

ENDORSEMENT

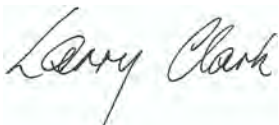
CITY & SOUTHWEST ACOUSTIC ADVISOR

Review of	Construction Noise and Vibration Impact Statement for Line-Wide works Portion 3 – Northern Connection	Document reference:	Construction Noise and Vibration Impact Statement Portion 3 – Northern Connection. Prepared by Renzo Tonin Associates for Systems Connect.
Prepared by:	Larry Clark, Alternate Acoustics Advisor		<i>TK685-03-02F01 CNVIS C2B_P3</i>
Date of issue:	9 March 2021		<i>Northern Connection (r8)</i> <i>Dated 24 February 2021</i>

As approved Alternate Acoustics Advisor for the Sydney Metro City & Southwest project, I have reviewed and provided comment on the Construction Noise and Vibration Impact Statement (CNVIS) for Line-Wide works Portion 3 – Northern Connection, as required under A27 (d) of the project approval conditions (SSI 15-7400).

I reviewed and commented on previous revisions of the CNVIS. Revision 8 has been updated since the last endorsed version of the CNVIS (r7) to address EPA Notice of Variation requirements.

I am satisfied that revision 8 of the CNVIS is technically valid, and includes appropriate noise and vibration mitigation and management. On this basis I endorse revision 8 of the CNVIS for Line-Wide works to be carried out in Portion 3 – Northern Connection.



Larry Clark, City & Southwest Alternate Acoustics Advisor

SYDNEY METRO CITY AND SOUTH WEST LINE WIDE WORKS

Construction Noise and Vibration Impact Statement Portion 3 - Northern Connection

24 February 2021

Systems Connect

TK685-03-02F01 CNVIS C2B_P3 Northern Connection (r8)

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Prepared for:	Systems Connect
Address:	Level 3, 116 Miller Street North Sydney NSW 2060
Attention:	Mathew Billings

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

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

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

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

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1 Introduction

This Construction Noise and Vibration Impact Statement (CNVIS) has been prepared on behalf of Systems Connect in accordance with the Construction Noise and Vibration Management Plan (CNVMP) [SMCSWLWC-SYC-1NL-PM-PLN-000032] [1], for the Design and Construction of the Line-Wide Works (LWW) of the Sydney Metro City & Southwest Project (the Project).

1.1 Relevant requirements and purpose of this CNVIS

As defined in the CNVMP, the works covered by this CNVIS are part of the Portion 3 - Chatswood to Sydenham Tunnels and Stations Works delivered under Critical State Significant Infrastructure Approval CSSI-7400. Condition E33 of CSSI-7400 requires that:

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 receivers.

This CNVIS applies to construction works to be undertaken at the Northern Connection worksite and supporting ancillary facilities and laydown areas along the rail corridor in Chatswood, Artarmon and St Leonards during standard construction hours as well as works outside of standard construction hours. The construction hours of work are defined by the Project Planning Approval conditions as outlined in the CNVMP.

In addition to the above, the Northern Connection works will be completed under the Sydney Trains Environment Protection Licence (EPL) number 12208. Licence Condition O5 sets the objectives for minimising noise impacts from rail maintenance and construction activities.

This CNVIS forms part of the CNVMP for the Project.

1.2 Structure of this CNVIS

This CNVIS is structured as follows:

- **Section 2** - Description of construction works and hours
- **Section 3** - Nearest sensitive receivers
- **Section 4** - Construction noise and vibration objectives
- **Section 5** - Construction noise assessment
- **Section 6** - Construction vibration impacts
- **Section 7** - Ground-borne noise assessment
- **Section 8** – Traffic noise assessment

- **Section 9 – Cumulative impacts.**

1.3 Quality assurance

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

2 Description of construction works and hours

2.1 Summary of works addressed in this CNVIS

2.1.1 Construction activities

This CNVIS provides an assessment of noise and vibration impacts from activities associated with the Northern Connection works between Sydney Metro City and Southwest and Sydney Metro North West. The works are located in the rail corridor between Chapman Avenue and Brand Street. Figure 2.1 (following) shows the Northern Connection, with the construction work areas and stages highlighted. Ancillary facilities and laydown areas at Chatswood, Artarmon and St Leonards will be used to support the Northern Connection works, in particular the rail possessions. The ancillary sites are shown in Figure 2.2, Figure 2.3 and Figure 2.4.

The Northern Connection construction activities will include:

- **Site establishment** – installation of environmental controls, construction of crane pads and access tracks.
- **Sydney Trains Works – Permanent Down**
 - Piling works for an intertrack retaining wall
 - Earthworks and combined services route (CSR), stormwater drainage excavation
 - Track construction including tamping, grinding and turnouts
 - OHW foundations, structures and wiring
 - Installation of signalling infrastructure and wiring
 - Removal of redundant track & infrastructure
 - Wall demolition
- **Sydney Metro Connection – Open Dive**
 - Piling works for the open dive retaining walls
 - Form-Reo-Pour (FRP) construction capping beam and transition slab
 - Earthworks and bulk excavation, stormwater drainage excavation
 - Track construction including tamping, grinding and turnouts
 - OHW foundations, structures and wiring
- **Ancillary Facilities and Laydown Areas to support Trackworks**
 - Site establishment prior to possessions/ site demobilisation post possessions
 - Spoil/ quarry materials stockpiling, materials laydown and site storage
 - Works train loading (St Leonards only)

- Drainage works (Brand Street/ MPR33 only).

The proposed works, likely plant and equipment and estimated Project timing is summarised in APPENDIX C. Works are planned to occur during standard construction hours, however due to the proximity of the works area to the operational rail corridor, some works will need to occur under rail possession. There are eleven rail possession periods planned to occur over the construction period, as outlined in APPENDIX C. The work areas are noted in APPENDIX C as 'red area' and 'blue area'. These areas are also depicted on Figure 2.1 following.

Figure 2.1 Northern Connection construction work areas



Figure 2.2 Northern Connection Ancillary Facilities (Drake Street, Brand Street and Valetta Lane)

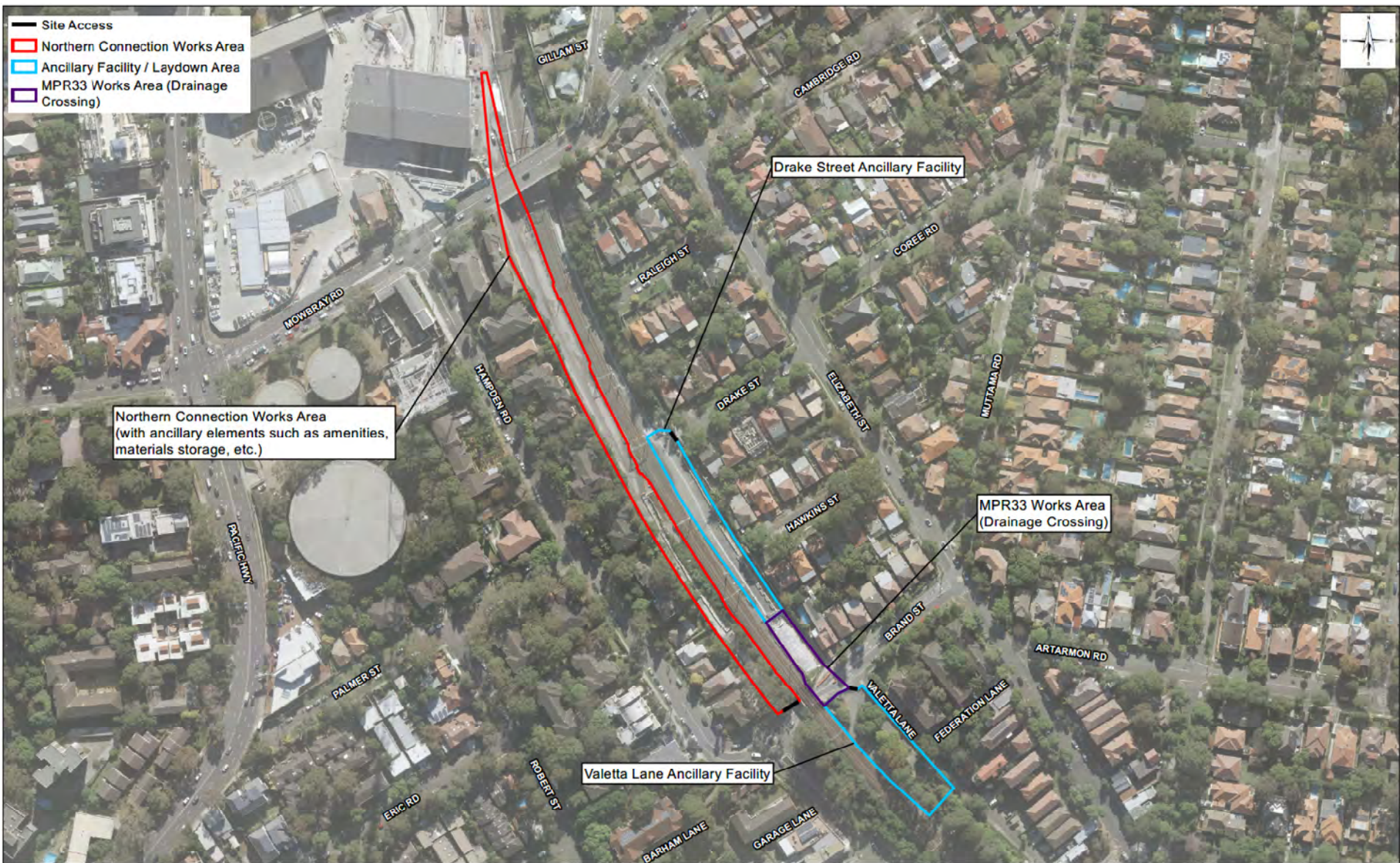


Figure 2.3 Northern Connection Ancillary Facilities (Cleland Road, Francis Street and Lambs Road)



Figure 2.4 Northern Connection Ancillary Facilities (Chandos Street St Leonards)



2.1.2 Construction traffic

The Northern Connection construction works will generate additional traffic movements in the form of:

- Light vehicle movements generated by construction personnel travelling to and from work
- Heavy vehicle movements generated by delivery vehicles bringing materials, plant and equipment to the worksite

Construction traffic on-site (i.e. within the Project footprint) is included as part of the construction noise assessment of the works activities identified in Sections 5 and APPENDIX C. When construction related traffic moves onto the public road network, a different noise assessment methodology is appropriate as vehicle movements would be regarded as 'additional road traffic' rather than as part of the construction site's activities. Construction traffic noise is addressed in Section 7.

2.1.3 Cumulative construction impacts

CSSI 7400 Condition of Approval E39 requires Systems Connect to consult with proponents of other construction works in the vicinity of the worksite and take reasonable steps to coordinate works to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers. Further to this, Condition E40 requires works to be coordinated to provide the required respite periods identified in accordance with the terms of the CSSI 7400 approval.

All concurrent Sydney Metro construction site works have been considered and addressed in Section 9 of this CNVIS. Potentially non-Sydney Metro concurrent construction activities within the vicinity of the Northern Connection worksite have also been considered, as discussed in Section 9.

2.2 Construction hours

The construction hours for the Project are defined by Project Planning Approval (PPA) Conditions E36, E37, E38, E41, E42, E44 and E48 and EPL Condition O5.1.

2.2.1 Standard construction hours

The standard construction hours of work are defined by the CSSI-7400 Condition E36. The EPL 12208 standard construction hours (Condition O5.1) are consistent with CSSI-7400 Condition E36. The standard construction hours for the Project are summarised in the table below.

Table 2.1: Standard construction hours

Construction Activity	Monday to Friday	Saturday	Sunday/ Public holiday
Above ground activities: construction sites and construction traffic	7:00 am to 6:00 pm	8:00 am to 1:00 pm	No work

2.2.2 Out of hours work periods

CSSI-7400 Condition E44 and E48 and EPL 12208 Condition 05.1 allow standard construction hours to be varied under specific conditions (where justified), including rail possessions. The Transport for NSW (TfNSW) Construction Noise and Vibration Strategy (CNVS) [9] provides a hierarchy of OOH work periods. The impact of OOH works may be reduced by scheduling work and activities with greater impact during the preferred periods when receivers are likely to be less sensitive to noise and vibration, such as in the day out of hours (OOHD) and evening out of hours (OOHE) periods. Table 2.2 presents the construction work periods as Standard Hours, OOHW Period 1 and OOHW Period 2.

Table 2.2: Construction hours

Day	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm	9pm	10pm	11pm
Monday																								
Tuesday																								
Wednesday																								
Thursday																								
Friday																								
Saturday																								
Sunday or Public Holiday																								

1. Standard construction hours are defined in CSSI-7400 Condition E36 as: Monday to Friday 7:00am to 6:00pm and Saturdays from 8:00am to 1:00pm.
2. Work outside of standard construction hours is defined as Out-of-Hours Work (OOHW) and has been divided by the CNVS into 2 periods of sensitivity. **OOHW Period 1** is the least sensitive OOH period and is defined as Monday to Friday 6:00pm to 10:00pm (evenings), Saturday 7:00am to 8:00am and 1:00pm to 10:00pm (day & evening) and Sunday and public holidays 8:00am to 6:00pm (days). **OOHW Period 2** is the most sensitive OOH period and is defined as Monday to Saturday 10:00pm to 7:00am (nights) and Sundays and public holidays 6:00pm to 8:00am (nights).

2.2.3 High noise generating works

High noise impact generating works are limited by EPL Condition O5.4 to:

- Between the hours of 8:00am to 10:00pm Monday to Friday
- Between the hours of 8:00am to 6:00pm Saturdays and Sundays, and
- where the high noise impact generating works are likely to impact the same noise sensitive receivers, in blocks of no more than three hours, with at least a one hour respite between each block of work, except as expressly permitted by the EPL.

In this regard, the eleven rail possession works have been carefully planned to accommodate this EPL Condition. However, Possession 4 and Possession 10 (see APPENDIX C for details) will require high noise impact generating activities outside the above limited hours.

This CNVIS supports the EPL variation request to accommodate these works.

2.2.4 Justification for OOHW

Construction works at the Northern Connection worksite will be undertaken where reasonable and feasible during standard construction hours, as described above. However, some works will need to be undertaken outside of standard construction hours due to safety or quality control considerations, or to comply with regulatory requirements.

EPL Condition O5.1 allows construction activities to undertaken outside of the hours where works during standard hours would adversely affect Sydney Trains' ability to provide safe and reliable rail services or a safe working environment.

There are twelve planned weekend rail possessions during the construction period to allow works to be undertaken inside the working rail corridor. In addition, several mid-week possessions would be required in the same works areas with less intensive works are also scheduled. The existing rail traffic would impose major risks to rail users and construction workers due to the extremely close proximity between all parties involved. Conducting works during rail shutdown possessions would minimise the risks of rail traffic and work site interaction. Works would need to be conducted 24 hours per day during the weekend rail possession period to allow the planned works to be completed within the shutdown period.

Oversize deliveries may need to take place outside of standard construction hours in order to comply with RMS requirements for oversize vehicle movements.

Any work outside standard construction hours must be undertaken in accordance with the Out of Hours Works Procedure and the CNVMP [1].

2.2.5 COVID-19 extended construction hours

The Environmental Planning and Assessment (COVID-19 Development – Construction Work Days) Order 2020 commenced on 9 April 2020 and will continue until 25 March 2021. The order permits standard construction hours on this project to be extended as follows:

- Saturday from 1pm to 6pm (no high noise work permitted)
- Sundays from 8am to 6pm (no high noise work permitted)
- Public holidays from 8am to 6pm (no high noise work permitted).

High noise work means activities such as rock breaking, rock hammering, sheet piling, pile driving or similar noisy activities, unless an existing consent or approval already allows these works to occur on any of the extended days.

Activities would be carried out during the COVID-19 extended construction hours, where they meet above requirements. Appropriate noise management levels for the extended hours period (i.e. Sundays/ Public Holidays 8am to 6pm) are as outlined for the Day (D/ D(O)) period in Section 4.1.1.

3 Nearest sensitive receivers

3.1 Residential receivers

To assess and manage construction noise and vibration impacts, the residential areas surrounding the Northern Connection worksite have been divided into Noise Catchment Areas (NCAs) based on each area's similar acoustic environment prior to the start of construction work. The NCAs are based on those established in the EIS for the Project, with some modifications to allow for site specific characteristics.

All relevant residential sensitive receivers and NCAs near the worksite are identified on an aerial photograph located in APPENDIX B.

3.2 Other sensitive receivers (PPA Condition E34)

Additional to residential receivers above, 'other' noise and vibration sensitive receivers such as passive recreation areas and places of worship surrounding the construction area have been identified and are summarised and identified on an aerial photograph located in APPENDIX B.

CSSI-7400 Condition E34 states:

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.

Sydney Metro and Systems Connect have undertaken consultation with identified sensitive receivers to determine sensitive periods. This has been taken into consideration in finalising respite strategies for high noise impacts.

3.3 Commercial and industrial premises

All commercial and industrial premises near the worksite have been considered in this assessment.

3.4 Heritage receivers

Heritage receivers have been identified in the Land Use Survey in Annexure B of the CNVMP. There are five heritage-listed buildings close to the work areas, noted in Table 3.1.

Table 3.1: Assessment heritage receivers

Name	Address/Location	Significance
Mowbray House	357 Mowbray Rd	Local
Chatswood Zone Substation No 80	348 Mowbray Rd	Local
Chatswood Reservoirs	366 Mowbray Rd	Local
Great Northern Hotel	367 Mowbray Rd	Local
Chatswood South Uniting Church and Cemetery	372-374 Mowbray Rd	Local

4 Construction noise and vibration objectives

4.1 Noise goals

4.1.1 Noise management levels (NMLs)

Construction noise management levels (NMLs) have been determined using the Construction Environmental Management Framework (CEMF)[10], CSSI-7400 Conditions, in accordance with the Sydney Metro City & Southwest Construction Noise and Vibration Strategy (SMCSNVS) [8] and as set out in the CNVMP.

For the C2S Northern Connection worksite, external NMLs are derived from the Interim Construction Noise Guideline (ICNG)[3], as identified in Section 5.1.1 of the CNVMP[1] and summarised in Table 4.1 below. Internal NMLs are also applicable at residential receiver locations during the 8 pm to 7 am period per CSSI-7400 Conditions E41 and E42, as summarised in Table 4.1 below.

Table 4.1: Application of NMLs at C2S Northern Connection (CSSI 7400 Conditions of Approval)

Time Period	Area	Receiver Type	Condition	Noise management level ³
ICNG				
Day ¹	All	All	CNVS ³ Section 5.3	ICNG (see Table B1 in APPENDIX B)
Day ¹ OOHW Period 1	All	All	CNVS ³ Section 5.3	ICNG (see Table B1 in APPENDIX B)
Evening ¹ OOHW Period 1	All	All	CNVS ³ Section 5.3	ICNG (see Table B1 in APPENDIX B)
Night ¹ OOHW Period 2	All	All	CNVS ³ Section 5.3	ICNG (see Table B1 in APPENDIX B)
ICSSI-7400				
Evening ¹ 8pm to 9pm (E2)	Non-residential zones ²	Residential	SSI-7400 E41	L _{Aeq(15minute)} 60 dB(A) (internal)
Evening ¹ 9pm to 10pm				L _{Aeq(15minute)} 45 dB(A) (internal)
Night ¹ 10pm to 7am (N)				
Evening ¹ 8pm to 10pm (E2)	Residential zones ²	Residential	SSI-7400 E42	L _{Aeq(15minute)} 45 dB(A) (internal)
Night ¹ 10pm to 7am (N)				
All	All	All	SSI-7400 E43	L _{Aeq(8hour)} 85 dB(A) (external) near the CCSI

1. Day refers to 7am to 6pm Monday to Friday and 8am to 6pm Saturday, Sunday and Public Holidays; Evening refers to Monday to Sunday 6:00pm to 10:00pm; Night refers to Monday to Friday 10:00pm to 7:00am and Saturdays, Sundays and public holidays 10:00pm to 8:00am.
2. These are identified by the applicable Local Environmental Plan land zoning of the receiver.
3. Sydney Metro City & South West Construction Noise and Vibration Strategy (Sydney Metro 2016)
4. A 5 dB penalty shall be applied if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned

ICNG NMLs

For residential receivers, the ICNG NMLs are based on the background noise levels derived from long-term noise logging conducted by SLR on behalf of Transport for NSW (TfNSW) to quantify ambient noise levels for the Environmental Impact Statement (EIS) [2]. Additional pre-construction noise monitoring was carried out prior to the Tunnels and Stations Excavation (TSE) works to establish more

accurate noise goals. This additional long-term, unattended noise monitoring was carried out in July 2017 by RT&A following a review of the EIS noise monitoring and has been incorporated into the CNVMP.

The NMLs for 'other' sensitive receivers are from the ICNG, as reported in Section 5.2.3 of the CNVMP. These are applicable when the other sensitive receiver is in use.

Receivers are considered 'noise affected' where construction noise levels are greater than the NMLs identified in APPENDIX B. The noise affected level represents the point above which there may be some community reaction to noise. Where predicted and/or measured construction noise levels are above the NMLs, all feasible and reasonable work practices will be applied to meet the NMLs.

Where construction activities are tonal or impulsive in nature and are described in the ICNG as being particularly annoying, 5 dB(A) must be added to the activity noise. Activities that are defined in the Interim Construction Noise Guideline (ICNG) [3] as particularly annoying include but are not limited to the use of 'beeper' style reversing or movement alarms; power saws; vibratory rolling; jack hammering, rock hammering or rock breaking; impact piling.

During standard construction hours, a highly affected noise objective of $L_{Aeq(15min)}$ 75 dB(A) applies in relation to airborne noise at all residential receivers.

Internal NMLs (CSSI-7400 Conditions E41 and E42)

CSSI-7400 Conditions E41 and E42 require that residential receivers within non-residential zones or residential zones (respectively) are not above the internal noise levels identified in Table 4.1. In accordance with CSSI-7400 Conditions E41 and E42, if construction works are particularly annoying (as described in *ICNG NMLs* above) or include ground-borne noise or a perceptible level of vibration at the affected receiver, a 5 dB(A) penalty should be added to the predicted construction noise level.

Where the above internal noise levels cannot be achieved, additional mitigation in accordance with the *Sydney Metro City and South West Noise and Vibration Strategy (SMCSNVS)* [8] is to be offered.

Addendum A of the SMCSNVS notes that the applicable Local Environmental Plan land zoning of the receiver be used to identify if residential receivers are located within residential or non-residential zones. An extract from the Willoughby Local Environmental Plan (2012) land zoning map (accessed 26/11/2017) is provided in Figure 4.1. Red and pink areas (R2, R3 and R4) indicate residential zones.

The zoning map indicates that the nearest residential receivers along the rail corridor are in residential areas. The nearest residential receivers on Pacific Highway and north of Albert Avenue are in non-residential areas (B3, B4 and B5 zone in Figure 4.1).

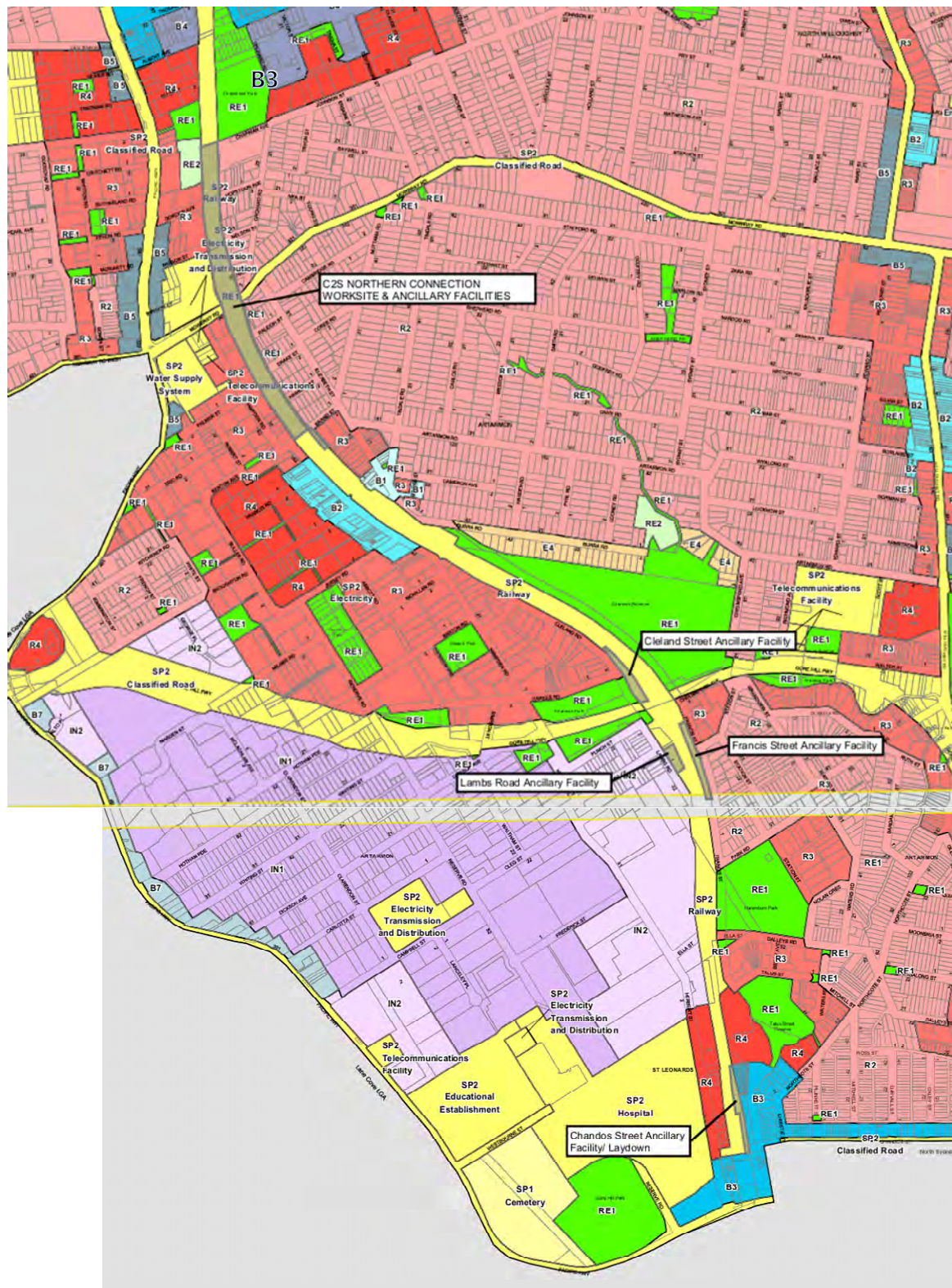
For this assessment, all residential receivers are conservatively assumed to be in residential zones, with a corresponding internal noise threshold level of $L_{Aeq(15minute)}$ 45 dB(A) between 8pm and 7am. Based on a minimum (conservative) external to internal noise difference of 10 dB(A) (assuming windows open), an equivalent external noise threshold of $L_{Aeq(15minute)}$ 55 dB(A) is applicable between 8pm and 7am for all receivers except for those that are receiving at-property treatments from TfNSW due to the operation of

the rail corridor. In this case, a conservative external noise threshold of $L_{Aeq(15\text{minute})}$ 65 dB(A) is considered. Where these external equivalent levels are above the external noise threshold, additional mitigation may be required in accordance with the SMCSNVS.

For some residential receivers on Pacific Highway and Albert Avenue, it is likely that the design of the buildings included upgraded window glazing and air conditioning systems to reduce the potential impact of road traffic noise and rail noise. At these locations, the assumed external to internal noise reduction are presented in APPENDIX D Table D1.

The assessment presented in Section 5.3 has assessed all receivers against the approach outlined in the SMCSNVS [8] and the CNVMP [1] which achieves the requirements of PPA Conditions E41 and E42, and is consistent with the ICNG [3] and the EIS [2].

Figure 4.1: Extract from the Willoughby Local Environmental Plan (2012) land zoning map



4.1.2 Sleep disturbance

Consistent with Section 5.1.3 of the CNVMP [1], an initial screening level of $L_{Amax} \leq L_{A90(15min)} + 15 \text{ dB(A)}$ is used. In situations where this results in an external screening level of less than 55 dB(A), a minimum screening level of 55 dB(A) is set. Note that this is equivalent to a maximum internal noise level of 45 dB(A) with windows open.

Where noise events are found to be above the screening level, further analysis is made to identify:

- the likely number of events above 45 dB(A) (internal) that might occur during the night assessment period
- whether events are above an 'awakening reaction' level of 55 dB(A) L_{Amax} (internal) that equates to NML of L_{Amax} 65 dB(A) (assuming open windows).

The ICNG recommends that where construction works are planned to extend over more than two consecutive nights, maximum noise levels and the extent and frequency of maximum noise level events above the RBL should be considered.

During construction works at night, attended noise monitoring will be undertaken at representative residences most impacted by the works during night-time periods (see Section 5). The noise monitoring will follow the procedures outlined in APPENDIX E of the CNVMP [1], which includes measurement of L_{Amax} noise metrics. If maximum noise levels are found to be above the sleep NML of 45 dB(A), the responsible noise source(s) will be identified and further analysis undertaken to quantify the extent and frequency of events above the NML. Additional feasible and reasonable mitigation measures may need to be considered to reduce potential impacts.

4.1.3 Construction related road traffic noise objectives

On the roads immediately adjacent to construction sites, the community may associate heavy vehicle movements with the Northern Connection worksite expansion works. Construction traffic movements on public roads will aim to limit any increase in existing road traffic noise levels to no more than 2 dB(A). All feasible and reasonable noise mitigation and management measures will be implemented.

4.2 Construction vibration goals

As reported in Section 5.4 and 5.5 of the CNVMP [1], construction vibration goals have been determined using:

- for human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (Department of Environment and Conservation, 2006) [4]
- for structural damage, the vibration limits set out in;
 - British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from ground-borne vibration [5] and

- German Standard DIN 4150-3: Structural Vibration - effects of vibration on structures [6].

4.2.1 Disturbance to building occupants (human annoyance)

For disturbance to human occupants of buildings, we refer to 'Assessing Vibration; a technical guideline' [4]. This document provides criteria which are based on the British Standard BS 6472-1992, 'Evaluation of human exposure to vibration in buildings (1-80Hz)' [7].

Intermittent vibration is assessed using vibration dose values (VDVs). For the assessment of potential vibration at the nearest vibration sensitive receivers preferred and maximum VDV goals for the day period (7:00am to 10:00pm) are presented in Table 4.2.

Table 4.2: Construction vibration disturbance goals

Location	Assessment period ¹	Vibration Dose Value (VDV), m/s ^{1.75}	
		Preferred values	Maximum values
Critical areas ²	Day or Night	0.10	0.20
Residences	Day	0.20	0.40
	Night	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or Night	0.40	0.80
Workshops	Day or Night	0.80	1.60

Notes: 1. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am

2. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source: BS 6472-1992

4.2.2 Structural damage to buildings

A conservative vibration damage screening level per receiver type is given below:

- Reinforced or framed structures (Line 1): 25.0 mm/s
- Unreinforced or light framed structures (Line 2): 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.

It is noted that vibration levels required to cause minor cosmetic damage are typically 10 x higher than levels that will cause disturbance to building occupants. Many building occupants assume that building damage is occurring when they feel vibration or observe rattling of loose objects, however the level of vibration at which people perceive vibration or at which loose objects may rattle is far lower than vibration levels that can cause damage to structures.

4.2.3 Heritage

Section 4.2.3 of the CNVMP [1] outlines the approach to manage potential vibration impacts on heritage items, where identified. The actions to be taken shall be to:

- 1) Identify heritage items where the 2.5 mm/s peak component particle velocity objective may be exceeded during specific construction activities
- 2) Structural engineering report to be undertaken on identified heritage items, to confirm structural integrity of the building and confirm if item is 'structurally sound'
- 3) If item confirmed as 'structurally sound', the screening criteria in Section 4.2.2 shall be adopted, or
- 4) If item confirmed as 'structurally unsound', the more conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity would be adopted.

4.2.4 Sensitive scientific and medical equipment

No sensitive scientific or medical equipment are known to be located near the assessed works. If they are identified, relevant vibration criteria should be established for each item in line with Section 5.5.3 of the CNVMP [1], and any corresponding management or mitigation measures determined.

4.2.5 Utilities and other vibration sensitive structures

Where utilities or other vibration sensitive structures are identified, relevant vibration criteria will be established for each item per Section 5.5.4 of the CNVMP [1], and any corresponding management or mitigation measures determined.

5 Construction noise assessment

5.1 Noise prediction methodology

Modelling and assessment of airborne noise impacts from activities associated with the construction works were determined by modelling the noise sources, receiver locations, topographical features, and possible noise mitigation measures using a Cadna-A computer noise model developed for this project. The model calculates the contribution of each noise source at identified sensitive receiver locations and allows for the prediction of the total noise from a site for the various stages of the construction works.

The noise prediction models take into account:

- Location of noise sources and sensitive receiver locations;
- Height of sources and receivers referenced to one metre digital ground contours for the site area and surrounding area;
- Sound Power Levels (L_w) of plant and equipment likely to be used during the various construction activities (see Table C1 in APPENDIX C). Table C1 also identifies the plant and equipment that will operate during each assessment period;
- Separation distances between sources and receivers;
- Ground type between sources and receivers;
- Attenuation from barriers (natural and purpose built).

Key details regarding the construction site layout, the likely plant and equipment (including truck movements), and hours of operation were informed by the Design and Construction Teams. This information is presented in APPENDIX C and formed the basis for all modelling assumptions used in this assessment. A plan of the likely timing of each activity is presented in Table C.2, based on information of timing of activities provided by the Design and Construction Teams. Table C.2 assists in setting the assumptions for concurrent activities to be carried out as the Project progresses. This ensures that cumulative noise impacts from the site are assessed and managed.

5.2 Construction activities

Table 5.1 presents a summary of the construction activities that are proposed to take place. Given the short duration of possession works, the results are based upon a typical worst case result. However, as the general works will occur for the full duration of the construction program, the works have been subdivided in the following two categories:

- High impact activities, which will include rail regulating and tamping, jack hammering, grinding, line drilling, pile driving, rock hammering, rock breaking, saw cutting, sheet piling, vibratory rolling;
- Typical activities, which will exclude the above high impact activities.

Table 5.1: Summary of construction activities

Activity (details in APPENDIX C Table C1)	Indicative timing/ Duration ¹	Work area		Assessment
		Permanent down (red)	Open dive (blue)	Reference ID
Northern Connection works				
General high activity	Feb 2020 to Nov 2022	X	X	GH
General typical activity	Feb 2020 to Nov 2022	X	X	GT
Possession 1 (Possession 0)	02 & 03 May 2020 (7 & 8 Mar 2020)	X	X	P1
Possession 2	18 & 19 July 2020	X	X	P2
Possession 3	24 & 25 Oct 2020	X	X	P3
Possession 4	20 & 21 Mar 2021	X	X	P4
Possession 5	5 & 6 June 2021	X	X	P5
Possession 6	14 & 15 Aug 2021	X	X	P6
Possession 7	6 & 7 November	X	X	P7
Possession 8	26 & 27 Mar 2022	-	X	P8
Possession 9	7 & 8 May 2022	-	X	P9
Possession 10	27 & 28 August 2022	-	X	P10
Possession 11	6 & 7 Nov 2022	-	X	P11
Ancillary Facilities ²				
Hopetoun Ave	Aug 2020-May 2022	-	-	AF_01
Drake Street	Aug 2020-May 2022	-	-	AF_02
Brand Street_Typical	Aug 2020-May 2022	-	-	AF_03
Brand Street_High	Aug 2020-May 2022	-	-	AF_03H
Valetta Lane	Aug 2020-May 2022	-	-	AF_04
Cleland Road	Aug 2020-May 2022	-	-	AF_05
Francis Street	Aug 2020-May 2022	-	-	AF_06
Lamb Street	Aug 2020-May 2022	-	-	AF_07
Chandos Street Laydown	Aug 2020-May 2022	-	-	AF_08

Notes: 1. Dates are indicative and subject to change at times.

2. Ancillary facilities are also in use across each possession

Additional mid-week possession dates may also be made available by Sydney Trains. These works will be similar to activities described in this CNVIS, and also within the defined works areas.

5.3 Predicted noise levels

Noise levels were determined by modelling the noise sources during each stage identified in Table 5.1, receiver locations, and operating activities. Details of the plant and adopted sound power levels are presented in APPENDIX C.

Predicted L_{Aeq} noise levels from the worksite are assessed against the NMLs and summarised in the following sections, with colour coding to denote the highest level of exceedance of the NML. Detailed results for each receiver are given in APPENDIX D.

The noise predictions presented in this CNVIS represent a realistic worst-case scenario when construction occurs at work locations close to residences and other sensitive receivers. At each receiver, noise levels will vary during the construction period based on the position of equipment within the worksite, the distance to the receiver, the construction activities being undertaken and the noise levels of particular plant items and equipment. Actual noise levels will often be less than the predicted levels presented in this CNVIS.

5.3.1 ICNG NMLs

5.3.1.1 Standard construction hours

Table 5.2 presents the predicted worst-case construction noise levels for each of the construction stages identified in Table 5.1 at the most affected residential receiver in each NCA. The results are presented in terms of level above the NML.

For **Standard Hours** construction noise impacts are presented as follows:

- Below NML
- < 10dB(A) above NML - construction noise clearly audible
- ◆ > 10dB(A) above NML - construction noise moderately intrusive
- > 75dB(A) - highly noise affected (for residential receivers)

Table 5.2: Summary of construction noise impacts at nearby receivers – standard hours

NCA	Level of compliance with NML for construction assessment scenario (see Table 5.1)																					
	Northern Connection worksite													Ancillary Facilities								
	GH	GT	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08
AS_01	🟡	🟢	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟡	🟢	🔴	🟢	🟢	🟢
AS_03	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🔴	🟡	🔴
AS_04	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_01	🟡	🟢	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_02	🟡	🟢	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_03	🟡	🔴	🟡	🟡	🟡	🟡	🟡	🟡	🔴	🔴	🔴	🔴	🟡	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_04	🟡	🔴	🔴	🔴	🔴	🟡	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🟡	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_05	🟡	🔴	🔴	🔴	🔴	🟡	🔴	🔴	🔴	🔴	🔴	🔴	🟡	🟢	🟡	🟡	🟡	🟡	🟢	🟢	🟢	🟢
CDS_06	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🔴	🟢	🔴	🟡	🔴	🟡	🟢	🟢	🟢	🟢
CDS_07	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	-	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_08	🟡	🟢	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_09	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_10	🟡	🟢	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CN_02	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟡
OSR	🔴	🟡	🟡	🟡	🟡	🔴	🟡	🟡	🟡	🟡	🟡	🟡	🟢	🟢	🟢	🟢	🟡	🟢	🟢	🟡	🔴	🔴

For the general works for the project, receivers adjacent to the rail corridor are predicted to experience noise levels above day-time NMLs for both the typical operations and high operations. There are highly noise affected receivers in NCAs CDS_03, CDS_04, CDS_05 and CDS_06 during the high activity works, and receivers in CDS_06 for the typical activity works. These works would be limited to standard daytime hours and where high noise impact activity occurs respite will be provided in accordance with Section 2.2.3

During the possession works, receivers adjacent to the rail corridor are predicted to experience noise levels above day-time NMLs for all possession periods. There are highly noise affected receivers predicted in NCAs CDS_03, CDS_04, CDS_05 and CDS_06. Impacts vary depending on the plant and equipment being utilised for the possession, with the greatest impacts being when sawing activities are taking place. Other dominate sources of noise during the possession periods would be from rollers, graders, rail grinders, concrete trucks and other similar types of large plant working within the rail corridor.

Receivers adjacent to the ancillary facilities are predicted to experience noise levels above day-time NMLs when the facilities are in use. There are highly noise affected receivers predicted in NCAs AS_03, CDS_04 and CDS_05.

All reasonable and feasible noise mitigation measures have been considered in this assessment. Mitigation measures that would be adopted, where practicable, are identified in Section 5.4.

5.3.1.2 OOHW period 1

As part of the C2S Northern Connection construction works, there are eleven planned possession periods, as noted in Table 5.1, between June 2020 and November 2022. The ancillary facilities may be required to assist with materials handling and laydown during possessions.

Predicted construction noise level were compared with the project NML to give an indication of the likely noise impact at receiver locations from the construction stages identified in Table 5.1. The impacts presented in Table 5.3 are as follows:

- Below NML
- < 5dB(A) above NML - construction noise noticeable
- ◆ 5 to 15dB(A) above NML - construction noise clearly audible
- > 15 to 25dB(A) above NML - construction noise moderately intrusive
- >25dB(A) above NML - construction noise highly intrusive

Table 5.3: Summary of construction noise impacts at nearby receivers – OOHW period 1 (ICNG)

NCA	Level of compliance with NML for construction assessment scenario (see Table 5.1)																						
	Northern Connection worksite													Ancillary Facilities									
	GH	GT	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	
	OOHW period 1 D(O)													OOHW period 1 D(O)									
AS_01	-	-	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	◆	●	■	●	●	●
AS_03	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	■	◆	■
AS_04	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	●
CDS_01	-	-	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_02	-	-	●	●	●	◆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_03	-	-	■	■	■	□	■	■	■	■	■	■	■	■	◆	●	●	●	●	●	●	●	●
CDS_04	-	-	□	□	□	□	□	□	□	□	□	□	□	■	□	●	●	○	●	●	●	●	●
CDS_05	-	-	□	□	□	□	■	■	■	■	■	■	■	◆	●	□	□	□	□	○	●	●	●
CDS_06	-	-	□	□	□	□	□	□	□	□	□	□	■	●	■	◆	■	◆	●	●	-	●	●
CDS_07	-	-	●	●	●	●	●	●	●	●	-	●	●	●	●	●	●	●	●	●	●	●	●
CDS_08	-	-	●	●	●	◆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_09	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_10	-	-	○	○	○	◆	○	○	○	○	○	○	○	●	●	●	●	●	●	●	●	●	●
CN_01	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CN_02	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	◆
OSR	-	-	◆	◆	◆	◆	○	○	○	○	◆	○	●	●	●	●	○	●	●	○	■	◆	◆

- Notes:
- 1) D(O): day out-of-hour (1pm to 6pm Saturday and 8am to 6pm Sundays and public holidays)
 - 2) E1: early evening period from 6pm to 8pm. E2: late evening period from 8pm to 10pm.
 - 3) Assessment against ICNG NMLs for this period is used to guide additional mitigation measures (Section 5.4.3). PPA Conditions E41/42 are applicable for this assessment period (see Section 5.3.2)
 - 4) OSR: this includes all commercial, industrial and other sensitive receivers.

NCA	Level of compliance with NML for construction assessment scenario (see Table 5.1)																						
	Northern Connection worksite													Ancillary Facilities									
	GH	GT	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	
	OOHW period 1 E1/E2													OOHW period 1 E1/E2									
AS_01	-	-	○	○	○	◆	●	●	●	●	○	○	●	●	○	○	◆	○	■	○	○	●	●
AS_03	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	■	◆	□	■
AS_04	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●	●
CDS_01	-	-	●	●	●	◆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_02	-	-	●	●	●	◆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_03	-	-	■	■	■	□	■	■	■	■	■	■	■	◆	●	●	●	●	●	●	●	●	●
CDS_04	-	-	■	■	■	□	■	■	■	■	□	□	■	□	●	●	●	○	●	●	●	●	●
CDS_05	-	-	□	□	□	□	■	■	■	◆	■	■	◆	●	□	□	□	□	○	●	●	●	●
CDS_06	-	-	□	□	□	□	□	□	□	■	□	□	■	●	■	■	■	◆	●	●	●	●	●
CDS_07	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_08	-	-	●	●	●	◆	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_09	-	-	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CDS_10	-	-	○	○	○	◆	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●
CN_01	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CN_02	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	■	◆	◆
OSR	-	-	○	○	○	◆	●	●	●	●	○	○	●	●	●	●	○	●	●	○	■	■	◆

- Notes:
- 1) D(O): day out-of-hour (1pm to 6pm Saturday and 8am to 6pm Sundays and public holidays)
 - 2) E1: early evening period from 6pm to 8pm. E2: late evening period from 8pm to 10pm.
 - 3) Assessment against ICNG NMLs for this period is used to guide additional mitigation measures (Section 5.4.3). PPA Conditions E41/42 are applicable for this assessment period (see Section 5.3.2)
 - 4) OSR: this includes all commercial, industrial and other sensitive receivers.

5.3.1.3 OOHW period 2

Predicted construction noise levels were compared with the ICNG NMLs during the night time period to determine applicable additional mitigation measures (Section 5.4.3) at the noise affected receivers from the construction stages identified in Section 5.2.

The impacts presented in Table 5.4 are as follows:

- Below NML
- < 5dB(A) above NML - construction noise noticeable
- ◆ 5 to 15dB(A) above NML - construction noise clearly audible
- > 15 to 25dB(A) above NML - construction noise moderately intrusive
- >25dB(A) above NML - construction noise highly intrusive

Table 5.4: Summary of construction noise impacts at nearby receivers – OOHW period 2 (ICNG)

NCA	Level of compliance with NML for construction assessment scenario (see Table 5.1)																					
	Northern Connection worksite													Ancillary Facilities								
	GH	GT	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08
AS_01	-	-	🟡	🟡	🟡	🟡	🟢	🟢	🟢	🟢	🟡	🟡	🟢	🟢	🟢	🟡	🟢	🟡	🔴	🟡	🟡	🟢
AS_03	-	-	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟡	🔴	🟡	🔴
AS_04	-	-	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟡	🟢	🟡	🟡	🟡	🟢
CDS_01	-	-	🟡	🟡	🟡	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟡	🟡	🟢	🟢	🟢	🟢	🟢
CDS_02	-	-	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟡	🟢	🟢	🟢	🟢	🟢	🟢
CDS_03	-	-	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🟢	🟢	🟢	🟢	🟢	🟢
CDS_04	-	-	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🟢	🟢	🟢	🟢	🟢	🟢
CDS_05	-	-	🔴	🔴	🔴	🔴	🟡	🟡	🟡	🟡	🔴	🔴	🟡	🟢	🔴	🔴	🔴	🔴	🟢	🟢	🟢	🟢
CDS_06	-	-	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🟢	🔴	🟡	🔴	🟡	🟢	🟢	🟢	🟢
CDS_07	-	-	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	-	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_08	-	-	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_09	-	-	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CDS_10	-	-	🟡	🟡	🟡	🟡	🟢	🟢	🟢	🟢	🟡	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CN_01	-	-	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢
CN_02	-	-	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟡
OSR	-	-	🟢	🟢	🟢	🟡	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟢	🟡	🟡

- Notes:
- 1) OSR: this includes all commercial, industrial and other sensitive receivers.
 - 2) Assessment against ICNG NMLs for this period is used to guide additional mitigation measures (Section 5.4.3). PPA Conditions E41/42 are applicable for this assessment period (see Section 0).

During the possessions, receivers near to the rail corridor are predicted to experience high noise impacts during the night time period. Predictions indicate that construction noise levels are expected to be highly intrusive at the closest noise sensitive receivers in NCAs CDS_03, CDS_04, CDS_05 and CDS_06. Similarly, when ancillary facilities are in use to support the possession works, impacts to the nearest affected receivers may be highly intrusive, depending on the activity being undertaken.

Impacts vary depending on the plant and equipment being utilised for the possession, with the greatest impacts being when rail sawing activities are taking place. Other dominate sources of noise during the possession periods would be from rollers, graders, rail grinders, concrete trucks and other similar types of large plant working within the rail corridor.

These possessions are essential works for the project and are required to be conducted continuously during the rail possession period (i.e. also including the night-time period).

As the ICNG NMLs have not been achieved for all proposed activities on the site, all reasonable and feasible noise mitigation and management measures would be implemented. These mitigation and management measures are discussed in Section 5.4 of this report. Further, it is necessary to apply Planning Approval Conditions E41 and E42 in order to manage impacts (see Section 0).

PPA Conditions E41/E42

Table 5.5 summarises the predicted noise impacts for each construction stage in each NCA compared with the internal NMLs in CSSI-7400 Conditions E41 and E42. Where predicted levels are above the NMLs at residential receivers, additional mitigation measures are to be offered in accordance with the documented procedure in Addendum A of the SMCSNVS.

The impacts presented are as follow:

- Noise levels predicted to be below internal NMLs in PPA Conditions E41 and E42;
- Noise levels predicted to be above internal NMLs in PPA Conditions E41 and E42.

Table 5.5: Noise level summary for PPA Conditions E41/E42 (residential only)

NCA	Level of compliance with NML																												
	Northern Connection worksite														Ancillary Facilities														
	GH	GT	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08							
OOHW period 2 E2/N														OOHW period 2 E2/N															
AS_01	-	-	■	■	■	□	■	■	■	■	■	■	■	■	■	■	■	□	■	□	■	■	■						
AS_03	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	□	□	□							
AS_04	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
CDS_01	-	-	□	□	□	□	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
CDS_02	-	-	□	□	□	□	□	□	□	■	□	□	■	■	■	■	■	■	■	■	■	■							
CDS_03	-	-	□	□	□	□	□	□	□	□	□	□	□	□	■	■	■	■	■	■	■	■							
CDS_04	-	-	□	□	□	□	□	□	□	□	□	□	□	□	■	■	■	■	■	■	■	■							
CDS_05	-	-	□	□	□	□	□	□	□	□	□	□	□	□	■	□	□	□	□	■	■	■							
CDS_06	-	-	□	□	□	□	□	□	□	□	□	□	□	□	■	□	□	□	□	■	■	■							
CDS_07	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
CDS_08	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
CDS_09	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
CDS_10	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
CN_01	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
CN_02	-	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	□							

Notes: 1) PPA Conditions E41/42 are applicable for this assessment period (see Section 5.3.2)
2) E2: late evening period from 8pm to 10pm.
3) N: night-time period from 10pm to 7am.

The results in Table 5.5 indicate that during the possession works, construction noise is predicted to be above the internal noise threshold of PPA Conditions E41/E42 at the nearest residential receivers along the rail corridor and near ancillary facilities at the nearest residential receivers in NCAs AS_01, AS_03, CDS_02, CDS_03, CDS_04, CDS_05, CDS_06 and CN_02. However, it is noted that these critical works are short-term in duration (i.e. couple of nights during a rail possession period). Additional mitigation measures will be offered in accordance with Section 5.4.3.

It is noted that several residential properties near the Chatswood Dive worksite and North Shore Line rail corridor have been already acoustically treated by TfNSW.

Measures for managing potential noise impacts are provided in Section 5.4. For more detailed predictions, see APPENDIX D. For more detailed additional noise measures, refer to APPENDIX E.

5.3.2 Sleep disturbance

Construction equipment may produce instantaneous noise events during operation. Due to the proximity of the residential receivers to the works, it is likely that maximum noise levels from sources within the rail corridor such as truck airbrakes, banging from metal on metal contact, rail grinding, tampers, etc. will exceed the sleep disturbance NML of 65 dB(A) L_{A1} (1 minute) during the night period works.

These activities will be managed by setting up relevant traffic management measures to minimise the use of compression brakes when leaving the work area, installing air brake silencers and broadband reversing alarms on heavy vehicles, and minimising heavy vehicle movements where practicable. Truck drivers will be instructed to avoid excessive acceleration from a stopped position and vigorous slamming of truck doors. The potential of loose items or plant/equipment that could generate metal-on-metal bangs will be identified and managed accordingly. Where practical, synthetic link lifting chains will be used to minimise metal-on-metal contact.

In addition, Toolbox talks will be used to advise all personnel of the need to follow quiet work practices during OOHW periods, including warning personnel of the need to respect the residential receivers surrounding the local area work sites. Other management measures are outlined in Section 5.4 to aid in providing additional noise reduction benefits where predicted levels are above the objective.

5.4 Noise mitigation and management

5.4.1 Consultation with affected receivers (CSSI-7400 Condition E33)

CSSI-7400 Condition E33 requires consultation with affected receivers to assist in determining site-specific mitigation measures.

Systems Connect will continue consultation with potentially affected landholders (taking into consideration consultation outcomes undertaken by Sydney Metro and TSE Contractor to date)

regarding specific mitigation measures applicable to the works at the C2S Northern Connection worksite.

5.4.2 Site noise control measures

Table 5.6 presents additional noise control measures recommended to reduce and manage potential noise impacts. Table C1 in **Error! Reference source not found.** notes specific management measures for the key construction stages to reduce noise impacts.

Table 5.6: Site noise control measures

Control type	Control measure	Typical use
At-Source Control Measures	Noise control kits	Plant that is brought to site for regular use should meet the sound power limits identified in Table C1. Where plant are above limits then the plant may require installation of 'noise control kits' to comply with the noise limits in Table C1. Such 'noise control kits' comprise: • high performance 'residential-grade' exhaust mufflers, • additional engine cowling / enclosure lined inside with sound absorbent industrial-grade foam, and • air intake and discharge silencers / louvres. The need to fit 'noise control kits' onto the identified plant, will be confirmed once each plant item is tested prior to its regular use on site.
	Limit equipment in use	Only the equipment necessary during each stage of the works will be used.
	Timing of equipment in use	Where practicable, activities and plant will be limited as outlined in Table C1 (APPENDIX C).
	Limit activity duration	Any equipment not in use for extended periods shall be switched off. For example, heavy vehicles should switch engines off when not in use.
	Use and siting of plant	Avoid/ limit simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver. Direct noise-emitting plant away from sensitive receivers where practicable. Locate fixed location plant items as far from sensitive receivers as practicable.
	Equipment selection	Use quieter and less noise/ vibration emitting construction methods where feasible and reasonable.
	Truck movements	Where practicable, avoid the use of park air brakes at night. Air brake silencers are to be correctly installed and fully operational for any heavy vehicles (as per CNVMP). Minimise unnecessary acceleration on site.
	Non-tonal reversing alarms	Alternative reverse alarms, such as 'quackers' will be installed on all plant and equipment, where practicable.
Path Control Measures	Temporary noise screens	Where practicable, temporary noise screens (e.g. Flexshield, Echo-barrier, or similar) should be used to provide additional noise reduction during works. Temporary noise screens can provide 5 to 10 dB noise reduction, where they can break line of sight.
	Mobile noise screens	Where practicable, a mobile noise screen/tent would be used to reduce noise from moving plant items e.g. concrete saw, road saw, pipe cutter. Mobile noise screens utilise aluminium mobile scaffold (or similar), with acoustic blanket/ quilt (e.g. Echo-barrier, FlexShield or similar) attached on up to 4 sides (including the top, where no solid platform). Mobile noise screens can provide 5 to 10 dB noise reduction, <u>where they can break line of sight.</u>

Control type	Control measure	Typical use
Noise Management Measures	Site inductions & Toolbox Talks	All employees, contractors and subcontractors will receive a Project induction. The environmental component may be covered in toolboxes and should include: - location of nearest sensitive receivers - relevant project specific and standard noise and vibration mitigation measures; - permitted hours of work; - OOHW Procedure and Form - construction employee parking areas.
	Community consultation	Inform community of construction activity and potential impacts. (see Section Consultation with affected receivers (CSSI-7400 Condition E33) and Consultation required under conditions E37/E38).
	Respite periods	During standard construction hours, high noise impact activities (i.e. above 75dB(A) at the closest residential receivers) are carried out in continuous blocks of up to 3 hours. Respite from high noise impact activities will be provided between each block for at least 1 hour. No high noise impact activities will be carried out during this 1 hour respite period.
	Respite for OOH	Timing of rail possessions would mean that where OOH is required at night and over weekend OOH periods. As noted 'Path Control Measures' above, where practicable, temporary noise screens and mobile noise screens would be used to reduce high noise impact sources. Noise affected receivers are identified in Table D1 of Detailed predicted noise levels. Table E1 in Additional noise mitigation identifies receivers where additional mitigation measures are triggered in accordance with the Sydney Metro CNVS (see Section Additional Noise Mitigation Measures).
	Behavioural practices	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.
	Noise monitoring	Noise monitoring is to be carried out as detailed in Section 5.4.4.

5.4.3 Additional noise mitigation measures

Table 5.7 below should be used to advise the appropriate additional noise mitigation during construction, based on the Transport for NSW Construction Noise and Vibration Strategy (ref: 7TP-ST-157/4.0) May 2018 (CNVS) [9] and the Sydney Metro City & Southwest – Line Wide Works Contract Construction Noise and Vibration Management Plan (SMCSWLWC-SYC-1NL-PM-PLN-000032-A-CNVMP-C2B) (CNVMP) [1].

Table 5.7: Additional Airborne Noise Mitigation Measures

When is the work being undertaken?	Predicted $L_{Aeq,15min}$ noise level above		Identify additional management measures to be implemented	
	Background (RBL)	Noise Management Level (NML)		
Standard Hours M-F 7am to 6pm Sat 8am to 1pm	0 to 10 dB(A)	-	-	-
	> 10 to 20 dB(A)	≤ 10 dB(A)	-	-
	> 20 to 30 dB(A)	> 10 to 20 dB(A)	LB, M	[MM2]
	> 30 dB(A)	> 20 dB(A)	LB, M	[MM2]
OOHW Period 1 M-F 6pm to 10pm Sat 1pm to 10pm Sun/ PH 8am to 10pm	0 to 10 dB(A)	≤ 5 dB(A)	-	-
	> 10 to 20 dB(A)	> 5 to 15 dB(A)	LB	[MM1]
	> 20 to 30 dB(A)	> 15 to 25 dB(A)	LB, M	[MM2]
	> 30 dB(A)	> 25 dB(A)	LB, M, IB, PC, RO, SN	[MM4]
OOHW Period 2 M-F 10pm to 7am Sat 10pm to 8am Sun/ PH 6pm to 8am	0 to 10 dB(A)	≤ 5 dB(A)	-	-
	> 10 to 20 dB(A)	> 5 to 15 dB(A)	LB, M	[MM2]
	> 20 to 30 dB(A)	> 15 to 25 dB(A)	LB, M, IB, PC, RO, SN	[MM4]
	> 30 dB(A)	> 25 dB(A)	LB, M, IB, PC, RO, SN, AA	[MM5]

Notes: Use the abbreviation codes in the table above to confirm management measures required
Code in square brackets [] refers to noise management code for affected receivers identified in each CNVIS
LB = Letter box drops
M = Monitoring
IB = Individual briefings
SN = Specific notifications
PC = Phone calls and emails
RO = Project specific respite offer
AA = Alternative accommodation

APPENDIX E presents a summary of the additional noise mitigation measures applicable for construction activities where, after application of all reasonable and feasible mitigation options, predicted construction noise levels still exceed the NMLs.

Prior to the commencement of the site establishment works, residential receivers around the C2S Northern Connection worksite, in particular those identified in APPENDIX E will be notified to advise that noise from the works may at times be audible. All potentially impacted receivers will be kept informed of the nature of works to be carried out, the expected noise levels and duration, as well as be given the project enquiries and complaints 1800 numbers (see Section 5.4.6).

5.4.4 Attended noise monitoring

Real time noise monitoring in accordance with CSSI-7400 Condition C11 is not proposed to be undertaken for the C2S Northern Connection worksite. Attended noise monitoring will be undertaken as required by this CNVIS. Noise monitoring is subject to obtaining the property owner/occupier's consent to access the property (where required). If consent to access property is denied, monitoring will be done on public land on the property boundary, provided it is safe to do so.

Attended noise monitoring will be undertaken during works at one of the representative residential receivers identified in the table below. Nominated attended measurement locations have been selected with the best opportunity to validate the predicted noise levels.

Table 5.8: Nominated verification monitoring locations

NCA	Nominated receiver address	Monitoring location at 1 m from
CDS_01	514 PACIFIC HIGHWAY	Eastern façade
CDS_02	552-554 PACIFIC HIGHWAY	Eastern façade

NCA	Nominated receiver address	Monitoring location at 1 m from
CDS_03	15 NELSON STREET	Southern façade
CDS_04	12 HOPETOUN AVENUE	Southern facade
CDS_05	338 MOWBRAY ROAD ARTARMON	Western façade
CDS_06	344 MOWBRAY ROAD	Northern façade

Notes: Monitoring on private property is subject to owner consent and where relevant, occupier consent. If consent to access property is denied, monitoring will be done on public land on the property boundary, provided it is safe to do so.

If verification monitoring shows that the external noise levels are consistently above the predicted levels, investigation will be undertaken to understand the cause of the exceedance.

Periodic assessment of plant noise levels will be undertaken in accordance with Section 9.2.3 and Table 20 of the CNVMP to confirm the plant noise levels are within the APPENDIX C Table C1.

All noise monitoring will follow the procedures outlined in Appendix D of the CNVMP.

5.4.5 Managing site specific activities and cumulative noise impacts (Gateway)

This CNVIS has established the overall impacts associated with the Northern Connection works and supporting ancillary facilities. A 3D construction noise and vibration management tool (Gateway, www.gateway.com.au) has been developed specifically for the Sydney Metro Line Wide Project to allow specific work areas and activities to be assessed as construction works progress. It also allows cumulative noise impact from other aspects of the Project or, where relevant noise from other construction projects, to be assessed and managed in accordance with the CNVMP.

Gateway will be used regularly to plan, assess and manage possession works progressively.

Gateway incorporates ground elevation contours, building heights, the built environment and atmospheric conditions to predict construction noise in accordance with the International Standard ISO 9613-2:1996 implementing quality standard ISO 17534-1:2015. All sensitive receivers identified by the land use survey (see Section 3) are integrated into the Gateway tool.

5.4.6 Complaints handling

Noise complaints received and responded to will be managed in accordance with the CNVMP and the Community Consultation Strategy.

Transport for NSW operate a 24-hour construction complaints line (1800 171 386).

Enquiries/ complaints may also be received through the Sydney Metro project email (linewidemetro@transport.nsw.gov.au).

6 Construction vibration impacts

6.1 Minimum working distances for vibration intensive plant

From the plant and equipment listed in APPENDIX C, the dominant vibration generating plant and equipment include:

- For the Northern Connection works
 - Excavator 30T with hammer attachment
 - Rock Saw
 - Smooth drum roller (up to 14t) - High vibration mode
 - Wacker Packer
- For the Brand Street M33 Drainage works:
 - Excavators with hammers (10-15T)
 - Rock Saw
 - Wacker Packer.

Potential vibration generated to receivers is dependent on separation distances, the intervening soil and rock strata, dominant frequencies of vibration, and the receiver structure.

The recommended minimum working distances for vibration intensive plant are presented in Table 6.1 and Table 6.2. These distances are conservatively based on excavation of hard rock. Site specific minimum working distances for vibration intensive plant items must be measured on site where plant and equipment are likely to operate close to or within the minimum working distances for cosmetic damage (Table 6.1).

Unlike noise, vibration cannot be readily predicted. There are many variables from site to site, such as soil type and conditions, sub surface rock, building types and foundations, and actual plant on site.

The data relied upon in this assessment (tabulated below) is taken from a database of vibration levels measured at various sites or obtained from other sources (such as BS5228-2:2009). They are not specific to this project as final vibration levels are dependent on many factors including the actual plant used, its operation and the intervening geology between the activity and the receiver.

Table 6.1: Minimum working distances (m) for cosmetic damage (continuous vibration)

Plant item	Minimum working distance (m)		
	Reinforced or framed structures (e.g. commercial buildings) ¹	Unreinforced or light framed structures (e.g. residential buildings) ¹	Sensitive structures (e.g. heritage structures) ²
Northern Connection works			
Excavator 30T with hammer attachment	5	10	10
Smooth drum roller (up to 14t) High vibration ⁴	5	5	15
Rock Saw	5	5	5
Wacker Packer	5	5	5
Brand Street M33 Drainage works			
Excavator with rock hammer (10-15T)	5	5	10
Rock Saw	5	5	5
Wacker packer (hand operated)	5	5	5

Notes: 1) Initial screening test criteria reduced by 50% due to potential dynamic magnification in accordance with BS7385.
 2) In accordance with Section 5.8.1 of CNVMP, a site inspection should determine whether a heritage structure is structurally unsound.
 3) Minimum working distances are in 5m increments only to account for the intrinsic uncertainty of this screening method.
 4) Operating for 30% of the time in high vibration mode.

Table 6.2: Minimum working distances (m) for human annoyance (continuous vibration)

Plant item	Minimum working distances, m				
	Critical areas ^{1,4}	Residences		Offices ^{3,4}	Workshops ⁴
		Day ²	Night ²		
Northern Connection works					
Excavator 30T with hammer attachment	40	25	30	20	15
Smooth drum roller (up to 14t) High vibration ⁴	105	55	75	30	15
Rock Saw	15	10	10	5	5
Wacker Packer	20	10	15	5	5
Brand Street ancillary facility works					
Excavator with rock hammer (10-15T)	30	20	25	15	10
Rock Saw	15	10	10	5	5
Wacker packer (hand operated)	20	10	15	5	5

Notes: 1: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring.
 2: Daytime is 7 am to 10 pm; Night-time is 10 pm to 7am.
 3: Examples include offices, schools, educational institutions and place of worship.
 4: Applicable when in use.
 5: Operating for 30% of the time in high vibration mode.

6.2 Vibration assessment

6.2.1 Structural damage

The buildings potentially at risk of cosmetic damage are identified (conservatively) by assuming the vibration intensive plant item is operating at the perimeter of the red and blue work areas or the Brand Street MPR33 work area. The number of buildings potentially within the minimum working distances for cosmetic damage are summarised in Table 6.3. The buildings are shown on aerial photographs in APPENDIX F.

Table 6.3: Number of buildings within minimum working distances for cosmetic damage

Plant item	Work area	Number of buildings	
		Screening criteria for non-heritage structures	Screening criteria for heritage structures
Northern Connection works			
Excavator 30T with hammer attachment	Red/ Blue area	16	0
Smooth drum roller (up to 14t) - High vibration ⁴	Red/ Blue area	0	0
Rock Saw	Red/ Blue area	0	0
Wacker Packer	Red/ Blue area	0	0
Brand Street MPR33 works			
Excavator with rock hammer (10-15T)	MPR33 work area	1	0
Rock Saw	MPR33 work area	1	0
Wacker packer (hand operated)	MPR33 work area	1	0

Table 6.3 above notes 16 non-heritage buildings potentially within the minimum working distances established for cosmetic damage assuming the 30 tonne excavator with hydraulic hammer attachment is operating at the edge of the red and blue work areas, closed to the buildings. This number of buildings can be refined based on more detail regarding specific areas that the 30 tonne excavator with hydraulic hammer attachment would be used.

There is a low risk of structural damage from vibration generated by other vibration intensive plant operating within the red/ blue work areas.

CSSI-7400 Condition E29 requires owners of properties at risk of exceeding the screening criteria for cosmetic damage to be notified before the commencement of vibration-generating works.

Vibration monitoring is recommended to verify that vibration levels achieve compliance with the structural damage objectives where plant is required to operate within the minimum working distance identified in Table 6.1. If the monitoring above identifies that vibration is likely to exceed the structural damage objectives, a different construction method with lower source vibration levels will be considered.

Vibration control and management measures are presented in Section 6.3.

6.2.2 Human annoyance

The assessing vibration guideline [4] notes that inside dwellings, adverse comments often arise when occupants can perceive (feel) vibration, particularly when the vibration arises from a source located outside their home (or outside their control), and assume that the vibration has the potential to damage their building or contents.

However, it is noted that vibration levels required to cause minor cosmetic damage are typically 10 x higher than levels that will cause disturbance to building occupants. Many building occupants assume that building damage is occurring when they feel vibration or observe rattling of loose objects, however the level of vibration at which people perceive vibration or at which loose objects may rattle is far lower than vibration levels that can cause damage to structures.

At properties near the worksite, it is likely that the nearest receivers will be able to feel vibration levels when vibration-generating equipment is being utilised. Properties where vibration levels may be above the vibration disturbance goals in Table 4.2 and there is a probability of adverse comment are shown in Table 6.4.

Table 6.4: Properties within minimum distances for human annoyance

Plant item	Critical areas ^{1,4}	Residences ⁵		Offices ^{3,4}	Workshops ⁴
		Day ²	Night ²		
Northern Connection works					
Excavator 30T with hammer attachment	0	25	32	1	0
Smooth drum roller (up to 14t) - high vibration ⁴	0	65	98	1	0
Rock Saw	0	15	15	0	0
Wacker Packer	0	15	20	0	0
Brand Street MPR33 works					
Excavator with rock hammer (10-15T)	0	4	5	0	0
Rock Saw	0	1	1	0	0
Wacker packer (hand operated)	0	1	3	0	0

Notes: 1: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring.

2: Daytime is 7 am to 10 pm; Night-time is 10 pm to 7am.

3: Examples include offices, schools, educational institutions and place of worship.

4: Applicable when in use.

5: Hotels and childcare centres are included in the residence category.

From the above table, receivers along the project corridor from Chapman Avenue to Brand Street may experience vibration which can cause adverse comment when vibration-generating plant is operated nearby. Impacts are greater at night, with up to 98 residences potentially impacted during the operation of the Smooth drum roller (up to 14t) in high vibration mode. Properties are further identified in APPENDIX F.

The above assessment is based on vibration-generating equipment being operating continuously at the closest location to nearby receivers. When vibration-generating equipment operates further from the closest point, the predicted vibration levels will reduce along with the probability of adverse comment.

Attended vibration measurements are proposed to be carried out proactively and in response to vibration complaints. If measurement results indicate exceedances of the vibration objectives for human annoyance at these locations, vibration control and management measures will be provided to reduce vibration impact (see Section 6.3.1).

After applying all feasible and reasonable vibration mitigation measures, if vibration monitoring still identifies that measured vibration levels are above the relevant vibration criteria for human annoyance, appropriate additional mitigation measures should be considered (see Section 6.3.2).

6.3 Vibration mitigation measures

6.3.1 Vibration control and management measures

In addition to the vibration control measures presented in the CNVMP, the following vibration management measures are provided to minimise vibration impact from construction activities to the nearest affected receivers and to meet the relevant human comfort vibration and structural damage limits identified in Section 4.2.

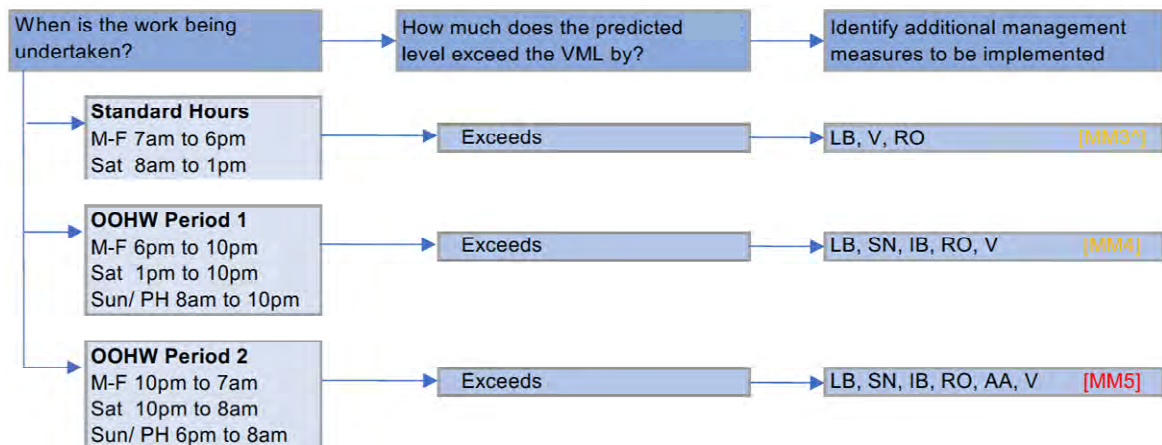
Table 6.5: Site vibration control measures

Control type	Control measure	Typical use
Construction Planning	Building condition surveys	Undertake building dilapidation surveys on all buildings located within the minimum working distances established for cosmetic damage prior to commencement of activities with the potential to cause property damage (see Section 6.1 and APPENDIX F).
	Community consultation	Implement community consultation measures – inform community of construction activity & potential impacts – inform community that the level of vibration at which people perceive it, or at which loose objects may rattle, is far lower than the level at which minor cosmetic damage is expected to occur
	Equipment selection/construction method	Use less vibration emitting construction methods where feasible & reasonable, for example vibratory rollers can, where practicable, be operated with the vibratory mode switched off to reduce vibration impact.
	Plan work activities to minimise vibration.	Plan traffic flow, parking & loading/unloading areas to maximise distances between truck routes and sensitive receivers.
Complaints Management	Construction Complaints Management System	Complaints will be managed in accordance with the Construction Complaints Management System (see Section 6.3.4). Each complaint shall be investigated and where vibration levels are established as exceeding the set limits, appropriate amelioration measures shall be put in place to mitigate future occurrences. Management measures may include modification of construction methods such as using smaller equipment and establishment of minimum working distances as mentioned above.

6.3.2 Additional vibration mitigation measures

After applying all feasible and reasonable mitigation measures identified in Table 6.5, if vibration monitoring at representative locations are still above relevant vibration objectives for human annoyance, the appropriate additional vibration mitigations measures, as outlined in Section 8.2 of the CNVMP.

Table 6.6: Additional vibration mitigation measures



Notes: Use the abbreviation codes in the table above to confirm management measures required
Code in square brackets [] refers to noise management code for affected receivers identified in each CNVIS

LB = Letter box drops

SN = Specific notifications

RO = Project specific respite offer

V = Verification monitoring

IB = individual briefing

AA = Alternative accommodation

6.3.3 Vibration monitoring

Attended vibration monitoring is to be undertaken to determine and verify site specific minimum working distances for cosmetic damage and human annoyance. Properties located within the minimum working distances for human annoyance are identified in APPENDIX F.

As a minimum, it is recommended that attended monitoring is undertaken at the locations in Table 6.7 when vibration significant plant items operate close to or within the minimum working distances. Additional monitoring may also be required in response to vibration complaints.

Real-time vibration monitoring in accordance with PPA Condition C11 is not proposed for this site.

Table 6.7: Attended vibration monitoring - nominated representative locations

Plant	Address ¹	Vibration objectives to check	
		Unreinforced or light framed structures (e.g. residential buildings)	Human annoyance ²
Northern Connection works			
Excavator 30T with hammer attachment	2 NELSON STREET CHATSWOOD	√	√ ¹
	5 NELSON STREET CHATSWOOD	√	√ ¹

Plant	Address ¹	Vibration objectives to check	
		Unreinforced or light framed structures (e.g. residential buildings)	Human annoyance ²
	7-11 NELSON STREET CHATSWOOD	✓	✓ ¹
	655 PACIFIC HIGHWAY CHATSWOOD	✓	✓ ¹
	1-3 GORDON AVENUE CHATSWOOD	✓	✓ ¹
	2A GORDON AVENUE CHATSWOOD	✓	✓ ¹
	11-13 HOPETOUN AVENUE CHATSWOOD	✓	✓ ¹
	12 HOPETOUN AVENUE CHATSWOOD	✓	✓ ¹
	4 CHAPMAN AVENUE CHATSWOOD	✓	✓ ¹
	342 MOWBRAY ROAD ARTARMON	✓	✓ ¹
	67 HAMPDEN ROAD ARTARMON	✓	✓ ¹
	77 HAMPDEN ROAD ARTARMON	✓	✓ ¹
	85-91 HAMPDEN ROAD ARTARMON	✓	✓ ¹
	93-97 HAMPDEN ROAD ARTARMON	✓	✓ ¹
	99 HAMPDEN ROAD ARTARMON	✓	✓ ¹
	117-119 HAMPDEN ROAD ARTARMON	✓	✓ ¹
Brand Street MPR33 works			
Excavator with rock hammer (10-15T)	13 BRAND STREET ARTARMON	✓	✓ ¹
Rock Saw	13 BRAND STREET ARTARMON	✓	✓ ¹
Wacker packer (hand operated)	13 BRAND STREET ARTARMON	✓	✓ ¹

Notes: 1. Monitoring on private property is subject to owner consent and where relevant, occupier consent.
2. Monitoring only required in the event of complaint related to vibration.

6.3.4 Managing site specific activities and cumulative vibration impacts (Gateway)

The Project environment team will use Gateway to manage construction vibration impact by defining specific work areas and identifying properties within minimum working distances established for cosmetic damage and human annoyance.

6.3.5 Management of complaints

Vibration complaints received and responded to will be managed in accordance with the CNVMP and the Community Consultation Strategy.

Transport for NSW operate a 24-hour construction complaints line (1800 171 386).

Enquiries/ complaints may also be received through the Sydney Metro project email (linewide@transport.nsw.gov.au).

7 Ground-borne noise assessment

Due to the nature of the Northern Connection works, which are surface works, airborne noise is expected to be much higher than ground-borne noise levels at the nearest sensitive receivers.

The risk of annoyance due to ground-borne noise is therefore considered low and has not been addressed further in this CNVIS.

8 Traffic noise assessment

8.1 Traffic noise assessment

For vehicles accessing the rail corridor, the only access available is from Brand Street via Hampden Road or Elizabeth Street. Based on a review of the construction activities during the general works and possession works, heavy vehicle movements from site would typically be infrequent, with movements primarily being deliveries and concrete trucks.

It is estimated that in the worst case scenario, there would be up to:

- Eight heavy vehicle movements per hour during the day,
- Four heavy vehicle movements per hour during the evening and
- Four heavy vehicle movements per hour during the night time period.

Hampden Road is a sub-arterial road with existing high traffic volumes during the day period, therefore additional construction related road traffic is expected to have negligible impacts during the day and evening periods. Access to the rail corridor during the night period would only occur during rail possessions.

Construction related road traffic may increase at times existing traffic noise on Hampden Road, Elizabeth Street and Brand Street by more than 2dB during the night period. However, the possession works are short term in duration (no more than two consecutive nights), and are spread out over the duration of the works from June 2020 to November 2022. Furthermore, all residences potentially impacted by road traffic noise on Hampden road and Brand Street have been identified in the construction noise assessment. Additional mitigation measures for these residences have been considered in the construction noise assessment.

8.2 Traffic noise mitigation and management

To minimise potential construction noise impacts onto the road network, Hampden Road should be the primary access to the rail corridor wherever practicable.

The Heavy Vehicle Code of Conduct also includes several measures, including limiting of compression braking, which will ensure that noise impacts of heavy vehicle traffic on surrounding streets are minimised.

9 Cumulative impacts

All concurrent Systems Connect construction works have been considered and addressed in this CNVIS.

It is noted that the permanent works being undertaken by the TSE Contractor are forecast to be completed by the end of November 2020. During standard construction hours, cumulative noise levels may be at times 2dB(A) higher than indicated in this assessment at few receivers closer to TSE worksite. This is not considered a significant increase for work activities undertaken during standard construction hours. Outside standard construction hours, TSE northern dive and portal works (ref: TH511-02 01.01.03 F03 CDS CNVIS (r2)) are expected to comply with ICNG NMLs. They will therefore have a negligible impact at the nearby noise sensitive receivers compared to the rail possession works assessed in this CNVIS where noise levels are predicted to be more than 25 dB(A) above ICNG NMLs (see Table 5.4 5.3).

Systems Connect are aware of other ongoing, potentially concurrent construction activities within the vicinity of the C2S Northern Connection worksite. These works, summarised in

Table 9.1, may have the potential to generate cumulative noise impacts on receivers. These works have been considered but it has been determined that, due to the nature of the other unrelated construction works, no additional physical mitigation measures are deemed reasonable. Nevertheless, Systems Connect will endeavour to take all reasonable steps to collaborate with other Projects to minimise cumulative noise and vibration impact where Systems Connect are above management levels and coordinate respite for affected sensitive receivers, whenever practicable.

Table 9.1: Other construction works close to C2S Northern Connection worksite

Construction company	Project	Timing of activities	Hours of works	Works location	Activity types	General plant types
Laing O'Rourke	LORAC	September 2018 to mid 2020	Standard construction hours, outside construction hours and rail possession works. Intermittent out of hours works between Chatswood and Artarmon train stations on the eastern extent	Between Chatswood and Artarmon train stations on the eastern extent	Rail and signalling modification works	Utility relocation, minor earthworks, signal and rail modification.
Sydney Trains	Sydney Train maintenance works	Based on Sydney Trains trackwork schedule	Based on Sydney Trains trackwork schedule	Any point along the railway corridor. Immediately adjacent to Systems Connect LWW worksite	Rail and signalling maintenance works	Utility relocation, minor earthworks, signal and rail modification.

Works Completed

10 Conclusion

Works associated with the C2S Northern Connection construction worksite have been identified and described in this report. Potentially affected noise and vibration sensitive receivers and relevant construction noise and vibration objectives have been identified and discussed to allow the assessment of potential construction impacts.

Expected construction noise levels have been predicted and presented in Section 5.3 and APPENDIX D. The expected duration of construction activities is outlined in Table C1 of APPENDIX C.

For the general construction works on the permanent down and open dive, impacts would be greatest during periods of high noise activity, such as when using saws, graders, rail tampers, rail grinders and other similar types of high noise generating plant and equipment. Residences adjacent to the rail corridor are predicted to be highly noise affected during these periods of high noise activity. During more typical operations, residences near the rail corridor would be noise affected when works are nearby, but are not likely to be highly noise affected.

There are eleven planned rail possessions works required to be undertaken standard construction hours. During the possession periods, construction noise is predicted to be highly intrusive for residences near to the works. The possession works are short in duration as they would be limited to no more than two consecutive nights, and are also spread out over the duration of the works from March 2020 to November 2022.

Noise mitigation and management measures have been presented in Section 5.4 to aid in providing additional noise reduction benefits where exceedance of the objective occurs.

Vibration and ground-borne noise (GBV&N) impacts have been presented in Section 6 and Section 7. Receivers adjacent to the works where vibratory rollers are required would be most affected. Suitable management measures have been presented in Sections 6.3.

The noise impact of construction traffic on the existing road network has been predicted in Section 8 and assessed as within the road traffic noise objectives identified in Section 4.1.3.

References

- [1] Sydney Metro City & Southwest – Line Wide Works Contract Construction Noise and Vibration Management Plan (SMCSWLWC-SYC-1NL-PM-PLN-000032-A-CNVMP-C2B)
- [2] SLR Consulting Australia Pty Ltd 2016 Sydney Metro Chatswood to Sydenham - Technical Paper 2: Noise and Vibration Report Number 610.14718R1 – 28 April 2016
- [3] Department of Environment and Climate Change 2009 NSW Interim Construction Noise Guideline
- [4] Department of Environment Conservation NSW 2006 Assessing Vibration; a technical guideline
- [5] British Standard BS 7385 Part 2 1993, Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration
- [6] German Standard DIN 4150-3:2016-12 Vibration in buildings – Part 3: Effects on structures
- [7] British Standard BS 6472-2008, Evaluation of human exposure to vibration in buildings (1-80Hz)
- [8] Transport for NSW Sydney Metro City & Southwest Construction Noise Strategy (ref: 610.14213-R3) 08 August 2016
- [9] Transport for NSW Construction Noise and Vibration Strategy (ref: 7TP-ST-157/4.0) May 2018
- [10] Transport for NSW Sydney Metro Construction Environmental Management Framework August 2016
- [11] Department of Environment, Climate Change and Water 2011 NSW Road Noise Policy
- [12] NSW Department of Planning – Development near rail corridors and busy road – interim guideline 2008

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The A-weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L _{Max}	The maximum sound pressure level measured over a given period.
L _{Min}	The minimum sound pressure level measured over a given period.

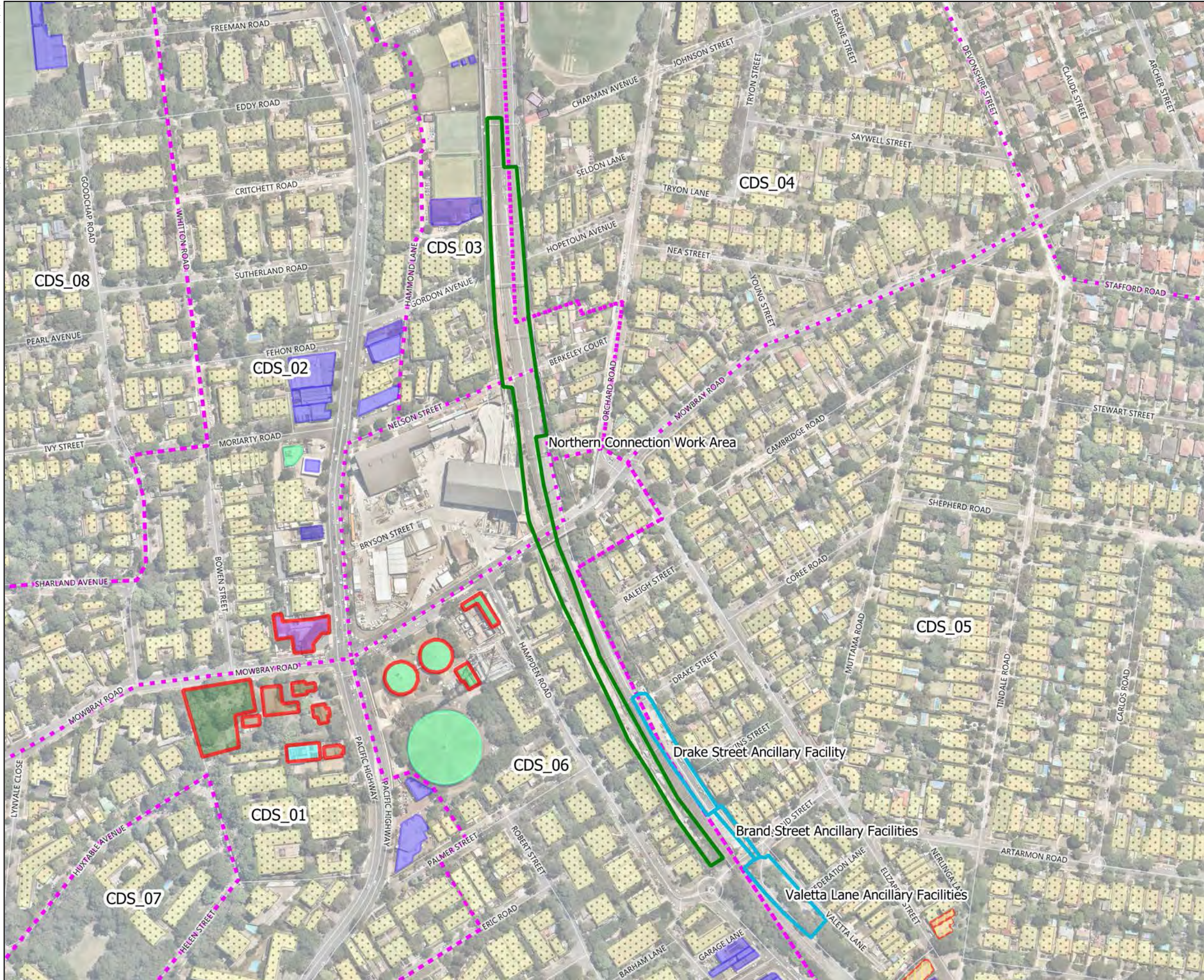
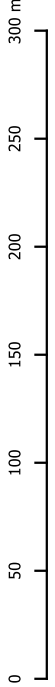
L ₁	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L ₁₀	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L ₉₀	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L _{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain L _{eq} sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B **Nearest sensitive receivers and noise management levels**

Table B1: Noise sensitive receivers and construction noise management levels

NORTHERN CONNECTION

NCA	Receiver Type	Reference RBL	Existing Noise Levels, dB(A)			ICNG NMLs				E41/42 NMLs	Sleep Dist. L _{Amax}		Comments
			RBL Day	RBL Evening	RBL Night	Day (S)	Day (O)	E	N	E2/N * (from 8pm to 7am)	Screening**	Max**	
CDS_01	Residential	RTA TH511-L02 516 Pacific Hwy, 55 Chatswood		54	42	65	60	59	47	55-65	57	65	
CDS_02	Residential	RTA TH511-L02 516 Pacific Hwy, 55 Chatswood		54	42	65	60	59	47	55-65	57	65	
CDS_03	Residential	EIS B.24	50	47	39	60	55	52	44	55-65	55	65	
CDS_04	Residential	EIS B.25	41	40	35	51	46	45	40	55-65	55	65	
CDS_05	Residential	EIS B.22	42	41	34	52	47	46	39	55-65	55	65	
CDS_06	Residential	EIS B.24	50	47	39	60	55	52	44	55-65	55	65	
CDS_07	Residential	EIS B.22	42	41	34	52	47	46	39	55-65	55	65	
CDS_08	Residential	EIS B.25	41	40	35	51	46	45	40	55-65	55	65	
CDS_09	Residential/ commercial		50	47	39	60	55	52	44	55-65	54	65	
CDS_10	Residential/ commercial		41	40	35	51	46	45	40	55-65	50	65	
AS_01	Predominantly Residential	EIS B.21	49	46	41	59	54	51	46	55-65	56	65	
AS_02	Commercial/ industrial area	EIS B.21	49	46	41	59	54	51	46	55-65	56	65	
Other sensitive receivers													
OSR	Studio building (music recording studio)					25							AS2107 ‘maximum’ (internal noise level)
OSR	Studio building (film or television studio)					30							AS2107 ‘maximum’ (internal noise level)
OSR	Cinema Space					35							AS2107 ‘maximum’ (internal noise level)
OSR	Hotel (Sleeping areas: Hotels near major roads)					40							AS2107 ‘maximum’ (internal noise level)
OSR	Classrooms at schools and other educational institutions					45							ICNG (internal noise level)
OSR	Hospital wards and operating theatres					45							ICNG (internal noise level)
OSR	Places of worship					45							ICNG (internal noise level)
OSR	Library (reading areas)					45							AS2107 ‘maximum’ (internal noise level)
OSR	Office building (general office areas)					45							AS2107 ‘maximum’ (internal noise level)
OSR	Community centres – Municipal Buildings					50							AS2107 ‘maximum’ (internal noise level)
OSR	Cafe/ Restaurant/ Bar (bars and lounges) – indoor areas					50							AS2107 ‘maximum’ (internal noise level)
OSR	Medical facilities					55							AS2107 ‘maximum’ (internal noise level)
OSR	Railway platform and concourse areas					55							AS2107 ‘maximum’ (internal noise level)
OSR	Cafe/ Restaurant/ Bar (bars and lounges) – outdoor areas					60							AS2107 ‘maximum’ ¹ (external noise level)
OSR	Passive recreation areas (e.g. area used for reading, meditation)					60							ICNG (external noise level)
OSR	Active recreation areas (e.g. sports fields)					65							ICNG (external noise level)
OSR	Commercial premises (including offices and retail outlets)					70							ICNG (external noise level)
OSR	Industrial premises					75							ICNG (external noise level)
Notes:	1 - Outdoor noise level based on recommended maximum internal noise level in AS 2107 plus 10 dB (10dB is a conservative estimate of the difference between internal and external noise levels, taken from ICNG p13)												
	D(S): standard construction hours from 7 am to 6 pm Monday to Friday and from 8 am to 6 pm Saturday												
	E: evening period from 6pm to 10pm (Monday to Saturday) - OOHW P1												
	N: night-time period from 10 pm to 7 am Monday to Friday, from 10 pm to 8 am Saturday, Sunday and Public holidays - OOHW P2												



LEGEND

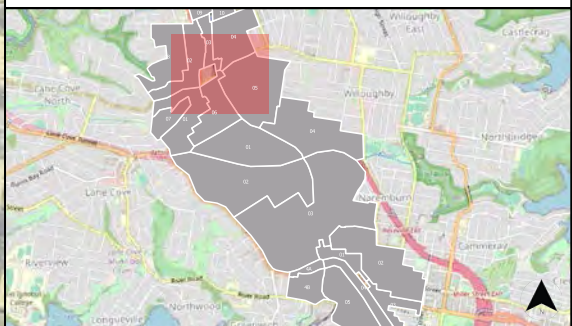
Noise sensitive receivers

Childcare	Theatre/Auditorium
Commercial	Mixed use
Educational	Project acquisition
Hotel/Motel/Hostel	Film/TV studio
Industrial	Cinema
Medical	Community centre
Place of Worship	Library
Recording studio	Laboratory
Recreational - Active	Other
Recreational - Passive	Heritage
Residential	

NCA

Northern Connection Work Area

Ancillary Facility / Laydown Area



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FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

Systems Connect

ACOUSTIC CONSULTANT

RENZO TONIN & ASSOCIATES
inspired to achieve

Ph (02) 8218 0500 Fax (02) 8218 0501

SYDNEY METRO - CHATSWOOD TO SYDENHAM

LINE WIDE WORKS
Land Use, NCA, Work Area ,Ancillary Facility and Laydown Area

Sheet 1 of 3

300 m
250
200
150
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LEGEND

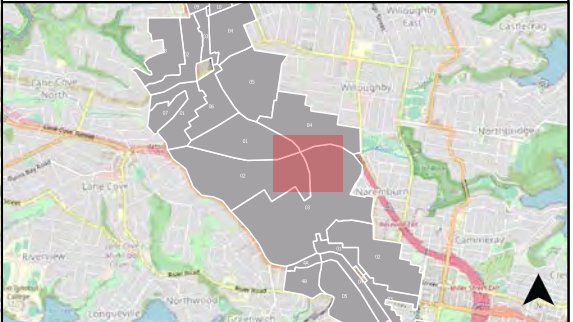
Noise sensitive receivers

- | | |
|------------------------|---------------------|
| Childcare | Theatre/Auditorium |
| Commercial | Mixed use |
| Educational | Project acquisition |
| Hotel/Motel/Hostel | Film/TV studio |
| Industrial | Cinema |
| Medical | Community centre |
| Place of Worship | Library |
| Recording studio | Laboratory |
| Recreational - Active | Other |
| Recreational - Passive | Heritage |
| Residential | |

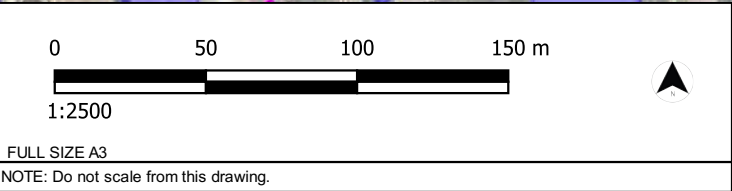
NCA

Northern Connection Work Area

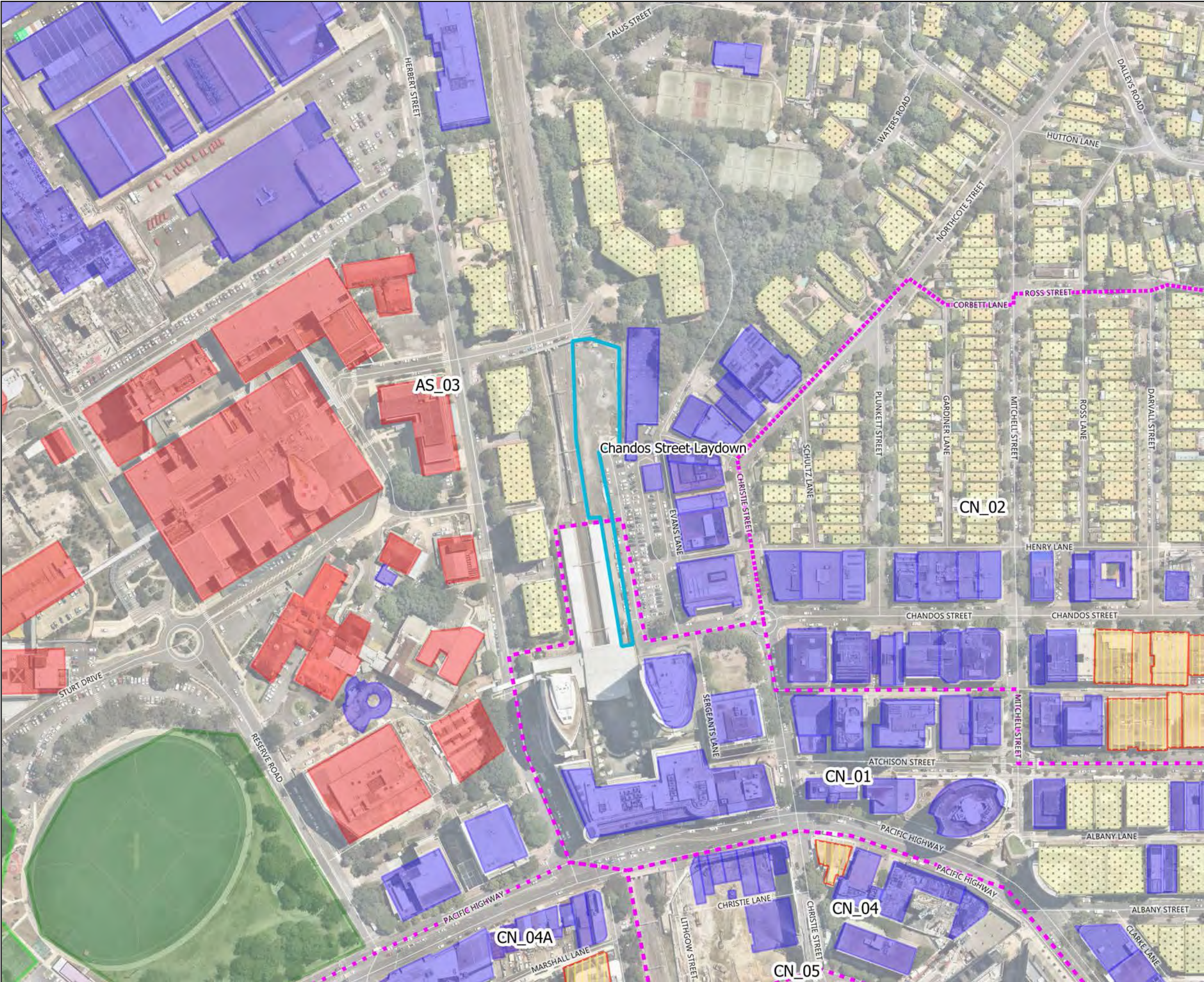
Ancillary Facility / Laydown Area



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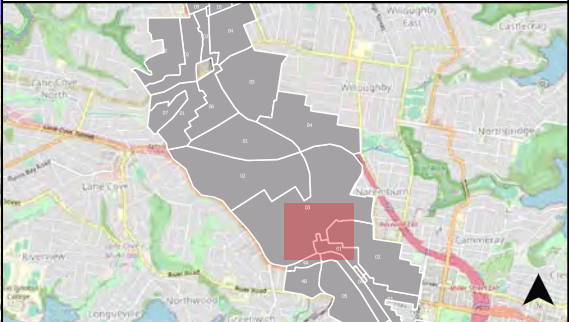
Noise sensitive receivers

- | | |
|------------------------|---------------------|
| Childcare | Theatre/Auditorium |
| Commercial | Mixed use |
| Educational | Project acquisition |
| Hotel/Motel/Hostel | Film/TV studio |
| Industrial | Cinema |
| Medical | Community centre |
| Place of Worship | Library |
| Recording studio | Laboratory |
| Recreational - Active | Other |
| Recreational - Passive | Heritage |
| Residential | |

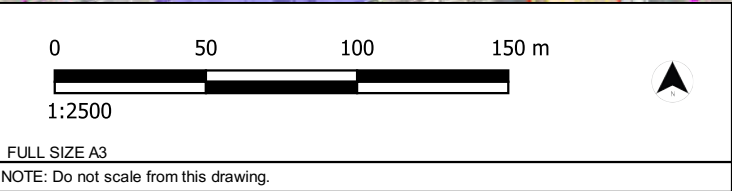
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Northern Connection Work Area

Ancillary Facility / Laydown Area



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APPENDIX C

Construction timetable/ activities/ management

Table C1: Construction Timetable/ Activities/ Equipment NORTHERN CONNECTION WORKS

Work activity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Construction Compound & Car Park [Operational for duration of works]	General worksite and Car parking	Feb 2020 to Feb 2021		Light vehicles / traffic control utes	Light vehicle	40 per hour	40 per hour	40 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
	Workshop; Deliveries; Maintenance; Storage	Feb 2020 to Feb 2021		Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-					
SITE ESTABLISHMENT														
Site Establishment	Installation of enviro controls	Mar 2020 to Apr 2021		Backhoe Loader 8T	Backhoe 8T	2	-	-	100	-	104	-	-	
				Hand tools	Hand tools	1	-	-	107	-	111	-	-	
				Tipper	Small Truck	4 p.h.	-	-	103	-	111	-	-	
	Construction of Crane Pads and access tracks	Mar 2020 to Jun 2020		Excavator w bucket (25t)	Excavator 30T	1	-	-	103	-	108	-	-	
				Grader	Grader 12H	1	-	-	113	-	113	-	-	
				Vibratory Roller - smooth drum (up to 14T)	Smooth drum roller up to 14T	1	-	-	112	-	118	HN	x	Dayshift only
PERMANENT DOWN (SYD TRAINS WORKS)														
Provisional sum	Earthworks & CSR Stormwater Drainage/ Sewer/ Potable / Recvled Water Excavation	Mar 2020 to Jan 2021		Excavators with hammers (35-45T)	Excavator 30T with hammer	3	-	-	118	5	123	HN	X	
				Bulldozer	Bulldozer	1	-	-	110	-	118	-	-	
				Concrete / road / rail saw	Rock Saw	1	-	-	121	5	129	HN	X	Dayshift only
				Generator	Generator	1	-	-	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	-	-	103	-	107	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-	
				Vaccum truck	Sucker Truck	2	-	-	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	-	-	108	-	110	-	X	
				Front end loader	Front End Loader	1	-	-	110	-	115	-	-	
				Generator	Generator	3	-	-	94	-	95	-	-	
				Pump	Water pump 6"	2	-	-	104	-	107	-	-	
				Skid steer / Bobcat (10T)	Skidsteer bobcat	1	-	-	104	-	109	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Compactor / Wacker packer	Compactor	1	-	-	108	-	110	-	X	
				Vibratory Roller - smooth drum (up to 14T)	Smooth drum roller up to 14T	1	-	-	112	-	118	HN	x	Dayshift only
				Water cart	Water Cart	1	-	-	104	-	107	-	-	
				Dump truck	Boogie	2	-	-	106	-	111	-	-	
				Grader	Grader	1	-	-	113	-	113	-	-	
				Track Construction including Tamping, Grinding & Turnouts	Dec 2020 to March 2021		Tamper - Hi Rail	Tamper	1	-	-	115	-	118
	Regulator	Regulator	1				-	-	108	-	112	HN	-	Dayshift only
	Handtool - grinder	Rail Grinder	1				-	-	107	-	118	HN	-	Dayshift only
	Light vehicles / traffic control utes	Light vehicle	2 per hour				-	-	89	-	100	-	-	
	Sleeper/Track Layer	Sleeper/Track Layer	1				-	-	103	-	110	-	-	
	Rail Welder	Rail Welder	2				-	-	93	-	103	-	-	
	Delivery truck	Flat bed truck	1				-	-	106	-	111	-	-	for Rail delivery
	Forklift	Forklift	1				-	-	99	-	103	-	-	
	Crane (Grove GMK5130)	Crane (Grove GMK5130)	1				-	-	105	-	103	-	-	
	Front end loader	Front End Loader	2				-	-	110	-	115	-	-	
	Excavator w bucket (25t)	High rail Excavator	2				-	-	103	-	108	-	-	
	Skid steer / Bobcat (10T)	Skidsteer bobcat	2				-	-	104	-	109	-	-	
	Fast Clip Machine	Fast Clip Machine	2				-	-	94	-	100	-	-	
	Flashbutt welder	Flashbutt welder	1				-	-	93	-	103	-	-	
	OHW Foundations, Structures and	October 2020 to Jan 2021					Hand tools (Power)	Power tools	Various	-	-	107	-	118
				Hand tools (Power)	Power tools	Various	-	-	107	-	118	-	-	
				EWP	EWP	3	-	-	95	-	98	-	-	
				Light vehicles / traffic control utes	Hi rail vehicle	1	-	-	89	-	100	-	-	
				Excavator w bucket (25t)	Excavator 30T	1	-	-	103	-	108	-	-	incl. auger attachment
	Structures	Apr 2020 to Oct 2020		Light vehicles / traffic control utes	Ute	2 per hour	-	-	89	-	100	-	-	
				Piling Rig - bored	Piling machine (bored)	1 per hour	-	-	107	-	116	-	-	
				Delivery truck	Flatbed truck	1	-	-	106	-	111	-	-	
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-	
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-	
				EWP	EWP	1 per hour	-	-	95	-	98	-	-	
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-	-	105	-	103	-	-	
				Tipper	Small Truck	1	-	-	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION WORKS

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes			
						7am - 6pm	6pm - 10pm	10pm - 7am	Model, dB(A)	L _{Aeq}	Penalty				L _{Amax}		
OPEN DIVE (SYDNEY METRO CONNECTION)																	
Provisional sum	FRP (Capping Beam)	Jul 2020 to Nov 2021		Generator	Generator	1	-	-	94	-	95	-	-				
				Concrete pump	Concrete Pump	1	-	-	103	-	107	-	-				
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-				
				EWP	EWP	3	-	-	95	-	98	-	-				
				Generator	Generator	3	-	-	94	-	95	-	-				
				Tipper	Small Truck	1	-	-	103	-	111	-	-				
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-				
				Telehandler / Franna crane (20t)	Telehandler	1	-	-	99	-	103	-	-				
					Excavator w bucket (25t)	8	-	-	103	-	108	-	-				
	Earthworks / bulk excavation Stormwater Drainage/ Sewer/ Potable / Recyled Water Excavation	Oct 2021 - Mar 2022		Bulldozer	Bulldozer	1	-	-	110	-	118	-	-				
				Concrete / road / rail saw	Rock Saw	1	-	-	121	5	129	HN	X				
				Generator	Generator	1	-	-	94	-	95	-	-				
				Concrete pump	Concrete Pump	1	-	-	103	-	107	-	-				
				Concrete Aqi	Concrete truck	2 per hour	-	-	108	-	111	-	-				
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-				
				Vaccum truck	Sucker Truck	2	-	-	107	-	111	-	-				
				Compactor / Wacker packer	Wacker Packer	1	-	-	108	-	110	-	X				
				Front end loader	Front End Loader	1	-	-	110	-	115	-	-				
				Forklift	Forklift	1	-	-	99	-	103	-	-				
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-	-	105	-	103	-	-				
				Flex drive motor	Flex drive motors	2	-	-	94	-	100	-	-				
				Generator	Generator	3	-	-	94	-	95	-	-				
				Pump	Water pump 6"	2	-	-	104	-	107	-	-				
				Skid steer / Bobcat (10T)	Skidsteer bobcat	1	-	-	104	-	109	-	-				
				Telehandler / Franna crane (20t)	Telehandler	1	-	-	99	-	103	-	-				
				Compactor / Wacker packer	Compactor	1	-	-	108	-	110	-	X				
				Vibratory Roller - smooth drum (up to 14T)	Smooth drum roller up to 14T	3	-	-	112	-	118	HN	x	Dayshift only			
				Water cart	Water Cart	2	-	-	104	-	107	-	-				
				Moxv	Moxv	2	-	-	108	-	111	-	-				
				Dump truck	Boogie	4	-	-	106	-	111	-	-				
				Track Construction including Tampina, Grinding & Turnouts	Jun 2022 to Sep 2022		Grader	Grader	1	-	-	113	-	113	-	-	
							Tamper - Hi Rail	Tamper	1	-	-	115	-	118	HN	-	Dayshift only
	Regulator	Regulator	1				-	-	108	-	112	HN	-	Dayshift only			
	Handtool - grinder	Rail Grinder	1				-	-	107	-	118	HN	-	Dayshift only			
	Light vehicles / traffic control utes	Light vehicle	4 per hour				-	-	89	-	100	-	-				
	Sleeper/Track Layer	Sleeper/Track Layer	1				-	-	103	-	110	-	-				
	Rail Welder	Rail Welder	2				-	-	93	-	103	-	-				
	Delivery truck	Flat bed truck	1				-	-	106	-	111	-	-				
	Forklift	Forklift	1				-	-	99	-	103	-	-				
	Crane (Grove GMK5130)	Crane (Grove GMK5130)	1				-	-	105	-	103	-	-				
	Front end loader	Front End Loader	2				-	-	110	-	115	-	-				
	Excavator w bucket (25t)	High rail Excavator	2				-	-	103	-	108	-	-				
	Skid steer / Bobcat (10T)	Skidsteer bobcat	2				-	-	104	-	109	-	-				
	Fast Clip Machine	Fast Clip Machine	2				-	-	94	-	100	-	-				
	OHW Foundations, Structures and Wiring	June 2022 to Nov 2022					Flashbutt welder	Flashbutt welder	1	-	-	93	-	103	-	-	
				Hand tools (Power)	Power tools	Various	-	-	107	-	118	-	-				
				EWP	EWP	3	-	-	95	-	98	-	-				
				Light vehicles / traffic control utes	Hi rail vehicle	1	-	-	89	-	100	-	-				
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-				
	Water cart	Water Cart	4 per hour	-	-	104	-	107	-	-							

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION - POSSESSION 0

Work activity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	7 to 8 Mar 2020		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-	
PERMANENT DOWN (SYD TRAINS WORKS)														
Red Area (limited)	Structures			Piling Rig - bored	Piling machine (bored)	1	1	1	107	-	116	-	-	
				Dump truck	Boogie	1	1	1	106	-	111	-	-	
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-	
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-	
				Tipper	Small Truck	1	1	1	103	-	111	-	-	
				Excavator w bucket (25t)	Excavator 20T	2	2	2	103	-	108	-	-	
				Concrete pump	Concrete pump	1	1	1	103	-	107	-	-	
				Vaccum truck	Sucker truck	1	0	1	107	-	111	-	-	
				Concrete Agi	Concrete truck	2	2	2	108	-	111	-	-	

NORTHERN CONNECTION - POSSESSION 1

			Compactor / Wacker packer	Wacker Packe	1	-
			Front end loader	Front End Loader	1	-
			Pump	Water pump 6"	2	-
			Telehandler / Franna crane (20t)	Telehandler	1	-
			Compactor / Wacker packer	Compactor	1	-
			Water cart	Water Cart	1	-
Red Area	Track Tie In		Tamper - Hi Rail	Tamper	1	-
			Regulator	Regulator	1	-
			Handtool - grinder	Rail Grinder	1	-
			Light vehicles / traffic control utes	Light vehicle	2 per hour	-
			Sleeper/Track Laver	Sleeper/Track Laver	1	-
			Rail Welder	Rail Welder	2	-
			Delivery truck	Flat bed truck	1	-
			Forklift	Forklift	1	-
			Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION - POSSESSION 2

Work activity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes				
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}							
COMPOUND																		
Provisional sum - full extent	General worksite and Car parking	18 to 19 Jul 2020		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-					
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-					
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-					
				Compressor	Air Compressor	2	-	-	102	-	103	-	-					
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-					
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-					
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-					
PERMANENT DOWN (SYD TRAINS WORKS)																		
Red Area	Drainage ULX			Excavator w bucket (25t)	Excavator 20T	1	1	1	103	-	108	-	-					
				Generator	Generator	2	2	2	94	-	95	-	-					
				Hvdrema	Hvdrema	1	1	1	110	-	113	-	-					
				Hand tools	Hand tools	1	-	-	107	-	111	-	-					
				Vaccum truck	Sucker Truck	2	-	-	107	-	111	-	-					
				Compactor / Wacker packer	Wacker Packer	1	-	-	108	-	110	-	X					
				Front end loader	Front End Loader	1	-	-	110	-	115	-	-					
				Pump	Water pump 6"	2	-	-	104	-	107	-	-					
				Telehandler / Franna crane (20t)	Telehandler	1	-	-	99	-	103	-	-					
				Compactor / Wacker packer	Compactor	1	-	-	108	-	110	-	X					
				Water cart	Water Cart	1	-	-	104	-	107	-	-					
				Red Area	Track Tie In			Tamper - Hi Rail	Tamper	1	-	-	115	-	118	HN	-	
								Regulator	Regulator	1	-	-	108	-	112	HN	-	
								Handtool - grinder	Rail Grinder	1	-	-	107	-	118	HN	-	
Light vehicles / traffic control utes	Light vehicle	2 per hour	-					-	89	-	100	-	-					
Sleeper/Track Layer	Sleeper/Track Layer	1	-					-	103	-	110	-	-					
Rail Welder	Rail Welder	2	-					-	93	-	103	-	-					
Delivery truck	Flat bed truck	1	-					-	106	-	111	-	-	for Rail delivery				
Forklift	Forklift	1	-					-	99	-	103	-	-					
Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-					-	105	-	103	-	-					
Front end loader	Front End Loader	2	-					-	110	-	115	-	-					
Excavator w bucket (25t)	High rail Excavator	2	-					-	103	-	108	-	-					
Skid steer / Bobcat (10T)	Skidsteer bobcat	2	-					-	104	-	109	-	-					
Fast Clip Machine	Fast Clip Machine	2	-					-	94	-	100	-	-					
Flashbutt welder	Flashbutt welder	1	-					-	93	-	103	-	-					
Red area (limited)	Structures			Piling Rig - bored	Piling machine (bored)	3	3	3	107	-	116	-	-					
				Delivery truck	Flatbed truck	2	2	3	106	-	111	-	-					
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-					
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-					
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	1	1	105	-	103	-	-					
				Tipper	Small Truck	2	2	2	103	-	111	-	-					
				Concrete Aqi	Concrete truck	2	2	2	108	-	111	-	-					
OPEN DIVE (SYDNEY METRO CONNECTION)																		
Blue area	Structures			Piling Rig - bored	Piling machine (bored)	3	3	3	107	-	116	-	-					
				Delivery truck	Flatbed truck	2	2	3	106	-	111	-	-					
				Light vehicles / traffic control utes	Light vehicle	4 per hour	-	-	89	-	100	-	-					
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-					
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	1	1	105	-	103	-	-					
				Tipper	Small Truck	2	2	2	103	-	111	-	-					
				Concrete Aqi	Concrete truck	2	2	2	108	-	111	-	-					

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION - POSSESSION 3A

Work activity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	17 to 18 Oct 2020		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-		
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-		
				Compressor	Air Compressor	2	-	-	102	-	103	-		
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-		
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-		
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-		
PERMANENT DOWN (SYD TRAINS WORKS)														
Red Area	Drainage ULX			Excavators with hammers (35-45T)	Excavator 20T with hammer	1	1	1	118	5	123	HN	X	
				Generator	Generator	2	2	2	94	-	95	-		
				Hydrema	Hydrema	1	1	1	110	-	113	-		
				Hand tools	Hand tools	1	-	-	107	-	111	-		
				Vaccum truck	Sucker Truck	2	-	-	107	-	111	-		
				Compactor / Wacker packer	Wacker Packer	1	-	-	108	-	110	-	X	
				Pump	Water pump 6"	2	-	-	104	-	107	-		
				Telehandler / Franna crane (20t)	Telehandler	1	-	-	99	-	103	-		
				Compactor / Wacker packer	Compactor	1	-	-	108	-	110	-	X	
				Water cart	Water Cart	1	-	-	104	-	107	-		
Red Area	Track Tie In and re-rail scope			Light vehicles / traffic control utes	Light vehicle	1	-	-	89	-	100	-	-	
				Rail Welder	Rail Welder	1	-	-	93	-	103	-		
				Delivery truck	Flat bed truck	1	-	-	106	-	111	-		
				Forklift	Forklift	2 per hour	-	-	99	-	103	-		
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-	-	105	-	103	-		
				Front end loader	Front End Loader	2	-	-	110	-	115	-		
				Excavator w bucket (25t)	High rail Excavator	1	-	-	103	-	108	-		
				Skid steer / Bobcat (10T)	Skidsteer bobcat	1	-	-	104	-	109	-		
				Fast Clip Machine	Fast Clip Machine	1	-	-	94	-	100	-		
				Vibratory Roller - smooth drum (up to 14T)	Smooth drum roller up to 14T	1	-	-	112	-	118	HN	x	dayshift only
				Flashbutt welder	Flashbutt welder	2	-	-	93	-	103	-		
				OPEN DIVE (SYDNEY METRO CONNECTION)										
Blue area	Structures			Piling Ria - bored	Piling machine (bored)	3	3	3	107	-	116	-	-	
				Delivery truck	Flatbed truck	2	2	3	106	-	111	-		
				Light vehicles / traffic control utes	Light vehicle	4 per hour	-	-	89	-	100	-		
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-		
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	1	1	105	-	103	-		
				Tipper	Small Truck	2	2	2	103	-	111	-		
Hopetoun Ave	Concrete pumping			Concrete Aai	Concrete truck	3 per hour	3 per hour	3 per hour	108	-	111	-		
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-		

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION - POSSESSION 3B

Work activity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	24 to 25 Oct 2020		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-		
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-		
				Compressor	Air Compressor	2	-	-	102	-	103	-		
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-		
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-		
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-		
PERMANENT DOWN (SYD TRAINS WORKS)														
Red Area	Drainage ULX			Excavators with hammers (35-45T)	Excavator 20T with hammer	1	1	1	118	5	123	HN	X	
				Generator	Generator	2	2	2	94	-	95	-		
				Hydrema	Hydrema	1	1	1	110	-	113	-		
				Hand tools	Hand tools	1	-	-	107	-	111	-		
				Vaccum truck	Sucker Truck	2	-	-	107	-	111	-		
				Compactor / Wacker packer	Wacker Packer	1	-	-	108	-	110	-	X	
				Pump	Water pump 6"	2	-	-	104	-	107	-		
				Telehandler / Franna crane (20t)	Telehandler	1	-	-	99	-	103	-		
				Compactor / Wacker packer	Compactor	1	-	-	108	-	110	-	X	
				Water cart	Water Cart	1	-	-	104	-	107	-		
Red Area	Track Tie In and re-rail scope			Light vehicles / traffic control utes	Light vehicle	1	-	-	89	-	100	-	-	
				Rail Welder	Rail Welder	1	-	-	93	-	103	-		
				Delivery truck	Flat bed truck	1	-	-	106	-	111	-		
				Forklift	Forklift	2 per hour	-	-	99	-	103	-		
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-	-	105	-	103	-		
				Front end loader	Front End Loader	2	-	-	110	-	115	-		
				Excavator w bucket (25t)	High rail Excavator	1	-	-	103	-	108	-		
				Skid steer / Bobcat (10T)	Skidsteer bobcat	1	-	-	104	-	109	-		
				Fast Clip Machine	Fast Clip Machine	1	-	-	94	-	100	-		
				Vibratory Roller - smooth drum (up to 14T)	Smooth drum roller up to 14T	1	-	-	112	-	118	HN	x	dayshift only
				Flashbutt welder	Flashbutt welder	2	-	-	93	-	103	-		
				OPEN DIVE (SYDNEY METRO CONNECTION)										
Blue area	Structures			Piling Rig - bored	Piling machine (bored)	3	3	3	107	-	116	-	-	
				Delivery truck	Flatbed truck	2	2	3	106	-	111	-		
				Light vehicles / traffic control utes	Light vehicle	4 per hour	-	-	89	-	100	-		
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-		
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	1	1	105	-	103	-		
				Tipper	Small Truck	2	2	2	103	-	111	-		
Hopetoun Ave	Concrete pumping			Concrete Aai	Concrete truck	3 per hour	3 per hour	3 per hour	108	-	111	-		
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-		

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION - POSSESSION 4

Work activity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	20 to 21 Mar		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-	
PERMANENT DOWN (SYD TRAINS WORKS)														
Red Area	Earthworks & CSR			Excavator w bucket (25t)	Excavator 20T	3	3	3	103	-	108	-	-	
				Bulldozer	Bulldozer	1	1	1	110	-	118	-	-	
				Concrete / road / rail saw	Rock Saw	1	1	1	121	5	129	HN	X	
				Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete Aqi	Concrete truck	1 per hour	1 per hour	1 per hour	108	-	111	-	-	
				Concrete vibrator	Vibrator	1	1	1	97	-	100	-	-	
				Vaccum truck	Sucker Truck	2	2	2	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	-	X	
				Front end loader	Front End Loader	1	1	1	110	-	115	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Pump	Water pump 6"	2	2	2	104	-	107	-	-	
				Skid steer / Bobcat (10T)	Skidsteer bobcat	1	1	1	104	-	109	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X	
				Vibratory Roller - smooth drum (up to 14T)	Smooth drum roller up to 14T	1	1	1	112	-	118	HN	x	
				Water cart	Water Cart	1	1	1	104	-	107	-	-	
				Dump truck	Bogie	2	2	2	106	-	111	-	-	
				Grader	Grader	1	1	1	113	-	113	-	-	
				Red Area	Track Construction including Tamping, Grinding & Turnouts			Tamper - Hi Rail	Tamper	1	-	-	115	-
Regulator	Regulator	1	-					-	108	-	112	HN	-	
Handtool - grinder	Rail Grinder	1	-					-	107	-	118	HN	-	
Light vehicles / traffic control utes	Light vehicle	2 per hour	-					-	89	-	100	-	-	
Sleeper/Track Layer	Sleeper/Track Layer	1	-					-	103	-	110	-	-	
Rail Welder	Rail Welder	2	-					-	93	-	103	-	-	
Delivery truck	Flat bed truck	1	-					-	106	-	111	-	-	
Forklift	Forklift	1	-					-	99	-	103	-	-	
Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-					-	105	-	103	-	-	
Front end loader	Front End Loader	2	-					-	110	-	115	-	-	
Excavator w bucket (25t)	High rail Excavator	2	-					-	103	-	108	-	-	
Skid steer / Bobcat (10T)	Skidsteer bobcat	2	-					-	104	-	109	-	-	
Fast Clip Machine	Fast Clip Machine	2	-					-	94	-	100	-	-	
Flashbutt welder	Flashbutt welder	1	-					-	93	-	103	-	-	
Red Area	OHW Foundations, Structures and Wiring			Hand tools (Power)	Power tools	Various	Various	Various	107	-	118	-	-	
				EWP	EWP	3	3	3	95	-	98	-	-	
				Light vehicles / traffic control utes	Hi rail vehicle	1	1	1	89	-	100	-	-	
				Excavator w bucket (25t)	Excavator 20T	1	1	1	103	-	108	-	-	
				Light vehicles / traffic control utes	Ute	2 per hour	3 per hour	4 per hour	89	-	100	-	-	
OPEN DIVE (SYDNEY METRO CONNECTION)														
Blue area	Structures FRP (Capping Beam)			Generator	Generator	1	1	-	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	-	103	-	107	-	-	
				Concrete vibrator	Vibrator	1	1	-	97	-	100	-	-	
				EWP	EWP	3	3	-	95	-	98	-	-	
				Generator	Generator	3	3	-	94	-	95	-	-	
				Tipper	Small truck	1	1	-	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	-	99	-	103	-	-	

Table C1: Construction Timetable/ Activities/ Equipment NORTHERN CONNECTION - POSSESSION 5

Work activity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes				
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}							
COMPOUND																		
Provisional sum - full extent	General worksite and Car parking	05 - 06 June 2021		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-					
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-					
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-					
				Compressor	Air Compressor	2	-	-	102	-	103	-	-					
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-					
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-					
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-					
PERMANENT DOWN (SYD TRAINS WORKS)																		
Red Area	Removal of redundant track and infrastructure			Excavator w bucket (25t)	Excavator 20T	3	-	-	103	-	108	-	-					
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-					
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-					
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-	-	105	-	103	-	-					
				Hvdrema	Hvdrema	4	-	-	110	-	113	-	-					
				Skid steer / Bobcat (10T)	Skidsteer bobcat	1	-	-	104	-	109	-	-					
				Telehandler / Franna crane (20t)	Telehandler	1	-	-	99	-	103	-	-					
				Front end loader	Front end loader	1	-	-	110	-	115	-	-					
				Bulldozer	Bulldozer	1	-	-	110	-	118	-	-					
				Tipper	Small truck	3	-	-	103	-	111	-	-					
OPEN DIVE (SYDNEY METRO CONNECTION)																		
Blue area	Drainage			Excavators with hammers (35-45T)	Excavator 20T with hammer	4	4	4	118	5	123	HN	X					
				Generator	Generator	1	1	1	94	-	95	-	-					
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-					
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-					
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-					
				Vaccum truck	Sucker Truck	2	2	2	107	-	111	-	-					
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	-	X					
				Forklift	Forklift	1	1	1	99	-	103	-	-					
				Generator	Generator	3	3	3	94	-	95	-	-					
				Pump	Water pump 6"	2	2	2	104	-	107	-	-					
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-					
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X					
				Water cart	Water Cart	2	2	2	104	-	107	-	-					
				Hvdrema	Hvdrema	4	4	4	110	-	113	-	-					
				Tamper - Hi Rail	Tamper	1	1	1	115	-	118	HN	-					
				Regulator	Regulator	1	1	1	108	-	112	HN	-					
				Blue area	Structures FRP (Capping Beam)			Piling Rig - bored	Piling machine (bored)	6	6	6	107	-	116	-	-	
								Delivery truck	Flatbed truck	3	3	3	106	-	111	-	-	
								Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-	
								Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-	
Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	1					1	105	-	103	-	-					
Tipper	Small truck	3	3					3	103	-	111	-	-					
Concrete Aqi	Concrete truck	3 per hour	3 per hour					3 per hour	108	-	111	-	-					
Hopetoun Ave	Concrete pumping			Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-					

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION - POSSESSION 6

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	28 & 29 Aug		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-	
PERMANENT DOWN (SYD TRAINS WORKS)														
Red Area	Wall demo			Excavator w bucket (25t)	Excavator 20T	2	-	-	103	-	108	-	-	
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-	
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-	
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-	-	105	-	103	-	-	
				Hvdrema	Hvdrema	2	-	-	110	-	113	-	-	
				Tipper	Small truck	1	-	-	103	-	111	-	-	
OPEN DIVE (SYDNEY METRO CONNECTION)														
Blue area	Drainage			Excavators with hammers (35-45T)	Excavator 20T with hammer	4	4	4	118	5	123	HN	X	
				Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete Aai	Concrete truck	1 per hour	-	-	108	-	111	-	-	
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-	
				Vaccum truck	Sucker Truck	2	2	2	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	-	X	
				Forklift	Forklift	1	1	1	99	-	103	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Pump	Water pump 6"	2	2	2	104	-	107	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X	
				Water cart	Water Cart	2	2	2	104	-	107	-	-	
				Hvdrema	Hvdrema	4	4	4	110	-	113	-	-	
				Tamper - Hi Rail	Tamper	1	1	1	115	-	118	HN	-	
				Regulator	Regulator	1	1	1	108	-	112	HN	-	
Blue area	Structures FRP (Capping Beam)			Piling Rig - bored	Piling machine (bored)	6	6	6	107	-	116	-	-	
				Delivery truck	Flatbed truck	3	3	3	106	-	111	-	-	
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-	
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-	
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	1	1	105	-	103	-	-	
				Tipper	Small truck	3	3	3	103	-	111	-	-	
Hopetoun Ave	Concrete pumping			Concrete Aai	Concrete truck	3 per hour	3 per hour	3 per hour	108	-	111	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
Blue area	OHW Foundations, Structures and Wiring			Hand tools (Power)	Power tools	Various	Various	Various	107	-	118	-	-	
				EWP	EWP	3	3	3	95	-	98	-	-	
				Light vehicles / traffic control utes	Hi rail vehicle	1	1	1	89	-	100	-	-	
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-	
				Water cart	Water Cart	4 per hour	-	-	104	-	107	-	-	

Table C1: Construction Timetable/ Activities/ Equipment NORTHERN CONNECTION - POSSESSION 7

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	6 & 7 Nov 2021		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-	
PERMANENT DOWN (SYD TRAINS WORKS)														
Red Area	Structures			Piling Rig - bored	Piling machine (bored)	1	-	-	107	-	116	-	-	
				Delivery truck	Flatbed truck	1	-	-	106	-	111	-	-	
				Light vehicles / traffic control utes	Ute	1 per hour	-	-	89	-	100	-	-	
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-	
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	-	-	105	-	103	-	-	
				Tipper	Small truck	1	-	-	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	
OPEN DIVE (SYDNEY METRO CONNECTION)														
Blue area	PMF Pit			Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete vibrator	Vibrator	1	1	1	97	-	100	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Tipper	Small truck	1	1	1	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	1 per hour	1 per hour	108	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
Blue area	Drainage			Excavator w bucket (25t)	Excavator 20T	4	4	4	103	-	108	-	-	
				Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-	
				Vaccum truck	Sucker Truck	2	2	2	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	-	X	
				Forklift	Forklift	1	1	1	99	-	103	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Pump	Water pump 6"	2	2	2	104	-	107	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X	
				Water cart	Water Cart	2	2	2	104	-	107	-	-	
				Hvdrema	Hvdrema	4	4	4	110	-	113	-	-	
				Tamper - Hi Rail	Tamper	1	1	1	115	-	118	HN	-	
				Regulator	Regulator	1	1	1	108	-	112	HN	-	
Blue area	Structures			Piling Rig - bored	Piling machine (bored)	3	3	3	107	-	116	-	-	
				Delivery truck	Flatbed truck	1	1	1	106	-	111	-	-	
				Light vehicles / traffic control utes	Ute	4 per hour	-	-	89	-	100	-	-	
				Water cart	Water Cart	1 per hour	-	-	104	-	107	-	-	
				Crane (Grove GMK5130)	Crane (Grove GMK5130)	1	1	1	105	-	103	-	-	
				Tipper	Small truck	1	1	1	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	2 per hour	3 per hour	108	-	111	-	-	

Table C1: Construction Timetable/ Activities/ Equipment NORTHERN CONNECTION - POSSESSION 8

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	29 & 30 Jan 2022		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-	
OPEN DIVE (SYDNEY METRO CONNECTION)														
Blue area	PMF Pit			Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete vibrator	Vibrator	1	1	1	97	-	100	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Tipper	Small truck	1	1	1	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	1 per hour	1 per hour	108	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
Blue area	Drainage			Excavator w bucket (25t)	Excavator 20T	4	4	4	103	-	108	-	-	
				Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-	
				Vaccum truck	Sucker Truck	2	2	2	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	-	X	
				Forklift	Forklift	1	1	1	99	-	103	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Pump	Water pump 6"	2	2	2	104	-	107	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X	
				Water cart	Water Cart	2	2	2	104	-	107	-	-	
				Hydrema	Hydrema	4	4	4	110	-	113	-	-	
				Tamper - Hi Rail	Tamper	1	1	1	115	-	118	HN	-	
				Regulator	Regulator	1	1	1	108	-	112	HN	-	
				Blue area	OHW Foundations, Structures and Wiring			Hand tools (Power)	Power tools	Various	-	-	107	-
Hand tools (Power)	Power tools	Various	-					-	107	-	118	-	-	
EWP	EWP	3	-					-	95	-	98	-	-	
Light vehicles / traffic control utes	Hi rail vehicle	1	-					-	89	-	100	-	-	
Light vehicles / traffic control utes	Light vehicle	4 per hour	-					-	89	-	100	-	-	
Water cart	Water Cart	4 per hour	-					-	104	-	107	-	-	

Table C1: Construction Timetable/ Activities/ Equipment NORTHERN CONNECTION - POSSESSION 9

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	29 & 30 Jan 2022		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-	
OPEN DIVE (SYDNEY METRO CONNECTION)														
Blue area	PMF Pit			Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete vibrator	Vibrator	1	1	1	97	-	100	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Tipper	Small truck	1	1	1	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	1 per hour	1 per hour	108	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
Blue area	Drainage			Excavator w bucket (25t)	Excavator 20T	4	4	4	103	-	108	-	-	
				Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-	
				Vaccum truck	Sucker Truck	2	2	2	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	-	X	
				Forklift	Forklift	1	1	1	99	-	103	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Pump	Water pump 6"	2	2	2	104	-	107	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X	
				Water cart	Water Cart	2	2	2	104	-	107	-	-	
				Hydrema	Hydrema	4	4	4	110	-	113	-	-	
				Tamper - Hi Rail	Tamper	1	1	1	115	-	118	HN	-	
				Regulator	Regulator	1	1	1	108	-	112	HN	-	
Blue area	Transition slab			Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete vibrator	Vibrator	1	1	1	97	-	100	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Tipper	Small truck	1	1	1	103	-	111	-	-	
				Concrete Aqi	Concrete truck	1 per hour	1 per hour	1 per hour	108	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	

Table C1: Construction Timetable/ Activities/ Equipment

NORTHERN CONNECTION - POSSESSION 10

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			High noise plant (EPL 12208 E3.1)	Vibration intensive plant	Notes
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}			
COMPOUND														
Provisional sum - full extent	General worksite and Car parking	27 & 28 Aug		Light vehicles / traffic control utes	Light vehicle	10 per hour	10 per hour	10 per hour	89	-	100	-	-	
				Water pump noise limited to SWL 87	Water treatment plant pumps 10Kw	2	2	2	87	-	90	-	-	
				Delivery truck	Road truck (deliveries to site)	4 p.h.	-	-	106	-	111	-	-	
				Compressor	Air Compressor	2	-	-	102	-	103	-	-	
				Hand tools	Workshop Hand Tools	1	-	-	107	-	111	-	-	
				Telehandler / Franna crane (20t)	Telehandler 2-3t	1	-	-	99	-	103	-	-	
				Water cart	Water cart	4 p.h.	-	-	104	-	107	-	-	
OPEN DIVE (SYDNEY METRO CONNECTION)														
Blue area	Drainage			Excavator w bucket (25t)	Excavator 20T	4	4	4	103	-	108	-	-	
				Generator	Generator	1	1	1	94	-	95	-	-	
				Concrete pump	Concrete Pump	1	1	1	103	-	107	-	-	
				Concrete Aqi	Concrete truck	1 per hour	-	-	108	-	111	-	-	
				Concrete vibrator	Vibrator	1	-	-	97	-	100	-	-	
				Vaccum truck	Sucker Truck	2	2	2	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	-	X	
				Forklift	Forklift	1	1	1	99	-	103	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Pump	Water pump 6"	2	2	2	104	-	107	-	-	
				Telehandler / Franna crane (20t)	Telehandler	1	1	1	99	-	103	-	-	
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X	
				Water cart	Water Cart	2	2	2	104	-	107	-	-	
				Hvdrema	Hvdrema	4	4	4	110	-	113	-	-	
				Tamper - Hi Rail	Tamper	1	1	1	115	-	118	HN	-	
				Regulator	Regulator	1	1	1	108	-	112	HN	-	
Provisional sum - Blue Area	Earthworks / trackwork			Excavator w bucket (25t)	Excavator 20T	1	1	1	103	-	108	-	-	
				Vaccum truck	Sucker Truck	1	-	-	107	-	111	-	-	
				Compactor / Wacker packer	Wacker Packer	1	-	-	108	-	110	-	X	
				Front end loader	Front End Loader	1	-	-	110	-	115	-	-	
				Forklift	Forklift	1	1	1	99	-	103	-	-	
				Flex drive motor	Flex drive motor	2	-	-	94	-	100	-	-	
				Generator	Generator	3	3	3	94	-	95	-	-	
				Compactor / Wacker packer	Compactor	1	1	1	108	-	110	-	X	
				Vibratory Roller - smooth drum (up to 14T)	Smooth drum roller up to 14T	1	1	1	112	-	118	HN	x	
				Moxv	Moxv	2	2	2	108	-	111	-	-	
				Hvdrema	Hvdrema	3	3	3	110	-	113	-	-	
				Grader	Grader	1	1	-	113	-	113	-	-	
				Tamper - Hi Rail	Tamper	1	1	1	115	-	118	HN	-	
				Regulator	Regulator	1	1	1	108	-	112	HN	-	
				Handtool - grinder	Rail Grinder	1	1	1	107	-	118	HN	-	
				Sleeper/Track Layer	Sleeper/Track Layer	1	1	1	103	-	110	-	-	
				Rail Welder	Rail Welder	2	2	2	93	-	103	-	-	
				Delivery truck	Flat bed truck	1	1	1	106	-	111	-	-	for Rail delivery
				Excavator w bucket (25t)	High rail Excavator	2	2	2	103	-	108	-	-	
				Skid steer / Bobcat (10T)	Skidsteer bobcat	2	2	2	104	-	109	-	-	
				Fast Clip Machine	Fast Clip Machine	2	2	2	94	-	100	-	-	
				Flashbutt welder	Flashbutt welder	1	1	1	93	-	103	-	-	

Table C1: Construction Timetable/ Activities/ Equipment NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			Vibration intensive plant	Notes				
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}						
HOPETOUN AVENUE																	
Open Dive Piling	Concrete Pumping		AF_01	Concrete Aqi	Concrete Truck	1	1	1	108	-	111	-					
				Concrete pump	Concrete Pump	2 per hour	2 per hour	2 per hour	103	-	107	-					
				Lighting tower	Lighting Tower	-	1	1	99	-	102	-					
				Light vehicles / traffic control utes	Light vehicle	2 per hour	2 per hour	2 per hour	89	-	100	-					
DRAKE STREET ANCILLARY FACILITY																	
Site establishment	Site establishment prior to possessions / site demobilisation post possessions		AF_02	Front end loader	Front-end loader	1 for 6 days	1	1	110	-	115	-	Lifting and loading materials				
				Hydrema articulated dump truck	Hydrema articulated dump truck	1 for 4 days	1	1	108	-	111	-					
				Hand tools	Hand tools	2	1	1	107	-	111	-					
				Dump truck	Balloon tyre dump truck	2	1	1	106	-	111	-					
				Delivery truck	Flatbed Truck	1 for 2 days			106	-	111	-					
				Rail Buq w/ Trailers	Rail Buq w/ Trailers	1 for 6 days	1	1	105	-	108	-					
				Bobcat	Bobcat	2	1	1	104	-	107	-					
				Water cart	Water Cart	1 for 4 days	1	1	104	-	107	-					
				Excavator w bucket (5t)	Excavator 8T Hi Rail	2 for 6 days	1	1	103	-	108	-					
				Excavator w bucket (13t)	Excavator 16T	5 for 2 dav	1	1	103	-	108	-					
				Excavator w bucket (25t)	Excavator Hi Rail 22T Leibherr	1 for 4 days	1	1	103	-	108	-					
				Lighting tower	Lighting Towers	3 for 2 days	3	3	99	-	102	-					
				Telehandler / Franna crane (20t)	Crane Truck	1 per day	1	1	99	-	103	-					
				Lifting Platform	6T Telehandler	1 onsite	1	1	95	-	95	-					
	Light vehicles / traffic control utes	Light Vehicle	2 for 10 day			89	-	100	-								
BRAND STREET MPR33 DRAINAGE WORKS																	
Drainage works	Drainage installation		AF_03H	Concrete / road / rail saw	Road Saw	1	1	1	121	5	129	X	Worst case activity only - AF_03H				
			AF_03	Excavators with hammers (10-15T)	Excavator 12t w hammer	1	1	1	115	5	120	X	Worst case activity only - AF_03H				
				Compactor / Wacker packer	Wacker Packer	1	1	1	108	-	110	X	Hand operated				
				Concrete Aqi	Concrete Truck	1	1	1	108	-	111	-					
				Hand tools	Hand tools	1	1	1	107	-	111	-					
				Water cart	Water Cart	1	1	1	104	-	107	-					
				Tipper	Truck/ Tipper	1	1	1	103	-	111	-					
				Excavator w bucket (10-15t)	Excavator 12t	1	1	1	103	-	108	-					
				Concrete pump	Concrete pump	1	1	1	103	-	107	-					
				Lighting tower	Lighting Towers	-	3	3	99	-	102	-					
				Generator	Generator	1	1	1	94	-	95	-					
					Light vehicles / traffic control utes	Light Vehicle	1	1	1	89	-	100	-				
				VALETTA LANE ANCILLARY FACILITY													
				General site works	Spoil stockpiling		AF_04	Hydrema articulated dump truck	Hydrema articulated dump truck	1 for 4 days	1	1	108	-	111		
Dump truck	Balloon tyre dump truck	3	1					1	106	-	111	-					
Delivery truck	Flatbed Truck	2 for 2 days							106	-	111	-					
Bobcat	Bobcat	1	1					1	104	-	107	-					
Water cart	Water Cart	1 for 4 days	1					1	104	-	107	-					
Excavator w bucket (5t)	Excavator 8T Hi Rail	1 for 5 days	1					1	103	-	108	-					
Excavator w bucket (13t)	Excavator 16T	1 for 2 day	1					1	103	-	108	-					
Lighting tower	Lighting Towers	4 for 2 days	4					4	99	-	102	-					
	Light vehicles / traffic control utes	Light Vehicle	2 for 10 day							89	-	100	-				
CLELAND ROAD ANCILLARY FACILITY																	
General site works	Material laydown, site storage		AF_05	Front end loader	Front-end loader	1 for 6 days	1	1	110	-	115	-	Lifting and loading materials				
				Hydrema articulated dump truck	Hydrema articulated dump truck	1 for 4 days	1	1	108	-	111	-					
				Hand tools	Hand tools	2	1	1	107	-	111	-					
				Dump truck	Balloon tyre dump truck	2	2	2	106	-	111	-					
				Delivery truck	Flatbed Truck	1 for 2 days			106	-	111	-					
				Rail Buq w/ Trailers	Rail Buq w/ Trailers	1 for 6 days	1	1	105	-	108	-					
				Bobcat	Bobcat	2	2	2	104	-	107	-					
				Water cart	Water Cart	1 for 4 days	1	1	104	-	107	-					
				Excavator w bucket (5t)	Excavator 8T Hi Rail	2 for 10 days	2	2	103	-	108	-					
				Excavator w bucket (13t)	Excavator 16T	1 for 2 day	1	1	103	-	108	-					
				Excavator w bucket (25t)	Excavator Hi Rail 22T Leibherr	1 for 4 days	1	1	103	-	108	-					
				Lighting tower	Lighting Towers	6 for 2 days	6	6	99	-	102	-					
				Telehandler / Franna crane (20t)	Crane Truck	1 per day	1	1	99	-	103	-					
				Lifting Platform	6T Telehandler	1 onsite			95	-	95	-					
					Light vehicles / traffic control utes	Light Vehicle	2 for 10 day			89	-	100	-				

Table C1: Construction Timetable/ Activities/ Equipment NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Work acitivity	Details	Indicative timing/ duration	Modelling ID	Plant/ Equipment	Plant/ Equipment (as provided by client)	Day	Evening	Night	Sound Power Level (Lw re: 1pW) in Noise Model, dB(A)			Vibration intensive plant	Notes					
						7am - 6pm	6pm - 10pm	10pm - 7am	L _{Aeq}	Penalty	L _{Amax}							
FRANCIS STREET ANCILLARY FACILITY																		
General site works	Material laydown		AF 06	Front end loader	Front-end loader	1 for 6 days			110	-	115	-	Lifting and loading materials					
				Hydrema articulated dump truck	Hydrema articulated dump truck	1 for 4 days			108	-	111	-						
				Hand tools	Hand tools	2			107	-	111	-						
				Dump truck	Balloon tyre dump truck	2			106	-	111	-						
				Delivery truck	Flatbed Truck	1 for 2 days			106	-	111	-						
				Rail Buq w/ Trailers	Rail Buq w/ Trailers	1 for 6 days			105	-	108	-						
				Bobcat	Bobcat	2			104	-	107	-						
				Water cart	Water Cart	1 for 4 days			104	-	107	-						
				Excavator w bucket (5t)	Excavator 8T Hi Rail	2 for 10 days			103	-	108	-						
				Excavator w bucket (13t)	Excavator 16T	5 for 2 dav			103	-	108	-						
				Excavator w bucket (25t)	Excavator Hi Rail 22T Leibherr	1 for 4 days			103	-	108	-						
				Telehandler / Franna crane (20t)	Crane Truck	1 per day			99	-	103	-						
				Lifting Platform	6T Telehandler	1 onsite			95	-	95	-						
				Light vehicles / traffic control utes	Light Vehicle	2 for 10 day			89	-	100	-						
LAMBS ROAD ANCILLARY FACILITY																		
General site works	Material laydown, site storage		AF 07	Front end loader	Front-end loader	1 for 6 days			110	-	115	-	Lifting and loading materials					
				Hydrema articulated dump truck	Hydrema articulated dump truck	1 for 4 days			108	-	111	-						
				Hand tools	Hand Tools	2			107	-	111	-						
				Delivery truck	Flatbed Truck	6 for 5 days			106	-	111	-						
				Bobcat	Bobcat	2			104	-	107	-						
				Water cart	Water Cart	1 for 4 days			104	-	107	-						
				Excavator w bucket (5t)	Excavator 8T Hi Rail	2 for 10 days			103	-	108	-						
				Excavator w bucket (13t)	Excavator 16T	5 for 2 dav			103	-	108	-						
				Lighting tower	Lighting Towers	1 for 2 days			99	-	102	-						
				Telehandler / Franna crane (20t)	Crane Truck	1 per day			99	-	103	-						
				Lifting Platform	6T Telehandler	1 onsite			95	-	95	-						
				Light vehicles / traffic control utes	Light Vehicle	2 for 10 day			89	-	100	-						
				CHANDOS STREET LAYDOWN														
				Trackworks	Stockpile quarry materials reload works train		AF 08	Front end loader	Front-end loader	1 for 5 days	1	1		110	-	115	-	Lifting and loading materials
Works train	Works train	1 for 1 day	1					1	115	-	118	-						
Hydrema articulated dump truck	Hydrema articulated dump truck	1 for 4 days							108	-	111	-						
Hand tools	Hand Tools	2							107	-	111	-						
Delivery truck	Flatbed Truck	1 for 2 days							106	-	111	-						
Delivery truck	Road Truck (Deliveries to site)	10 for 5 day							106	-	111	-						
Bobcat	Bobcat	1	1					1	104	-	107	-						
Water cart	Water Cart	1 for 4 days	1					1	104	-	107	-						
Excavator w bucket (25t)	Excavator Hi Rail 22T Leibherr	1 for 4 days	1					1	103	-	108	-						
Lighting tower	Lighting Towers	4 for 2 days	4					4	99	-	102	-						
Telehandler / Franna crane (20t)	Crane Truck	1 per day							99	-	103	-						
Lifting Platform	6T Telehandler	1 onsite							95	-	95	-						
Light vehicles / traffic control utes	Light Vehicle	2 for 5 day	2					2	89	-	100	-						

APPENDIX D Detailed predicted noise levels

The detailed predicted levels have provided to Systems Connect in a spreadsheet table in order to more adequately mitigate and manage potential noise impacts.

Table D1: Predicted construction noise levels

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

NCA	Address	Predicted noise level, dB(A)																Day (Standard)																Evening (DOHW)																Night (DOHW)																E2 (E4/E42)																N (E4/E42)															
		Day (Standard)																Evening (DOHW)																Night (DOHW)																E2 (E4/E42)																N (E4/E42)																															
		NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08																																														
AS1.01	4 BRIGHTON ROAD, ARTARMON (WILLOUGHBY)	59	35	50	50	61	52	38	37	37	-	54	35	50	50	61	52	38	37	37	-	51	35	50	50	61	52	38	37	37	-	55	35	50	50	61	52	38	37	37	-	55	35	50	50	61	52	38	37	37	-																																														
AS1.01	1 BRIGHTON ROAD, ARTARMON (WILLOUGHBY)	59	34	50	50	61	52	38	38	38	-	54	34	50	50	61	52	38	38	38	-	45	34	50	50	61	52	38	38	38	-	55	34	50	50	61	52	38	38	38	-	55	34	50	50	61	52	38	38	38	-																																														
AS1.01	3 JERSEY ROAD, ARTARMON (WILLOUGHBY)	59	-	46	48	58	49	38	38	38	-	54	-	46	48	58	49	38	38	38	-	45	-	46	48	58	49	38	38	38	-	55	-	46	48	58	49	38	38	38	-	55	-	46	48	58	49	38	38	38	-																																														
AS1.01	5 JERSEY ROAD, ARTARMON (WILLOUGHBY)	59	-	47	46	51	42	39	38	38	-	54	-	47	46	51	42	39	38	38	-	45	-	47	46	51	42	39	38	38	-	55	-	47	46	51	42	39	38	38	-	55	-	47	46	51	42	39	38	38	-																																														
AS1.01	8 BRIGHTON ROAD, ARTARMON (WILLOUGHBY)	59	-	42	44	56	47	35	-	34	-	54	-	42	44	56	47	35	-	34	-	51	-	42	44	56	47	35	-	34	-	55	-	42	44	56	47	35	-	34	-	55	-	42	44	56	47	35	-	34	-																																														
AS1.01	2 BRIGHTON ROAD, ARTARMON (WILLOUGHBY)	59	35	52	53	63	54	39	35	36	-	54	35	52	53	63	54	39	35	36	-	51	35	52	53	63	54	39	35	36	-	55	35	52	53	63	54	39	35	36	-	55	35	52	53	63	54	39	35	36	-																																														
AS1.01	7 JERSEY ROAD, ARTARMON (WILLOUGHBY)	59	-	-	40	52	43	36	34	37	-	54	-	-	40	52	43	36	34	37	-	51	-	-	40	52	43	36	34	37	-	55	-	-	40	52	43	36	34	37	-	55	-	-	40	52	43	36	34	37	-																																														
AS1.01	15 BARTON ROAD, ARTARMON (WILLOUGHBY)	59	-	34	35	43	34	47	40	41	-	54	-	34	35	43	34	47	40	41	-	51	-	34	35	43	34	47	40	41	-	55	-	34	35	43	34	47	40	41	-	55	-	34	35	43	34	47	40	41	-																																														
AS1.01	1 MCILLAN ROAD, ARTARMON (WILLOUGHBY)	59	-	41	41	50	41	42	39	40	-	54	-	41	41	50	41	42	39	40	-	51	-	41	41	50	41	42	39	40	-	55	-	41	41	50	41	42	39	40	-	55	-	41	41	50	41	42	39	40	-																																														
AS1.01	11 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	59	-	36	-	42	-	52	48	49	-	54	-	36	-	42	-	52	48	49	-	51	-	36	-	42	-	52	48	49	-	55	-	36	-	42	-	52	48	49	-	55	-	36	-	42	-	52	48	49	-																																														
AS1.01	19 BARTON ROAD, ARTARMON	59	-	37	37	34	-	39	37	38	-	54	-	37	37	34	-	39	37	38	-	51	-	37	37	34	-	39	37	38	-	55	-	37	37	34	-	39	37	38	-	55	-	37	37	34	-	39	37	38	-																																														
AS1.01	108 RESERVE ROAD, ARTARMON	59	-	-	-	-	-	36	36	36	-	54	-	-	-	-	-	36	36	36	-	51	-	-	-	-	-	36	36	36	-	55	-	-	-	-	36	36	36	-	55	-	-	-	36	36	36	-																																																	
AS1.01	16 BARTON ROAD, ARTARMON	59	-	36	-	35	-	39	38	39	-	54	-	36	-	35	-	39	38	39	-	51	-	36	-	35	-	39	38	39	-	55	-	36	-	35	-	39	38	39	-	55	-	36	-	35	-	39	38	39	-																																														
AS1.01	26 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	59	-	37	35	44	35	40	39	40	-	54	-	37	35	44	35	40	39	40	-	51	-	37	35	44	35	40	39	40	-	55	-	37	35	44	35	40	39	40	-	55	-	37	35	44	35	40	39	40	-																																														
AS1.01	38 CLELAND ROAD, ARTARMON (WILLOUGHBY)	59	-	41	42	51	42	46	46	45	-	54	-	41	42	51	42	46	46	45	-	51	-	41	42	51	42	46	46	45	-	55	-	41	42	51	42	46	46	45	-	55	-	41	42	51	42	46	46	45	-																																														
AS1.01	29 - 33 PARKES ROAD, ARTARMON (WILLOUGHBY)	59	-	35	34	43	34	43	41	42	-	54	-	35	34	43	34	43	41	42	-	51	-	35	34	43	34	43	41	42	-	55	-	35	34	43	34	43	41	42	-	55	-	35	34	43	34	43	41	42	-																																														
AS1.01	24 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	59	-	36	-	42	-	40	40	39	-	54	-	36	-	42	-	40	40	39	-	51	-	36	-	42	-	40	40	39	-	55	-	36	-	42	-	40	40	39	-	55	-	36	-	42	-	40	40	39	-																																														
AS1.01	38 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	59	-	43	43	54	45	41	38	37	-	54	-	43	43	54	45	41	38	37	-	51	-	43	43	54	45	41	38	37	-	55	-	43	43	54	45	41	38	37	-	55	-	43	43	54	45	41	38	37	-																																														
AS1.01	12 BRIGHTON ROAD, ARTARMON (WILLOUGHBY)	59	-	34	-	35	-	39	38	39	-	54	-	34	-	35	-	39	38	39	-	51	-	34	-	35	-	39	38	39	-	55	-	34	-	35	-	39	38	39	-	55	-	34	-	35	-	39	38	39	-																																														
AS1.01	28 - 30 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	59	-	38	34	46	37	41	38	39	-	54	-	38	34	46	37	41	38	39	-	51	-	38	34	46	37	41	38	39	-	55	-	38	34	46	37	41	38	39	-	55	-	38	34	46	37	41	38	39	-																																														
AS1.01	15 HAMPDEN ROAD, ARTARMON	59	-	-	-	35	-	47	45	46	-	54	-	-	-	35	-	47	45	46	-	51	-	-	-	35	-	47	45	46	-	55	-	-	-	35	-	47	45	46	-	55	-	-	-	35	-	47	45	46	-																																														
AS1.01	23-27 PARKES ROAD, ARTARMON	59	-	-	-	40	-	45	44	46	-	54	-	-	-	40	-	45	44	46	-	51	-	-	-	40	-	45	44	46	-	55	-	-	-	40	-	45	44	46	-	55	-	-	-	40	-	45	44	46	-																																														
AS1.01	35-39 PARKES ROAD, ARTARMON	59	-	-	-	37	-	43	40	41	-	54	-	-	-	37	-	43	40	41	-	51	-	-	-	37	-	43	40	41	-	55	-	-	-	37	-	43	40	41	-	55	-	-	-	37	-	43	40	41	-																																														
AS1.01	20-22 HAMPDEN ROAD, ARTARMON	59	-	38	37	46	37	46	44	45	-	54	-	38	37	46	37	46	44	45	-	51	-	38	37	46	37	46	44	45	-	55	-	38	37	46	37	46	44	45	-	55	-	38	37																																																				

Table D1: Predicted construction noise levels

Receiver		Predicted noise level, dB(A)																NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS															
		Day (Standard)																Evening (DOHW)															
		AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML		
NCA	Address	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML		
AS.03	0 PACIFIC HIGHWAY, ST LEONARDS (WILLOU	59	-	-	-	-	39	35	70	54	-	-	-	-	-	39	35	70	45	-	-	-	-	-	-	39	35	70	55	-	-	70	
AS.03	19 - 23 HERBERT STREET, ST LEONARDS (W)	59	-	-	-	-	37	43	38	69	54	-	-	-	-	37	43	38	69	45	-	-	-	-	-	37	43	38	69	55	-	-	69
AS.03	19 - 23 HERBERT STREET, ST LEONARDS (W)	59	-	-	-	-	38	46	41	60	54	-	-	-	-	38	46	41	60	45	-	-	-	-	-	38	46	41	60	55	-	-	60
AS.03	15 DARGAN STREET, NAREMBURN, NSW	59	-	-	-	-	40	40	41	35	54	-	-	-	-	40	40	41	35	45	-	-	-	-	-	40	40	41	35	55	-	-	35
AS.03	17 DARGAN STREET, NAREMBURN, NSW	59	-	-	-	-	38	39	39	35	54	-	-	-	-	38	39	39	35	45	-	-	-	-	-	38	39	39	35	55	-	-	45
AS.03	7 HERBERT STREET, ST LEONARDS (WILLOUGH	59	-	-	-	-	40	-	-	70	54	-	-	-	-	40	-	-	70	45	-	-	-	-	-	40	-	-	70	55	-	-	70
AS.03	18 GRANDVIEW STREET, NAREMBURN, NSW	59	-	-	-	36	-	49	56	54	-	-	-	-	36	-	49	56	54	-	-	-	-	-	36	-	49	56	54	-	-	54	
AS.03	48 DALLEYS ROAD, NAREMBURN, NSW	59	-	-	-	-	36	37	38	44	54	-	-	-	-	36	37	38	44	45	-	-	-	-	-	36	37	38	44	55	-	-	44
AS.03	32 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	39	39	41	38	54	-	-	-	-	39	39	41	38	45	-	-	-	-	-	39	39	41	38	55	-	-	38
AS.03	32 NORTHGATE STREET, NAREMBURN, NSW	59	-	-	-	-	34	34	38	49	54	-	-	-	-	34	34	38	49	45	-	-	-	-	-	34	34	38	49	55	-	-	49
AS.03	27 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	36	35	34	41	54	-	-	-	-	36	35	34	41	45	-	-	-	-	-	36	35	34	41	55	-	-	41
AS.03	23-25 PARK ROAD, NAREMBURN, NSW	59	-	-	-	34	-	-	-	-	54	-	-	-	-	42	43	41	-	51	-	-	-	-	34	-	-	-	-	55	-	-	41
AS.03	40 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	41	42	42	37	54	-	-	-	-	41	42	42	37	51	-	-	-	-	-	41	42	42	37	55	-	-	37
AS.03	44 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	40	41	41	-	54	-	-	-	-	40	41	41	-	45	-	-	-	-	-	40	41	41	-	55	-	-	41
AS.03	18 NORTHGATE STREET, NAREMBURN (WILLOU	59	-	-	-	-	36	38	39	57	54	-	-	-	-	36	38	39	57	45	-	-	-	-	-	36	38	39	57	55	-	-	57
AS.03	18 NORTHGATE STREET, NAREMBURN (WILLOU	59	-	-	-	-	34	37	38	53	54	-	-	-	-	34	37	38	53	45	-	-	-	-	-	34	37	38	53	55	-	-	53
AS.03	1 GRANDVIEW STREET, NAREMBURN, NSW	59	-	-	-	35	-	45	49	48	-	-	-	-	35	-	45	49	48	-	-	-	-	-	35	-	45	49	48	-	-	48	
AS.03	20 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	34	-	42	54	-	-	-	-	34	-	42	54	-	45	-	-	-	-	-	34	-	42	54	-	-	42	
AS.03	13-15 RUTH STREET, NAREMBURN, NSW	59	-	-	-	-	41	40	41	35	54	-	-	-	-	41	40	41	35	51	-	-	-	-	-	41	40	41	35	55	-	-	35
AS.03	10 DALLEYS ROAD, NAREMBURN, NSW	59	-	-	-	-	38	37	43	54	-	-	-	-	38	37	43	54	-	45	-	-	-	-	-	38	37	43	55	-	-	43	
AS.03	16 GRANDVIEW STREET, NAREMBURN, NSW	59	-	-	-	-	42	52	51	-	54	-	-	-	42	52	51	-	45	-	-	-	-	-	-	42	52	51	-	55	-	-	51
AS.03	102 NORTHGATE STREET, NAREMBURN, NSW	59	-	-	-	-	34	34	34	36	54	-	-	-	-	34	34	34	36	45	-	-	-	-	-	34	34	34	36	55	-	-	36
AS.03	1 DARGAN STREET, NAREMBURN, NSW	59	-	-	-	-	37	36	37	35	54	-	-	-	-	37	36	37	35	45	-	-	-	-	-	37	36	37	35	55	-	-	35
AS.03	29 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	36	35	34	39	54	-	-	-	-	36	35	34	39	51	-	-	-	-	-	36	35	34	39	55	-	-	39
AS.03	9-11 RUTH STREET, NAREMBURN, NSW	59	-	-	-	-	38	39	36	34	54	-	-	-	-	38	39	36	34	45	-	-	-	-	-	38	39	36	34	55	-	-	34
AS.03	16 DARGAN STREET, NAREMBURN, NSW	59	-	-	-	-	38	37	38	36	54	-	-	-	-	38	37	38	36	45	-	-	-	-	-	38	37	38	36	55	-	-	36
AS.03	16 MCNORMIA STREET, NAREMBURN, NSW	59	-	-	-	-	35	36	38	39	54	-	-	-	-	35	36	38	39	45	-	-	-	-	-	35	36	38	39	55	-	-	39
AS.03	44 NORTHGATE STREET, NAREMBURN, NSW	59	-	-	-	-	37	45	54	-	-	-	-	-	37	45	54	-	45	-	-	-	-	-	-	37	45	54	-	55	-	-	45
AS.03	26 BONGALONG STREET, NAREMBURN, NSW	59	-	-	-	-	35	38	39	44	54	-	-	-	-	35	38	39	44	45	-	-	-	-	-	35	38	39	44	55	-	-	44
AS.03	2 OLYMPIA ROAD, NAREMBURN, NSW	59	-	-	-	34	-	41	44	42	-	-	-	-	34	-	41	44	42	-	-	-	-	-	34	-	41	44	42	-	-	42	
AS.03	67 MITCHELL STREET, NAREMBURN, NSW	59	-	-	-	-	35	37	38	45	54	-	-	-	-	35	37	38	45	51	-	-	-	-	-	35	37	38	45	55	-	-	45
AS.03	14 TALUS STREET, NAREMBURN, NSW	59	-	-	-	-	34	38	48	54	-	-	-	-	34	38	48	54	-	45	-	-	-	-	-	34	38	48	54	-	-	48	
AS.03	20 DALLEYS ROAD, NAREMBURN, NSW	59	-	-	-	-	37	38	45	54	-	-	-	-	37	38	45	54	-	45	-	-	-	-	-	37	38	45	54	-	-	45	
AS.03	1 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	34	40	54	-	-	-	-	-	34	40	54	-	45	-	-	-	-	-	-	34	40	54	-	55	-	-	40
AS.03	23 DALLEYS ROAD, NAREMBURN, NSW	59	-	-	-	-	35	37	38	45	54	-	-	-	-	35	37	38	45	45	-	-	-	-	-	35	37	38	45	55	-	-	45
AS.03	34 PARK ROAD, NAREMBURN, NSW	59	-	-	-	34	-	40	42	44	-	-	-	-	34	-	40	42	44	-	-	-	-	-	-	34	-	40	42	44	-	-	44
AS.03	26-28 NORTHGATE STREET, NAREMBURN, NSW	59	-	-	-	-	34	46	54	-	-	-	-	-	34	46	54	-	45	-	-	-	-	-	-	34	46	54	-	55	-	-	46
AS.03	50 NORTHGATE STREET, NAREMBURN, NSW	59	-	-	-	-	34	44	54	-	-	-	-	-	34	44	54	-	45	-	-	-	-	-	-	34	44	54	-	55	-	-	44
AS.03	40 NORTHGATE																																

Table D1: Predicted construction noise levels

Table D1: Predicted construction noise levels		NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS																																															
Receiver	Address	Predicted noise levels (dBA)																Evening (DOHW)																Night (DOHW)															
		Day (Standard)																Night (E41/E42)																Night (E41/E42)															
		NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08								
AS.03	5 OLYMPIA ROAD, NAREMBURN, NSW	59	-	-	-	34	-	-	41	37	-	-	54	-	-	-	34	-	-	41	37	-	-	51	-	-	-	34	-	-	41	37	-	-	45	-	-	-	34	-	-	41	37	-	-				
AS.03	33 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	35	35	35	40	54	-	-	-	-	-	35	35	35	40	54	-	-	-	-	-	-	35	35	35	40	54	-	-	55	-	-	-	35	35	35	40	54	-	-				
AS.03	102 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	34	34	39	54	-	-	-	-	-	-	34	34	39	54	-	-	-	-	-	-	34	34	39	54	-	-	39	55	-	-	34	34	34	39	54	-	-						
AS.03	3 GRANDVIEW STREET, NAREMBURN, NSW	59	-	-	-	-	35	-	43	40	42	-	54	-	-	-	35	-	43	40	42	-	51	-	-	-	35	-	43	40	42	-	55	-	-	35	-	43	40	42	-	55							
AS.03	30 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	-	34	34	43	54	-	-	-	-	-	34	34	43	54	-	-	-	-	-	-	34	34	43	54	-	-	39	55	-	-	34	34	43	54	-	-							
AS.03	1 OLYMPIA ROAD, NAREMBURN, NSW	59	-	-	-	36	-	41	37	36	-	54	-	-	-	36	-	41	37	36	-	51	-	-	-	36	-	41	37	36	-	55	-	-	36	-	41	37	36	-	55								
AS.03	15 GRANDVIEW STREET, NAREMBURN, NSW	59	-	-	-	-	34	-	47	48	47	-	54	-	-	-	34	-	47	48	47	-	51	-	-	-	34	-	47	48	47	-	55	-	-	34	-	47	48	47	-	55							
AS.03	5 DARGAN STREET, NAREMBURN, NSW	59	-	-	-	-	-	-	-	-	36	54	-	-	-	-	-	-	-	-	36	51	-	-	-	-	-	-	-	-	36	55	-	-	-	-	36	55	-	-									
AS.03	15 WATERS ROAD, NAREMBURN, NSW	59	-	-	-	-	-	-	-	-	43	54	-	-	-	-	-	-	-	-	43	51	-	-	-	-	-	-	-	-	43	55	-	-	-	-	43	55	-	-									
AS.03	29 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	36	36	37	41	54	-	-	-	-	36	36	37	41	54	-	-	-	-	36	36	37	41	54	-	-	36	36	37	41	54	-	-	36	36	37	41	54	-	-				
AS.03	17 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	35	37	38	45	54	-	-	-	-	35	37	38	45	54	-	-	-	-	35	37	38	45	54	-	-	35	37	38	45	54	-	-	35	37	38	45	54	-	-				
AS.03	29 PARK ROAD, NAREMBURN, NSW	59	-	-	-	-	40	40	42	-	54	-	-	-	-	40	40	42	-	54	-	-	-	-	40	40	42	-	54	-	-	40	40	42	-	55	-	-	40	40	42	-	55						
AS.03	54 MITCHELL STREET, NAREMBURN, NSW	59	-	-	-	-	-	36	48	54	-	-	-	-	-	36	48	54	-	-	-	-	-	-	36	48	54	-	-	-	36	48	54	-	-	55	-	-	36	48	54	-	-						
AS.03	1 TALUS STREET, NAREMBURN (WILLOUGHBY)	59	-	-	-	-	-	37	43	54	-	-	-	-	-	37	43	54	-	-	-	-	-	-	37	43	54	-	-	-	37	43	54	-	-	55	-	-	37	43	54	-	-						
AS.03	74 - 76 DALLEYS ROAD, NAREMBURN (WILLOU)	59	-	-	-	-	38	43	43	47	54	-	-	-	-	38	43	43	47	54	-	-	-	-	38	43	43	47	54	-	-	38	43	43	47	54	-	-	38	43	43	47	54	-	-				
AS.03	46 DALLEYS ROAD, NAREMBURN, NSW	59	-	-	-	-	-	-	-	-	42	54	-	-	-	-	-	-	-	-	42	51	-	-	-	-	-	-	-	-	42	55	-	-	-	-	42	55	-	-									
AS.03	50 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	-	-	-	-	43	54	-	-	-	-	43	51	-	-	-	-	-	-	43	54	-	-	-	-	43	55	-	-	-	-	43	55	-	-									
AS.03	78 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	-	-	-	-	-	54	-	-	-	-	51	-	-	-	-	-	-	-	54	-	-	-	-	-	54	-	-	-	-	54	-	-	-	-									
AS.03	1 NOLAN CRESCENT, NAREMBURN (WILLOUGHBY)	59	-	-	-	-	36	40	40	39	54	-	-	-	-	36	40	40	39	54	-	-	-	-	36	40	40	39	54	-	-	36	40	40	39	54	-	-	36	40	40	39	54	-	-				
AS.03	15 STATION STREET, NAREMBURN (WILLOUGH)	59	-	-	-	-	40	42	42	34	54	-	-	-	-	40	42	42	34	54	-	-	-	-	40	42	42	34	54	-	-	40	42	42	34	54	-	-	40	42	42	34	54	-	-				
AS.03	7 DARGAN STREET, NAREMBURN, NSW	59	-	-	-	-	-	-	-	-	35	54	-	-	-	-	-	-	-	-	35	54	-	-	-	-	-	-	-	-	35	54	-	-	-	-	35	54	-	-									
AS.03	15 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	34	36	44	54	-	-	-	-	-	34	36	44	54	-	-	-	-	-	34	36	44	54	-	-	34	36	44	54	-	-	34	36	44	54	-	-							
AS.03	15 STATION STREET, NAREMBURN (WILLOUGH)	59	-	-	-	-	38	41	42	-	54	-	-	-	-	38	41	42	-	54	-	-	-	-	38	41	42	-	54	-	-	38	41	42	-	55	-	-	38	41	42	-	55						
AS.03	14 BONGALONG STREET, NAREMBURN, NSW	59	-	-	-	-	-	37	36	41	54	-	-	-	-	37	36	41	54	-	-	-	-	-	37	36	41	54	-	-	37	36	41	54	-	-	37	36	41	54	-	-							
AS.03	19 OLYMPIA ROAD, NAREMBURN, NSW	59	-	-	-	35	-	44	47	45	-	54	-	-	-	35	-	44	47	45	-	51	-	-	-	35	-	44	47	45	-	55	-	-	35	-	44	47	45	-	55								
AS.03	21 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	-	36	37	42	54	-	-	-	-	36	37	42	54	-	-	-	-	-	36	37	42	54	-	-	36	37	42	54	-	-	36	37	42	54	-	-							
AS.03	94 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	-	39	54	-	-	-	-	-	-	39	54	-	-	-	-	-	-	-	39	54	-	-	-	-	39	54	-	-	-	-	39	54	-	-									
AS.03	46 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	34	-	36	41	54	-	-	-	-	34	-	36	41	54	-	-	-	-	34	-	36	41	54	-	-	34	-	36	41	54	-	-	34	-	36	41	54	-	-				
AS.03	13 OLYMPIA ROAD, NAREMBURN, NSW	59	-	-	-	35	-	44	45	42	-	54	-	-	-	35	-	44	45	42	-	51	-	-	-	35	-	44	45	42	-	55	-	-	35	-	44	45	42	-	55								
AS.03	36 PARK ROAD, NAREMBURN, NSW	59	-	-	-	34	-	41	42	40	-	54	-	-	-	34	-	41	42	40	-	51	-	-	-	34	-	41	42	40	-	55	-	-	34	-	41	42	40	-	55								
AS.03	102 NORTHCOE STREET, NAREMBURN, NSW	59	-	-	-	-	35	34	-	35	54	-	-	-	-	35	34	-	35	54	-	-	-	-	35	34	-	35	54	-	-	35	34	-	35	54	-	-	35	34	-	35							
AS.03	19 DALLEYS ROAD, NAREMBURN, NSW	59	-	-	-	-	34	38	37	43	54	-	-	-	-	34	38	37	43	54	-	-	-	-	34	38	37	43	54	-	-	34	38	37	43	54	-	-	34	38	37	43	54	-	-				
AS.03	34 - 36 STATION STREET, NAREMBURN (WILL)	59	-	-	-	37	-	53	60	51	-	54	-	-	-	37	-	53	60	51	-	51	-	-	-	37	-																						

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Client Name	Project Name:
TH511-2 Construction noise results (r18) - Final.xlsm	CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Table D1: Predicted construction noise levels

Receiver		Predicted noise levels, dB(A)																NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS																																							
		Day (Standard)																Evening (DOHW)																																							
		Night (DOHW)																Night (DOHW)																																							
		E2 (E41/E42)																E2 (E41/E42)																																							
NCA	Address	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08																
A5.04	29 CHELMSFORD AVENUE, WILLOUGHBY, NSW	59	-	-	-	37	-	49	49	48	-	54	-	-	-	37	-	49	49	48	-	51	-	-	-	37	-	49	49	48	-	45	-	-	-	37	-	49	49	48	-	55	-	-	-	37	-	49	49	48	-						
A5.04	81 ARTARMON ROAD, ARTARMON, NSW	59	-	-	-	41	-	43	43	43	-	54	-	-	-	41	-	43	43	43	-	51	-	-	-	41	-	43	43	43	-	41	-	43	43	43	-	55	-	-	-	41	-	43	43	43	-	55	-	-	-	41	-	43	43	43	-
A5.04	27 WALTER STREET, WILLOUGHBY, NSW	59	-	-	-	34	-	42	47	46	-	54	-	-	-	34	-	42	47	46	-	51	-	-	-	34	-	42	47	46	-	45	-	-	-	34	-	42	47	46	-	55	-	-	-	34	-	42	47	46	-						
A5.04	44 ARTARMON ROAD, ARTARMON, NSW	59	-	-	-	39	-	48	45	43	-	54	-	-	-	39	-	48	45	43	-	51	-	-	-	39	-	48	45	43	-	45	-	-	-	39	-	48	45	43	-	55	-	-	-	39	-	48	45	43	-						
A5.04	45 ARTARMON ROAD, ARTARMON, NSW	59	-	-	-	37	-	44	46	44	-	54	-	-	-	37	-	44	46	44	-	51	-	-	-	37	-	44	46	44	-	45	-	-	-	37	-	44	46	44	-	55	-	-	-	37	-	44	46	44	-						
A5.04	24 LUCKNOW STREET, WILLOUGHBY, NSW	59	-	-	-	40	-	48	42	41	-	54	-	-	-	40	-	48	42	41	-	51	-	-	-	40	-	48	42	41	-	45	-	-	-	40	-	48	42	41	-	55	-	-	-	40	-	48	42	41	-						
A5.04	23 BURRA ROAD, ARTARMON, NSW	59	-	37	36	48	39	49	44	43	-	54	-	37	36	48	39	49	44	43	-	51	-	37	36	48	39	49	44	43	-	45	-	37	36	48	39	49	44	43	-	55	-	37	36	48	39	49	44	43	-						
A5.04	85 ARTARMON ROAD, ARTARMON, NSW	59	-	-	-	40	-	42	44	44	-	54	-	-	-	40	-	42	44	44	-	51	-	-	-	40	-	42	44	44	-	45	-	-	-	40	-	42	44	44	-	55	-	-	-	40	-	42	44	44	-						
A5.04	32 RICHMOND AVENUE, WILLOUGHBY, NSW	59	-	-	-	37	-	45	44	43	-	54	-	-	-	37	-	45	44	43	-	51	-	-	-	37	-	45	44	43	-	45	-	-	-	37	-	45	44	43	-	55	-	-	-	37	-	45	44	43	-						
A5.04	13 BURRA ROAD, ARTARMON, NSW	59	-	34	-	45	36	51	45	44	-	54	-	34	-	45	36	51	45	44	-	51	-	34	-	45	36	51	45	44	-	45	-	34	-	45	36	51	45	44	-	55	-	34	-	45	36	51	45	44	-						
A5.04	16 RICHMOND AVENUE, WILLOUGHBY, NSW	59	-	-	-	37	-	50	51	49	-	54	-	-	-	37	-	50	51	49	-	51	-	-	-	37	-	50	51	49	-	45	-	-	-	37	-	50	51	49	-	55	-	-	-	37	-	50	51	49	-						
A5.04	19 WALTER STREET, WILLOUGHBY, NSW	59	-	-	-	34	-	41	44	43	-	54	-	-	-	34	-	41	44	43	-	51	-	-	-	34	-	41	44	43	-	45	-	-	-	34	-	41	44	43	-	55	-	-	-	34	-	41	44	43	-						
A5.04	12 LUCKNOW STREET, WILLOUGHBY, NSW	59	-	-	-	37	-	43	40	40	-	54	-	-	-	37	-	43	40	40	-	51	-	-	-	37	-	43	40	40	-	45	-	-	-	37	-	43	40	40	-	55	-	-	-	37	-	43	40	40	-						
A5.04	25 WALTER STREET, WILLOUGHBY, NSW	59	-	-	-	-	-	43	48	47	-	54	-	-	-	-	-	43	48	47	-	51	-	-	-	-	-	43	48	47	-	45	-	-	-	-	43	48	47	-	55	-	-	-	-	43	48	47	-								
A5.04	84 ARTARMON ROAD, ARTARMON, NSW	59	-	-	-	41	-	45	40	40	-	54	-	-	-	41	-	45	40	40	-	51	-	-	-	41	-	45	40	40	-	45	-	-	-	41	-	45	40	40	-	55	-	-	-	41	-	45	40	40	-						
A5.04	23 CHELMSFORD AVENUE, WILLOUGHBY, NSW	59	-	-	-	37	-	51	53	51	-	54	-	-	-	37	-	51	53	51	-	51	-	-	-	37	-	51	53	51	-	45	-	-	-	37	-	51	53	51	-	55	-	-	-	37	-	51	53	51	-						
A5.04	23 WALTER STREET, WILLOUGHBY, NSW	59	-	-	-	34	-	41	44	43	-	54	-	-	-	34	-	41	44	43	-	51	-	-	-	34	-	41	44	43	-	45	-	-	-	34	-	41	44	43	-	55	-	-	-	34	-	41	44	43	-						
A5.04	2 CHELMSFORD AVENUE, ARTARMON, NSW	59	-	-	-	40	-	51	49	48	-	54	-	-	-	40	-	51	49	48	-	51	-	-	-	40	-	51	49	48	-	45	-	-	-	40	-	51	49	48	-	55	-	-	-	40	-	51	49	48	-						
A5.04	73 ARTARMON ROAD, WILLOUGHBY, NSW	59	-	-	-	42	-	47	43	43	-	54	-	-	-	42	-	47	43	43	-	51	-	-	-	42	-	47	43	43	-	45	-	-	-	42	-	47	43	43	-	55	-	-	-	42	-	47	43	43	-						
A5.04	2 PYRL ROAD, ARTARMON, NSW	59	-	37	35	49	40	48	44	43	-	54	-	37	35	49	40	48	44	43	-	51	-	37	35	49	40	48	44	43	-	45	-	37	35	49	40	48	44	43	-	55	-	37	35	49	40	48	44	43	-						
A5.04	95 ARTARMON ROAD, ARTARMON, NSW	59	-	-	-	40	-	41	39	39	-	54	-	-	-	40	-	41	39	39	-	51	-	-	-	40	-	41	39	39	-	45	-	-	-	40	-	41	39	39	-	55	-	-	-	40	-	41	39	39	-						
A5.04	64 ARTARMON ROAD, ARTARMON, NSW	59	-	-	-	42	-	49	46	46	-	54	-	-	-	42	-	49	46	46	-	51	-	-	-	42	-	49	46	46	-	45	-	-	-	42	-	49	46	46	-	55	-	-	-	42	-	49	46	46	-						
A5.04	6 PYRL ROAD, ARTARMON, NSW	59	-	40	38	50	41	46	41	42	-	54	-	40	38	50	41	46	41	42	-	51	-	40	38	50	41	46	41	42	-	45	-	40	38	50	41	46	41	42	-	55	-	40	38	50	41	46	41	42	-						
A5.04	16 LUCKNOW STREET, WILLOUGHBY, NSW	59	-	-	-	37	-	45	41	41	-	54	-	-	-	37	-	45	41	41	-	51	-	-	-	37	-	45	41	41	-	45	-	-	-	37	-	45	41	41	-	55	-	-	-	37	-	45	41	41	-						
A5.04	20 LUCKNOW STREET, WILLOUGHBY, NSW	59	-	-	-	35	-	44	42	41	-	54	-	-	-	35	-	44	42	41	-	51	-	-	-	35	-	44	42	41	-	45	-	-	-	35	-	44	42	41	-	55	-	-	-	35	-	44	42	41	-						
A5.04	8 PYRL ROAD, ARTARMON, NSW	59	-	35	-	48	39	45	40	41	-	54	-	35	-	48	39	45	40	41	-	51	-	35	-	48	39	45	40	41	-	45	-	35	-	48	39	45	40	41	-	55	-	35	-	48	39	45	40	41	-						
A5.04	17 BURRA ROAD, ARTARMON, NSW	59	-	37	35	49	40	49	44	43	-	54	-	37	35	49	40	49	44	43	-	51	-	37	35	49	40	49	44	43	-	45	-	37	35	49</																					

Table D1: Predicted construction noise levels

[illegible]

Client Name

Project Name:

TH511-2 Construction noise results (r18) - Final.xlsm

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table D1: Predicted construction noise levels

Receiver		Predicted noise level, dB(A)																NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS													
		Day (Standard)																Evening (DOHW)													
		NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08
NCA		Address																Night (DOHW)													
CD5_01		539-541 PACIFIC HIGHWAY ARTARMON																E2 (E4/E42)													
CD5_01	539-541 PACIFIC HIGHWAY ARTARMON	65	-	44	42	50	41	-	-	-	-	60	-	44	42	50	41	-	-	-	-	59	-	44	42	50	41	-	-	-	-
CD5_01	9 ERIC ROAD ARTARMON	65	-	48	45	51	42	-	-	-	-	60	-	48	45	51	42	-	-	-	-	59	-	48	45	51	42	-	-	-	-
CD5_01	11 HUXTABLE AVENUE, LANE COVE NORTH, NSW	65	-	-	-	38	-	-	-	-	-	60	-	-	-	38	-	-	-	-	-	59	-	-	-	38	-	-	-	-	-
CD5_01	9 HUXTABLE AVENUE, LANE COVE NORTH, NSW	65	-	-	-	38	-	-	-	-	-	60	-	-	-	38	-	-	-	-	-	59	-	-	-	38	-	-	-	-	-
CD5_01	11 HUXTABLE AVENUE, LANE COVE NORTH, NSW	65	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	59	-	-	-	-	-	-	-	-	-
CD5_01	13 PALMER STREET ARTARMON	65	-	52	42	54	45	-	-	-	-	60	-	52	42	54	45	-	-	-	-	59	-	52	42	54	45	-	-	-	-
CD5_01	15 PALMER STREET ARTARMON	65	-	51	41	54	45	-	-	-	-	60	-	51	41	54	45	-	-	-	-	59	-	51	41	54	45	-	-	-	-
CD5_01	50TA PACIFIC HIGHWAY ARTARMON	65	-	-	-	37	-	-	-	-	-	60	-	-	-	37	-	-	-	-	-	59	-	-	-	37	-	-	-	-	-
CD5_01	50T PACIFIC HIGHWAY ARTARMON	65	-	-	35	43	34	-	-	-	-	60	-	-	35	43	34	-	-	-	-	59	-	-	35	43	34	-	-	-	-
CD5_01	491 PACIFIC HIGHWAY ARTARMON	65	-	-	36	45	36	-	-	-	-	60	-	-	36	45	36	-	-	-	-	59	-	-	36	45	36	-	-	-	-
CD5_01	460A PACIFIC HIGHWAY LANE COVE NORTH	65	-	-	-	-	36	-	-	-	-	60	-	-	-	-	36	-	-	-	-	59	-	-	-	-	36	-	-	-	-
CD5_01	460 PACIFIC HIGHWAY LANE COVE NORTH	65	-	-	-	-	36	-	-	-	-	60	-	-	-	-	36	-	-	-	-	59	-	-	-	-	36	-	-	-	-
CD5_01	462A PACIFIC HIGHWAY LANE COVE NORTH	65	-	-	-	36	-	-	-	-	-	60	-	-	-	36	-	-	-	-	-	59	-	-	-	36	-	-	-	-	-
CD5_01	462 PACIFIC HIGHWAY LANE COVE NORTH	65	-	-	-	36	-	-	-	-	-	60	-	-	-	36	-	-	-	-	-	59	-	-	-	36	-	-	-	-	-
CD5_02	755-759 PACIFIC HIGHWAY CHATSWOOD	65	47	37	35	42	-	-	-	-	-	60	47	37	35	42	-	-	-	-	-	59	47	37	35	42	-	-	-	-	-
CD5_02	8-12 SUTHERLAND ROAD CHATSWOOD	65	49	37	36	46	37	-	-	-	-	60	49	37	36	46	37	-	-	-	-	59	49	37	36	46	37	-	-	-	-
CD5_02	5-7 SUTHERLAND ROAD CHATSWOOD	65	45	38	35	43	34	-	-	-	-	60	45	38	35	43	34	-	-	-	-	59	45	38	35	43	34	-	-	-	-
CD5_02	3-5 FREEMAN ROAD, CHATSWOOD, NSW	65	45	35	34	41	-	-	-	-	-	60	45	35	34	41	-	-	-	-	-	59	45	35	34	41	-	-	-	-	-
CD5_02	10 FREEMAN ROAD, CHATSWOOD, NSW	65	42	-	-	41	-	-	-	-	-	60	42	-	-	41	-	-	-	-	-	59	42	-	-	41	-	-	-	-	-
CD5_02	403 MOWBRAY ROAD, CHATSWOOD, NSW	65	36	38	34	46	37	-	-	-	-	60	36	38	34	46	37	-	-	-	-	59	36	38	34	46	37	-	-	-	-
CD5_02	6-8 FREEMAN ROAD CHATSWOOD	65	44	-	-	37	-	-	-	-	-	60	44	-	-	37	-	-	-	-	-	59	44	-	-	37	-	-	-	-	-
CD5_02	1-3 EDDY ROAD CHATSWOOD	65	46	36	35	43	34	-	-	-	-	60	46	36	35	43	34	-	-	-	-	59	46	36	35	43	34	-	-	-	-
CD5_02	552-554 PACIFIC HIGHWAY CHATSWOOD	65	43	42	41	47	38	-	-	-	-	60	43	42	41	47	38	-	-	-	-	59	43	42	41	47	38	-	-	-	-
CD5_02	544 PACIFIC HIGHWAY CHATSWOOD	65	37	43	41	48	39	-	-	-	-	60	37	43	41	48	39	-	-	-	-	59	37	43	41	48	39	-	-	-	-
CD5_02	524-542 PACIFIC HIGHWAY CHATSWOOD	65	41	44	42	50	41	-	-	-	-	60	41	44	42	50	41	-	-	-	-	59	41	44	42	50	41	-	-	-	-
CD5_02	483 MOWBRAY ROAD, CHATSWOOD, NSW	65	36	38	34	46	37	-	-	-	-	60	36	38	34	46	37	-	-	-	-	59	36	38	34	46	37	-	-	-	-
CD5_02	6-8 FREEMAN ROAD CHATSWOOD	65	44	-	-	37	-	-	-	-	-	60	44	-	-	37	-	-	-	-	-	59	44	-	-	37	-	-	-	-	-
CD5_02	1-3 EDDY ROAD CHATSWOOD	65	46	36	35	43	34	-	-	-	-	60	46	36	35	43	34	-	-	-	-	59	46	36	35	43	34	-	-	-	-
CD5_02	552-554 PACIFIC HIGHWAY CHATSWOOD	65	43	42	41	47	38	-	-	-	-	60	43	42	41	47	38	-	-	-	-	59	43	42	41	47	38	-	-	-	-
CD5_02	544 PACIFIC HIGHWAY CHATSWOOD	65	37	43	41	48	39	-	-	-	-	60	37	43	41	48	39	-	-	-	-	59	37	43	41	48	39	-	-	-	-
CD5_02	524-542 PACIFIC HIGHWAY CHATSWOOD	65	41	44	42	50	41	-	-	-	-	60	41	44	42	50	41	-	-	-	-	59	41	44	42	50	41	-	-	-	-
CD5_02	483 MOWBRAY ROAD, CHATSWOOD, NSW	65	36	40	36	46	37	-	-	-	-	60	36	40	36	46	37	-	-	-	-	59	36	40	36	46	37	-	-	-	-
CD5_02	415 MOWBRAY ROAD, CHATSWOOD, NSW	65	-	35	-	44	35	-	-	-	-	60	-	35	-	44	35	-	-	-	-	59	-	35	-	44	35	-	-	-	-
CD5_02	7 FREEMAN ROAD, CHATSWOOD, NSW	65	37	-	-	40	-	-	-	-	-	60	37	-	-	40	-	-	-	-	-	59	37	-	-	40	-	-	-	-	-
CD5_02	419 MOWBRAY ROAD, CHATSWOOD, NSW	65	-	-	-	36	-	-	-	-	-	60	-	-	-	36	-	-	-	-	-	59	-	-	-	36	-	-	-	-	-
CD5_02	393 MOWBRAY ROAD, CHATSWOOD, NSW	65	34	36	-	43	34	-	-	-	-	60	34	36	-	43	34	-	-	-	-	59	34	36	-	43	34	-	-	-	-
CD5_02	12 SHARLAND AVENUE, CHATSWOOD, NSW	65	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	59	-	-	-	-	-	-	-	-	-
CD5_02	2 - 6 BOWEN STREET, CHATSWOOD (WILLOUGH)	65	35	40	39	49	40	-	-	-	-	60	35	40	39	49	40	-	-	-	-	59	35	40	39	49	40	-	-	-	-
CD5_02	15 ELLIS STREET CHATSWOOD	65	46	37	34	41	-	-	-	-	-	60	46	37	34	41	-	-	-	-	-	59	46	37	34	41	-	-	-	-	-
CD5_02	6 SHARLAND AVENUE, CHATSWOOD, NSW	65	-	-	-	36	-	-	-	-	-	60	-	-	-	36	-	-	-	-	-	59	-	-	-	36	-	-	-	-	-
CD5_02	1 GOODCHAP ROAD, CHATSWOOD (WILLOUGHBY)	65	-	-	-	40	-	-	-	-	-	60	-	-	-	40	-	-	-	-	-	59	-	-	-	40	-	-	-	-	-
CD5_02	621-627 PACIFIC HIGHWAY CHATSWOOD	65	43	-	-	40	-	-	-	-	-	60	43	-	-	40	-	-	-	-	-	59	43	-	-	40	-	-	-	-	-
CD5_02	614 PACIFIC HIGHWAY CHATSWOOD	65	48	34	-	42	-	-	-	-	-	60	48	34	-	42	-	-	-	-	-	59	48	34	-	42	-	-	-	-	-
CD5_02	391 MOWBRAY ROAD, CHATSWOOD, NSW	65	34	39	36	46	37	-	-	-	-	60	34	39	36	46	37	-	-	-	-	59	34	39	36	46	37	-	-	-	-
CD5_0																															

Table D1: Predicted construction noise levels

Table D1

Predicted construction noise levels

Receiver	NCA	Address	Predicted noise levels, dBA																NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS																						
			Day (DOWH)																Night (DOWH)																						
			NM1	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	NM2	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	NM1	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	NM2	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07
CDS_02	23-25 BOWEN STREET CHATSWOOD	65	34	-	-	38	-	-	-	-	-	60	34	-	-	38	-	-	-	-	-	45	34	-	-	38	-	-	-	-	-	55	34	-	-	38	-	-	-	-	-
CDS_02	17 BOWEN STREET CHATSWOOD	65	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	
CDS_02	11 BOWEN STREET CHATSWOOD	65	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	
CDS_02	15 BOWEN STREET CHATSWOOD	65	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	
CDS_02	3 SUTHERLAND ROAD CHATSWOOD	65	34	-	-	-	-	-	-	-	-	60	34	-	-	-	-	-	-	-	-	45	34	-	-	-	-	-	-	-	-	55	34	-	-	-	-	-	-	-	
CDS_02	588 PACIFIC HIGHWAY CHATSWOOD	65	39	-	-	36	-	-	-	-	-	60	39	-	-	36	-	-	-	-	-	45	39	-	-	36	-	-	-	-	-	55	39	-	-	36	-	-	-	-	
CDS_02	592 PACIFIC HIGHWAY CHATSWOOD	65	44	-	-	34	-	-	-	-	-	60	44	-	-	34	-	-	-	-	-	45	44	-	-	34	-	-	-	-	-	55	44	-	-	34	-	-	-	-	
CDS_02	598 PACIFIC HIGHWAY CHATSWOOD	65	47	-	-	36	-	-	-	-	-	60	47	-	-	36	-	-	-	-	-	45	47	-	-	36	-	-	-	-	-	55	47	-	-	36	-	-	-	-	
CDS_03	15 NELSON STREET CHATSWOOD	60	44	-	-	36	-	-	-	-	-	52	44	-	-	40	-	-	-	-	-	45	44	-	-	40	-	-	-	-	-	55	44	-	-	40	-	-	-	-	
CDS_03	96-100 ALBERT AVENUE CHATSWOOD	60	47	37	34	42	-	-	-	-	-	55	47	37	34	42	-	-	-	-	-	45	47	37	34	42	-	-	-	-	-	55	47	37	34	42	-	-	-	-	
CDS_03	88 ALBERT AVENUE CHATSWOOD	60	47	36	34	42	-	-	-	-	-	52	47	36	34	42	-	-	-	-	-	45	47	36	34	42	-	-	-	-	-	55	47	36	34	42	-	-	-	-	
CDS_03	84-86 ALBERT AVENUE CHATSWOOD	60	45	35	-	43	34	-	-	-	-	55	45	35	-	43	34	-	-	-	-	45	45	35	-	43	34	-	-	-	-	55	45	35	-	43	34	-	-	-	
CDS_03	8-4 ELLIS STREET CHATSWOOD	60	50	38	35	43	34	-	-	-	-	52	50	38	35	43	34	-	-	-	-	45	50	38	35	43	34	-	-	-	-	55	50	38	35	43	34	-	-	-	
CDS_03	96-100 ALBERT AVENUE CHATSWOOD	60	48	37	35	43	34	-	-	-	-	52	48	37	35	43	34	-	-	-	-	45	48	37	35	43	34	-	-	-	-	55	48	37	35	43	34	-	-	-	
CDS_03	3 ELLIS STREET CHATSWOOD	60	45	35	-	41	-	-	-	-	-	55	45	35	-	41	-	-	-	-	-	45	45	35	-	41	-	-	-	-	-	55	45	35	-	41	-	-	-	-	
CDS_03	7-11 NELSON STREET CHATSWOOD	60	53	44	41	49	40	-	-	-	-	55	53	44	41	49	40	-	-	-	-	45	53	44	41	49	40	-	-	-	-	55	53	44	41	49	40	-	-	-	
CDS_03	10 GORDON AVENUE CHATSWOOD	60	50	34	-	40	-	-	-	-	-	52	50	34	-	40	-	-	-	-	-	45	50	34	-	40	-	-	-	-	-	55	50	34	-	40	-	-	-	-	
CDS_03	26 GORDON AVENUE CHATSWOOD	60	57	41	38	45	36	-	-	-	-	55	57	41	38	45	36	-	-	-	-	45	57	41	38	45	36	-	-	-	-	55	57	41	38	45	36	-	-	-	
CDS_03	2A GORDON AVENUE CHATSWOOD	60	53	37	34	41	-	-	-	-	-	52	53	37	34	41	-	-	-	-	-	45	53	37	34	41	-	-	-	-	-	55	53	37	34	41	-	-	-	-	
CDS_03	17 NELSON STREET CHATSWOOD	60	46	-	-	39	-	-	-	-	-	55	46	-	-	39	-	-	-	-	-	45	46	-	-	39	-	-	-	-	-	55	46	-	-	39	-	-	-	-	
CDS_03	1-3 GORDON AVENUE CHATSWOOD	60	58	39	37	45	36	-	-	-	-	55	58	39	37	45	36	-	-	-	-	45	58	39	37	45	36	-	-	-	-	55	58	39	37	45	36	-	-	-	
CDS_03	5-9 GORDON AVENUE CHATSWOOD	60	55	38	34	42	-	-	-	-	-	55	55	38	34	42	-	-	-	-	-	45	55	38	34	42	-	-	-	-	-	55	55	38	34	42	-	-	-	-	
CDS_03	4-6 ELLIS STREET CHATSWOOD	60	48	35	34	42	-	-	-	-	-	55	48	35	34	42	-	-	-	-	-	45	48	35	34	42	-	-	-	-	-	55	48	35	34	42	-	-	-	-	
CDS_03	1 NBN STREET CHATSWOOD	60	51	37	46	47	37	-	-	-	-	52	51	37	46	47	37	-	-	-	-	45	51	37	46	47	37	-	-	-	-	55	51	37	46	47	37	-	-	-	
CDS_03	2 NELSON STREET CHATSWOOD	60	54	47	41	47	38	-	-	-	-	55	54	47	41	47	38	-	-	-	-	45	54	47	41	47	38	-	-	-	-	55	54	47	41	47	38	-	-	-	
CDS_03	3 NELSON STREET CHATSWOOD	60	59	37	-	40	-	-	-	-	-	55	59	37	-	40	-	-	-	-	-	45	59	37	-	40	-	-	-	-	-	55	59	37	-	40	-	-	-	-	
CDS_03	5 NELSON STREET CHATSWOOD	60	57	-	-	36	-	-	-	-	-	55	57	-	-	36	-	-	-	-	-	45	57	-	-	36	-	-	-	-	-	55	57	-	-	36	-	-	-	-	
CDS_03	16 ORCHARD ROAD CHATSWOOD	60	56	38	35	44	35	-	-	-	-	55	56	38	35	44	35	-	-	-	-	45	56	38	35	44	35	-	-	-	-	55	56	38	35	44	35	-	-	-	
CDS_03	19 NBN STREET CHATSWOOD	60	37	-	-	34	-	-	-	-	-	52	37	-	-	34	-	-	-	-	-	45	37	-	-	34	-	-	-	-	-	55	37	-	-	34	-	-	-	-	
CDS_03	8 ORCHARD ROAD CHATSWOOD	60	47	43	38	45	36	-	-	-	-	52	47	43	38	45	36	-	-	-	-	45	47	43	38	45	36	-	-	-	-	55	47	43	38	45	36	-	-	-	
CDS_03	12 ORCHARD ROAD CHATSWOOD	60	51	42	38	45	36	-	-	-	-	52	51	42	38	45	36	-	-	-	-	45	51	42	38	45	36	-	-	-	-	55	51	42	38	45	36	-	-	-	
CDS_03	14 ORCHARD ROAD CHATSWOOD	60	51	41	38	44	35	-	-	-	-	52	51	41	38	44	35	-	-	-	-	45	51	41	38	44	35	-	-	-	-	55	51	41	38	44	35	-	-	-	
CDS_03	6 ORCHARD ROAD CHATSWOOD	60	48	44	40	48	39	-	-	-	-	55	48	44	40	48	39	-	-	-	-	45	48	44	40	48	39	-	-	-	-	55	48	44	40	48	39	-	-	-	
CDS_03	10 ORCHARD ROAD CHATSWOOD	60	45	42	37	47	38	-	-	-	-	55	45	42	37	47	38	-	-	-	-	45	45	42	37	47	38	-	-	-	-	55	45	42	37	47	38	-	-	-	
CDS_03	2 ELLIS STREET CHATSWOOD	60	43	-	-	34	-	-	-	-	-	52	43	-	-	34	-	-	-	-	-	45	43	-	-	34	-	-	-	-	-	55	43	-	-	34	-	-	-	-	
CDS_04	33 DEVONSHIRE STREET, CHATSWOOD, NSW	51	40	36	-	40	-	-	-	-	-	46	40	36	-	40	-	-	-	-	-	45	40	36	-	40	-	-	-	-	-	55	40	36	-	40	-	-	-	-	
CDS_04	21 JOHNSON STREET, CHATSWOOD, NSW	51	42	37	35	43	34	-	-	-	-	46	42	37	35	43	34	-	-	-	-	45	42	37	35	43	34	-	-	-	-	55	42	37	35	43	34	-	-	-	
CDS_04	35-43 ORCHARD ROAD CHATSWOOD	51	51	38	37	44	35	-	-	-	-	46	51	38	37	44	35	-	-	-	-	45	51	38	37	44	35	-	-	-	-	55	51	38	37	44	35	-	-	-	
CDS_04	1 VICTOR STREET CHATSWOOD	51	49	38	37	44	35	-	-	-	-	46	49	38	37	44	35	-	-	-	-	45	49	38	37	44	35	-	-	-	-	55	49	38	37	44	35	-	-	-	
CDS_04	2-4 VICTOR STREET, CHATSWOOD, NSW	51	38	36	35	43	34	-	-	-	-	45	38	36	35	43	34	-	-	-	-	45	38	36	35	43	34	-	-	-	-	55	38	36	35	43	34	-	-	-	
CDS_04	16-22 DEVONSHIRE STREET, CHATSWOOD, NSW	51	43	37	35	43	34	-	-	-	-	46	43	37	35	43	34	-	-	-	-	45	43	37	35	43	34	-	-	-	-	55	43	37	35	43	34	-	-	-	
CDS_04	25-29 DEVONSHIRE STREET, CHATSWOOD, NSW	51	40	36	-	42	-	-	-	-	-	46	40	36	-	42	-	-	-	-	-	45	40	36	-	42	-	-	-	-	-	55	40	36	-	42	-	-	-	-	
CDS_04	43-45 JOHNSON STREET CHATSWOOD	51	49	38	37	44	35	-	-	-	-	46	49	38	37	44	35	-	-	-	-	45	49	38	37	44	35	-	-	-	-	55	49	38	37	44	35	-	-	-	
CDS_04	25-31 JOHNSON STREET, CHATSWOOD, NSW	51	45	38	36	44	35	-	-	-	-	46	45	38	36	44	35	-	-	-	-	45	45	38	36	44	35	-	-	-	-	55	45	38	36	44	35	-	-	-	
CDS_04	37-39 JOHNSON STREET, CHATSWOOD, NSW	51	44	35	36	43	34	-	-	-	-	45	44	35	36	43	34	-	-	-	-	45	44	35	36	43	34	-	-	-	-	55	44	35	36	43	34	-	-	-	
CDS_04	19 JOHNSON STREET, CHATSWOOD, NSW	51	38	36	-	40	-	-	-	-	-	46	38	36	-	40	-</																								

Client Name

TH511-2 Construction noise results (r18) - Final.xlsm

Project Name:

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Client Name	Project Name:
TH511-2 Construction noise results (r18) - Final.xlsm	CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table D1: Predicted construction noise levels

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

NCA	Address	Predicted noise levels (dBA)																Evening (DOHW)																Night (DOHW)																E2 (E41/E42)																N (E41/E42)																													
		Day (Standard)																Day (DOHW)																Night (DOHW)																Night (DOHW)																Night (DOHW)																Night (DOHW)													
CD5_05	55 SHEPHERD ROAD, ARTARMON, NSW	52	-	35	-	38	-	34	-	-	-	47	-	35	-	38	-	34	-	-	-	46	-	35	-	38	-	34	-	-	-	45	-	35	-	38	-	34	-	-	55	-	35	-	38	-	34	-	-	-	-	-																																											
CD5_05	5-7 CARLOS ROAD, ARTARMON, NSW	52	-	42	41	50	41	36	34	34	-	47	-	42	41	50	41	36	34	34	-	46	-	42	41	50	41	36	34	34	-	45	-	42	41	50	41	36	34	34	-	55	-	42	41	50	41	36	34	34	-	-	-																																										
CD5_05	15 ELIZABETH STREET, ARTARMON (WILLOUGHBY)	52	-	45	40	61	52	38	34	34	-	47	-	45	40	61	52	38	34	34	-	46	-	45	40	61	52	38	34	34	-	45	-	45	40	61	52	38	34	34	-	55	-	45	40	61	52	38	34	34	-	-	-																																										
CD5_05	30 ELIZABETH STREET, ARTARMON (WILLOUGHBY)	52	-	52	46	73	64	34	-	-	-	47	-	52	46	73	64	34	-	-	-	46	-	52	46	73	64	34	-	-	-	45	-	52	46	73	64	34	-	-	55	-	52	46	73	64	34	-	-	-	-																																												
CD5_05	19 ELIZABETH STREET, ARTARMON (WILLOUGHBY)	52	-	46	45	63	54	39	35	-	-	47	-	46	45	63	54	39	35	-	-	46	-	46	45	63	54	39	35	-	-	45	-	46	45	63	54	39	35	-	55	-	46	45	63	54	39	35	-	-	-																																												
CD5_05	59 TINDALE ROAD, ARTARMON, NSW	52	-	36	34	41	-	-	-	-	-	47	-	36	34	41	-	-	-	-	-	46	-	36	34	41	-	-	-	-	-	45	-	36	34	41	-	-	55	-	36	34	41	-	-	-	-	-	-																																														
CD5_05	50 TINDALE ROAD, ARTARMON, NSW	52	-	41	-	40	-	-	-	-	-	47	-	41	-	40	-	-	-	-	-	46	-	41	-	40	-	-	-	-	-	45	-	41	-	40	-	-	55	-	41	-	40	-	-	-	-	-	-																																														
CD5_05	22 ELIZABETH STREET, ARTARMON (WILLOUGHBY)	52	-	43	45	59	50	38	34	35	-	47	-	43	45	59	50	38	34	35	-	46	-	43	45	59	50	38	34	35	-	45	-	43	45	59	50	38	34	35	-	55	-	43	45	59	50	38	34	35	-																																												
CD5_05	22 CARLOS ROAD, ARTARMON, NSW	52	-	-	40	35	-	-	-	-	-	47	-	-	40	35	-	-	-	-	-	46	-	-	40	35	-	-	-	-	-	45	-	-	40	35	-	-	55	-	-	40	35	-	-	-	-	-	-																																														
CD5_05	14 SMITH ROAD, ARTARMON, NSW	52	-	35	-	41	-	-	34	35	34	-	47	-	35	-	41	-	-	34	35	34	-	46	-	35	-	41	-	-	34	35	34	-	45	-	35	-	41	-	-	55	-	35	-	41	-	-	34	35	34	-																																											
CD5_05	39 TINDALE ROAD, ARTARMON, NSW	52	-	34	-	39	-	-	-	-	-	47	-	34	-	39	-	-	-	-	-	46	-	34	-	39	-	-	-	-	-	45	-	34	-	39	-	-	55	-	34	-	39	-	-	-	-	-	-	-																																													
CD5_05	29 MUTTAMAH ROAD, ARTARMON (WILLOUGHBY)	52	-	38	36	44	35	34	-	-	-	47	-	38	36	44	35	34	-	-	46	-	38	36	44	35	34	-	-	-	45	-	38	36	44	35	34	-	55	-	38	36	44	35	34	-	-	-	-	-																																													
CD5_05	34 ELIZABETH STREET, ARTARMON (WILLOUGHBY)	52	-	48	49	76	67	36	-	-	-	47	-	48	49	76	67	36	-	-	46	-	48	49	76	67	36	-	-	-	45	-	48	49	76	67	36	-	55	-	48	49	76	67	36	-	-	-	-	-																																													
CD5_05	2 BRAND STREET, ARTARMON (WILLOUGHBY)	52	-	-	59	64	73	64	37	-	-	47	-	-	59	64	73	64	37	-	-	46	-	-	59	64	73	64	37	-	-	45	-	-	59	64	73	64	37	-	55	-	-	59	64	73	64	37	-	-	-																																												
CD5_05	35 CAMERON AVENUE, ARTARMON (WILLOUGHBY)	52	-	43	41	56	47	40	35	35	-	47	-	43	41	56	47	40	35	35	-	46	-	43	41	56	47	40	35	35	-	45	-	43	41	56	47	40	35	35	-	55	-	43	41	56	47	40	35	35	-																																												
CD5_05	32 MUTTAMAH ROAD, ARTARMON, NSW	52	37	42	39	45	36	-	-	-	-	47	37	42	39	45	36	-	-	-	-	46	37	42	39	45	36	-	-	-	45	37	42	39	45	36	-	-	55	37	42	39	45	36	-	-	-	-	-																																														
CD5_05	118 ARTARMON ROAD, ARTARMON, NSW	52	-	42	35	52	43	41	38	39	-	47	-	42	35	52	43	41	38	39	-	46	-	42	35	52	43	41	38	39	-	45	-	42	35	52	43	41	38	39	-	55	-	42	35	52	43	41	38	39	-																																												
CD5_05	11 CAMERON AVENUE, ARTARMON, NSW	52	-	42	36	53	44	42	37	37	-	47	-	42	36	53	44	42	37	37	-	46	-	42	36	53	44	42	37	37	-	45	-	42	36	53	44	42	37	37	-	55	-	42	36	53	44	42	37	37	-																																												
CD5_05	21 TINDALE ROAD, ARTARMON, NSW	52	-	45	46	53	44	36	-	-	-	47	-	45	46	53	44	36	-	-	46	-	45	46	53	44	36	-	-	-	45	-	45	46	53	44	36	-	55	-	45	46	53	44	36	-	-	-	-																																														
CD5_05	130 ARTARMON ROAD, ARTARMON, NSW	52	-	43	40	56	47	39	36	35	-	47	-	43	40	56	47	39	36	35	-	46	-	43	40	56	47	39	36	35	-	45	-	43	40	56	47	39	36	35	-	55	-	43	40	56	47	39	36	35	-																																												
CD5_05	55 SHEPHERD ROAD, ARTARMON, NSW	52	-	34	-	40	-	34	-	-	-	47	-	34	-	40	-	34	-	-	-	46	-	34	-	40	-	34	-	-	-	45	-	34	-	40	-	34	-	55	-	34	-	40	-	34	-	-	-	-																																													
CD5_05	20 CAMERON AVENUE, ARTARMON, NSW	52	-	43	41	56	47	41	37	37	-	47	-	43	41	56	47	41	37	37	-	46	-	43	41	56	47	41	37	37	-	45	-	43	41	56	47	41	37	37	-	55	-	43	41	56	47	41	37	37	-																																												
CD5_05	5 ELIZABETH STREET, ARTARMON (WILLOUGHBY)	52	-	43	43	57	48	38	34	34	-	47	-	43	43	57	48	38	34	34	-	46	-	43	43	57	48	38	34	34	-	45	-	43	43	57	48	38	34	34	-	55	-	43	43	57	48	38	34	34	-																																												
CD5_05	2 SMITH ROAD, ARTARMON, NSW	52	-	41	39	48	39	41	37	37	-	47	-	41	39	48	39	41	37	37	-	46	-	41	39	48	39	41	37	37	-	45	-	41	39	48	39	41	37	37	-	55	-	41	39	48	39	41	37	37	-																																												
CD5_05	8 SMITH ROAD, ARTARMON, NSW	52	-	37	35	42	-	38	35	35	-	47	-	37	35	42	-	38	35	35	-	46	-	37	35	42	-	38	35	35	-	45	-	37	35	42	-	38	35	35	-	55	-	37	35	42	-	38	35	35	-																																												
CD5_05	133 ARTARMON ROAD, ARTARMON, NSW	52	-	43	41	51	42	38	34	34	-	47	-	43	41	51	42	38	34	34	-	46	-	43	41	51	42	38	34	34	-	45	-	43	41	51	42	38	34	34	-	55	-	43	41	51	42	38	34	34	-																																												
CD5_05	132 ARTARMON ROAD, ARTARMON, NSW	52	-	44	39	57	48	38	36	34	-	47	-	44	39	57	48	38	36	34	-	46	-	44	39	57	48	38	36	34	-	45	-	44	39	57	48	38	36	34	-	55	-	44</																																																			

Table D1: Predicted construction noise levels

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Client Name

Project Name:

TH511-2 Construction noise results (r18) - Final.xlsm

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Project Name:

Table D1: Predicted construction noise levels

Receiver		Predicted noise levels, dB(A)																N(EN14442)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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		AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NM1	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NM1	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NM1	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Project Name:

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table D1: Predicted construction noise levels

Receiver		Predicted noise levels (dBA)																N (E41/E42)																															
		Day (Standard)								Day (DOHW)								Evening (DOHW)								Night (DOHW)								E2 (E41/E42)															
		NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06
NCA	Address	69	-	-	-	-	-	-	36	-	45	64	-	-	-	-	-	36	-	45	60	-	-	-	-	-	36	-	45	55	-	-	-	-	-	36	-	45	55	-	-	-	-	-	36	-	45		
CH.01	5 ATCHISON STREET ST LEONARDS	69	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.01	34 OXLEY STREET ST LEONARDS	69	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.01	36 OXLEY STREET ST LEONARDS	69	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.01	1 ALBANY STREET ST LEONARDS	69	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.01	1 ALBANY STREET ST LEONARDS	69	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.01	38-46 ALBANY STREET ST LEONARDS	69	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.01	563-565 PACIFIC HIGHWAY ST LEONARDS	69	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	48 ATCHISON STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	35	34	44	53	-	-	-	-	-	-	35	34	44	49	-	-	-	-	-	-	35	34	44	45	-	-	-	-	-	35	34	44	55	-	-	-	-	35	34	44	
CH.02	55 CHANDOS STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	35	35	48	53	-	-	-	-	-	-	35	35	48	49	-	-	-	-	-	-	35	35	48	45	-	-	-	-	-	35	35	48	55	-	-	-	-	35	35	48	
CH.02	63-65 CHANDOS STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	35	35	47	53	-	-	-	-	-	-	35	35	47	49	-	-	-	-	-	-	35	35	47	45	-	-	-	-	-	35	35	47	55	-	-	-	-	35	35	47	
CH.02	50 ATCHISON STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	66 ATCHISON STREET, CROWS NEST, NSW	58	-	-	-	-	-	-	-	39	53	53	-	-	-	-	-	-	-	39	49	-	-	-	-	-	-	-	39	45	55	-	-	-	-	-	-	39	55	-	-	-	-	-	39	55			
CH.02	52-56 ATCHISON STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	58 ATCHISON STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	34	-	53	-	-	-	-	-	-	-	34	-	49	-	-	-	-	-	-	34	-	-	55	-	-	-	-	-	-	34	-	-	-	-	-	-	55				
CH.02	67-69 CHANDOS STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	35	34	47	53	-	-	-	-	-	-	35	34	47	49	-	-	-	-	-	35	34	47	45	-	-	-	-	-	35	34	47	55	-	-	-	-	35	34	47		
CH.02	111-115 CHANDOS STREET, CROWS NEST, NSW	58	-	-	-	-	-	-	-	-	40	53	-	-	-	-	-	-	-	-	40	49	-	-	-	-	-	-	-	-	40	55	-	-	-	-	-	-	-	-	-	-	-	-	40	55			
CH.02	107 CHANDOS STREET, CROWS NEST, NSW	58	-	-	-	-	-	-	-	40	53	-	-	-	-	-	-	-	-	-	40	49	-	-	-	-	-	-	-	-	40	55	-	-	-	-	-	-	-	-	-	-	-	-	40	55			
CH.02	78-80 ALEXANDER STREET CROWS NEST	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	75 CHANDOS STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	35	34	39	53	-	-	-	-	-	-	35	34	39	49	-	-	-	-	-	35	34	39	45	-	-	-	-	-	35	34	39	55	-	-	-	-	35	34	39		
CH.02	162 WILLOUGHBY ROAD, CROWS NEST, NSW	58	-	-	-	-	-	-	-	-	37	53	-	-	-	-	-	-	-	-	37	49	-	-	-	-	-	-	-	-	37	55	-	-	-	-	-	-	-	-	-	-	-	-	37	55			
CH.02	64 ATCHISON STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	83-85 CHANDOS STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	34	34	41	53	-	-	-	-	-	-	34	34	41	49	-	-	-	-	-	34	34	41	45	-	-	-	-	-	34	34	41	55	-	-	-	-	34	34	41		
CH.02	160 WILLOUGHBY ROAD, CROWS NEST, NSW	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	80-82 ATCHISON STREET, CROWS NEST, NSW	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	60 ATCHISON STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	89 CHANDOS STREET, ST LEONARDS, NSW	58	-	-	-	-	-	-	-	-	40	53	-	-	-	-	-	-	-	-	40	49	-	-	-	-	-	-	-	-	40	55	-	-	-	-	-	-	-	-	-	-	-	-	40	55			
CH.02	79 ALEXANDER STREET CROWS NEST	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	118-124 WILLOUGHBY ROAD CROWS NEST	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	11 ERNEST STREET CROWS NEST	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	53-57 ATCHISON STREET CROWS NEST	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	55				
CH.02	13 ERNEST STREET CROWS NEST	58	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-																															

Table D1: Predicted construction noise levels

Receiver		Predicted noise levels, dB(A)																N (E41/E42)																											
		Day (Standard)																N (E41/E42)																											
		AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NM(L)	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NM(L)	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NM(L)	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08					
Day (DOHW)		Day (DOHW)																Evening (DOHW)														Night (DOHW)													
Evening (DOHW)		Evening (DOHW)																Night (DOHW)														Night (DOHW)													
Night (DOHW)		Night (DOHW)																Night (DOHW)														Night (DOHW)													
E2 (E41/E42)		E2 (E41/E42)																E2 (E41/E42)														E2 (E41/E42)													
N (E41/E42)		N (E41/E42)																N (E41/E42)														N (E41/E42)													
N (E41/E42)		N (E41/E42)																N (E41/E42)														N (E41/E42)													
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NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Project Name:

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table D1: Predicted construction noise levels

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

		Predicted noise levels, dBA																Day (Standard)																Evening (OOHW)																Night (OOHW)																E2 (E4/E42)																N (E4/E42)															
NCA	Address	NM_L	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	NM_L	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	NM_L	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	NM_L	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	NM_L	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08																																														
CN_04B	15 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	17 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	19 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	16 MARSHALL AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	4 PORTVIEW ROAD, GREENWICH, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	14 PARK ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	6 PORTVIEW ROAD, GREENWICH, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	10 BERRY ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	8 BERRY ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	8 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	18 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	12 MARSHALL AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	23 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	23 BERRY ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	12 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	16 BERRY ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	21 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	6 BERRY ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	5 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	11 PARK ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	2 MARSHALL AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	1 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	6 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	21 BERRY ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	13 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	7 PARK ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	17 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	3 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	9 BERRY ROAD, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	27 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	10 HOLDSWORTH AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
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CN_04B	25 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	8 PORTVIEW ROAD, GREENWICH, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	7 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	2 MARSHALL AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	9 CANBERRA AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	16 MARSHALL AVENUE, ST LEONARDS, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_04B	10 PORTVIEW ROAD, GREENWICH, NSW	69	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-																																														
CN_05	4 LAMONT STREET, WOLLSTONECRAFT (NORTH	55	-	-	-	-	-	-	-	-	-	50	-	-	-	-	-	-																																																																															

Client Name

Project Name:

TH511-2 Construction noise results (r18) - Final.xlsm

CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Construction noise results (r18) - Final.xlsm

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Client Name	Project Name:
TH511-2 Construction noise results (r18) - Final.xlsm	CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table D1: Predicted construction noise levels

Table D1: Predicted construction noise levels																																																NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS																							
Receiver		Predicted noise levels (dBA)																Predicted noise levels (dBA)																Predicted noise levels (dBA)																Predicted noise levels (dBA)																					
		Day (Standard)								Day (DOHW)								Evening (DOHW)								Night (DOHW)								Night (E4/E42)								Night (E4/E42)								Night (E4/E42)																					
NCA	Address	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08																					
OSR	3 GEORGE PLACE, ARTARMON (WILLOUGHBY)	70	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	-																			
OSR	99 SHIRLEY ROAD, CROWS NEST (NORTH SYD)	70	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	-																			
OSR	109 ALEXANDER STREET, CROWS NEST	70	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	-																			
OSR	70 CHANDOS STREET, ST LEONARDS, NSW	70	-	-	-	-	-	35	35	45	70	-	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	-																			
OSR	18 WHITING STREET, ARTARMON	75	-	-	-	36	-	40	37	36	75	-	-	-	36	-	40	37	36	75	-	-	-	36	-	40	37	36	75	-	-	-	36	-	40	37	36	75	-	-	-	36	-	40	37	36	75	-	-	-	-	-	-	-																	
OSR	27 HOTHAM PARADE, ARTARMON	75	-	-	-	41	-	40	36	35	75	-	-	-	41	-	40	36	35	75	-	-	-	41	-	40	36	35	75	-	-	-	41	-	40	36	35	75	-	-	-	41	-	40	36	35	75	-	-	-	-	-	-	-																	
OSR	14 WHITING STREET, ARTARMON	75	-	-	-	35	-	40	38	37	75	-	-	-	35	-	40	38	37	75	-	-	-	35	-	40	38	37	75	-	-	-	35	-	40	38	37	75	-	-	-	35	-	40	38	37	75	-	-	-	-	-	-	-																	
OSR	53 CARLOTTA STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	-	37	35	34	-	70	-	-	-	-	37	35	34	-	70	-	-	-	-	37	35	34	-	70	-	-	-	-	37	35	34	-	70	-	-	-	-	37	35	34	-	70	-	-	-	-	-	-	-																	
OSR	58 WHITING STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	40	-	-	-	-	70	-	-	-	-	40	-	-	-	-	70	-	-	-	-	40	-	-	-	70	-	-	-	-	40	-	-	-	70	-	-	-	-	40	-	-	-	70	-	-	-	-	-	-																	
OSR	56 WHITING STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	42	-	34	-	-	70	-	-	-	42	-	34	-	-	70	-	-	-	42	-	34	-	-	70	-	-	-	42	-	34	-	-	70	-	-	-	42	-	34	-	-	70	-	-	-	-	-	-																		
OSR	12 HERBERT STREET, ST LEONARDS (WILLOUGHBY)	70	-	-	-	-	34	38	-	44	70	-	-	-	-	34	38	-	44	70	-	-	-	-	34	38	-	44	70	-	-	-	-	34	38	-	44	70	-	-	-	-	34	38	-	44	70	-	-	-	-	-	-																		
OSR	2 FREDERICK STREET, ST LEONARDS (WILLOUGHBY)	70	-	-	-	34	-	-	-	-	70	-	-	-	34	-	-	-	-	-	70	-	-	-	34	-	-	-	70	-	-	-	-	34	-	-	-	70	-	-	-	-	34	-	-	-	70	-	-	-	-	-	-																		
OSR	102 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	70	-	52	54	67	58	35	-	-	70	-	52	54	67	58	35	-	-	-	70	-	52	54	67	58	35	-	-	70	-	52	54	67	58	35	-	-	70	-	52	54	67	58	35	-	-	70	-	52	54	67																			
OSR	46 HOTHAM PARADE, ARTARMON (WILLOUGHBY)	70	-	-	-	41	-	-	-	-	70	-	-	-	41	-	-	-	-	-	70	-	-	-	41	-	-	-	70	-	-	-	-	41	-	-	-	70	-	-	-	-	41	-	-	-	70	-	-	-	-	-	-																		
OSR	9 HANDED STREET, ARTARMON (WILLOUGHBY)	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	75	-	-	-	-	-	-																			
OSR	41 HERBERT STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	36	-	40	43	38	70	-	-	-	36	-	40	43	38	70	-	-	-	36	-	40	43	38	70	-	-	-	36	-	40	43	38	70	-	-	-	36	-	40	43	38	70	-	-	-	-	-	-	-																	
OSR	10 HERBERT STREET, ST LEONARDS (WILLOUGHBY)	70	-	-	-	-	36	37	-	-	70	-	-	-	-	36	37	-	-	70	-	-	-	-	36	37	-	-	70	-	-	-	-	36	37	-	-	70	-	-	-	-	36	37	-	-	70	-	-	-	-	-	-																		
OSR	90 DICKSON AVENUE, ARTARMON (WILLOUGHBY)	70	-	-	-	37	-	36	-	-	70	-	-	-	37	-	36	-	-	70	-	-	-	37	-	36	-	-	70	-	-	-	37	-	36	-	-	70	-	-	-	37	-	36	-	-	70	-	-	-	-	-	-																		
OSR	64-66 WHITING STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	35	-	-	-	-	70	-	-	-	35	-	-	-	-	-	70	-	-	-	35	-	-	-	70	-	-	-	-	35	-	-	-	70	-	-	-	-	35	-	-	-	70	-	-	-	-	-	-																		
OSR	57 WHITING STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	36	-	34	-	-	70	-	-	-	36	-	34	-	-	70	-	-	-	36	-	34	-	-	70	-	-	-	36	-	34	-	-	70	-	-	-	36	-	34	-	-	70	-	-	-	-	-	-																		
OSR	50 BROUGHTON ROAD, ARTARMON (WILLOUGHBY)	70	-	-	-	35	-	-	-	-	70	-	-	-	35	-	-	-	-	-	70	-	-	-	35	-	-	-	70	-	-	-	-	35	-	-	-	70	-	-	-	-	35	-	-	-	70	-	-	-	-	-	-																		
OSR	503 VICTORIA AVENUE, CHATSWOOD	70	-	-	-	35	-	-	-	-	70	-	-	-	35	-	-	-	-	-	70	-	-	-	35	-	-	-	70	-	-	-	-	35	-	-	-	70	-	-	-	-	35	-	-	-	70	-	-	-	-	-	-																		
OSR	2 LANCELEY PLACE, ARTARMON (WILLOUGHBY)	70	-	-	-	-	40	-	-	-	70	-	-	-	-	40	-	-	-	-	70	-	-	-	-	40	-	-	-	70	-	-	-	-	40	-	-	-	70	-	-	-	-	40	-	-	-	70	-	-	-	-	-	-																	
OSR	114 CHRISTIE STREET, ST LEONARDS (WILLOUGHBY)	70	-	-	-	-	-	-	-	69	70	-	-	-	-	-	-	-	-	-	69	70	-	-	-	-	-	-	69	70	-	-	-	-	-	-	69	70	-	-	-	-	-	-	69	70	-	-	-	-	-																				
OSR	37 WHITING STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	34	39	-	40	35	36	70	-	-	-	34	39	-	40	35	36	70	-	-	-	34	39	-	40	35	36	70	-	-	-	34	39	-	40	35	36	70	-	-	-	34	39	-	40	35	36	70	-	-	-																
OSR	22 LAMBS ROAD, ARTARMON (WILLOUGHBY)	70	-	-	-	37	-	54	67	74	39	70	-	-	-	37	-	54	67	74	39	70	-	-	-	37	-	54	67	74	39	70	-	-	-	37	-	54	67	74	39	70	-	-	-	37	-	54	67	74	39	70	-	-	-																
OSR	52 WHITING STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	36	-	40	35	37	70	-	-	-	36	-	40	35	37	70	-	-	-	36	-	40	35	37	70	-	-	-	36	-	40	35	37	70	-	-	-	36	-	40	35	37	70	-	-	-	-	-	-	-																	
OSR	70 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	70	-	51	52	62	53	36	-	-	70	-	51	52																																																									

Table D1: Predicted construction noise levels

Table D1: Predicted construction noise levels		NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS																																															
Receiver	Address	Predicted noise levels (dBA)																Evening (DOHW)																Night (DOHW)															
		Day (Standard)	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08	NML	AF.01	AF.02	AF.03	AF.03H	AF.04	AF.05	AF.06	AF.07	AF.08								
OSR	36 HOTHAM PARADE ARTARMON	75	-	-	-	38	-	36	34	-	-	75	-	-	-	38	-	36	34	-	-	75	-	-	-	38	-	36	34	-	-	75	-	-	-	38	-	36	34	-	-								
OSR	11 WALTHAM STREET ARTARMON	75	-	-	-	38	-	50	37	-	-	75	-	-	-	38	-	50	37	-	-	75	-	-	-	38	-	50	37	-	-	75	-	-	-	38	-	50	37	-	-								
OSR	9 WALTHAM STREET ARTARMON	50	-	-	-	38	-	50	44	38	-	50	-	-	-	38	-	50	44	38	-	50	-	-	-	38	-	50	44	38	-	50	-	-	-	38	-	50	44	38	-								
OSR	23 WHITING STREET ARTARMON	75	-	-	-	-	-	39	35	-	-	75	-	-	-	-	-	39	35	-	-	75	-	-	-	-	-	39	35	-	-	75	-	-	-	-	-	39	35	-	-								
OSR	19 WHITING STREET ARTARMON	75	-	-	-	-	-	39	36	36	-	75	-	-	-	-	-	39	36	36	-	75	-	-	-	-	-	39	36	36	-	75	-	-	-	-	-	39	36	36	-								
OSR	1-3 WALTHAM STREET ARTARMON	75	-	-	-	40	-	51	43	41	-	75	-	-	-	40	-	51	43	41	-	75	-	-	-	40	-	51	43	41	-	75	-	-	-	40	-	51	43	41	-								
OSR	7 WALTHAM STREET ARTARMON	75	-	-	-	42	-	52	44	39	-	75	-	-	-	42	-	52	44	39	-	75	-	-	-	42	-	52	44	39	-	75	-	-	-	42	-	52	44	39	-								
OSR	21 WHITING STREET ARTARMON	75	-	-	-	-	-	39	35	-	-	75	-	-	-	-	-	39	35	-	-	75	-	-	-	-	-	39	35	-	-	75	-	-	-	-	-	39	35	-	-								
OSR	29 CARLOTTA STREET ARTARMON	75	-	-	-	-	-	38	36	37	-	75	-	-	-	-	-	38	36	37	-	75	-	-	-	-	-	38	36	37	-	75	-	-	-	-	-	38	36	37	-								
OSR	33 DICKSON AVENUE ARTARMON	75	-	-	-	-	-	40	-	-	-	75	-	-	-	-	-	40	-	-	-	75	-	-	-	-	-	40	-	-	-	75	-	-	-	-	-	40	-	-	-								
OSR	31 DICKSON AVENUE ARTARMON	75	-	-	-	-	-	41	34	-	-	75	-	-	-	-	-	41	34	-	-	75	-	-	-	-	-	41	34	-	-	75	-	-	-	-	-	41	34	-	-								
OSR	75 RESERVE ROAD ARTARMON	75	-	-	-	35	-	41	38	37	-	75	-	-	-	35	-	41	38	37	-	75	-	-	-	35	-	41	38	37	-	75	-	-	-	35	-	41	38	37	-								
OSR	7 DICKSON AVENUE ARTARMON	75	-	-	-	37	-	46	37	35	-	75	-	-	-	37	-	46	37	35	-	75	-	-	-	37	-	46	37	35	-	75	-	-	-	37	-	46	37	35	-								
OSR	29 CLARENDON STREET ARTARMON	75	-	-	-	-	-	41	35	35	-	75	-	-	-	-	-	41	35	35	-	75	-	-	-	-	-	41	35	35	-	75	-	-	-	-	-	41	35	35	-								
OSR	77 RESERVE ROAD ARTARMON	75	-	-	-	-	-	41	37	37	-	75	-	-	-	-	-	41	37	37	-	75	-	-	-	-	-	41	37	37	-	75	-	-	-	-	-	41	37	37	-								
OSR	29 DICKSON AVENUE ARTARMON	75	-	-	-	37	-	41	37	36	-	75	-	-	-	37	-	41	37	36	-	75	-	-	-	37	-	41	37	36	-	75	-	-	-	37	-	41	37	36	-								
OSR	24 HERBERT STREET ARTARMON	75	-	-	-	38	-	53	40	35	-	75	-	-	-	38	-	53	40	35	-	75	-	-	-	38	-	53	40	35	-	75	-	-	-	38	-	53	40	35	-								
OSR	13 WALTHAM STREET ARTARMON	75	-	-	-	40	-	46	41	37	-	75	-	-	-	40	-	46	41	37	-	75	-	-	-	40	-	46	41	37	-	75	-	-	-	40	-	46	41	37	-								
OSR	32 DICKSON AVENUE ARTARMON	75	-	-	-	36	-	43	-	-	-	75	-	-	-	36	-	43	-	-	-	75	-	-	-	36	-	43	-	-	-	75	-	-	-	36	-	43	-	-	-								
OSR	40 DICKSON AVENUE ARTARMON	75	-	-	-	34	-	38	-	-	-	75	-	-	-	34	-	38	-	-	-	75	-	-	-	34	-	38	-	-	-	75	-	-	-	34	-	38	-	-	-								
OSR	20 HERBERT STREET ARTARMON	75	-	-	-	40	-	49	44	42	-	75	-	-	-	40	-	49	44	42	-	75	-	-	-	40	-	49	44	42	-	75	-	-	-	40	-	49	44	42	-								
OSR	16 DICKSON AVENUE ARTARMON	75	-	34	-	35	-	42	35	35	-	75	-	34	-	35	-	42	35	35	-	75	-	34	-	35	-	42	35	35	-	75	-	34	-	35	-	42	35	35	-								
OSR	28 DICKSON AVENUE ARTARMON	75	-	-	-	38	-	41	-	-	-	75	-	-	-	38	-	41	-	-	-	75	-	-	-	38	-	41	-	-	-	75	-	-	-	38	-	41	-	-	-								
OSR	17 CARLOTTA STREET ARTARMON	75	-	-	-	36	-	38	36	38	-	75	-	-	-	36	-	38	36	38	-	75	-	-	-	36	-	38	36	38	-	75	-	-	-	36	-	38	36	38	-								
OSR	9 CARLOTTA STREET ARTARMON	75	-	-	-	38	-	41	37	38	-	75	-	-	-	38	-	41	37	38	-	75	-	-	-	38	-	41	37	38	-	75	-	-	-	38	-	41	37	38	-								
OSR	7 CARLOTTA STREET ARTARMON	75	-	-	-	-	-	41	39	39	-	75	-	-	-	41	-	39	39	-	75	-	-	-	41	-	39	39	-	75	-	-	-	41	-	39	39	-	75	-	-	-							
OSR	4-14 DICKSON AVENUE ARTARMON	75	-	34	-	37	-	44	38	38	75	75	-	34	-	37	-	44	38	38	75	75	-	34	-	37	-	44	38	38	75	75	-	34	-	37	-	44	38	38	75	75	-						
OSR	7A DICKSON AVENUE ARTARMON	75	-	-	-	40	-	46	39	36	-	75	-	-	-	40	-	46	39	36	-	75	-	-	-	40	-	46	39	36	-	75	-	-	-	40	-	46	39	36	-								
OSR	35 DICKSON AVENUE ARTARMON	75	-	-	-	35	-	40	36	37	-	75	-	-	-	35	-	40	36	37	-	75	-	-	-	35	-	40	36	37	-	75	-	-	-	35	-	40	36	37	-								
OSR	80 HOTHAM PARADE, ARTARMON (WILLOUGHBY)	70	-	-	-	36	-	-	-	-	-	70	-	-	-	36	-	-	-	-	-	70	-	-	-	36	-	-	-	-	-	70	-	-	-	36	-	-	-	-	-								
OSR	86 RESERVE ROAD, ARTARMON (WILLOUGHBY)	75	-	-	-	34	-	38	35	-	-	75	-	-	-	34	-	38	35	-	-	75	-	-	-	34	-	38	35	-	-	75	-	-	-	34	-	38	35	-	-								
OSR	84 HAMPDEN ROAD, ARTARMON (WILLOUGHBY)	70	-	-	51	52	64	55	37	-	34	-	70	-	-	51	52	64	55	37	-	34	-	70	-	-	51	52	64	55	37	-	34	-	70	-	-	51	52	64	55	37	-	34	-				
OSR	70 ALBERT AVENUE, CHATSWOOD	55	43	-	-	39	-	-	-	-	-	55																																					

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

		Predicted noise levels, dBA																																																															
		Day (Standard)								Day (OOHW)								Evening (OOHW)								Night (OOHW)								E2 (E1+E2)								N (E1+E2)																							
NCA	Address	NM1	AF-01	AF-02	AF-03	AF-04	AF-05	AF-06	AF-07	AF-08	NM1	AF-01	AF-02	AF-03	AF-04	AF-05	AF-06	AF-07	AF-08	NM1	AF-01	AF-02	AF-03	AF-04	AF-05	AF-06	AF-07	AF-08	NM1	AF-01	AF-02	AF-03	AF-04	AF-05	AF-06	AF-07	AF-08	NM1	AF-01	AF-02	AF-03	AF-04	AF-05	AF-06	AF-07	AF-08	NM1	AF-01	AF-02	AF-03	AF-04	AF-05	AF-06	AF-07	AF-08										
OSR	35 WHITING STREET ARTARMON	75	-	-	-	34	-	-	-	-	75	-	-	-	34	-	-	-	-	75	-	-	-	34	-	-	-	-	75	-	-	-	34	-	-	-	-	75	-	-	-	34	-	-	-	-	75	-	-	-	34	-	-	-	-										
OSR	32 WHITING STREET ARTARMON	75	-	-	-	35	-	37	34	-	75	-	-	-	35	-	37	34	-	75	-	-	-	35	-	37	34	-	75	-	-	-	35	-	37	34	-	75	-	-	-	35	-	37	34	-	75	-	-	-	35	-	37	34	-										
OSR	32 WOTHAM PARADE ARTARMON	75	-	-	-	35	-	-	-	-	75	-	-	-	35	-	-	-	-	75	-	-	-	35	-	-	-	-	75	-	-	-	35	-	-	-	-	75	-	-	-	35	-	-	-	-	75	-	-	-	35	-	-	-											
OSR	17 WHITING STREET ARTARMON	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	75	-	-	-	-														
OSR	27 CLEG STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	38	-	43	51	45	-	70	-	-	38	-	43	51	45	-	70	-	-	38	-	43	51	45	-	70	-	-	38	-	43	51	45	-	70	-	-	38	-	43	51	45	-	70	-	-	38	-	43	51	45										
OSR	53 DICKSON AVENUE, ARTARMON (WILLOUGHBY)	70	-	-	-	-	38	-	-	-	70	-	-	-	-	38	-	-	-	-	70	-	-	-	-	38	-	-	-	70	-	-	-	-	38	-	-	-	-	70	-	-	-	-	38	-	-	-	-	70	-	-	-	-											
OSR	5 ABBOTT ROAD ARTARMON	55	-	-	-	34	-	-	-	-	55	-	-	-	34	-	-	-	-	55	-	-	-	34	-	-	-	-	55	-	-	-	34	-	-	-	-	55	-	-	-	34	-	-	-	-	55	-	-	-	-														
OSR	407 PACIFIC HIGHWAY ARTARMON	70	-	35	39	47	38	-	-	-	70	-	35	39	47	38	-	-	-	70	-	35	39	47	38	-	-	-	70	-	35	39	47	38	-	-	70	-	35	39	47	38	-	-	70	-	35	39	47	38	-														
OSR	217 Pacific Hwy, ArtArmon NSW 2064	75	-	-	-	-	34	-	-	-	75	-	-	-	-	34	-	-	-	75	-	-	-	-	34	-	-	-	75	-	-	-	-	34	-	-	-	75	-	-	-	-	34	-	-	-	-	75	-	-	-	-													
OSR	94 HAMFEN ROAD, ARTARMON (WILLOUGHBY)	70	-	-	41	41	58	49	-	-	70	-	-	41	41	58	49	-	-	70	-	-	41	41	58	49	-	-	70	-	-	41	41	58	49	-	-	70	-	-	41	41	58	49	-	-	70	-	-	41	41	58	49	-											
OSR	14 ARTARMON ROAD, WILLOUGHBY, NSW	75	-	-	-	-	35	-	-	-	75	-	-	-	-	35	-	-	-	75	-	-	-	-	35	-	-	-	75	-	-	-	-	35	-	-	-	75	-	-	-	-	35	-	-	-	-	75	-	-	-	-													
OSR	63 DICKSON AVENUE, ARTARMON (WILLOUGHBY)	70	-	-	-	36	-	-	-	-	70	-	-	-	36	-	-	-	-	70	-	-	-	36	-	-	-	-	70	-	-	-	36	-	-	-	-	70	-	-	-	36	-	-	-	-	70	-	-	-	-														
OSR	14 TALUS STREET, NAREMBURN (WILLOUGHBY)	70	-	-	-	-	-	-	-	40	70	-	-	-	-	-	-	-	-	40	70	-	-	-	-	-	-	-	40	70	-	-	-	-	-	-	40	70	-	-	-	-	-	-	-	40	70	-	-	-	-														
OSR	108 KORTHCOTE STREET, NAREMBURN (WILLOUGHBY)	70	-	35	35	52	-	-	-	-	70	-	35	35	52	-	-	-	-	70	-	35	35	52	-	-	-	-	70	-	35	35	52	-	-	-	70	-	35	35	52	-	-	-	-	70	-	35	35	52	-														
OSR	2A ELIZABETH STREET, ARTARMON (WILLOUGHBY)	70	-	37	38	55	46	38	35	35	-	70	-	37	38	55	46	38	35	35	-	70	-	37	38	55	46	38	35	35	-	70	-	37	38	55	46	38	35	35	-	70	-	37	38	55	46	38	35	35	-														
OSR	0 FRANCIS ROAD, ARTARMON (WILLOUGHBY)	70	-	52	52	65	56	-	-	-	70	-	52	52	65	56	-	-	-	70	-	52	52	65	56	-	-	-	70	-	52	52	65	56	-	-	70	-	52	52	65	56	-	-	70	-	52	52	65	56	-														
OSR	0 BARTON ROAD, ARTARMON (WILLOUGHBY)	70	-	35	-	41	-	39	41	41	-	70	-	35	-	41	-	39	41	41	-	70	-	35	-	41	-	39	41	41	-	70	-	35	-	41	-	39	41	41	-	70	-	35	-	41	-	39	41	41	-														
OSR	1 ARTARMON ROAD, WILLOUGHBY, NSW	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	75	-	-	-	-																
OSR	20 ELIZABETH STREET, ARTARMON (WILLOUGHBY)	70	-	35	42	47	38	37	34	-	70	-	35	42	47	38	37	34	-	70	-	35	42	47	38	37	34	-	70	-	35	42	47	38	37	34	-	70	-	35	42	47	38	37	34	-	70	-	35	42	47	38	37												
OSR	7-9 WILKES AVENUE, ARTARMON (WILLOUGHBY)	70	-	53	54	70	61	37	-	-	70	-	53	54	70	61	37	-	-	70	-	53	54	70	61	37	-	-	70	-	53	54	70	61	37	-	-	70	-	53	54	70	61	37	-	-	70	-	53	54	70	61	37												
OSR	38 PUNCH STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	38	-	41	-	-	70	-	-	-	38	-	41	-	-	70	-	-	-	-	38	-	41	-	-	70	-	-	-	-	38	-	41	-	-	70	-	-	-	-	38	-	41	-	-	70	-	-	-												
OSR	40 WHITING STREET, ARTARMON (WILLOUGHBY)	70	-	-	-	35	-	-	-	-	70	-	-	-	35	-	-	-	-	70	-	-	-	35	-	-	-	-	70	-	-	-	35	-	-	-	-	70	-	-	-	35	-	-	-	-	70	-	-	-	-														
OSR	30-32 CHANDOS STREET, ST LEONARDS (WI)	70	-	-	-	-	-	34	46	70	-	-	-	-	-	34	46	70	-	-	-	-	-	-	-	-	34	46	70	-	-	-	-	-	34	46	70	-	-	-	-	-	34	46	70	-	-	-	-																
OSR	17 DICKSON AVENUE ARTARMON	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	-	75	-	-	-														
OSR	15 DICKSON AVENUE ARTARMON	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	-	75	-	-	-														
OSR	13 DICKSON AVENUE ARTARMON	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	75	-	-	-	-	41	-	-	-	-	75	-	-	-														
OSR	14 WALTHAM STREET ARTARMON	75	-	-	-	-	43	34	34	-	75	-	-	-	-	43	34	34	-	75	-	-	-	-	43	34	34	-	75	-	-	-	-	43	34	34	-	75	-	-	-	-	43	34	34	-	75	-	-	-	-														
OSR	27 DICKSON AVENUE ARTARMON	75	-	-	-	42	-	-	-	-	75	-	-	-	42	-	-	-	-	75	-	-	-	42	-	-	-	-	75	-	-	-	42	-	-	-	75	-	-	-	42	-	-	-	75	-	-	-	-																
OSR	23 DICKSON AVENUE ARTARMON	75	-	-	-	38	-	-	-	-	75	-	-	-	38	-	-	-	-	75	-	-	-	38	-	-	-	-	75	-	-	-	38	-	-	-	75	-	-	-	38	-	-	-	75	-	-	-	-																
OSR	19 DICKSON AVENUE ARTARMON	75	-	-	-	36	-	-	-	-	75	-	-	-	36	-	-	-	-	75	-	-	-	36	-	-	-	-	75	-	-	-	36	-	-	-	75	-	-	-	36	-	-	-	75	-	-	-	-																
OSR	5 WALTHAM STREET ARTARMON	75	-	34	34	50	41	38	-	-	75	-	34	34	50	41	38	-	-	75	-	34	34	50	41	38	-	-	75	-	34	34	50	41	38	-	-	75	-	34	34	50	41	38	-	-	75	-	34	34	50	41	38												
OSR	22 HERBERT STREET ARTARMON	75	-	-	-	37	-	51	-	-	75	-	-	-	37	-	51	-	-	75	-	-	-	37	-	51	-	-	75	-	-	-	37	-	51	-	-	75	-	-	-	37	-	51	-	-	75	-	-	-	-														
OSR	7 WHITING STREET ARTARMON	75	-	-	38	-	37	34	-	-	75	-	-	-	38	-	37	34	-	-	75	-	-	-	38	-	37	34	-	75	-	-	-	38	-	37	34	-	-	75	-	-	-	38	-	37	34	-	-	75	-	-	-												
OSR	75 RESERVE ROAD ARTARMON	75	-	-	-	41	40	-	-	-	75	-	-	-	41	40	-	-	-	75	-	-	-	41	40	-	-	-	75	-	-	-	41	40	-	-	75	-	-	-	41	40	-	-	75	-	-	-	-																
OSR	73 RESERVE ROAD ARTARMON	75	-	-	-	40	38	-	-	-	75	-	-	-	40	38	-	-	-	75	-	-	-	40	38	-	-	-	75	-	-	-	40	38	-	-	75	-	-	-	40	38	-	-	75	-	-	-	-																
OSR	27 CAROLITA STREET ARTARMON	75	-	-	-	35	34	-	-	-	75	-	-	-	35	34	-	-	-	75	-	-	-	35	34	-	-	-	75	-	-	-	35	34	-	-	75	-	-	-	35	34	-	-	75	-	-	-	-																
OSR	25 CAROLITA STREET ARTARMON	75	-	-	-	37	35	35	-	-	75	-	-	-	37	35	35	-	-	75	-	-	-	37	35	35	-	-	75	-	-	-	37	35	35	-	-	75	-	-	-	37	35	35	-	-	75	-	-</																

APPENDIX E Additional noise mitigation

The additional noise mitigation measures have provided to Systems Connect in a spreadsheet table in order to more adequately mitigate and manage potential noise impacts.

The table below is replicated from Table 5.7, and identifies the additional mitigation measures to be applied at construction noise affected receivers.

When is the work being undertaken?	Predicted $L_{Aeq, 15min}$ noise level above		Identify additional management measures to be implemented	
	Background (RBL)	Noise Management Level (NML)		
Standard Hours M-F 7am to 6pm Sat 8am to 1pm	0 to 10 dB(A)	-	-	-
	> 10 to 20 dB(A)	≤ 10 dB(A)	-	-
	> 20 to 30 dB(A)	> 10 to 20 dB(A)	LB, M	[MM2]
	> 30 dB(A)	> 20 dB(A)	LB, M	[MM2]
OOHW Period 1 M-F 6pm to 10pm Sat 1pm to 10pm Sun/ PH 8am to 10pm	0 to 10 dB(A)	≤ 5 dB(A)	-	-
	> 10 to 20 dB(A)	> 5 to 15 dB(A)	LB	[MM1]
	> 20 to 30 dB(A)	> 15 to 25 dB(A)	LB, M	[MM2]
	> 30 dB(A)	> 25 dB(A)	LB, M, IB, PC, RO, SN	[MM4]
OOHW Period 2 M-F 10pm to 7am Sat 10pm to 8am Sun/ PH 6pm to 8am	0 to 10 dB(A)	≤ 5 dB(A)	-	-
	> 10 to 20 dB(A)	> 5 to 15 dB(A)	LB, M	[MM2]
	> 20 to 30 dB(A)	> 15 to 25 dB(A)	LB, M, IB, PC, RO, SN	[MM4]
	> 30 dB(A)	> 25 dB(A)	LB, M, IB, PC, RO, SN, AA	[MM5]

Notes: Use the abbreviation codes in the table above to confirm management measures required
Code in square brackets [] refers to noise management code for affected receivers identified in each CNVIS

LB = Letter box drops
M = Monitoring
IB = Individual briefings
SN = Specific notifications
PC = Phone calls and emails
RO = Project specific respite offer
AA = Alternative accommodation

In the attached spreadsheet results table, an additional management measure code (MM1, MM2 et al) is given to each receiver if construction noise levels are expected to exceed the Noise Management Level (NML). Each additional management measure code corresponds to a collection of measures identified in the CNVS [9]. The extent of the additional management measures is proportional to the exceedance of the NML and the period in which the exceedance is experienced.

For example, if a receiver experiences construction noise of 10 to 20 dB(A) above the NML during Standard Hours, then the letterbox drop (LB) and verification of predicted noise levels (M) measures are to be adopted for the receiver.

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Client Name
TH511-2 Construction noise results (r18) - Final.xlsm

Project Name:
CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table E1: Additional noise mitigation and receiver notification

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Receiver	Additional noise mitigation and receiver notifications																																		
	Day (Standard)																																		
	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07
NCA	Address																																		
AS_03	12 GRANDVIEW STREET, NAREMBURN (WILLOU																																		
AS_03	1 CHELMSFORD AVENUE, NAREMBURN (WILLOU																																		
AS_03	73 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	49 STATION STREET, NAREMBURN, NSW																																		
AS_03	8 TALUS STREET, NAREMBURN, NSW																																		
AS_03	49 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	7 DALLEYS ROAD, NAREMBURN, NSW																																		
AS_03	5 GRANDVIEW STREET, NAREMBURN, NSW																																		
AS_03	15 GRANDVIEW STREET, NAREMBURN, NSW																																		
AS_03	29 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	65 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	26 OLYMPIA ROAD, NAREMBURN, NSW																																		
AS_03	49 PARK ROAD, NAREMBURN, NSW																																		
AS_03	77 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	37 DALLEYS ROAD, NAREMBURN, NSW																																		
AS_03	49 PARK ROAD, NAREMBURN, NSW																																		
AS_03	32 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	29 OLYMPIA ROAD, NAREMBURN, NSW																																		
AS_03	1 DOSS STREET, NAREMBURN, NSW																																		
AS_03	10 BONGALONG STREET, NAREMBURN, NSW																																		
AS_03	38 NORTHCOTE STREET, NAREMBURN, NSW																																		
AS_03	77 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	33 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	30 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	95 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	2 GRANDVIEW STREET, NAREMBURN, NSW																																		
AS_03	67 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	26 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	15 TALUS STREET, NAREMBURN (WILLOUGHBY																																		
AS_03	55 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	1 FRANCIS STREET, NAREMBURN (WILLOUGHB																																		
AS_03	28A STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	51 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	39 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	58 NORTHCOTE STREET, NAREMBURN, NSW																																		
AS_03	24 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	6 GRANDVIEW STREET, NAREMBURN (WILLOUGH																																		
AS_03	9 FRANCIS STREET, NAREMBURN (WILLOUGHB																																		
AS_03	59 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	3 ROSS STREET, NAREMBURN, NSW																																		
AS_03	22 GRANDVIEW STREET, NAREMBURN, NSW																																		
AS_03	24 OLYMPIA ROAD, NAREMBURN, NSW																																		
AS_03	9 TALUS STREET, NAREMBURN (WILLOUGHBY)																																		
AS_03	19 - 23 HERBERT STREET, ST LEONARDS (W)																																		
AS_03	49 PARK ROAD, NAREMBURN, NSW																																		
AS_03	55 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	18 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	30 DALLEYS ROAD, NAREMBURN, NSW																																		
AS_03	41 STATION STREET, NAREMBURN, NSW																																		
AS_03	61 STATION STREET, NAREMBURN, NSW																																		
AS_03	8 GRANDVIEW STREET, NAREMBURN (WILLOUGH																																		
AS_03	11 FRANCIS STREET, NAREMBURN (WILLOUGH																																		
AS_03	4A GRANDVIEW STREET, NAREMBURN (WILLOUGH																																		
AS_03	54 MITCHELL STREET, NAREMBURN, NSW																																		
AS_03	17 FRANCIS STREET, NAREMBURN (WILLOUGH																																		
AS_03	71 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	18A STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	65 MITCHELL STREET, NAREMBURN, NSW																																		
AS_03	37 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	21 DALLEYS ROAD, NAREMBURN, NSW																																		
AS_03	22A GRANDVIEW STREET, NAREMBURN (WILLOU																																		
AS_03	16 GRANDVIEW STREET, NAREMBURN (WILLOU																																		
AS_03	22 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	41 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	31 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	27 DALLEYS ROAD, NAREMBURN, NSW																																		
AS_03	53 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	45 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	7 FRANCIS STREET, NAREMBURN (WILLOUGHB																																		
AS_03	10 GRANDVIEW STREET, NAREMBURN (WILLOU																																		
AS_03	8 GRANDVIEW STREET, NAREMBURN (WILLOUGH																																		
AS_03	3 FRANCIS STREET, NAREMBURN (WILLOUGHB																																		
AS_03	53 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	43 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	19 FRANCIS STREET, NAREMBURN (WILLOUGH																																		
AS_03	29 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	4A GRANDVIEW STREET, NAREMBURN (WILLOUGH																																		
AS_03	39 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	47 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	4A GRANDVIEW STREET, NAREMBURN (WILLOUGH																																		
AS_03	71 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	63 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	61 PARK ROAD, NAREMBURN (WILLOUGHBY)																																		
AS_03	2 LAWSON LANE, NAREMBURN, NSW																																		
AS_03	19 FRANCIS STREET, NAREMBURN (WILLOUGH																																		
AS_03	1 CHELMSFORD AVENUE, NAREMBURN (WILLOU																																		
AS_03	47 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	35 STATION STREET, NAREMBURN (WILLOUGH																																		
AS_03	10 GRANDVIEW STREET, NAREMBURN (WILLOU																																		
AS_04	1 PYRL ROAD, ARTARMON, NSW																																		
AS_04	27 BURRA ROAD, ARTARMON, NSW																																		
AS_04	32 ARTARMON ROAD, WILLOUGHBY, NSW																																		
AS_04	51 ARTARMON ROAD, WILLOUGHBY, NSW																																		
AS_04	26 LUCKNOW STREET, WILLOUGHBY, NSW																																		
AS_04	29 WALTER STREET, WILLOUGHBY, NSW																																		
AS_04	100 ARTARMON ROAD, ARTARMON, NSW																																		
AS_04	60 ARTARMON ROAD, ARTARMON, NSW																																		
AS_04	27 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																		
AS_04	3 HARDEN ROAD, ARTARMON, NSW																																		
AS_04	22 LUCKNOW STREET, WILLOUGHBY, NSW																																		
AS_04	29 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																		
AS_04	27 WALTER STREET, WILLOUGHBY, NSW																																		
AS_04	44 ARTARMON ROAD, ARTARMON, NSW																																		
AS_04	45 ARTARMON ROAD, WILLOUGHBY, NSW																																		
AS_04	24 LUCKNOW STREET, WILLOUGHBY, NSW																																		
AS_04	23 BURRA ROAD, ARTARMON, NSW																																		
AS_04	13 BURRA ROAD, ARTARMON, NSW																																		
AS_04	16 RICHMOND AVENUE, WILLOUGHBY, NSW																																		
AS_04	25 WALTER STREET, WILLOUGHBY, NSW																																		
AS_04	23 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																		
AS_04	2 CHELMSFORD AVENUE, ARTARMON, NSW																																		
AS_04	73 ARTARMON ROAD, WILLOUGHBY, NSW																																		
AS_04	2 PYRL ROAD, ARTARMON, NSW																																		

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

Receiver	Additional noise mitigation and reviewer notifications										Day (OOHW)								Evening (OOHW)								Night (OOHW)								E2 (E41/E42)								N2 (E41/E42)																							
	Day (Standard)										Day (OOHW)								Evening (OOHW)								Night (OOHW)								E2 (E41/E42)								N2 (E41/E42)																							
	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08	AF_01	AF_02	AF_03	AF_03H	AF_04	AF_05	AF_06	AF_07	AF_08																					
NCA	Address																																																																	
AS_04	64 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	6 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	8 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	17 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	102 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	70 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	31 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	17 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	72 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	46 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	25 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	15 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	38 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	7 HARDEN ROAD, ARTARMON, NSW																																																																	
AS_04	31 WALTER STREET, WILLOUGHBY, NSW																																																																	
AS_04	68 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	28 LUCKNOW STREET, WILLOUGHBY, NSW																																																																	
AS_04	45 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	80 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	1 HARDEN ROAD, ARTARMON, NSW																																																																	
AS_04	47 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	4 COONEY ROAD, ARTARMON, NSW																																																																	
AS_04	12 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	25 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	54 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	55 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	19 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	9 HARDEN ROAD, ARTARMON, NSW																																																																	
AS_04	18 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	20 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	59 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	104 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	48 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	71 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	4 CHELMSFORD AVENUE, ARTARMON, NSW																																																																	
AS_04	98 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	30 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	40 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	52 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	50 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	1 COONEY ROAD, ARTARMON, NSW																																																																	
AS_04	46 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	76 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	28 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	26 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	43 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	50 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	11 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	21 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	32 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	14 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	13 HARDEN ROAD, ARTARMON, NSW																																																																	
AS_04	5 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	5 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	4 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	20 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	28 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	11 HARDEN ROAD, ARTARMON, NSW																																																																	
AS_04	69 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	24 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	42 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	7 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	26 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	16 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	22 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	67 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	8 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	74 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	3 COONEY ROAD, ARTARMON, NSW																																																																	
AS_04	37 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	56 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	3 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	24 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	36 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	18 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	30 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	53 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	35 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	66 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	4 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	10 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	63 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	41 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	34 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	6 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	2 COONEY ROAD, ARTARMON, NSW																																																																	
AS_04	10 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	12 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	65 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	14 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	38 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	22 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	36 ARTARMON ROAD, WILLOUGHBY, NSW																																																																	
AS_04	39 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	9 BURRA ROAD, ARTARMON, NSW																																																																	
AS_04	2 BURRA ROAD, ARTARMON (WILLOUGHBY)																																																																	
AS_04	12 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	33 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	3 PYRL ROAD, ARTARMON, NSW																																																																	
AS_04	22 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	21 CHELMSFORD AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	74 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	54 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	5 COONEY ROAD, ARTARMON, NSW																																																																	
AS_04	5 HARDEN ROAD, ARTARMON, NSW																																																																	
AS_04	78 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	26 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
AS_04	64 ARTARMON ROAD, ARTARMON, NSW																																																																	
AS_04	26 RICHMOND AVENUE, WILLOUGHBY, NSW																																																																	
CDS_01	24-28 HELEN STREET LANE COVE NORTH																																																																	
CDS_01	30-36 HELEN STREET LANE COVE NORTH																																																																	
CDS_01	472 PACIFIC HIGHWAY LANE COVE NORTH																																																																	
CDS_01	382-384 MOWBRAY ROAD, LANE COVE NORTH																																																																	

Client Name
TH511-2 Construction noise results (r18) - Final.xlsm

Project Name:
CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Client Name
TH511-2 Construction noise results (r18) - Final.xlsm

Project Name:
CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Table E1: Additional noise mitigation and receiver notifications

[illegible]

Client Name
TH511-2 Construction noise results (r18) - Final.xlsm

Project Name:
CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

[illegible]

Client Name
TH511-2 Construction noise results (r18) - Final.xlsm

Project Name:
CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

Table E1: Additional noise mitigation and receiver notifications

NORTHERN CONNECTION ANCILLARY FACILITIES AND LAYDOWN AREAS

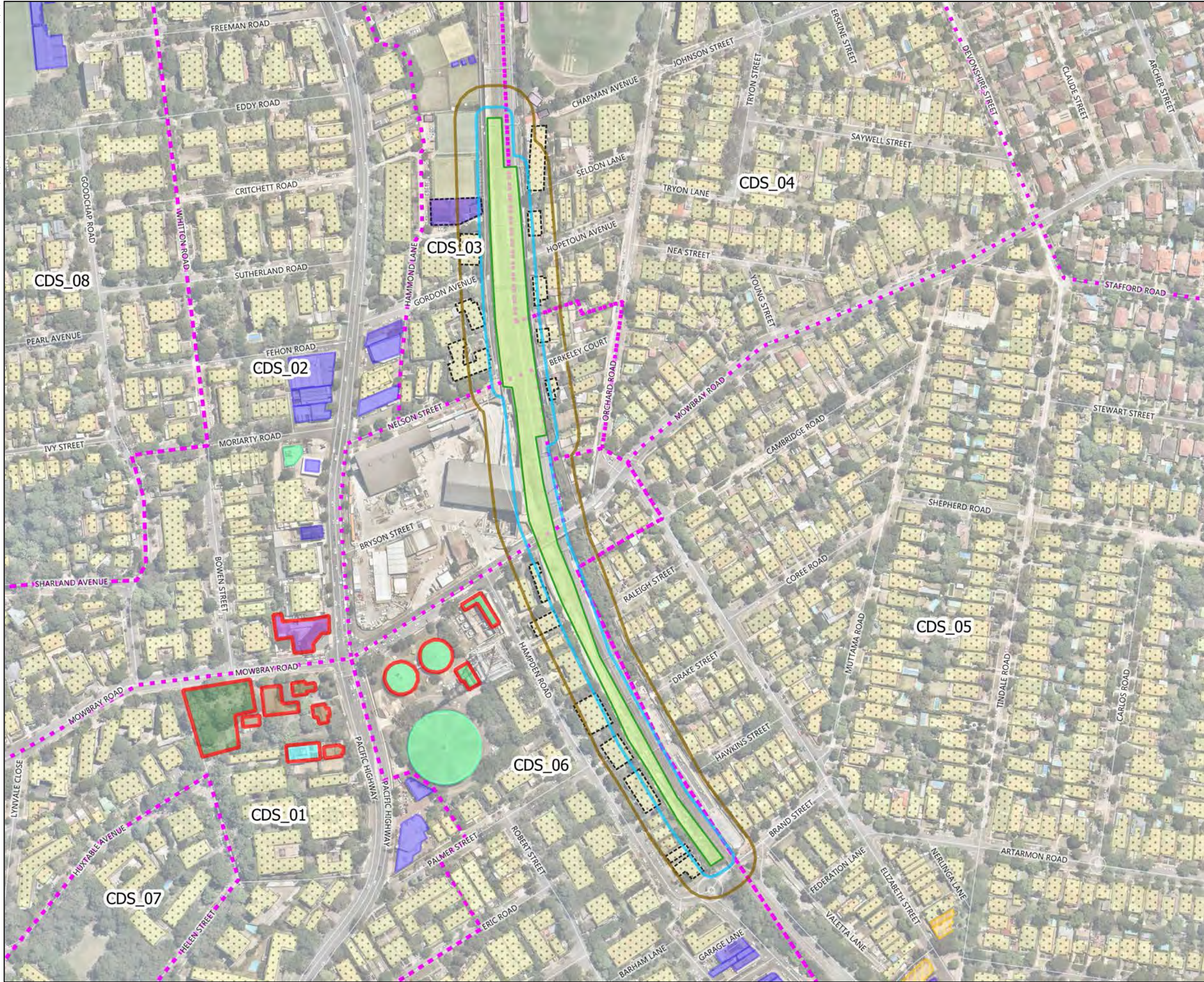
[illegible]

Client Name
TH511-2 Construction noise results (r18) - Final.xlsm

Project Name:
CONSTRUCTION NOISE AND VIBRATION IMPACT STATEMENT: Input site

APPENDIX F Minimum working distances for vibration

F.1 Minimum Working Distances for Northern Connection Work Area



LEGEND

Noise sensitive receivers

Childcare	Theatre/Auditorium
Commercial	Mixed use
Educational	Project acquisition
Hotel/Motel/Hostel	Film/TV studio
Industrial	Cinema
Medical	Community centre
Place of Worship	Library
Recording studio	Laboratory
Recreational - Active	Other
Recreational - Passive	Heritage
Residential	

NCA

MWD for cosmetic damage and human annoyance for Excavator 30T with hammer attachment

- Unreinforced structures (7.5mm/s ppv)
- Heritage structures (2.5mm/s ppv)
- Human annoyance - Residential (night)

Work area

Receivers affected by MWD for cosmetic damage

SYDNEY METRO - CHATSWOOD TO SYDENHAM

LINE WIDE WORKS

MWD for cosmetic damage and human annoyance

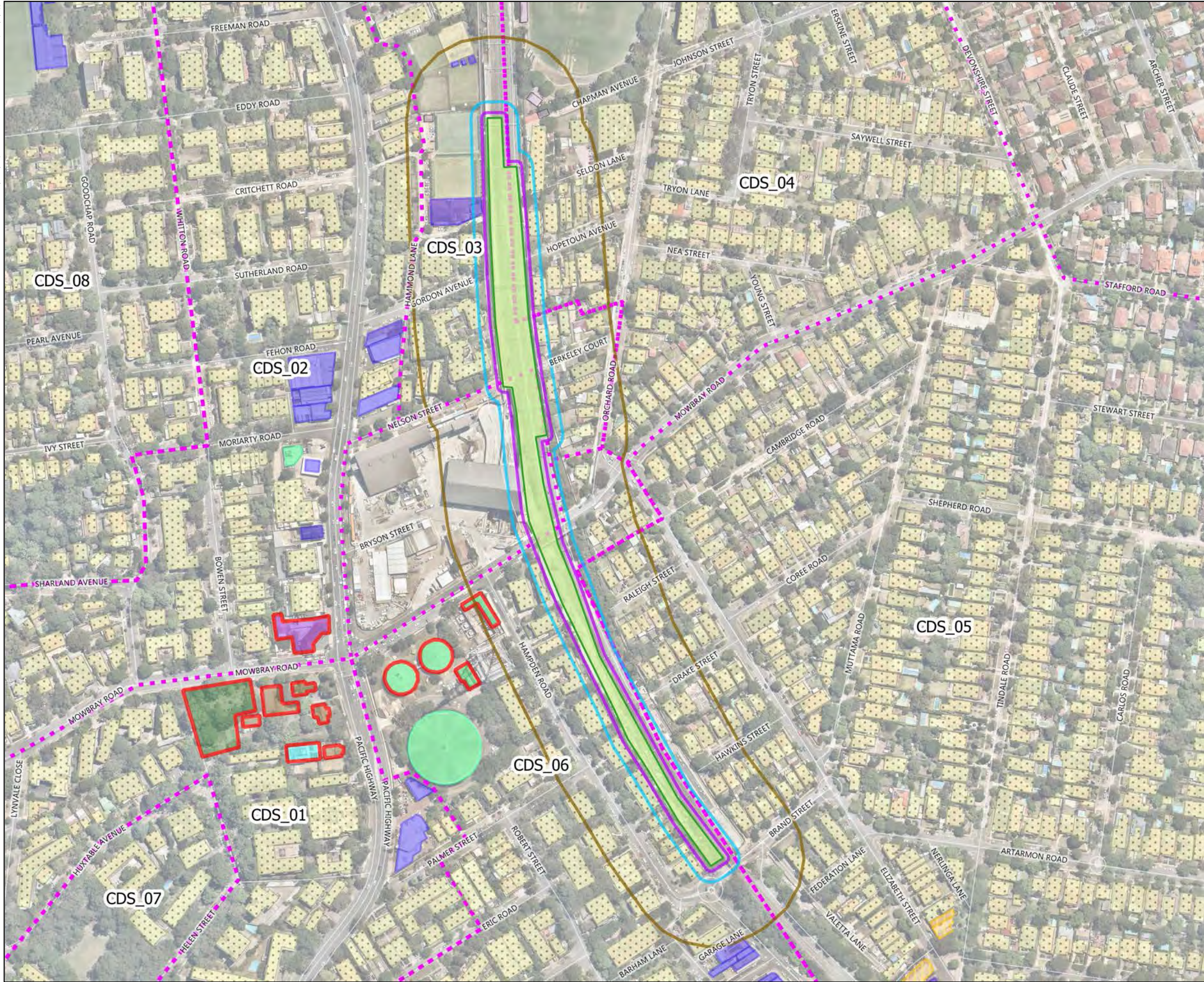
Work area: Northern Connection works

..	..	..	..	..	..
r2	MS	22/09/20	Update figures	..	TG
r1	MS	19/08/20	Update figures	..	TG
r0	MS	26/03/20	Prepare figures	..	TG
REV	BY	DATE	DESCRIPTION	APPROVER	
A3 Original			Co-ordinate System: MGA Zone 56		

070140210 m

1:3500

NOTE: Do not scale from this drawing.



LEGEND

Noise sensitive receivers

Childcare

Commercial

Educational

Hotel/Motel/Hostel

Industrial

Medical

Place of Worship

Recording studio

Recreational - Active

Recreational - Passive

Residential

Theatre/Auditorium

Mixed use

Project acquisition

Film/TV studio

Cinema

Community centre

Library

Laboratory

Other

Heritage

NCA

MWD for cosmetic damage and human annoyance for Smooth drum roller (up to 14t)-High vibration

Unreinforced structures (7.5mm/s ppv)

Heritage structures (2.5mm/s ppv)

Human annoyance - Residential (night)

Work area

SYDNEY METRO - CHATSWOOD TO SYDENHAM

LINE WIDE WORKS

MWD for cosmetic damage and human annoyance

Work area: Northern Connection works

CLIENT

ACOUSTIC CONSULTANT

Ph (02) 8218 0500 Fax (02) 8218 0501

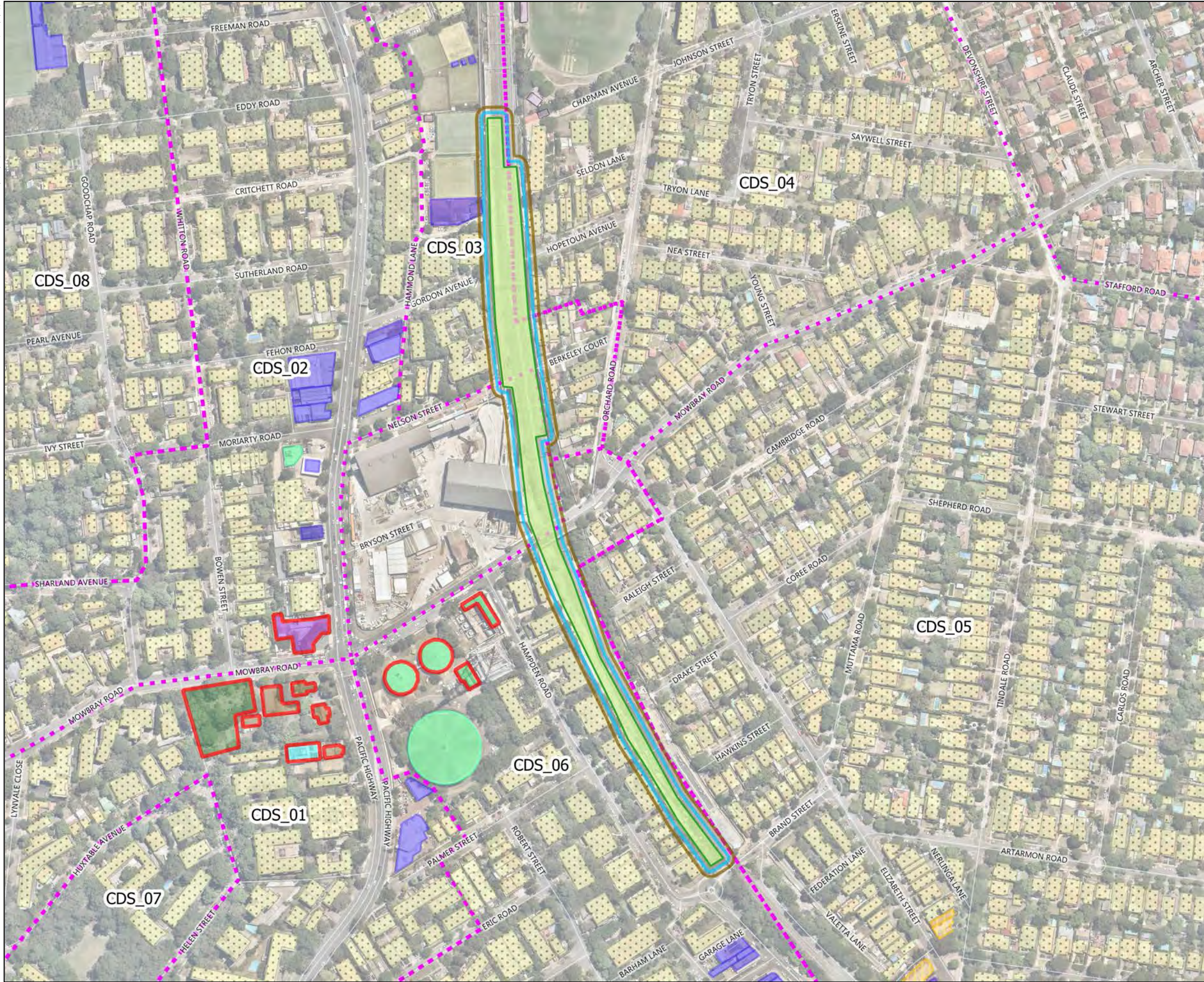
REV	BY	DATE	DESCRIPTION	APPROVER
r2	MS	22/09/20	Update figures	TG
r1	MS	19/08/20	Update figures	TG
r0	MS	26/03/20	Prepare figures	TG

Co-ordinate System: MGA Zone 56

Full size A3

NOTE: Do not scale from this drawing.

Sheet 2 of 7



LEGEND

Noise sensitive receivers

Childcare

Commercial

Educational

Hotel/Motel/Hostel

Industrial

Medical

Place of Worship

Recording studio

Recreational - Active

Recreational - Passive

Residential

Theatre/Auditorium

Mixed use

Project acquisition

Film/TV studio

Cinema

Community centre

Library

Laboratory

Other

Heritage

NCA

MWD for cosmetic damage and human annoyance for Rock Saw

Unreinforced structures (7.5mm/s ppv)

Heritage structures (2.5mm/s ppv)

Human annoyance - Residential (night)

Work area

SYDNEY METRO - CHATSWOOD TO SYDENHAM

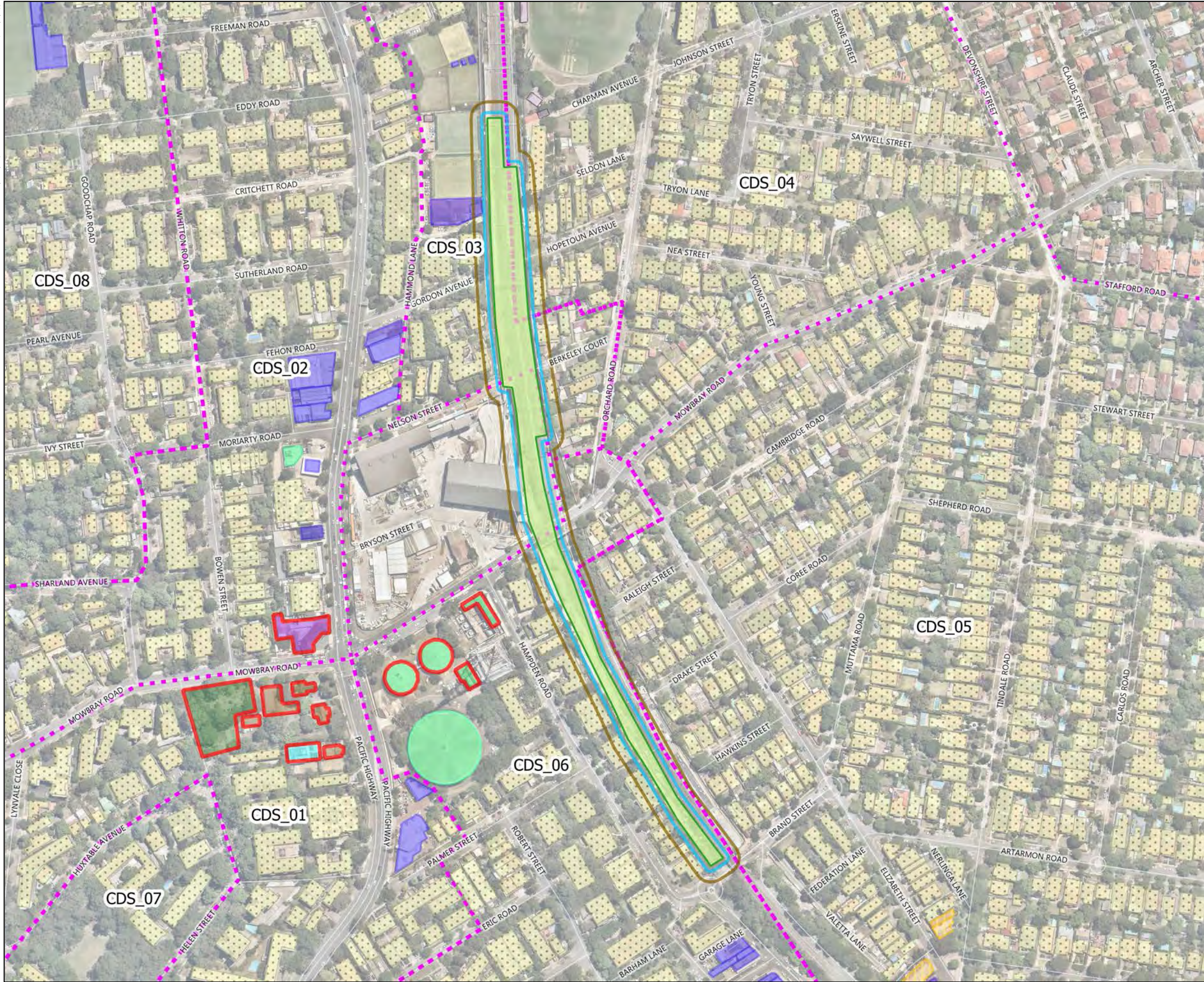
LINE WIDE WORKS

MWD for cosmetic damage and human annoyance

Work area: Northern Connection works

Sheet 3 of 7

..	..	..	..	..	..	0	70	140	210 m	CLIENT	ACOUSTIC CONSULTANT	SYDNEY METRO - CHATSWOOD TO SYDENHAM		
r2	MS	22/09/20	Update figures	..	..	1:3500						LINE WIDE WORKS		
r1	MS	19/08/20	Update figures	..	..	NOTE: Do not scale from this drawing.							MWD for cosmetic damage and human annoyance	
r0	MS	26/03/20	Prepare figures	..	..									Work area: Northern Connection works
REV	BY	DATE	DESCRIPTION	APPROVER	FULL SIZE A3					Ph (02) 8218 0500 Fax (02) 8218 0501		Sheet 3 of 7		
A3 Original					Co-ordinate System: MGA Zone 56									



LEGEND

Noise sensitive receivers

Childcare	Theatre/Auditorium
Commercial	Mixed use
Educational	Project acquisition
Hotel/Motel/Hostel	Film/TV studio
Industrial	Cinema
Medical	Community centre
Place of Worship	Library
Recording studio	Laboratory
Recreational - Active	Other
Recreational - Passive	Heritage
Residential	

--- NCA

MWD for cosmetic damage and human annoyance for Wacker Packer

Unreinforced structures (7.5mm/s ppv)

Heritage structures (2.5mm/s ppv)

Human annoyance - Residential (night)

Work area

SYDNEY METRO - CHATSWOOD TO SYDENHAM

LINE WIDE WORKS

MWD for cosmetic damage and human annoyance

Work area: Northern Connection works

..	..	..	..	..	..
r2	MS	22/09/20	Update figures	..	TG
r1	MS	19/08/20	Update figures	..	TG
r0	MS	26/03/20	Prepare figures	..	TG
REV	BY	DATE	DESCRIPTION	APPROVER	
A3 Original			Co-ordinate System: MGA Zone 56		

0 70 140 210 m

1:3500

NOTE: Do not scale from this drawing.

CLIENT

Systems Connect

ACOUSTIC CONSULTANT

RENZO TONIN & ASSOCIATES

inspired to achieve

Ph (02) 8218 0500 Fax (02) 8218 0501

Sheet 4 of 7

F.2 Minimum Working Distances for Brand Street MPR33 works

180 m
160
140
120
100
80
60
40
20
0



LEGEND

Noise sensitive receivers

Childcare

Commercial

Educational

Hotel/Motel/Hostel

Industrial

Medical

Place of Worship

Recording studio

Recreational - Active

Recreational - Passive

Residential

Theatre/Auditorium

Mixed use

Project acquisition

Film/TV studio

Cinema

Community centre

Library

Laboratory

Other

Heritage

NCA

MWD for cosmetic damage and human annoyance for Excavator with rock hammer (10-15T)

Unreinforced structures (7.5mm/s ppv)

Heritage structures (2.5mm/s ppv)

Human annoyance - Residential (night)

Work area

Receivers affected by MWD for cosmetic damage

..	..	..	..	..	..
r2	MS	22/09/20	Update figures	TG	..
r1	MS	19/08/20	Update figures	TG	..
r0	MS	26/03/20	Prepare figures	TG	..
REV	BY	DATE	DESCRIPTION	APPROVER	
A3	Original		Co-ordinate System: MGA Zone 56		

0306090

0

30

60

90 m

1:1500

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

ACOUSTIC CONSULTANT

Ph (02) 8218 0500 Fax (02) 8218 0501

SYDNEY METRO - CHATSWOOD TO SYDENHAM

LINE WIDE WORKS

MWD for cosmetic damage and human annoyance

Work area: Brand Street M33 Drainage works

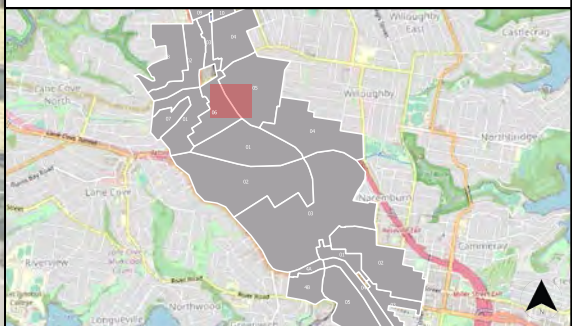
Sheet 5 of 7

180 m
160
140
120
100
80
60
40
20
0



- LEGEND**
- Noise sensitive receivers**
- | | |
|------------------------|---------------------|
| Childcare | Theatre/Auditorium |
| Commercial | Mixed use |
| Educational | Project acquisition |
| Hotel/Motel/Hostel | Film/TV studio |
| Industrial | Cinema |
| Medical | Community centre |
| Place of Worship | Library |
| Recording studio | Laboratory |
| Recreational - Active | Other |
| Recreational - Passive | Heritage |
| Residential | |

- NCA
- MWD for cosmetic damage and human annoyance for Rock Saw**
- Unreinforced structures (7.5mm/s ppv)
 - Heritage structures (2.5mm/s ppv)
 - Human annoyance - Residential (night)
- Work area
- Receivers affected by MWD for cosmetic damage



..	..	..	..	..	..
r2	MS	22/09/20	Update figures	TG	..
r1	MS	19/08/20	Update figures	TG	..
r0	MS	26/03/20	Prepare figures	TG	..
REV	BY	DATE	DESCRIPTION	APPROVER	
A3	Original		Co-ordinate System: MGA Zone 56		

0 30 60 90 m

1:1500

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

ACOUSTIC CONSULTANT

Ph (02) 8218 0500 Fax (02) 8218 0501

SYDNEY METRO - CHATSWOOD TO SYDENHAM

LINE WIDE WORKS

MWD for cosmetic damage and human annoyance

Work area: Brand Street M33 Drainage works

Sheet 6 of 7

180 m
160
140
120
100
80
60
40
20
0



LEGEND

Noise sensitive receivers

- | | |
|------------------------|---------------------|
| Childcare | Theatre/Auditorium |
| Commercial | Mixed use |
| Educational | Project acquisition |
| Hotel/Motel/Hostel | Film/TV studio |
| Industrial | Cinema |
| Medical | Community centre |
| Place of Worship | Library |
| Recording studio | Laboratory |
| Recreational - Active | Other |
| Recreational - Passive | Heritage |
| Residential | |

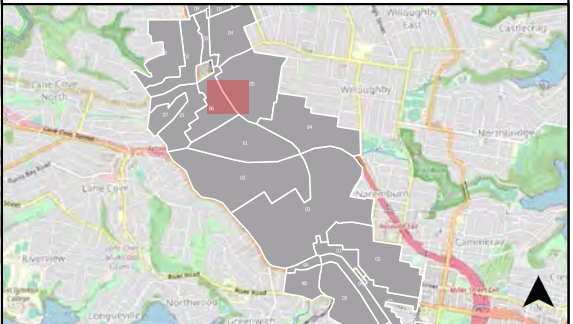
NCA

MWD for cosmetic damage and human annoyance for Wacker packer (hand operated)

- Unreinforced structures (7.5mm/s ppv)
- Heritage structures (2.5mm/s ppv)
- Human annoyance - Residential (night)

Work area

Receivers affected by MWD for cosmetic damage



REV	BY	DATE	DESCRIPTION	APPROVER
r2	MS	22/09/20	Update figures	TG
r1	MS	19/08/20	Update figures	TG
r0	MS	26/03/20	Prepare figures	TG

A3 Original

Co-ordinate System: MGA Zone 56

0 30 60 90 m

1:1500

FULL SIZE A3

NOTE: Do not scale from this drawing.

CLIENT

Systems Connect

ACOUSTIC CONSULTANT

RENZO TONIN & ASSOCIATES
inspired to achieve

Ph (02) 8218 0500 Fax (02) 8218 0501

SYDNEY METRO - CHATSWOOD TO SYDENHAM

LINE WIDE WORKS

MWD for cosmetic damage and human annoyance

Work area: Brand Street M33 Drainage works

Sheet 7 of 7