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Acoustic Report

- Traffic Noise-

Proposed Development at

No. 742 Henry Lawson Drive
Picnic Point

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1.0 SCOPE OF WORK & DESCRIPTION

The aim of this report is to determine the building materials to be used and the construction methods to be adopted such that the proposed development at No. 742 Henry Lawson Drive Picnic Point is built to achieve acceptable internal noise levels as per Canterbury Bankstown Council Conditions.

The site is located on Henry Lawson Drive in the suburb of Picnic Point. (Figure 1– Site Location). Henry Lawson Drive Road's Annual Average Daily Traffic (AADT) is > 20,000 vehicles.

Internal noise intrusion levels are to be within the limits adopted by the Australian Standard/New Zealand Standard AS/NZS 2107:2016 *"Acoustics – Recommended Design Sound Levels and Reverberation Times"*, NSW Department of planning document titled "Development Near Rail Corridors & Busy Roads - Interim Guideline", and Clause 102 of the State Environmental Planning Policy – (Infrastructure) 2007.

The architectural plans by SY Design Rev. C dated December 22, 2021 are for the proposed construction of dual occupancy dwelling. (Figure 2 – Proposed Site Plans).

Figure 1 - Site Location

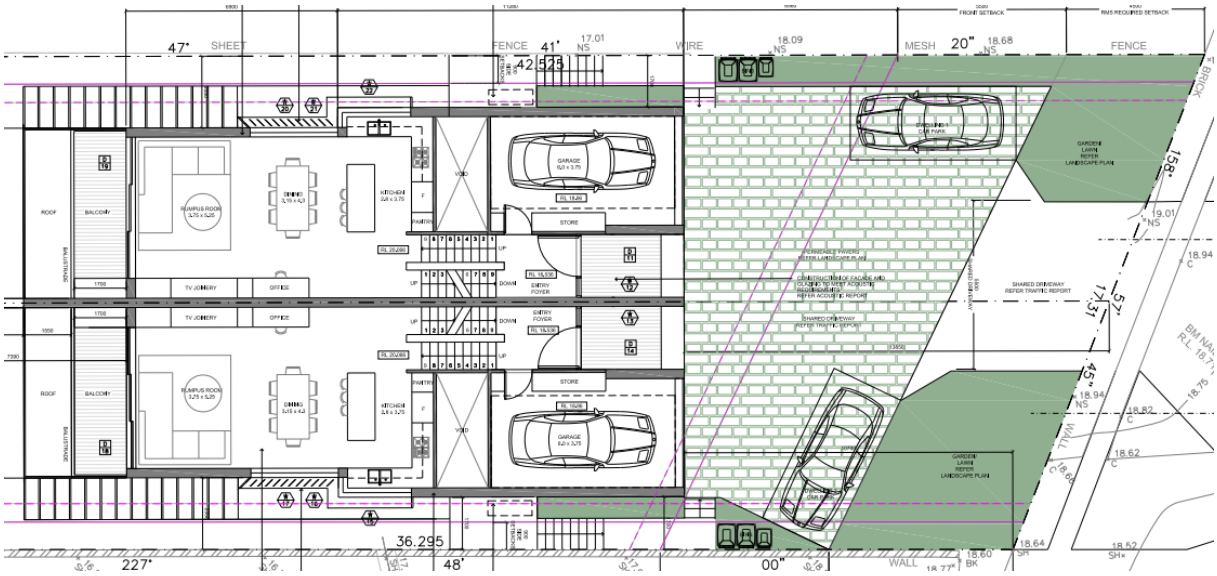


Figure 2- Proposed Site Plan

2.0 ACOUSTIC DESCRIPTORS

L_{Amax} – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

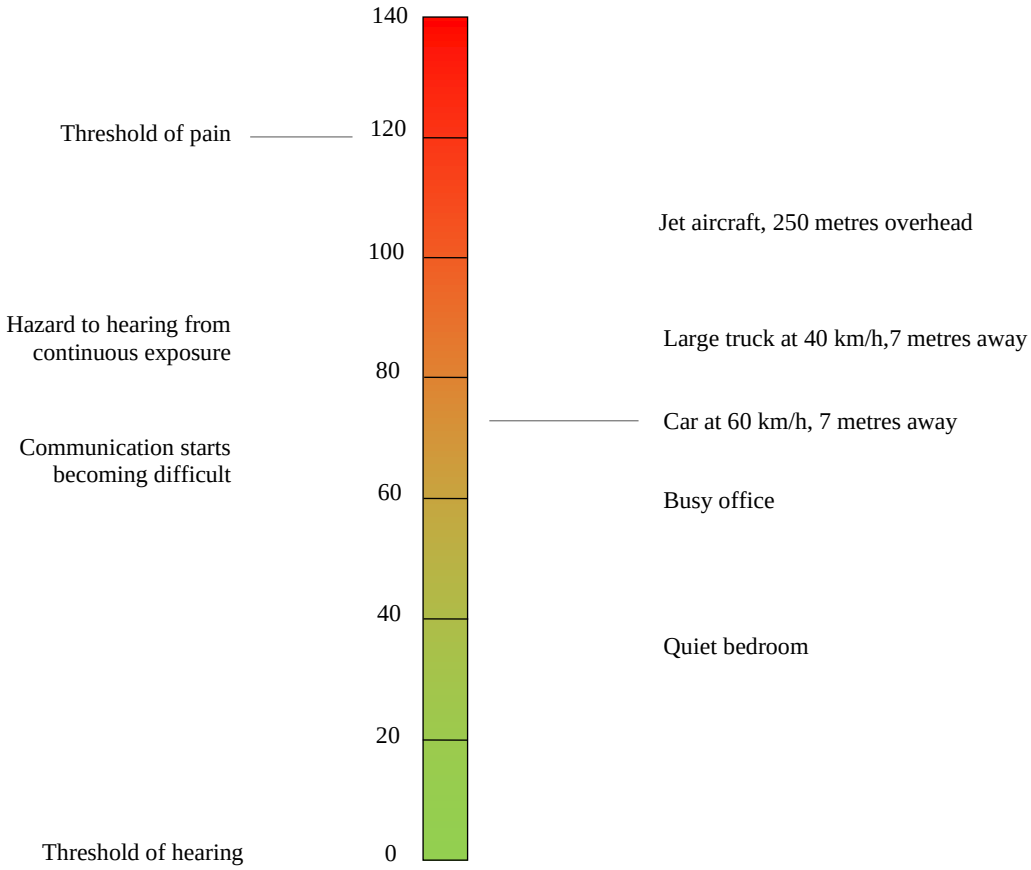
L_{A50} – The L_{A50} level is the noise level which is exceeded for 50% of the sample period. During the sample period, the noise level is below the L_{A50} level for 50% of the time.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and nighttime) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and nighttime.

The level of common sounds on the dB(A) scale as the figure below:



3.0 ACOUSTICAL STUDY

3.1 AUSTRALIAN/NEW ZEALAND STANDARD AS/NZS 2107:2016

The above standard has formulated the criteria for developments situated in urban areas.

As traffic noise levels are not constant, a L_{eq} noise level descriptor is used when assessing this type of noise source. The L_{eq} is the mean energy level of noise being measured and has been found to accurately describe the level of annoyance caused by traffic noise.

It is usual practice, when we find it necessary to recommend internal sound levels in buildings to refer to Australian/New Zealand Standard AS/NZS 2107:2016 "Acoustics – Recommended Design Sound Levels and Reverberations times for Building Interiors".

AS/NZS 2107:2016 sets out design internal noise levels and reverberation times for different buildings depending on the use of these structures. The noise levels recommended in AS/NZS 2107:2016 take into account the function of the area and apply that to the sound level measured within the space unoccupied although ready for occupancy.

In Table 1, Page 13, the standard recommends the following noise levels for residential buildings proposed next to major Roads.

Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range	Design reverberation time (T) range, s
RESIDENTIAL BUILDINGS (see Note 5 and Clause 5.2)		
Houses and apartments in inner city areas or entertainment districts or near major roads—		
Apartment common areas (e.g. foyer, lift lobby)	45 to 50	—
Living areas	35 to 45	—
Sleeping areas (night time)	35 to 40	—
Work areas	35 to 45	—
Houses and apartments in suburban areas or near minor roads—		
Apartment common areas (e.g. foyer, lift lobby)	45 to 50	—
Living areas	30 to 40	
Sleeping areas (night time)	30 to 35	
Work areas	35 to 40	—

3.2 DEVELOPMENT NEAR RAIL CORRIDORS AND BUSY ROADS – INTERIM GUIDELINE & CLAUSE 102 OF THE SEPP

Henry Lawson Drive is classified as a busy road with more than 20,000 AADT.

According to Figure 3.3 (a) of the Interim Guideline, an acoustic assessment is required for the proposed development.

The site falls under Category 4 as per Figure 3.3(a) of the Interim Guideline. As per Appendix C of the Interim Guideline, the building elements and their minimum required acoustic weighted sound reduction index Rw are as follows:

- Windows Sliding Doors - Rw 35
- Front Façade - Rw 55
- Roof - Rw 52
- Entry Door - Rw 33

All building specifications are to be carried out as per Appendix C (on page 67) of the Interim Guideline.

Clause 102 of the SEPP states that where the development is for residential use and is located in or adjacent to a relevant road corridor, a consent authority must not grant consent unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

- in any bedroom in the building – 35dB(A) at any time between 10.00p.m. and 7.00a.m.
- anywhere else in the building (other than a garage, kitchen, bathroom or hallway) – 40dB(A) at any time.

External façade recommendations will be provided in Section 5.0 of this report to ensure compliance with the above internal amenity criteria.

4.0 NOISE SURVEY. INSTRUMENTATION & RESULTS

On November 8th, 2021, an engineer from our office went to the above address to carry out acoustic measurements representative of noise reading at the boundary line facing Henry Lawson Drive (Figure 3 – Noise Reading Location).

Figure 3 – Noise Reading Location

Unattended noise monitoring was carried out for 24 hours in order to determine existing background noise levels of the existing day [7:00-18:00], evening [18:00-22:00] and night [22:00-7:00] noise levels $L_{(A90,\ 15\ minutes)}$ and $L_{(Aeq,\ 15\ minutes)}$.

All sound pressure levels are rounded to the nearest whole decibel. All measurements were taken in accordance with the Australian Standards AS 1055 "Acoustics- Description and Measurements of Environmental Noise".

The measurement procedure and the equipment used for the noise survey are described below. All sound pressure levels are rounded to the nearest whole decibel. All sound level measurements and analysis carried throughout this report are carried with Svantek 977 Noise and vibration level meter – Serial Number Serial Number -92626- .

The Svantek 977 noise logger has the following features:

- Type 1 sound level measurements meeting IEC 61672:2002

- General vibration measurements (acceleration, velocity and displacement) and HVM meeting ISO 8041:2005 standard
- Three parallel independent profiles
- 1/1 and 1/3 octave real time analysis
- Acoustic dose meter function
- FFT real time analysis (1920 lines in up to 22.4 kHz band)
- Reverberation Time measurements (RT 60)
- Advanced Data Logger including spectra logging
- USB Memory Stick providing almost unlimited logging capacity
- Time domain signal recording
- Advanced trigger and alarm functions
- USB 1.1 Host & Client interfaces (real time PC "front end" application supported)
- RS 232 and IrDA interfaces
- Modbus protocol

The microphone was positioned at 1.5m from ground level. The machine was calibrated prior and after reading using our Svantek SV 33A S/N: 90200 class 1 Calibrator (No significant drift was recorded). Any readings affected by strong wind or rain have been disregarded. A Summary of those readings is presented in the table below:

Table 4.1- Results of Noise Readings on November 8th , 2021

November 8th, 2021	**Highest 10th Percentile $L_{(Aeq, 15 minutes)}$**	**Arithmetic Average $L_{(A90, 15 minutes)}$**
Day & Evening Time – 7:00am-10:00pm	61 dB(A) *	50dB(A)
Night & Early Morning Time – 10:00pm-7:00am	54 dB(A) *	40dB(A)

*+ 2.5 dB(A) is allowed for façade reflection.

5.0 BUILDING COMPONENT RECOMMENDATIONS

5.1 Windows/Sliders, Walls, Door & Roof

Building Component	*Rw Rating to be Achieved*
Windows & Sliding Doors in All Bedroom Areas of both dwellings are to be 10.38mm laminated type with full perimeter Fin Mohair woven brush acoustic seals (1)(2)(3).	**35**
Windows & Sliding Doors in Living/Dining/Kitchen Area and Rumpus Room are to be 6.38mm laminated type with full perimeter Fin Mohair woven brush acoustic seals (1)(2)(3).	**32**
Windows and Slider in all other non-habitable areas are to be unrestricted in accordance with Australian Standard AS 2047 (Windows in Buildings) (1)(2)(3).	**25**
External Doors are to be Solid Core with acoustic seals fitted around the door. A drop seal is required at the base of the external door (2).	**30-33**
External Walls (Ground Floor- First Floor) are to be 240 mm brick veneer/270 double brick construction construction with or any other method of wall construction with an Rw of 44(2)(3). **Single External Walls (First Floor-If any)** are to be Conventional timber stud-framed walls, clad externally with timber cladding on continuous 4mm ply bracing and internally with 13 mm thick plasterboard plus cavity filled with 75mm 11kg/m^3 insulation (2)(3). and internally with 13mm plasterboard plus cavity filled with 75mm thick, 11kg/m^3 insulation batts. (2)(3)	**50** **42**
Roof is to be Colorbond Steel Roofing on 13mm plasterboard ceiling with 75mm thick, 11kg/m3 insulation, in ceiling cavity (3).	**45-50**

NB: This report is to be read in conjunction with the BASIX certificate and any other related building specification. (1). No through weep holes in windows/sliders. (2) All gaps between window & door frames and the masonry walls are to be sealed using acoustic foam Hilti CP620 or similar. Glass wool batts should be applied prior to the application of the foam to seal larger gaps. (3) All gaps are to be acoustically sealed.

-*Glazing Notes -Leaks & Glazing Attenuation-**

- The Acoustic performance of a glazing system highly depends on the leaks around and within the glazing frame and façade. A double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 30 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, a double-glazing system with Rw of 40 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.

- A 10.38mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 29 (less than that of 6.38 mm glass) at a leak of 0.1 %. Moreover, 10.38m mm laminated glazing system with Rw of 35 will have its acoustic performance dropped to Rw of 20 (less than that of 3.0 mm float glass) at a leak of 1 % of the glazing area.

- A double-glazing system with Rw of 40, a 10.38m mm laminated glazing system with Rw of 35, and a 6.38 mm laminated glazing system with Rw of 32 will all attain almost the same Rw of around 20 (less than that of 3.0 mm float glass) at a leak of 1 % in the façade or a within/around the glazing system.

The graph below shows the actual transmission loss achieved inside a room with different glazing thicknesses relative to small leaks occurring along the window frame and façade.

- <u>A test report is to be provided from a recognized acoustic laboratory, verifying that the glazing system (glass, frame and seals) will meet the nominated sound rating required.</u>

6.0 SLEEP AROUSAL

Section 5.4 of the NSW Road Noise Policy mentions the Environment Protection Authority NSW 1999 guideline which aims at limiting the level of sleep disturbance due to environmental noise. It states that the $L_{A1,\ 1\text{-minute}}$ level of any noise should not exceed the ambient L_{AF90} noise level by more than 15dB. This guideline takes into account the emergence of noise events but does not directly limit the number of such events or their highest level, which are also found to affect sleep disturbance.

Applying the above thus the sleep disturbance criteria for the above project is $L_{A1,\ 1\ minute}$ and should not be exceeded by [L_{A90} = 40dB(A) –at mid night-plus 15] = 55 dB(A) on Henry Lawson Drive façade.

There are other studies on sleep disturbance like the one carried the enHealth Council (2004) and the guidelines published by the World Health Organisation (1999) were reviewed and analysed in terms of the guidance on noise exposure and sleep disturbance. The enHealth report states that:

'As a rule for planning for short-term or transient noise events, for good sleep over 8 hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) $L_{A,(Max)}$ *more than 10 or 15 times per night'.*

7.0 DISCUSSION & CONCLUSION

The construction of the proposed development at No. 742 Henry Lawson Drive Picnic Point if carried out as recommended in the plans and specifications and including the acoustic recommendations in Section 5.0 of this report, will meet the required internal noise levels as

required in Clause 102 of the State Environmental Planning Policy – (Infrastructure) 2007 and AS/NZS 2107 "*Acoustics – Recommended Design Sound Levels and Reverberation Time*s" and Canterbury Bankstown City Council conditions and requirements.

Should you require further explanations, please do not hesitate to contact us

Yours Sincerely,

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