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Traffic Noise Intrusion into Development at 28 Sugarmill Road Sapphire Beach

Report No.	M21170.01
Site:	28 Sugarmill Road, Sapphire Beach NSW
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SUMMARY

A new residential development lot is proposed at 28 Sugarmill Road, Sapphire Beach.

Traffic noise levels at the site of proposed dwellings were predicted based on noise contours published previously.

Based on those noise levels, no specific acoustic treatment is recommended other than the use of minimum Category 1 building elements (described in the Appendix).

CONTENTS

FIGURES

TABLES

1. INTRODUCTION

A new residential lot is proposed at 28 Sugarmill Road, Sapphire Beach. Council have advised that the lot is situated within the Pacific Highway Acoustic Buffer and traffic noise impacts on any proposed dwellings needs to be investigated in accordance with Clause 101 of the Infrastructure SEPP (2007) and the NSW Department of Planning Development Near Rail Corridors and Busy Roads – Interim Guideline (2008).

The Acoustic Buffer was determined using Matrix Thornton Report M15387 in which noise contours were published. Those contours were used to determine the noise impact at the site.

2. PURPOSE OF THE REPORT

Assessment procedures will include:

- Obtain noise data from Report M15387.
- Setting the appropriate limits in the rooms.
- Calculate noise intrusion using different glazing and construction materials.
- Recommend minimum glazing and ventilation requirements.
- Prepare a report on these findings acceptable to Council.

3. LOCATION

The site location is shown on in Figure 3-1.

Figure 3-1 Site Location

4. NOISE OBJECTIVES

State Environmental Planning Policy (*Infrastructure*) *2007* (SEPP) Clause 102 states the following with regard to road traffic noise impacts on non-road developments.

102: Impact of road noise or vibration on non-road development

(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 40,000 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 LAeq levels are not exceeded:

(a) in any bedroom in the building—35 dB(A) at any time between 10 pm and 7 am,
(b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.

The NSW Department of Planning *Development Near Rail Corridors and Busy Roads – Interim Guideline* gives guidelines for application of the SEPP, including the following:

The night-time 'sleeping areas' criterion is 5dBA more stringent than the 'living areas' criteria to promote passive acoustic design principles. For example, designing the building such that sleeping areas are less exposed to road or rail noise than living areas may result in less onerous requirements for glazing, wall construction and acoustic seals.

If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

Building Envelope Noise Reduction

The criteria detailed in the SEPP (Infrastructure) 2007 refer to internal noise levels.
Most buildings will achieve an internal noise level 10dBA below the external noise level with the windows open, without providing additional treatment.
Based on the SEPP criteria and the indication that the minimum noise reduction by a building façade, the mitigation requirements for various noise levels are given in Table 4-1. Note that all the external noise level criteria above refer to free-field noise levels.

Day time Noise – $L_{Aeq,\ 15hr}$ dBA	Night time Noise to Sleeping Areas– $L_{Aeq,\ 9hr}$ dBA	Mitigation Requirements
Up to 60	Up to 55	No Requirement
61-65	55-60	Mechanical Ventilation
>65	>60	Acoustic Design

Table 4-1 Acoustic Requirements

Note: Day is defined as 7.00am to 10.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.
Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.

5. TRAFFIC NOISE LEVELS ACROSS THE LOT

There are no details of the proposed subdivision at this stage. Therefore, we will calculate the worst noise impact at the site.

Matrix Thornton Report M15387 gives noise levels at 2m and 4.5m from ground level, representing the noise impact at ground floor rooms, and first floor rooms of any future dwellings. As we don't know which type of dwelling will be built, we will quote the results for ground floor and first floor rooms.

Based on that report the traffic noise levels at the most affected part of the site are predicted to be:

Daytime ground floor - $L_{Aeq,15hr}$ 55 dBA; and
Night time ground floor - $L_{Aeq,9hr}$ 52 dBA.

Daytime first floor - $L_{Aeq,15hr}$ 57 dBA; and
Night time first floor - $L_{Aeq,9hr}$ 53 dBA.

The worst case is for night time at 4.5m height.

Figure 5-1 shows the night time 4.5m contours published in Matrix Thornton Report M15387.

Figure 5-2 shows a close up of the same contour as it traverses the site.

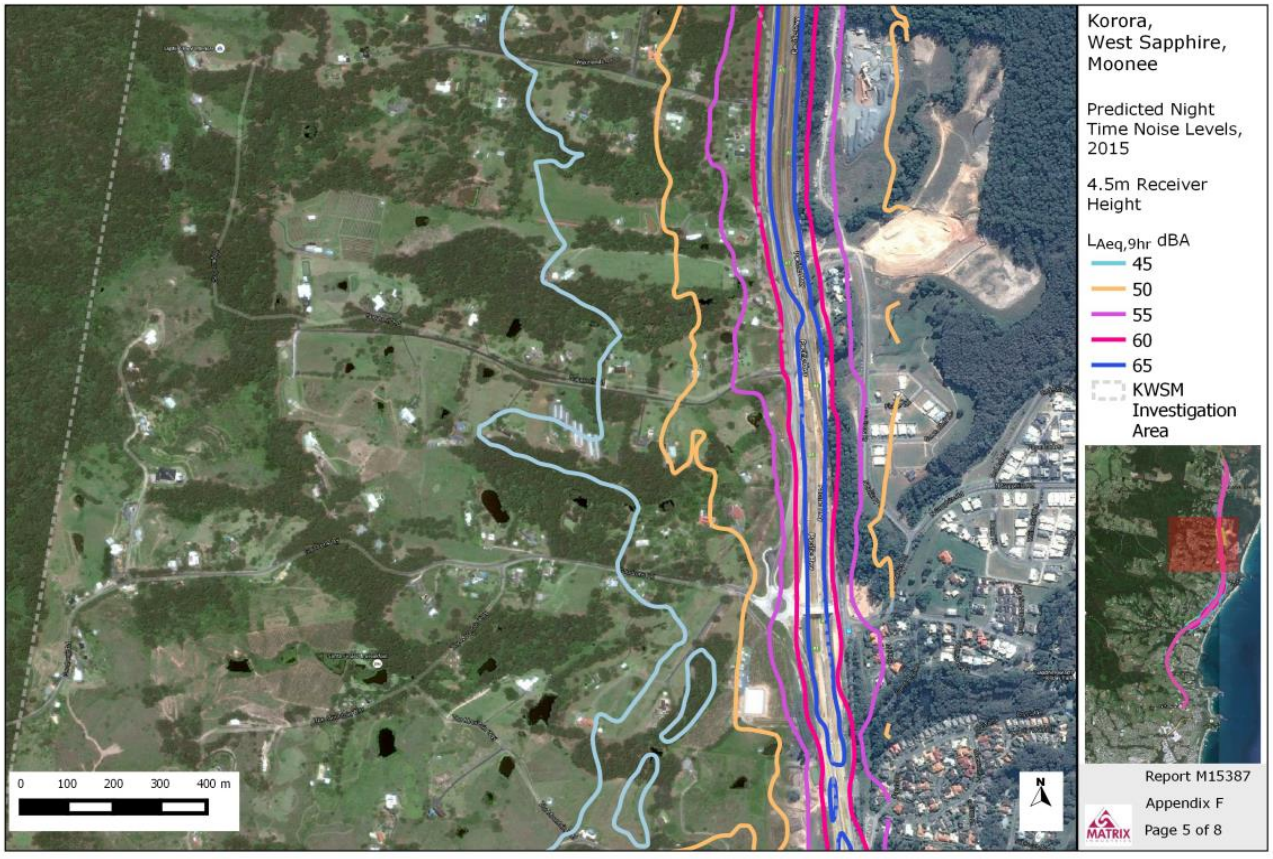

Figure 5-1 Night Time First Floor Noise Contours

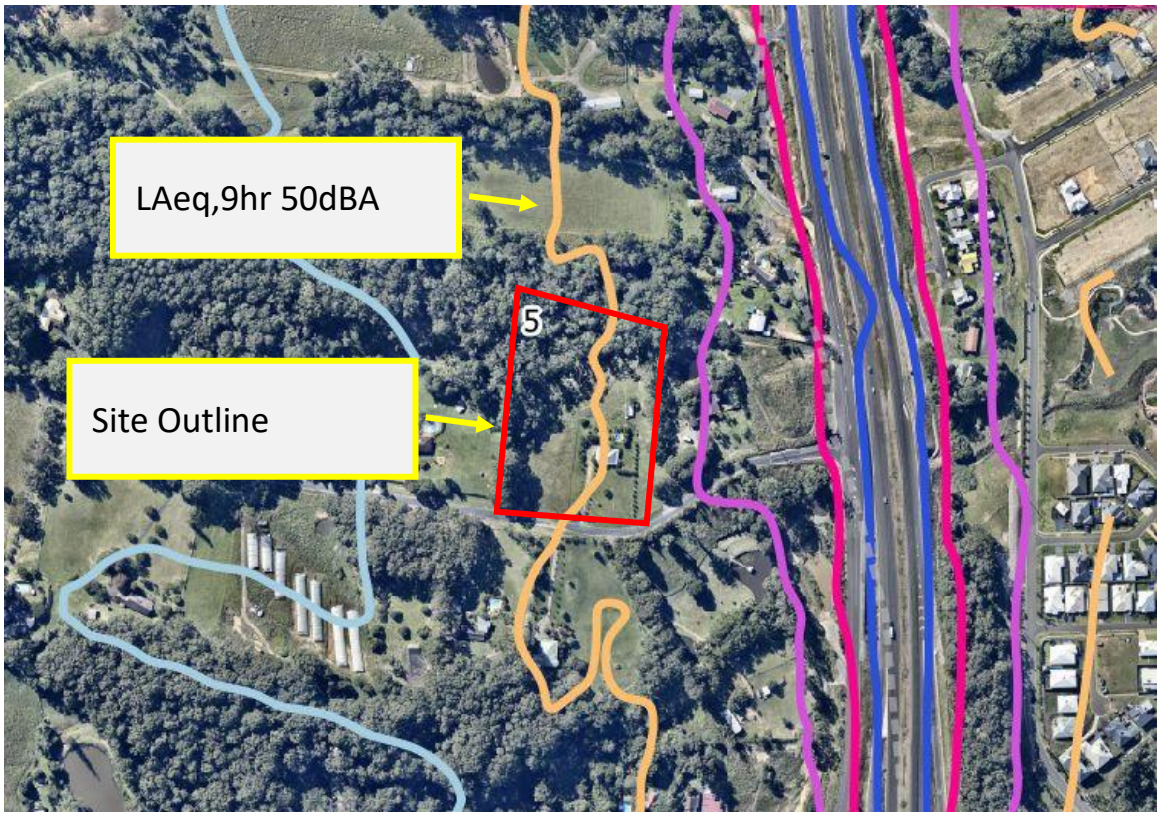

Figure 5-2 Night Time First Floor Noise Contours at Site

6. Assessment and Recommendations

As night time noise levels are predicted to be below 55dBA at all locations, and daytime levels are predicted to be below 60dBA, no acoustic design treatment is required to comply with the SEPP requirement. Standard building elements will be satisfactory as described below.

Building Element Categories

The guideline describes categories of building construction with increasing acoustic performance. At this site Category 1 constructions will be satisfactory. See Appendix B for a description of Category 1 building elements.

7. CONCLUSION

Traffic noise levels at the site of proposed dwellings were predicted based on noise contours published previously.

Based on those noise levels, no specific acoustic treatment is required for residential development at this lot.

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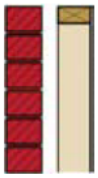
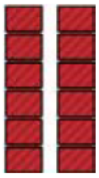
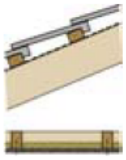
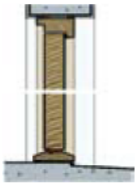
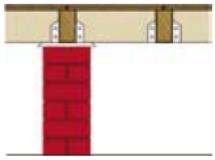
Acoustic Consultant
Chartered Professional Engineer

Appendix A: Glossary of Acoustic Terms

Assessment Period	The period in a day over which assessments are made.
dB(A)	Unit of sound level in A-weighted decibels. The A-weighting approximates the sensitivity of the human ear by filtering these frequencies. The dB(A) measurement is considered representative of average human hearing.
L_{Aeq}	The A-weighted equivalent continuous sound pressure level, used to quantify the average noise level over a time period.
L_{A10}	The A-weighted sound pressure level exceeded for 10% of the measurement period. It is usually used as the descriptor for intrusive noise level.
L_{A90}	The A-weighted sound pressure level exceeded for 90% of the measurement period. It is usually used as the descriptor for background noise level.
$L_{Aeq15min}$	Refers to the A-weighted energy averaged equivalent noise level over a 15 minute time period.
L_{Cpeak}	The highest instantaneous C-weighted sound pressure level over the measurement period. It is usually used for high impulsive noise.
L_{Amax}	The maximum A-weighted sound pressure level for the measurement period.
Loudness	A 3dB(A) change in sound pressure level is just noticeable or perceptible to the average human ear; a 5dB(A) increase is quite noticeable and a 10dB(A) increase is typically perceived as a doubling in loudness.
RBL	The overall single figure background level representing the assessment period over the whole monitoring period. For the short-term method of assessment, the RBL is the measured $L_{A90,\ 15min}$ value, or where a number of measurements have been made, the lowest $L_{A90,\ 15min}$ value.

Appendix B: Category 1 Building Elements

Category No.	Building Element	Standard Constructions	sample
1	**Windows/Sliding Doors**	Openable with minimum 4mm monolithic glass and standard weather seals	
	Frontage Facade	**Timber Frame or Cladding:** 6mm fibre cement sheeting or weatherboards or plank cladding externally, 90mm deep timber stud or 92mm metal stud, 13mm standard plasterboard internally	
		Brick Veneer: 110mm brick, 90mm timber stud or 92mm metal stud, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally	
		Double Brick Cavity: 2 leaves of 110mm brickwork separated by 50mm gap	
	Roof	Pitched concrete or terracotta tile or metal sheet roof with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R1.5 insulation batts in roof cavity.	
	Entry Door	35mm solid core timber door fitted with full perimeter acoustic seals	
	Floor	1 layer of 19mm structural floor boards, timber joist on piers	
		Concrete slab floor on ground