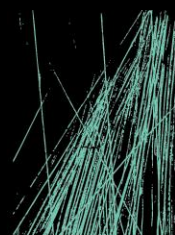




ACOUSTIC REPORT FOR DEVELOPMENT APPLICATION

75-77 FOAMCREST AVENUE

NEWPORT



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1 INTRODUCTION

JHA Consulting Engineers has been engaged by Richard Cole Architecture to provide an acoustic assessment for the proposed residential development located at 75-77 Foamcrest Avenue, Newport, NSW.

The proposal involves the demolition of existing buildings and construction of a new building with 7 premium residential units plus an associated underground carpark. An acoustic assessment has been undertaken and it is detailed in this report along with the findings and recommendations. It has been prepared as part of the Development Application to be submitted to the Northern Beaches Council.

The objectives of this acoustic assessment are:

- Identify the external noise and vibration sources that will potentially affect the proposed development.
- Carry out noise surveys to determine existing ambient and background noise levels on site plus external noise sources that will potentially affect the proposed development.
- Establish the appropriate noise level and vibration criteria in accordance with the relevant standards, guidelines and legislation for the following issues:
 - Noise emissions from mechanical plant from the development to the surrounding receivers.
 - Noise emissions from traffic generated by the proposed development.
 - Noise intrusion from Barrenjoey Road traffic.
- Carry out a preliminary acoustic assessment to determine whether the relevant criteria can be achieved and, where applicable, comment on noise control measures required to achieve compliance with the relevant noise level criteria.

This report provides:

- A statement of compliance with the relevant statutory criteria for the proposed use development within the vicinity of the nearest potentially affected receivers.
- Recommendations for noise mitigation measures for the proposed development in order to meet the relevant criteria when compliance is not achieved.

The following documentation has been used for the preparation of this report:

- Architectural drawings of the proposed development provided by Richard Cole Architecture.
- Noise data collected on site through the use of a noise logger and a hand held spectrum analyser.
- Traffic and parking impacts report by TEF Consulting.

This document and related work has been prepared following JHA Consulting Engineers Quality and Environmental Management Systems, which are based on AS/NZS ISO 9001:2015 and ISO 14001:2015 respectively.

2 DESCRIPTION OF THE PROPOSAL

Newport is a suburb on the Sydney's northern beaches in the local government area of Northern Beaches Council, being approximately 30km north of Sydney CBD. The site is located at 75-77 Foamcrest Avenue, Newport, NSW.

The proposed development is a two level building with 7 premium residential units (4 on ground floor and 3 on first floor) plus an associated underground carpark. Figure 1 shows proposed ground floor and first floor plans.



Figure 1: Ground floor and first floor plans of proposed development.

The site is located within a suburban residential environment, being characterised by medium levels of activity during the day. The surrounding buildings are residential, while commercial receivers are located one block further south of the Site. To the east is Newport Beach.

A summary of the nearest sensitive receivers surrounding the site location is shown in Table 1, including the approximate distances from the site boundary to receiver boundaries.

ID	Sensitive Receiver	Receiver Type	Distance (m)
1	79-83 Foamcrest Avenue	Residential	< 5
2	407 Barrenjoey Road	Residential	< 5
3	405 Barrenjoey Road	Residential	< 5
4	403 Barrenjoey Road	Residential	10
5	71 Foamcrest Avenue	Residential	18
6	73 Foamcrest Avenue	Residential	< 5
7	58 Foamcrest Avenue	Residential	18
8	60-62 Foamcrest Avenue	Residential	18

Table 1: Nearest sensitive receivers surrounding the site location.

Figure 2 shows the proposed site location and the nearest noise sensitive receivers as described in table above.



Figure 2: Aerial view of site showing the location of the proposed development site and residential receivers (green).

It is noted that if noise impacts associated with the proposed development are controlled at the nearest noise sensitive receivers, then compliance with the recommended noise criteria at all noise sensitive receivers will be achieved.

3 SITE MEASUREMENTS

3.1 GENERAL

Attended and unattended noise surveys were conducted in the locations shown in Figure 3 order to establish the ambient and background noise levels of the site and surrounds.

JHA Consulting Engineers carried out the surveys, in accordance with the method described in the 'AS/NZ 1055:2018 Description and measurement of environmental noise'.

The long term and short term noise monitoring locations are shown in Figure 3.



Figure 3: Long-term noise monitoring location (L1) and short-term noise monitoring location (M1).

3.2 LONG-TERM NOISE MONITORING

Long-term noise monitoring was carried out from Friday 6th November to Friday 13th November 2020 with a Rion NL-52 noise logger (Serial Number 01054192). The noise logger recorded L_{A1} , L_{A10} , L_{Aeq} and L_{A90} noise parameters at 15-minute intervals during the measurement period. The calibration of the noise logger was checked before and after use and no deviations were recorded.

The noise logger was located on the proposed development site – facing Foamcrest Avenue – as shown in Figure 3. The location was secured and is considered to be representative of the typical ambient and background noise levels.

The noise logger microphone was mounted 1.5 metres above the ground and a windshield was used to protect the microphone. Weather conditions were monitored during the unattended noise monitoring period.

The detailed results of the long-term noise monitoring are presented graphically in Appendix A. As stated in the NSW NPI, any data likely to be affected by rain, wind or other extraneous noise has been excluded from the calculations (shaded in the Appendix A graphs).

The Ambient Background Levels (ABLs) have been established in general accordance with the methodology described in the NSW NPI, i.e. 10th percentile background noise level (L_{A90}) for each period of each day of the ambient noise survey. The median of these levels is then presented as the RBLs (Rating Background Levels) for each assessment period.

These RBLs are shown in Table 2, together with the ambient noise levels (L_{Aeq}) measured for each period.

Location	Rating Background Levels, dB(A)			L_{Aeq} Ambient Noise Levels, dB(A)		
	Day	Evening	Night	Day	Evening	Night
	7am-6pm	6pm-10pm	10pm-7am	7am-6pm	6pm-10pm	10pm-7am
L1	44	41	37	56	51	51

Table 2: Results of long-term noise monitoring.

3.3 SHORT-TERM NOISE MONITORING

Short-term noise monitoring was carried out to obtain representative third-octave band noise levels of the site. One short-term noise monitoring location was chosen as representative.

On Friday 13th November 2020, short-term noise measurements were carried out during day-time. Short-term noise measurements were carried out with a NTI XL-2 hand-held Sound Level Meter (SLM) (Serial Number A2A-13742-E0). The calibration of the SLM was checked before and after each use and no deviations were recorded.

The SLM microphone was mounted 1.5 metres above the ground and a windshield was used to protect the microphone. Measurements were undertaken in the free-field – i.e. more than 3 metres away from any building façade or vertical reflective surface. Weather conditions were calm and dry during the attended noise monitoring.

A summary of the results of the short-term noise monitoring are shown in Table 3.

Location	Date and Time	Parameter	Sound Pressure Level, dB re 20μPa								
			Overall dB(A)	Octave Band Centre Frequency, Hz							
				63	125	250	500	1k	2k	4k	8k
M1	13/11/2020	L90,15min	47	54	47	45	41	41	38	32	25
	12:38pm – 12:53pm	Leq,15min	59	64	59	57	54	56	50	45	41
		L10,15min	60	65	59	57	53	57	51	44	40

Table 3: Results of short-term noise monitoring.

4 RELEVANT NOISE STANDARDS AND GUIDELINES

4.1 STANDARDS AND GUIDELINES

The following standards and guidelines are considered relevant to the project and have been referenced in developing the project noise level criteria.

- Regulatory Framework
 - Environmental Planning and Assessment (EP&A) Act 1979.
 - Protection of the Environment Operations (POEO) Act 1997.
- Planning Northern Beaches Council
 - Pittwater Council Local Environmental Plan (PW-LEP) 2014.
 - Pittwater Council Development Control Plan (PW-DCP) 2014.
- Noise Emissions
 - NSW EPA Noise Policy for Industry (NPI) 2017.
- Traffic Noise
 - Infrastructure State Environmental Planning Policy (ISEPP) 2007.
 - NSW DECC Road Noise Policy (RNP) 2011.
 - NSW DoP Development near Rail Corridors and Busy Roads – Interim Guideline 2008.

4.2 REGULATORY FRAMEWORK

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides the regulatory framework for the protection of the environment in NSW. The EP&A Act is relevantly about planning matters and ensuring that 'environmental impact' associated with the proposed development is properly considered and reasonable before granting development consent to develop.

The assessment of 'environmental impact' relies upon the identification of acceptable noise criteria which may be defined in a Development Control Plan, or derived from principles using guidelines like NSW EPA Noise Policy for Industry (NPI 2017) or Noise Guide for Local Government (NGLG 2013).

The Protection of the Environment Operations (POEO) Act 1997 has the objective to protect, restore and enhance the quality of the NSW environment. Abatement of noise pollution is underpinned by the definition of 'offensive noise' as follows:

"...

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or,

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.

..."

4.3 PLANNING NORTHERN BEACHES COUNCIL

Relevant planning documents of Northern Beaches Council Legislation have been reviewed for any noise requirement or criteria.

The Pittwater Council Local Environmental Plan (PW-LEP) is the environmental planning instrument that applies to the site. PW-LEP sets the Land Zoning of the site and surroundings as shown in Figure 4 – as per information extracted from PW-LEP map 6370_COM_LZN_017_010_20140623. The proposed development land category is Medium Density Residential (R3).

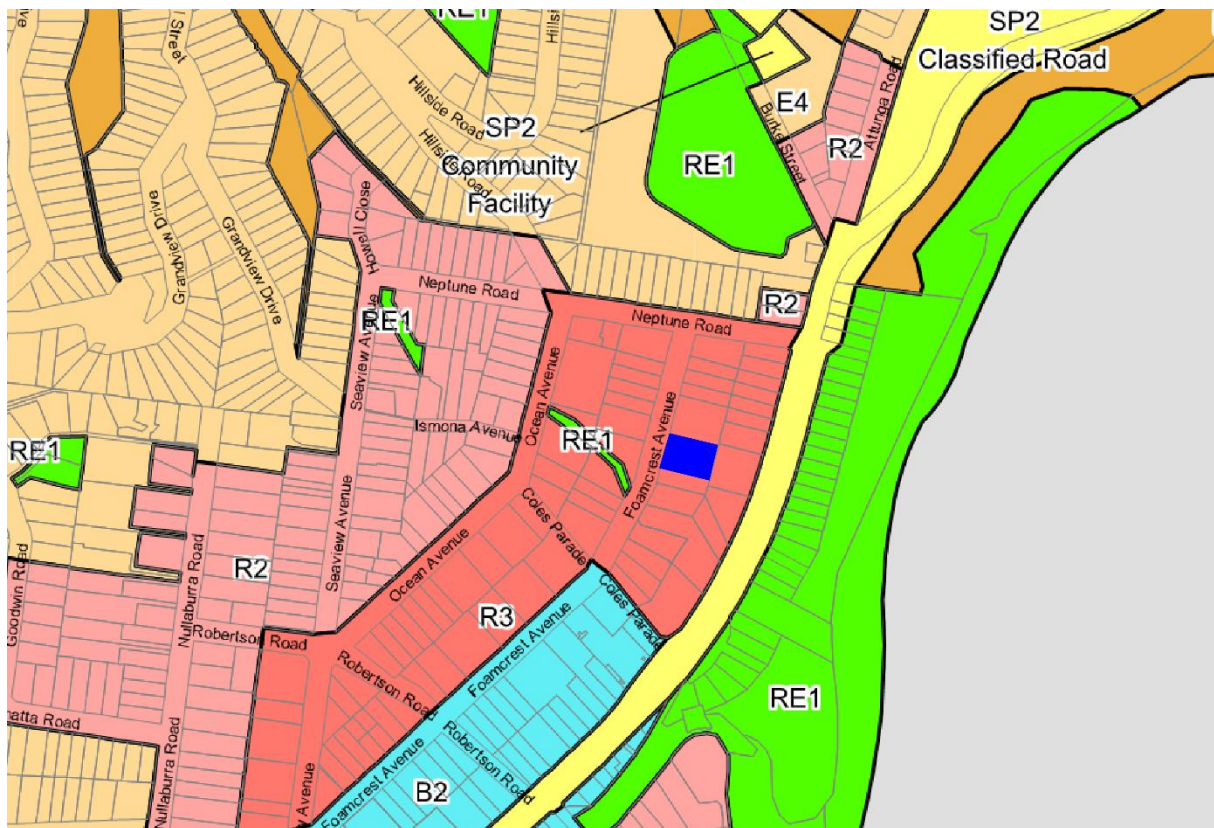


Figure 4: Land Zoning of the site (blue shading) and surroundings.

Section 4.4 of the Pittwater Council Development Control Plan (PW-DCP) provides the generic provisions for acoustic requirements as follows.

" ...

C1.6 Acoustic Privacy

Outcomes

- Noise is substantially contained within each dwelling and noise from any communal or private open space areas are limited.
- Noise is not to be offensive as defined by the Protection of the Environment Operations Act 1997, including noise from plant, equipment and communal or private open space areas.

Controls

- Noise-sensitive rooms, such as bedrooms, should be located away from noise sources, including main roads, parking areas, living areas and communal and private open space areas and the like.

- Walls and/or ceilings of dwellings that are attached to another dwelling/s shall have a noise transmission rating in accordance with Part F (5) of the Building Code of Australia. (Walls and ceilings of attached dwellings must also comply with the fire rating provisions of the Building Code of Australia).
- Noise generating plants including pool/spa motors, air conditioning units and the like shall not produce noise levels that exceed 5dBA above the background noise when measured from the nearest property boundary.

Developments must comply in all respects with the Protection of the Environment Operations Act 1997, and other relevant legislation.

..."

4.4 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW EPA Noise Policy for Industry (NPI) 2017 assesses noise from industrial noise sources - scheduled under the POEO. Mechanical noise from the development shall be addressed following the recommendations in the NSW NPI. The use of the noise monitoring procedures and background noise assessment methodology are commonly recommended by other relevant guidelines.

The assessment is carried out based on the existing ambient and background noise levels addressing the following:

- Intrusiveness Criteria, to control intrusive noise into nearby sensitive receivers.
- Amenity Criteria, to maintain the noise level amenity for particular land uses.

These criteria are established for each assessment period (day, evening and night) and the more stringent sets the Project Noise Trigger Level (PNTL's).

4.4.1 INTRUSIVENESS CRITERIA

The NSW NPI defines the intrusiveness criteria as follows:

"The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15 minute period, and does not exceed the background noise level by more than 5 dB when beyond a minimum threshold."

Based on the intrusiveness criteria definition and the estimated background noise levels on site, Table 4 shows the intrusiveness criteria for the noise sensitive receivers.

Indicative Noise Amenity Area	Period	Rating Background Level $L_{A90,period}$ dB(A)	Intrusiveness Criterion dB(A)
Medium Density Residential (R3)	Day	44	49
	Evening	41	46
	Night	37	42

Table 4: Determination of the intrusiveness criteria for residential noise sensitive receivers.

4.4.2 AMENITY CRITERIA

The NSW NPI states the following to define the amenity criteria:

"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance."

Based on the amenity criteria definition and the land zoning, Table 5 shows the amenity criteria for the noise sensitive receivers.

Indicative Noise Amenity Area	Period	Amenity Noise Level $L_{Aeq,period}$ dB(A)	Adjusted Amenity Criterion dB(A)
Medium Density Residential (R3)	Day	55	53 $L_{Aeq,15min}$ (55-5+3)
	Evening	45	43 $L_{Aeq,15min}$ (45-5+3)
	Night	40	38 $L_{Aeq,15min}$ (40-5+3)
Commercial (B2)	When In Use	65	63 $L_{Aeq,15min}$ (65-5+3)
Passive Recreation (RE1)	When in use	50	48 $L_{Aeq,15min}$ (50-5+3)

Table 5: Determination of amenity criteria for noise sensitive receivers.

4.4.3 PROJECT NOISE TRIGGER LEVELS

The PNTL's are shown in Table 6 and have been obtained in accordance with the requirements of the NSW NPI. These shall be assessed to the most affected point on or within the noise sensitive receiver boundary.

Indicative Noise Amenity Area	Period	Intrusiveness Criterion, $L_{Aeq,15min}$ dB(A)	Amenity Criterion, $L_{Aeq,15min}$ dB(A)
Medium Density Residential (R3)	Day	49	53
	Evening	46	43
	Night	42	38
Commercial (B2)	When In Use	---	63
Passive Recreation (RE1)	When in use	---	48

Table 6: Determination of PNTL's (light grey highlight) for noise sensitive receivers.

4.5 TRAFFIC NOISE

4.5.1 TRAFFIC NOISE GENERATED

The NSW DECC Road Noise Policy (RNP) establishes criteria for traffic noise from:

- Existing roads
- New road projects
- Road development projects
- New traffic generated by developments

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2.0dB above the existing noise levels. An increase of up to 2.0dB represents a minor impact that is considered barely perceptible to the average person.

In cases where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria.

4.5.2 TRAFFIC NOISE INTRUSION

The clauses 102 and 103 of the ISEPP refers to guidelines that must be taken into account when a development is adjacent to a freeway, a toll-way, a transit-way or a road with an annual average daily traffic volume (AADT) of more than 20,000 vehicles – busy road.

At this stage, as per NSW Roads & Maritime Services traffic volume data, Barrenjoey Road has an AADT higher than 20,000 vehicles. Therefore, clause 102 of the SEEP applies and the NSW DoP *'Development near Rail Corridors and Busy Roads – Interim Guideline'* shall be used to assess the noise impact to the proposed development.

As per Table 3.1 of the NSW DoP *'Development Near Rail Corridors and Busy Roads – Interim Guideline'*, the airborne noise traffic level from Barrenjoey Road shall not exceed 35dB(A) within the sleeping areas of the residential units during night-time (10pm to 7am) and 40dB(A) for other habitable rooms at any time.

Guidance on internal noise levels from traffic noise may be obtained from Australian Standard AS3671:1989 *'Acoustics – Road Traffic Noise Intrusion – Building sitting and construction'*.

5 NOISE IMPACT ASSESSMENT AND RECOMMENDATIONS

Based on the expected operations of the proposed development, the following items have been considered within the acoustic assessment:

- Noise emissions from mechanical plant from the development to the surrounding receivers.
- Noise emissions from traffic generated by the proposed development.
- Noise intrusion from Barrenjoey Road traffic.

The acoustic assessment has considered the following:

- Noise levels have been considered as continuous over assessment time period to provide the worst-case scenario.
- Distance attenuation, building reflections and directivity.
- Lowest measured background noise levels at the nearest noise sensitive receiver have been used to provide a worst-case scenario.

5.1 NOISE EMISSIONS FROM MECHANICAL PLANT

Noise from proposed development's mechanical plant should be controlled to ensure external noise emissions are not intrusive and do not impact on the amenity of the nearby noise sensitive receivers. External mechanical plant will consist in external condenser units serving individually to each apartment. The proposed location of the condenser units is in the south-east of the development underneath an undercroft as shown in Figure 5.



Figure 5: External mechanical plant location.

At this stage, final plant selections have not been made; therefore, it is not possible to undertake a detailed assessment. However, a preliminary review has been carried out for the mechanical plant and the following assumptions have been considered:

- Based on the proposed location of the mechanical plant, 79-83 Foamcrest Avenue will be the nearest noise sensitive receiver.
- It is noted that a typical 1,800mm fence will be located on the boundary of the proposed development and it is assumed a distance of approximately 4 metres from the external condenser units to the lot boundary.
- The most restrictive criteria is 38dB(A) at residential receivers during night-time period – refer to Table 6.
- Dimensions of the plantroom are approximately 8,600x1,250x1,000mm (WxDxH).

Mechanical plant will consist in 7 condenser units and the proposed preliminary selection is Daikin RXYMQ9AY1. Assumed sound pressure levels of the condenser units are shown in Table 7.

	Sound Pressure Level, dB re 20 μ Pa								
	Overall dB(A)	Octave Band Centre Frequency (Hz)							
		63	125	250	500	1000	2000	4000	8000
Daikin RXYMQ9AY1	58	58	60	56	54	54	48	42	33

Table 7: Assumed sound pressure levels (at 1 meter) of condenser units. Measured as per JIS Standard.

Based on the above, Table 8 shows the noise impact assessment of the external condenser units at the nearest residential receiver at 79-83 Foamcrest Avenue.

Calculation	Overall A-weighted noise level, in dB(A)
L_{Aeq} of 7 condenser units at 1 meter	67
Directivity, reflections, dB	3
Barrier Attenuation, dB	-17
Distance Attenuation, dB	-16
L_{Aeq} predicted at residential receiver	37
Noise level criteria night-time. Complies?	38 / Yes

Table 8: Predicted external mechanical plant noise impact at nearest residential receiver.

The predicted noise level indicates compliance of NSW NPI criteria is achieved. Acoustic assessment of all mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures. It shall be noted that the noise level emissions from the external mechanical plant cannot exceed the established PTNL's in Table 6.

5.2 TRAFFIC GENERATION NOISE

Noise impact of the traffic flows generated by the proposed development have to meet the NSW RNP criteria. At this moment, there is not traffic report for the development. As a conservative assessment we have assume the traffic flow of the development as follows.

Architectural drawings show 17 carpark spaces and we have assumed a minimum of 2 trips per vehicle/day, being 34 trips/day. This traffic flow can be stated as a low/minor traffic flow compared with the existing traffic flows in Foamcrest Avenue and Barrenjoey Road.

As noted in Section 4.5, when considering land use redevelopment and the impact on sensitive land uses (residential / schools / hospitals / recreational) the NSW Road Noise Policy (RNP) states that an increase up to 2.0dB in relation to existing noise levels is anticipated to be insignificant. Based on the carpark spaces and expected vehicle trips, the increase of traffic noise levels due to the proposed development is less than the maximum allowable increase of 2.0dB.

Therefore, the traffic increase due to the proposed development will not result in any noticeable change in traffic noise levels and is expected to meet the NSW Road Noise Policy recommendations.

5.3 TRAFFIC NOISE INTRUSION

Traffic noise from Barrenjoey Road will be the key noise source affecting to the proposed development. As per NSW Road & Maritime Services, Barrenjoey Road has an average annual daily traffic (AADT) higher than 40,000 vehicles per day. This information has been retrieved from NSW RMS traffic volume map number 12.

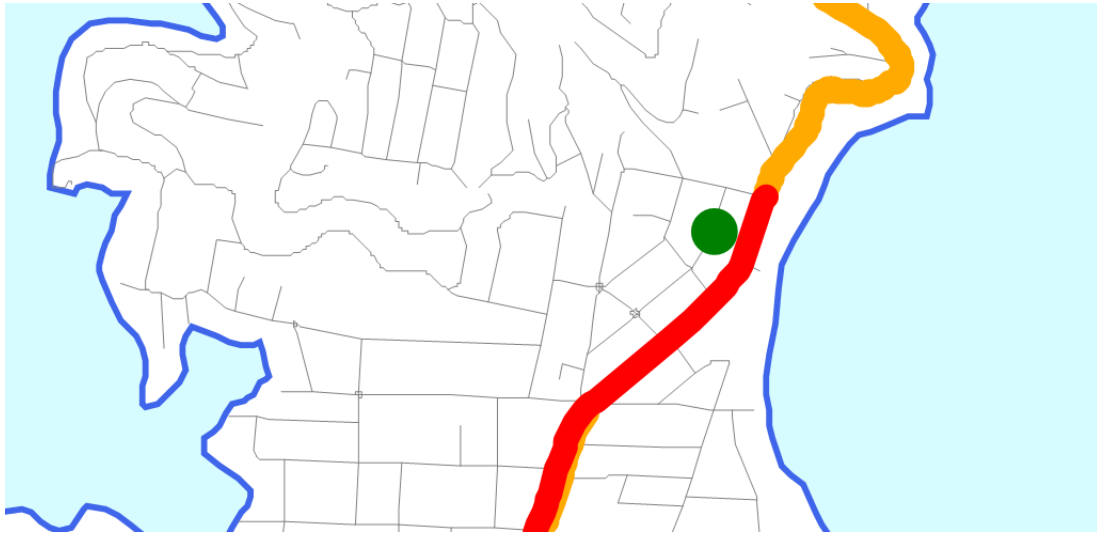


Figure 6: Excerpt of NSW RMS traffic volume map showing site (green dot) and surrounding roads.

East façade – most exposed to traffic noise – will not have a direct line-of-sight to the road as buildings on 403, 405 and 407 Barrenjoey Road will shield the building.

As per the unattended monitoring noise levels in Appendix A, traffic noise clearly dominates noise levels between 3.30am to 9.00pm, being the traffic noise levels steady with minimal fluctuations – approximately L_{Aeq} 55dB(A). Therefore, noise levels during night-time shoulder period between 3.30am and 7.00am are approximately L_{Aeq} 55dB(A). This noise level will be used to establish the minimum glazing requirements to achieve ISEPP noise level criteria.

To achieve the required internal noise levels within bedrooms during night-time period as per ISEPP, it is recommended that windows and glazed doors for the bedrooms shall achieve a minimum sound insulation performance of R_w32 . This sound insulation rating can be achieved with a 6.38mm laminated glazing, similar to proposed glazing by the *'Development near Rail Corridors and Busy Roads – Interim Guideline'* Appendix C.

Based on the above, we consider that traffic noise break-in will not be an issue if a typical façade design and nominated glazing are proposed. The acoustic performance of the façade is to be addressed further throughout detailed design.

6 SUMMARY AND CONCLUSIONS

A noise assessment has been carried out for the proposed residential development at 75-77 Foamcrest Avenue, Newport, NSW. This report forms part of the documentation package to be submitted to Northern Beaches Council as part of the Development Application.

This report establishes relevant noise level criteria, details the acoustic assessment and provides comments and recommendations for the proposed development.

Ambient and background noise surveys have been undertaken at the existing site to establish the appropriate noise criteria in accordance with the relevant guidelines.

The noise assessment has adopted methodology from relevant guidelines, standards and legislation to assess noise impact. The noise impacts have been predicted at the nearest noise sensitive receiver boundaries, taking in account distance attenuation, building reflections and directivity.

At this stage, a final mechanical plant selection has been made, therefore a detailed assessment has not been able to be carried out. A preliminary review has been carried out for the mechanical plant, and based on the composition, location and the most restrictive criteria, noise emissions from the external condenser units will achieve the NSW NPI noise level criteria.

Traffic noise impact due to the likely generated vehicle movements of the proposed development – based on the number of carpark spaces – is anticipated to be insignificant, as the noise levels will not increase more than 2dB at the nearby sensitive noise receivers.

A glazing with a R_w32 sound insulation rating (6.38mm laminated) is nominated in order to comply with ISEPP traffic noise requirements. The assessment has assumed noise levels from Barrenjoey Road, distance from the site to the road kerb, shielding from buildings in Barrenjoey Road. Traffic noise break-in will not be an issue if a typical façade design and nominated glazing are proposed.

The information presented in this report shall be reviewed if any modifications to the features of the development specified in this report occur, including and not restricted to selection of mechanical plant, modification to the building and the introduction of any noise sources.

Based on the information presented in this report, relevant objectives will be satisfied and therefore approval is recommended to be granted.

APPENDIX A: LONG TERM NOISE MONITORING

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_{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.

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.

