Road Traffic Noise Assessment

52-62 May Road, Narraweena, NSW 2099.

February 2021

Report No. nss23359 – Final

Prepared at the request of:-

JV Urban P.O Box 768 Byron Bay, NSW 2418

Prepared by:-

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1. INTRODUCTION

Noise and Sound Services was requested by JV Urban, on behalf of May Road Group to carry out a road traffic noise assessment at 52-62 May Road, Narraweena, NSW 2099. The subject site is currently a commercial complex, consisting of ground floor shops and retail spaces. It is proposed to demolish the existing premises and construct a 3-storey mixed-use development comprising of 9 commercial/retail shops to be situated on the ground floor and 16 residential dwellings to be situated on the first and second floors of the complex.

This assessment was carried out in accordance with the client's request outlined in an email dated 5th February 2021, which entails a council condition that stipulates the following:

1. "Acoustic Report

An acoustic report is to be prepared by a qualified acoustic engineer, the report is to confirm that the following LAeq levels are not exceeded within the development:

- (a) In any bedroom in the residential accommodation 35 dBA at any time between 10 pm and 7 am,
- (b) Anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway) 40 dBA at any time."

The purpose of the survey is to assess road traffic noise levels and advise on the sound insulation requirements from external noise in line with the State Environmental Planning Policy (Infrastructure) 2007, Clause 102 - Impact of road noise or vibration on non-road development and the Australian Standards AS 3671 and AS 2107 – 2016, 'Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors'.

2. SITE AND DEVELOPMENT DESCRIPTION

The proposed development at 52-62 May Road, Narraweena, NSW 2099 is situated directly north of an arterial road being Warringah Road (A38). The nearest façade of the newly proposed development at 52-62 May Road, Narraweena is located approximately 18 metres from Warringah Road. The site currently consists of commercial and retail shops. It is proposed to demolish the existing premises and construct a three-storey building comprising of commercial/retail shops on the ground floor and residential dwellings on the first and second floors of the complex.

Full details are given in drawings provided by 'Benson McCormack Architecture', of Studio 5, 505 Balmain Road, Lilyfield, NSW 2040 Drawing numbers: A-1306 Rev 02, A Rev 02, A-0001 Rev 04, A-0006 Rev 02, A-0007 Rev 04, A-0009 Rev 02, A-0101 Rev 04, A 0102 Rev 05, A-0103 Rev 04,

A-0105 Rev 03, A-0201 – A-0203 Rev 04, A-2051 Rev 05, A-2052 Rev 02, A-1304 Rev 02, A-1301 Rev 04 and A-1305 Rev 02, Dated: 14th October 2020; Drawing numbers A-0103 Rev 04, A-0104 Rev 05 Dated 26th November 2020 and Drawing number A-1001 Rev 01 Dated 16th May 2020.

3. CRITERIA

3.1 State Environmental Planning Policy (Infrastructure) 2007 Clause 102 - Impact of road noise or vibration on non-road development

The State Environmental Planning Policy (Infrastructure) 2007, Subdivision 2 Development (SEPP) does not apply to the site at May Road, Narraweena. Notwithstanding this, the internal noise levels have been designed to meet the requirements of the SEPP. The State Environmental Planning Policy (Infrastructure) 2007, provides the following:-

- 1) This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:
 - (a) a building for residential use,
 - (b) a place of public worship,
 - (c) a hospital,
 - (d) an educational establishment or child care centre.
- 2) Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purposes of this clause and published in the Gazette.
- 3) If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:
 - (a) in any bedroom in the building 35 dBA at any time between 10 pm and 7 am,
 - (b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway) 40 dBA at any time.
- 4) In this clause, freeway, tollway and transitway have the same meanings as they have in the Roads Act 1993.

3.2 Australian Standards AS 3671 and AS 2107

The Australian Standard AS 3671-1989 'Acoustics - Road traffic noise intrusion building siting and construction' refers to guideline limits in Australian Standard AS 2107. Australian Standard AS/NZS 2107 – 2016 'Acoustic – Recommended Design Sound Levels and Reverberation Times for Building Interiors' which provides recommended design sound levels for different areas of occupancy in buildings. This includes recommended internal design sound levels from continuous road traffic noise for houses and apartments near major roads as shown in Table 1 below.

TABLE 1 - RECOMMENDED DESIGN SOUND LEVEL FORRESIDENTIAL BUILDINGS. FROM AS/NZS 2107 (2016).

	Design Sound Level		
Type of Occupancy	Range (LAeq, t) dBA		
Houses and Apartments Near Major Roads	_		
Living Areas	35 to 45		
Sleeping Areas (night time)	35 to 40		
Work Areas	35 to 45		

3.3 Site Specific Noise Goals

Site-specific internal road traffic noise goals ($L_{Aeq, period}$) in line with the State Environmental Planning Policy (Infrastructure) 2007 and Australian Standard AS 2107 are set at 35 dBA for sleeping areas and 40 dBA for living/work areas.

4. NOISE MEASUREMENTS

4.1 Instrumentation

The instrumentation used for measurement of the existing environment consisted of a Bruel & Kjaer 2250 sound level meter (serial number 3011239) fitted with a microphone windshield. This meter conforms to Australian Standard AS IEC 61672.1-2004: '*Electroacoustics - Sound level meters – Specifications*' as a class 1 precision sound level meter and has an accuracy suitable for both field and laboratory use. The calibration of the meter was checked before and after the measurement period with a Brüel and Kjær acoustical calibrator model 4230 (serial number 2445349). No significant system drift occurred over the measurement periods.

The sound level meter has been checked, adjusted and aligned to conform to the Bruel & Kjaer factory specifications and issued with conformance certificates within the last 24 months as required by the regulations. The internal test

equipment used is traceable to the National Measurement Laboratory at C.S.I.R.O, Lindfield, NSW, Australia.

The calibrator has been checked, adjusted and aligned to conform to the Brüel and Kjær factory specifications and issued with conformance certificates within the last 12 months as required by the regulations. The internal test equipment used is traceable to the National Measurement Laboratory at C.S.I.R.O., Lindfield, NSW, Australia.

4.2 Measurement Procedure

The acoustical measurements were carried out in accordance with Australian Standards AS 1055. 'Acoustics –Description and Measurement of Environmental Noise', (2018) and AS 2702 'Acoustics –Methods for the Measurement of Road Traffic Noise', (1984) as required by Australian Standard AS 3671 'Acoustics – Road Traffic Noise Intrusion – Building Siting and Construction' (1989).

Free field noise measurements were carried out in the vicinity of the proposed site, approximately 18 metres from Warringah Road (A38), along the Western boundary of the existing complex. This location presents a similar offset distance between the centreline of Warringah Road and the nearest façade of the proposed development. A total of 4, 15-minute, operator-attended noise surveys were conducted. The measurements were carried out on Thursday 11th February 2021.

The 'A' frequency weighting and 'fast' time weighting were used exclusively. The weather was dry. 25 degrees Celsius with negligible wind. The time of the measurements was selected as representing a time when the traffic flows are considered to be high whilst maintaining free flow, i.e., without congestion. As such, noise levels are considered to be a worst-case scenario. Night time levels (from 10:00 pm to 7:00 am) are lower than the day time levels and hence meeting the criteria during the day time will also ensure that the night time criterion is met.

4.3 Measurement Results

The daytime energy average external road traffic noise level ($L_{Aeq, 1 hour}$) was measured as **61 dBA** at approximately 18 metres from Warringah Road. This location represents the nearest façade of the proposed residential development facing Warringah Road. Full results are shown in Appendix A.

5. DISCUSSION AND CALCULATIONS

This section of the report discusses the measurement results at the development site for the proposed development and details formula used to predict external and internal noise levels in various rooms.

5.1 External Noise Levels

The free field external road traffic noise level at the subject site was found to be 61 dBA at the measurement location of approximately 18 metres from the centreline of Warringah Road. The nearest façade of the proposed development, to be facing the Warringah Road, is at a distance of approximately 18 metres. The distances of other rooms of the development from the measurement position have also been taken into account.

5.2 Internal Noise Levels

In addition to distance attenuation, the internal noise level (L_{p2}) in various rooms of the proposed development is found from the formula:

$$L_{p2} = L_{p1} - R_w + 10 Log_{10} (S/A) - K + 6 dBA$$

Where: L_{p1} is the external noise level;

R_w is the weighted sound reduction index of the partition; S is the area of the partition (window or glazed door); A is the room acoustic absorption; and K is an angle of view correction.

By applying this formula, the selection of the weighted sound reduction index (R_w) for the windows and glazed doors in the external façades for the proposed dwellings can be found. The glazed areas are normally the weakest acoustic partition in the room façades.

6. **RECOMMENDATIONS**

This section provides the minimum construction requirements to meet the internal noise goals.

6.1 Wall Construction

The external walls must have a minimum $R_{\rm w}$ of 45 dB, which is for standard double brick and for:-

- brick veneer consisting of 110 mm thick exterior face brick, with 92 mm metal stud or 90 mm deep timber stud, at least 40 mm clearance between the masonry and stud frame and 10 mm thick plasterboard internal wall constructions; or
- timber frame cladding consisting of 6 mm thick fibre cement sheeting (example James Hardie®) or weatherboard or plank cladding externally, 90 mm deep timber stud or 92 mm metal stud, one layer of 13 mm thick standard plasterboard internally with at least R1.5 thermal insulation in the wall cavity.

6.2 Roof / Ceiling Construction

The roof / ceiling must have a minimum R_w of 43 dB, which is standard for a concrete slap (at least 110 mm thick) or a sheet metal roof (or concrete/terracotta tile) with sarking and 10 mm thick plasterboard ceiling fixed to the ceiling joists. The roof cavity should be lined with at least R2 thermal insulation batts.

6.3 Minimum Glazing Thickness and R_w Ratings

To meet the internal design goals, as given in Section 3.3 above, the glazing in the rooms of the proposed residence will require the glass thicknesses specified in Table 2 below in order to achieve the recommended R_w ratings.

TABLE 2 - MINIMUM GLAZING THICKNESS AND Rw RATINGS – 52-62
MAY ROAD, NARRAWEENA, NSW 2099

Room	Ref - Size of Glazing W x H (mm)	Recommended Glazing Minimum Thickness	Required Minimum R _w or STC (dB)
Unit 01			
Living / Dining	2 x D003 2200 x 2500	6.38mm laminated sliding door with acoustic seals.	31
Bedroom 1	D003 2200 x 2500	10.38mm laminated sliding door with acoustic seals.	35
	W04 2000 x 1500	10.38mm laminated fixed window with acoustic seals.	
	W06 870 x 1500	10.38mm laminated fixed window with acoustic seals.	
Bedroom 2W03 1000 x 15006.38mm laminated awning window with acoustic seals.		27	
Unit 02	•		•
Living / Dining	D003 2200 x 2500	6.38mm laminated sliding door with acoustic seals.	33
	W04 2000 x 1500	6.38mm laminated fixed window with acoustic seals.	
	W06 870 x 1500	6.38mm laminated fixed window with acoustic seals.	
Bedroom 1	D003 2200 x 2500	6.38mm laminated sliding door with acoustic seals.	34
Bedroom 2	D003 2200 x 2500	6.38mm laminated sliding door with acoustic seals.	33

Continued.....

TABLE 2 - MINIMUM GLAZING THICKNESS AND Rw RATINGS – 52-62MAY ROAD, NARRAWEENA, NSW 2099. Continued.

Room	Ref - Size of Glazing W x H (mm)Recommended Glazing Minimum Thickness		Required Minimum R _w or STC (dB)
Unit 03			
Living / Dining	D003 2200 x 2500	6.38mm laminated sliding door with acoustic seals.	33
	W04 2000 x 1500	6.38mm laminated fixed window with acoustic seals.	
	W06 870 x 1500	6.38mm laminated fixed window with acoustic seals.	
Bedroom 1	Bedroom 1 D003 2200 x 2500 6.38mm laminated sliding door with acoustic seals.		33
Bedroom 2	W01 1000 x 2000	6.38mm laminated awning window with acoustic seals.	29
Unit 04			
Living / Dining	W05 3700 x 1500	10.38mm laminated fixed window with acoustic seals.	35
	W07 1080 x 1500	10.38mm laminated fixed window with acoustic seals.	
	D04 3000 x 2500	10.38mm laminated sliding door with acoustic seals.	
	D02 1000 x 2500	10.38mm laminated door with acoustic seals.	
Bedroom 1	W02 900 x 2400	6.38mm laminated awning window with acoustic seals.	30
Bedroom 2	Bedroom 2 W02 900 x 2400 6.38mm laminated awning window with acoustic seals		30
Bedroom 3	Bedroom 3 W03 1000 x 1500 6.38mm laminated awning window with acoustic seals		28
Unit 05	<u>.</u>	Ľ	
Living / Dining	2 x W01 1000 x 2000	4mm float awning window with acoustic seals.	20
	D04 3000 x 2500	5mm toughened sliding door with weather seals.	20
	D02 1000 x 2500	5mm toughened sliding door with weather seals.	20
Bedroom 1	W02 900 x 2400	4mm float awning window with acoustic seals.	20
Bedroom 2	W02 900 x 2400	4mm float awning window with acoustic seals.	20
Bedroom 3	W03 1000 x 1500	4mm float awning window with acoustic seals.	20

Continued.....

TABLE 2 - MINIMUM GLAZING THICKNESS AND Rw RATINGS – 52-62MAY ROAD, NARRAWEENA, NSW 2099. Continued.

Room	Ref - Size of Glazing W x H (mm)	Recommended Glazing Minimum Thickness	Required Minimum R _w or STC (dB)
Unit 06			·
Living / Dining	W01 1000 x 2000	4mm float awning window with acoustic seals.	20
	D04 3000 x 2500	5mm toughened sliding door with weather seals.	
Bedroom 1	W01 1000 x 2000	1000 x 20004mm float awning window with acoustic seals.	
Bedroom 2	W01 1000 x 2000	4mm float awning window with acoustic seals.	20
Unit 07			
Living / Dining	W01 1000 x 2000	4mm float awning window with acoustic seals.	20
	D04 3000 x 2500	5mm toughened sliding door with weather seals.	
Bedroom 1	W01 1000 x 2000	4mm float awning window with acoustic seals.	20
Bedroom 2	W01 1000 x 2000	4mm float awning window with acoustic seals.	20
Unit 08			
Living / Dining	D04 3000 x 2500	5mm toughened sliding door with weather seals.	20
Bedroom 1	W01 1000 x 2000	4mm float awning window with acoustic seals.	20
Unit 09			
Living / Dining	D04 3000 x 2500	6.38mm laminated sliding door with acoustic seals.	29
	Roof Window (Skylight)	<i>Velux High Performance</i> <i>double glazed 2004'</i> or equivalent	
Bedroom 1 D02 1000 x 2500		6.38mm laminated door with acoustic seals.	31
Bedroom 2 W03 1000 x 1500		6.38mm laminated awning window with acoustic seals.	29
Unit 10			
Living / Dining	D04 3000 x 2500	6.38mm laminated sliding door with acoustic seals.	31
	Roof Window	'Velux High Performance	
	(Skylight)	<i>double glazed 2004</i> ' or equivalent	
Bedroom 1	D02 1000 x 2500	6.38mm laminated door with acoustic seals.	31
Bedroom 2	W03 1000 x 1500	6.38mm laminated awning window with acoustic seals.	29

Continued.....

TABLE 2 - MINIMUM GLAZING THICKNESS AND Rw RATINGS – 52-62MAY ROAD, NARRAWEENA, NSW 2099. Continued.

Room	Ref - Size of Glazing W x H (mm)Recommended Glazing Minimum Thickness		Required Minimum Rw or STC	
Unit 11		(dB)		
Living / Dining	D04 3000 x 2500	6.38mm laminated sliding	31	
	Roof Window (Skylight)	<i>Velux High Performance</i> <i>double glazed 2004'</i> or equivalent		
Bedroom 1	D02 1000 x 2500	6.38mm laminated door with acoustic seals.	31	
Bedroom 2	W01 1000 x 2000	6.38mm laminated awning window with acoustic seals.	29	
Unit 12	-			
Living / Dining	2 x D04 3000 x 2500	8.38mm laminated sliding door with acoustic seals.	36	
	D02 1000 x 2500	acoustic seals.		
Bedroom 1	D02 1000 x 2500	6.38mm laminated door with acoustic seals.	30	
Bedroom 2	W03 1000 x 1500	6.38mm laminated awning window with acoustic seals.	27	
Unit 13				
Living / Dining	2 x D04 3000 x 2500	5mm toughened sliding door with weather seals.	20	
	D02 1000 x 2500	6.38mm laminated door with acoustic seals.		
Bedroom 1	D02 1000 x 2500	000 x 25006.38mm laminated door with acoustic seals.		
Bedroom 2	W03 1000 x 1500	4mm float awning window with acoustic seals.	20	
Unit 14				
Living / Dining	D04 3000 x 2500	5mm toughened sliding door with weather seals.	20	
	W01 1000 x 2000	4mm float awning window with acoustic seals.		
Bedroom 1	Bedroom 1D02 1000 x 25005mm toughened sliding door with weather seals.		20	
Unit 15				
Living / Dining	D04 3000 x 2500	5mm toughened sliding door with weather seals.	20	
	W01 1000 x 2000	4mm float awning window with acoustic seals.		
Bedroom 1	D02 1000 x 2500	5mm toughened sliding door with weather seals.	20	
Unit 16				
Living / Dining	Living / Dining D04 3000 x 2500 5mm toughened sliding door with weather seals.		20	
Bedroom 1 D02 1000 x 2500 6.38mm laminated c acoustic seal		6.38mm laminated door with acoustic seals.	20	

Notes:

- All skylights/roof windows should be Velux High 'Performance double glazed 2004' or equivalent.
- All other window glazing to be a minimum of 4mm thick float glass and door glazing to be a minimum of 6.38mm thick laminated glass for habitable rooms with a minimum R_w or STC rating of 20 dB; R_w = Weighted Sound Reduction Index, covers a frequency range from 100 Hz to 3.15 kHz;
- STC = Sound Transmission Class, covers a frequency range from 120 Hz to 4 kHz;
- Glazing systems recommended are minimum requirements for acoustic purposes. In some cases, thicker glass may be required for safety or other reasons.
- Glazing performance for residential component of development was only assessed according to council condition outlined in introduction.
- Door and Window types and sizes adopted from Door and Window Schedule prepared by Benson McCormack Architecture (Drawing No. A-1001 Rev 01 Dated 16th May 2020).

6.4 Ventilation

An acoustically insulated building must be kept virtually air tight to exclude external noise. Therefore, the R_w ratings in Table 2 above, are only achieved when the glazing is closed. Hence there is a requirement for mechanical ventilation or air-conditioning to provide fresh air to control odours. Specific ventilation requirements are outside of our scope of expertise, however requirements for indoor-air quality are given in Australian Standard AS 1668.2 - 2012, "*The use of ventilation and air-conditioning in buildings - Ventilation design for indoor air contaminant control*".

Internal noise levels from mechanical ventilation or air-conditioning should not exceed 35 dBA for bedroom areas and 40 dBA for all other habitable areas. External noise levels from mechanical ventilation or air-conditioning should not exceed 5 dB over the lowest existing background noise level (L_{AF90}) when in day time use and when measured at the neighbouring boundary. Night time noise levels must meet the requirements of the Protection of the Environment Operations (Noise Control) Regulation 2017.

7. SUMMARY AND CONCLUSIONS

Noise emission from road traffic movements using Warringah Road (A38), have been measured in the vicinity of 52-62 May Road, Narraweena, NSW 2099. The measurements have been used to predict internal noise levels for the proposed mixed-use development. No exceedences of the internal noise levels are predicted. This is providing that the recommendation details shown in Section 6 above are fully complied with. Mechanical ventilation (e.g., internal wallmounted air ventilators) or air conditioning is required.

Status	Date	Prepared by:		
Draft	12th February 2021	Anthony Nachar B.E. (Civil), AAS(Grad)		
Status	Date	Checked by:		
Draft	13th February 2021	Ken Scannell MSc., MAAS		
Status	Date	Issued by:		
Final	20th February 2021	Ken Scannell MSc., MAAS		

Important Note. All products and materials suggested by 'Noise and Sound Services' are selected for their acoustical properties only. All other properties such as airflow, aesthetics, chemical, corrosion, combustion, construction details, decomposition, expansion, fire rating, grout or tile cracking, loading, shrinkage, ventilation, etc are outside of 'Noise and Sound Services' field of expertise and **must be** checked with the supplier or suitably qualified specialist before purchase.

APPENDIX A – MEASURED SOUND PRESSURE LEVELS

Environmental noise levels can vary considerably with time; therefore, it is not adequate to use a single number to fully describe the acoustic environment. The preferred, and now generally accepted, method of recording and presenting noise measurements is based upon a statistical approach. For example, the L_{AF10} noise level is the level exceeded for 10% of the time and is approximately the average maximum noise level. The L_{AF90} level is the level that is exceeded for 90% of the time and is considered to be approximately the average of the minimum noise level recorded. This level is often referred to as the 'background' noise level. The L_{Aeq} level represents the average noise energy during the measurement period.

The measurement procedure and the equipment used for the noise survey are given in section 4 of this report. The measurement results are shown in Table A. All sound pressure levels in Table A are rounded to the nearest whole decibel.

Time		Sound Pressure Level (dBA)					
Start	Finish	LAeq	LAF1	LAF10	LAF50	LAF90	LAF99
11:30	11:45	61	70	64	58	52	49
11:50	12:05	60	68	63	59	53	49
12:05	12:20	61	69	64	58	51	47
12:20	12:35	60	70	63	59	52	44
11:30	12:35	61	70	64	58	51	44

TABLE A – 52-62 MAY ROAD, NARRAWEENA, NSW 2099, 11th February 2021

APPENDIX B - EXAMPLE MATERIAL SUPPLIERS

Acoustic Glazing Suppliers

'Vantage Windows' telephone: 1300 026 189 http://www.awsaustralia.com.au 'Wideline Pty Ltd' telephone: (02) 8304 6400. www.wideline.com.au 'Trend Windows & Doors Pty Ltd' telephone: (02) 9840 2000. www.trendwindows.com.au 'Thermoglaze Windows' telephone: 1300 166 571 www.thermaglazewindows.com.au 'Christoffel Pty Ltd' telephone: (02) 9627 4811 www.christoffel.com.au/contact.htm 'Sound Barrier Systems Pty. Ltd' telephone: (02) 9540 4333, or email tony.angel@soundbarrier.com.au 'Velux' telephone: (02) 1300 859 856 http://www.velux.com.au/ 'Safetyline Jalouise' telephone: 1300 86 3350 http://www.safetylinejalousie.com.au/

Internal Wall-Mounted Air Ventilators

Active:

'*Acoustica*' – telephone 1300 722 825 www.acoustica.com.au '*Sonair*' – telephone 1300 858 674 www.edmonds.com.au

Passive: *Silenceair®*' – telephone 02 9555 7215 www.silenceair.com