Proposed Extension of Operating Hours
Fitstop Earlwood
335 Homer Street, Earlwood, NSW

Client:
TAF1-A Pty Ltd

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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 **TAF1-A Pty Ltd** to assess operational noise emission resulting from the use and operation of the proposed gym located at 335 Homer Street, Earlwood, NSW, in support of a proposed extension of its operating hours for DA.

This document provides an assessment of noise emission resulting from various noise sources associated with the operation of the proposed gym at the most potentially affected sensitive receiver locations, to achieve compliance with the relevant noise criteria and objectives. This assessment is prepared in accordance with the various acoustic requirements of:

(a) Canterbury-Bankstown Council;
(b) NSW Environment Protection Authority;
(c) Association of Australasian Acoustical Consultants; and
(d) Australian Standards.

1.2 PROJECT DESCRIPTION

The development proposal is for a gym to be located at 335 Homer Street, Earlwood, situated within a Local Centre (E1) land zone within the Canterbury-Bankstown Council area of NSW. The site is in a stand-alone building, bounded by commercial retail shop tenancies adjacent to the east and west. The nearest residential receivers are located across Homer Lane to the rear of the site.

Acoustic Dynamics understands that Council has requested an acoustic assessment be undertaken of the proposed operations of the gym to confirm that nearby sensitive receivers will not be adversely affected during the proposed extended hours.

Acoustic Dynamics understands the gym is approved to operate from 6:00am to 10:00pm, Monday through Friday. It is now seeking to extend its operating hours by one hour each morning, proposing to open from 5:00am.

Acoustic Dynamics understands the premise has a capacity for approximately 25 members, with additional staff. Public parking is available within the parking area along Homer Avenue, and patron access to the premises will be through the main entrance on Homer Street only. Acoustic Dynamics understands only staff are to use the rear access door and this will be kept closed at all times.

The various noise sources and operations associated with the gym are predicted to include:

- Exercise equipment including cardio equipment, weight machines and a free weights area;
- Amplified background music;
- Various items of mechanical plant;
- Vehicle movements; and
- Ingress and egress of patrons.

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.

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 and operator-attended measurements 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

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

- *Canterbury-Bankstown Council Local Environmental Plan 2023* (LEP); and
- *Canterbury-Bankstown Council Development Control Plan 2015* (DCP).

Acoustic Dynamics' review of the Canterbury-Bankstown Council LEP and DCP did not yield specific acoustic criteria or information relevant to this assessment.

2.2 STATE GOVERNMENT POLICIES AND LEGISLATION

2.2.1 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

Noise emission from the development must comply with the requirements of the *Protection of the Environment Operations Act 1997* (POEO Act). The POEO Act requires that the development must not generate *"offensive noise"*.

*"**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 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);
- *Road Noise Policy 2011* (RNP); and
- *Noise Guide for Local Government 2013* (NGLG).

References to applicable acoustic guidelines and requirements are summarised below.

2.3.1 NOISE POLICY FOR INDUSTRY 2017

The NPfI outlines and establishes noise criteria for industrial and other noise sources in various zoning areas. The following criteria have been applied for the assessment of noise emission associated with the use and operation of the 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 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.

PROJECT NOISE TRIGGER LEVEL

Acoustic Dynamics advises the Project Noise Trigger Level is the lower of the Project Intrusiveness and the Project Amenity Noise Levels.

Although the NPfI is used mainly for **industrial facilities** and does **not apply** for the assessment of operational noise emission from a commercial gymnasium, Acoustic Dynamics advises that achieving compliance with the NPfI's noise emission objectives applicable at the boundaries of the nearest sensitive receivers will adequately protect the acoustic amenity of these receivers.

2.3.2 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.

2.3.3 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 summarizes the sleep disturbance criterion:

$L_{Aeq,15min} \leq$ 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

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."*

2.4 ASSOCIATION OF AUSTRALASIAN ACOUSTICAL CONSULTANTS

Member firms of the Association of Australasian Acoustical Consultants (AAAC) have prepared the *Guideline for Acoustic Assessment of Gymnasiums and Exercise Facilities (Version 1.0, February 2022)* to assist members and local councils in accurately and fairly assessing the noise and vibration impact from gymnasiums on residential and commercial receivers.

2.4.1 GUIDELINE FOR ACOUSTIC ASSESSMENT OF GYMNASIUMS AND EXERCISE FACILITIES 2022

Contained within the guideline are recommendations of noise objectives to be used for the assessment of the impact of noise and vibration emission from gymnasiums and exercise facilities to nearby receivers.

GENERAL NOISE EMISSION TO RESIDENTIAL RECEIVERS

The section below outlines the relevant criteria applicable to noise emission levels from sources associated with the development at nearby residential receivers.

"3.3 Residential Receiver Noise Criteria

3.3.1 General Noise Emission to Residential Receivers

The following criteria apply to noise emission from music, patrons and staff within the premises to residential receivers. Note should be made that "general noise" does not include the occasional impulsive noise from activities such as weight drops. Such noise sources are assessed under "Impulsive Noise":

a) The $L_{A10(15min)}$ noise contribution from music, patrons and staff emitted from the gymnasium or exercise facility shall not exceed the background noise level in any octave band frequency (31.5 Hz to 8 kHz inclusive) by more than 5 dB at the boundary, or within at any affected residence between 7am and 10pm (*8am on Sundays and public holidays).*

b) The $L_{A10(15min)}$ noise contribution from music, patrons and staff emitted from the gymnasium or exercise facility shall not exceed the background noise in any octave band centre frequency (31.5 Hz to 8 kHz inclusive) at the boundary, or within any affected residence between 10pm and 7am (*8am on Sundays and public holidays).*

c) Notwithstanding compliance of the above, noise from music, patrons and staff at the gymnasium or exercise facility shall not be audible in any habitable room in any residential premises between the hours of 10pm and 7am (*8am on Sundays and public holidays)."*

d) Where the $L_{A10(15min)}$ noise level is below the threshold of hearing, Tf at any Octave Band Centre Frequency as defined in Table 1 of International Standard ISO 226:2003 "Acoustics – Normal equal-loudness-level contours" then the value of Tf corresponding to that Octave Band Centre Frequency shall be used instead.

GENERAL NOISE EMISSION TO NON-RESIDENTIAL RECEIVERS

The following provisions applicable to noise emission levels from the proposed gym at nearby commercial receivers also apply.

> ***"3.4 Non-Residential Receiver Noise Criteria***
>
> ***3.4.1 General Noise Emission to Non-Residential Receivers***
> *The acceptable noise level in non-residential receivers will vary depending on the use of the space. For example a higher level of noise intrusion would be acceptable for an industrial receiver, compared to a school or office. Australian Standard AS2107 Acoustics - Recommended design sound levels and reverberation times for building interiors provides design sound level ranges for a variety of different areas of occupancy in buildings.*
>
> *The AAAC recommends that the $L_{Aeq,15min}$ noise emission level resulting from the operation of the gymnasium or exercise facility should not exceed the lower extent of the design sound level range for the use given in Table 1 of AS2107, at the assessment location, as defined above, at all times. This includes both airborne and structure-borne noise from general noise sources such as music, patrons and staff associated with the operation.*
>
> *Note should be made that "General Noise" does not include the occasional impulsive noise from activities such as weight drops. Such noise sources are assessed under "Impulsive Noise"."*

The AAAC provides recommended criteria for impulsive noise emission from gymnasiums to residential and non-residential receivers from the performance of activities within a gymnasium or exercise space.

These activities often include the use of free weights, weight machines, cardio machines such as treadmills and stationary exercise bikes, as well as equipment such as boxing bags, battle ropes and exercises where is made with the floor such as box jumps or skipping. These criteria are presented below.

IMPULSIVE NOISE EMISSION TO RESIDENTIAL RECEIVERS

The AAAC recommends the following criteria apply to impulsive noise emission from gymnasiums to residential receivers from the performance of activities within the gymnasium including the dropping of weights. Overall contributed L_{AFmax} within octave bands of interest (octave bands containing the impulse energy, generally 31.5 Hz to 250 Hz, as determined by the acoustic consultant) should not exceed the following levels:

> *"$L_{AFmax(\sum Oct,31.5\text{-}250Hz)} \leq 35$ dB for daytime[1]*
> *$L_{AFmax(\sum Oct,31.5\text{-}250Hz)} \leq 30$ dB for evening[2]*
> *$L_{AFmax(\sum Oct,31.5\text{-}250Hz)} \leq 25$ dB for night-time[3]*
>
> *Notes:*
> 1. *Daytime is 7am to 6pm*
> 2. *Evening is 6pm to 10pm*
> 3. *Night-time is 10pm to 7am* (*8am on Sundays and public holidays)*
> 4. *Justification would be required of the acoustician to vary any of the above"*

IMPULSIVE NOISE EMISSION TO NON-RESIDENTIAL RECEIVERS

The acceptable noise level in non-residential receivers will vary depending on the use of the space. Australian Standard *AS 2107 Acoustics – Recommended design sound levels and reverberation times for building interiors* provides design sound level ranges for a variety of different areas of occupancy in buildings. Using AS 2107 as a guide, the AAAC recommends the following criteria apply to impulsive noise emission from gymnasiums to non-residential receivers from the performance of activities within the gymnasium including the dropping of weights. Overall contributed L_{AFmax} within octave bands of interest (octave bands containing the impulse energy, generally 31.5 Hz to 250 Hz, as determined by the acoustic consultant) should not exceed the following levels:

"$L_{AFmax(\sum Oct,31.5\text{-}250Hz)}$ ≤ 40 dB for general uses[1]
$L_{AFmax(\sum Oct,31.5\text{-}250Hz)}$ ≤ 35 dB for sensitive uses[2]
$L_{AFmax(\sum Oct,31.5\text{-}250Hz)}$ ≤ 30 dB for critically sensitive uses[3]

Notes:

1. *General uses may include office spaces and general working areas*
2. *Sensitive uses may include private offices, classrooms, childcare and movie cinemas*
3. *Critically sensitive uses may include noise sensitive laboratories and board rooms*
4. *Justification would be required of the acoustician to vary any of the above"*

2.5 AUSTRALIAN STANDARDS

2.5.1 AS 2107:2016 "ACOUSTICS – RECOMMENDED DESIGN SOUND LEVELS AND REVERBERATION TIMES FOR BUILDING INTERIORS"

AS 2107 recommends satisfactory and maximum design sound levels for various types of occupancy within buildings. The following satisfactory and maximum design sound levels for the relevant types of occupancies and areas within the development are detailed.

Table 2.2 Recommended Sound Levels for Different Areas of Occupancy (Extract from AS 2107 Table 1)

Type of occupancy / activity	*Design sound level, ($L_{Aeq,t}$) range [dB (A)]*
5 OFFICE BUILDINGS	
General office areas	*40 to 45*
8 SHOP BUILDINGS	
Small retail stores	*< 50*
Specialty shops	*< 45*

Acoustic Dynamics advises that any levels of airborne noise transmitted into various areas of premises adjacent or within proximity to the development should not exceed the relevant design sound levels presented above. By ensuring the noise levels associated with the operations of development received within the adjacent and nearby tenancies do not exceed the recommended internal design levels, it is likely to ensure occupants of nearby receivers are not adversely affected by the development.

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
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
XL2	A2A-05048-E0	NTI Audio XL2 Noise Logger
4230	1234135	Brüel & Kjaer Acoustic Calibrator

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 PROJECT CRITERIA

To establish the acoustic environment at the subject site in accordance with the criteria outlined above, unattended noise monitoring was conducted between Tuesday 6 May 2025 and Tuesday 13 May 2025.

The noise logger was installed on the rooftop of the development, shielded from direct noise associated with vehicular traffic and mechanical plant associated with the development.

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**.

Following the general procedures outlined in the EPA's NPfI and the AAAC Guideline, a summary of the established noise environment and noise emission criteria is presented in **Table 4.1** and **Table 4.2** below, respectively.

Table 4.1 Noise Emission Criteria for Receivers – NPfI

Receiver Type	Assessment Period	LA90 Rating Background Noise Level (RBL) [dB]	Project Intrusiveness Noise Level LAeq,15min [dB]	Project Amenity Noise Level LAeq,15min [dB][1]	Project Noise Trigger Level LAeq,15min [dB][3]
Residential Receivers	Morning Shoulder[2] (5am to 6am)	38	43	38	**38**
	Day (7am1 to 6pm)	44	49	53	**49**
	Evening (6pm to 10pm)	43	48	43	**43**
	Night (10pm to 7am1)	38	43	38	**38**
Commercial Receivers	At any time	-	-	63	**63**

Note: 1) Amenity adjustment based on "*Suburban*" residential receiver and "*Commercial*" receiver types (NPfI Table 2.2). 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 ($L_{Aeq,15min}$ = $L_{Aeq,\ period}$ **+ 3 dB**).

2) **No Project Amenity Noise Levels for shoulder periods**. However, the amenity criterion for the night-time period has been adopted **for conservatism**.

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

Results from the long-term noise monitoring are presented in **Appendix B**.

Table 4.2 Noise Emission Criteria for Residential Receivers - AAAC

Receiver	Period	Measurement	Measured L_{A90} Noise Emission Octave Band Spectrum & Most Stringent L_{A10} Noise Emission Criteria [dB]									
			32	63	125	250	500	1K	2K	4K	8K	O/A
Nearest Residential Receivers	Morning Shoulder (5am-6am)[1]	Background Noise Level	1	17	23	29	33	32	27	18	10	**37**
		External Criteria (BG + 0 dB)	20[3]	17	23	29	33	32	27	18	12[3]	**37**
		Internal Criteria[2] (BG - 10 dB)	20[3]	11[3]	13	19	23	22	17	8	12[3]	**27**

Note: 1) Compliance with the night-time criteria during daytime level operations will ensure compliance during the daytime background noise period.

2) Calculated to be inaudible at the façade, assuming windows to residential receivers are open. Achieving compliance at the façade will ensure compliance within the nearest habitable room.

3) A-weighted level based on threshold of hearing (T_f) at any Octave Band Centre Frequency as defined in Table 1 of International Standard ISO 226:2003, *"Acoustics – Normal equal-loudness-level contours"*.

4.2 NOISE SOURCES AND OPERATIONS

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

These assumptions and noise levels have been established based on information provided by the proponent, short-term measurements and inspections conducted on-site, or referenced from our database of nearfield measurements at similar developments.

1. A typical maximum number of **25** patrons concurrently using the proposed gym and various items of fitness equipment (including exercise machines, weight machines and free weights), including the provision of background music within any 15-minute assessment period (reverberant **$L_{Aeq(15minute)}$ 75 dB(A)**);

2. The ingress/egress of **25** patrons entering or exiting through the main entrance within any 15-minute assessment period (assuming a full class);

3. The operation of **5** existing **Daikin RXV71WVMS** air-conditioning condenser units located on the roof of the premises (conservative maximum assumed combined sound power level of **L_w 73 dB(A)**); and

4. Should patrons arrive via private vehicle, the arrival and departure of these patrons along surrounding local roads, utilising designated parking spaces and street parking available within the vicinity of the premise (13 vehicle events within any 15-minute assessment period, typical vehicle events are expected to be significantly lower).

Acoustic Dynamics advises that the assessment of the above scenario is conducted to ensure the **worst-case** scenario achieves compliance during the most-sensitive time of operation. It is advised that by achieving compliance with the nearest sensitive receiver locations, compliance will also be achieved at all other sensitive receiver locations further away.

4.3 NEAREST RECEIVERS

The cumulative noise impact has been assessed to the potentially most affected point at the adjacent sensitive receiver properties presented below.

Table 4.3 Nearest Sensitive Receiver Locations

Receiver	Location	Direction
Residential Receivers		
R_1	20 Coney Road	North
R_2	22 Coney Road	North
Commercial Receivers		
C_1	337 - 339 Homer Street	West
C_2	322 - 332 Homer Street	South
C_3	331 - 333 Homer Street	East

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.

5 OPERATIONAL NOISE EMISSION ASSESSMENT

The calculated maximum noise emission levels at the nearest receiver locations against the relevant criteria are presented below. It is advised that by achieving compliance with the nearest sensitive receiver locations, compliance will also be achieved at all other receiver locations.

The assessment location for **external noise emission** is defined as the most affected point on or within any sensitive receiver property boundary. Examples of this location may be:

- 1.5m above ground level;
- On a balcony at 1.5m above floor level; and
- Outside a window on the ground or higher floors, at a height of 300mm below the head of the window.

The assessment location for **internal noise emission** is defined as the most affected point within the nearest room of any sensitive receiver property, assuming windows are open.

5.1 EXTERNAL NOISE EMISSION LEVELS

The calculated maximum **external** noise emission levels at the nearest receiver locations and the relevant noise emission criteria are presented below.

NB: The calculated emission levels are based upon the assumption that the recommendations presented in **Section 7** have been implemented.

Table 5.1 Calculated External Noise Emission Levels at Nearest Receivers

Receiver	Assessment Period	Noise Source[2]	Maximum $L_{Aeq(1hr/15min)}$ Noise Emission Level [dB][3]	Noise Emission L_{Aeq} Criterion [dB]	Complies ?
R_1	Morning Shoulder (5am to 6am)[1]	Internal Operations	24	**38**	**Yes**
		Patrons & Staff	14		
		Vehicles	33		
		Mechanical Plant	23		
		Total[4]	**34**		
R_2		Internal Operations	22		**Yes**
		Ingress/egress	11		
		Vehicles	31		
		Mechanical Plant	23		
		Total[4]	**32**		
C_1	Any time during hours of operation	Internal Operations	41	**63**	**Yes**
		Ingress/egress	28		
		Vehicles	46		
		Mechanical Plant	51		
		Total[4]	**53**		

Receiver	Assessment Period	Noise Source[2]	Maximum $L_{Aeq(1hr/15min)}$ Noise Emission Level [dB][3]	Noise Emission L_{Aeq} Criterion [dB]	Complies ?
C_2	Any time during hours of operation	Internal Operations	41	**63**	**Yes**
		Ingress/egress	32		
		Vehicles	46		
		Mechanical Plant	47		
		Total[4]	**50**		
C_3		Internal Operations	**30**		**Yes**
		Ingress/egress	**23**		
		Vehicles	**43**		
		Mechanical Plant	**34**		
		Total[4]	**44**		

Note: 1) Compliance with this most sensitive time period criterion ensures compliance during all other less stringent time periods.
2) Noise sources and operations detailed in **Section 4.2**.
3) Acoustic Dynamics has assumed all noise sources will be operating continuously over the assessment period (i.e. 15-minute or 1-hour).
4) Includes the benefits of recommendations outlined in **Section 7**.

Table 5.2 Calculated External Noise Emission Levels at Residential Receivers

Receiver	Noise Source[1]	Relevant L_{A10} Noise Emission Criterion [dB] & Calculated L_{A10} Noise Emission Levels at Receivers [dB][2,3]										Complies?
		32	63	125	250	500	1K	2K	4K	8K	O/A	
Morning Shoulder Criterion (5am to 6am)[4]		20[3]	17	23	29	33	32	27	18	12[3]	**37**	
R_1	Gym Operations	-	4	21	23	19	19	10	6	-	**26**	
	Patrons & Staff[5]	-	-	-	3	11	16	15	2	-	**19**	
	Cumulative Total	**20[3]**	**4**	**21**	**20**	**20**	**21**	**16**	**7**	**12[3]**	**17**	**Yes**
R_2	Gym Operations	-	2	20	22	18	20	12	8	-	**26**	
	Patrons & Staff[5]	-	-	-	-	7	14	14	2	-	**17**	
	Cumulative Total	**20[3]**	**2**	**20**	**22**	**19**	**21**	**16**	**9**	**12[3]**	**27**	**Yes**

Note: 1) Noise sources and operations detailed in **Section 4.2**.
2) Acoustic Dynamics assumes noise sources will operate continuously over the assessment period.
3) Includes the benefits of recommendations outlined in **Section 7**.
4) Compliance with this most sensitive time period criterion ensures compliance during all other less stringent time periods.
5) Patron and staff noise within premise only (AAAC Guideline for Gymnasiums Section 3.3.1).

5.2 INTERNAL NOISE EMISSION LEVELS

The calculated maximum **internal** noise emission levels at the nearest receiver locations and the relevant noise emission criteria are presented below.

Acoustic Dynamics has assessed potential noise impacts due to the transmission of airborne noise to the nearest receiver windows and through the shared boundary partitions.

NB: The calculated emission levels are based upon the assumption that the recommendations presented in **Section 7** have been implemented.

Table 5.3 Calculated Internal Noise Emission Levels at Residential Receivers

Receiver	Noise Source[1]	Relevant L_{A10} Noise Emission Criterion [dB] & Calculated L_{A10} Noise Emission Levels at Receivers [dB][2,3]										Complies?
		32	63	125	250	500	1K	2K	4K	8K	O/A	
Morning Shoulder Criterion (5am to 6am)[4]		20[3]	11[3]	13	19	23	22	17	8	12[3]	**27**	
R_1	Gym Operations	-	-	13	17	13	14	7	7	-	**21**	
	Patrons & Staff[5]	-	-	-	-	3	10	10	-	-	**14**	
	Cumulative Total	**20[3]**	**11[3]**	**13**	**17**	**13**	**16**	**12**	**7**	**12[3]**	**22**	**Yes**
R_2	Gym Operations	-	-	12	15	11	12	5	6	-	**19**	
	Patrons & Staff[5]	-	-	-	-	1	8	7	-	-	**11**	
	Cumulative Total	**20[3]**	**11[3]**	**12**	**15**	**11**	**14**	**9**	**6**	**12[3]**	**20**	**Yes**

Note: 1) Noise sources and operations detailed in **Section 4.2**.
2) Acoustic Dynamics assumes noise sources will operate continuously over the assessment period.
3) Includes the benefits of recommendations outlined in **Section 7**.
4) Compliance with this most sensitive time period criterion ensures compliance during all other less stringent time periods.
5) Patron and staff noise within premise only (AAAC Guideline for Gymnasiums Section 3.3.1).

Acoustic Dynamics has calculated the following noise levels into the adjacent commercial tenancies, assuming a lightweight concrete construction of **R_w 38**. Acoustic Dynamics advises this assumption is highly conservative, and the actual construction separating the site from adjacent buildings is likely to perform significantly better (i.e. likely a block masonry wall).

Table 5.4 Calculated Internal Noise Emission Levels at Nearest Commercial Receivers

Receiver	Assessment Period	Noise Source[1]	Maximum Cumulative $L_{Aeq(15min)}$ Noise Level [dB][2]	Internal $L_{Aeq(15min)}$ Criterion [dB]	Complies?
C_1	At any time	Cumulative Gym Operations	37	**45**	**Yes**
C_2			37	**45**	**Yes**

Note: 1) Noise sources and operations detailed in **Section 4.2**.
2) Calculated emission levels are based on the assumption that the recommendations presented in **Section 7** have been implemented.

5.3 STRUCTURE-BORNE NOISE AND VIBRATION EMISSION LEVELS

Acoustic Dynamics advises that the subject site is a stand-alone building with no receivers that will be affected by the dropping of weights within the building. Regardless, based on extensive experience with other similar gyms, Acoustic Dynamics recommends the suitable flooring systems be installed.

Subsequent to the incorporation of the recommendations outlined within **Section 7**, Acoustic Dynamics advises that the structure-borne noise and vibration emission associated with typical gym operations is predicted to be acceptable at the nearest receivers. However, if required, the proponent is aware that impact sound transmission testing may be undertaken to determine the minimum floor buildup required to minimize structure borne noise emission to adjacent receivers.

5.4 ROAD TRAFFIC NOISE EMISSION 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 NSW EPA's RNP criteria outlined in **Section 2.3.2**.

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 5.5 Calculated Road Traffic Noise Emission Levels & Relevant Noise Criteria

Sensitive Receiver	Predicted Maximum $L_{eq,1hr}$ Sound Pressure Level [dB][1]	Relevant $L_{Aeq,1hr}$ Criterion [dB][2,3]	Complies?
Residential receivers along Homer Lane	49	**50**	**Yes**

Note: 1) Predicted L_{Aeq} noise level is the maximum noise level measured within a 1-hour period.
2) Measured noise level within a 1-hour period during the night-time assessment period (10:00pm until 7:00am on weekdays, or 8:00am on weekends and public holidays).
3) Compliance with this most sensitive assessment period criterion ensures compliance during all other less stringent assessment periods.

5.5 SLEEP DISTURBANCE

Acoustic Dynamics has determined the potential maximum $L_{A1(60\,Sec)}$ **external** noise emission level from the development resulting from car doors closing in the shared public car park to the west of the site, when measured at the nearest residential receivers during the morning shoulder assessment period.

Table 5.6 Calculated Maximum Instantaneous External Noise Levels & Relevant Noise Criteria

Sensitive Receiver	Source	Predicted Maximum $L_{A1(60\ Sec)}$ Sound Pressure Level [dB][1]	$L_{A1(60\ Sec)}$ Sleep Disturbance Criterion [dB][2]	Complies?
Residential Receivers along Homer Ave	Car door closing	50	**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 instantaneous noise events that exceed the external sleep disturbance criterion at the nearest residential receivers are unlikely to cause awakening reactions, following incorporation of the recommendations provided in **Section 7**.

6 DISCUSSION

The calculated noise emission levels associated with the operations of the gym indicate the following:

1. Noise emission resulting from the proposal is **predicted to comply** with the relevant acoustic criteria of Canterbury-Bankstown Council, NSW policies and legislation, the NSW EPA, AAAC Guidelines and Australian Standards during the proposed hours of operation when assessed at the nearest sensitive receivers;

2. Noise emission associated with additional traffic on surrounding local roads is **predicted to comply** with the NSW EPA's RNP when assessed at the nearest sensitive receivers;

3. Maximum instantaneous external noise events are **predicted to comply** with the NSW EPA's guidelines on sleep disturbance when assessed at the nearest sensitive receivers;

4. There is **low risk** of acoustic disturbance to the nearest sensitive residential, commercial and industrial receivers during the proposed hours of operation;

5. To ensure the assessment is conducted in a conservative manner, noise emission has been assessed as a **worst-case** scenario (i.e. all noise generating activities and noise sources occurring simultaneously and at maximum capacity). Generally, noise emission associated with the proposal is **predicted to be lower** than the calculations presented; and

6. The noise calculations and operational assumptions should not be considered prescriptive. They are modelling assumptions that have been used to demonstrate typical noise sources and operations associated with the facility **can be designed to achieve compliance** with the relevant criteria.

7 RECOMMENDATIONS AND DESIGN ADVICE

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

7.1 NOISE MANAGEMENT PLAN

Acoustic Dynamics recommends the adoption of a Noise Management Plan incorporating best management practice procedures to protect the acoustic amenity of the surrounding area. Such a management plan should outline policies and procedures to ensure noise emission is kept to a minimum, including:

1. Ensuring all glass windows and doors the proposed gym 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 as patrons egress to ensure noise emission of patrons is kept to a minimum when entering and leaving the premises;

4. Restricting the use of low frequency speakers (sub-woofers) and ensuring any full range speakers are isolated from building services;

5. The use of free weights over 15 kg are to be restricted to the Free Weights area only. Free weights under 15 kg are restricted to the Free Weights area and Functional Training area;

6. Reduction of the internal noise level from music to **L_{Aeq} 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 gym, following the fit-out of the premises and the installation of the speaker system;

7. The noise level of background music within the gym should be kept to an appropriate level, to enable speech intelligibility within the gym and to ensure patrons are not required to raise their voices while in the gym;

8. Installation of impact sound absorbing flooring to reduce regenerated noise and vibration in areas of the gym where high levels of impact are expected, such as the Free Weights area and Function Training area;

9. The implementation of an appropriate management policy regarding the dropping of weights, including:

    - Education and training of all gym staff, personal trainers and members, instructing how to place weights without dropping;

- Erection of clearly visible signage throughout the gym advising members that they must not drop weights or allow weights to drop on the floor, or use weights outside the designated weight areas;
- Imposition of penalties (membership warnings, suspensions or lockout restrictions) on members identified dropping weights; and

10. 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.

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

7.2 POSITIONING OF EQUIPMENT

Where feasible, Acoustic Dynamics recommends that any free weights equipment is positioned as close as practical to the most rigid part of the subject premises. Such locations are likely to be next to load bearing walls or as close as practically possible to structural columns.

Where possible, cardio equipment should also be placed as close as practical to the most rigid locations within the premises, however this is less critical than the location of the free weights and pin and plate loaded weights equipment.

7.3 IMPACT ISOLATION FLOORING

Acoustic Dynamics recommends installation of the following flooring products/systems in the weights areas and under cardio equipment within the gym. Installation of the flooring will reduce vibration emission and associated regenerated noise to compliant levels within the adjacent and surrounding occupancies.

Based on Acoustic Dynamics understanding of feasibility within the gym, the recommended flooring systems are presented below.

Table 7.1 Recommended Floor Systems

Area	Floor Topping & Energy Absorbing Layer
Deadlift area & lifting platform areas	**Preferred:** 48mm Regupol Sonusfit M517™ **Alternate:** 8mm Rubber topping on 30mm A1 Shockpad™
Free Weights Area / Plate-loaded Machines	**Preferred:** 48mm Regupol Sonusfit M517™ **Alternate:** 8mm Rubber topping on 30mm A1 Shockpad™
Strength Training Pin-loaded Machines[1]	**Preferred:** 22mm Pavigym Endurance S&S™ **Alternate:** 8mm or 10mm Gym Floor Topping

Area	Floor Topping & Energy Absorbing Layer
Functional training area	**Preferred:** 1 layer of 22mm Pavigym Endurance S&S™ **Alternate:** 8mm or 10mm Gym Floor Topping
Cardio / Treadmills[2]	**Preferred:** 1 layer of 22mm Pavigym Endurance S&S™ **Alternate:** 8mm or 10mm Gym Floor Topping

Note: 1) Embleton NXS-17™ or Mason Mercer IMF-D™ springs **must** be installed beneath the weight stacks **and** machines must be fitted with rubber feet/pads. See **Section 7.4** for specific recommendations regarding pin and plate loaded equipment.

2) See **Section 7.5** for specific recommendations regarding cardio equipment.

Prior to selecting and ordering flooring, Acoustic Dynamics recommends a review be undertaken of the manufactured product quality, likely durability, manufacturer's installation specifications and the warranty provided.

Acoustic Dynamics advises that installation of the above recommended flooring products/systems in the relevant areas of the gym is likely to significantly reduce/minimise vibration emission and associated regenerated noise into the adjacent and surrounding occupancies, as well as improve the internal environment for patrons.

Note is made that the installation of impact reducing flooring should be supplemented by the implementation of a suitable Noise Management Plan.

7.4 PIN AND PLATE LOADED EQUIPMENT

Acoustic Dynamics recommends the incorporation of springs and/or soft rubber supports and mounts to pin and plate loaded weights equipment, where feasible.

Although unlikely to offer such treatments without prompting or specific request, Acoustic Dynamics understands that most manufacturers/suppliers of pin and plate loaded weights equipment are now able to fit springs and/or soft rubber supports/mounts to the pin and plate loaded weights equipment they supply.

Acoustic Dynamics understands that a number of manufacturers/suppliers of pin and plate loaded weights equipment have liaised with various spring suppliers including Embelton Ltd™ and Mason Mercer™ to obtain suitable spring and soft rubber mounts for their equipment. Once sourced, we understand that the service technicians for these equipment manufacturers/suppliers can fit these to the equipment.

Acoustic Dynamics' experience and measurements are indicative that regenerated sound and vibration resulting from the use of this equipment can be **significant reduced** following the incorporation of such springs and/or soft rubber supports and mounts.

7.5 TREADMILLS AND CARDIO EQUIPMENT

Although not likely to cause disturbance in the same manner as weight drop impacts, noise associated with the use of treadmills and cardio equipment should be considered.

Acoustic Dynamics advises the use of suitably resilient pads, mounts, platforms or springs can be installed under the feet of cardio equipment.

Acoustic Dynamics understands that most manufacturers/suppliers of cardio equipment are now able to fit springs and/or soft rubber supports/mounts to the equipment they supply. A supplier of suitable springs, mounts and cardio platforms is Embelton Australia (Ph: 03 9353 4811).

8 CONCLUSION

Acoustic Dynamics has conducted an acoustic assessment of operational noise emission associated with the gym located at 335 Homer Street, Earlwood, NSW.

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) Canterbury-Bankstown Council;
(b) NSW Environment Protection Authority;
(c) Association of Australasian Acoustical Consultants; and
(d) Australian Standards.

The assessment predicted noise impacts at nearby sensitive receiver locations. Noise modelling was conducted using assumed **worst-case** noise and operational scenarios in **Section 4.2**.

Recommendations are provided in **Section 7** detailing best management practices and design strategies minimise the acoustic impacts on the surrounding acoustic environment.

Acoustic Opinion

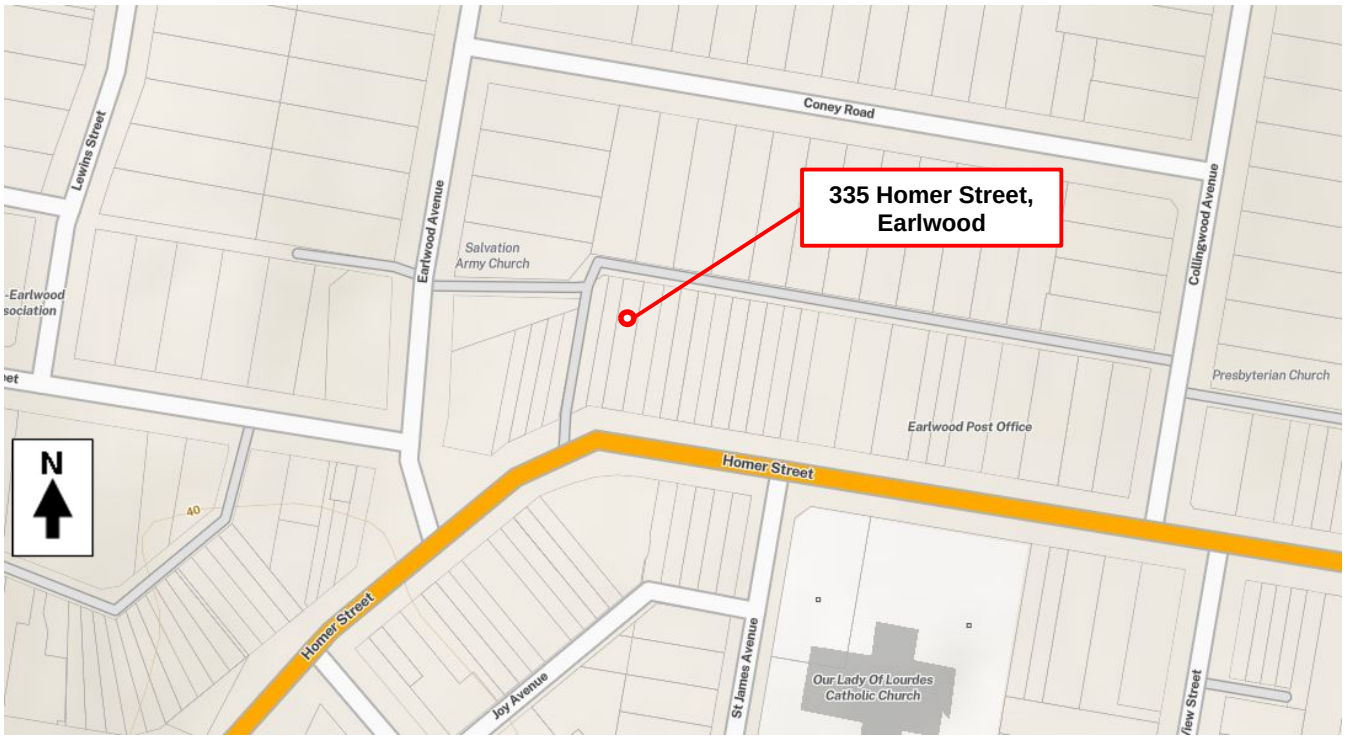
Further to our site survey, noise monitoring and measurements, our review of the relevant acoustic criteria and requirements, and our calculations, Acoustic Dynamics advises that the proposal can be designed to comply with the relevant acoustic criteria of Canterbury-Bankstown Council, the NSW EPA, AAAC and Australian Standards, 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 MAP, AERIAL IMAGE AND DRAWINGS

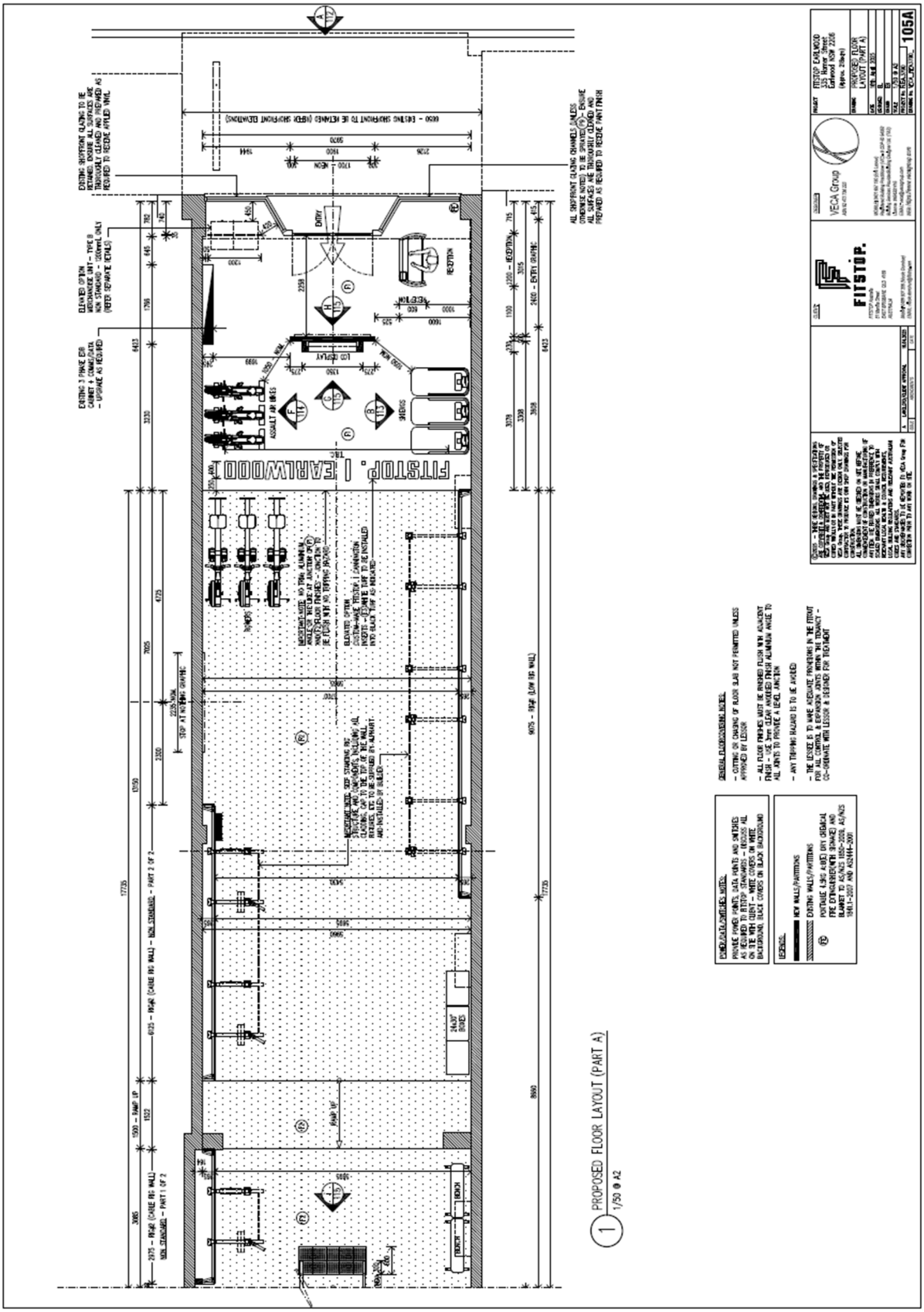
A.1 LOCATION MAP (COURTESY OF SDT EXPLORER)



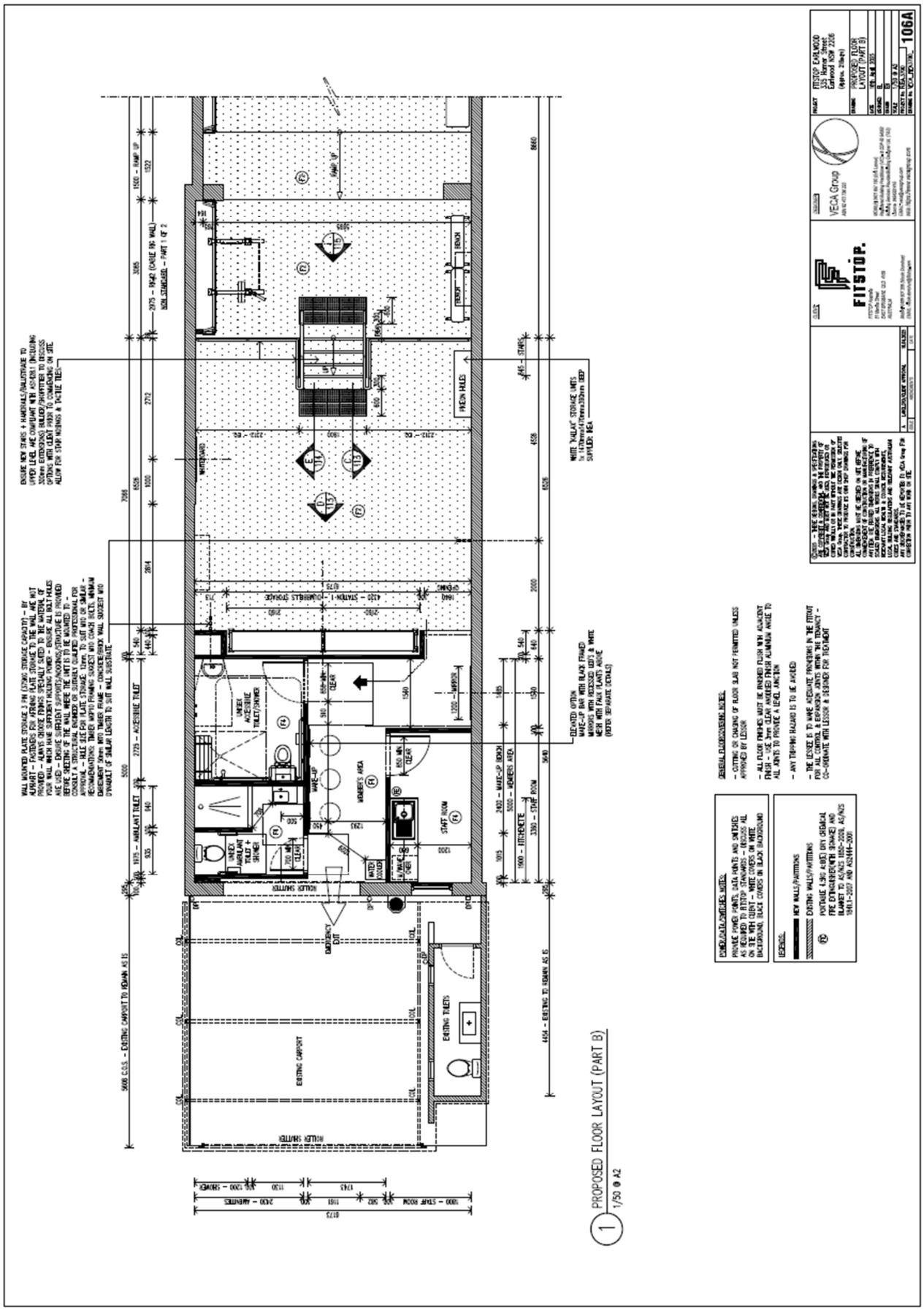
A.2 AERIAL IMAGE (COURTESY OF SDT EXPLORER)

A.3 ARCHITECTURAL PLANS (COURTESEY OF PBD ARCHITECTS)

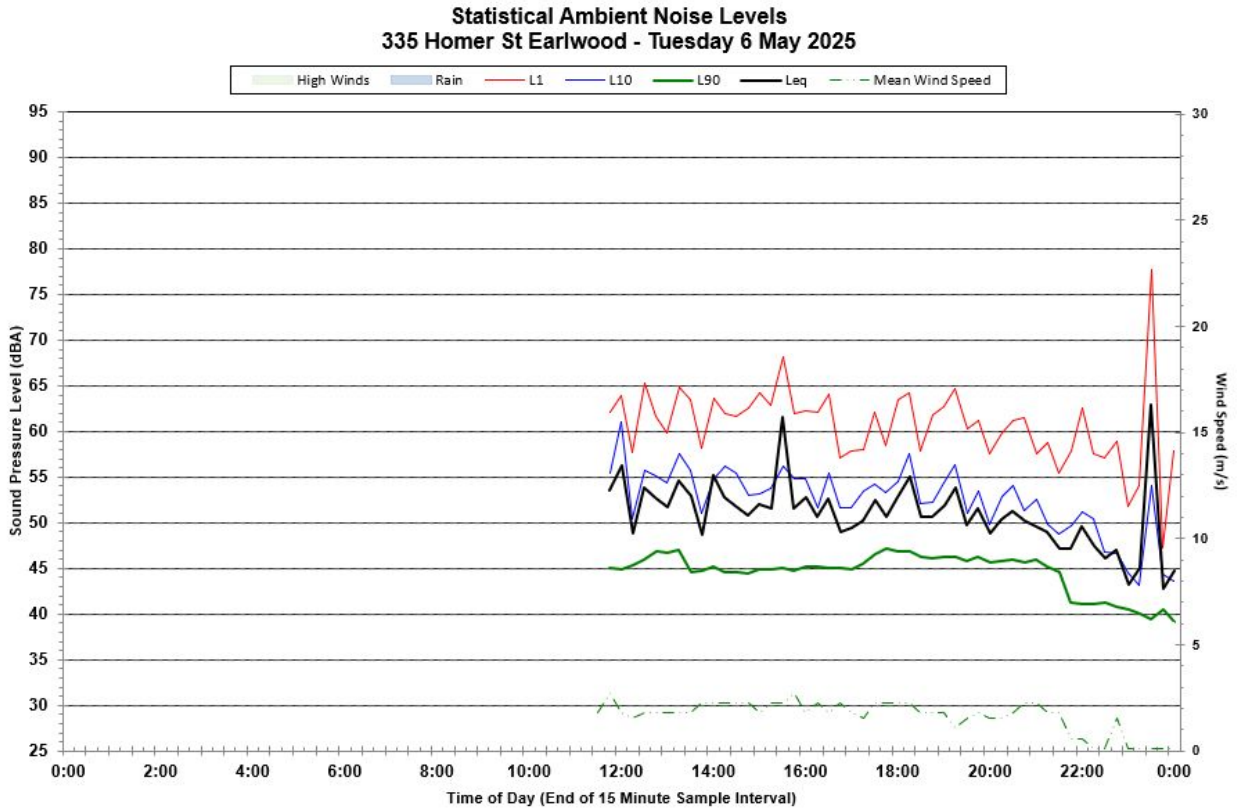
A.3.1 PROPOSED FLOOR PLAN LAYOUT (PART A)

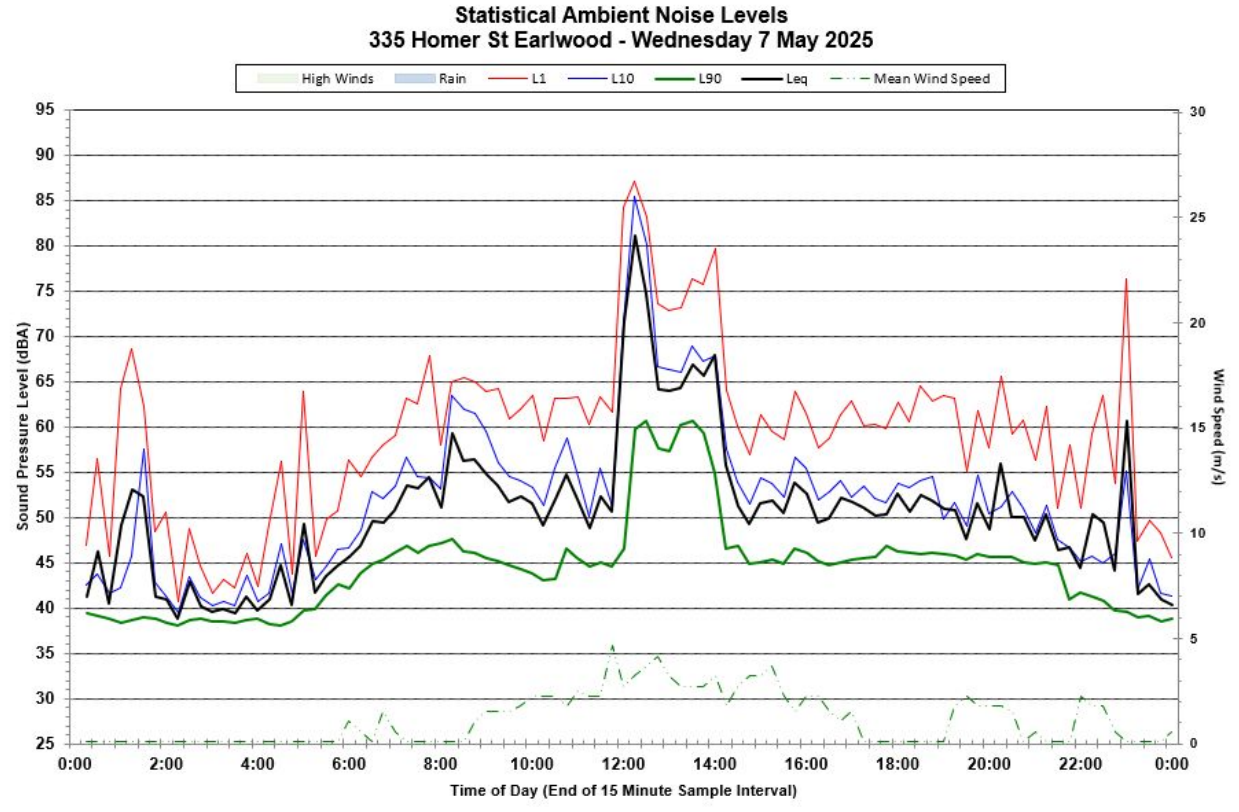


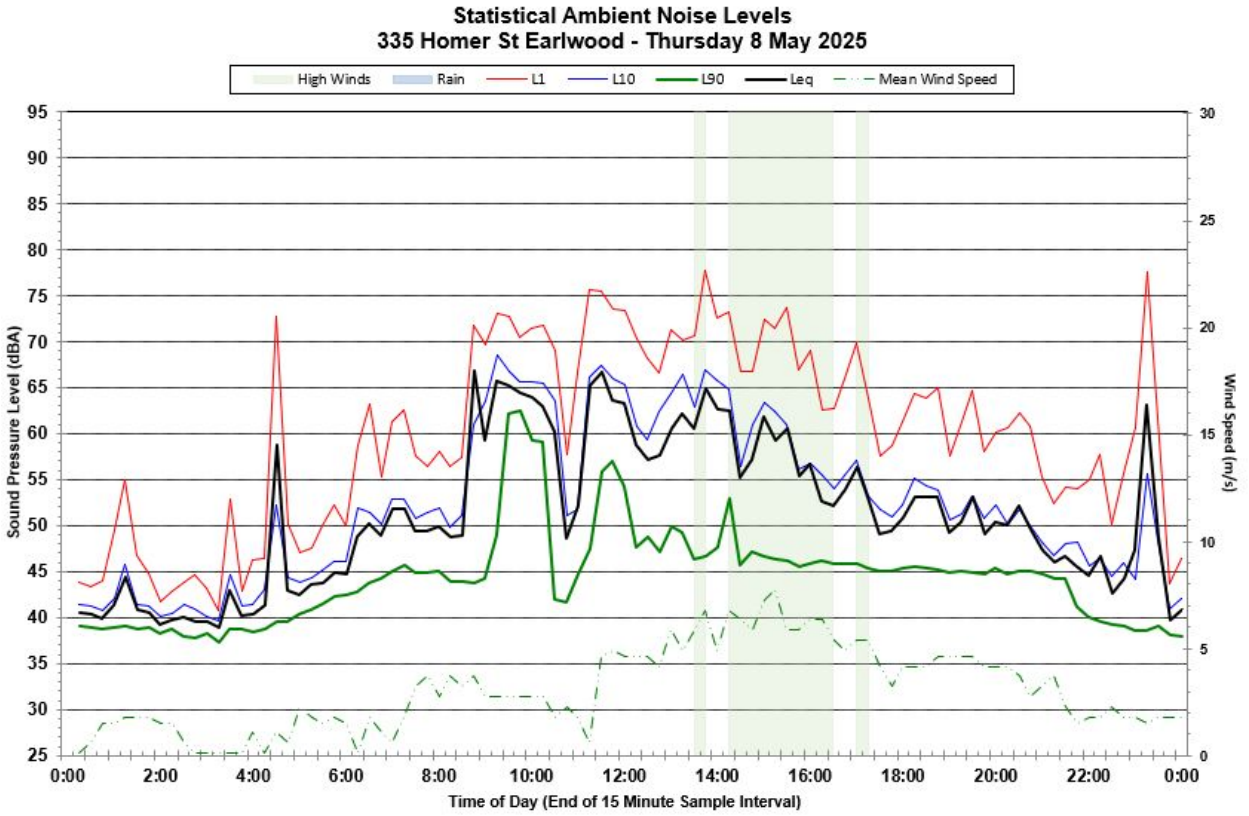
A.3.2 PROPOSED FLOOR PLAN LAYOUT (PART B)

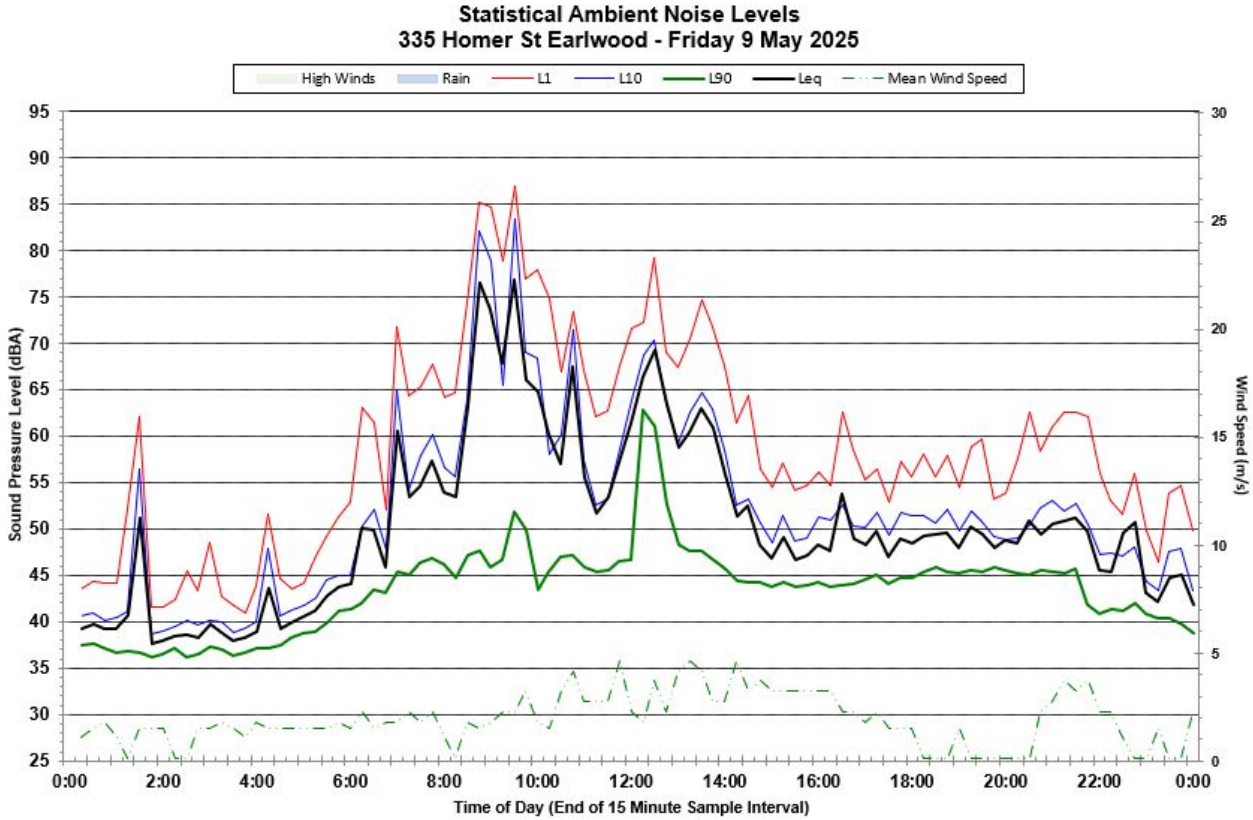


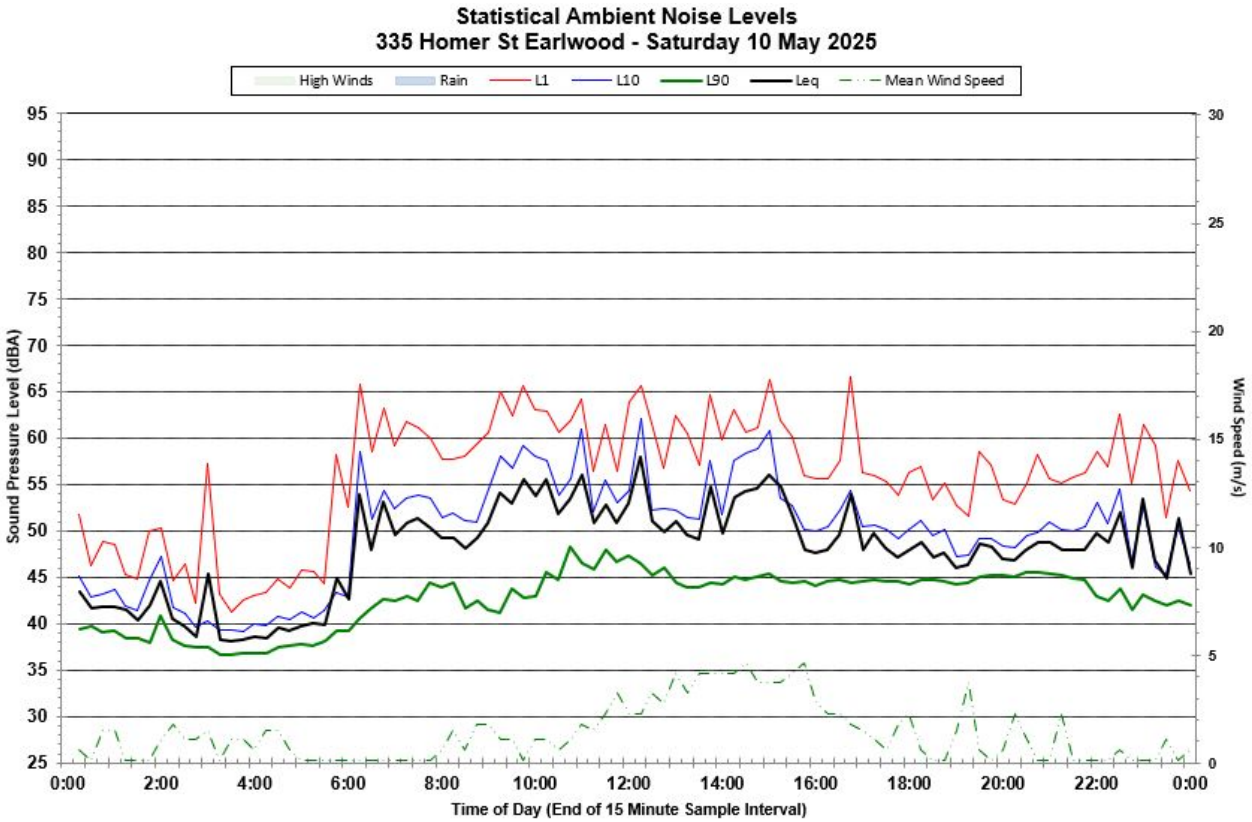
APPENDIX B — UNATTENDED NOISE MONITORING STATISTICAL GRAPHS

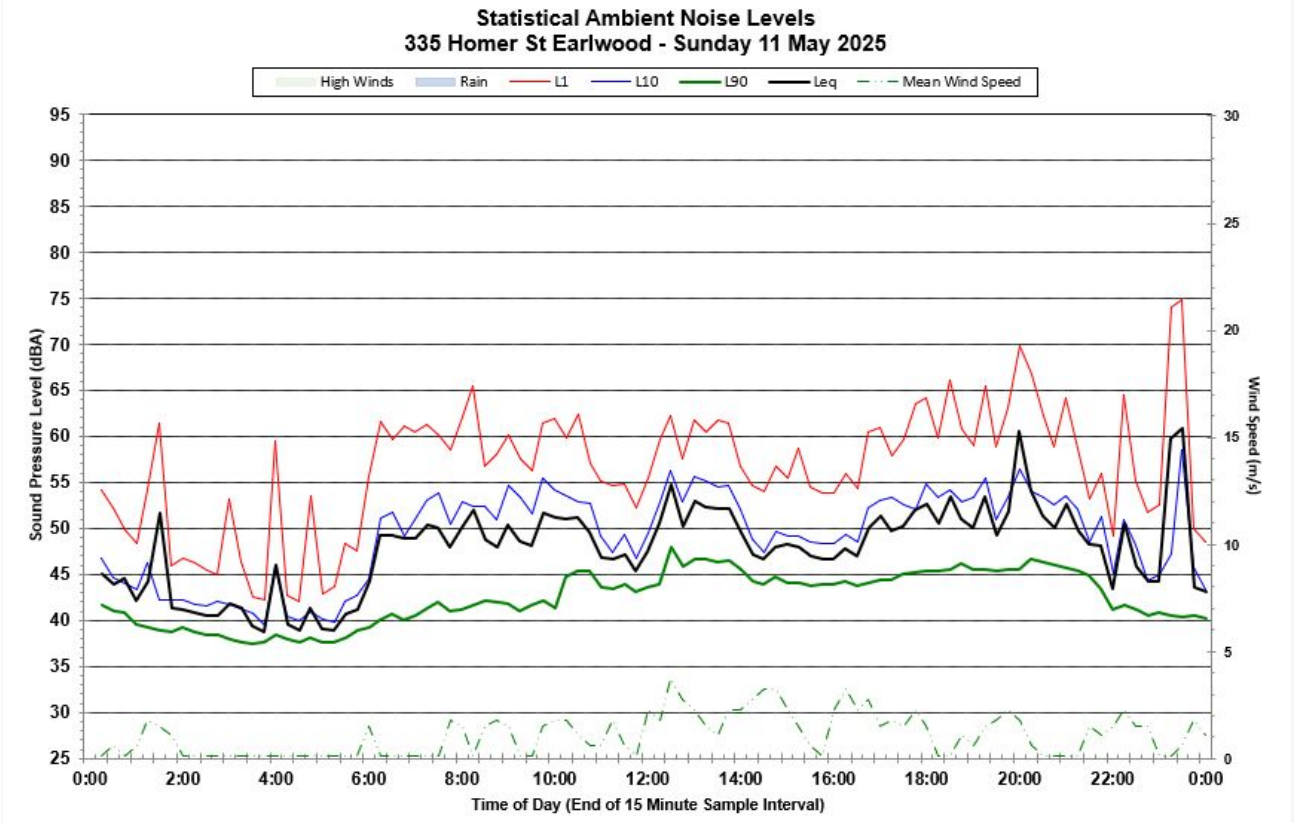


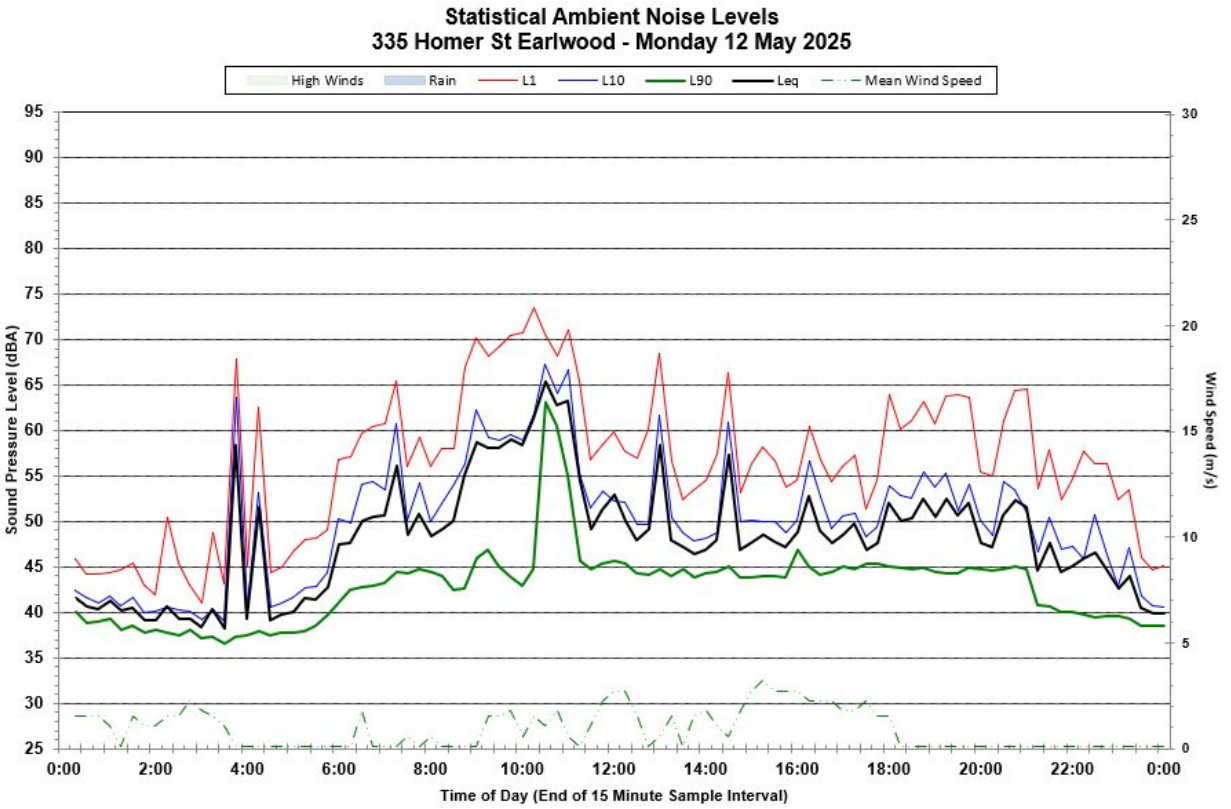


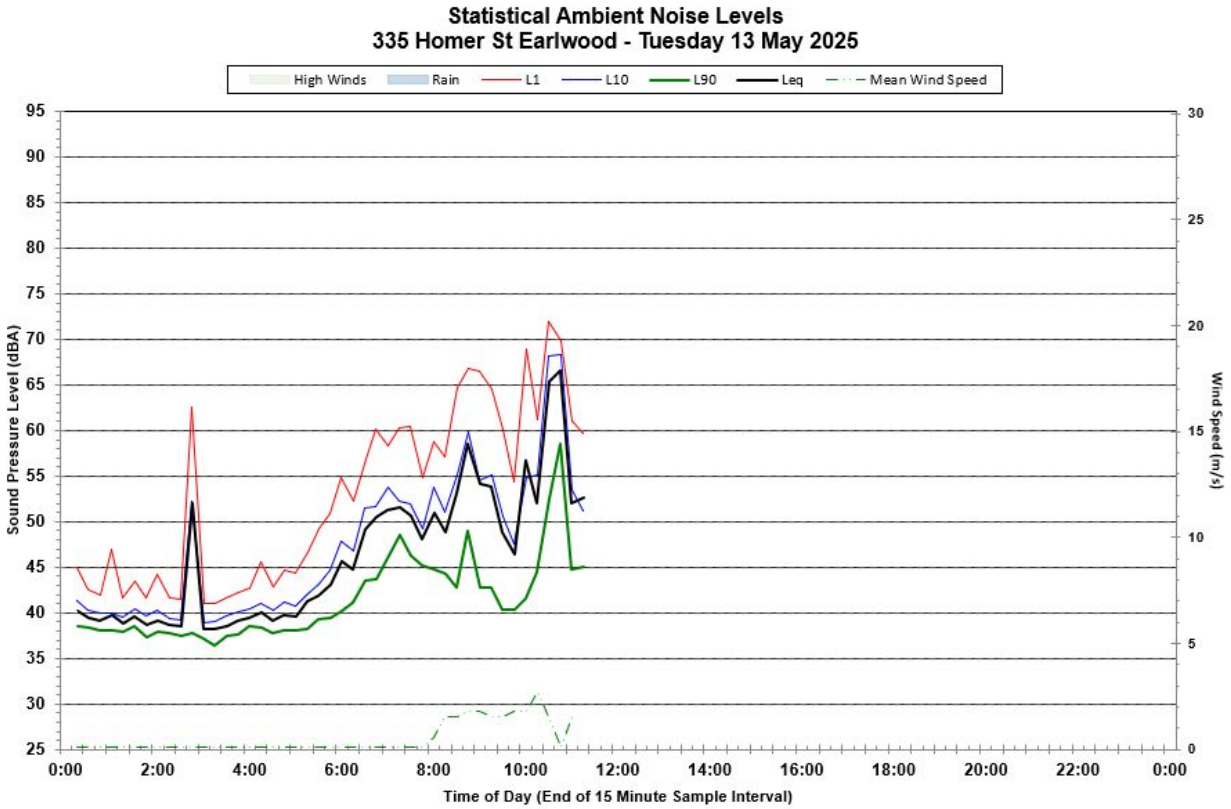

Statistical Ambient Noise Levels
335 Homer St Earlwood - Thursday 8 May 2025
High Winds
Rain
L1
L10
L90
Leq
Mean Wind Speed
Sound Pressure Level (dBA)
Wind Speed (m/s)
Time of Day (End of 15 Minute Sample Interval)


Statistical Ambient Noise Levels
335 Homer St Earlwood - Friday 9 May 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
335 Homer St Earlwood - Saturday 10 May 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
335 Homer St Earlwood - Sunday 11 May 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
335 Homer St Earlwood - Monday 12 May 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
335 Homer St Earlwood - Tuesday 13 May 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)