

ENDORSEMENT CITY & SOUTHWEST ACOUSTIC ADVISOR

Review of	Construction Noise and Vibration Impact Statement Addendum: Marrickville Early Morning Activities	Document reference:	SYDNEY METRO CITY & SOUTHWEST-TSE WORKS
Prepared by:	Larry Clark Alternate Acoustic Advisor		Construction Noise and Vibration Impact Statement Addendum: Early Morning Activities
Date of issue:	3 August 2020		<i>TH511-02 01.10.03 F05 MDS early morning works (r2)</i> <i>Dated 21 July 2020</i>

As approved Acoustic Advisor for the Sydney Metro City & Southwest project, I have reviewed revision 2 of the Construction Noise and Vibration Impact Statement (CNVIS) addendum for Marrickville Early Morning Activities, as required under A27 (d) of the project approval conditions.

The CNVIS addendum is for on-site construction activities at Marrickville Dive Station (MDS) worksite to the morning shoulder period (i.e. 5:30am to 7:00am) Monday to Saturday until the end of the project (i.e. approximately September 2020) excluding Sunday and Public holidays.

I am satisfied that the CNVIS Addendum is technically valid and that it includes appropriate noise and vibration mitigation and management. On this basis I endorse revision 2 of the CNVIS Addendum.



Larry Clark, City & Southwest Alternate Acoustic Advisor

21 July 2020

TH511-02 01.10.03 F05 MDS early morning works(r2)

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Sydney Metro Chatswood to Sydenham – TSE Works - Marrickville Dive Site - Early Morning Activities - CNVIS Addendum

1 Introduction

1.1 Overview of works

This technical memorandum is an addendum to the reports *Construction Noise and Vibration Impact Statement: Marrickville Construction site (Marrickville CNVIS)*¹ and *Construction Noise and Vibration Impact Statement: Marrickville Site Demobilisation and Stabling Yard Preparation Works (Stabling Yard CNVIS)*². This memorandum has been prepared on behalf of John Holland CPB Ghella Joint Venture (JHCPBG) in accordance with the Construction Noise and Vibration Management Plan (CNVMP) [SMCSWTSE-JCG-TPW-EM-PLN-002012]³ for the Design and Construction of the Tunnel and Station Excavation (TSE) Works of the Sydney Metro City & Southwest Project (the Project).

JHCPBG is proposing to extend on-site construction activities at Marrickville Dive Station (MDS) worksite to the morning shoulder period (i.e. 5:30am to 7:00am) Monday to Saturday until the end of the project (i.e. approximately September 2020) excluding Sunday and Public holidays.

This memorandum has been prepared to address the potential construction noise and vibration impacts from the proposed construction activities during the morning shoulder period. All concurrent works have been assessed and details are presented in Section 2.1 below.

¹ Report TH511-02 01.10.03 D01 MDS CNVIS (r8), dated 27 July 2018 (Marrickville CNVIS)

² Report TH511-02 01.10.03 F04 MDS Stabling yard CNVIS (r3), dated 28 January 2020 (Stabling Yard CNVIS)

³ Sydney Metro City & Southwest – TSE Works Construction Noise and Vibration Management Plan (SMCSTSE-JCG-TPW-EN-PLN-002012)

1.2 Justification for out of hours construction works

Under EPL20971 L4.2 works and activities may be carried out outside standard construction hours if *“the works and activities do not cause, when measured at the boundary of the most affected noise sensitive receiver:*

- a) *LAeq(15 minute) noise levels greater than 5dB above the day, evening and night rating background level (RBL) as applicable; and*
- b) *LA1(1 minute) or LAm_{ax} noise levels greater than 15dB above the night RBL for night works; and*
- c) *Continuous or impulsive vibration values greater than those for human exposure to vibration, set out for residences in Table 2.2 in “Environmental noise management – Assessing Vibration: a technical guideline” (Department of Environment and Conservation, February 2006); and*
- d) *Intermittent vibration value greater than those for human exposure to vibration, set out for residences in Table 2.4 in “Environmental noise management – Assessing Vibration: a technical guideline” (Department of Environment and Conservation, February 2006).”*

2 Construction noise assessment

2.1 Construction activities

Early morning construction activities would support the Stabling Yard preparation works at MDS worksite and include the following activities (Figure 2.1):

- Stockpile preparation works in the green areas;
- Spoil unloading and handling works in the yellow area;
- Concrete pour operations in the orange area;
- Mobile crane operations in the blue areas.

All heavy vehicles (i.e. spoil and concrete trucks) would access the MDS worksite via May Street, Bedwin Road and turn into Edinburgh Road and Sydney Steel Road (as per *Marrickville CNVIS*).

Figure 2.1 – Early morning construction works

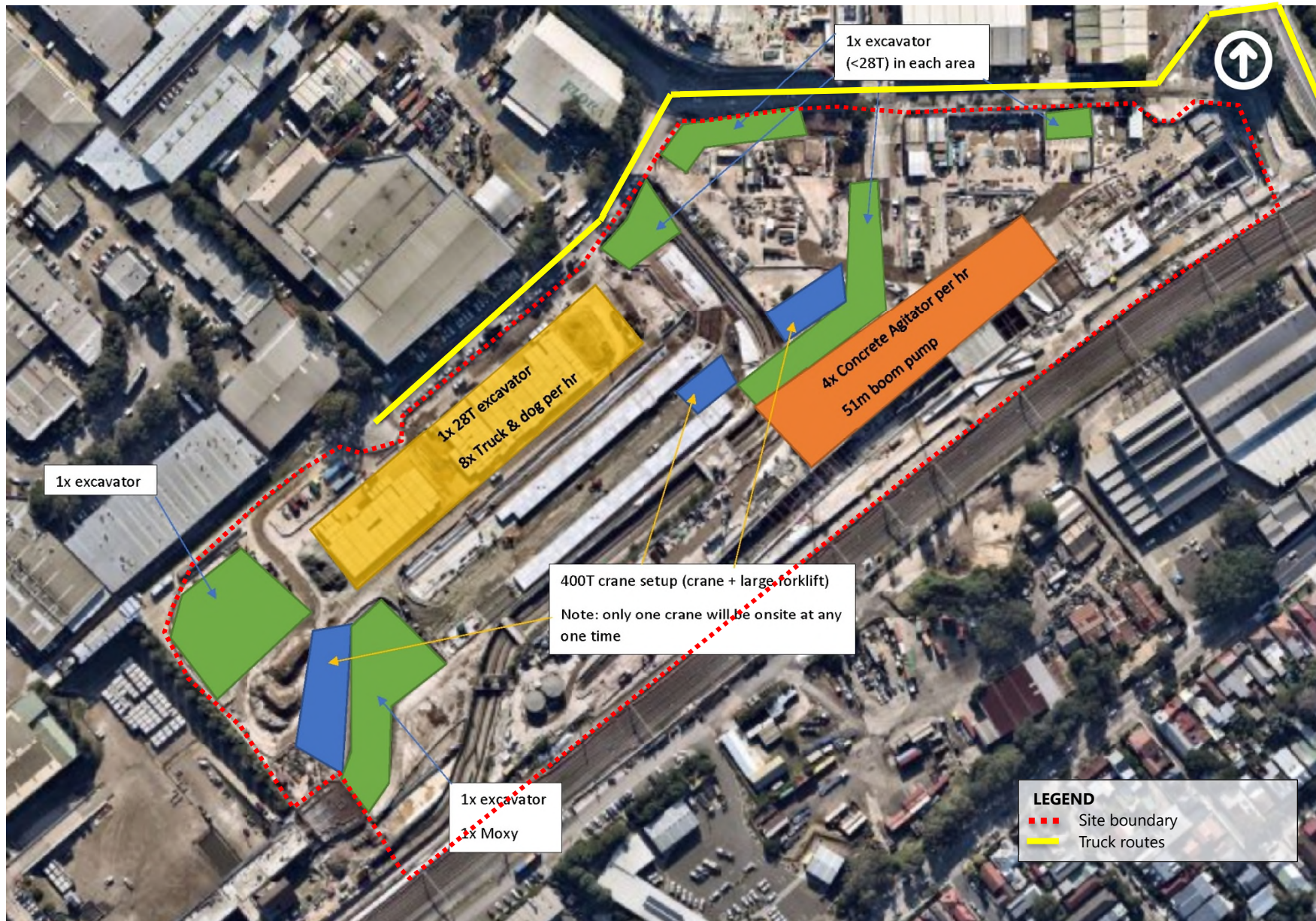


Table 2.1 presents the list of plant that are proposed to be used during these works and the associated sound power levels.

Table 2.1: Construction activities and associated sound power levels

Plant and equipment	Morning shoulder 5:30am – 7:00am	Sound power level, dB(A)	
		L _{Aeq}	L _{A1}
Spoil truck	8 p.h.	106	111
Concrete agitators	4 p.h.	108	111
Excavator with bucket	7	103	112
Moxy	1	108	111
400T crane	1	104	106
Forklift	1	104	107
Concrete agitator + concrete pump	1	108	111

Predicted noise levels associated with the proposed works at the nearest residential receivers are presented in Table 2.2.

Table 2.2: Predicted noise levels at the closest noise sensitive receiver during morning shoulder period (5:30am to 7:00am)

NCA	Address	Type of receiver	Construction noise levels, L _{Aeq,15min} , dB(A)			Sleep disturbance, L _{A1,1min} dB(A)	
			Predicted level	ICNG NML ¹	CoA E41 ²	Predicted level	Screening criteria ³
MDS_04	78 Unwins Bridge Rd, St Peters	Residential	52	55	55	57	65
MDS_04	74 Unwins Bridge Rd, St Peters	Residential	54	55	55	59	65
MDS_02	344-348 Edgeware Rd, Newtown	Residential	53	53	55	58	63
MDS_02	358-360 Edgeware Rd, Newtown	Residential	51	53	55	56	63
MDS_01	65 Edinburgh Rd, Marrickville	Residential	50	50	55	55	60

- Notes:
- 1) Shoulder period NML was calculated based on Section 3.3 "Dealing with shoulder periods" of the INP (i.e. shoulder period RBL+5). This is also consistent with long-term monitoring data from the EIS.
 - 2) External equivalent NML assuming an open window and a conservative façade loss of 10dB(A).
 - 3) Shoulder period RBL + 15

As can be noted from Table 2.2, the predicted noise levels are expected to be below the morning shoulder NMLs and the internal NML defined in PPA condition E41 at the nearest residential receivers. In addition, the predicted maximum noise levels L_{A1} associated with these works are expected to be below the sleep disturbance screening level at the nearest residential receivers.

Other noise sensitive receives such as commercial and educational premises are not likely to be in use during the morning shoulder period.

2.2 Construction traffic noise

Potential construction traffic impacts on main access roads due to heavy vehicle movements was covered in Section 8 of the *Marrickville CNVIS*. A maximum of 16 heavy vehicle movements per hour (including spoil and segment trucks) at night was assessed in the *Marrickville CNVIS* and predicted to have minimal impact on the main roads used to access the site.

JHCPBG would require 12 heavy vehicles (i.e. 4 concrete and 8 spoil trucks) per hour during the morning shoulder period (i.e. 5:30am to 7:00am) accessing the worksite via Edinburgh Road and Sydney Steel Road. Considering the reduction in heavy vehicle movements over the night-time period, the proposed truck movements are expected to have negligible impact on noise generated by the main roads used to access the site.

2.3 Construction vibration

No vibration intensive plant and equipment are proposed for these works, therefore the vibration impact is considered to be negligible and in compliance with EPL conditions L4.2(c) and L4.2(d).

3 Noise mitigation and management

Based upon the assessment, as the predicted noise levels are expected to be below the PPA Condition E41 external equivalent NML, there are no additional noise mitigation or management measures applicable for the assessed works.

Nevertheless, toolbox talks will be used to advise all personnel of the need to follow quiet work practices during the evening period, including using the radio to communicate rather than horn "beeping", avoiding excessive acceleration from a stopped position and vigorous slamming of truck doors and warning personnel of the need to respect the residential receivers surrounding the works.

In addition, attended noise monitoring will be undertaken at the locations identified in Table 3.1 to verify that noise levels from construction works are below the levels predicted in this memorandum or the morning shoulder NMLs.

Table 3.1: Nominated verification monitoring locations

NCA	Nominated receiver address
MDS_04	74 Unwins Bridge Rd, St Peters

NCA	Nominated receiver address
MDS_02	344-348 Edgeware Rd, Newtown
Note:	Monitoring on private property is subject to owner consent and where relevant, occupier consent. If property access is denied, monitoring will still be carried out outside property boundaries.

If verification monitoring shows that the external noise levels from the construction works are consistently (i.e. for 2 or more consecutive verification monitoring events/ occasions) above the predicted levels or relevant NMLs, investigation will be undertaken to understand the cause of the exceedance and relevant reasonable and feasible mitigation measures will be implemented.

4 Conclusion

This technical memorandum is an addendum to the report *Marrickville CNVIS and Stabling Yard CNVIS* to review the potential noise and vibration impacts from the on-site construction activities during the morning shoulder period (i.e. 5:30am to 7:00am).

Noise and vibration levels are predicted to comply with the EPL20971 condition L4.2 and PPA Condition E41 at the nearest noise sensitive receivers.

Noise monitoring will be undertaken to verify that noise levels are below the levels predicted in this memorandum or the morning shoulder NMLs. The consultation and notification process in accordance with PPA Condition E33 will continue and from now on also include these additional works.

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Authorised
13.07.2020	Initial issue	0	1	M. Tabacchi	-	T. Gowen
21.07.2020	Minor edit	-	2	M. Tabacchi	-	T. Gowen

Important Disclaimer:

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

This document is issued subject to review and authorisation by the Team Leader noted by the initials printed in the last column above. If no initials appear, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

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

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

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

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

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

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 Leq 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.