

LOT B, 30 PEEL STREET, BELMORE

Rail Noise Assessment

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Donald Raiviu Malai MAR & Keegan Monica MAR

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Prepared for:	Donald Raiviu Malai MAR & Keegan Monica MAR
Address:	C/- Vogue Homes 2/16 Weld St Prestons, NSW 2170
Attention:	Tugba Cifci

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Supplementary professional advice should be sought in respect of these issues.

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1 Introduction

Renzo Tonin & Associates was engaged by Donald Raiviu Malai MAR & Keegan Monica MAR to assess noise impact onto the proposed two storey dwelling at Lot B, 30 Peel Street, Belmore. The subject site is in proximity to the Bankstown rail corridor (which is currently under conversion into a Metro rail line) and is potentially impacted by rail noise and therefore an acoustic assessment in accordance with the State Environmental Planning Policy (Transport & Infrastructure) 2021 is required.

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 Project Description

2.1 Site Location

The site is located south of the Bankstown rail corridor which services passenger trains only. The proposed dwelling is located approximately 26m south of the nearest train track as indicated in Figure 2-1 below.



Figure 2-1: Site and Surroundings

Architectural drawings prepared by Vogue Homes dated 23/06/2025 were reviewed for this assessment.

2.2 Proposed Floor Plans

The floor plans of the proposed dwelling are shown in Figure 2-2 and Figure 2-3 below.

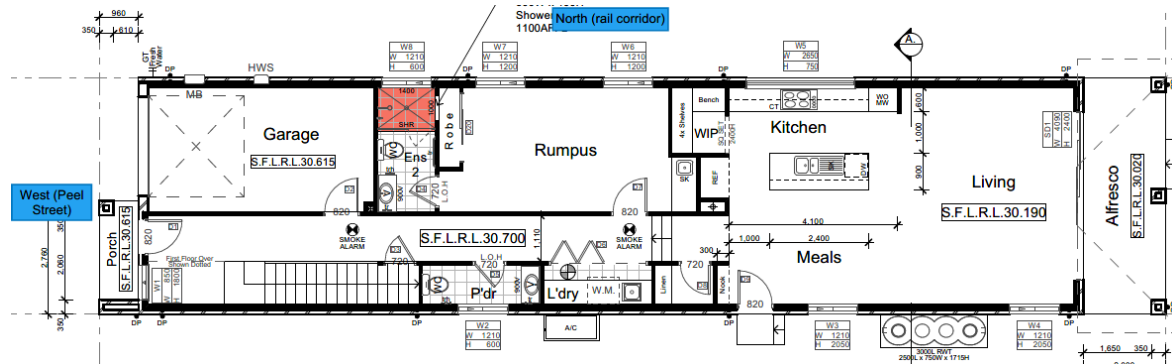


Figure 2-2: Proposed Ground Floor

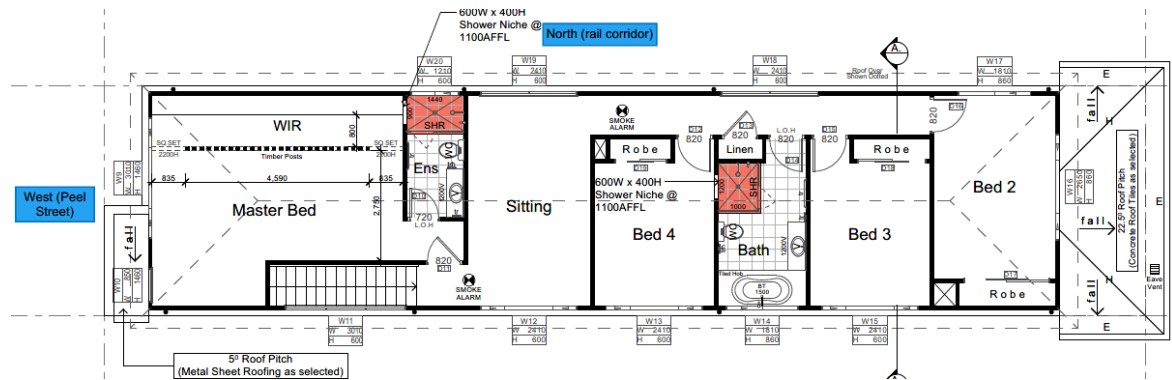


Figure 2-3: Proposed Level 1

3 Relevant Criteria

3.1 Road Rail Noise Criteria

Clause 2.100 (3) of SEPP (Transport & Infrastructure) 2021 defines internal noise criteria for residential developments adjacent to rail corridors and busy roads and are summarised in Table 3-1 below. The application and assessment methods of the SEPP criteria are provided in the DoP publication “Development Near Rail Corridors and Busy Roads – Interim Guideline” as detailed in the following section.

Table 3-1: Internal Noise Criteria for Rail Noise – SEPP (Transport & Infrastructure) 2021 and DoP Guideline

Occupancy	Windows & Doors Condition	Maximum Internal Noise Levels	
		Day, $L_{Aeq}(T)$	Night, $L_{Aeq}(T)$
Bedrooms	Closed	-	35 dB(A), 9 hour
All Other Habitable Areas	Closed	40 dB(A), 15 hour	40 dB(A), 9 hour

Notes: 1. Day and Night assessment periods are defined as follows: Day is defined as 7:00am to 10:00pm. Night is defined as 10:00pm to 7:00am

The application and assessment methods of the SEPP criteria are provided in the Department of Planning’s publication “Development Near Rail Corridors and Busy Roads – Interim Guideline” and is adopted for this assessment.

The following assessment is conducted in accordance with DoP guideline and recommendations are provided to ensure rail noise levels within the proposed development do not exceed the levels specified in Clause 2.100 (3) of SEPP (Transport & Infrastructure) 2021.

4 Assessment and Recommendations

4.1 Rail Noise Assessment

The DoP guideline has developed screen tests for single dwelling developments which are exposed to noise from rail corridors. Since the proposed development is within 80m of an operational track, the screen tests detailed in Section 3.5.1 of the DoP Guideline is applicable. More specifically, Figure 3.1 of the guideline has been adopted for the rail noise assessment and is reproduced below.

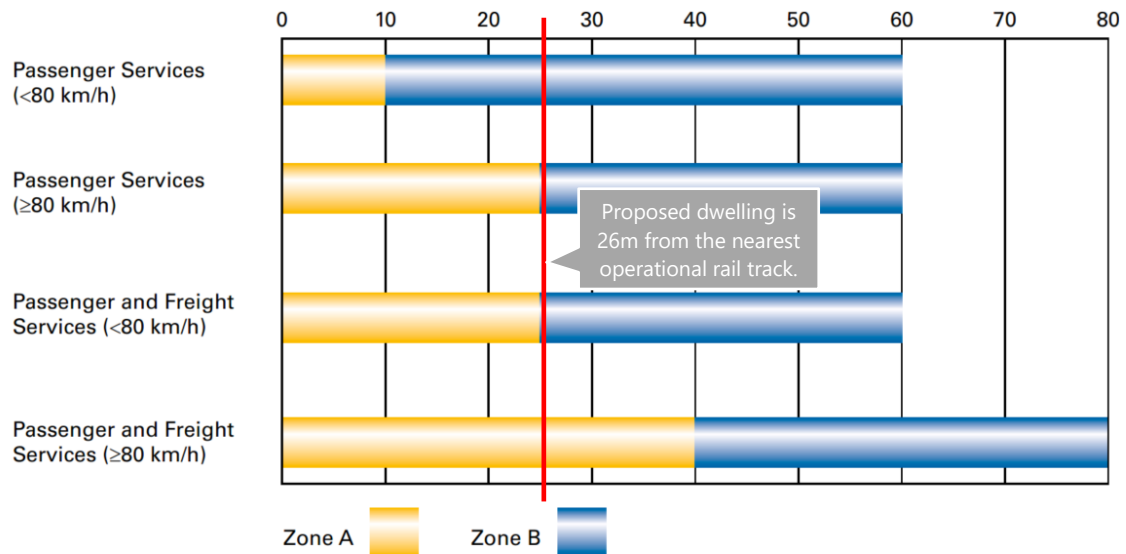


Figure 3.1: Acoustic Assessment Zones based on distance (m) of noise-sensitive development from operational track (not corridor)

Figure 4-1: DoP Screen Test Single/Dual Occupancy Dwellings

Based on the distance of 26m to an operational track, the development falls in “Zone B”. For dwellings in Zone B the DoP guideline recommends noise mitigation measures consistent with Road Noise Control Treatment Category 2 (published in Appendix of C of the guideline) for the development to achieve compliance with the internal noise criteria stipulated in SEPP (Transport & Infrastructure) 2021.

4.2 Facade Recommendations

Appendix C of the DoP Guideline sets out standard constructions for each category of noise control treatment for the sleeping areas and other habitable areas of single / dual occupancy residential developments. From the screen tests carried out above the required noise control treatment was determined and presented in Table 4-1 below.

Table 4-1: Recommended Sound Reduction Index (R_w) for Building Elements on Worst-affected Facades

Category of Noise Control Treatment	Minimum Acoustic Rating R _w of Building Elements				
	Window/ Sliding Doors ¹	Frontage Facade ¹	Roof	Entry Door ¹	Floor ²
Category 2	27	45	43	30	29

Category of Noise Control Treatment	Minimum Acoustic Rating R_w of Building Elements				
	Window/ Sliding Doors ¹	Frontage Facade ¹	Roof	Entry Door ¹	Floor ²

Notes:

1. Facade or building elements on facade with direct line-of-sight to the busy road and/or rail corridor.
2. Applicable to buildings on piers

A summary of the recommended treatments to the noise affected facades that meet the acoustic requirements determined in Table 4-1 is presented in Table 4-2 below.

Table 4-2: Recommended Forms of Construction

Room	Facade Element	Proposed Form of Construction	Minimum Sound Insulation Rating of Assembly
Ground Floor			
Entry & Stairs	External walls	<u>External:</u> Brick veneer construction consisting of single leaf of 110mm brick. <u>Internal:</u> 1 layer of 10mm standard plasterboard screw fixed to 90mm timber studs with wall wrap to external side of stud. Stud framing is minimum 20mm off masonry with minimum R2.0 insulation installed in wall cavity. Or an alternative system with equivalent acoustic rating	Rw54
	Front door (D1)	40mm solid-core timber door with full perimeter acoustic seals. Or an alternative system with equivalent or greater acoustic rating	Rw30
	Window (W1)	Minimum 6mm monolithic glass with full perimeter acoustic seals Or an alternative system with equivalent or greater acoustic rating	Rw27
Rumpus	External walls	<u>External:</u> Brick veneer construction consisting of single leaf of 110mm brick. <u>Internal:</u> 1 layer of 10mm standard plasterboard screw fixed to 90mm timber studs with wall wrap to external side of stud. Stud framing is minimum 20mm off masonry with minimum R2.0 insulation installed in wall cavity. Or an alternative system with equivalent acoustic rating	Rw54
	Windows (W6 & W7)	Minimum 6mm monolithic glass with full perimeter acoustic seals Or an alternative system with equivalent or greater acoustic rating	Rw27
Kitchen & Living area	External walls	<u>External:</u> Brick veneer construction consisting of single leaf of 110mm brick. <u>Internal:</u> 1 layer of 10mm standard plasterboard screw fixed to 90mm timber studs with wall wrap to external side of stud. Stud framing is minimum 20mm off masonry with minimum R2.0 insulation installed in wall cavity. Or an alternative system with equivalent acoustic rating	Rw54
	Window (W5) and Alfresco sliding door (SD1)	Minimum 6mm monolithic glass with full perimeter acoustic seals Or an alternative system with equivalent or greater acoustic rating	Rw27

Room	Facade Element	Proposed Form of Construction	Minimum Sound Insulation Rating of Assembly
Meals area	External walls	<u>External:</u> Brick veneer construction consisting of single leaf of 110mm brick. <u>Internal:</u> 1 layer of 10mm standard plasterboard screw fixed to 90mm timber studs with wall wrap to external side of stud. Stud framing is minimum 20mm off masonry with minimum R2.0 insulation installed in wall cavity. Or an alternative system with equivalent acoustic rating	Rw54
	Windows (W3 & W4)	Standard construction	N/A
	External door (D9)	Standard construction	N/A
Ensuite, Powder room and Laundry	External walls and external doors	Standard construction	N/A
Garage	External walls, and external doors	Standard construction	N/A
First Floor			
Master bedroom	North (face rail corridor) and West external walls	<u>External:</u> Fibre cement cladding such as James Hardie Linea Weatherboard and external wall wrap/sarking screw fixed to 90mm timber studs. Install minimum R2.0 insulation in stud wall cavity. <u>Internal:</u> 2 layers of 13mm fire-rated plasterboard screw fixed to timber stud framing at 600mm centres. Or an alternative system with equivalent acoustic rating.	Rw45
	South external wall	Standard construction	N/A
	Roof/Ceiling	Pitched concrete tile with sarking to underside, flat ceiling consisting of 1 layer of 13mm standard plasterboard direct fixed to underside of joists. Install minimum R3.5 insulation batts above plasterboard ceiling. Or an alternative system with equivalent acoustic rating	Rw43
	Windows (W9 & W10)	Minimum 6mm monolithic glass with full perimeter acoustic seals Or an alternative system with equivalent or greater acoustic rating	Rw27
Sitting, stair void and bedroom hallway	North (face rail corridor) external wall	<u>External:</u> Fibre cement cladding such as James Hardie Linea Weatherboard and external wall wrap/sarking screw fixed to 90mm timber studs. Install minimum R2.0 insulation in stud wall cavity. <u>Internal:</u> 2 layers of 13mm fire-rated plasterboard screw fixed to timber stud framing at 600mm centres. Or an alternative system with equivalent acoustic rating.	Rw45
	South external wall	Standard construction	N/A

Room	Facade Element	Proposed Form of Construction	Minimum Sound Insulation Rating of Assembly
	Roof/Ceiling	Pitched concrete tile with sarking to underside, flat ceiling consisting of 1 layer of 13mm standard plasterboard direct fixed to underside of joists. Install minimum R3.5 insulation batts above plasterboard ceiling. Or an alternative system with equivalent acoustic rating	Rw43
	North facing windows (W17, W18 & W19)	Minimum 6mm monolithic glass with full perimeter acoustic seals Or an alternative system with equivalent or greater acoustic rating	Rw27
	South facing windows (W11 & W12)	Standard construction	N/A
Bedroom 2	North (face rail corridor) and east external walls	<u>External:</u> Fibre cement cladding such as James Hardie Linea Weatherboard and external wall wrap/sarking screw fixed to 90mm timber studs. Install minimum R2.0 insulation in stud wall cavity. <u>Internal:</u> 2 layers of 13mm fire-rated plasterboard screw fixed to timber stud framing at 600mm centres. Or an alternative system with equivalent acoustic rating.	Rw45
	South external wall	Standard construction	N/A
	Roof/ceiling	Pitched concrete tile with sarking to underside, flat ceiling consisting of 1 layer of 13mm standard plasterboard direct fixed to underside of joists. Install minimum R3.5 insulation batts above plasterboard ceiling. Or an alternative system with equivalent acoustic rating	Rw43
	Windows (W16 & W17)	Minimum 6mm monolithic glass with full perimeter acoustic seals Or an alternative system with equivalent or greater acoustic rating	Rw27
Bedroom 3, Bedroom 4 Bathroom and Ensuite	External walls, windows and roof/ceiling	Standard construction	N/A

Notes:

1. The glazing supplier shall ensure that installation techniques will not diminish the Rw performance of the glazing when installed on site.
2. Framing of windows, external sliding doors shall not diminish overall acoustic rating of the glazed assembly.
3. The above glazing thicknesses should be considered the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading, thermal requirements etc.
4. The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

5 Conclusion

Renzo Tonin & Associates have completed a rail noise assessment for the proposed dwelling at Lot B, 30 Peel Street, Belmore. Screen tests were conducted in accordance with the DoP's Interim Guideline to determine the required acoustic treatment to the proposed building envelope to achieve compliance with the internal noise criteria set in Clause 2.100 (3) of the SEPP (Transport & Infrastructure) 2021. Therefore, with the implementation of recommendations made in Table 4-2 into the building design, rail noise levels inside the proposed dwelling will comply with the internal noise criteria stipulated in Clause 2.100 (3) of the SEPP (T&I) 2021.

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 common sounds in our daytime environment: <table><tr><td rowspan="2">threshold of hearing</td><td>0 dB</td><td>The faintest sound we can hear</td></tr><tr><td>10 dB</td><td>Human breathing</td></tr><tr><td rowspan="2">almost silent</td><td>20 dB</td><td></td></tr><tr><td>30 dB</td><td>Quiet bedroom or in a quiet national park location</td></tr><tr><td rowspan="2">generally quiet</td><td>40 dB</td><td>Library</td></tr><tr><td>50 dB</td><td>Typical office space or ambience in the city at night</td></tr><tr><td rowspan="2">moderately loud</td><td>60 dB</td><td>CBD mall at lunch time</td></tr><tr><td>70 dB</td><td>The sound of a car passing on the street</td></tr><tr><td rowspan="2">loud</td><td>80 dB</td><td>Loud music played at home</td></tr><tr><td>90 dB</td><td>The sound of a truck passing on the street</td></tr><tr><td rowspan="2">very loud</td><td>100 dB</td><td>Indoor rock band concert</td></tr><tr><td>110 dB</td><td>Operating a chainsaw or jackhammer</td></tr><tr><td rowspan="2">extremely loud</td><td>120 dB</td><td>Jet plane take-off at 100m away</td></tr><tr><td>130 dB</td><td></td></tr><tr><td>threshold of pain</td><td>140 dB</td><td>Military jet take-off at 25m away</td></tr></table>			threshold of hearing	0 dB	The faintest sound we can hear	10 dB	Human breathing	almost silent	20 dB		30 dB	Quiet bedroom or in a quiet national park location	generally quiet	40 dB	Library	50 dB	Typical office space or ambience in the city at night	moderately loud	60 dB	CBD mall at lunch time	70 dB	The sound of a car passing on the street	loud	80 dB	Loud music played at home	90 dB	The sound of a truck passing on the street	very loud	100 dB	Indoor rock band concert	110 dB	Operating a chainsaw or jackhammer	extremely loud	120 dB	Jet plane take-off at 100m away	130 dB		threshold of pain	140 dB	Military jet take-off at 25m away
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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.