

24 June 2020

Pacific National
C/o Urbanco
PO Box 546
PYRMONT NSW 2009

Dear Guy,

**St Marys Freight Hub - Update Noise and Vibration
Impact Assessment - Non-network rail**

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) was commissioned by Urbanco and SITE Planning+Design on behalf of Pacific National to undertake a Noise and Vibration Impact Assessment of the construction and operation of the proposed St Marys Freight Hub (the Proposal). This assessment was documented in the report *St Marys Freight Hub – Noise and Vibration Impact Assessment – Post Exhibition Version 60593074-02_D* dated 11 February 2020 and formed part of the Environmental Impact Statement (EIS) documentation. It is noted that after the assessment was completed a 3 m high noise barrier located just inside the southern boundary of the Sydney Trains corridor at Camira Street was proposed, to replace the previously proposed 2.4 m high southern Proposal site barrier. The Department of Planning, Industry and the Environment (DPIE) approved the Proposal (SSD-7308) on 7 May 2020 including the Camira Street noise barrier.

This letter provides additional information regarding the non-network rail line which forms part of the proposal.

2.0 Rail Infrastructure Noise Guideline

2.1 L_{Aeq} criteria

The *Rail Infrastructure Noise Guideline* (RING) provides guidance in relation to acceptable noise limits for rail development projects. Non-network rail lines exclusively servicing industrial sites are considered within Appendix 3 of the *Rail Infrastructure Noise Guideline*. Recommended L_{Aeq} noise levels for these non-network rail lines are reproduced from the NSW *Industrial Noise Policy* (EPA, 2000) and are provided below.

Table 1 Project amenity noise levels

Type of receiver	Indicative noise amenity area	Time of day	Project amenity noise level, L_{Aeq} (period) dB(A)	
			Recommended	Maximum
Residential receivers	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
School classroom	All	Noisiest 1-hour period when in use	45 ¹	50
Place of worship	All	When in use	50 ¹	55
Commercial premises	All	When in use	65	70
Active recreation area	All	When in use	55	75

Note:

- 1 External noise levels are based upon a 10 dB reduction from outside to inside through an open window.

2.2 Sleep disturbance criteria

The *Noise Policy for Industry* requires the potential for sleep disturbance to be assessed by considering maximum noise levels events during the night-time period.

Where the subject development/premises night-time noise levels at a residential location exceed the following screening levels a detailed maximum noise level event assessment should be undertaken:

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

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Based on the measured background noise levels during the night, the sleep disturbance criteria for the nearest noise sensitive residential receivers are presented in Table 2.

Table 2 Night-time sleep disturbance screening levels

Location	Measured night-time RBL, $L_{A90,15 mins}$ dB(A)	Sleep disturbance screening levels, dB(A)	
		$L_{Aeq,15min}$	L_{AFmax}
NCA 1 Residential receivers	34	40	52
NCA 2 Residential receivers	37	42	52
NCA 3 Residential receivers	36	41	52

3.0 Rail noise sources

The following rail traffic noise sources have been incorporated into the rail noise model for the non-network rail line:

- Moving train (three locomotives), with the power based upon attended noise measurements previously undertaken (according to Australian Standard AS 2377:2002 – *Acoustics – Methods for the measurement of rail bound vehicle noise*) by AECOM of a heavily laden (gross weight 1,040 tonnes) Class 81 locomotive accelerating on Notch 3
- Moving wagons, with the power based upon the Transport for NSW Rail Noise Database

The sound power levels for these sources are presented in Table 3. The sound power level presented in Table 3 for the moving train is the base power of one locomotive. The moving train has been modelled as a line source with three locos pulling away to the south, taking 468 seconds of a 900 second (15 minute) period to travel 1.3 kilometres within the site (i.e. travelling at 10 km/h). A correction of 6 dB has been added to the model to account for rail discontinuities, where the main western rail line becomes the non-network rail line.

Table 3 presents the sound power levels which were used in the operational noise model.

Table 3 Summary of sound power levels

Source	Sound power level (SWL, dB) at octave band centre frequency, Hz								Overall SWL dB(A)
	63	125	250	500	1000	2000	4000	8000	
Moving loco	96	96	96	97	96	98	97	97	104
Moving wagons	104	96	89	87	87	87	83	75	93
Wagon bunching L _{A1} ¹	-	-	-	-	-	-	-	-	112
Curve/brake squeal L _{A1} ¹	-	-	-	-	-	-	-	-	113

Notes:

1. Reference: RHA Report 10-1142-R1 RAC Line-based Noise PRP Study – Noise Source Working Paper, Sep 2000

4.0 Results

Pacific National currently hold five train paths per day for the site (three are scheduled for the night time period). As the night-time is the most affected period it has been assessed below. An L_{Aeq 9hr} assessment has been undertaken for rail movements on the non-network line and an L_{Amax} assessment has been undertaken for curve squeal and bunching (it has been assumed that brake squeal noise levels will be no louder than bunching or curve squeal).

4.1 Operational rail noise

The results for the L_{Aeq 9hr} assessment for NCAs 1-3 are provided below. A noise contour map is attached to the end of this letter.

Table 4 Predicted operational noise levels – 13 Elm Street, North St Marys (NCA 1)

Weather conditions	Distance from Proposal (m)	Sound pressure level, L _{Aeq 9hr} dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	650	22	40	-
Night south-westerly wind		24	40	-
Night westerly wind		24	40	-
Night temperature inversion – SW wind		24	40	-
Night temperature inversion – W wind		24	40	-

Table 5 Predicted operational noise levels – 49 Kalang Avenue, St Marys (NCA 2)

Weather conditions	Distance from Proposal (m)	Sound pressure level, $L_{Aeq\ 9hr}$ dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	50	36	40	-
Night south-westerly wind		36	40	-
Night westerly wind		37	40	-
Night temperature inversion – SW wind		363	40	-
Night temperature inversion – W wind		37	40	-

Table 6 Predicted operational noise levels – 27-29 Albert Street, Werrington (NCA 3)

Weather conditions	Distance from Proposal (m)	Sound pressure level, $L_{Aeq\ 9hr}$ dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	600	30	40	-
Night south-westerly wind		23	40	-
Night westerly wind		23	40	-
Night temperature inversion – SW wind		28	40	-
Night temperature inversion – W wind		27	40	-

4.2 Curve Squeal

The results for the L_{Amax} curve squeal assessment for NCAs 1-3 are provided below.

Table 7 Predicted night-time L_{Amax} operational noise levels and sleep disturbance criteria for curve squeal – 13 Elm Street, North St Marys (NCA 1)

Weather conditions	Distance from Proposal (m)	Sound pressure level, L_{Amax} dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	650	29	52	-
Night south-westerly wind		29	52	-
Night westerly wind		30	52	-
Night temperature inversion – SW wind		29	52	-
Night temperature inversion – W wind		30	52	-

Table 8 Predicted night-time L_{Amax} operational noise levels and sleep disturbance criteria for curve squeal – 49 Kalang Avenue, St Marys (NCA 2)

Weather conditions	Distance from Proposal (m)	Sound pressure level, L_{Amax} dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	50	55	52	3
Night south-westerly wind		55	52	3
Night westerly wind		56	52	4
Night temperature inversion – SW wind		55	52	3
Night temperature inversion – W wind		56	52	4

Table 9 Predicted night-time L_{Amax} operational noise levels and sleep disturbance criteria for curve squeal – 27-29 Albert Street, Werrington (NCA 3)

Weather conditions	Distance from Proposal (m)	Sound pressure level, L_{Amax} dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	600	37	52	-
Night south-westerly wind		37	52	-
Night westerly wind		38	52	-
Night temperature inversion – SW wind		37	52	-
Night temperature inversion – W wind		38	52	-

4.3 Bunching

The results for the L_{Amax} bunching assessment for NCAs 1-3 are provided below.

Table 10 Predicted night-time L_{Amax} operational noise levels and sleep disturbance criteria for bunching – 13 Elm Street, North St Marys (NCA 1)

Weather conditions	Distance from Proposal (m)	Sound pressure level, L_{Amax} dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	650	30	52	-
Night south-westerly wind		30	52	-
Night westerly wind		31	52	-
Night temperature inversion – SW wind		30	52	-
Night temperature inversion – W wind		31	52	-

Table 11 Predicted night-time L_{Amax} operational noise levels and sleep disturbance criteria for bunching – 49 Kalang Avenue, St Marys (NCA 2)

Weather conditions	Distance from Proposal (m)	Sound pressure level, L_{Amax} dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	50	51	52	-
Night south-westerly wind		51	52	-
Night westerly wind		52	52	-
Night temperature inversion – SW wind		51	52	-
Night temperature inversion – W wind		52	52	-

Table 12 Predicted night-time L_{Amax} operational noise levels and sleep disturbance criteria for bunching – 27-29 Albert Street, Werrington (NCA 3)

Weather conditions	Distance from Proposal (m)	Sound pressure level, L_{Amax} dB(A)		
		Result	Criterion	Exceedance
Night neutral conditions	600	39	52	-
Night south-westerly wind		39	52	-
Night westerly wind		40	52	-
Night temperature inversion – SW wind		39	52	-
Night temperature inversion – W wind		40	52	-

5.0 Discussion

Table 4 to Table 6 indicates that the train movements into and out of the site are expected to comply with the *Rail Infrastructure Noise Guideline* criteria.

Sleep disturbance exceedances due to rail movements are predicted at NCA 2. Curve squeal is predicted to cause exceedances of up to 4 dB(A), bunching is not expected to cause exceedances. It is noted that this type of noise is already a feature of this area due to rail movements on the main western railway line.

The following measures will be considered to mitigate the maximum noise levels generated by the rail movements:

- Use of track lubrication and wagon steering to minimise curve squeal
- Use of electronically controlled pneumatic braking systems to minimise brake squeal
- Permanent noise monitoring systems with associated reporting and provision of digital data records to the Secretary
- Policies and procedures that demonstrate acceptance, monitoring and reporting on locomotive and rolling stock's performance communicated to operators using the St Marys Freight Hub.

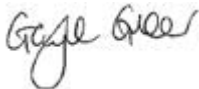
It should also be noted that:

- NCA 2 already experiences L_{Amax} noise levels in excess of 70 dB(A) during the night due to existing industrial noise and train pass-bys. The type of noise likely to be generated by operation of the Proposal will be of the same nature and generally a lower level
- The predicted exceedances due to the Proposal are worst case, noise levels would generally be lower for most of the night.

In addition, the *Road Noise Policy* contains a review of research into sleep disturbance which represents NSW EPA advice on the subject of sleep disturbance due to noise events. It concludes that having considered the results of research to date that, '*Maximum internal noise levels below 50 to 55 dB(A) are unlikely to cause awakening reactions*'. Therefore, given that an open window provides around 10 dB in noise attenuation from outside to inside, external noise levels of 60 to 65 dB(A) are unlikely to result in awakening reactions. Noise levels above 65 dB(A) may cause awakening. L_{Amax} noise levels due to the Proposal are not predicted to exceed the awakening reaction level of 65 dB(A) at any noise sensitive receiver.

No sleep disturbance exceedances due to rail movements are predicted for NCA 1 and NCA 3.

Yours faithfully



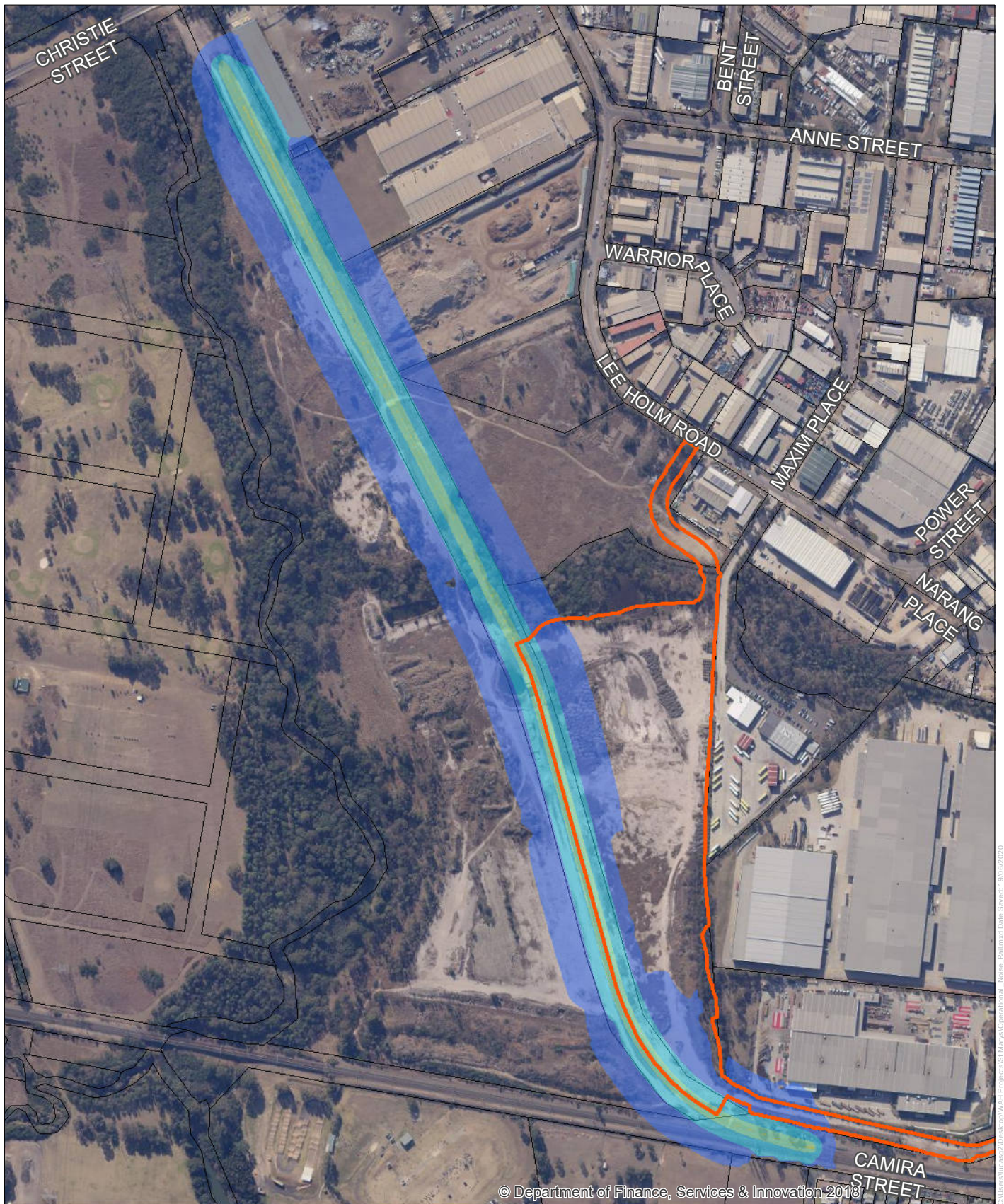
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Operational Noise Levels

ST MARYS
freight hub

pacificnational

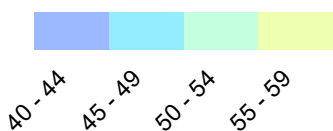
AECOM



0 90 180 Meters

Night-time - Neutral Weather - Rail

Sound Pressure Level, $L_{Aeq\ 9hr}$ dB(A)



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