Operational Noise Emission Assessment

Proposed Licensed Club
37 Tompsitt Drive Jerrabomberra

Client:
Tuggeranong Valley Rugby Union & Sports Club Limited

16 May 2025

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Notice

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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 below.

NOISE DESCRIPTORS

L_{eq} – The 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.

$L_{Aeq(15min)}$ – The A-weighted average equivalent sound level over a 15-minute period.

L_{A10} – The A-weighted noise level that has been exceeded for 10% of the measurement duration.

L_{A90} – The A-weighted noise level that has been exceeded for 90% of the measurement duration. This descriptor is used to describe the background noise level.

RBL – Rating Background Level. The overall, single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24-hour period used for assessment background level). This is the level used for assessment purposes.

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.

R_w – Weighted Sound Reduction Index. A measure of sound insulation performance of a building element. The higher the number, the better the insulation performance.

A-WEIGHTING

"A-weighting" refers to a prescribed amplitude versus frequency curve used to "weight" noise measurements 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. 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 EXECUTIVE SUMMARY

Acoustic Dynamics is engaged by **Tuggeranong Valley Rugby Union & Sports Club Limited** to conduct an assessment of noise emission and environmental noise impacts associated with the operation of the proposed licensed premises located at 37 Tompsitt Drive, Jerrabomberra, in the Queanbeyan-Palerang Regional Council area of NSW.

This assessment is prepared in accordance with the various acoustic requirements of:

(a) Queanbeyan-Palerang Regional Council;
(b) Liquor and Gaming NSW;
(c) NSW Environment Protection Authority;
(d) Association of Australasian Acoustical Consultants; and
(e) Australian Standards.

1.2 PROJECT DESCRIPTION

The project site is located at 37 Tompsitt Drive, Jerrabomberra, legally described as Lot 6 DP1246134, and is situated within a situated within a Complex Area (CA) and Local Centre (E1) land zone.

The project proposal is seeking staged development approval to operate as a licensed premises, including indoor and outdoor dining areas.

As per the Statement of Environmental Effects, Stage 1 of the development will incorporate:

- Construction of the Pavilion building comprising:
  - Reception, lounge and office area;
- Construction of the main building comprising:
  - Ground level with restaurant, bar areas, gaming areas, function room, and amenities;
  - Mezzanine level containing building plant equipment for main buildings;
- Construction of the eastern car park and part of the western car park for a total of 153 parking spaces; and
- Landscaping for the development including the construction of paths and refurbishment of the pond area.

Following approval of Stage 1, the applicant may seek development approval for expansion of the operations, described as Stage 2, which will incorporate:

- Alterations to the Pavilion building comprising:
  - Ground floor alteration including the construction of a stairwell, lift and removal of office rooms;

    - Mezzanine floor with office and meeting rooms;
        - Internal construction of level 1 with function room reception area;
- Alterations and additions to the main building comprising:
    - Demolition works comprising the removal of the roof;
    - Construction of level 1 to provide for two (2) function rooms, bar, amenities and plant equipment;
- Construction of an alfresco dining area to the east of the pond including a bar.
- Construction of a viewing platform to the north of the pond.
- Extension to the western car park to provide for a further 119 parking spaces (for a total of 272 car spaces).

Various noise sources and operations associated with the proposal include the following:

- Patron noise;
- Music noise;
- Mechanical plant and equipment;
- Vehicle movements (272 space car park); and
- Staff and patron movements.

The closest noise sensitive receiver locations are located as follows:

1. **R1:** Residential receivers located at 49 Esmond Avenue;
2. **R2:** Residential receivers located at 51 Esmond Avenue;
3. **R3:** Residential receivers located at 24 O'Sullivan Road;
4. **R4:** Residential receivers located at 17 O'Sullivan Road;
5. **R5:** Residential receivers located at 8 Miles Place; and
6. **R6:** Residential receivers located at 7 Miles Place.

It is understood that club is seeking to operate between 9:00am and 2:00am, with the following trading hours for the various areas proposed:

Table 1.1 Proposed Hours of Operation

Area	Hours of Operation / General Trading	Cease Sale of Liquor	Final Close
Poker Machine Lounge	Monday to Sunday 9:00am – 2:00am	1:00am	2:00am
Lounge / Bar	Monday to Sunday 9:00am – 2:00am	1:00am	2:00am
Bistro	Monday to Sunday 11:00am – 10:00pm	10:00pm	10:00pm
Cafe	Monday to Sunday 9:00am – 2:00am	N/A	2:00am
Alfresco	Monday to Sunday 9:00am – 10:00pm	10:00pm	10:00pm
Pondside Dining[1]	Monday to Sunday 9:00am – 10:00pm	10:00pm	10:00pm
L1 Function Room Terrace[1]	Monday to Sunday 9:00am – 10:00pm	10:00pm	10:00pm
Function Rooms[2]	Monday to Sunday 9:00am – 12:00am	12:00am	12:00am

Note: 1) Development Stage 2 item.

2) Being Stage 1 function room, and 2 x Stage 2 function rooms.

It is anticipated that Stage 1 and Stage 2 of the development will accommodate a cumulative maximum of 1,320 patrons, with an expected average of 800 patrons between Sunday and Wednesday, and 1,100 patrons between Thursday to Saturday.

The project site, adjacent receivers and surrounding area are shown in the Location Map and Aerial Image presented within **Appendix A**.

1.3 SCOPE OF WORKS

Acoustic Dynamics has been engaged to provide an acoustic assessment suitable for submission to the relevant authorities as part of a Development Application.

The scope of the assessment is to include the following:

- Review local planning and development control instruments, state guidelines, federal legislation, standards and guidelines applicable to the proposal;
- Conduct unattended noise monitoring at the development site to determine the existing noise environment and establish relevant noise criteria;
- Perform relevant calculations and noise modelling associated with the proposal to determine noise emission at nearby receiver locations; and
- Provide recommendations for design measures to be incorporated to achieve compliance with the relevant criteria and minimise potential noise impacts at nearby receiver locations.

2 ASSESSMENT CRITERIA AND STANDARDS

Acoustic Dynamics has reviewed local planning and development control instruments, government policies and legislation, standards and guidelines that are applicable to the proposal. The relevant sections of this review and the most stringent criteria applicable to this assessment are presented below.

2.1 LOCAL GOVERNMENT AND COUNCIL CRITERIA

2.1.1 LOCAL PLANNING AND DEVELOPMENT CONTROL INSTRUMENTS

Acoustic Dynamics has reviewed the relevant local planning and development control instruments, including the following documents:

- Queanbeyan-Palerang Regional Council *Local Environmental Plan* 2022 (LEP); and
- Queanbeyan-Palerang Regional Council *Development Control Plan 2012* (DCP).

Acoustic Dynamics' review of the LEP did not yield specific acoustic criteria or information relevant to this assessment.

Acoustic Dynamics' review of the DCP indicated the following information relevant to this assessment:

*"**2.3.6 Noise and Vibration**"*

Objectives

1) *To ensure development provides for effective management of noise and vibration through effective siting, building design, materials and layout, construction and engineering techniques, operational management.*

2) *Where a proposed development includes an activity which may generate unreasonable noise or which may be affected by an existing noise source, an acoustic study is to be undertaken to establish noise levels and provide a mitigation strategy demonstrating the measures to be taken to effectively mitigate noise.*

3) *Noise sensitive developments such as dwellings should be designed to reasonably protect the proposed development from noise sources such as arterial roads, entertainment venues and the like.*

Controls

a) *Development should be designed to minimise the potential for offensive noise.*
…

e) *Commercial and retail developments, or mixed use developments, should have suitably located and designed goods delivery and garbage collection areas, vehicle entry and exits and other noise sources so that amenity of residents both within the development and in nearby buildings is reasonably protected.*

f) *To ensure development is designed so noise and vibration from new businesses, light industrial and leisure/cultural/entertainment venues and other noise generating activities do not unacceptably affect the amenity of nearby residential and other noise or vibration sensitive uses.*

Council can enforce the requirements within the relevant local planning and development control instruments under the *Environmental Planning and Assessment Act of 1979*.

2.2 STATE GOVERNMENT POLICIES AND LEGISLATION

Acoustic Dynamics has conducted a review of the relevant state environmental planning policies, legislative acts and statutory instruments, including the *Protection of the Environment Operations Act 1997* (POEO Act).

References to various acoustic requirements applicable to this assessment are summarised below.

2.2.1 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The POEO Act provides generic regulatory instruments that can be applied to manage noise emission from a development site. Acoustic Dynamics advises that the operation of building services and other sources associated with the development not generate *"offensive noise",* as defined within the Act:

*"**offensive noise** means noise–*

(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."

2.3 LIQUOR AND GAMING NSW

Prior to the *Liquor Act 2007* being gazetted by the NSW State Parliament, and establishment of the *Liquor Regulation 2008*, noise emission from licensed premises had to comply with the Liquor and Gaming NSW noise emission criteria (formerly NSW Office of Liquor and Gaming (OLG)), detailed below. Acoustic Dynamics advises that many NSW liquor licenses still specify the following noise emission criteria:

"The L_{A10} noise emitted from the licensed premises shall not exceed the background noise level in any octave band frequency (31.5 Hz to 8 kHz inclusive) by more than 5 dB(A) between 7.00am and midnight at the boundary at any affected residence.

The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise in any octave band centre frequency (31.5 Hz to 8 kHz inclusive) between midnight and 7.00am at the boundary of any affected residence.

Notwithstanding compliance of the above, noise from the licensed premises shall not be audible in any habitable room in any residential premises between the hours of midnight and 7.00am."

2.4 NSW ENVIRONMENT PROTECTION AUTHORITY

Acoustic Dynamics has reviewed various assessment guidelines and criteria published by the NSW Environment Protection Authority (EPA), including the following documents:

- *Noise Policy for Industry 2017* (NPfI); and
- *Road Noise Policy 2011* (RNP).

References to applicable acoustic guidelines and requirements are summarised below.

2.4.1 NOISE POLICY FOR INDUSTRY 2017

The NPfI outlines and establishes noise criteria for industrial and other noise sources in various zoning areas. The requirements of the NPfI have been applied for the assessment of noise emission associated with the use and operation of the development (excluding patron and music noise).

2.4.2 ROAD NOISE POLICY 2011

The RNP document provides road traffic noise criteria for proposed roads as well as other developments with the potential to have an impact in relation to traffic noise generation.

The noise criteria applicable to the subject site is presented below.

Table 2.1 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	$L_{Aeq, (1\ hour)}$ 55 (external)	$L_{Aeq, (1\ hour)}$ 50 (external)

Accepted application of the Section 2.4 of the RNP is that where road traffic noise levels already exceed the assessment criteria, an increase of less than 2 dB represents a minor impact that is barely perceptible to the average person.

2.4.3 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 NSW EPA has investigated overseas and Australian research on sleep disturbance. The assessment of noise for sleep disturbance relies on the application of a screening that indicates the potential for this to occur. The EPA's NGLG 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 $L_{A1(1\ minute)}$ (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 NPfI provide the following additional information:

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

- *$L_{Aeq,15min}$ 40 dB(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 summarises the sleep disturbance criterion for external noise levels:

$L_{Aeq,15min} \leq 40$ dB or $L_{Aeq,15min} \leq$ (RBL + 5 dB), whichever is greater

AND

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

The RNP references other publications for consideration:

"The World Health Organisation guidelines (WHO 1999) recommended that:

'where noise is continuous, the equivalent sound pressure level should not exceed 30 dB(A) indoors, if negative effects on sleep are to be avoided'."

In addition to the above, the EPA has previously 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."

2.5 ASSOCIATION OF AUSTRALASIAN ACOUSTICAL CONSULTANTS

Acoustic Dynamics has reviewed various assessment guidelines and criteria published by the Association of Australasian Acoustical Consultants (AAAC). References to applicable acoustic guidelines and requirements are summarised below.

2.5.1 LICENSED PREMISES NOISE ASSESSMENT TECHNICAL GUIDELINE 2020

The AAAC's *Licensed Premises Noise Assessment Technical Guideline 2020* (LPG) outlines various guidelines to assess the potential impacts of noise from the operations of licensed

premises, to balance societal needs for entertainment and socialising and the desire for reasonable levels of amenity in the surrounding community.

The LPG provides various assessment techniques to cover two key areas:

- **Patron sound level data** to predict noise emissions from groups of people in various situations, including restaurants, small outdoor drinking/smoking areas, poker machine areas, beer gardens and nightclubs; and
- **Music sound level data** within venues and measures to minimise and limit music noise breakout.

Acoustic Dynamics has considered and applied the assessment techniques presented within the LPG, where relevant, and outlined the applicable methodologies in **Section 4**.

2.6 PROJECT CRITERIA

To establish the acoustic environment at the subject site unattended noise monitoring was conducted on site between Tuesday 25 March 2025 and Friday 4 April 2025.

Acoustic Dynamics advises the measurement location is representative of the existing noise environment of the nearest sensitive receivers. The measurement location is shown within **Appendix A**. Results from the long-term noise monitoring are presented in **Appendix B**.

2.6.1 NPFI CRITERIA

For premises to which it applies, the project criteria for the assessment of external noise emission from industrial noise sources at the boundaries sensitive receiver areas are presented below, and are based on the established noise environment determined in accordance with the procedures of the NPfI.

Table 2.2 Project External Noise Level Objectives – Other Receivers

Location	Assessment Period	L_{A90} Rating Background Noise Level (RBL) [dB]	Measured L_{Aeq} Noise Level [dB]	Project Intrusiveness Noise Level $L_{Aeq,15min}$ [dB]	Project Amenity Noise Level $L_{Aeq,15min}$ [dB][2]	Project Noise Trigger Level $L_{Aeq,15min}$ [dB]
Residential Receivers	Day (7am[1] to 6pm)	36	53	41	53	**41**
	Evening (6pm to 10pm)	37	52	42	43	**42**
	Night (10pm to 7am[1])	35	48	40	38	**38**

Note: 1) 8:00am on Sundays and public holidays.

2) Amenity adjustment based on "*Suburban*" residential receiver type. The noise emission objective has been modified in accordance with the recommendations detailed within the NPfI Section 2.2, for time standardisation of the intrusiveness and amenity noise levels ($L_{Aeq,15min}$ will be taken to be equal to the **$L_{Aeq,\ period}$ + 3 dB**).

2.6.2 LIQUOR AND GAMING NSW CRITERIA

In accordance with the L&G NSW noise emission requirements, octave band L_{A10} background noise level criteria have been determined and presented below.

Table 2.3 Project External Octave Band Noise Emission Objectives – Residential Receivers

Location[1]	Assessment Period	Method for Calculation of Criteria	Relevant $L_{A10,15min}$ External Noise Emission Criteria [dB] Octave Band Centre Frequency [Hz]									
			32	63	125	250	500	1K	2K	4K	8K	OA
Nearest Residential Receivers	Day 7am to midnight	External L_{A90}	15	23	24	25	29	32	28	23	20	36
		(L_{A90} + 5 dB)[2]	**20**	**28**	**29**	**30**	**34**	**37**	**33**	**28**	**25**	**41**
	Night Midnight to 2am	External L_{A90}	11	13	16	21	24	26	27	25	21	33
		(L_{A90} - 10 dB)[3]	**20[4]**	**11[4]**	**6[4]**	**11**	**14**	**16**	**17**	**15**	**12[4]**	**23**

Note: 1) The measurement location is representative of the existing noise environment of the nearest sensitive receivers.

2) External Background Noise Level (L_{A90}) + 5 dB.

3) External Background Noise Level (L_{A90}) - 10 dB at the facade. Assessed externally for assessment of inaudibility through an open or closed window.

4) Threshold of hearing

2.6.3 SLEEP DISTURBANCE CRITERION

In accordance with the NPfI guidelines detailed above, the following sleep disturbance screening criterion for external noise emission has been applied for this project:

External Sleep Disturbance Criteria:
$L_{Aeq,15min}$ ≤ 35 dB / L_{Amax} or $L_{A1(1\ minute)}$ ≤ 52 dB

3 NOISE MEASUREMENT EQUIPMENT AND STANDARDS

All measurements were conducted in general accordance with AS 1055.1:2018 *Acoustics – Description and Measurement of Environmental Noise Part 1: General Procedures*. Sound measurements were carried out using precision sound level meters conforming to the requirements of IEC 61672.1:2002 *Electroacoustics: Sound Level Meters – Part 1: Specifications*. The instrumentation used during the survey is set out in **Table 3.1**.

Table 3.1 Noise Survey Instrumentation

Type	Serial Number	Instrument Description
4189	2385698	Brüel & Kjaer 12.5 mm Prepolarised Condenser Microphone
4230	623588	Brüel & Kjaer Acoustic Calibrator
2250	2679541	Brüel & Kjaer Modular Precision Sound Level Meter
4189	2670479	Brüel & Kjaer 12.5 mm Prepolarised Condenser Microphone
XL2	A2A-05048-E0	NTI Audio XL2 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 METHODOLOGY

Acoustic modelling was undertaken using noise modelling software *(CadnaA Version 2023)* to predict operational noise levels generated by the development. CadnaA calculates environmental noise propagation according to the applicable international and ISO standards, including the ISO 9613 algorithm.

Within our calculations and acoustic modelling, noise emission contributions from the development have been considered taking the following factors into account:

- Airborne noise losses due to distance and ground topography;
- Losses due to direction and diffraction;
- Increases due to reflections; and
- Acoustic shielding.

4.1 NOISE SOURCES

Acoustic Dynamics has established and assessed the following noise sources and operations associated with the development.

The noise data presented below has been established based on information provided by the proponent and referenced from our database of noise measurements at similar developments.

4.1 Patron & Music L_{10} Octave Band Sound Power Levels

Description	Octave Band Frequency (Hz) [dB]									dB(A)
	31.5	63	125	250	500	1k	2k	4k	8k	
1 x patron (normal)	52	57	60	65	68	63	57	53	47	68
1 x patron (raised)	56	61	64	69	74	71	65	60	52	75
1 x patron (loud)	58	63	67	75	82	81	76	68	62	84
Restaurant/bistro (w BG music)	89	93	87	82	83	82	79	73	62	86
Indoor/Outdoor gaming lounge	68	61	61	68	71	69	72	67	62	76
Upper ground function room (w. amplified music)	92	108	109	105	93	93	92	84	83	101
L1 Function room (w. amplified music)[2]	92	108	109	105	93	93	92	84	83	101

Note: 1) Development Stage 2 item.

Table 4.2 Other Noise Sources Sound Power Levels

Source	Sound Power Level L_w [dB(A)]
Mechanical Equipment	
Heating & cooling stack	85
Small toilet or garbage room exhaust fan	60
Kitchen exhaust fan	80
Compressor	80
Vehicle Movements	
Passenger vehicle driving at a speed of 5km/h	85
Delivery van driving at a speed of 5km/h	91
Waste collection	95

Note: 1) Octave band sound levels are not displayed, however have been used in the modelling.

4.2 NOISE SCENARIO ASSUMPTIONS

The following worst-case noise emission assumptions were made regarding the noise model configuration during the two development stages.

4.2.1 STAGE 1 NOISE MODEL ASSUMPTIONS

Mechanical plant and onsite carpark activity scenario:

1. All mechanical plant operating at capacity (assumed cumulative sound power level of 95 dB(A) within the plant deck), venting through acoustic louvre facade;
2. 48 vehicles accessing and manoeuvring in the onsite carpark during peak hour; and
3. Waste collection/loading dock activity (daytime hours only).

Music and Patron Noise Scenario (pre-midnight):

1. Restaurant operating at capacity including background music;
2. Indoor gaming lounge operating at capacity;
3. Outdoor gaming lounge operating at capacity;
4. Upper ground function room operating at capacity with amplified music;
5. 60 patrons within the upper ground alfresco dining area (10% raised, 20% normal, 70% listening) (in use until 10pm); and
6. Groups of patrons traversing the carpark (80 patrons per hour).

Music and Patron Noise Scenario (post-midnight):

1. Restaurant operating at capacity including background music;
2. Indoor gaming lounge operating at capacity;
3. Outdoor gaming lounge operating at capacity; and
4. Groups of patrons traversing the carpark (80 patrons per hour).

4.2.2 STAGE 2 NOISE MODEL ASSUMPTIONS

Mechanical plant and onsite carpark activity scenario:

1. All mechanical plant operating at capacity (assumed cumulative sound power level of 95 dB(A) within the plant deck), venting through acoustic louvre facade;
2. 73 vehicles accessing and manoeuvring in the onsite carpark during peak hour; and
3. Waste collection/loading dock activity (daytime hours only).

Music and Patron Noise Scenario (pre-midnight):

1. 88 patrons within the pondside alfresco dining area (10% raised, 20% normal, 70% listening) (in use until 10:00pm);
2. 60 patrons within the upper ground alfresco dining area (10% raised, 20% normal, 70% listening) (in use until 10:00pm);
3. Restaurant operating at capacity;
4. Indoor gaming lounge operating at capacity;
5. Outdoor gaming lounge operating at capacity;
6. Upper ground function room operating at capacity with amplified music;
7. L1 function rooms operating at capacity with amplified music;
8. 40 patrons within the L1 function room terrace (10% raised, 20% normal, 70% listening) (in use until 10:00pm); and
9. Groups of patrons traversing the carpark (80 patrons per hour).

Music and Patron Noise Scenario (post-midnight):

1. Restaurant operating at capacity including background music;
2. Indoor gaming lounge operating at capacity;
3. Outdoor gaming lounge operating at capacity; and
4. Groups of patrons traversing the carpark (80 patrons per hour).

4.3 CALCULATED PATRON & MUSIC NOISE LEVELS

The calculated maximum patron and music noise emission levels at the nearest receiver locations are presented against the relevant noise criteria below.

Table 4.3 Calculated Patron & Music Noise Levels at Residential Receivers

Receiver	Noise Source[1]	Relevant L_{A10} Noise Emission Criterion [dB] and Calculated L_{A10} Noise Emission Levels at Receivers [dB][2,3]										Complies ?
		32	63	125	250	500	1K	2K	4K	8K	OA	
7am to 12am		**20**	**28**	**29**	**30**	**34**	**37**	**33**	**28**	**25**	**41**	-
R_1	Stage 1 Operations	2	19	22	24	30	30	26	17	0	35	**Yes**
	Stage 1 + 2 Operations	2	19	25	26	32	32	27	17	0	36	**Yes**
R_2	Stage 1 Operations	3	20	24	26	32	32	28	19	0	37	**Yes**
	Stage 1 + 2 Operations	3	20	26	28	33	33	29	19	2	38	**Yes**
R_3	Stage 1 Operations	3	20	24	26	32	33	29	20	1	37	**Yes**
	Stage 1 + 2 Operations	3	20	26	28	33	34	30	20	2	38	**Yes**
R_4	Stage 1 Operations	1	19	23	25	31	32	29	19	0	36	**Yes**
	Stage 1 + 2 Operations	1	19	25	27	32	33	29	20	1	37	**Yes**
R_5	Stage 1 Operations	0	5	7	7	11	13	11	3	0	18	**Yes**
	Stage 1 + 2 Operations	0	5	17	15	20	17	13	4	0	24	**Yes**
R_6	Stage 1 Operations	0	3	11	11	13	14	15	7	0	20	**Yes**
	Stage 1 + 2 Operations	0	3	14	14	19	17	16	8	0	23	**Yes**
12am to 2am		**20**	**11**	**6**	**11**	**14**	**16**	**17**	**15**	**12**	**23**	-
R_1	Stage 1 Operations	0	0	0	0	0	0	1	0	0	1	**Yes**
	Stage 1 + 2 Operations	0	0	0	0	0	0	1	0	0	5	**Yes**
R_2	Stage 1 Operations	0	0	0	0	1	3	3	0	0	6	**Yes**
	Stage 1 + 2 Operations	0	0	0	0	1	3	3	0	0	8	**Yes**
R_3	Stage 1 Operations	0	0	0	0	1	4	3	0	0	8	**Yes**
	Stage 1 + 2 Operations	0	0	0	0	1	4	3	0	0	8	**Yes**
R_4	Stage 1 Operations	0	0	0	0	1	3	3	0	0	7	**Yes**
	Stage 1 + 2 Operations	0	0	0	0	1	3	3	0	0	8	**Yes**
R_5	Stage 1 Operations	0	0	0	0	0	1	1	0	0	5	**Yes**
	Stage 1 + 2 Operations	0	0	0	0	0	1	1	0	0	5	**Yes**
R_6	Stage 1 Operations	0	0	0	3	11	11	14	7	0	18	**Yes**
	Stage 1 + 2 Operations	0	0	0	3	11	11	14	7	0	18	**Yes**

Note: 1) Operations and noise sources detailed ins **Section 4.2**.

2) Includes the benefits of recommendations outlined in **Section 5**.

3) Contributions from individual areas are presented in **Appendix A**.

4.4 CALCULATED MECHANICAL PLANT & VEHICLE ACTIVITY NOISE LEVELS

The calculated maximum mechanical plant and onsite vehicle noise levels at the nearest receiver locations are presented against the relevant noise criteria below.

Table 4.4 Calculated Mech. Plant & Onsite Vehicle Noise Levels at Residential Receivers

Receiver	Assessment Period[1]	Noise Source[2]	$L_{Aeq(15min)}$ Noise Emission Level [dB][3]	Noise Emission L_{Aeq} Criterion [dB]	Complies ?
R_1	Night	Stage 1 Operations	30	**38**	**Yes**
		Stage 1 + 2 Operations	30	**38**	**Yes**
R_2	Night	Stage 1 Operations	32	**38**	**Yes**
		Stage 1 + 2 Operations	33	**38**	**Yes**
R_3	Night	Stage 1 Operations	33	**38**	**Yes**
		Stage 1 + 2 Operations	34	**38**	**Yes**
R_4	Night	Stage 1 Operations	32	**38**	**Yes**
		Stage 1 + 2 Operations	33	**38**	**Yes**
R_5	Night	Stage 1 Operations	29	**38**	**Yes**
		Stage 1 + 2 Operations	30	**38**	**Yes**
R_6	Night	Stage 1 Operations	27	**38**	**Yes**
		Stage 1 + 2 Operations	28	**38**	**Yes**

Note: 1) Night time period being 10:00pm to *7:00am (*8:00am Sundays and public holidays). Compliance during the more stringent night period ensures compliance during the less sensitive day and evening periods.

2) Operations and noise sources detailed ins **Section 4.2**.

23 Includes the benefits of recommendations outlined in **Section 5.**

4.5 ROAD TRAFFIC NOISE LEVELS

Acoustic Dynamics understands that patrons and staff who drive will access the development via surrounding local roads. Vehicles utilising local roads are assessed in consideration of the RNP criteria outlined in **Section 2**.

Noise modelling was conducted to predict potential road traffic noise impacts during a representative **worst-case** scenario with half of the 73 vehicle trips per hour, departing the site and turning left onto Tompsitt Drive, and then left onto Limestone Drive. Actual traffic pass-by numbers are likely to be lower than the numbers assumed within this assessment.

A sound power level of **90 dB(A)** has been adopted for a vehicle traveling at an average of 50 km/hr along the local roads.

The calculated maximum noise emission levels at the nearest residential receivers, due to the vehicles utilising surrounding local roads, are presented below. Acoustic Dynamics advises that by achieving compliance with the nearest sensitive receiver locations, compliance will also be achieved at all other sensitive receiver locations further away.

Table 4.5 Calculated Road Traffic Noise Emission Levels & Relevant Noise Criteria

Receiver	Predicted Maximum $L_{eq,1hr}$ Sound Pressure Level [dB][1]	Most Stringent Criterion (Night) $L_{Aeq(1hr)}$ [dB][1]	Complies?
Nearest Residential Receivers	46	**50**	**Yes**

Note: 1) Compliance with the night-time criterion will ensure compliance with the daytime criterion.

4.6 SLEEP DISTURBANCE

Acoustic Dynamics has determined the potential maximum $L_{A1(60\ Sec)}$ **external** noise emission level from the development resulting from onsite vehicle activity (assessed as L_{Amax} 96 dB), and a loud patron egressing through the car park when departing the site (assessed as L_{Amax} 90 dB), when measured at the nearest residential receivers during the night-time assessment period.

The transient noise impacts are assessed as a worst-case scenario (i.e. a door slamming at the edge of a carpark closest to a receiver property or a resident laughing loudly at a location within close proximity to a receiver property).

Although such a scenario is unlikely to occur regularly, the assessment is conducted in such a manner to ensure the amenity of neighbouring residents is protected.

Table 4.6 Calculated Maximum Instantaneous External Noise Levels & Relevant Noise Criteria

Sensitive Receiver	Predicted Maximum $L_{A1(60\ Sec)}$ Sound Pressure Level [dB][1]	$L_{A1(60\ Sec)}$ Sleep Disturbance Criterion [dB][2]	Complies?
Nearest Residential Receivers	44	**52**	**Yes**

Note: 1) Predicted $L_{A1(60\ Sec)}$ noise level is the maximum noise level measured within a 60-second period.
2) Maximum instantaneous noise level measured during the night-time assessment period (10:00pm until 7:00am on weekdays, or 8:00am on weekends and public holidays).

Acoustic Dynamics advises that although there may be instantaneous noise events (i.e. car door closing, vehicle activity in the carpark, or instantaneous resident noise events) that occasionally exceed the external L_{AMax} objective (**L_{AMax} ≤ 52 dB**) at the nearest residential receivers, the maximum instantaneous internal noise levels are predicted to comply with the NSW EPA internal noise guideline (**L_{Max} ≤ 50-55 dB(A)**) and is unlikely to cause awakening reactions.

5 RECOMMENDATIONS AND DESIGN ADVICE

The following recommendations are provided to ensure noise associated with the proposal is adequately managed and minimised.

5.1 NOISE MANAGEMENT PLAN

Acoustic Dynamics recommends the adoption of a Plan of Management (PoM) incorporating best management practice procedures to protect the acoustic amenity of the surrounding area.

A copy of the PoM shall be maintained by the Manager/Licensee and accessible to all senior management staff. All site staff shall be briefed on the relevant sections of the PoM during their induction to the company, including the explanation of noise and vibration control and a discussion of the specific noise reduction strategies. It shall be the duty of the Manager/Licensee to ensure all operational management strategies and procedures are complied with.

The PoM shall outline policies and procedures to ensure noise emission from the premises are kept to a minimum, including:

1. The trading hours of the premises shall remain consistent with the hours of operation contained within the development consent granted by Council. The following area-specific management measures shall also be implemented within the approved trading hours:

Table 5.1 Recommended Hours of Operation

Area	Hours of Operation / General Trading	Cease Sale of Liquor	Final Close
Poker Machine Lounge	Monday to Sunday 9:00am – 2:00am	1:00am	2:00am
Lounge / Bar	Monday to Sunday 9:00am – 2:00am	1:00am	2:00am
Bistro	Monday to Sunday 11:00am – 10:00pm	10:00pm	10:00pm
Cafe	Monday to Sunday 9:00am – 2:00am	N/A	2:00am
Alfresco	Monday to Sunday 9:00am – 10:00pm	10:00pm	10:00pm
Pondside Dining[1]	Monday to Sunday 9:00am – 10:00pm	10:00pm	10:00pm
L1 Function Room Terrace[1]	Monday to Sunday 9:00am – 10:00pm	10:00pm	10:00pm
Function Rooms[2]	Monday to Sunday 9:00am – 12:00am	12:00am	12:00am

Note: 1) Development Stage 2 item.
2) Being Stage 1 function room, and 2 x Stage 2 function rooms.

2. The number of patrons within the outdoor areas is not to exceed to the following:
   - Alfresco: 60 patrons;
   - Pondside dining: 88 patrons;
   - L1 function room terrace: 40 patrons;

3. All outdoor areas (alfresco, pondside dining, function room terrace) are to be restricted to day and evening use only (i.e. no use after 10:00pm);

4. All windows and doors to the upper ground function room shall be closed at all times;

5. All windows and doors to the level 1 function room shall be closed at all times;

6. The northern-most and southern-most doors to the restaurant, and the pass-through to the bar can remain open until 10:00pm (see markup in **Appendix A**).

7. When the bistro restaurant is operating at more than 25% capacity (i.e. more than 53 patrons), or after 10:00pm, all other doors and windows on the eastern facade of the restaurant/bistro shall remain closed;

8. At the cessation of trade, ensure patrons and staff leave the premises quietly and respectfully to minimise any potential impacts on the surrounding amenity, including signage reminding patrons and staff to be aware of their neighbours and to leave in a respectful manner;

9. Staff are to be trained in appropriate setup and pack-down procedures, including, but not limited to no playing of music, exercising care when stacking tables and chairs, filling ice buckets, cleaning, moving stock and cleaning, to ensure that excessive noise is not generated from those activities;

10. Heavy vehicle movements and deliveries must be received during day-time operational hours only. Should heavy vehicles be required to be on-site for longer than five minutes, engines should be switched off for the duration;

11. Noise generating activities such as rubbish disposal and placing empty glass bottles in waste bins shall be conducted during the day time trading hours only; and

12. Implementation of an appropriate community liaison procedure, including a noise and vibration complaint procedure and means of ongoing communication with nearby potentially affected receivers once development operations begin.

5.2 AUDIO ENTERTAINMENT SYSTEM

The following measures are provided as guidance to assist in the appropriate design and operation of the audio visual and entertainment system within the premises.

1. Speakers should be isolated from the building structure or fabric through the use of resilient mounts or decoupling mechanisms to reduce the regenerated noise throughout the building;

2. All speakers installed within the internal areas shall be oriented away from the nearest receivers. No speakers are to be installed in outdoor areas;

3. A multi-band sound system limiter shall be installed to limit the overall output of all speakers. An appropriately qualified audio-visual engineer or acoustic consultant shall be engaged to assist in the calibration of the limiting control device to ensure music noise is acceptable and compliant at neighbouring receiver locations;

4. Performers shall be made aware of the potential for noise disturbance prior to their appearance, and their performance must adhere to all noise restrictions in place at all times. Sound levels shall be set to an appropriate level such that performers can hear themselves without increasing the overall level of sound within the room;

5. Music within the restaurant must be limited to background music only (i.e. patrons can engage in conversation without exertion); and

6. All music within the function rooms is to cease no later than midnight.

5.3 BUILDING CONSTRUCTION

Acoustic Dynamics advises that the effectiveness of the building construction should be assessed based on three essential construction principles of noise transmission reduction, listed below:

1. **Mass**: Any addition to the wall and ceiling partitions must add mass, be it additional masonry, plasterboard or high-density insulation;

2. **Resilience**: Solid partitions such as masonry, plasterboard or glazing are more effective at reducing noise transmission between rooms than soft materials; and

3. **Air-tight Construction**: There should be **no gaps** left around or within any of the partitions. Large gaps are to be sealed with MDF packing and smaller gaps are able to be filled with flexible mastic sealant.

Further to the general principles above, Acoustic Dynamics advises the following construction measures should be implemented to ensure noise transmission is adequately controlled:

1. All glazing to the upper ground and level 1 function rooms shall be selected on the basis of achieving **$R_w \geq 40$**. Suitable glazing would be:
   - Single glaze: 12.5mm Vlam Hush; or
   - Double glaze: 8mm VFloat / 16mm airgap / 10.5mm Hush;

2. All glazing to the restaurant/bistro shall be selected on the basis of achieving **$R_w \geq 35$**. Suitable glazing would be:
   - Single glaze: 10.38mm Vlam; or

- Double glaze: 10mm mono / 12mm airgap / 6.38mm Vlam;

3. The doors between the level 1 function rooms and the terrace are to be designed as air lock systems. The air lock should incorporate two acoustically rated doors (with **$R_w \geq 30$**), and are required to be fitted with acoustic seals to maintain adequate acoustic isolation (see markup in **Appendix A**;

4. All doors and operable windows shall be fitted with acoustic seals that form an airtight seal when closed. Acoustic seals for glazed doors should be a minimum:
    - Raven RP127Si drop seal (or equivalent); and
    - Schlegel Foam-Tite 32001 perimeter seal (or equivalent);

5. The facade of the development should be designed to achieve **R_w 50**. Suitable construction would be:
    - Hebel Power Panel; to
    - 50mm top hats; to
    - 90mm steel studs at 600mm centres; with
    - 90mm Acoustigard 14kg in the stud frame; and
    - Lined with 1 layer* 13mm Gyprock Standard plasterboard (*2 layers of 13mm sound rated plasterboard in all function rooms);

6. The roof of the development shall be constructed to achieve **R_w 45**. Suitable construction would be:
    - Sheet metal lining; to
    - Bradford Anticon 60 MD over purlins; to
    - Minimum 150mm timber or steel purlins; with
    - 185mm Gold Batts 3.5 in the ceiling cavity; to
    - Rondo furring channels at 600mmm centres; and
    - Lined with 1 layer* of 13mm Gyprock Standard plasterboard (*2 layers of 13mm sound rated plasterboard in all function rooms);

7. Ventilation to the outdoor gaming area is to be provided by acoustic louvres located above the ground floor facade wall. The louvres shall be capable of achieving the following sound transmission loss:

Table 5.2 Required Sound Transmission Loss for Acoustic Louvres to Outdoor Gaming Area[1]

63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
4 dB	7 dB	9 dB	13 dB	14 dB	12 dB	12 dB	8 dB

Note. 1) Performance data based on Fantech SBL1, or equivalent louvre.

8. The facade walls of the pondside dining area shall be full height to the extent shown in **Appendix A**. The facade walls, and roof must be constructed using suitably dense material (15kg/m^3), such as masonry, double layer Colorbond, 12mm Perspex, or equivalent material; and

9. Following development approval and prior to construction certification, an acoustic consultant is to be engaged to review the proposed fit-out and construction and provide appropriate acoustic design advice.

5.4 INTERNAL ACOUSTIC DESIGN

Acoustic Dynamics advises the sound transmission performance of the building envelope is determined by the level of noise generated within the internal areas. To reduce the level of noise generated, it is necessary to provide patrons with a comfortable internal acoustic environment. A comfortable acoustic environment is conducive to good speech intelligibility which will reduce the need for patrons to use excessive vocal effort.

Acoustic Dynamics provides the following internal acoustic design and finishes guide to ensure the build-up of reverberant energy is adequately controlled and an acceptable acoustic environment is maintained within all potentially high-risk internal areas of the venue:

1. Absorptive finishes shall be included within the **internal** and **external** dining areas, the function rooms, and function room terrace areas to reduce the build-up of reverberant noise from patrons and music. The following absorptive finishes are recommended:

Table 5.3 Recommended Sound Absorptive Finishes for Internal Restaurant and Dining Areas

Surface	Finish	Minimum Noise Reduction Coefficient (NRC[1])	Description
Walls	Absorptive Panels	0.90	• Minimum 50mm thick panels affixed to 50% of available wall space with a minimum 50mm air gap.
Ceiling	Absorptive Panels or Acoustic Sprayed Plaster	0.90	• Minimum 50mm thick panels affixed to 50% of available wall space with a minimum 50mm air gap; or • Acoustic plaster sprayed directly onto minimum 25mm fibreglass, fixed to the ceiling plasterboard lining or underside of soffit.
Floors	Carpet	0.10	• Low pile carpet.

Note: 1) NRC is an average rating of how much sound is absorbed by a material. NRC ratings range from 0 to 1. The higher the NRC, the more sound energy is absorbed.

2. Where absorptive panels have been specified, the following absorptive panels would be suitable:

Table 5.4 Acoustic Panel Suppliers

Supplier	Product	Website
Acoustica	50mm QuietSpace™ Panel	www.acoustica.com.au
Autex	50mm Quietspace™ Panel	www.autexglobal.com/au
Ecoustic	50mm Acoustic Soffit	www.instyle.com.au

3. Where the installation of panels to wall areas is not feasible, consideration should be given to the installation of soft fabrics and materials to the wall surfaces. The intent of all wall-mounted absorption is to provide a soft finish to reduce the reflection of sound; and

4. With any absorptive covering, coverage of minimum 50% of the total subject area is an ideal target to aim for. Exact placement of the acoustic treatment is not the primary acoustic concern as, in most cases, the aesthetic considerations of the room are likely to take precedence. However, the total surface area of such panels should be maximised, with as many panels as feasible installed, particularly within the open-plan patron areas.

5.5 MECHANICAL SERVICES

At this stage of the proposal, Acoustic Dynamics understands the selection and location of specific items of mechanical plant have not yet been finalised. Acoustic Dynamics is satisfied that mechanical plant noise can be controlled by practical and standard mitigation measures.

To achieve compliance with the relevant noise emission criteria, Acoustic Dynamics advises that mechanical plant should be selected such that the overall sound power levels of items do not exceed the levels specified below:

Table 5.5 Recommended Maximum Sound Power Levels for Mechanical Plant

Source	Recommended Maximum Sound Power Level L_w [dB(A)]
Kitchen exhaust fan	80
Cool room compressor	80
Cool room exhaust fan	80
Toilet exhaust fan	65
Heating/cooling plant	85

Acoustic Dynamics provides the following general mechanical plant controls and considerations to ensure compliance with the relevant criteria is achieved:

1. All plant is to be located within the rooftop plant deck areas. The plant decks are to be enclosed with a suitable acoustic barrier and acoustic louvre (See **Section 5.6**);

2. Where feasible, mechanical plant supply and return outlets should be located in a manner that utilizes shielding from the adjacent building structure;

3. If required, acoustic screening (fibre cement sheeting or equivalent) can be constructed around outlets to provide appropriate shielding. Detailed construction advice should be provided from an acoustic consultant following selection of mechanical plant);

4. Where feasible, mechanical plant should be programmed to turn off during non-trading hours;

5. Ductwork should be isolated from the building structure via the use of spring hangers or resilient mounts;

6. Reduce mechanical plant vibration through inspection and where necessary maintenance and repair of any fans, motors or ductwork. Inspection and maintenance should include motors, shafts, bearings, belts and tightening of any loose parts or connections; and

7. Where further control of mechanical noise emission is deemed necessary, this could be achieved through installation of noise barriers, screening and in duct attenuators.

Following development approval and determination of a detailed mechanical layout and schedule, Acoustic Dynamics recommends that a full **mechanical noise emission assessment** be completed by an appropriately qualified acoustical consultant prior to obtaining construction certification.

5.6 ACOUSTIC BARRIERS

Acoustic Dynamics advises an acoustic barrier is required to mitigate noise transmission from the development to the nearest receivers. The effectiveness of an acoustic barrier is determined by its height, constructed materials and density.

1. A 3m high barrier is required along the eastern and south eastern perimeter of the site. The barrier must be close fitting to the ground and should have no gaps along the surface;

2. The mechanical plant deck areas are to be enclosed with a full height acoustic barrier (or minimum 900mm above the top of the plant). Acoustic louvres can be incorporated into the plant deck facade, and must be capable of achieving the following sound transmission loss:

Table 5.6 Required Sound Transmission Loss for Acoustic Louvres to Plant Deck

63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
5 dB	10 dB	14 dB	22 dB	27 dB	25 dB	21 dB	17 dB

Note. 1) Performance data based on Fantech SBL2, or equivalent louvre

3. An acoustic landscape baffle (primary acoustic landscape baffle) is to be incorporated into the landscaping directly to the north east of the bar pass-through (see drawing in **Appendix A**); and

4. The acoustic barriers must meet the following specifications:
   i. The acoustic barrier must provide a minimum surface density of **15 kg/m^2** and contain **no gaps** along the surface. All gaps are to be adequately sealed using a flexible mastic sealant. Acoustic Dynamics advises that the acoustic barrier could be constructed to be:
      - A double layer Colorbond 0.8mm BMT (or equivalent) construction;
      - Masonry (brick or concrete) construction;
      - A minimum 9mm thick compressed fibre-cement sheeting on a timber or steel stud; or
      - Other suitable material (minimum surface density of **15 kg/m^2**) such as Perspex or equivalent;

5.7 BUILDING MATERIAL CERTIFICATION

Acoustic Dynamics advises that all building materials specified must be tested and certified by a locally recognised and accepted testing agency in respect of their intended use. Where appropriate, materials and noise mitigation measures specified by Acoustic Dynamics must be certified by a locally recognised and qualified professional for suitability (structural, wind loading, or other) for the intended use.

6 AIRCRAFT NOISE INTRUSION ASSESSMENT

6.1.1 QUEANBEYAN PALERANG REGIONAL LEP 2022

Clauses 7.9 and 7.10 of the Queanbeyan Palerang Regional LEP 2022 contain the following relevant information relating to aircraft noise intrusion.

"7.9 Development in areas subject to aircraft noise

(1) The objectives of this clause are as follows—
(a) to prevent certain noise sensitive developments from being located near Canberra Airport and the airport flight paths,
(b) to minimise the impact of aircraft noise from the airport and the flight paths by requiring appropriate noise attenuation measures in noise sensitive buildings,
(c) to ensure development near the airport does not hinder or have other adverse impacts on the ongoing, safe and efficient operation of Canberra Airport.
(2) This clause applies to development—
(a) on land—
(i) near Canberra Airport, and
(ii) in an ANEF contour of 20 or greater, and
(b) the consent authority considers likely to be adversely affected by aircraft noise.

(3) Development consent must not be granted to the development unless the consent authority—

(a) considers whether the development will result in an increase in the number of dwellings or people affected by aircraft noise, and

(b) considers the location of the development in relation to the criteria set out in Table 2.1 (Building Site Acceptability Based on ANEF Zones) in AS 2021:2015, and

(c) is satisfied the development will meet the indoor design sound levels shown in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021:2015.

(4) In this clause—

ANEF contour means a noise exposure contour shown as an ANEF contour on the Noise Exposure Forecast Contour Map for Canberra Airport prepared by the Commonwealth Department responsible for airports.

AS 2021:2015 means AS 2021:2015, Acoustics—Aircraft noise intrusion—Building siting and construction.

7.10 Aircraft noise—development in the South Jerrabomberra Urban Release Area

(1) The objective of this clause is to provide specific controls in relation to noise sensitive development in the South Jerrabomberra Urban Release Area.

(2) This clause applies to development on land in the South Jerrabomberra Urban Release Area.

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied the development will meet the indoor design sound levels shown in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021:2015.

(4) In this clause—

AS 2021:2015 means AS 2021:2015, Acoustics—Aircraft noise intrusion—Building siting and construction.

South Jerrabomberra Urban Release Area means the land shown as "South Jerrabomberra" on the Urban Release Area Map."

6.1.2 AS 2021:2015

AS 2021:2015 provides guidance on the siting and construction of buildings in the vicinity of airports to minimise aircraft noise intrusion.

The standard provides guidance for determining whether the extent of aircraft noise intrusion makes building sites "*Acceptable*", "*Conditionally Acceptable*", or "*Unacceptable*", and the type of building construction necessary to provide a given noise reduction.

The relevant tables for ANEF zones and indoor design sound levels are reproduced below:

Table 6.1 Building Site Acceptability based on ANEF Zones (AS 2021:2015 Table 2.1)

Building Type	ANEF zone of site		
	Acceptable	Conditionally Acceptable	Unacceptable
Hotel, motel, hostel	*Less than 20 ANEF*	*25 to 30 ANEF*	*Greater than 30 ANEF*
Commercial building	*Less than 25 ANEF*	*25 to 35 ANEF*	*Greater than 35 ANEF*

NOTES: 1) The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.

2) Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).

Table 6.2 Indoor Design Levels for Determination of Aircraft Noise Reduction (AS 2021:2015 Table 3.3)

Building Type and Activity	Indoor Design Sound Level, dB(A)
Hotels, motels, hostels	
Social activities	*70*
Commercial buildings, offices and shops	
Private offices, conference rooms	*55*
Drafting, open offices	*65*

The noise levels referred to in **Table 6.2** above are maximum internal noise levels (dB(A)) from an aircraft flyover, when external windows and doors are closed.

6.1.3 MAXIMUM AIRCRAFT NOISE LEVEL & ANR

Based on a review of the noise logging data conducted on site, the maximum noise level associated with an aircraft flyover is L_{Amax} **79 dB**. To achieve the most internal design levels detailed in **Table 6.2**, the aircraft noise reductions required to be incorporated into the building envelope are

- Staff room and meeting room **ANR 24 dB**; and
- Venue: **ANR 9 dB.**

6.1.4 AIRCRAFT FACADE DESIGN RECOMMENDATIONS

To ensure the internal design levels are achieved, the following construction is to be implemented:

1. Staff room and meeting room:
   i. Glazed components to be 12.38mm laminate to achieve **R_w 33**;
   ii. Any sound flanking paths (airgaps) around the windows, doors, framing components and wall structure must be sealed **airtight** to provide adequate acoustic insulation. All airgaps are to be sealed with a flexible mastic sealant;
   iii. Sliding doors should have a high performing wipe and sweep seal installed to form an **airtight seal** between the sliding door and the adjacent panel and stile;
   iv. Operable windows should be fitted with a compressible perimeter seal to form an **airtight seal** when the window is closed;

v. The acoustic performance of the selected glazing frames be confirmed with the suppliers, to ensure that the glazing and frame systems will achieve the minimum acoustic performance levels recommended above;

2. Development Roof:
   i. Construction required to achieve **R_w 45**;
   ii. Suitable construction would be:
      - Sheet metal lining; to
      - Bradford Anticon 60 MD over purlins; to
      - Minimum 150mm timber or steel purlins; with
      - 185mm Gold Batts 3.5 in the ceiling cavity; to
      - Rondo furring channels at 600mmm centres; and
      - 1 layer of 13mm Standard plasterboard; OR
      - Alternate equivalent construction to achieve **R_w 45**; and

   iii. Any sound flanking paths or airgaps around structural, plumbing, and electrical components must be sealed airtight with a fire rated mastic sealant such as Gyprock Fire Mastic or CSR FireSeal to provide adequate acoustic insulation.

7 CONCLUSION

Acoustic Dynamics has assessed noise emission and environmental noise impacts associated with the operations of the proposed licensed premises located at 37 Tompsitt Drive, Jerrabomberra.

A review of the applicable local council, state government, federal legislation and international standards was conducted. Noise levels were assessed in accordance with the requirements of:

(a) Queanbeyan-Palerang Regional Council;
(b) Liquor and Gaming NSW;
(c) NSW Environment Protection Authority;
(d) Association of Australasian Acoustical Consultants; and
(e) Australian Standards.

Acoustic Opinion

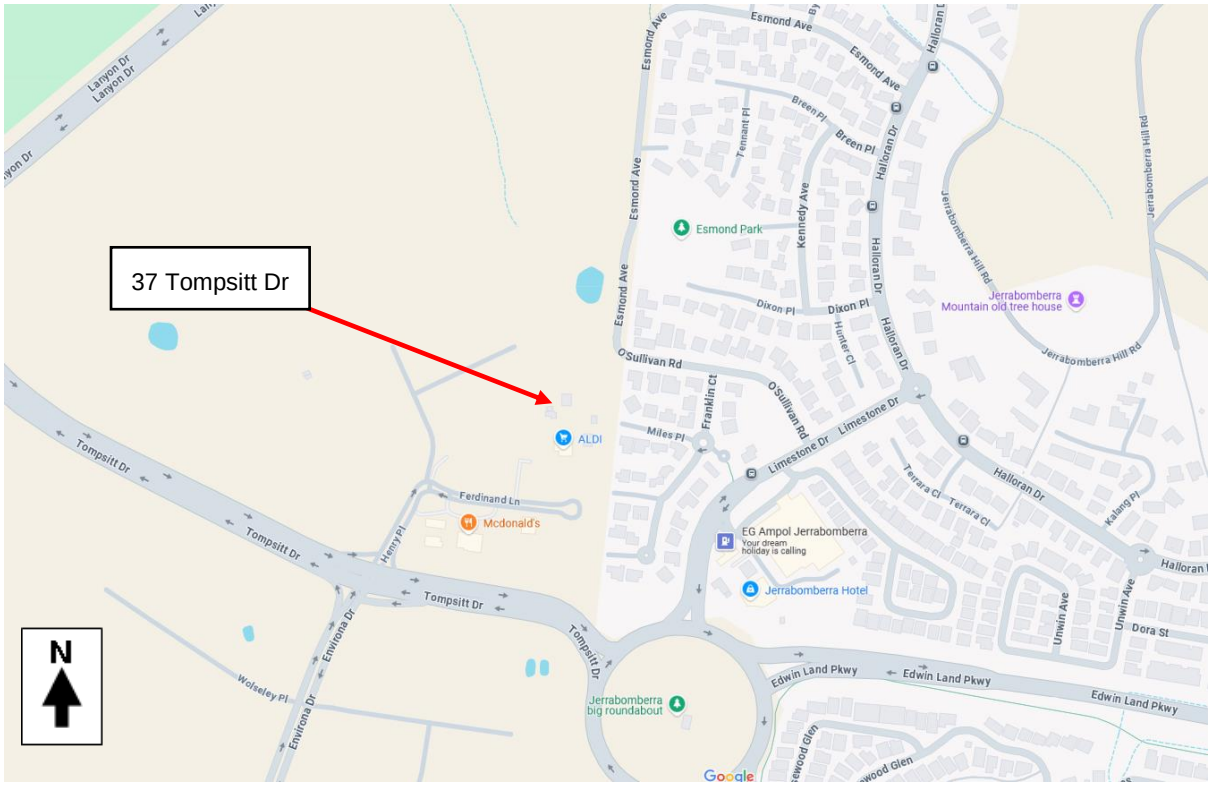
Further to our site survey, noise monitoring and measurements, our review of the relevant acoustic criteria and requirements, and our calculations, Acoustic Dynamics advises that the proposal can be designed to comply with the relevant acoustic criteria of Queanbeyan-Palerang Regional Council, the NSW OLG, NSW EPA, POEO Act 1997 with the incorporation of our recommendations detailed within this report.

It is our opinion that the acoustic risks associated with the proposal can be adequately controlled and the amenity of neighbouring properties and residents can be satisfactorily protected.

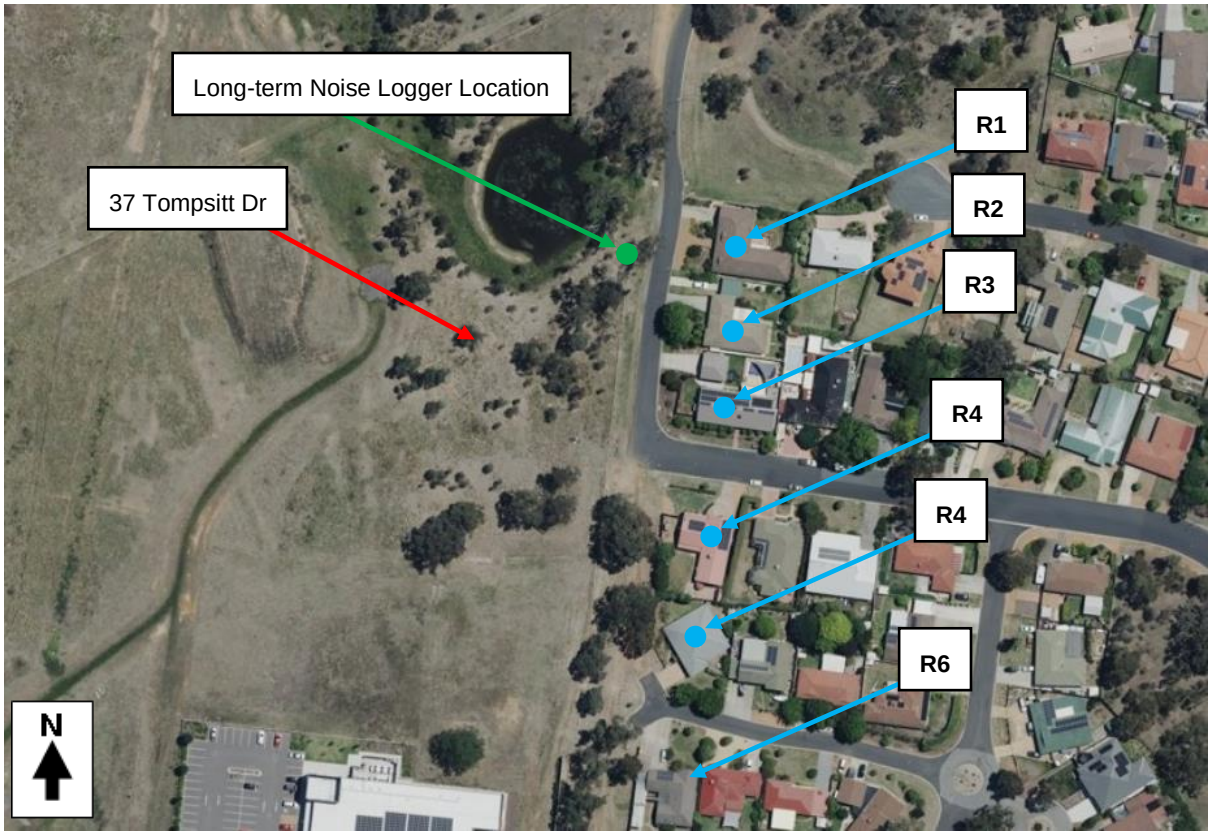
We trust that the above information meets with your present requirements and expectations. Please do not hesitate to contact us on 02 9908 1270 should you require more information.

APPENDIX A – LOCATION MAPS, DRAWINGS & PHOTOGRAPHS

A.1 LOCATION MAP



A.2 AERIAL IMAGE

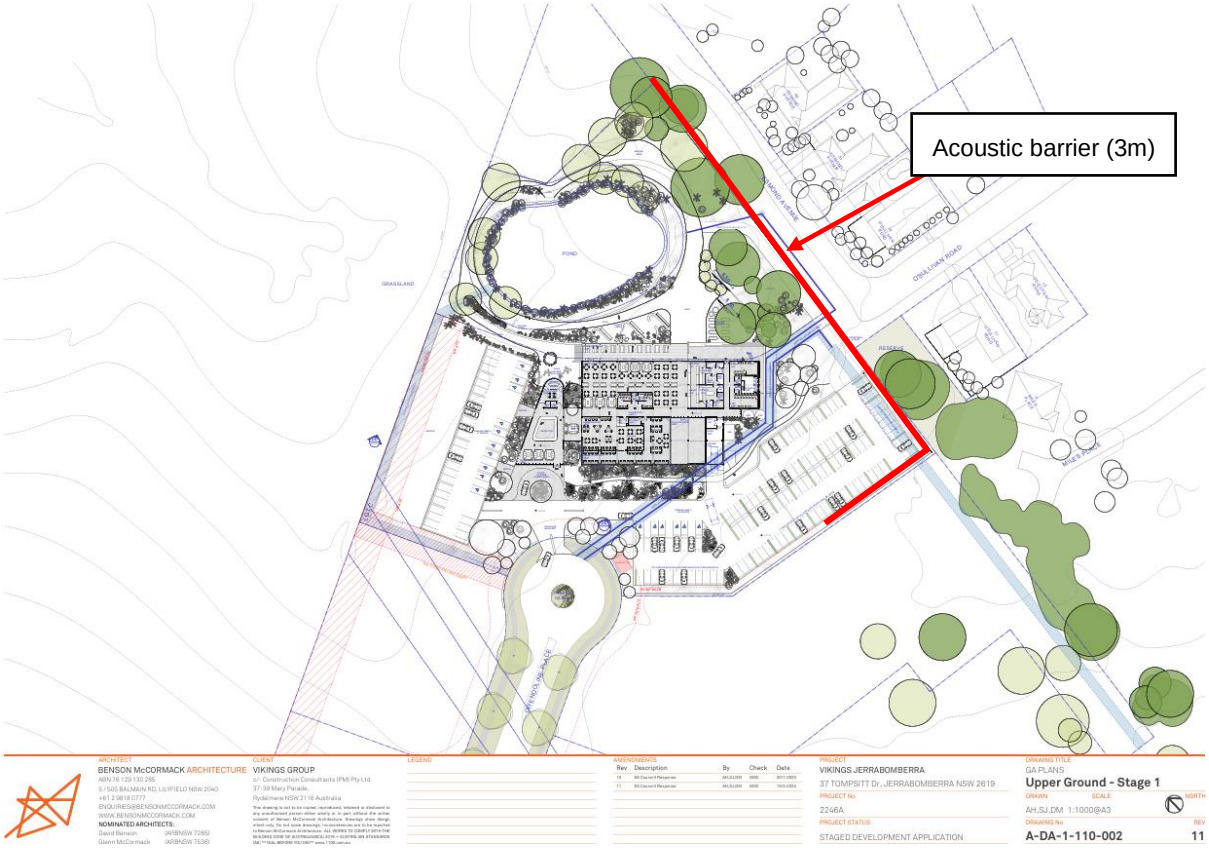


A.3 LOCATION CONTEXT

A.4 DRAWINGS

A.4.1 STAGE 1 LOWER GROUND PLAN

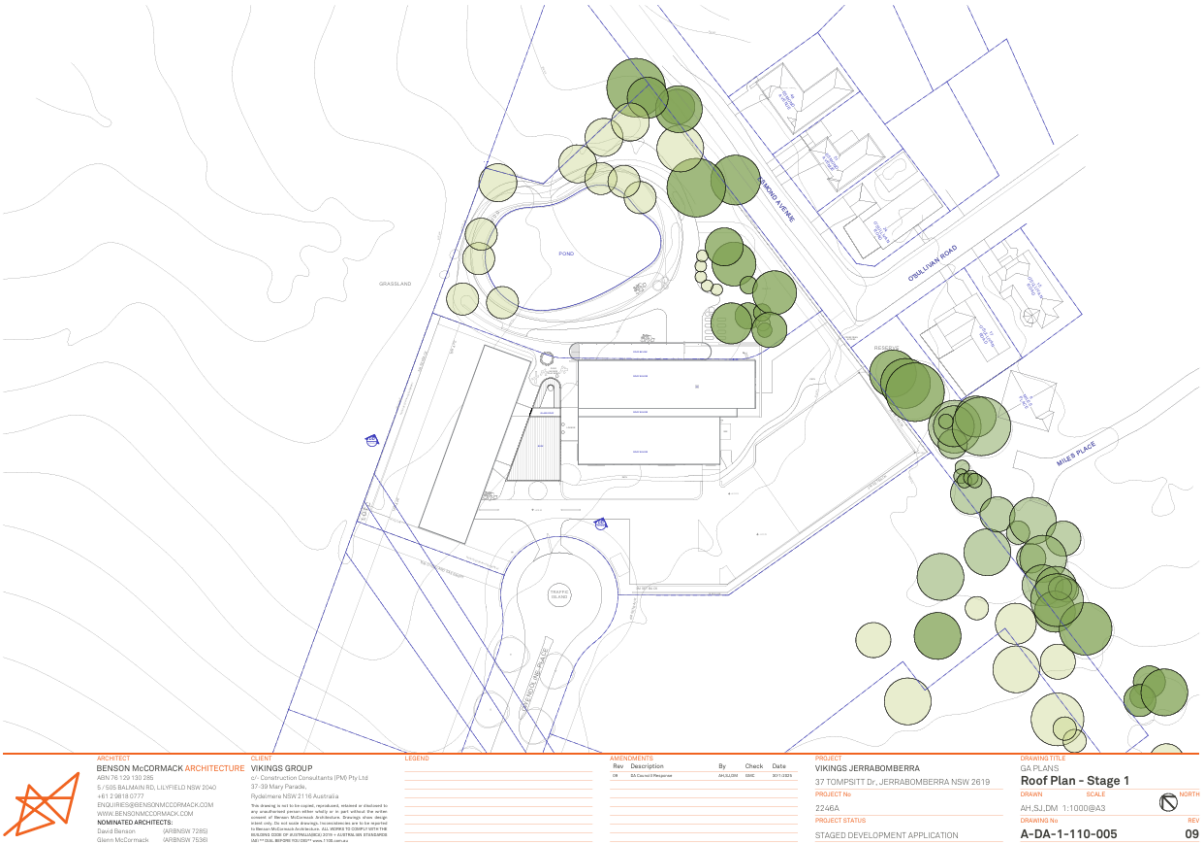
A.4.2 STAGE 1 UPPER GROUND PLAN



A.4.3 STAGE 1 MEZZANINE PLAN

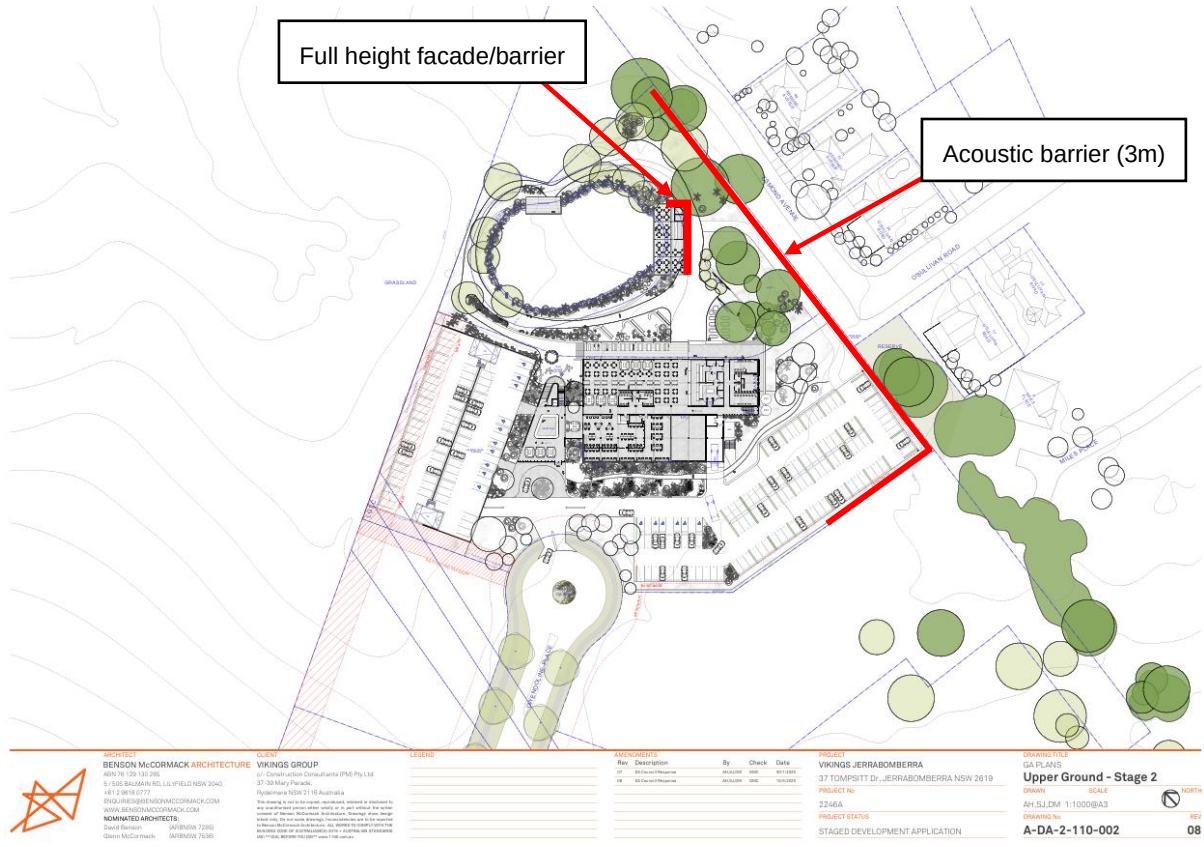
A.4.4 STAGE 1 LEVEL 1 PLAN

A.4.5 STAGE 1 ROOF PLAN



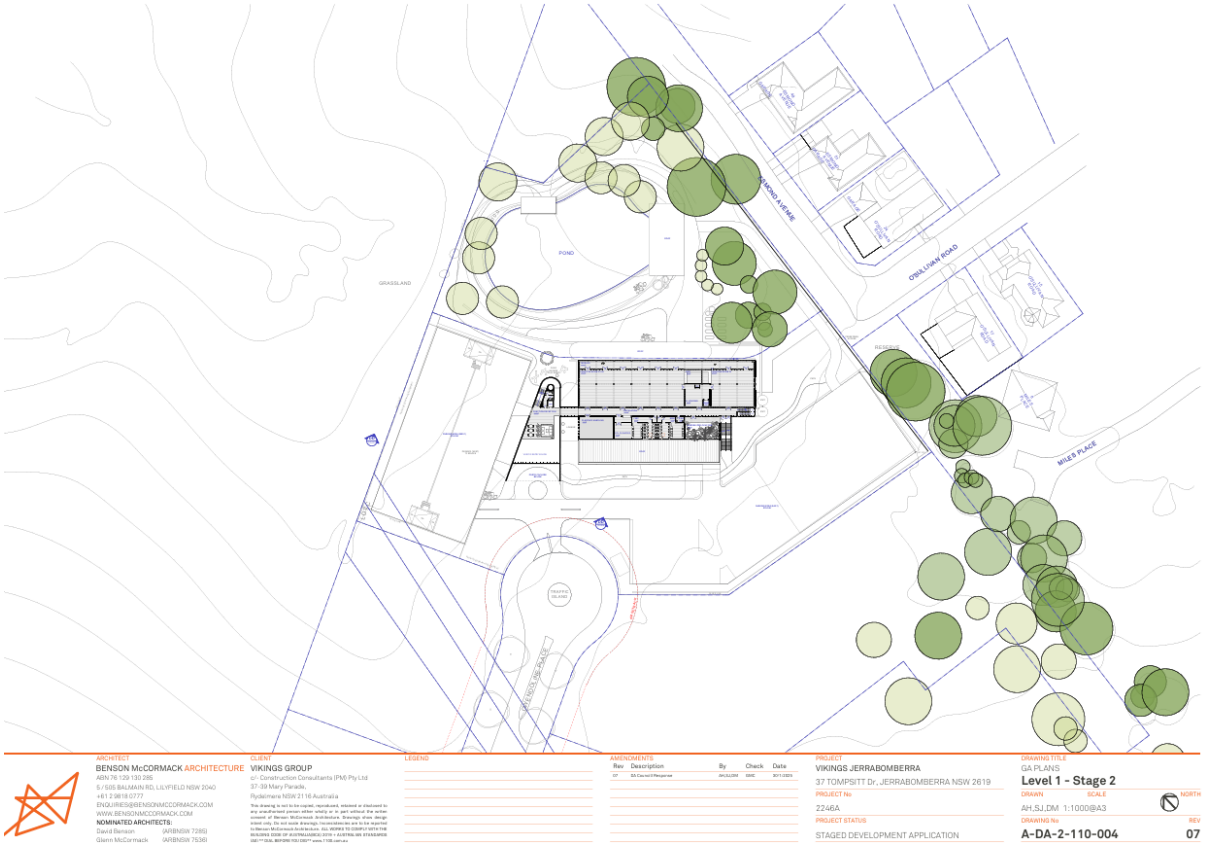
A.4.6 STAGE 2 LOWER GROUND PLAN

A.4.7 STAGE 2 UPPER GROUND PLAN

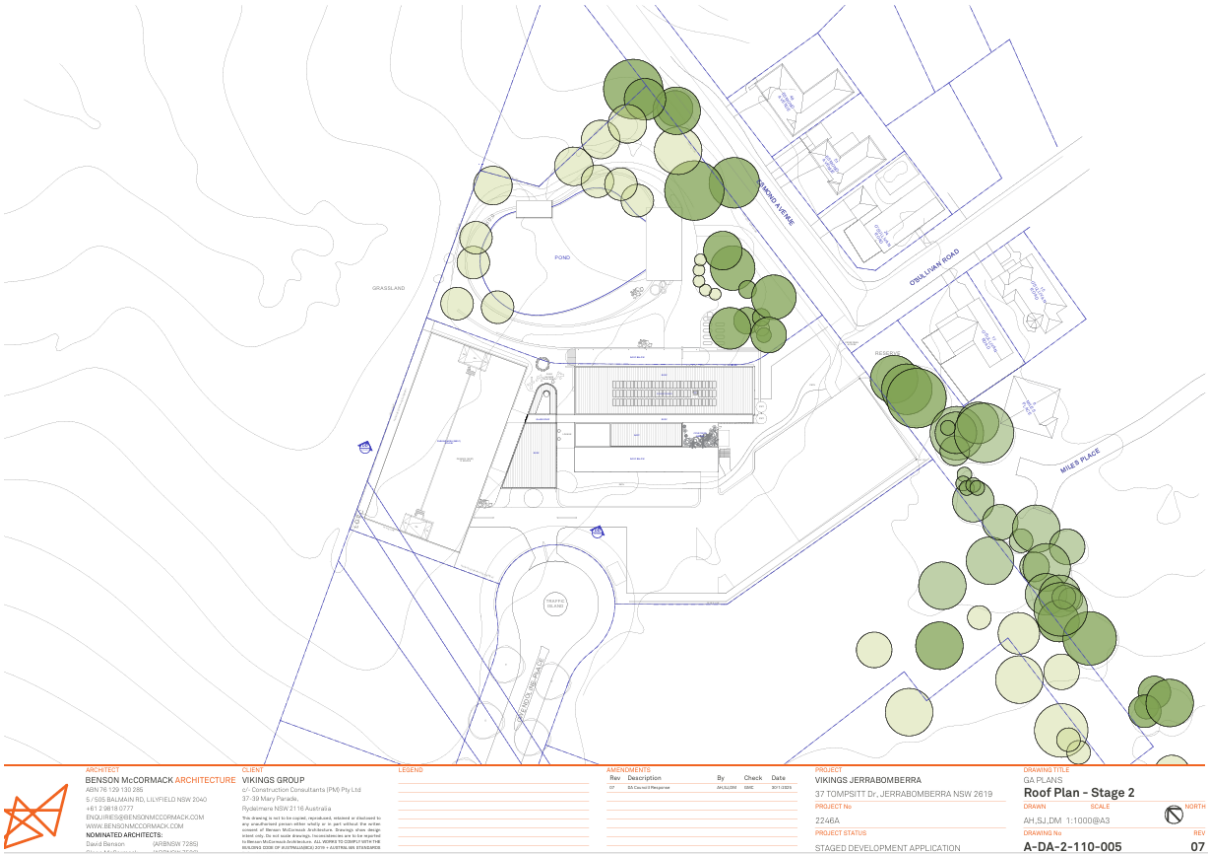


A.4.8 STAGE 2 MEZZANINE PLAN

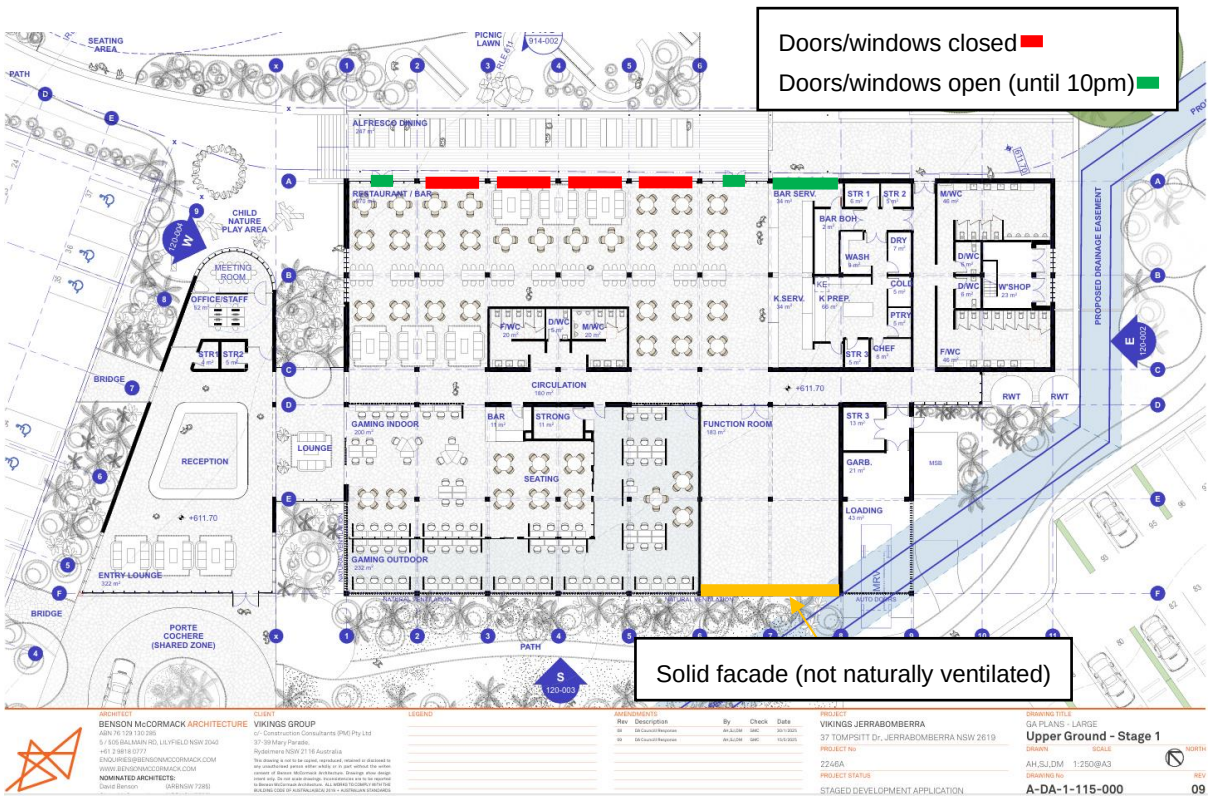
A.4.9 STAGE 2 LEVEL 1 PLAN



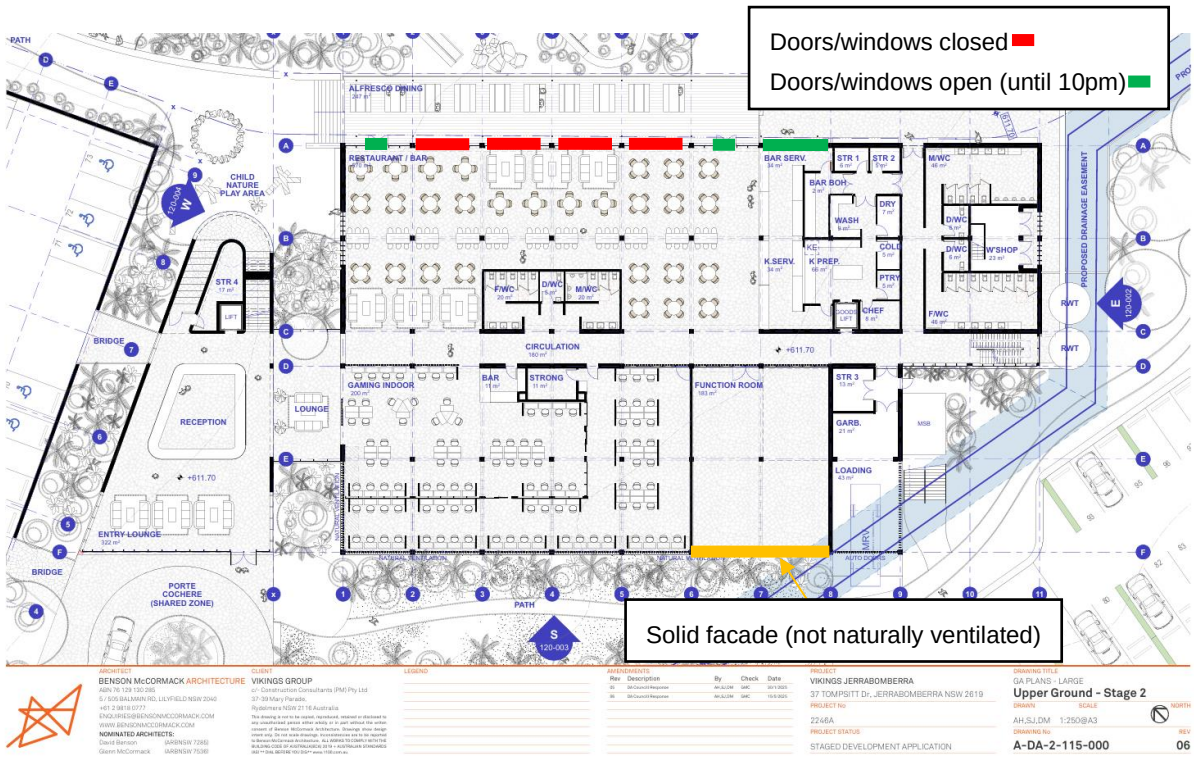
A.4.10 STAGE 2 ROOF PLAN



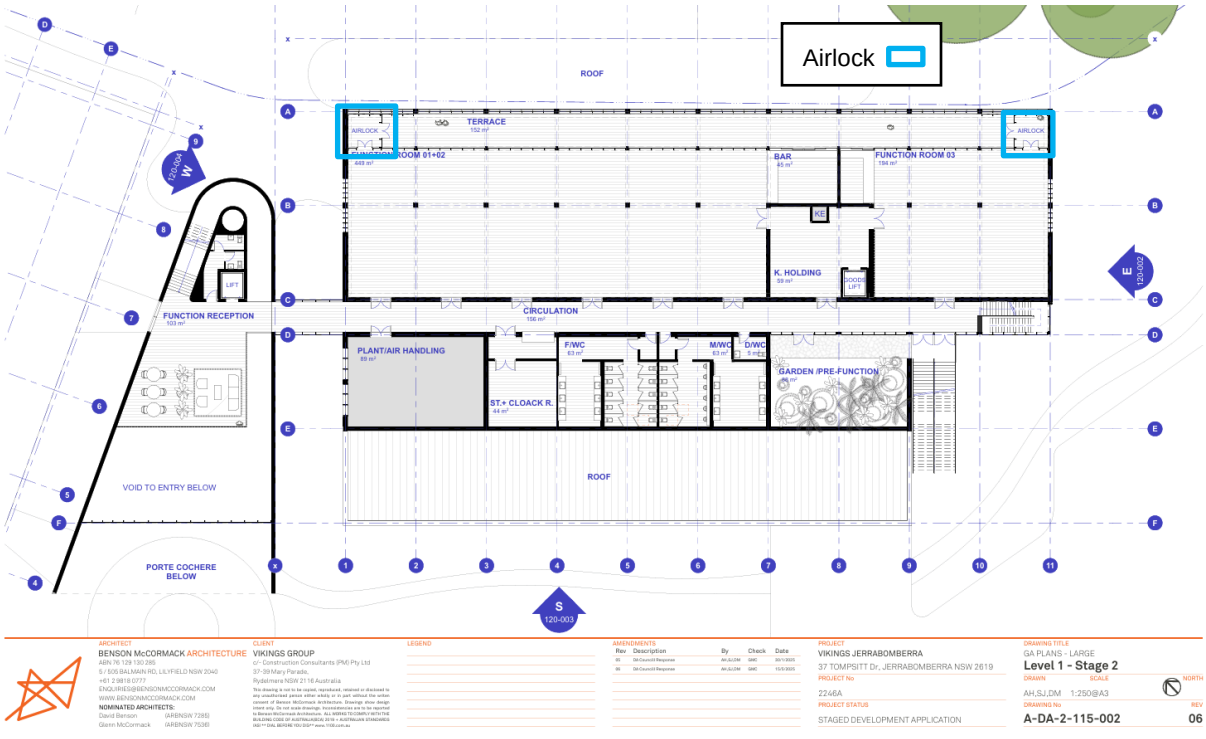
A.4.11 STAGE 1 UPPER GROUND LARGE



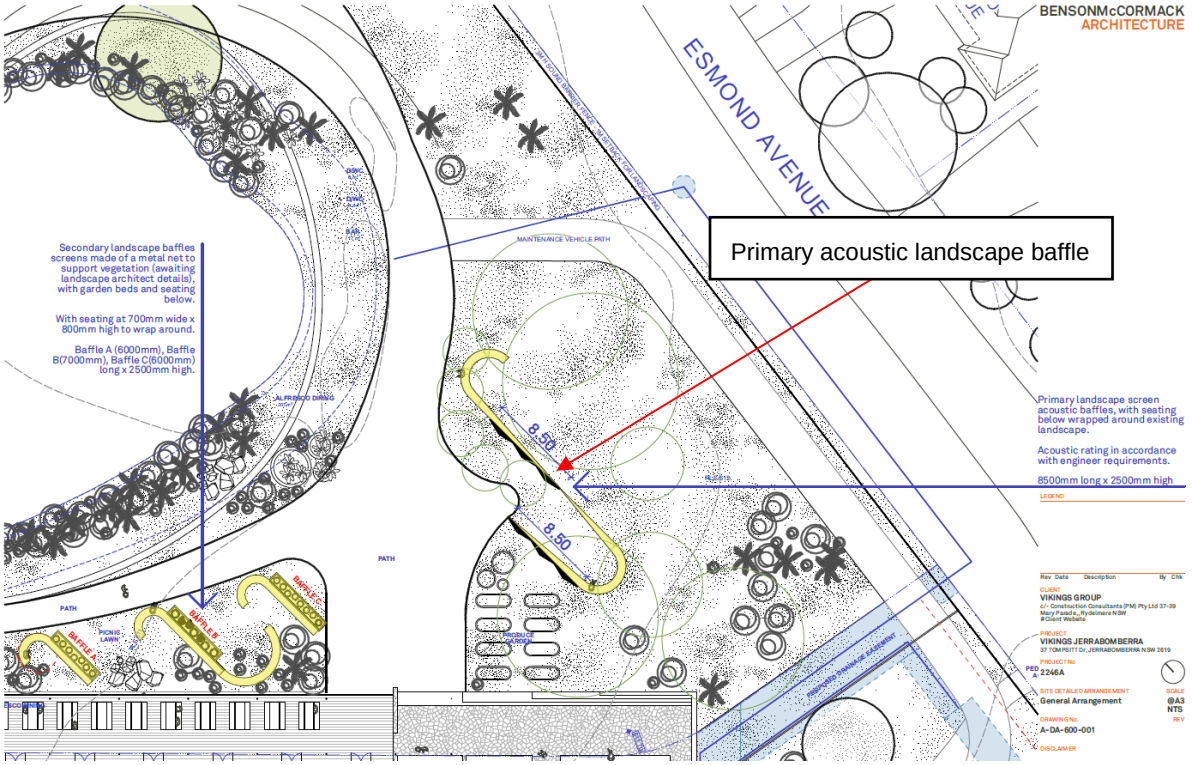
A.4.12 STAGE 2 UPPER GROUND LARGE



A.4.13 STAGE 2 LEVEL 1 LARGE



A.4.14 LANDSCAPE ACOUSTIC BAFFLE



A.5 INDIVIDUAL AREA OCTAVE BAND CONTRIBUTIONS

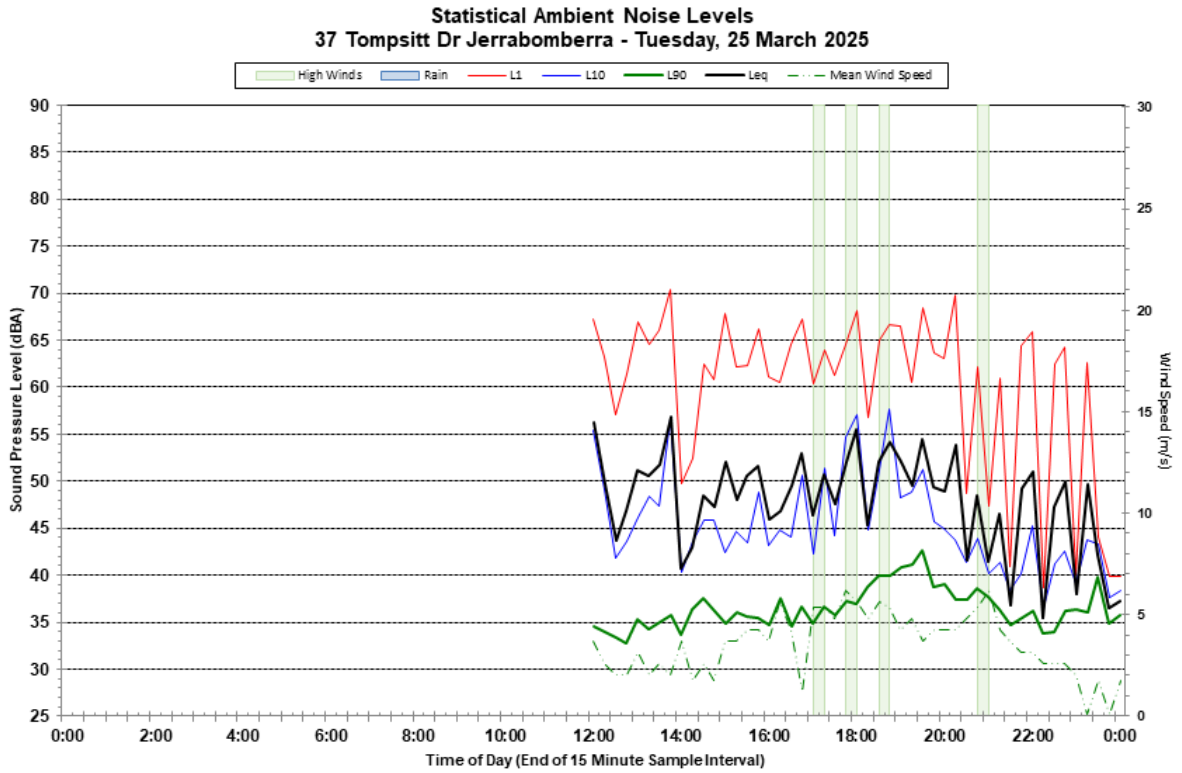
Receiver	Predicted L_{A10} Noise Contribution [dB]									
	Period	31.5 Hz	63 Hz	125 Hz	250Hz	500Hz	1kHHz	2kHz	4kHz	8kHz
Restaurant										
R1	Day	2	19	22	24	29	29	25	15	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	3	20	24	26	31	32	28	19	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	3	20	24	26	31	32	29	19	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	1	19	23	25	30	32	28	19	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	5	5	4	10	12	9	1	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	3	3	1	7	9	7	0	0
	Night	0	0	0	0	0	0	0	0	0
Restaurant (≤ 25% Capacity)										
R1	Day	0	16	20	21	26	27	23	13	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	1	18	21	23	29	29	25	16	0
	Night	0	0	0	0	0	1	0	0	0
R3	Day	0	18	21	23	29	29	26	16	0
	Night	0	0	0	0	0	1	0	0	0

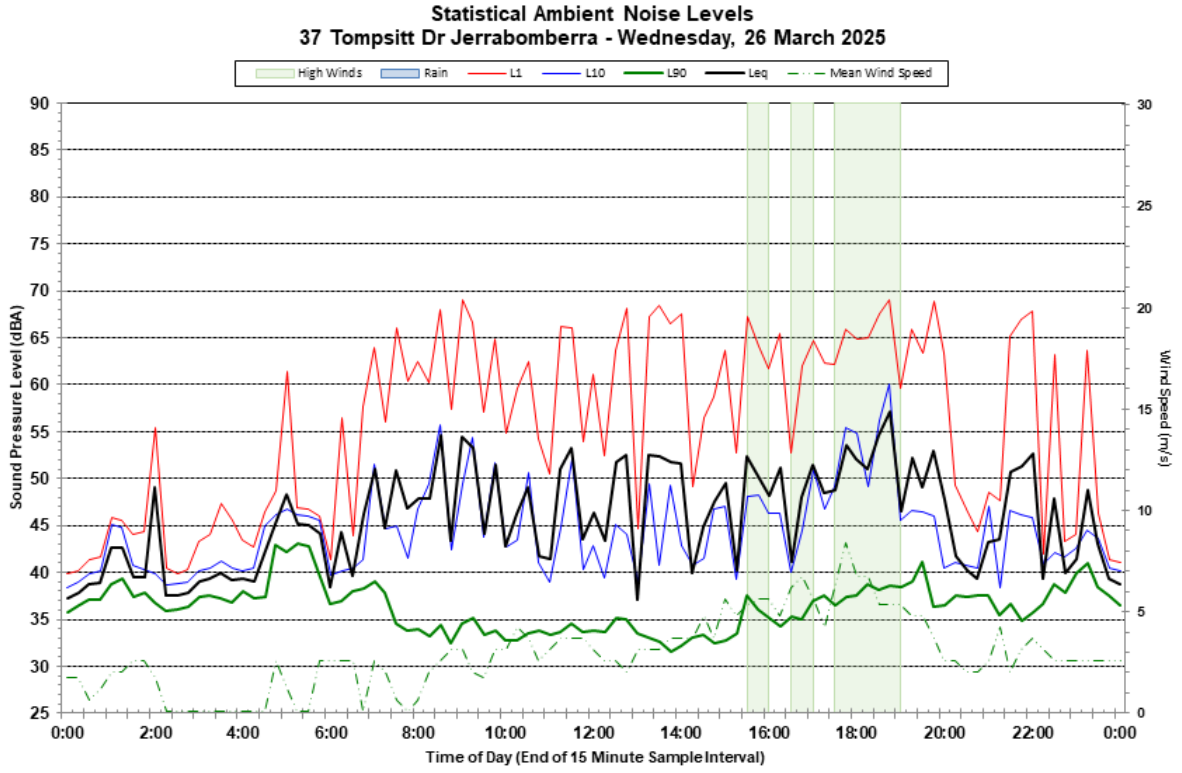
Receiver	Predicted L_{A10} Noise Contribution [dB]									
	Period	31.5 Hz	63 Hz	125 Hz	250Hz	500Hz	1kHHz	2kHz	4kHz	8kHz
R4	Day	0	16	20	22	28	29	26	17	0
	Night	0	0	0	0	0	1	0	0	0
R5	Day	0	2	2	1	7	9	7	0	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	0	0	0	5	7	4	0	0
	Night	0	0	0	0	0	0	0	0	0
Alfresco										
R1	Day	0	0	0	15	24	24	19	11	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	0	0	1	15	24	23	17	8	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	0	0	0	16	24	24	18	10	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	0	0	0	15	24	23	15	5	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	0	0	0	5	6	1	0	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	0	0	0	2	4	0	0	0
	Night	0	0	0	0	0	0	0	0	0
Outdoor Gaming										
R1	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	0	0	2	11	11	14	7	0
	Night	0	0	0	2	11	11	14	7	0
Upper Ground Function Room										
R1	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	0	0	2	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	0	4	1	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0

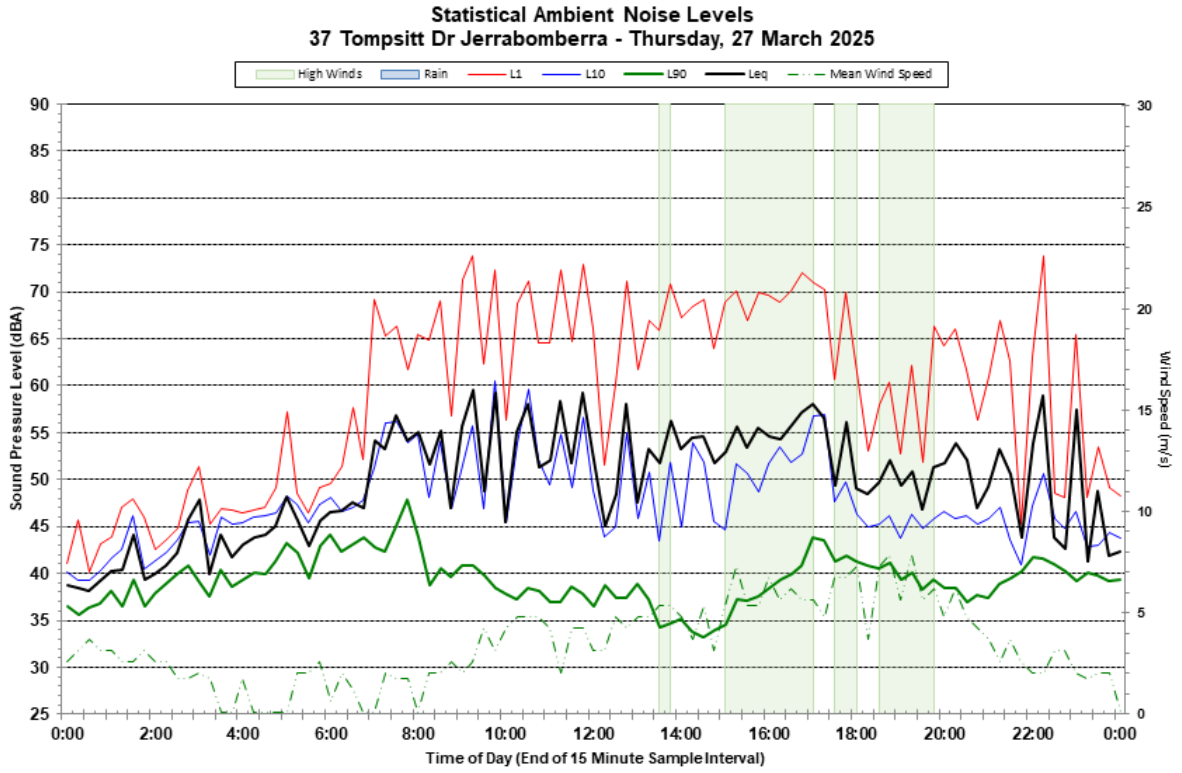
Receiver	Predicted L_{A10} Noise Contribution [dB]									
	Period	31.5 Hz	63 Hz	125 Hz	250Hz	500Hz	1kHHz	2kHz	4kHz	8kHz
R6	Day	0	0	10	9	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
Ingress Egress										
R1	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	0	0	0	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
Pondside Dining										
R1	Day	0	0	1	17	24	20	10	0	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	0	0	2	17	24	20	11	0	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	0	0	0	15	22	18	9	0	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	0	0	0	12	19	15	6	0	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	0	0	11	18	15	6	0	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	0	0	9	17	14	5	0	0
	Night	0	0	0	0	0	0	0	0	0
L1 Function Rooms										
R1	Day	0	0	21	20	7	9	16	0	0
	Night	0	0	0	0	0	0	0	0	0
R2	Day	0	0	22	22	9	12	19	0	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	0	0	23	22	10	13	20	0	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	0	0	21	20	8	11	18	0	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	0	16	12	0	0	4	0	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	0	12	7	0	0	0	0	0
	Night	0	0	0	0	0	0	0	0	0
Function Room Terrace										
R1	Day	0	0	0	15	25	24	16	8	0

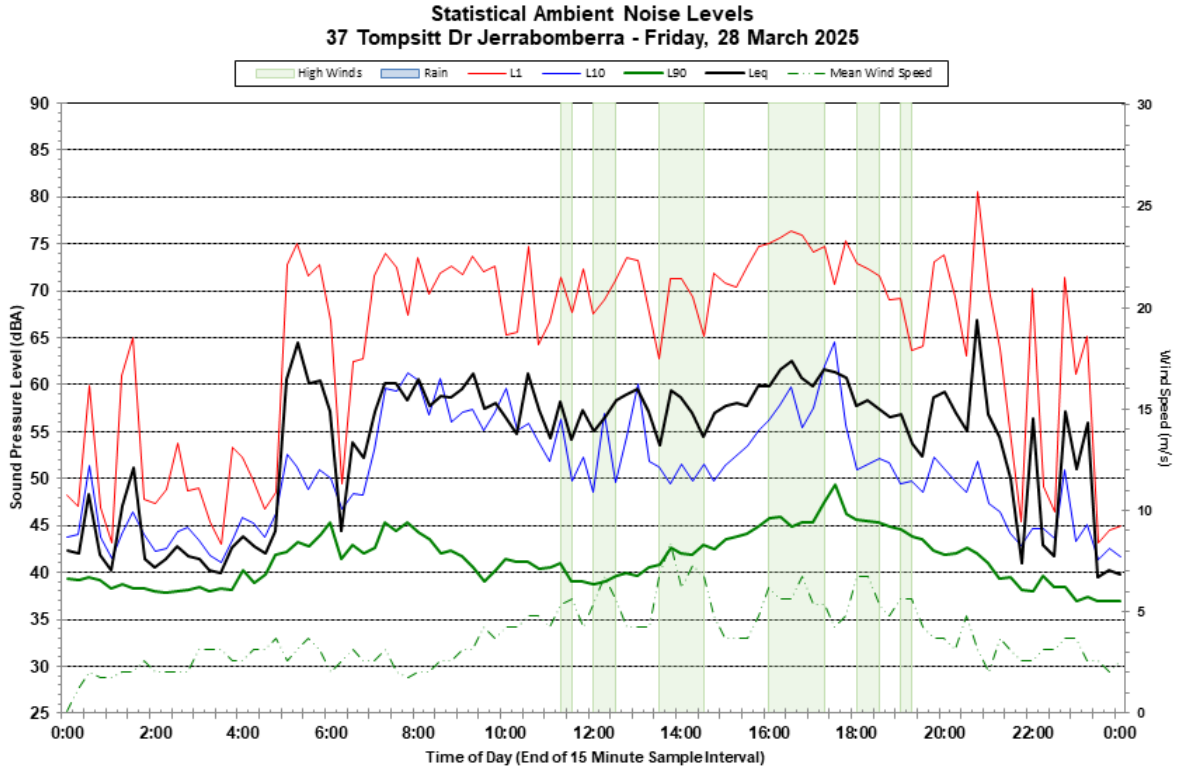
Receiver	Predicted L_{A10} Noise Contribution [dB]									
	Period	31.5 Hz	63 Hz	125 Hz	250Hz	500Hz	1kHHz	2kHz	4kHz	8kHz
	Night	0	0	0	0	0	0	0	0	0
R2	Day	0	0	0	16	26	25	18	10	0
	Night	0	0	0	0	0	0	0	0	0
R3	Day	0	0	0	16	26	25	18	9	0
	Night	0	0	0	0	0	0	0	0	0
R4	Day	0	0	0	14	24	23	16	7	0
	Night	0	0	0	0	0	0	0	0	0
R5	Day	0	0	0	3	10	6	0	0	0
	Night	0	0	0	0	0	0	0	0	0
R6	Day	0	0	0	0	5	1	0	0	0
	Night	0	0	0	0	0	0	0	0	0

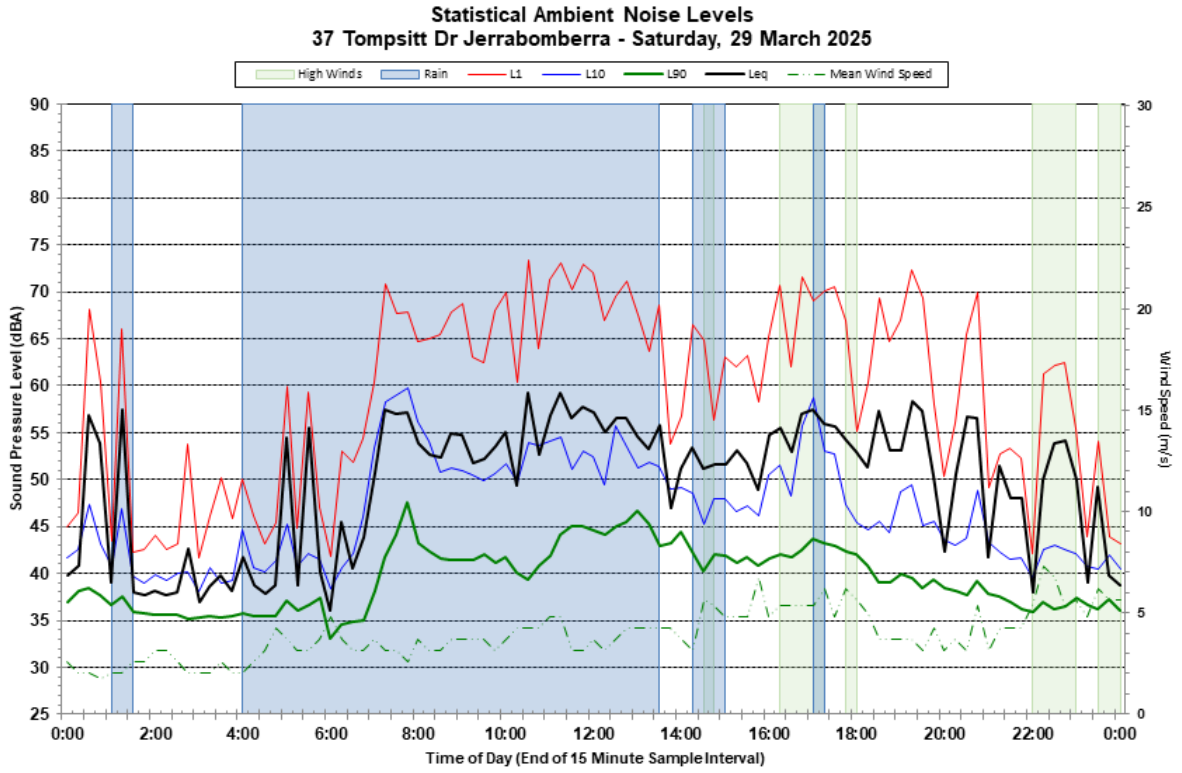
APPENDIX B – UNATTENDED NOISE LOGGER DATA

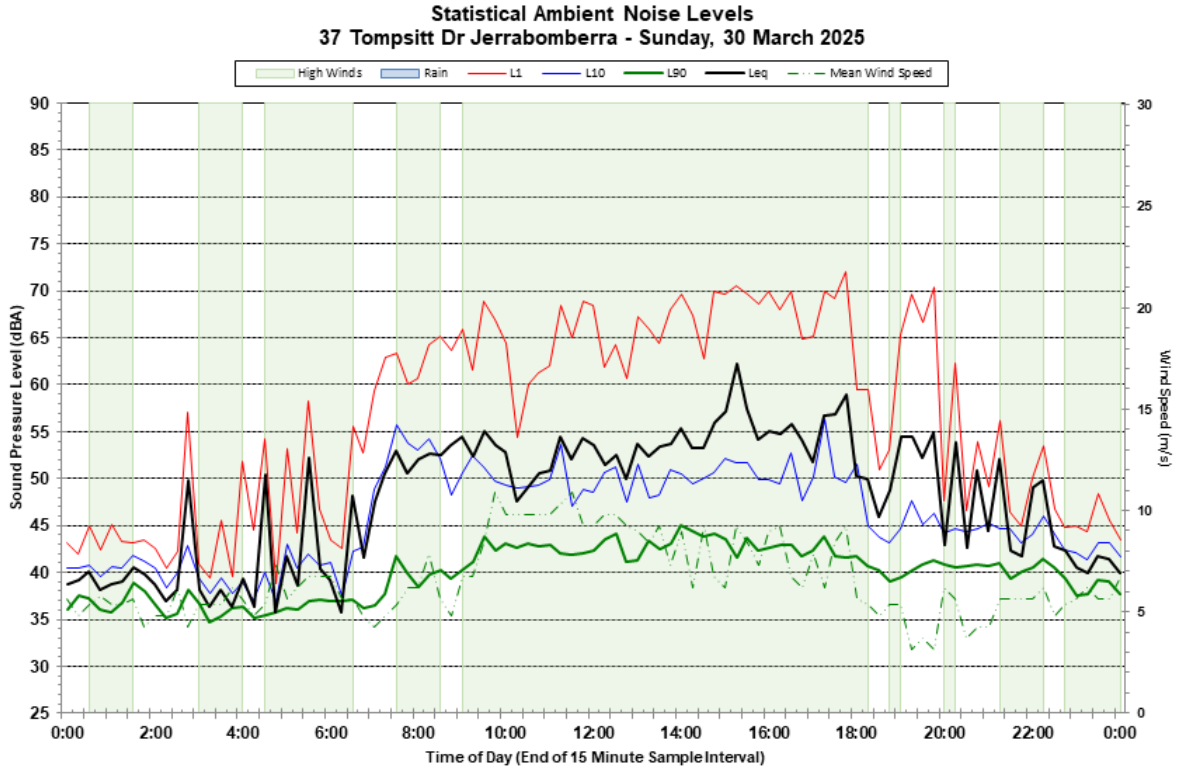


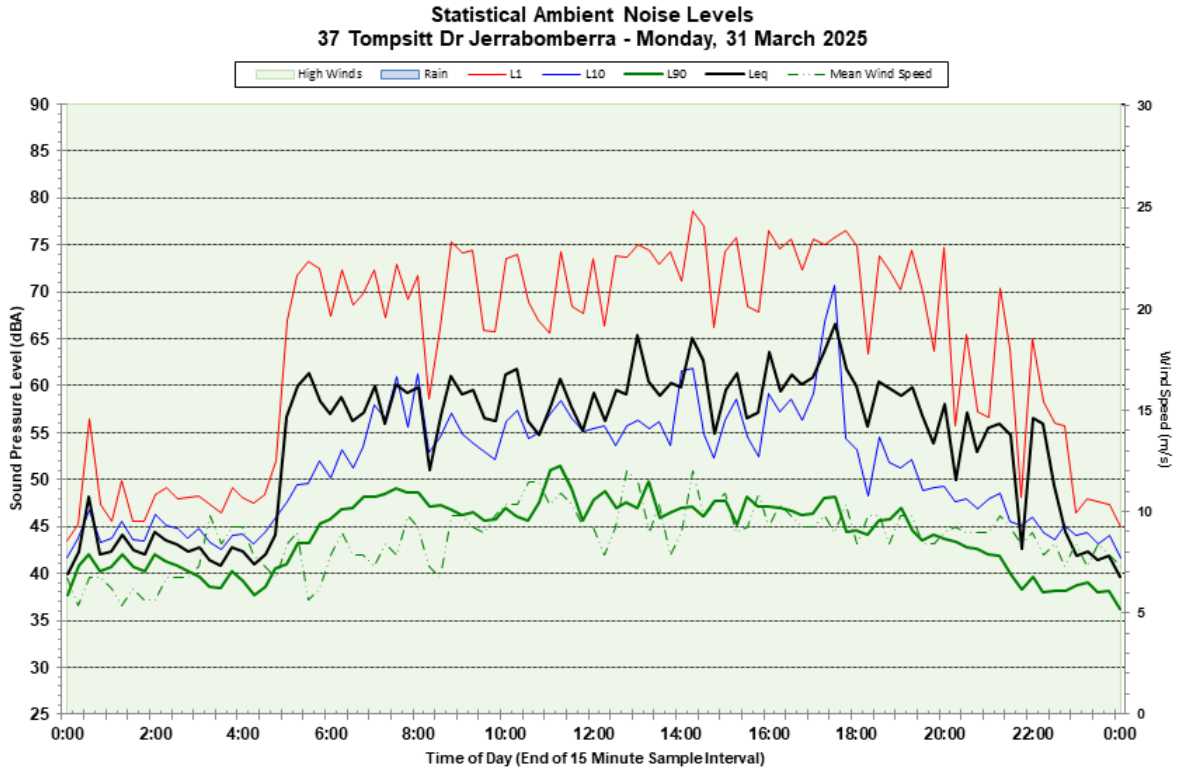


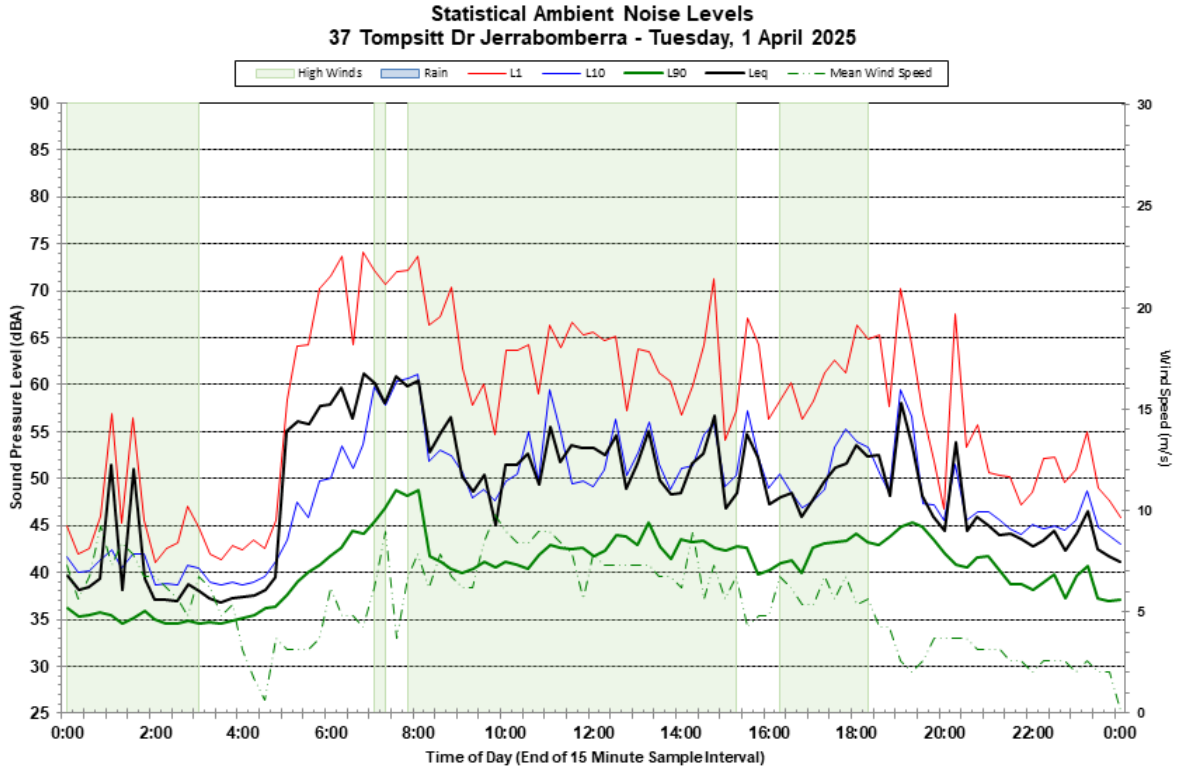

Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Thursday, 27 March 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)

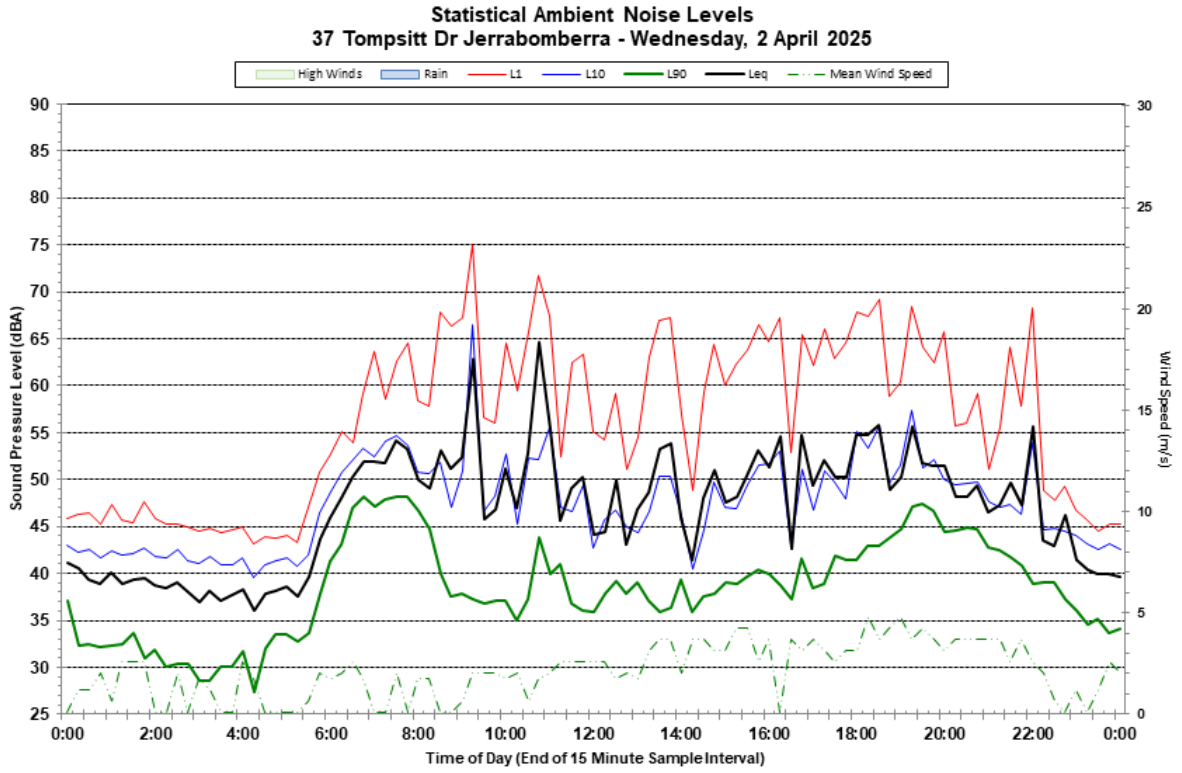

Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Friday, 28 March 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)

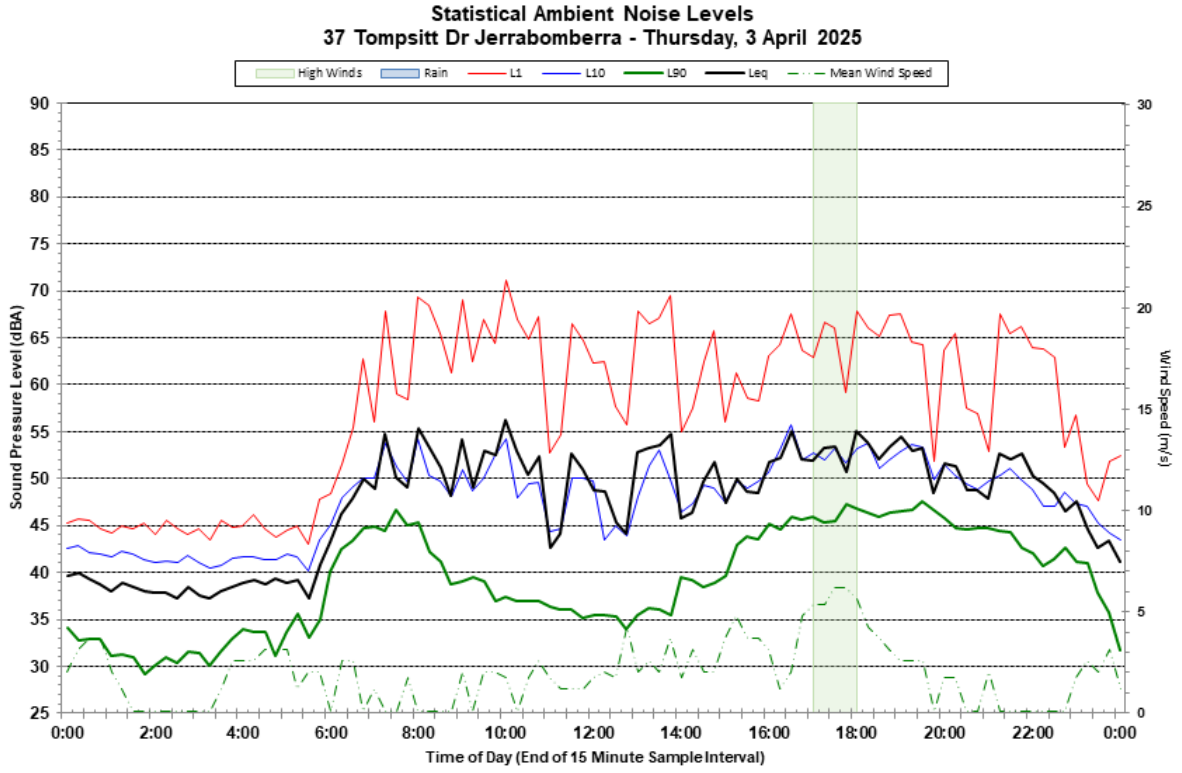

Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Saturday, 29 March 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)

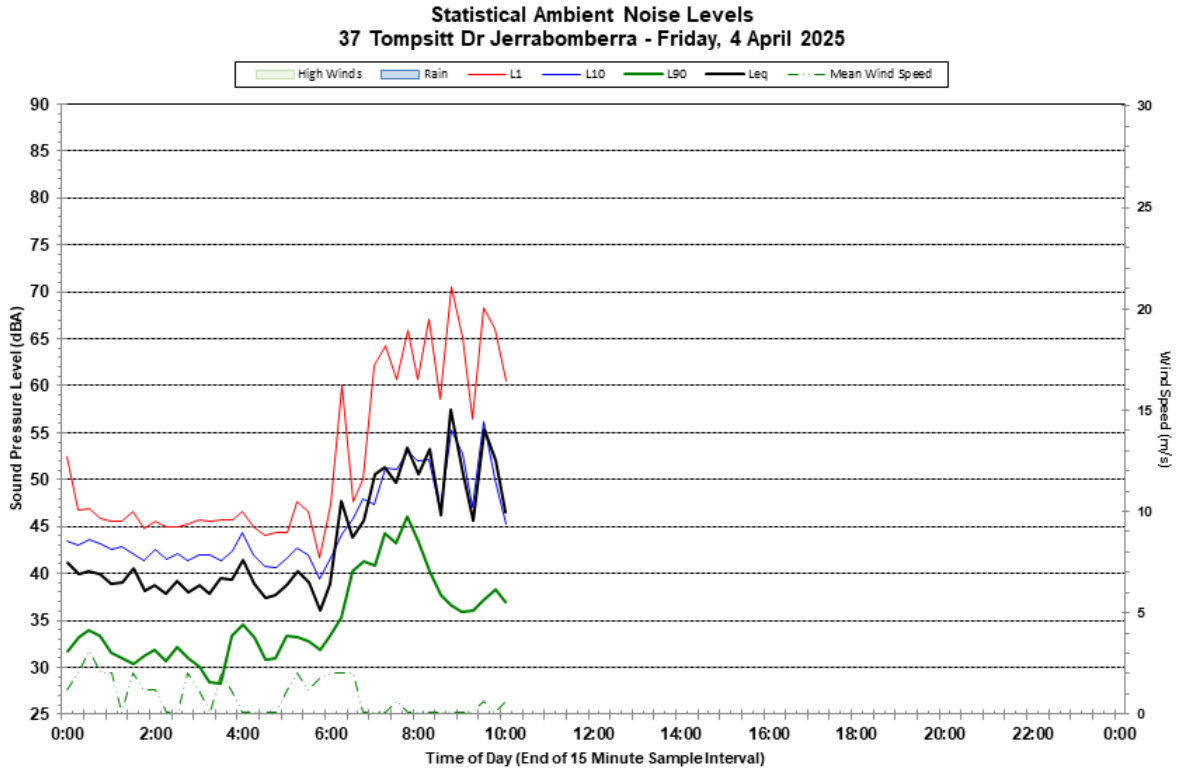

Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Sunday, 30 March 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Monday, 31 March 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Tuesday, 1 April 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Wednesday, 2 April 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Thursday, 3 April 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
37 Tompsitt Dr Jerrabomberra - Friday, 4 April 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
30
25
20
15
10
5
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00