



Operational Noise Emission Assessment

Proposed Martial Arts Studio

2/374-378 Sydney Rd, Balgowlah, NSW



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8 March 2021



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GLOSSARY

NOISE

Noise is produced through rapid variations in air pressure at audible frequencies (20 Hz – 20 kHz). Most noise sources vary with time. The measurement of a variable noise source requires the ability to describe the sound over a particular duration of time. A series of industry standard statistical descriptors have been developed to describe variable noise, as outlined in Section 2 below.

NOISE DESCRIPTORS

dB – Decibels. The fundamental unit of sound, a Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell. Probably the most common usage of the Decibel in reference to sound loudness is dB sound pressure level (SPL), referenced to the nominal threshold of human hearing. For sound in air and other gases, dB(SPL) is relative to 20 micropascals (μPa) = 2×10^{-5} Pa, the quietest sound a human can hear.

L_{Aeq} – The A-weighted sound pressure level averaged over the measurement period. It can be considered as the equivalent continuous steady-state sound pressure level, which would have the same total acoustic energy as the real fluctuating noise over the same time period. Measured in dB.

L_{Amax} – The maximum or peak A-weighted noise level that occurs over the measurement period. Measured in dB.

Indoor Design Level – The recommended maximum level in dB(A) inside a building from external noise sources.

A-WEIGHTING

"A-weighting" refers to a prescribed amplitude versus frequency curve used to "weight" noise measurements in order to represent the frequency response of the human ear. Simply, the human ear is less sensitive to noise at some frequencies and more sensitive to noise at other frequencies. The A-weighting is a method to present a measurement or calculation result with a number representing how humans subjectively hear different frequencies at different levels.

NOISE CHARACTER, NOISE LEVEL AND ANNOYANCE

The perception of a given sound to be deemed annoying or acceptable is greatly influenced by the character of the sound and how it contrasts with the character of the background noise. A noise source may be measured to have only a marginal difference to the background noise level, but may be perceived as annoying due to the character of the noise.

Acoustic Dynamics' analysis of noise considers both the noise level and sound character in the assessment of annoyance and impact on amenity.

1 INTRODUCTION

1.1 SUMMARY

Acoustic Dynamics is engaged by **Turnbull Planning International on behalf of Ms Ashley Ainsworth and Mr Fabricio Ainsworth** to assess noise emission resulting from operation of the proposed Martial Arts Studio (Jiu Jitsu Academy), located at Shop 2, 374-378 Sydney Rd, Balgowlah, NSW.

This document provides an assessment of noise emission levels at nearby receivers resulting from various noise sources associated with the proposed studio. This assessment is prepared in accordance with the various acoustic assessment requirements of Northern Beaches Council, the NSW Environmental Protection Authority (EPA) and relevant Australian Standards.

1.2 LOCATION & DESCRIPTION OF SUBJECT SITE

The proposal is for a martial arts studio to be located at Shop 2, 374-378 Sydney Rd, Balgowlah, NSW. The primary noise source associated with the studio includes the members/patrons involved in group fitness classes. It is understood that no music or PA system will be provided within the internal areas of the studio.

Acoustic Dynamics understands that Council has requested an acoustic assessment be undertaken of the proposed operation of the studio to confirm that nearby sensitive receivers will not be adversely affected by the operation of the subject studio.

There will be no parking spaces provided within the building for studio members/patrons, and access to the studio will be through the entrance off Totem Lane.

The proposed hours of operation are as follows:

- Weekdays: 6:00am to 8:00pm; and
- Weekends: 8:00am to 12:00pm.

The expected number of students/members at any given time is capped at 25 attendees, as part of small group classes of 45 mins in duration.

With regard to acoustical assessment, the nearest sensitive receivers are as follows:

- Residential receivers above (within the same building as) the proposed studio;
- Residential receivers located on the first floor of the adjacent building; and
- Commercial receivers on the same level within the same building as the subject site.

The subject building and the surrounding area is shown in the Location Map, Aerial Image and Drawings presented within **Appendix A**.

1.3 SCOPE

Acoustic Dynamics has been engaged to provide an acoustic assessment suitable for submission to the Northern Beaches Council.

The scope of the assessment is to include the following:

- Review of legislation, Council criteria and Australian Standards relevant to the internal noise emission at the subject site;
- Travel to site to conduct inspections and testing;
- Conduct noise monitoring to establish background noise levels at a location representative of the most affected sensitive receiver;
- Examination of architectural drawings; and
- Prediction of likely noise emission associated with the subject site.

2 ASSESSMENT CRITERIA AND STANDARDS

Acoustic Dynamics has conducted a review of the local council, state government and federal legislation that is applicable to noise assessment for the subject site. The relevant sections of the legislation are presented below. The most stringent criteria which have been used in the assessment of the subject site are summarised below.

2.1 NORTHERN BEACHES COUNCIL

2.1.1 LOCAL ENVIRONMENT PLAN

A review of the Manly Local Environment Plan (LEP) 2013 was conducted. No relevant acoustic requirements or noise criteria were presented within the LEP.

2.1.2 DEVELOPMENT CONTROL PLANS

A review of the Manly Development Control Plan (DCP) 2013 was conducted. No relevant acoustic requirements or noise criteria were presented within the DCP.

2.2 NSW EPA'S NOISE POLICY FOR INDUSTRY

The EPA, in its Noise Policy for Industry (NPfI) document published in October 2017, outlines and establishes noise criteria for industrial or other noise sources in various zoning areas.

Acoustic Dynamics advise that the following criteria have been applied for the assessment of the operational noise associated with the subject commercial development.

Project Intrusiveness Noise Level

The intrusiveness noise level is determined as follows:

$L_{Aeq, 15min}$ = rating background noise level + 5 dB	
where:	
$L_{Aeq, 15min}$	represents the equivalent continuous (energy average) A-weighted sound pressure level of the source over 15 minutes.
and	
Rating background noise level	represents the background level to be used for assessment purposes, as determined by the method outlined in Fact Sheets A and B.

Project Amenity Noise Level

The recommended amenity noise levels represent the objective for **total** industrial noise at a receiver location, whereas the **project amenity noise level** represents the objective for a noise from a **single** industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows:

Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB(A)
--

The NPfI provides exceptions to the above method to derive the project amenity noise level. Exception 4 states:

“Where cumulative industrial noise is not a necessary consideration because no other industries are present in the areas, or likely to be introduced into the area in the future. In such cases the relevant amenity noise level is assigned as the project amenity noise level for the development.”

The **Project Noise Trigger Level** is the lowest value of Project Intrusiveness Noise Level or Project Amenity Noise Level after conversion to L_{Aeq} equivalent value.

To establish the acoustic environment at the subject site in accordance with the guidelines of the NSW EPA's NPfI, unattended noise logging was conducted on the back balcony of the subject site. Acoustic Dynamics advises the measurement location was representative of the existing noise environment of the nearest sensitive receivers. The prevailing weather conditions during the unattended noise monitoring were generally calm and did not influence the noise

measurements taken. Operator-attended background noise measurements were undertaken on site to supplement unattended background noise monitoring data collected.

The results of the unattended noise monitoring are presented graphically in **Appendix B**. Following the general procedures outlined in the EPA's NPfI, a summary of the established noise environment, and relevant environmental noise criteria is presented in **Table 2.1**.

Acoustic Dynamics advises that the assessment of the proposed development has been based on the **lowest** background noise levels in the area during typical **maximum** use and operation of the site. Acoustic Dynamics advises that such an assessment is conservative and will ensure no loss of amenity to the nearby residential receivers.

Table 2.1 Summary of External Measured Noise Levels & Most Stringent Criteria

Location	Time of Day	Measured RBL (L_{A90}) [dB]	Measured L_{Aeq} Noise Level [dB]	Project Intrusive Noise Level $L_{Aeq,15min}$ [dB]	Project Amenity Noise Level $L_{Aeq,15min}$ [dB] ³	Project Noise Trigger Level $L_{Aeq,15min}$ [dB]
Nearest residential receiver(s)	Daytime (7am ² to 6pm)	52	63	57	58	57
	Evening (6pm to 10pm)	50	56	55	48	48
	Night-time (10pm to 7am ²)	48	56	53	43	43
	Morning Shoulder (6am to 7am)	N/A	N/A	N/A	N/A	50

Note: 1) Acoustic Dynamics advises that the proposed studio will be open 6:00am – 8:00pm on weekdays, and 8:00am to 12pm on weekends.
 2) 8am on Sundays and public holidays.
 3) Amenity adjustment based on “Urban” receiver type (Table 2.3 of the NPfI). The noise emission objective has been modified in accordance with the recommendations detailed within the NPfI Section 2.2, for time period standardising of the intrusiveness and amenity noise levels ($L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq, period} + 3$ decibels (dB)).

For premises to which it applies, the NPfI noise criteria for the assessment of noise emission from industrial noise sources at the boundaries of nearby commercial premises are reproduced from Table 2.1 of the NPfI and presented as **Table 2.2**.

Table 2.2 – Recommended L_{Aeq} Noise Levels – Commercial

Type of Receiver	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level $L_{Aeq,15min}$ [dB] ¹
Commercial premises	All	When in use	68

Note 1) Amenity adjustment based on “Commercial” receiver type (Table 2.3 of the NPfl). The noise emission objective has been modified in accordance with the recommendations detailed within the NPfl Section 2.2, for time period standardising of the intrusiveness and amenity noise levels ($L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq, period} + 3$ decibels (dB)).

The EPA’s NPfl specifies additional noise emission level corrections that should be applied when a noise source is determined to include “modifying factors” that can vary the perceived intrusiveness of a noise source. Such modifying factors include tonal, low frequency, impulsive, or intermittent noise.

Although the NPfl does not apply for the assessment of noise emission from the subject development, Acoustic Dynamics advises that achieving compliance with the NPfl intrusive noise emission objectives applicable at the boundaries of the nearest non-residential premises will adequately protect the acoustic amenity of these receivers.

2.2.1 THE EPA’S SLEEP DISTURBANCE CRITERION

Acoustic Dynamics advises that sleep disturbance is a complex issue and the potential for sleep disturbance to occur depends on both the level of noise at a residential receiver and the number of events that occur.

The EPA has in the past investigated overseas and Australian research on sleep disturbance. The method of assessing noise for sleep disturbance relies on the application of a screening that indicates the potential for this to occur. The EPA’s Noise Guide for Local Government, provides the following guidance for such a screening test:

“Currently, there is no definitive guideline to indicate a noise level that causes sleep disturbance and more research is needed to better define this relationship. Where likely disturbance to sleep is being assessed, a screening test can be applied that indicates the potential for this to occur. For example, this could be where the subject noise exceeds the background noise level by more than 15 dB(A). The most appropriate descriptors for a source relating to sleep disturbance would be $L_{A1(1\text{ minute})}$ (the level exceeded for 1% of the specified time period of 1 minute) or L_{Amax} (the maximum level during the specified time period) with measurement outside the bedroom window.”

Additionally, the guidelines of the NSW EPA’s NPfl provide the following additional information:

“Where the subject development/premises night-time noise levels at a residential location exceed:

- *$L_{Aeq,15min}$ 40dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is greater*

Further to the above information, the following summarizes the sleep disturbance criterion:

$$L_{Amax} \text{ or } L_{A1(1 \text{ minute})} < L_{A90} + 15 \text{ dB or } 52 \text{ dB(A), whichever is greater}$$

In addition to the above, the EPA has published the following additional information relating to findings of significant research carried out for sleep disturbance:

“Maximum internal noise levels below 50-55 dBA are unlikely to cause awakening reactions... One or more noise events per night, with maximum internal noise levels of 65-70 dBA, are not likely to affect health and wellbeing significantly.”

Conservatively based on an assumed minimum ambient background noise level determined for the morning shoulder period within **Table 2.1**, the following sleep disturbance screening criterion was determined for the residential receivers with windows open:

$$\text{Sleep Disturbance Criterion} = \underline{65 \text{ dB(A)}}$$

2.3 THE EPA'S ROAD NOISE POLICY

The NSW Environmental Protection Authority (EPA) presents guidelines for assessment of road traffic noise in its Road Noise Policy (RNP). The document provides road traffic noise criteria for proposed road as well as other developments with the potential to have an impact in relation to traffic noise generation. **Table 3.3** presents the relevant RNP noise criteria for the subject development site.

Table 2.3 Road Traffic Noise Assessment Criteria for Residential Land Uses

Road category	Type of project / land use	Assessment Criteria [dB]	
		Day (7am – 10pm)	Night (10pm – 7am)
Local Roads	6. Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq, (1 \text{ hour})}$ 55 (external)	$L_{Aeq, (1 \text{ hour})}$ 50 (external)

2.4 RELEVANT AUSTRALIAN STANDARDS

2.4.1 AS 2107 – “ACOUSTICS – RECOMMENDED DESIGN SOUND LEVELS ...FOR BUILDINGS”

Australian Standard 2107-2016 recommends satisfactory and maximum design sound levels for various types of occupancy within buildings. AS 2107 recommends the following satisfactory and maximum design sound levels, detailed in **Table 2.4**, for the relevant types of occupancies and areas which are likely to be located adjacent to the studio:

Table 2.4 – Recommended Design Sound Levels for Different Areas of Occupancy in Buildings (Extract from Australian Standard 2107 Table 1)

Item	Type of Occupancy / Activity	Design sound level ($L_{Aeq,t}$) range [dB]	Design reverberation time (T) range, s
7	RESIDENTIAL BUILDINGS (see Note 5 and Clause 5.2) ²		
	Houses and apartment in inner city areas or entertainment districts or near major roads –		
	Living areas	35 to 45	–
	Sleeping areas (night time)	35 to 40	–
	Houses and apartment in suburban areas or near minor roads –		
	Living areas	30 to 40	
	Sleeping areas (night time)	30 to 35	
8	SHOP BUILDINGS		
	Small Retail stores (general)	<50	See Note 1 ¹
	Speciality shops (where detailed discussion is necessary in transactions)	<45	See Note 1 ¹

Note: 1) Reverberation time should be minimized for noise control.

2) **Clause 5.2 Design sound levels and expectations of quality states:**

“The design sound levels give in Table 1 are not necessarily appropriate in all circumstances. In particular, lower sound levels may be appropriate in quiet environments or where expectations of quality are high. For example, lower design sound levels than those given in Table 1 may be preferred for luxury hotels and apartments. However, additional costs will be incurred in achieving sufficient sound attenuation between spaces for acoustic privacy requirements. For each 5 dB reduction in the background sound level, 5 dB shall be added to the overall sound isolation performance of the dividing elements to maintain the same level of privacy. There could also be additional costs associated with the provision of quieter building services.”

Acoustic Dynamics advises that any levels of airborne noise or regenerated noise transmitted into the tenancies adjacent to the proposed studio should not exceed the relevant maximum

design sound levels presented in **Table 2.4** above. By ensuring the noise levels from the studio received within the adjacent tenancies do not exceed the above recommended maximum internal design level, it is likely to ensure occupants of the adjacent tenancies are not adversely affected by the use and operation of the proposed studio.

3 INSTRUMENTATION & MEASUREMENT STANDARDS

All measurements were conducted in general accordance with Australian Standard 1055.1-1997, “Acoustics – Description and Measurement of Environmental Noise Part 1: General Procedures”. Acoustic Dynamics’ sound measurements were carried out using precision sound level meters conforming to the requirements of IEC 61672-2002 “Electroacoustics: Sound Level Meters – Part 1: Specifications”. The survey instrumentation used during the survey is set out in **Table 3.1**.

Table 3.1 – Noise Survey Instrumentation

Type	Serial Number	Instrument Description
2270	2664115	Brüel & Kjaer Modular Precision Sound Level Meter
4189	2385698	Brüel & Kjaer 12.5 mm Prepolarised Condenser Microphone
4230	623588	Brüel & Kjaer Acoustic Calibrator
Ngara	878067	ARL Ngara Type 1 Environmental Noise Logger

The reference sound pressure level was checked prior to and after the measurements using the acoustic calibrator and remained within acceptable limits.

4 ASSESSMENT

The following subsections provide an assessment of the proposed studio against the various noise emission criteria and objectives outlined in **Section 2** above.

4.1 OPERATIONAL NOISE EMISSION TO RECEIVERS (EXTERNAL)

Based on the site visit, previous experience and the drawings and information provided by the proponent, Acoustic Dynamics has conservatively undertaken modelling and calculations to predict the likely **maximum** $L_{Aeq,15min}$ internal noise levels at the nearest residential and commercial receivers resulting from the following **assumed** noise sources and activities:

- ❑ The provision of group fitness classes and personal training. This would involve students participating in Jui Jitsu training exercises on custom matting. The staff would be providing verbal instruction (raised voices at various times);
- ❑ The egress of patrons (calculations based on the conservative assumption of a maximum of 25 patrons in a 15-minute period during the daytime, evening and morning-shoulder hours);

- ❑ A typical maximum number of 25 patrons concurrently using the proposed studio and its equipment within any 15-minute assessment period; and
- ❑ The arrival and departure of patron vehicles along surrounding local roads, utilising the street parking available in the vicinity of the studio. A maximum of 50 vehicle movements within a 1-hour period is conservatively assumed, during the operation of the proposed studio.

The calculated maximum noise emission levels at the nearest external receiver locations and the relevant noise emission criteria are presented in **Table 4.1** below. It is advised that by achieving compliance with the nearest residential and commercial receiver locations, compliance will also be achieved at all other receiver locations further away.

Table 4.1 Maximum External Noise Emission Levels & Relevant Criteria – Nearest External Receivers

Receiver Location	Assessment Description & Period	Noise Source	Maximum $L_{Aeq(15min)}$ Noise Emission Level [dB]	Noise Emission $L_{Aeq(15min)}$ Criterion [dB]	Complies with Criteria?
Unit directly above balcony	Morning-shoulder (6am to 7am) ¹	All sources associated with the Martial Arts Studio ²	28	50	Yes
Unit above front door			36		Yes
Unit across Totem Lane			42		Yes
Commercial Receivers Adjacent	When in use		54	68	Yes

Note: 1) Acoustic Dynamics advises that by achieving compliance with the more stringent morning-shoulder criteria, compliance will also be achieved with the less stringent daytime and evening criteria.
 2) Cumulative noise emission from the use and operation of the studio and egress of members/students

The predicted noise emission levels presented above in **Table 4.1** include allowances for relevant distance, direction and shielding losses. Acoustic Dynamics advises that the above calculated noise emission levels are conservatively based on the maximum source noise levels and capacity operations (i.e. worst-case scenario) at the proposed studio. Acoustic Dynamics advises that such a scenario is unlikely to occur for the majority of the time.

Acoustic Dynamics also advises that the calculated L_{A1} noise emission from all studio-related activities achieves compliance with the EPA's sleep disturbance screening criterion during morning-shoulder hour of $L_{A1(1min)} \leq 65 \text{ dB}$. It is advised that by achieving compliance with the nearest residential receiver location, compliance will also be achieved at all other residential receiver locations further away.

Acoustic Dynamics advises that the above calculated noise emission levels are conservatively based on the maximum source noise levels and maximum capacity operations (i.e. worst case scenario) at the proposed Martial Arts Studio. Acoustic Dynamics advises that such a scenario is unlikely to occur for the majority of the time.

Based on the results of Acoustic Dynamics' noise modelling and calculations, we advise that the predicted maximum noise emission associated with the use and operation of the proposed development will comply with the relevant noise emission criteria.

4.2 OPERATIONAL NOISE EMISSION TO RECIEVERS (INTERNAL)

Acoustic Dynamics has conservatively undertaken modelling and calculations to predict the potential **maximum** L_{Aeq} internal reverberant noise level within the residential receiver's unit directly above resulting from the following noise assumed cumulative noise from within the subject martial arts studio:

- Internal Reverberant Sound Pressure Level of **75 dB(A)**;

The noise levels within the residential receiver unit due to the studio activity are presented below in **Table 4.3**.

Table 4.3 Maximum Internal Noise Emission Levels & Relevant Criteria – Nearest Internal Receivers

Receiver Location	Noise Source	Maximum calculated L_{Aeq} Noise Emission Level [dB]	AS 2107 L_{Aeq} Noise Level Objective [dB]	Complies with Criterion?
Residential Receiver directly above	All sources associated with the Martial Arts Studio ¹	25	30 ²	Yes

Note 1) Cumulative noise emission from the use and operation of the studio and egress of members/student
 2) Acoustic Dynamics has used the most stringent criteria, being the night time (sleeping areas) detailed in **Table 2.4**, to demonstrate compliance can be achieved, for the residential receivers and all other commercial receivers.

Acoustic Dynamics advises that the above calculated noise emission levels are conservatively based on the maximum source noise levels and maximum capacity operations (i.e. worst-case scenario) at the proposed studio. Acoustic Dynamics advises that such a scenario is unlikely to occur for the majority of the time.

4.3 ROAD TRAFFIC NOISE EMISSION

Acoustic Dynamics has conducted an analysis of road traffic noise due to off-site car movements resulting from the proposed studio. The results are attached below in **Table 4.3**.

Table 4.3 Maximum Road Traffic Noise Emission Levels & Criteria for Residential Receivers

All Residential Receivers	Noise Source	Quietest Period Source Operates	Calculated Maximum $L_{Aeq}(1 \text{ hour})$ Noise Level [dB]	Relevant Criterion $L_{Aeq}(1 \text{ hour})$ [dB]	Complies With Criteria?
Residential receivers on Sydney Road	Off-site car movements	Morning-shoulder (6am to 7am) ¹	31	50	Yes

Based on the results of Acoustic Dynamics' noise modelling and calculations, we advise that the predicted maximum road traffic noise associated with the use and operation of the proposed development will comply with the relevant noise emission criteria.

5 RECOMMENDATIONS & ADVICE

5.1 RECOMMENDED MANAGEMENT PLAN

Acoustic Dynamics' calculations and analysis indicate that all noise emission associated with the use and operation of the proposed studio is likely to achieve compliance with the various relevant noise emission criteria. Nevertheless, we provide the following recommendations that should be incorporated into the proposed studio to ensure noise emission is adequately managed and minimised during operation of the studio.

We recommend a management plan incorporating measures to protect the acoustic amenity of the surrounding area be implemented by the proprietor. Such a management plan should outline policies and procedures to ensure noise emission from patrons at the proposed studio are kept to a minimum, including:

- 1) Ensuring the glass windows/doors of the proposed studio are kept closed at all times (other than when patrons enter and exit the premises);
- 2) The erection of clear signage at all studio entries and exits advising patrons that they must not generate excessive noise when entering and leaving the premises;
- 3) Staff monitoring the behaviour of patrons within the subject premises and patron ingress/egress to ensure noise emission of patrons is kept to a minimum when entering and leaving the premises;
- 4) The use of weights, medicine balls, slam balls (or equivalent equipment, such as those used in commercial gyms) are not permitted to be used within the studio;

- 5) Restricting the use of low frequency speakers (sub-woofers) and ensuring any full range speakers are isolated from building services. Furthermore, if any full range speakers are to be installed and used, ensure that the internal noise level from music does not exceed $L_{Aeq (15min)}$ **75 dB**. Note is made that the maximum internal reverberant sound pressure level can be set to ensure the adjacent receivers are not adversely affected by the operation of the subject studio, following the fit-out of the premises and the installation of the speaker system; and
- 6) Installation of specific martial arts mats (6cm thick, 40kg/m³ roll out matting) in the training area to reduce the regenerated noise and vibration in areas of the studio where high levels of impact are expected. Acoustic Dynamics notes that the client already intends to install such mats.

Acoustic Dynamics advises that incorporation of the above recommendations will ensure that noise emission associated from the use and operation of the proposed studio is likely to comply with the relevant noise emission criteria and not adversely impact nearby receivers.

6 CONCLUSION

Acoustic Dynamics has conducted an acoustic assessment of the noise emission resulting from the use and operation of the proposed Martial Arts Studio (Jiu Jitsu Studio) located at Shop 2, 374-378 Sydney Rd, Balgowlah.

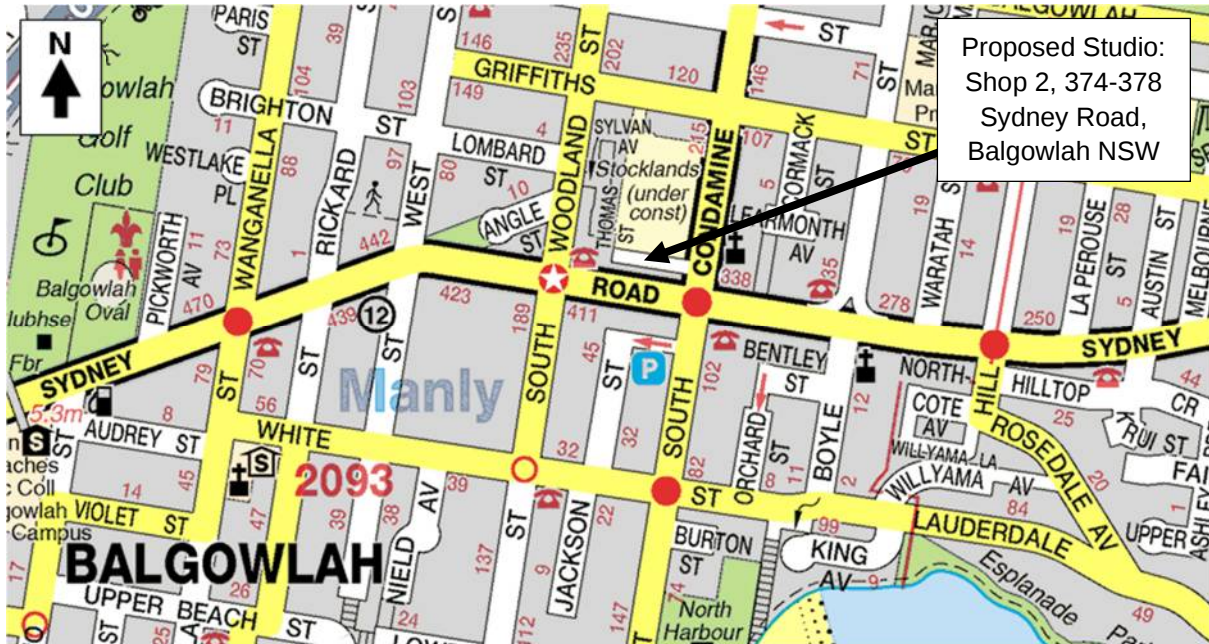
Acoustic Opinion

Further to the noise monitoring and measurements conducted, our review of the relevant acoustic criteria and requirements and our calculations, Acoustic Dynamics advises that the proposed studio development, with the incorporations of the recommendations detailed within Section 5 above, will comply with the relevant acoustic criteria of Northern Beaches Council, the NSW POEO Act 1997 and the NSW EPA.

We trust that the above information meets with your requirements and expectations. Please do not hesitate to contact us on 02 9908 1270 should you require more information.

APPENDIX A –LOCATION MAP, AERIAL IMAGE AND DRAWINGS

A.1 SITE LOCATION MAP



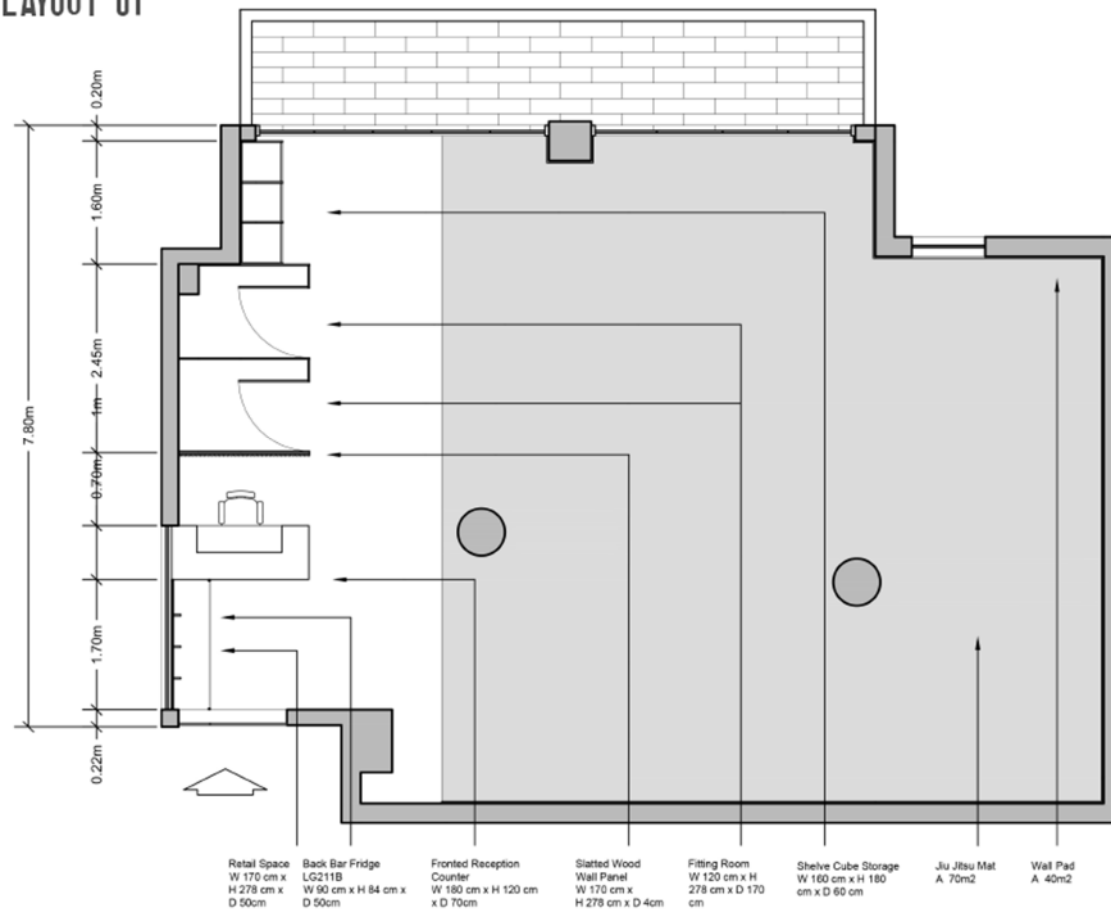
A.2 AERIAL IMAGE (COURTESY OF SIXMAPS.COM)



A.3 DRAWINGS

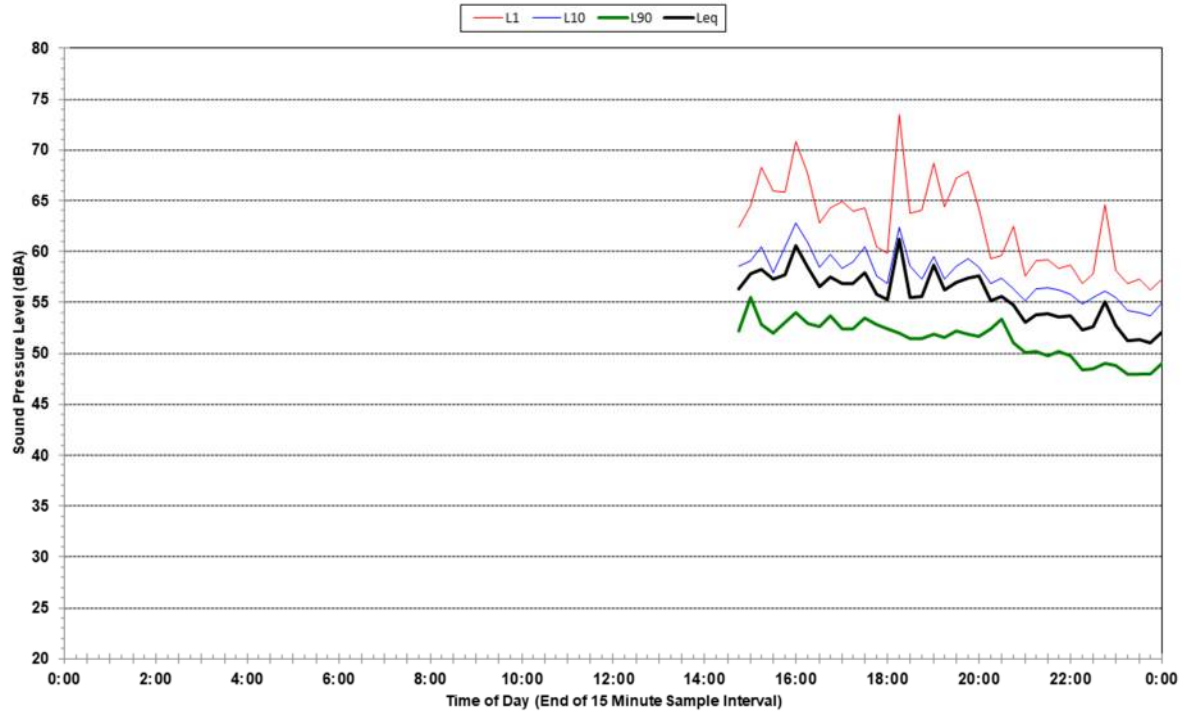
A.3.1 DEVELOPMENT GROUND FLOOR PLAN

ALLIANCE | LAYOUT 01

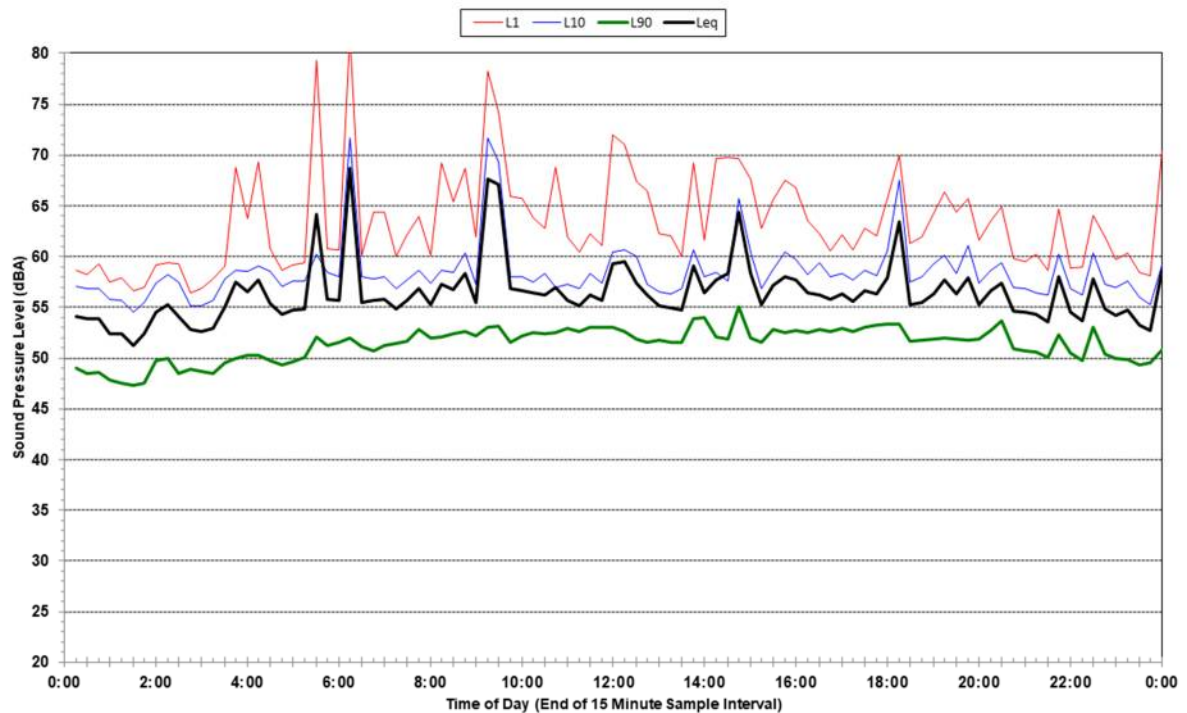


APPENDIX B – UNATTENDED NOISE LOGGER DATA

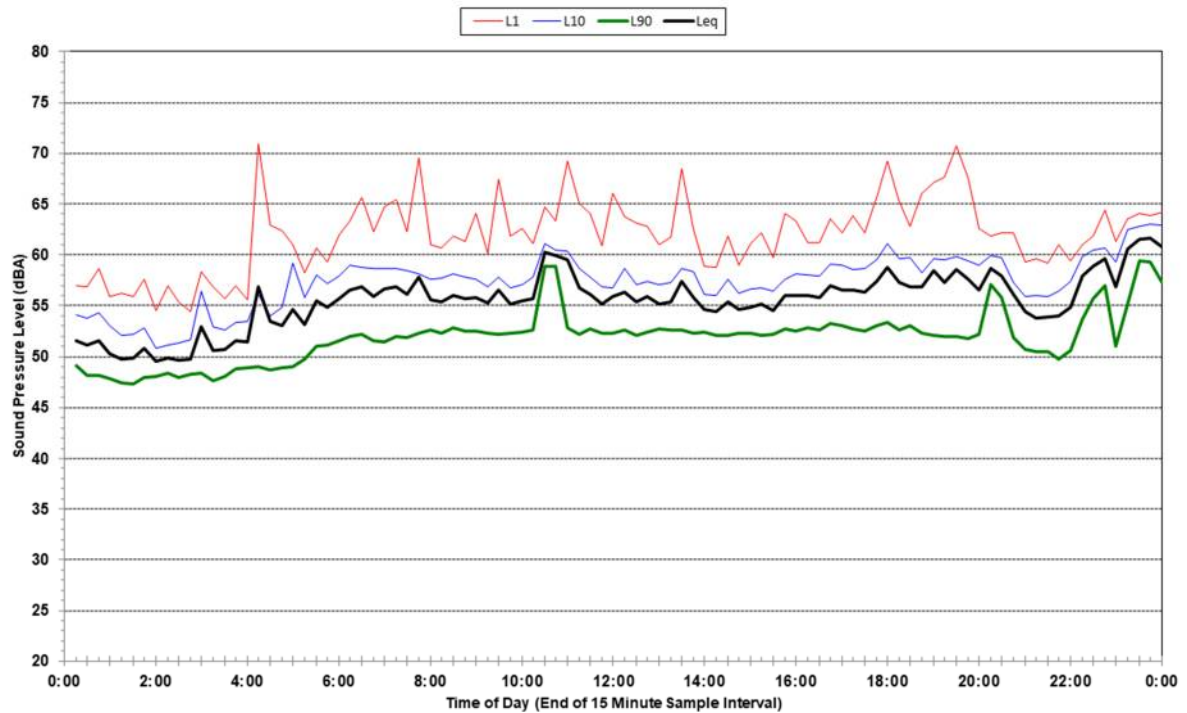
Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Wednesday 17 February 2021



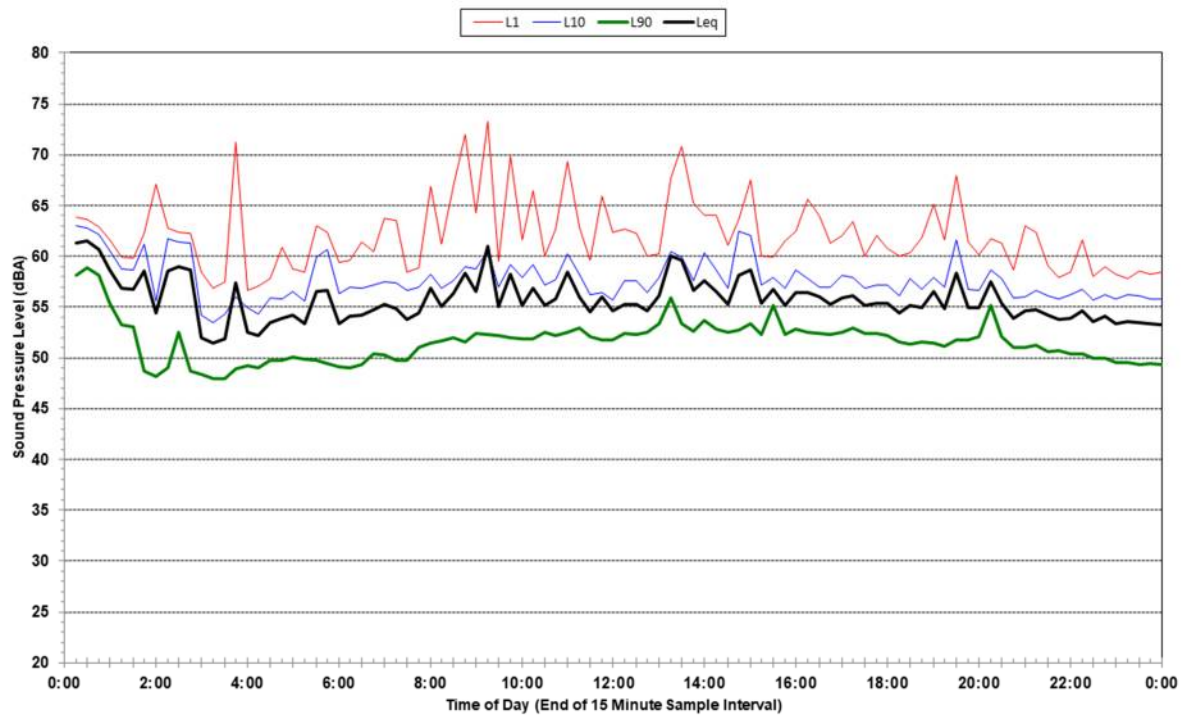
Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Thursday 18 February 2021



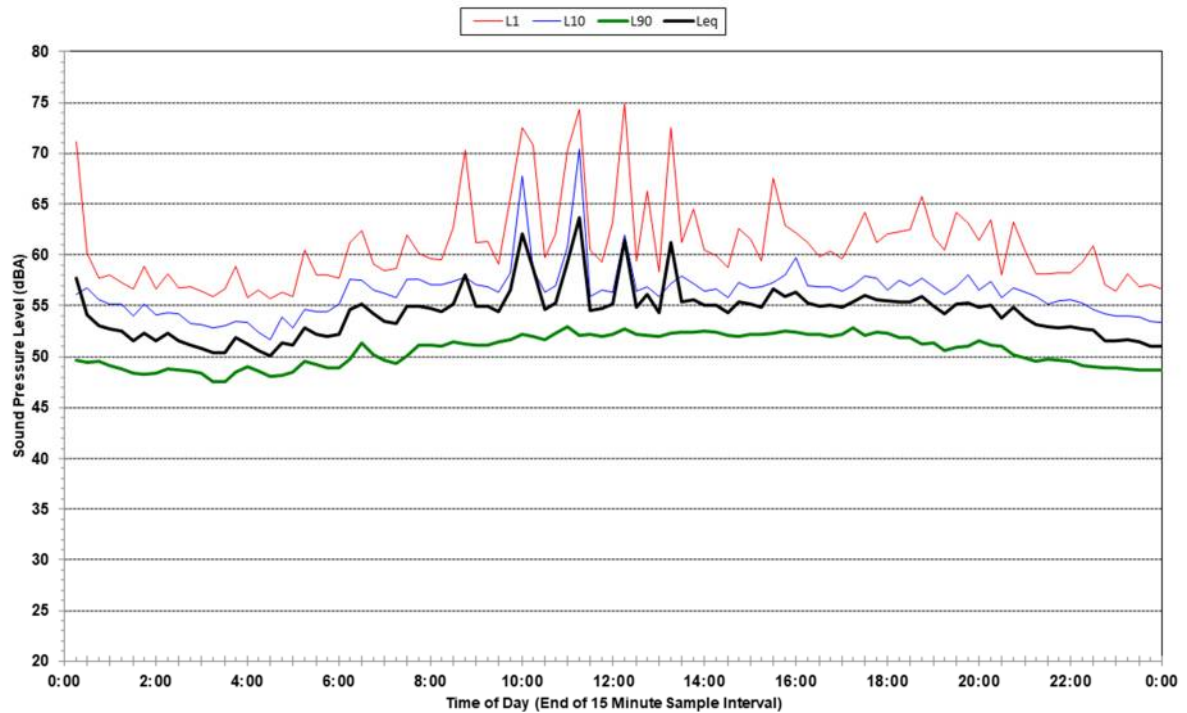
Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Friday 19 February 2021



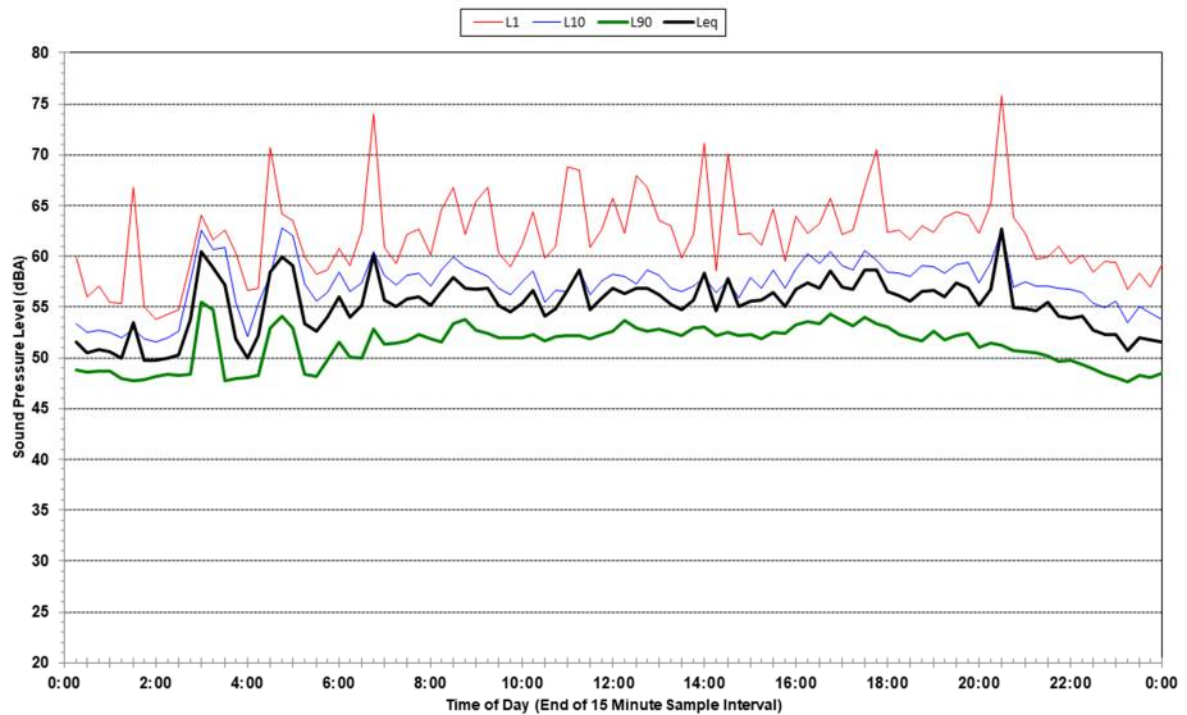
Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Saturday 20 February 2021



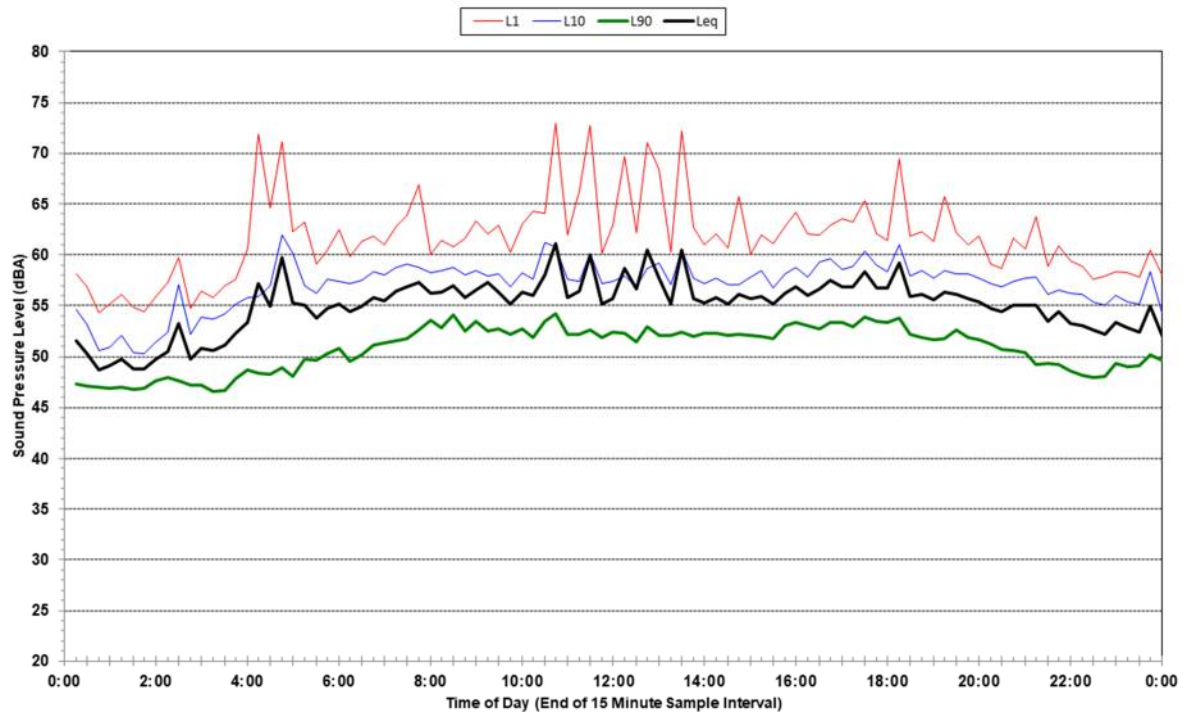
Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Sunday 21 February 2021



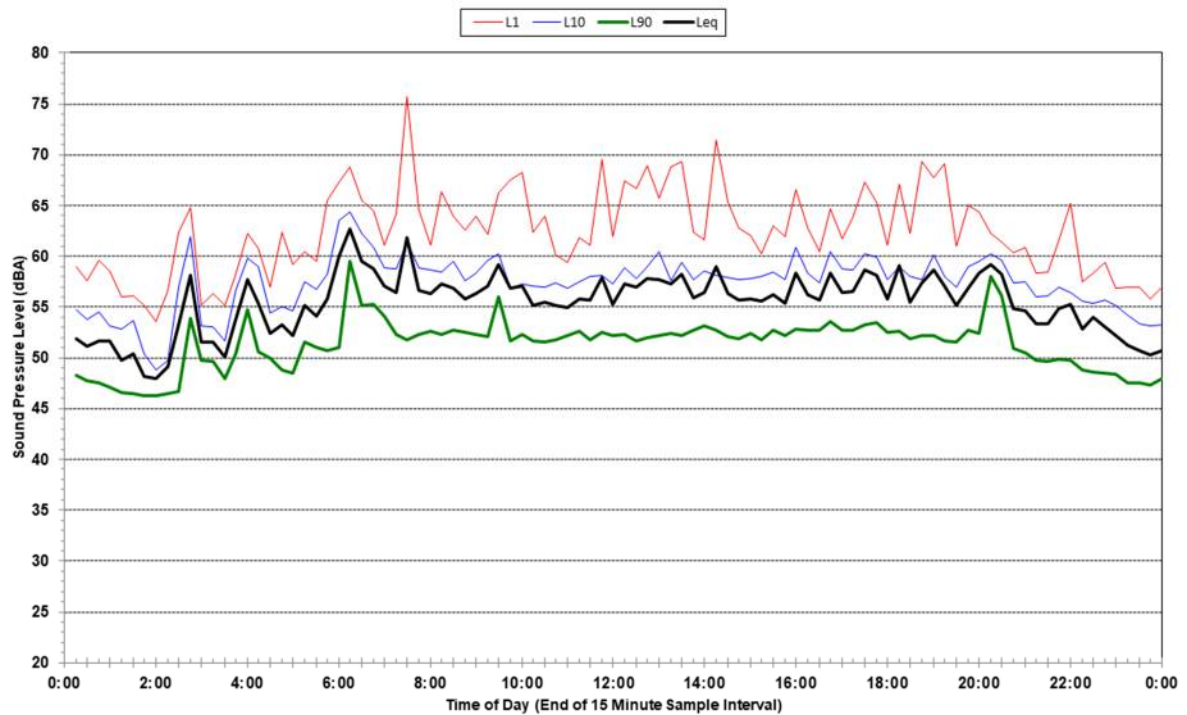
Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Monday 22 February 2021



Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Tuesday 23 February 2021



Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Wednesday 24 February 2021



Statistical Ambient Noise Levels
2/374-378 Sydney Rd Balgowlah - Thursday 25 February 2021

