vibration assessment will be considered by TfNSW, the contractor and the Acoustic Advisor or Environmental Representative (if applicable) collectively when the predicted noise levels are anticipated to:

- Exceed an RBL at a residential receiver or an NML at a non-residential receiver by more than 10dBA, **AND**
- Affect the same receiver on 10 or more **occasions**. An occasion is considered to be anytime works are carried out between:
  - 6pm on a weekday and the start of standard hours the next day, **OR**
  - 1pm on a Saturday and 8am on a Sunday, **OR**
  - 8am on a Sunday or public holiday and the start of standard hours the next day.

A *detailed* quantitative noise and vibration assessment should generally include:

- Derivation of RBLs for residential receivers based on noise monitoring at representative locations and/or derivation of NMLs for non-residential receivers based on sensitivities.
- Detailed prediction of noise levels for daytime, evening and night time OOH periods (as applicable) in accordance with Section 4.5 of the ICNG (including a clear outline of timing, duration and predicted noise levels during each OOH period).
- For Night Time OOH Period works, a prediction of maximum noise levels and a review of potential sleep disturbance impacts in accordance with Section 4.3 of the ICNG.
- Detailed predictions of vibration levels for sensitive receivers.

Please complete Steps 1 to 4 below.

Step 1: RBLs/NMLs	If RBLs for residential receivers or NMLs for non-residential receivers have already been established (e.g. in an Environmental Impact Statement, Review of Environmental Factors, detailed quantitative noise assessment or Construction Noise and Vibration Impact Statement for other work activities), enter into Table 3 and attach the supporting evidence as Appendix 4. If no RBLs/NMLs have been established, use Table 1 to estimate RBLs/NMLs and enter into Table 3.
Step 2: Predicted Anticipated Noise Levels	If predicted anticipated noise levels have already been established (e.g. in an Environmental Impact Statement, Review of Environmental Factors, detailed quantitative noise assessment), enter the predicted anticipated noise levels into Table 3 and attach the supporting evidence as Appendix 4. If predicted anticipated noise levels have not already been established, use Table 2 to estimate anticipated noise aspects for the noisiest plant/equipment and enter into Table 3. In Table 3, use these values to calculate the anticipated predicted noise levels.

Step 3: Exceedances and Mitigation Measures	Compare the anticipated predicted noise levels to the applicable RBLs/NMLs, calculate the exceedances and enter into Table 3. Provide a description of the mitigation measures that are planned to be implemented in order to mitigate the noise (and vibration if relevant) impacts. **Standard Mitigation Measures:**
Step 4: Consideration of Additional Mitigation Measures	Use Table 4 and the exceedances in Table 3 to determine the applicable Additional Mitigation Measures for consideration. Use Table 6 to indicate which of these measures are applicable, which will be implemented and provide justification for any applicable measures that will not be implemented.

Table 1: Estimated RBLs for Residential Receivers and NMLs for Non-Residential Receivers

Sensitive Receiver Category	**Estimated RBLs (dBA)**		
Residential	**Daytime OOH**	**Evening OOH**	**Night Time OOH**
Urban (e.g. city hubs, near busy roads, near industrial activity)	**55**	**50**	**45**
Suburban	**45**	**40**	**35**
Quiet, rural or isolated	**40**	**35**	**30**
Non-Residential	**ICNG NMLs (dBA)**		
Industrial facilities	**75** (only applicable when in use)		
Offices or retail	**70** (only applicable when in use)		
Health and educational facilities	**55** (only applicable when in use)		

Table 2: Noise Aspects for Predicted Noise Levels

Noise Aspect	If anticipated predicted noise levels have not already been established, select the most applicable value for each noise aspect below and enter these values into Table 3.	dBA Value
1. Estimated predicted plant /equipment noise level at 10 metres Including +5 dBA penalty for annoying activities as per ICNG (refer to Appendix B for other predicted noise level data)	Hand-held tamper, impact sheet piling rig	105
	Rail grinder, ballast regulator, concrete/rock saw, excavator hammer, jackhammer, rock-breaker	95
	Mainline tamping machine, pin puller, dynamic track stabiliser, large bulldozer, chainsaw, large excavator, pour fill/ballast, water cart, super-sucker, front-end loader, vibratory or bored piling	85
	Asphalt paver, backhoe, small bulldozer, mulcher, concrete pump/mixer/agitator, tower/mobile crane, small excavator, grader, forklift, welder, wheeled-loader, Standard Penetration Testing	80
	Truck, spreader, whacker packer, cherry-picker, fence post driver, electric drill, drill rig	75
	Lighting tower, small generator	70
	Light vehicle, hand-tools (no impact), small cement mixer	65
2. Noise source character	Non-continuous use (plant/equipment to operate for less than half the time)	- 5
3. Local screening	Existing screening between site and receiver (buildings, cuttings, canopies, etc.)	- 5
	Temporary screening to be implemented near work site	- 10
	Acoustic shed or enclosure	- 25
4. Distance attenuation	< 10 metres	0
	10 to 20 metres	- 5
	20 to 35 metres	- 10
	35 to 60 metres	- 15
	60 to 100 metres	- 20
	100 to 180 metres	- 25
	180 to 350 metres	- 30
	350 to 1,000 metres	- 40

Table 3: Predicted Noise Levels and Exceedances of RBLs or NMLs (dBA)

Period (only complete as applicable for each period)	**Noisiest Plant /Equipment** (state the noisiest plant/ equipment to be used during each applicable OOH period)	**Receiver Type** (state 'Res' or 'Non-Res' as applicable for closest receiver to noisiest plant/ equipment)	Enter the most applicable values from Table 2, then add to determine the Predicted Noise Level				**Predicted Noise Level** (1 + 2 + 3 + 4)	**RBL** (for Res)	**NML** (for Non-Res)	**Exceedance** (Predicted Noise Level minus RBL for Res or NML for Non-Res)
			1. Plant/ Equipment Noise Level	**2. Noise Source Character**	**3. Local Screening**	**4. Distance Attenuation**				
Daytime OOH										
Evening OOH										
Night Time OOH										

Table 4: Additional Mitigation Measures (AMM) requiring Consideration for Implementation

OOH Period	Additional Mitigation Measures (AMM)* that must be considered for implementation (apply the exceedances from Table 3 to the two OOH period categories below as applicable)			
	<= 10 dBA Exceedance	10 to <= 20 dBA Exceedance	20 to <= 30 dBA Exceedance	> 30 dBA Exceedance ^
Daytime OOH Period	–	LB	M, LB	M, IB, LB, PC, RO, SN
Evening and Night Time OOH Periods	–	M, LB	M, IB, LB, PC, SN, RO	M, IB, LB, PC, SN, RO, AA*

* AA is only applicable to Night Time OOH periods.

^ Where exceedances are greater than 45 dBA under the City & Southwest Chatswood to Sydenham planning approval, Conditions E41 and E42 mandate that applicable AMMs must be offered in certain circumstances.

Table 5: List of Additional Mitigation Measures (AMM)

AMM Abbrev.	AMM	AMM Descriptions and Guidance
LB	Letterbox-drop (generic to the project)	A newsletter is produced and distributed to the local community via letterbox-drop and the project mailing list. These newsletters provide an overview of current and upcoming works across the project and other topics of interest. The objective is to engage, inform and provide project-specific messages. Advanced warning of potential disruptions (e.g. traffic changes or noisy works) can assist in reducing the impact on the community. Content and newsletter length is determined on a project-by-project basis. Most projects distribute notifications on a monthly basis. The geographic extent of letterbox-drops is generally centred on the immediate surrounding community and rarely extends beyond 100 metres from the works site.
M	Monitoring	Where it has been identified that specific construction activities are likely to exceed the relevant Rating Background Levels (RBL) and/or Noise Management Levels (NMLs), monitoring may be conducted at the affected receiver(s) or a nominated representative location (typically the nearest receiver where more than one receiver have been identified). Monitoring can be in the form of either unattended logging or operator attended surveys. The purpose of monitoring is to inform the relevant personnel when the RBL/NML has been exceeded so that additional management measures may be implemented.
IB	Individual Briefings	Individual briefings are used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented. Communications representatives would visit identified stakeholders at least 48 hours ahead of potentially disturbing construction activities. Individual briefings provide affected stakeholders with personalised contact and tailored advice, with the opportunity to comment on the project.
PC	Phone calls (and/or emails)	Phone calls and/or emails detailing relevant information would be made to identified/affected stakeholders within seven days of proposed work. Phone calls and/or emails provide affected stakeholders with personalised contact and tailored advice, with the opportunity to provide comments on the proposed work and specific needs etc.
SN	Specific Notifications (specific to the OOH work)	Specific notifications would be letterbox-dropped or hand-distributed to identified stakeholders no later than seven days ahead of construction activities that are likely to exceed the RBLs/NMLs. This form of communication is used to support periodic notifications or to advertise unscheduled works. The geographic extent of specific notifications is generally centred on the immediate surrounding community and rarely extends beyond 100 metres from the works site.
RO	Respite Offer	The purpose of a project specific respite offer is to provide residents subjected to lengthy periods of noise and/or vibration impacts respite during OOH periods. Respite offers are offers made to affected receivers to provide a period of either no or limited noise impacts. This can be in the form of stopping or limiting works onsite or offering affected receivers dinner/movie vouchers. The first priority is to implement a period of no or limited noise impacts. If this cannot be achieved, dinner/movie vouchers may be offered on a case-by-case basis. Respite offers must be made in certain circumstances in accordance with Condition E38 of the Chatswood to Sydenham planning approval.
AA	Alternative Accommodation *(residential only)*	Alternative accommodation options may be provided for residents living in close proximity to construction works that are likely to incur unreasonably high impacts during night time OOH periods. Alternative accommodation will be considered on a case-by-case basis.

Table 6: Consideration of Additional Mitigation Measures

Additional Mitigation Measures	Applicable for Consideration? YES or NO (refer to Table 4)	To be Implemented? YES or NO	Justification (if applicable for consideration, but will not be implemented)
LB			
M			
IB			
PC			
SN			
RO			
AA			

4. Community Consultation	
What community consultation has been undertaken already?	
What community consultation is planned to be undertaken?	
If drafted already, attach applicable Community Notification as Appendix 5.	

5. Contractor's Signature				
Contractor's Identification of Risk Level: If the work is subject to the Chatswood to Sydenham planning approval, use Section 3.1.2.3 of the Chatswood to Sydenham Out of Hours Work Protocol to identify a Risk Rating.	Circle:	LOW	or	HIGH
Contractor's Signature:				
Name:				
Title:				
Contact Number:				
Date:				

6. Contractor's Contact Details		
Contractor Personnel	**Name**	**Mobile**
Manager Environment:		
Manager Communications:		
Contractor's Representative:		
Contractor's 24hr contact person:		

City & Southwest Determination Page (to be left blank by contractors)

	Step 1 – Endorsement from TfNSW Principal Manager Project Communications Contractor's Communications Manager	Step 2 – Endorsement from Acoustic Advisor	Step 3 – Approval from Environmental Representative OR Secretary of Department of Planning & Environment
Risk Level:	*N/A*	*Circle: LOW or HIGH* *If works after 9pm are considered HIGH, TfNSW submits application to the Secretary of Department of Planning & Environment for approval.*	*N/A*
Signature:			
Name:			
Date:			
Comments: (including Acoustic Advisor Risk Level comments)			
Conditions:			

Generic Determination Page (to be left blank by contractors)

	Step 1 –TfNSW Principal Manager Project Communications	**Step 2 – Acoustic Advisor** (may be optional depending on planning approval or contract requirements)	**Step 3 – Environmental Representative** (may be optional depending on planning approval or contract requirements)	**Step 4 –TfNSW Principal Manager, Sustainability, Environment & Planning** (only required if not approved already)
Action:	Endorsement	Circle: Endorsement OR Approval	Circle: Endorsement OR Approval	Approval
Signature:				
Name:				
Date:				
Comments:				
Conditions:				

Appendix 1: Map (and/or ECM)

Appendix 2: Traffic Management Plan or Traffic Control Plan

(if applicable)

Appendix 3: Road Occupancy Licence and/or Road Opening Permit

(if applicable)

Appendix 4: Supporting Evidence for Noise and Vibration Impacts

(if applicable)

Appendix 5: Community Notification

(if applicable)

Appendix F – Consultation

McCallum, Chris

From: Asad Rajbhoy <ARajbhoy@cityofsydney.nsw.gov.au>
Sent: Wednesday, 16 May 2018 4:44 PM
To: McCallum, Chris
Cc: Elise Webster; Sebastian Smyth
Subject: RE: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Chris,

We have reviewed the Construction Management Plans for the Sydney Metro Central Station Main Works and our comments are as follows:

Construction Biodiversity Management Plan
We noted two things in the report:

- It is not clear where Sydney Metro were taking on the recommended mitigation methods (pg 9 of Biosis report) in their management plan, specifically the removal of roofing one day prior. Please confirm.
- Also page 21 of section 3, it notes that animals found prior to the clearing will be removed and relocated to suitable habitat. Please clarify that any microbats will only be handled by wildlife carers/ecologists. This shouldn't only be referred to when an injured animal is found.

Construction Soil and Water Management Plan
Under the section of legislation, Sydney Metro should also assess the development under the "NSW State Government's Flood Prone Lands Policy" as outlined in the "NSW State Governments 2005 Floodplain Development Manual". Accordingly, the development should be designed in accordance with flood compatibility.

Construction Noise and Vibration Management Plan
No comments.

Construction Heritage Management Plan
The following minor amendment is required.

- The report incorrectly cites *OPC heritage architects* as nominated heritage specialists for the project in a number of places (e.g. at paragraph 5.2.2 on p27/61 of the report). This needs to be generally corrected in the report as it should be ***OCP*** (i.e. Otto Cserhalmi & Partners).

Other than that, the CHMP document is acceptable given the current stage of project design and appears to satisfy consent condition C3 for heritage.
The report appears to put more emphasis and detail into archaeological issues rather than built heritage but offers guidance for the development of more detail on built heritage as the project progresses into the detailed design stage.

It is also noted that section 8 of the report covers *continuous improvement* of the report as the project progresses.

Please let me know if you have any questions. Thank you.

Regards,

Asad Rajbhoy
Traffic & Transport Planner Major Projects
City Access & Transport

CITY OF SYDNEY
Sydney2030/Green.Global.Connected

Telephone: +612 9265 9902
cityofsydney.nsw.gov.au

From: Asad Rajbhoy
Sent: Tuesday, 8 May 2018 2:54 PM
To: McCallum, Chris <CMcCallum@laingorourke.com.au>
Cc: Elise Webster <EWebster@cityofsydney.nsw.gov.au>
Subject: RE: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Chris,

Received. I'll check with Sebastian and get back to you.

Regards,

Asad

From: McCallum, Chris <CMcCallum@laingorourke.com.au>
Sent: Tuesday, 8 May 2018 2:50 PM
To: Asad Rajbhoy <ARajbhoy@cityofsydney.nsw.gov.au>
Subject: FW: Sydney Metro Central Station Main Works Project Management Plan Review

FYI

Chris McCallum
Environmental Manager
LAING O'ROURKE

Mobile: 0408 264 164
E-mail: cmccallum@laingorourke.com.au
Web: www.laingorourke.com.au

From: McCallum, Chris
Sent: Monday, 30 April 2018 1:34 PM
To: 'ssmyth@cityofsydney.nsw.gov.au'
Subject: Sydney Metro Central Station Main Works Project Management Plan Review

Dear Sebastian,

Laing O'Rourke has been engaged by the Sydney Metro Delivery Office to undertake construction of the Sydney Metro Central Station Main Works (CSMW) as part of the approved Sydney Metro Chatswood to Sydenham project.

Please see attached Laing O'Rourke's Construction Biodiversity Management Plan and Construction Soil and Water Management Plan for the CSMW worksite within Central Railway Station Precinct in the City of Sydney Council LGA. The Construction Noise and Vibration Management Plan and Construction Heritage Management Plan will be sent separately via Sharefile due to the document size. Please let me know if you do not receive them. These documents have been developed for the City and Southwest (S&SW) project as per the planning approval requirement condition C3 of project approval SSI 15_7400. This condition

also requires the project to develop these Management Plans in consultation with Council. A copy of the planning approval conditions for the project can be found here:-

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7400

As such, Laing O'Rourke would like to formally submit the attached documents for your comment. The earliest Council response would be very much appreciated but S&SW project team need comments back by no later than Wednesday 16th May 2018. We are happy to meet with you to discuss the Project in further detail and to discuss any issues of concern Council may have.

Thank you for your help and understanding and please do not hesitate in contacting me if required to discuss.

Yours sincerely,

Chris

Chris McCallum
Environmental Manager

LAING O'ROURKE

Mobile: 0408 264 164
E-mail: cmccallum@laingorourke.com.au
Web: www.laingorourke.com.au

BEFORE PRINTING THIS E-MAIL
please consider the environment

Chris McCallum

From: Gordon Downey [mailto:Gordon.Downey@epa.nsw.gov.au]
Sent: Wednesday, 4 July 2018 10:44 AM
To: McCallum, Chris
Cc: Jacinta Hanemann; Sarah Thomson; Claire Miles; Mike Sharpin
Subject: RE: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Chris,

I refer to the Sydney Metro City and Southwest – Central Station Main Works – Construction Noise and Vibration Management Plan (CNVMP – Report No. SMCSWSMC-LOR-SMC-EM-PLN-000003) forwarded to EPA via email on 26 June 2017.

Thank you for forwarding the CNVMP for our records. The EPA encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, it is not EPA policy to approve or endorse these documents. The EPA's role is to set environmental objectives/requirements for environmental management, rather than being directly involved in the development of strategies to achieve those objectives/requirements.

You may however wish to submit the CNVMP, or parts thereof, as supporting information for your future Environment Protection Licence (EPL) application. Information in the CNVMP would be a relevant consideration for EPA in exercising its functions under Section 45 of the Protection of the Environment Operations Act 1997.

Any required application to EPA to vary a licence, or for the issue of a licence for scheduled development work or a licenced activity should be made in a timely manner to allow for processing of the application. The Act provides that a licence application is deemed to have been refused after 60 days.

Thank you for your email and please do not hesitate to contact me should you wish to discuss.

Best regards

Gordon

Gordon Downey
Senior Operations Officer - Metropolitan Infrastructure
Metro, NSW Environment Protection Authority
+61 2 9995 5783
gordon.downey@epa.nsw.gov.au www.epa.nsw.gov.au @EPA_NSW
Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555

From: McCallum, Chris [mailto:CMcCallum@laingorourke.com.au]
Sent: Tuesday, 26 June 2018 6:04 PM
To: Gordon Downey <Gordon.Downey@epa.nsw.gov.au>
Cc: Jacinta Hanemann <Jacinta.Hanemann@epa.nsw.gov.au>; Sarah Thomson <Sarah.Thomson@epa.nsw.gov.au>;

Claire Miles <Claire.Miles@epa.nsw.gov.au>; Mike Sharpin <Mike.Sharpin@epa.nsw.gov.au>
Subject: RE: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Gordon,

Thank you for EPA's comments on the Construction Soil and Water Management Plan.

The City and Southwest (S&SW) project planning approval requirement condition C9 also requires the EPA to be consulted on the Construction Noise and Vibration Monitoring Program which is detailed in the attached Construction Noise and Vibration Management Plan. As such, Laing O'Rourke would like to formally submit the attached document for comment. The earliest response would be very much appreciated but S&SW project team need comments back by no later than Wednesday 11th July 2018.

In reference to the Environmental Protection Licence Application we are planning to submit the application to the EPA this week.

Thank you for your help and understanding and please do not hesitate in contacting me if required to discuss.

Yours sincerely,

Chris McCallum
Environmental Manager
LAING O'ROURKE

Mobile: 0408 264 164
E-mail: cmccallum@laingorourke.com.au
Web: www.laingorourke.com.au

BEFORE PRINTING THIS E-MAIL
please consider the environment

From: Gordon Downey [mailto:Gordon.Downey@epa.nsw.gov.au]
Sent: Friday, 20 April 2018 12:53 PM
To: McCallum, Chris
Cc: Jacinta Hanemann; Sarah Thomson; Claire Miles; Mike Sharpin
Subject: FW: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Chris,

I refer to the Sydney Metro City and Southwest – Central Station Main Works - Biodiversity Management Plan (BMP) and Soil Water Management Plan (SWMP) forwarded to EPA via email on 17 April 2017. The EPA is not responsible for biodiversity and the EPA has not forwarded the BMP to OEH.

Thank you for forwarding these plans for our records. The EPA encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, it is not EPA policy to approve or endorse these documents. The EPA's role is to set environmental objectives/requirements for environmental management, rather than being directly involved in the development of strategies to achieve those objectives/requirements.

Sydney Trains currently holds an Environment Protection Licence (EPL) for rail systems activities on the NSW Rail Network pursuant to the Protection of the Environment Operations Act 1997 *(the Act)*. As the proposed works will be occurring on the Sydney Trains licensed premises, you should, in the first instance, liaise with Sydney trains. An appropriate initial point of contact is Rod Barber – Environment Manager – Corporate Services; PH: (02) 8922 4538 or 0410 622 899.

Any required application to EPA to vary a licence, or for the issue of a licence for scheduled development work or a licenced activity should be made in a timely manner to allow for processing of the application. The Act provides that a licence application is deemed to have been refused after 60 days.

Following your discussion with Sydney Trains, it may be advantageous to brief the EPA on the project and timeframes.

Thank you for your email.

Best Regards

Gordon Downey
Senior Operations Officer - Metropolitan Infrastructure
Metro, NSW Environment Protection Authority
+61 2 9995 5783
gordon.downey@epa.nsw.gov.au www.epa.nsw.gov.au @EPA_NSW
Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555

From: Mike Sharpin
Sent: Wednesday, 18 April 2018 9:56 AM
To: Gordon Downey <Gordon.Downey@epa.nsw.gov.au>
Subject: FW: Sydney Metro Central Station Main Works Project Management Plan Review

FYI – can we please discuss when convenient?

From: Mildi Palmer
Sent: Wednesday, 18 April 2018 9:53 AM
To: Mike Sharpin <Mike.Sharpin@epa.nsw.gov.au>; Claire Miles <Claire.Miles@epa.nsw.gov.au>
Subject: FW: Sydney Metro Central Station Main Works Project Management Plan Review

Hi, FYI the below and referral for any action needed.

From: McCallum, Chris [mailto:CMcCallum@laingorourke.com.au]
Sent: Tuesday, 17 April 2018 5:19 PM
To: Mildi Palmer <Mildi.Palmer@epa.nsw.gov.au>
Subject: Sydney Metro Central Station Main Works Project Management Plan Review

Dear Mildi,

Laing O'Rourke has been engaged by the Sydney Metro Delivery Office to undertake construction of the Sydney Metro Central Station Main Works (CSMW) as part of the approved Sydney Metro Chatswood to Sydenham project.

Please see attached Laing O'Rourke's Construction Soil and Water Management Plan and Construction Biodiversity Management Plan for the CSMW worksite within Central Railway Station Precinct. These documents have been developed for the City and Southwest (S&SW) project as per the planning approval requirement condition C3 of project approval SSI 15_7400. This condition also requires the project to develop these Management Plans in consultation with the OEH. A copy of the planning approval conditions for the project can be found here:-

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7400

As such, Laing O'Rourke would like to formally submit the attached documents for comment.

The earliest OEH response would be very much appreciated but S&SW project team need comments back by no later than Friday 4th May 2018.

Thank you for your help and understanding and please do not hesitate in contacting me if required to discuss.

Yours sincerely,

Chris

Chris McCallum
Environmental Manager

LAING O'ROURKE

Mobile: 0408 264 164
E-mail: cmccallum@laingorourke.com.au
Web: www.laingorourke.com.au

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McCallum, Chris

From: Gordon Downey <Gordon.Downey@epa.nsw.gov.au>
Sent: Wednesday, 4 July 2018 10:44 AM
To: McCallum, Chris
Cc: Jacinta Hanemann; Sarah Thomson; Claire Miles; Mike Sharpin
Subject: RE: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Chris,

I refer to the Sydney Metro City and Southwest – Central Station Main Works – Construction Noise and Vibration Management Plan (CNVMP – Report No. SMCSWSMC-LOR-SMC-EM-PLN-000003) forwarded to EPA via email on 26 June 2017.

Thank you for forwarding the CNVMP for our records. The EPA encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, it is not EPA policy to approve or endorse these documents. The EPA's role is to set environmental objectives/requirements for environmental management, rather than being directly involved in the development of strategies to achieve those objectives/requirements.

You may however wish to submit the CNVMP, or parts thereof, as supporting information for your future Environment Protection Licence (EPL) application. Information in the CNVMP would be a relevant consideration for EPA in exercising its functions under Section 45 of the Protection of the Environment Operations Act 1997.

Any required application to EPA to vary a licence, or for the issue of a licence for scheduled development work or a licenced activity should be made in a timely manner to allow for processing of the application. The Act provides that a licence application is deemed to have been refused after 60 days.

Thank you for your email and please do not hesitate to contact me should you wish to discuss.

Best regards

Gordon

Gordon Downey
Senior Operations Officer - Metropolitan Infrastructure
Metro, NSW Environment Protection Authority
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gordon.downey@epa.nsw.gov.au www.epa.nsw.gov.au @EPA_NSW
Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555

From: McCallum, Chris [mailto:CMcCallum@laingorourke.com.au]
Sent: Tuesday, 26 June 2018 6:04 PM
To: Gordon Downey <Gordon.Downey@epa.nsw.gov.au>
Cc: Jacinta Hanemann <Jacinta.Hanemann@epa.nsw.gov.au>; Sarah Thomson <Sarah.Thomson@epa.nsw.gov.au>; Claire Miles <Claire.Miles@epa.nsw.gov.au>; Mike Sharpin <Mike.Sharpin@epa.nsw.gov.au>
Subject: RE: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Gordon,

Thank you for EPA's comments on the Construction Soil and Water Management Plan.

The City and Southwest (S&SW) project planning approval requirement condition C9 also requires the EPA to be consulted on the Construction Noise and Vibration Monitoring Program which is detailed in the attached Construction Noise and Vibration Management Plan. As such, Laing O'Rourke would like to formally submit the attached document for comment. The earliest response would be very much appreciated but S&SW project team need comments back by no later than Wednesday 11th July 2018.

In reference to the Environmental Protection Licence Application we are planning to submit the application to the EPA this week.

Thank you for your help and understanding and please do not hesitate in contacting me if required to discuss.

Yours sincerely,

Chris McCallum
Environmental Manager
LAING O'ROURKE

Mobile: 0408 264 164
E-mail: cmccallum@laingorourke.com.au
Web: www.laingorourke.com.au

From: Gordon Downey [mailto:Gordon.Downey@epa.nsw.gov.au]
Sent: Friday, 20 April 2018 12:53 PM
To: McCallum, Chris
Cc: Jacinta Hanemann; Sarah Thomson; Claire Miles; Mike Sharpin
Subject: FW: Sydney Metro Central Station Main Works Project Management Plan Review

Hi Chris,

I refer to the Sydney Metro City and Southwest – Central Station Main Works - Biodiversity Management Plan (BMP) and Soil Water Management Plan (SWMP) forwarded to EPA via email on 17 April 2017. The EPA is not responsible for biodiversity and the EPA has not forwarded the BMP to OEH.

Thank you for forwarding these plans for our records. The EPA encourages the development of such plans to ensure that proponents have determined how they will meet their statutory obligations and designated environmental objectives. However, it is not EPA policy to approve or endorse these documents. The EPA's role is to set environmental objectives/requirements for environmental management, rather than being directly involved in the development of strategies to achieve those objectives/requirements.

Sydney Trains currently holds an Environment Protection Licence (EPL) for rail systems activities on the NSW Rail Network pursuant to the Protection of the Environment Operations Act 1997 *(the Act)*. As the proposed works will be occurring on the Sydney Trains licensed premises, you should, in the first instance, liaise with Sydney trains. An appropriate initial point of contact is Rod Barber – Environment Manager – Corporate Services; PH: (02) 8922 4538 or 0410 622 899.

Any required application to EPA to vary a licence, or for the issue of a licence for scheduled development work or a licenced activity should be made in a timely manner to allow for processing of the application. The Act provides that a licence application is deemed to have been refused after 60 days.

Following your discussion with Sydney Trains, it may be advantageous to brief the EPA on the project and timeframes.

Thank you for your email.

Best Regards

Gordon Downey
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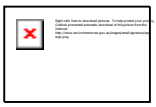
gordon.downey@epa.nsw.gov.au www.epa.nsw.gov.au @EPA_NSW
Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555



From: Mike Sharpin
Sent: Wednesday, 18 April 2018 9:56 AM
To: Gordon Downey <Gordon.Downey@epa.nsw.gov.au>
Subject: FW: Sydney Metro Central Station Main Works Project Management Plan Review

FYI – can we please discuss when convenient?

From: Mildi Palmer
Sent: Wednesday, 18 April 2018 9:53 AM
To: Mike Sharpin <Mike.Sharpin@epa.nsw.gov.au>; Claire Miles <Claire.Miles@epa.nsw.gov.au>
Subject: FW: Sydney Metro Central Station Main Works Project Management Plan Review

Hi, FYI the below and referral for any action needed.

From: McCallum, Chris [mailto:CMcCallum@laingorourke.com.au]
Sent: Tuesday, 17 April 2018 5:19 PM
To: Mildi Palmer <Mildi.Palmer@epa.nsw.gov.au>
Subject: Sydney Metro Central Station Main Works Project Management Plan Review

Dear Mildi,

Laing O'Rourke has been engaged by the Sydney Metro Delivery Office to undertake construction of the Sydney Metro Central Station Main Works (CSMW) as part of the approved Sydney Metro Chatswood to Sydenham project.

Please see attached Laing O'Rourke's Construction Soil and Water Management Plan and Construction Biodiversity Management Plan for the CSMW worksite within Central Railway Station Precinct. These documents have been developed for the City and Southwest (S&SW) project as per the planning approval requirement condition C3 of project approval SSI 15_7400. This condition also requires the project to develop these Management Plans in consultation with the OEH. A copy of the planning approval conditions for the project can be found here:-

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7400

As such, Laing O'Rourke would like to formally submit the attached documents for comment.

The earliest OEH response would be very much appreciated but S&SW project team need comments back by no later than Friday 4th May 2018.

Thank you for your help and understanding and please do not hesitate in contacting me if required to discuss.

Yours sincerely,

Chris

Chris McCallum
Environmental Manager

Mobile: 0408 264 164
E-mail: cmccallum@laingorourke.com.au
Web: www.laingorourke.com.au

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Appendix G – CNVS: Construction Noise and Vibration Monitoring Guideline

CNVS: APPENDIX A - Construction Noise and Vibration Monitoring Guideline

This document is intended to provide guidance and outline the minimum requirements for contractors undertaking construction noise and vibration monitoring on the Sydney Metro Project. It should be read in conjunction with the requirements of the Construction Noise and Vibration Strategy (CNIS), the EPA's Interim Construction Noise Guideline (ICNG) and the conditions of approval.

Construction Noise and Vibration Impact Statements (CNIS) are to be developed prior to the commencement of demolition and construction to assess the potential impact of noise and vibration at surrounding noise sensitive receivers and, where necessary, to develop detailed noise and vibration mitigation and management plans. The plans shall identify suitable monitoring locations; the types of instruments to be used; the timing duration and frequency of monitoring; and whether the monitoring is to be operator-attended or unattended.

The objectives of monitoring are as follows:

Attended

- confirm source noise and vibration levels used for predictions
- confirm noise and vibration levels at receivers are consistent with predictions
- confirm suitability of mitigation measures and provide evidence to support corrective action
- investigate alerts and alarms from unattended monitoring (see below)
- verify measured unattended noise and vibration levels
- provide a record of construction noise and vibration levels for complaints management

Unattended

- confirm noise and vibration levels near receivers are consistent with predictions,
- confirm suitability of mitigation measures and provide evidence to support corrective action
- providing a continuous record of noise and vibration levels, for use in incident or complaint investigations
- providing notification (alerts and alarms) to project staff if levels exceed pre-determined thresholds
- providing a record of construction noise and vibration levels

Monitoring for the Project will be required at the commencement of works and at regular intervals throughout the project (i.e. when new construction activities commence) to quantify the airborne noise, ground-borne noise and vibration levels associated with construction activities.

Monitoring would also be required in the event of a complaint being received and would be conducted at:

- the affected receiver; or
- if more than one affected receiver has been identified, at the nearest affected receiver; or
- where the nearest affected receiver refuses monitoring on their property, at the near point to that receiver within the site boundary.
- If it can be demonstrated that direct measurement of the construction site is impractical, alternative means of determining construction noise levels may be adopted in accordance with Chapter 11 of the NSW Industrial Noise Policy.

The contractor would need to determine the suitability of either attended or unattended monitoring for each monitoring event.

1. Construction Noise Monitoring

The noise measurement procedures employed throughout the monitoring program will be in accordance with the requirements of Australian Standard (AS) 1055:1997 Acoustics - Description and Measurement of Environmental Noise and the NSW Department of predicted levels.

Measurements are expected to consist of operator-attended and unattended measurements. All noise measurements will be performed and analysed by a suitably qualified acoustical consultant.

1.1. Noise Monitoring

Noise monitoring for the Project will be required at the commencement of works and at regular intervals throughout the project to quantify the airborne and ground-borne noise levels associated with the construction activities for comparison against the noise management levels and to confirm that noise levels at the nearest receivers are consistent with the predictions in the CNISs.

All noise monitoring results will be assessed against the nominated noise criteria, compared to the conditions on the consent / licence, or the relevant noise management objectives and summarised in a report. Reporting would be submitted to the construction contractor and project manager within one week of being undertaken or at weekly intervals for continuous monitoring. Where monitoring has been conducted in response to complaints, these reports will be submitted within 3 days to TfNSW and should be suitable for public distribution.

1.2. Airborne Noise

1.2.1. Operator-Attended Monitoring

The objective of operator attended monitoring is to accurately quantify the airborne noise levels associated with the construction activities for comparison against the noise management levels and to confirm that noise levels at the nearest receivers are consistent with the predictions in the CNVSs.

Operator-attended noise measurements are to be undertaken at the commencement of any new construction activities or location.

The operator-attended noise measurements must be undertaken at a location representative of the potentially most exposed receivers, or alternatively at other specifically identified sensitive receivers (i.e. in complaint locations).

1.2.2. Continuous Noise Monitoring

Continuous noise monitors may be installed (as determined appropriate by the Project team in areas identified as high risk level or repeated complaints) and positioned at the closest sensitive receiver, where practicable (dependent upon the location of construction works).

These units will enable review of the noise levels at the nearest sensitive receivers and, if necessary, provide triggers to modify construction activities where noise levels are higher than predicted.

Consideration should be given to the implementation of real-time or near real-time remote monitoring systems. Such systems may be beneficial in identifying the source of the noise management level exceedance, identifying the occurrence of false-positive trigger events, and provide real-time feedback to the project team on the potential impact of works in relation to the management levels. Real-time remote monitoring systems may be acceptable for the monitoring of airborne noise, ground-borne noise, and vibration.

1.3. Methodology

Monitoring will be conducted in accordance with Australian Standard (AS) 1055:1997 Acoustics – Description and Measurement of Environmental Noise and the INP (DECC, 2000).

Operator-attended noise measurements are to be conducted during normal Project operations to quantify the noise emissions and potential impacts from the Project.

Timing

Operator-attended noise monitoring will be conducted for a minimum of 15 minutes at each location during the subject construction activities. Where a longer monitoring duration is required, measurements must be made in consecutive 15 minute periods.

Measurement

All acoustic instrumentation used in the monitoring programme will be designed to comply with the requirements of AS IEC 61672.1:2004 Electroacoustics – Sound level meters – Specifications and carry current National Association of Testing Authorities (NATA) or manufacturer calibration certificates.

The operator will quantify and characterise the maximum (L_{Amax}) noise level and the energy average ($L_{Aeq(15minute)}$) noise level from construction activities over a 15 minute measurement period.

In addition, the operator will quantify and characterise the ambient level of noise (i.e. L_{Amax}, L_{A1}, L_{A10} and L_{A90}) over the measurement period, where possible.

Instrument calibration will be checked before and after each measurement survey, with the variation in calibrated levels to not exceed ±0.5 dBA.

Assessment of Results

The assessment of the results will be undertaken in comparison to the predicted noise levels in the appropriate CNVIS. In the event of the measured nose levels being higher than predicted, an assessment will be conducted to determine:

- Timing, location and the equipment in use during the exceedance.
- Exclusion of non-Project related noise (e.g. can the exceedance be attributed entirely to the Project). This will include consideration of:
  - the methods and type of equipment being used by the project at the time of the exceedance and proximity to the locations at which the exceedance was recorded
  - the location of non-project related activities and proximity to the locations at which the exceedance was recorded.

If the above assessment determines that the noise levels are due to Project noise then noise mitigation measures detailed in Section 7 of the CNIS will be required to be considered.

Measurement Reporting

The following should be included in as a minimum in noise monitoring report:

- The type of monitoring conducted (for example, at a particular project stage or following complaints) and a brief statement of the measurement method.
- The noise/vibration/blasting conditions on the consent / licence, or the relevant noise management objectives.
- Descriptions of the nearest affected residences and other sensitive land uses or, in the case of complaints, description of the complainant location and complaint.
- Description of the instrumentation used (the instrumentation specifications required for compliance noise monitoring are the same as those required for background noise monitoring set out in Appendix B of the NSW Industrial Noise Policy (EPA 2000))
- The results of monitoring at each monitoring location, including a comparison with the consent conditions or relevant noise management objectives
- The location of the construction works in relation to the monitoring position. (sketch plan & sections, photos)
- Details of the various construction equipment in use during the measurement period.
- Indicative noise levels at the measurement location from the operation of the various plant items, together with the observed duration of individual items.
- Details as to the likely dominant noise sources.
- Meteorological conditions (i.e. temperature, humidity, cloud cover, and wind speed and direction)
- A clear statement outlining the project's compliance or non-compliance with the conditions or objectives where the monitored level is higher than the conditions or objectives,
- The reasons for non-compliance should be stated, strategies for minimising noise identified and stated, and the appropriate actions to implement the mitigation and or management strategies.

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2. Cosmetic Damage Vibration Monitoring

2.1. General

Where it is anticipated that an item of plant will exceed the cosmetic damage criteria, vibration monitoring is required at the nearest affected receiver. Where concerns have been raised regarding vibration, vibration monitoring would be required at the receiver(s) in question.

All vibration monitoring results will be assessed against the nominated vibration goals and compiled into a report to be forwarded to the construction contractor and project manager and TfNSW. Reporting would be submitted within one week of being undertaken or at weekly intervals for continuous monitoring. Where monitoring has been conducted in response to complaints, these reports will be submitted within 3 days to TfNSW and should be suitable for public distribution if deemed necessary by TfNSW.

2.2. Vibration Compliance

All monitoring results will be assessed against the nominated criteria, compared to the conditions on the consent / licence, or the relevant management objectives.

Table 17 Nominated Site Control Vibration Criteria (ie Operator Warning and Halt Levels) - To be Measured at the Base

Structure	Site Control Criteria (PPV in any Orthogonal Direction)	
	Operator Warning Level	Operator Halt Level
Reinforced of framed structures	20 mm/s	25 mm/s
Unreinforced or light framed structures	5 mm/s	7.5 mm/s
Heritage	1.5 mm/s	2.5 mm/s

Exceedance of the “Operator Warning Level” would not require excavation activity to cease, but rather alerts the Construction Manager to proceed with caution at reduced force or load.

An exceedance of the “Operator Halt Level” would require the Construction Manager to implement an alternative excavation technique pending further analysis of the vibration frequency content in order to determine any potential exceedance of the criteria presented in the CNVS or the site specific CNVIS.

Vibration monitoring equipment must be set so that as a minimumm visual and audible alarms are triggered when the levels of vibration exceed the control criteria presented in **Table 17**.

If the “Operator Warning Level” is reached, the contractor will immediately, either:

- Reduce the number of vibration-generating plant/equipment items; or
- Cease operation, pending further analysis of the potential for building damage. A suitably qualified specialist acceptable to the construction contractor must endorse the conclusions of such an investigation.

2.3. Other Vibration Sensitive Structures and Utilities

Where structures and utilities are encountered which may be considered to be particularly sensitive to vibration, a vibration goal which is more stringent than structural damage goals presented in Section 5.4 of the CNVS may need to be adopted. Examples of such structures and utilities include:

- Tunnels
- Gas pipelines
- Fibre optic cables
- Medical or vibration sensitive equipment.

Specific vibration goals would be determined on a case-by-case basis. An acoustic consultant would be engaged by the construction contractor and would liaise with the structure or utility's owner in order to determine acceptable vibration levels.

2.4. Vibration Monitor Specification

Construction vibration monitoring instrumentation used for the identification of structural and cosmetic damage will be employed that meets the following primary specifications presented in **Table 18**. The instrumentation must be installed, operated and maintained by suitably qualified or trained personnel. The instruments must be externally calibrated at regular intervals.

Table 18 vibration Monitor Specifications

Specification	Seismic
Resolution	0.016 mm/s
Range	0.1 mm/s to 254 mm/s
Accuracy	3% at 15 Hz
Sample Rate	Minimum 1024 samples per second per channel
Frequency Response	2 Hz to 250 Hz (3 dB points)
Communications Link	Keyboard and Modem
Recording Mode	Waveform Recording and archiving

It should be noted that equipment specifications detailed in **Table 18** may not be suitable for the measurement of all vibration impacts such as human comfort and or the measurement of vibration impacts to sensitive equipment. Prior to any measurement being conducted the contractor must ensure that the monitoring equipment being proposed is suitable for the type of measurement being conducted.

2.5. Vibration Monitoring

Structural vibration monitoring must be carried out as required during the construction period.

Transducer mounting plates would be installed at the base of the building or structure, at the location closest to the construction works. The monitoring locations would be on a stiff part of the building or structure (at the foundations) on the side of the structure adjacent to the subject construction works.

The vibration monitoring system must be configured to record the peak vibration levels and to trigger an audible/visual alarm when the predetermined vibration thresholds nominated in **Table 17** are exceeded. The thresholds correspond to an "Operator Warning Level" and an "Operator Halt Level", where the Warning Level is between 66% and 80% of the Halt Level.
The vibration threshold must be set to the respective "Operator Warning Level" (ppv) and the "Operator Halt Level" (ppv) depending on the type of building or structure, the exceedance of which will be indicated by the audible/visual alarm in the construction site.

Should the alarm signalling "Operator Halt Level" be activated then all nearby construction works must stop immediately. Construction personnel engaged on the site must have been briefed on the procedures including the location and nature of audio and visual alarms. The audio and visual alarms must be arranged to directly alert the equipment operations to any alarm event.

Exceedances of the "Operator Halt Level" are only permissible when the recommended vibration limits in the Standard are achieved (based on the frequency content of the vibration signal) and the vibration criteria are approved by a suitably qualified specialist.

An exceedance of the "Operator Warning Level" will not require the excavation activities to cease, but rather alert the Construction Manager to proceed with caution at a reduced force or load.

Attended vibration monitoring will, if considered necessary, be carried out by a suitably qualified specialist. Attended structural damage vibration monitoring must be carried out in response to structural damage criterion exceedances. This monitoring would provide direct feedback to the operators and appropriate modification of construction techniques.

Supplementary Vibration Monitoring

Supplementary structural damage vibration monitoring must also be carried out in response to exceedances of the criteria or for the purpose of refining construction techniques in order to minimise vibration emissions. Monitoring would be attended under these circumstances, in order to provide immediate feedback to the operators.

Reporting

If vibration monitoring has been conducted, reports must be submitted to the Project Manager at weekly intervals. These reports will cover the preceding weeks' activities and will include the following:

- The type of monitoring conducted (for example, at a particular project stage or following complaints) and a brief statement of the measurement method.
- The vibration/blasting conditions on the consent / licence, or the relevant management objectives.
- Descriptions of the nearest affected residences and other sensitive land uses or, in the case of complaints, description of the complainant location and complaint.
- Vibration monitoring results summary together with notes describing any vibration-intensive activities (if applicable).
- Summary of measurements exceeding the vibration criteria levels and descriptions of the plant or operations causing these exceedances (if available).
- Details of corrective action applicable to vibration criteria exceedances and confirmation of its successful implementation. Where corrective action has not yet been implemented, it may be shown as pending and the status of its implementation will be carried forward to following reports.

2.6. Ground-borne Noise and Vibration

Operator-attended and unattended noise and vibration monitoring will be conducted where the ground-borne noise and vibration levels are higher than predicted, or in response to complaints. People tend of hear vibration before they feel vibration; that means that if the ground-borne noise criteria are exceeded then the human comfort criteria for vibration could also be exceeded.

Where attended ground-borne noise monitoring is not possible, indirect unattended remote monitoring[4] of ground-borne noise from measured vibration velocity should be considered to obtain an indication of ground-borne noise impacts and assist in management of impacts.

[4] "Monitoring ground borne and structure borne noise for management of construction impacts" D.Anderson,D.Sburlati, Proceedings of ACOUSTICS 2016 , 9-11 November 2016, Brisbane, Australia.

---------- END OF DOCUMENT ----------

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Carolyn Riley
Director Environment Sustainability and Planning
Sydney Metro
Transport for NSW
PO Box K659
HAYMARKET NSW 1240

16 August 2023

Ref: CSMW CNVMPrev14

Dear Ben

RE: Endorsement of Sydney Metro City and Southwest – Central Station Main Works-Construction Noise and Vibration Management Plan (CNVMP Rev 14)

Thank you for providing the following document for Environmental Representative (ER) review and approval as required by the Condition of Approval A24 (j) of the Sydney Metro City & Southwest project (SSI – 15_7400 January 9 2017).

- Sydney Metro City and Southwest – Central Station Main Works -Construction Noise and Vibration Management Plan (Revision 14 dated June 2023)

The Plan was developed to address the Condition C3(a) of the Project Approval. Revision 14 of the Plan is the outcome of an LOR annual revision that included minor changes that were administrative in nature.

The revised CNVMP was endorsed by the Acoustic Advisor on 14 August 2023. As an approved ER for the Sydney Metro City & Southwest project, I have reviewed the document. I approve the revised Plan for implementation under Condition A24(j).

Yours sincerely

Michael Woolley
Environmental Representative – Sydney Metro – City and South West