

# **Attachment D**

<b>Acoustic Report</b>
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## ALEGRE BAR & DINING

### OUTDOOR DINING AREA ACOUSTIC ASSESSMENT REPORT

19 Mar. 2023

Doc. Rev 7



GDR1 Pty Ltd t/a Alegre Bar & Dining

(ABN: 33634814761)

Shop 13 & 14, 25-55 Lime Street

Sydney, NSW 2000

Lot 56 in Deposited Plan 1014625

Dear Alegre Management Team,

**Alegre Bar & Dining, King Street Wharf, Sydney – Outdoor Dining Area Acoustic Assessment Report**

Thank you for organising the acoustic measurements, as well as the detailed site survey on Friday 28<sup>th</sup> October 2022.

Additional acoustic logging and hand-held measurements have been performed between Tuesday 21 February 2023 and Wednesday 8 March 2023 at two most affected receivers, as well as patron noise survey during peak Friday night.

This report presents the acoustic measurements results, our acoustic assessment of the existing noise levels and proposed equipment, and the acoustic details to accompany the modification application for Condition 14, namely removal of clause “No speakers or music outside”.

The present study which indicates that compliance can be achieved with the proposed scheme, provided the recommendations in this report are implemented.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Claudi Pop', is written over a light blue horizontal line.

**Claudiu Pop**

Director Australasia

BEng (Struct), MSc (Acoustics), PhD Cand. (Architecture)

## 1. Introduction

The Alegre Bar & Dining venue is located in a mixed commercial and residential area on 25-55 Lime Street, Sydney, NSW.

This report provides a review of the current sound levels in the restaurant and at a number of locations around the site where the sound levels were also documented for the Development Application for comparison purposes.

The review of the proposed loudspeakers data and specifications, as well as the recommended sound limits, numbers and locations for the sound system components to comply with the DA stipulated levels at the receivers are presented in this report.

For the purpose of this assessment the following documents have been reviewed:

**1. Architectural Package:**

- a. Official Stamped and Marked Plans: “1314 King Street Wharf, issued by Kathryn Ashley Studio, **Proposed Plan**, drawing number 101, Revision W, dated 26 October 2021.

**2. Updated Plan of Management:**

- a. Alegre, Bar & Dining, **Plan of Management**, Shop 13 & 14 King Street Wharf 25-55 Lime Street Sydney, issued by Alegre Bar & Dining, dated 23.02.2023.

**3. Application Supporting Statement by Alegre Bar & Dining:**

- a. Alegre, Bar & Dining, **Statement to Support S4.55(2) – Modification Application for Renewing Trading Hours Trial Period and Removal of Condition 14 “No Speakers or Music Outside”** Shop 13 & 14 King Street Wharf 25-55 Lime Street Sydney, issued by Alegre Bar & Dining, dated 23.02.2023.

**4. Technical Specification and Data for Proposed Equipment:**

- a. MX Series High-Fidelity Weatherproof Loudspeakers, issued by Quest Engineering.

**5. Additional Information Letter Request:**

- a. Modification Application: 25-55 Lime Street, Sydney NSW 2000, Reference number: D/2021/1212/A, issued by City of Sydney Council, dated 15.02.2023.

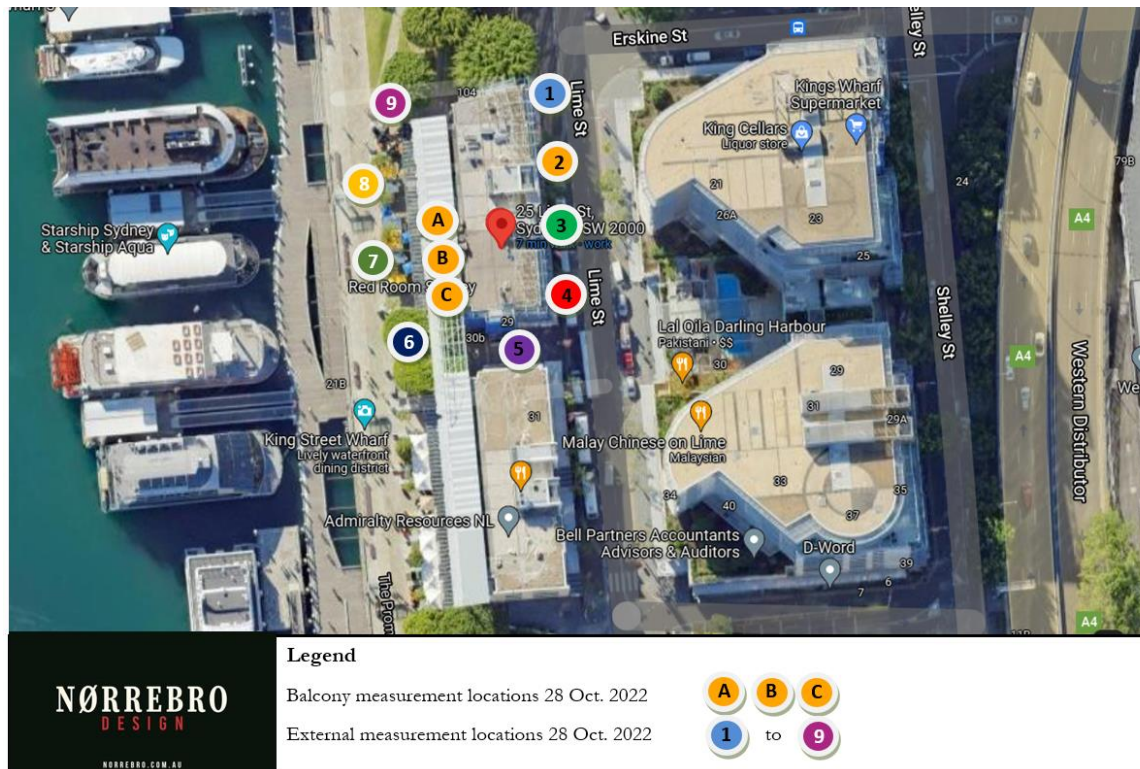
## 2. Acoustic Measurements Methodology and Results

**Sound Pressure Level  $LA_{eq}$**  is the “equivalent noise level” is the summation of noise events integrated over a selected period of time. This noise metric is commonly used to correlate noise exposure and human annoyance.  $LA_{eq}$  is measured in dB(A) (A weighted sound pressure level) due to the fact that the ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the “A” filter. A sound level measured with this filter switched in is denoted as dB(A). Practically all noise is measured using the A weighting.

### 2.1 Operator Attended Noise Measurements

The following internal and external restaurant patron noise is assessed in accordance with the Association of Australian Acoustical Consultants “Licensed Premises Noise Assessment Technical Guideline” Version 1.0 dated August 2019.

The measurements included 3 locations on the outdoor dining area during operation on a Friday between 2:30-3:00 PM, as well as 9 locations around the site. The measurement locations are presented in the figure below, and the detailed spectral and level analysis is presented in the following chapters.



*Figure 1: Operator attended measurements showing the relative location to adjoining properties*

The noise survey was conducted on site and adjacent to the site with the following instruments:

Equipment	Make	Model No.
Type 1 Sound Calibrator	Bruel & Kjaer - Denmark	4231
Hand Held Analyser	Bruel & Kjaer- Denmark	2250

*Table 1: Equipment used in the survey*

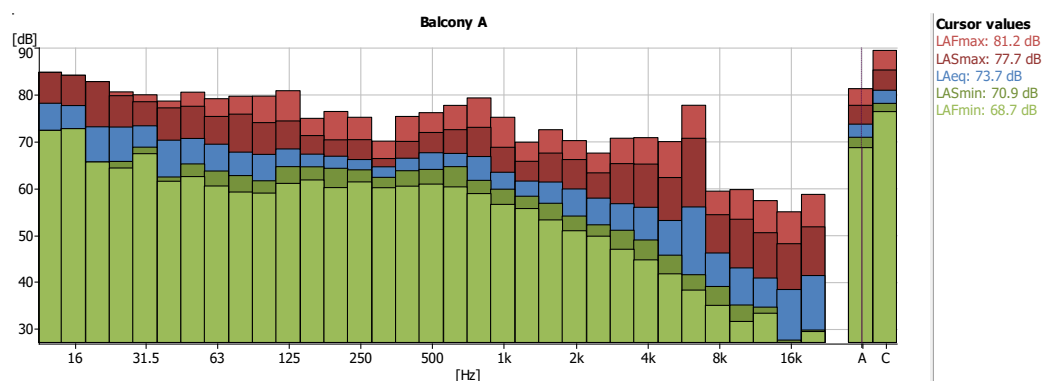
The equipment was calibrated before and after the measurements and no deviations were recorded.

The following figures illustrate the measurement locations and a full 1/3 octave analysis of the measurements at each location.





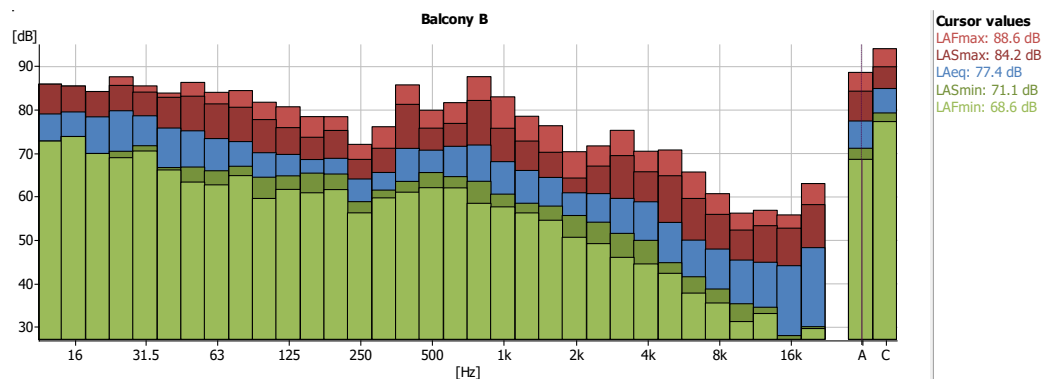
*Figure 2: Measurement location – Outdoor dining area A*



*Figure 3: Measurement location Outdoor dining area A results*



*Figure 4: Measurement location – Outdoor dining area B*

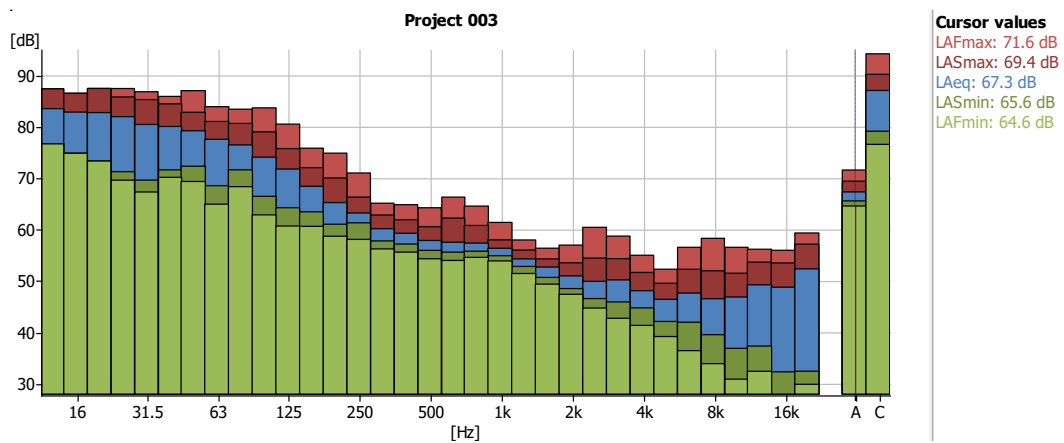


*Figure 5: Measurement location Outdoor dining area B results*





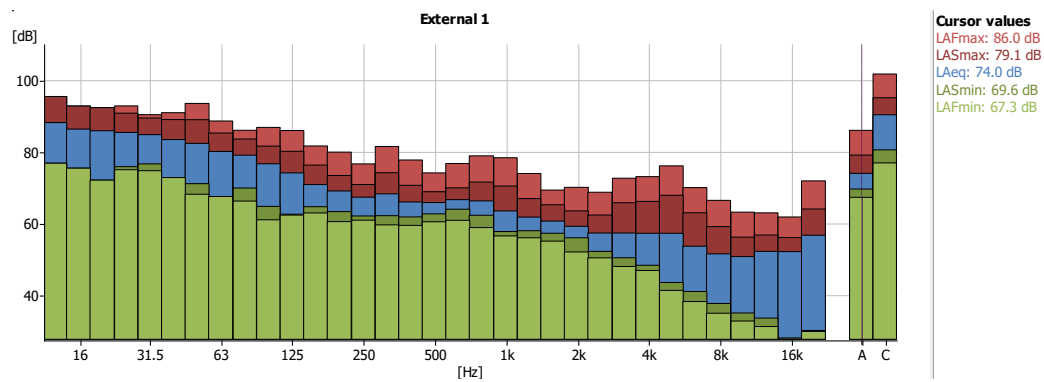
*Figure 6: Measurement location – Outdoor dining area C*



*Figure 7: Measurement location Outdoor dining area C results*



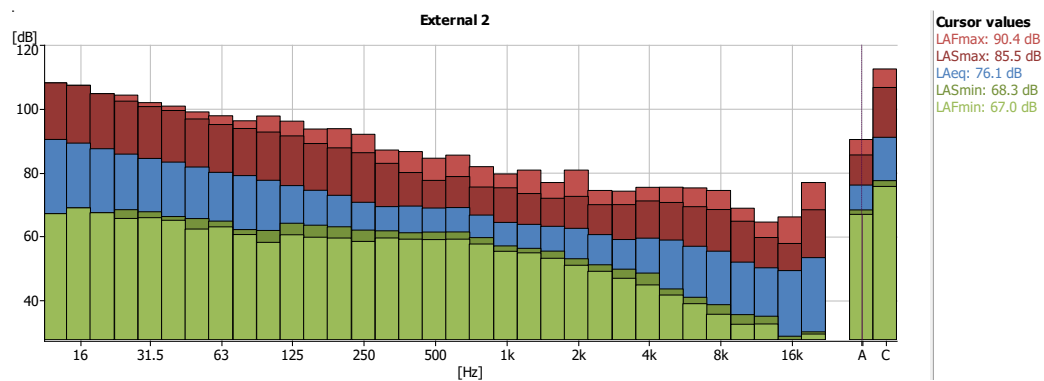
*Figure 8: Measurement location – External 1*



*Figure 9: Measurement location External 1 results*



*Figure 10: Measurement location – External 2*

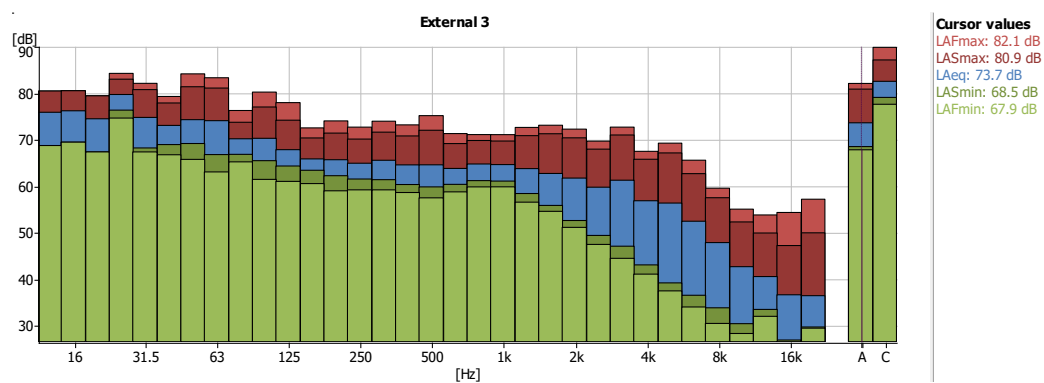


*Figure 11: Measurement location External 2 results*





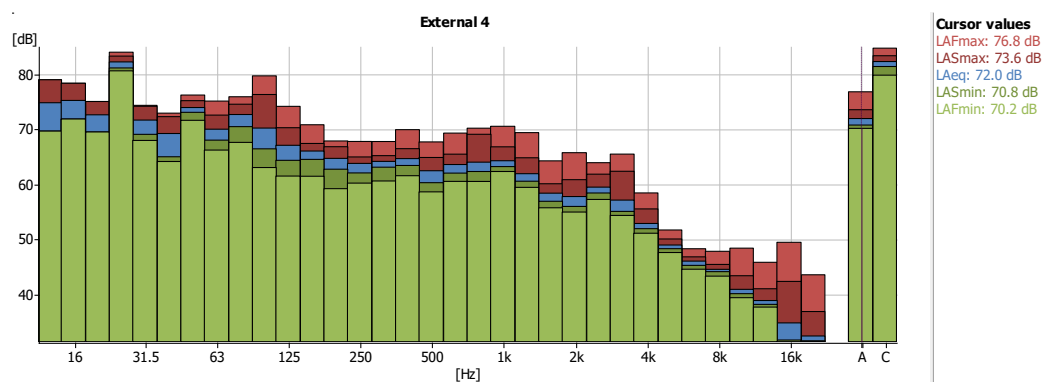
*Figure 12: Measurement location – External 3*



*Figure 13: Measurement location External 3 results*



*Figure 14: Measurement location – External 4*

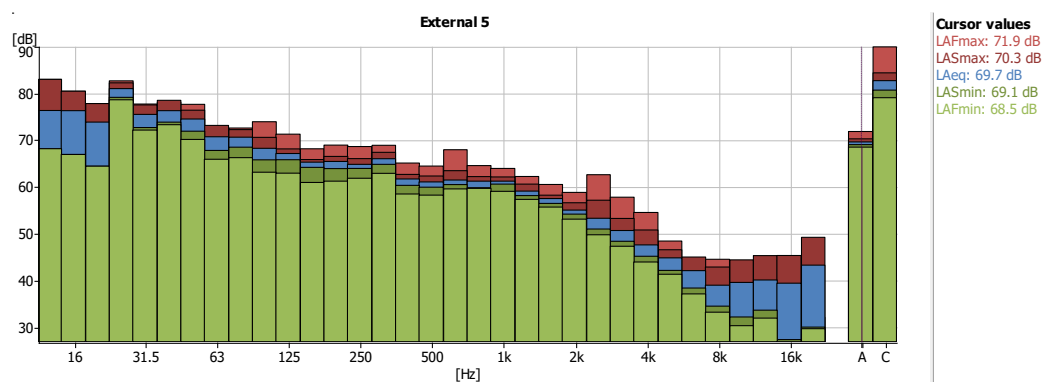


*Figure 15: Measurement location External 4 results*





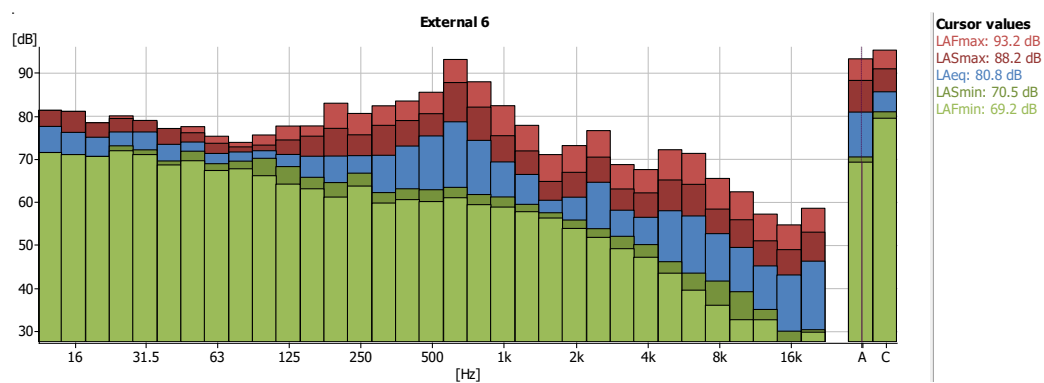
*Figure 16: Measurement location – External 5*



*Figure 17: Measurement location External 5 results*

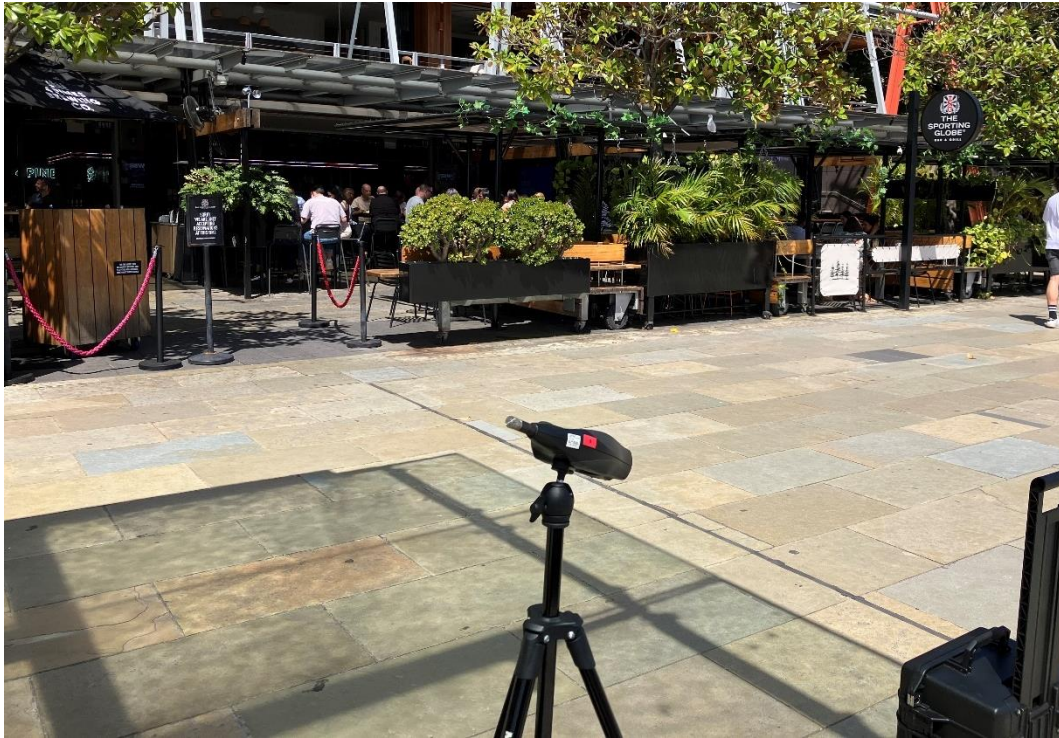


*Figure 18: Measurement location – External 6*

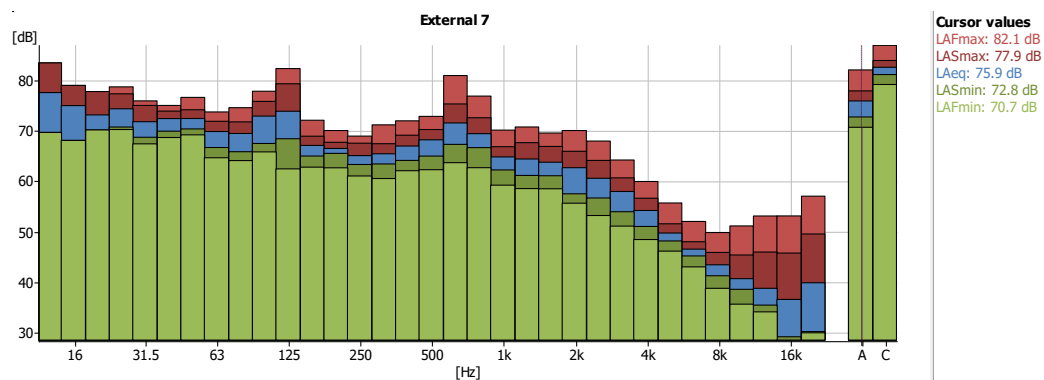


*Figure 19: Measurement location External 6 results*





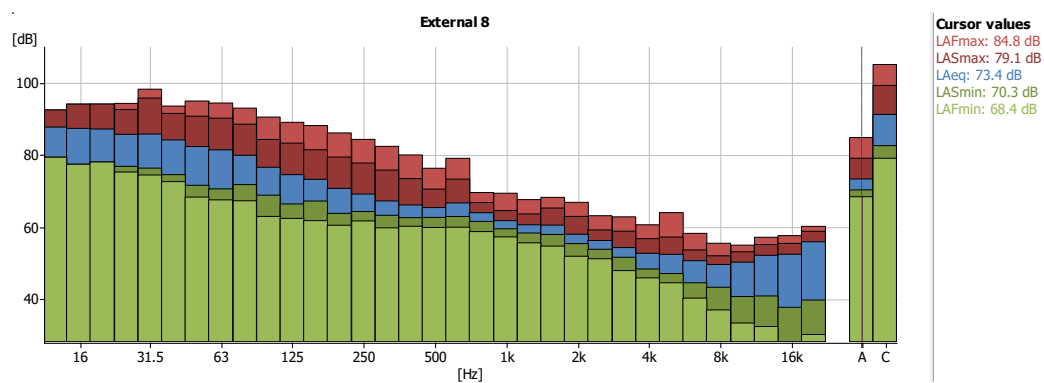
*Figure 20: Measurement location – External 7*



*Figure 21: Measurement location External 7 results*



*Figure 22: Measurement location – External 8*

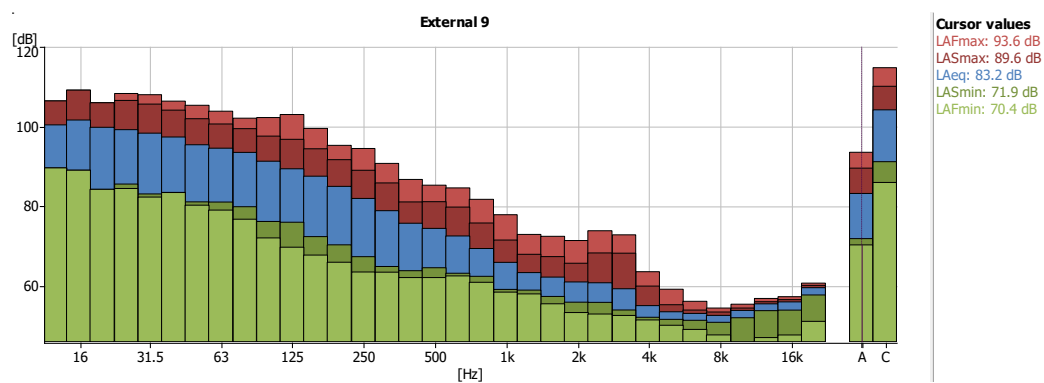


*Figure 23: Measurement location External 8 results*





*Figure 24: Measurement location – External 9*



*Figure 25: Measurement location External 8 results*



## 2.2 Operator Attended Measurement Summary

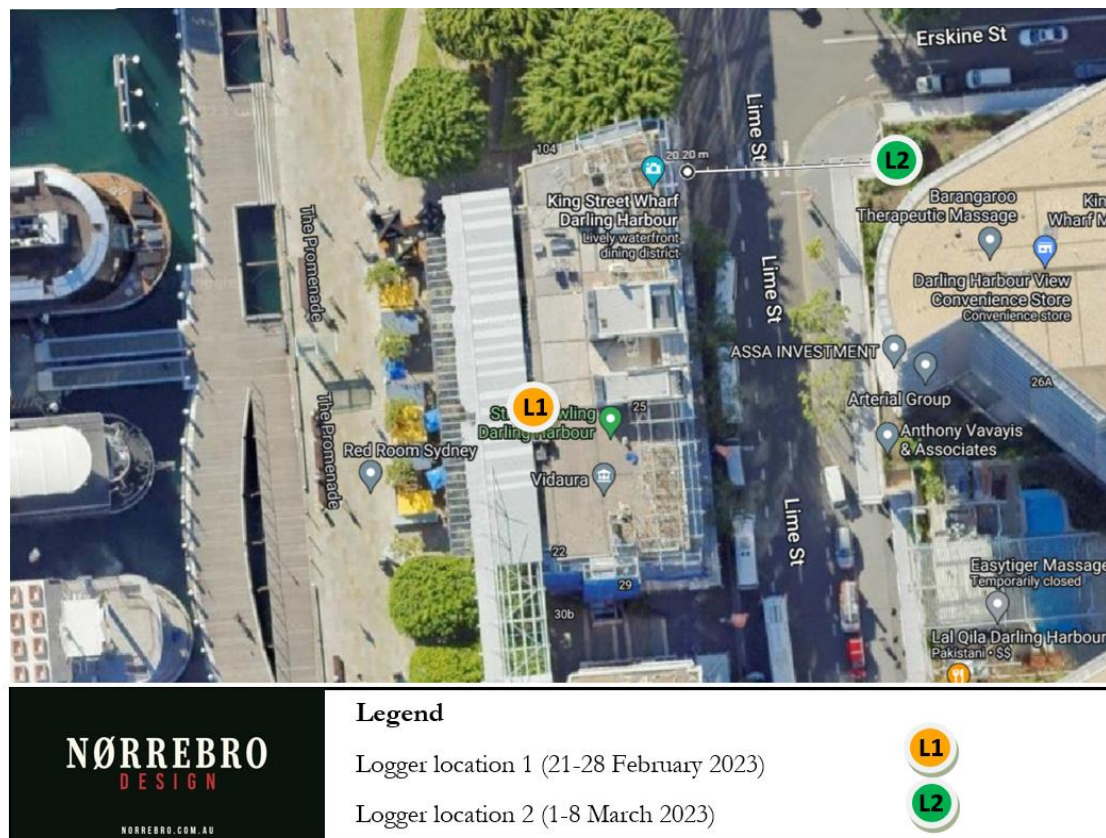
The results of the measurements are tabulated below:

Location no.	LAeq (dBA)	Remarks
A	73.7	Sound dominated by patrons' conversations.
B	77.4	Sound dominated by patrons' conversations.
C	75.3	Sound dominated by patrons' conversations.
1	74.0	Noise dominated by traffic. Occasional pedestrian conversations.
2	76.1	Noise dominated by traffic. Occasional pedestrian conversations.
3	73.7	Noise dominated by traffic. Occasional pedestrian conversations.
4	72.0	Noise dominated by traffic. Occasional pedestrian conversations.
5	69.7	Noise dominated by general ambient noise, some traffic noise, some occasional pedestrian conversations.
6	80.8	Noise dominated by general ambient noise, some traffic noise, some occasional pedestrian conversations.
7	75.9	Noise dominated by general ambient noise, some occasional pedestrian conversations.
8	73.4	Noise dominated by general ambient noise, some occasional pedestrian conversations.
9	83.2	Noise dominated by general ambient noise, some occasional pedestrian conversations.

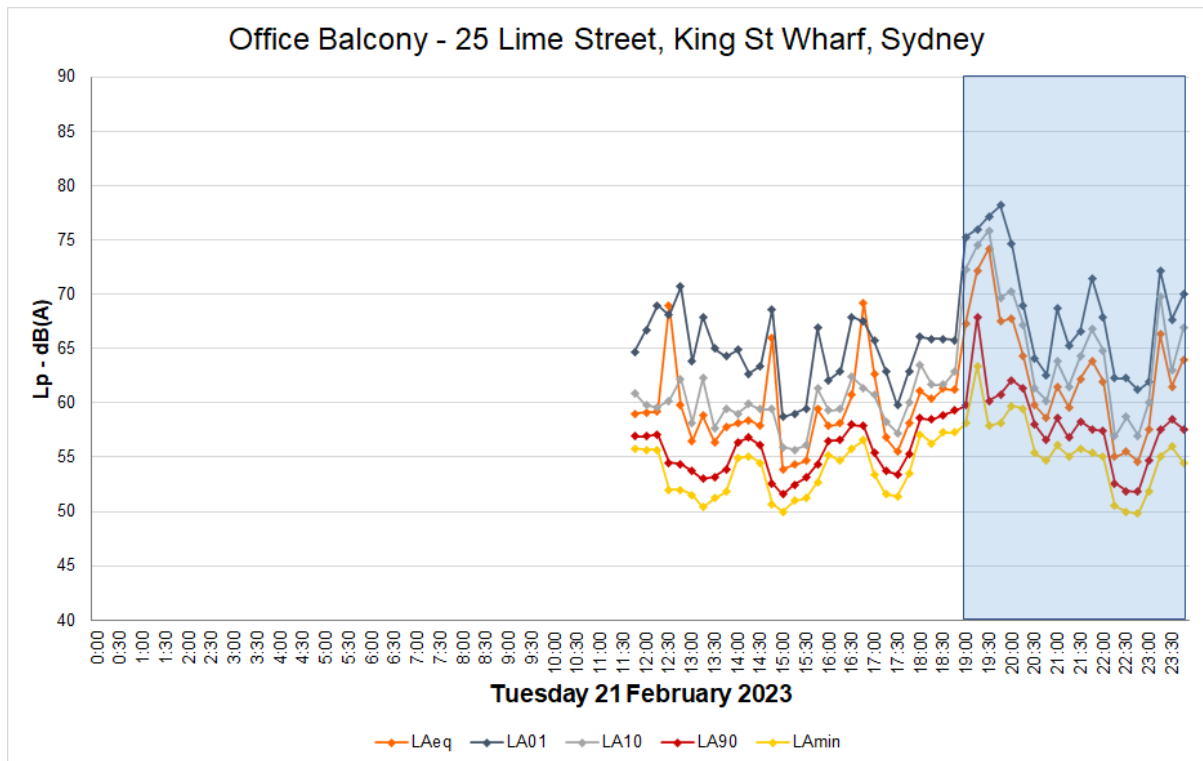
*Table 2: Hand held survey results*

## 2.3 Automatic Long Term Noise Logger Measurements in February and March 2023

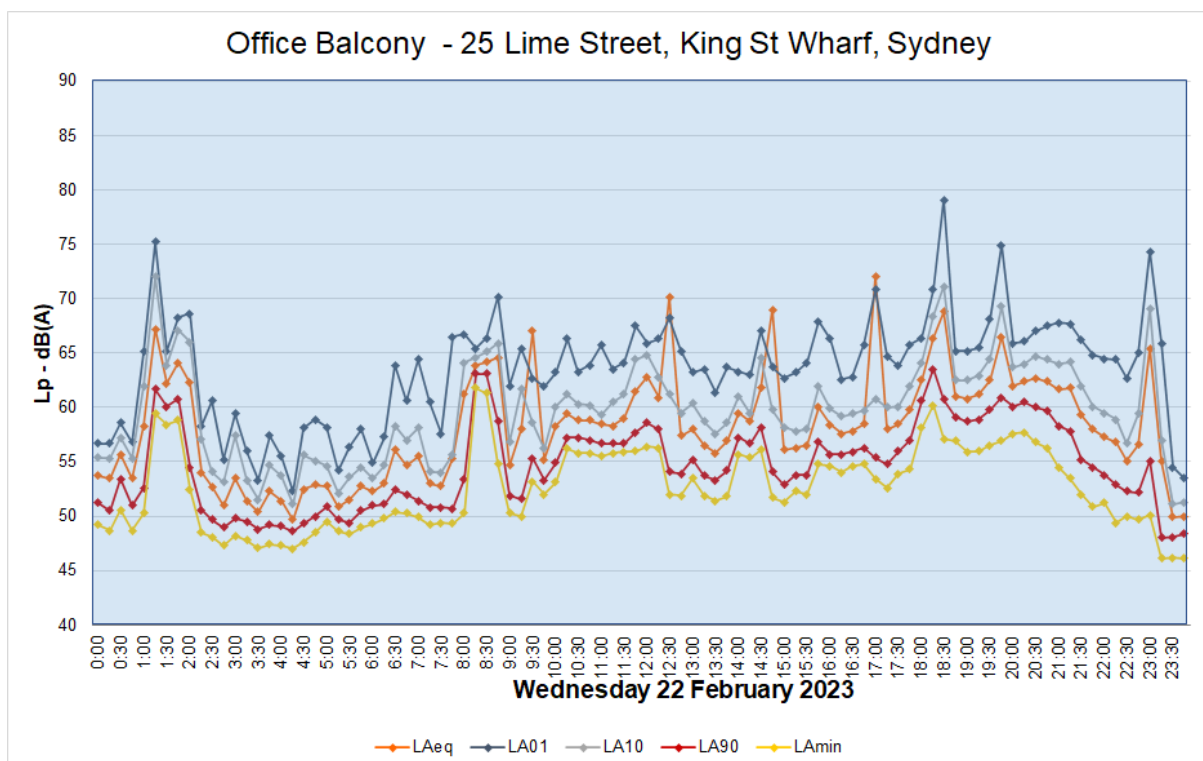
Noise loggers were installed at the Office balcony at 25 Lime Street above the Alegre Restaurant and at the balcony area on first floor of the Apartment Complex at 26 Lime St, King St Wharf, Sydney.



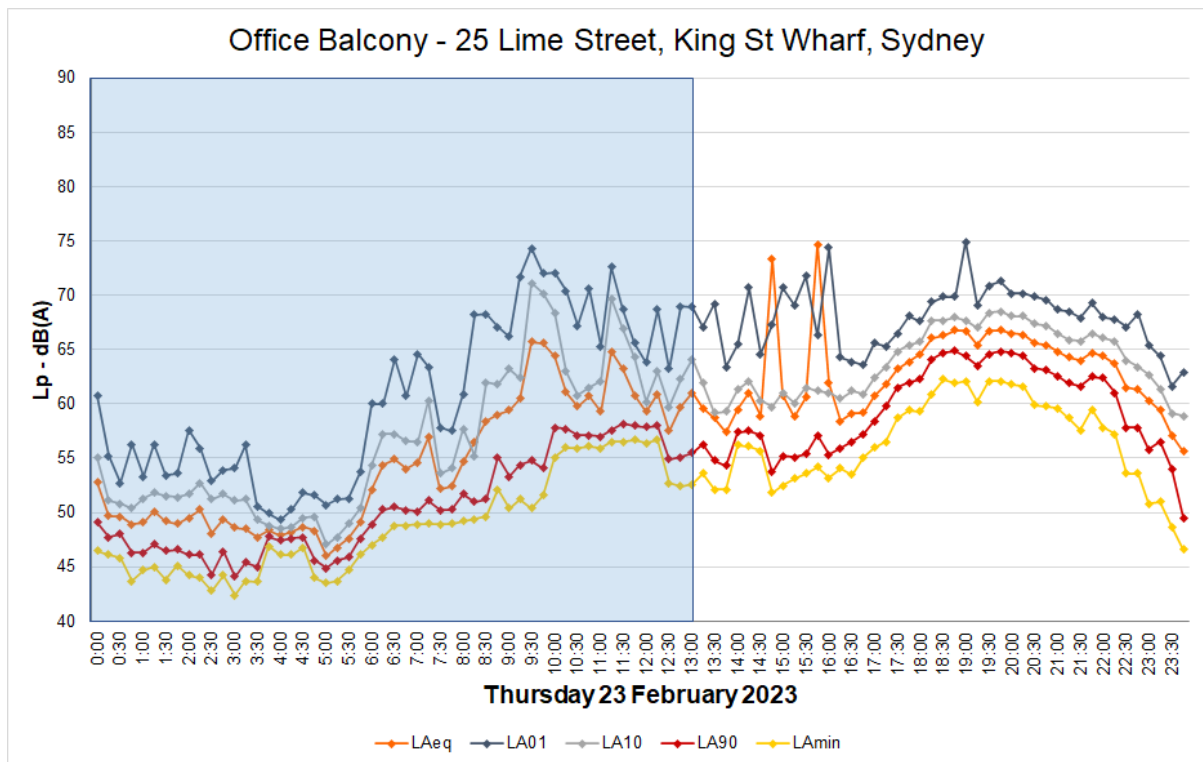
The measurement plots of the logger data collected at the Office balcony above the Alegre Restaurant (21-28 February 2023) are shown below. (The areas shaded blue indicate the excluded data due of rain or wind velocity at the Sydney observatory exceeding 5m/s).



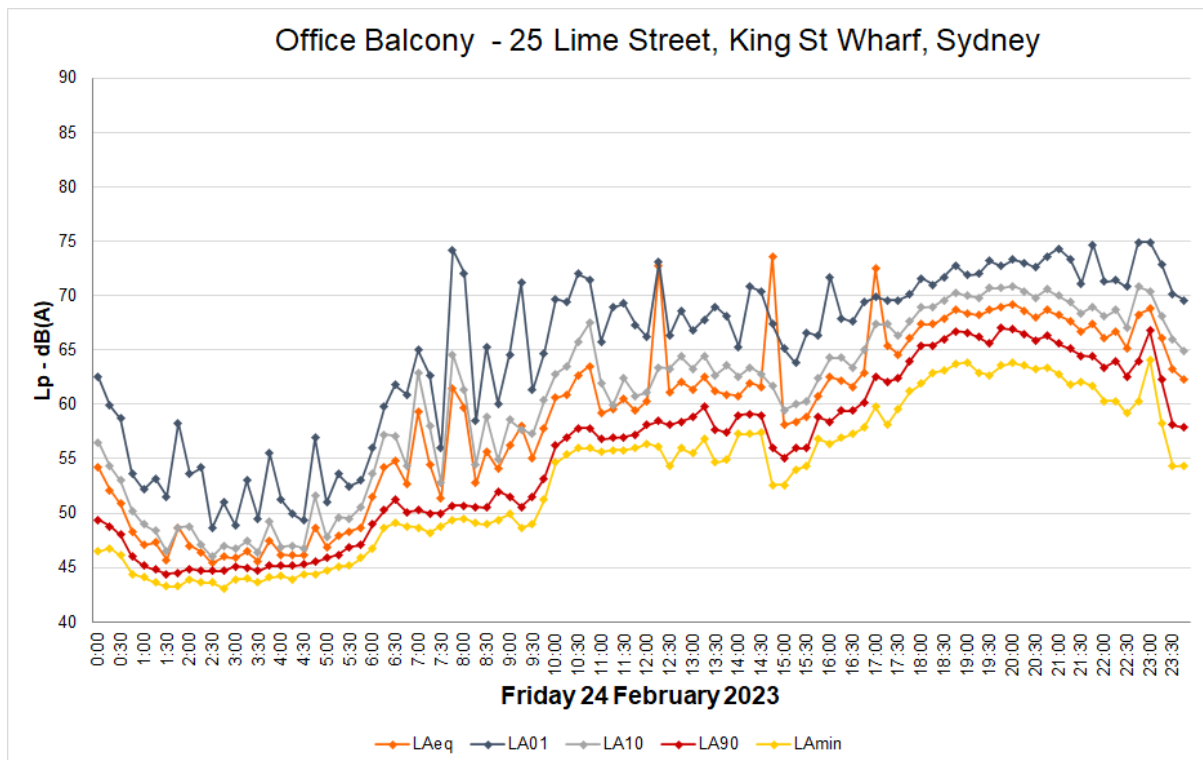
*Figure 26: Logger L1 data – day one*



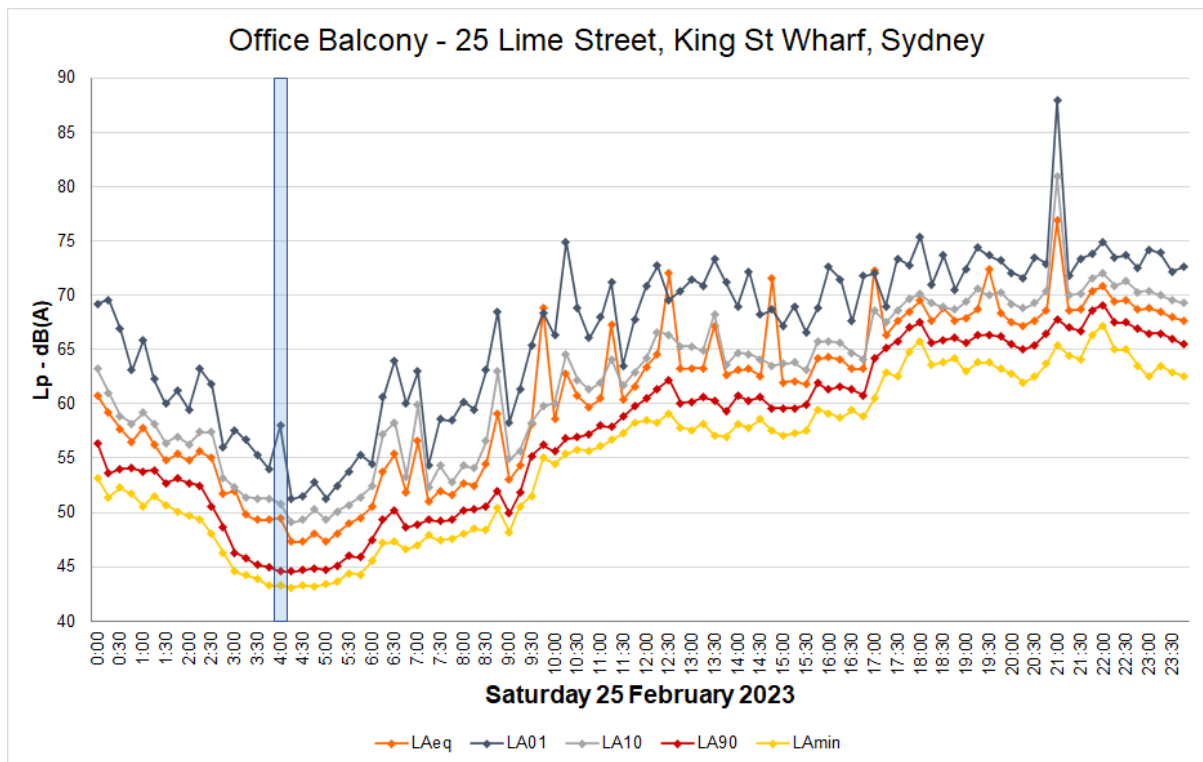
*Figure 27: Logger L1 data – day two*



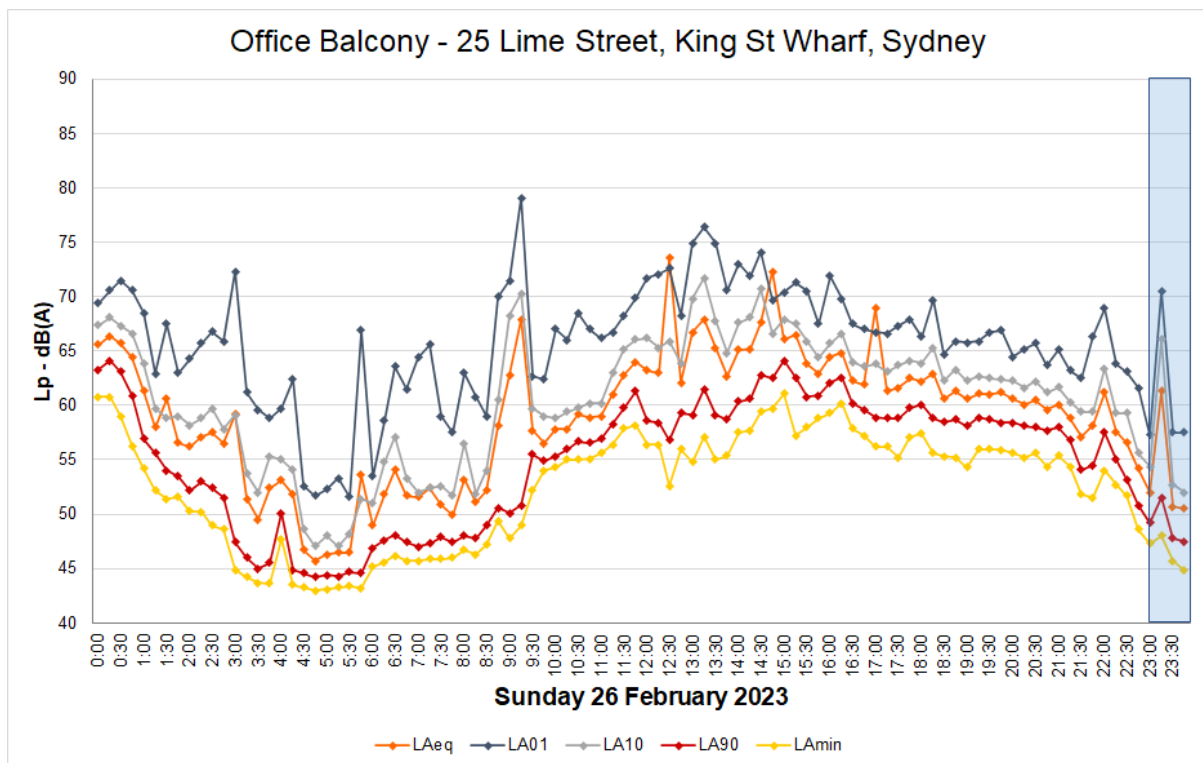
*Figure 28: Logger L1 data – day three*



*Figure 29: Logger L1 data – day four*

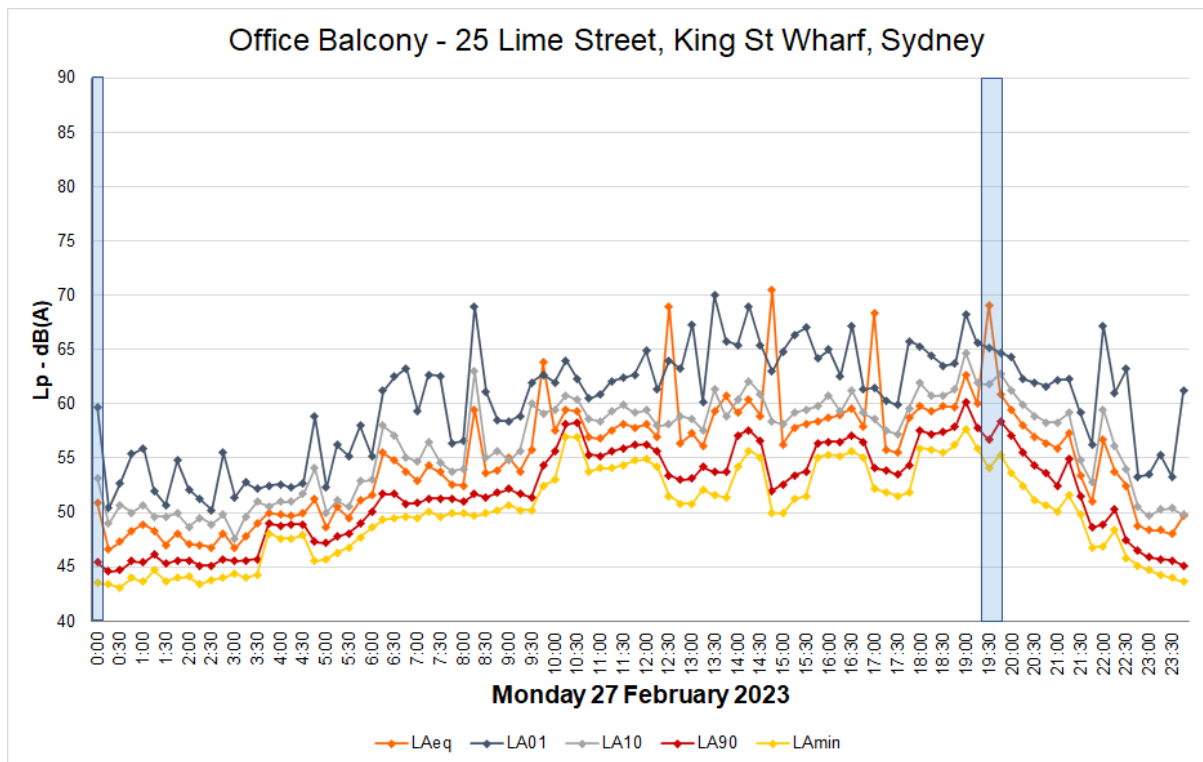


*Figure 30: Logger L1 data – day five*

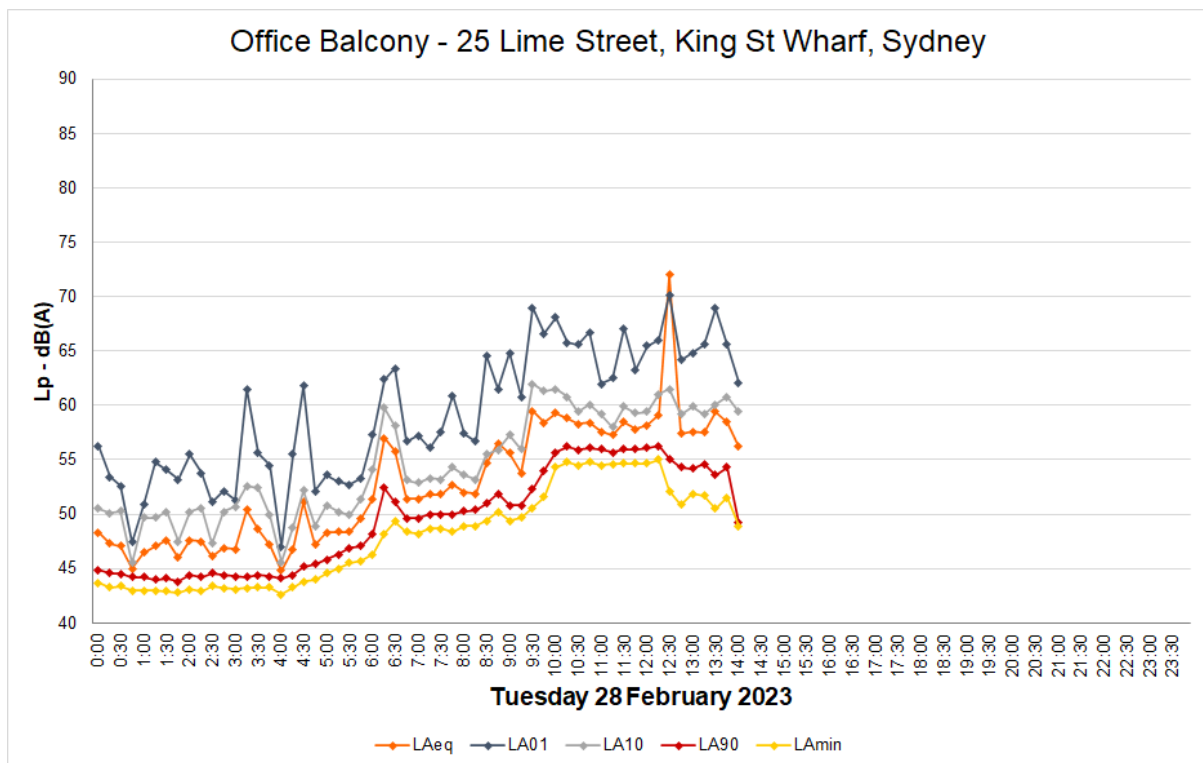


*Figure 31: Logger L1 data – day six*



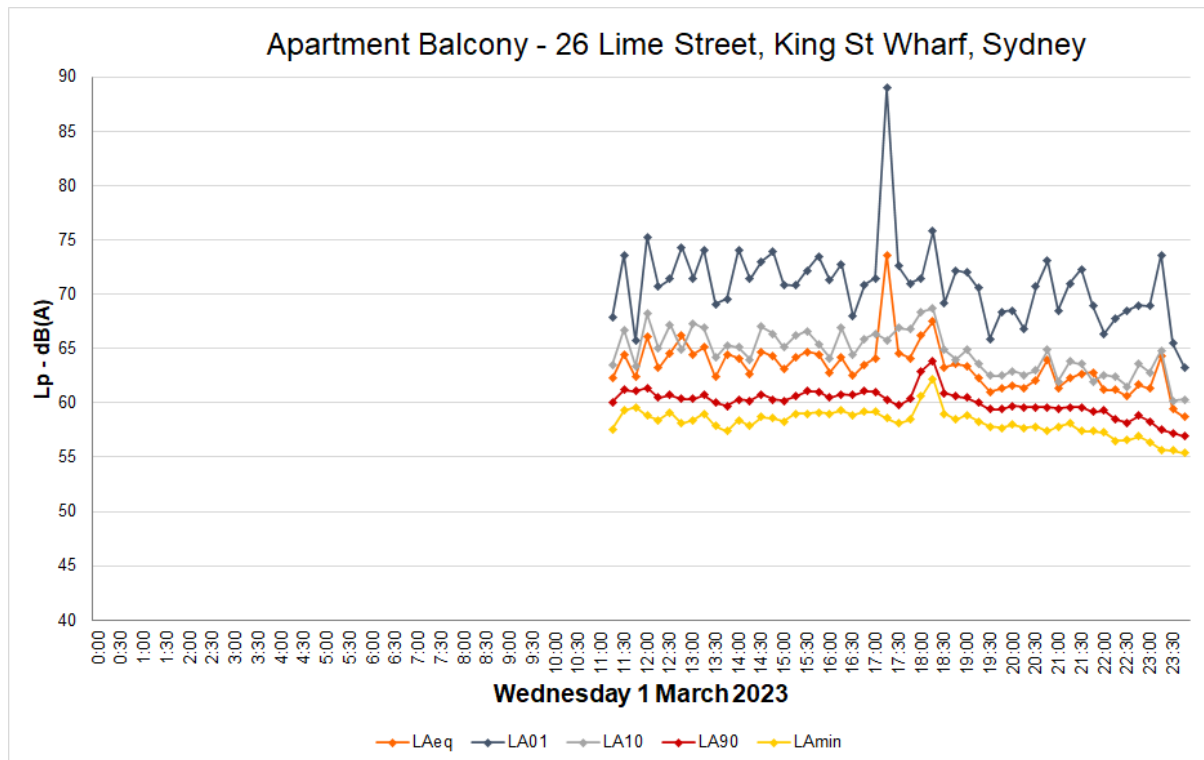


*Figure 32: Logger L1 data – day seven*



*Figure 33: Logger L1 data – day eight*

The measurement plots of the loggers at the balcony area of 26 Lime St, King St Wharf, Sydney (1-8 March 2023) are shown below. (The areas shaded blue indicate the excluded data because of rain or wind velocity at the Sydney observatory exceeding 5m/s).



*Figure 34: Logger L2 data – day one*

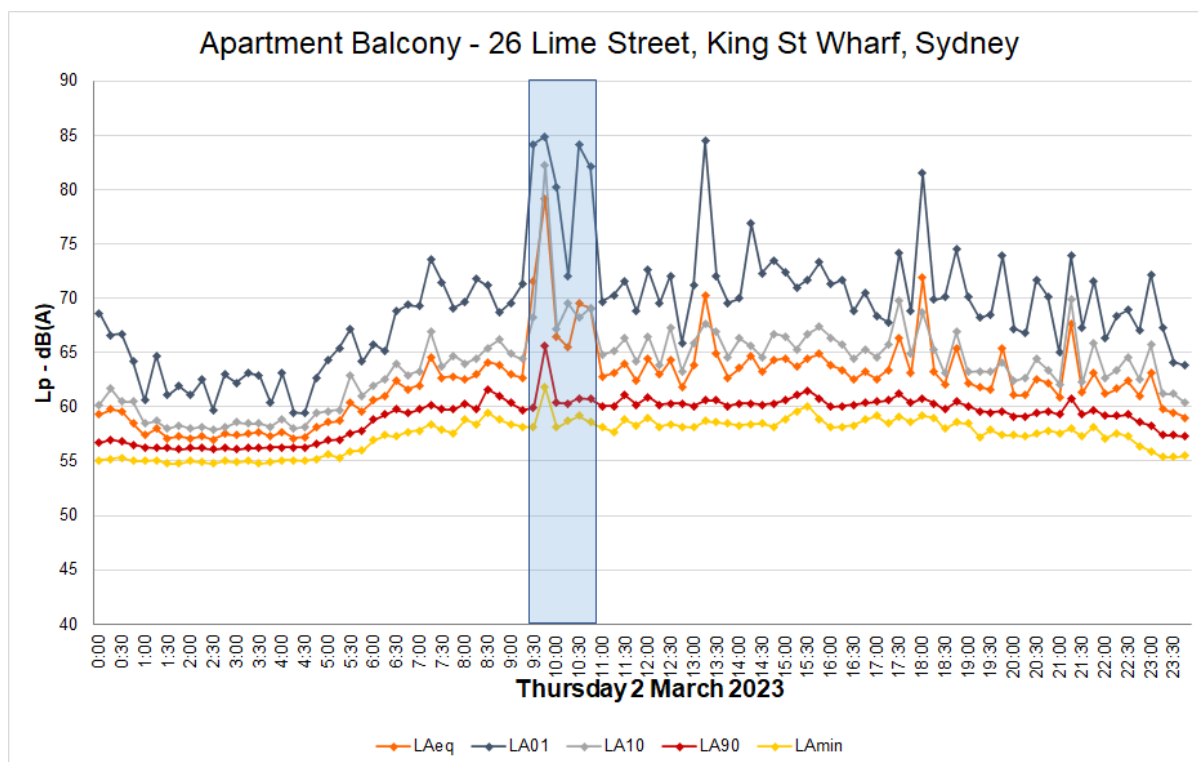


Figure 35: Logger L2 data – day two

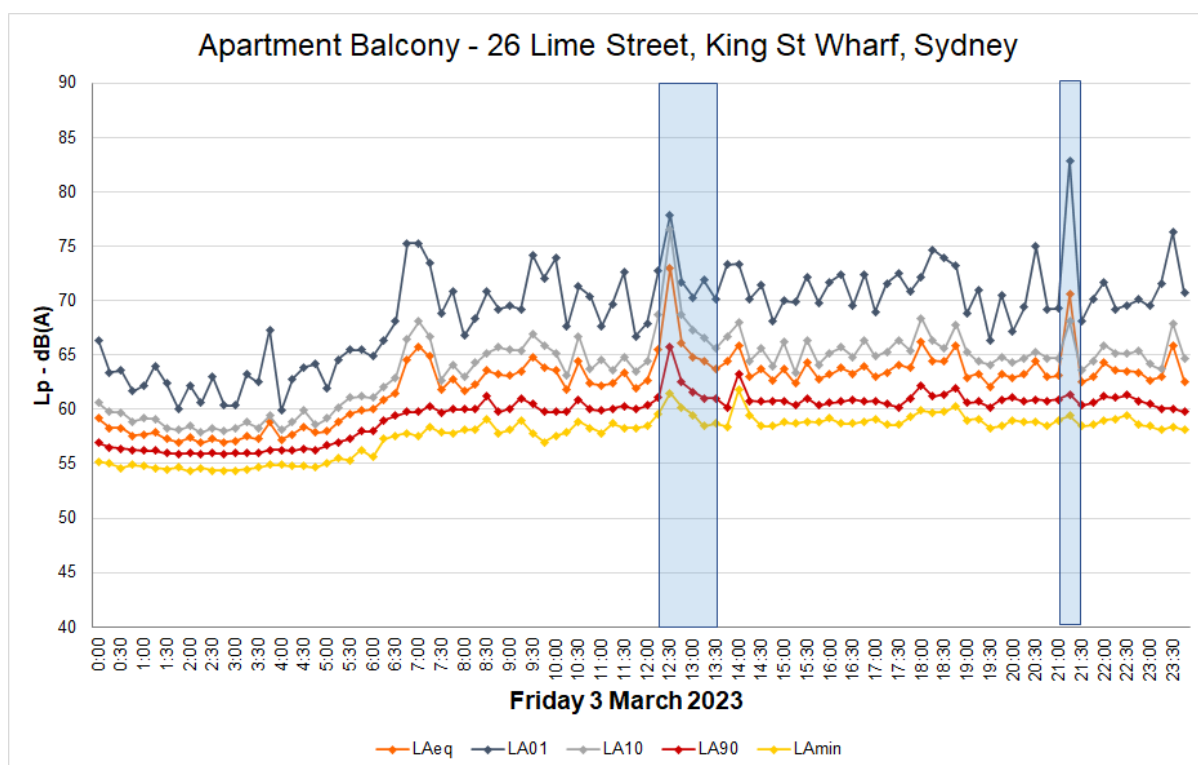


Figure 36: Logger L2 data – day three

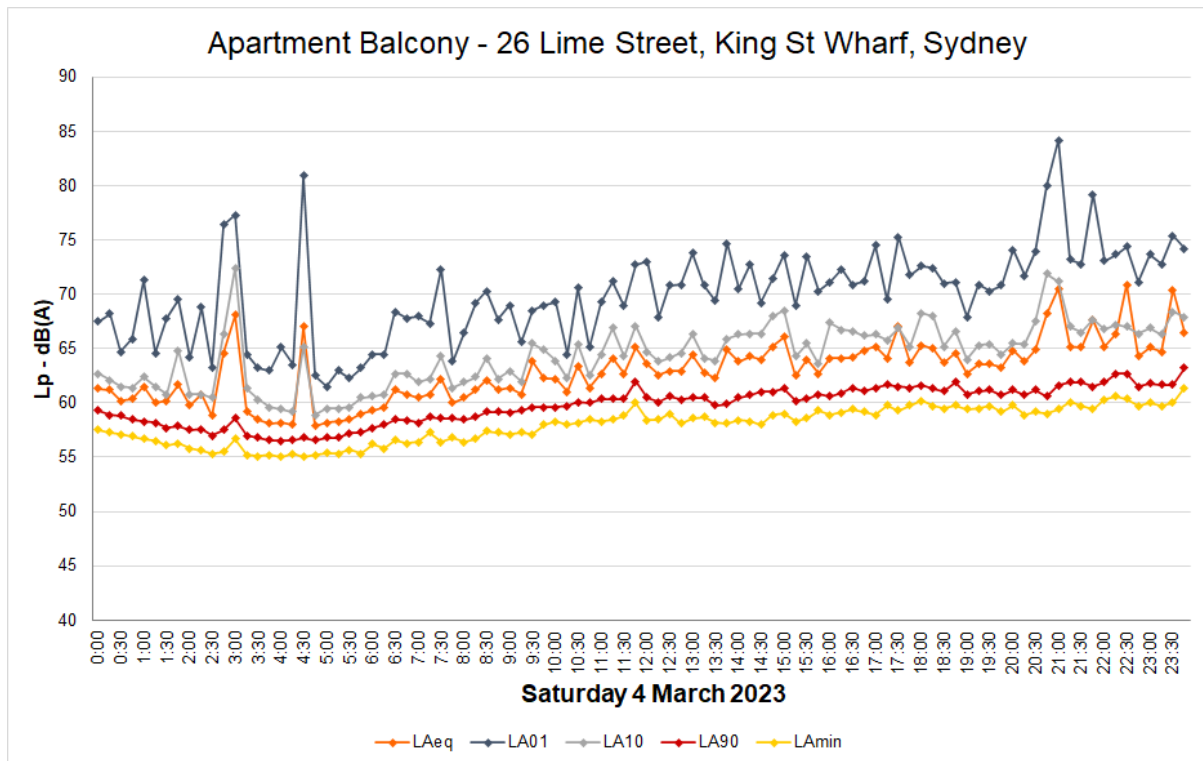


Figure 37: Logger L2 data – day four

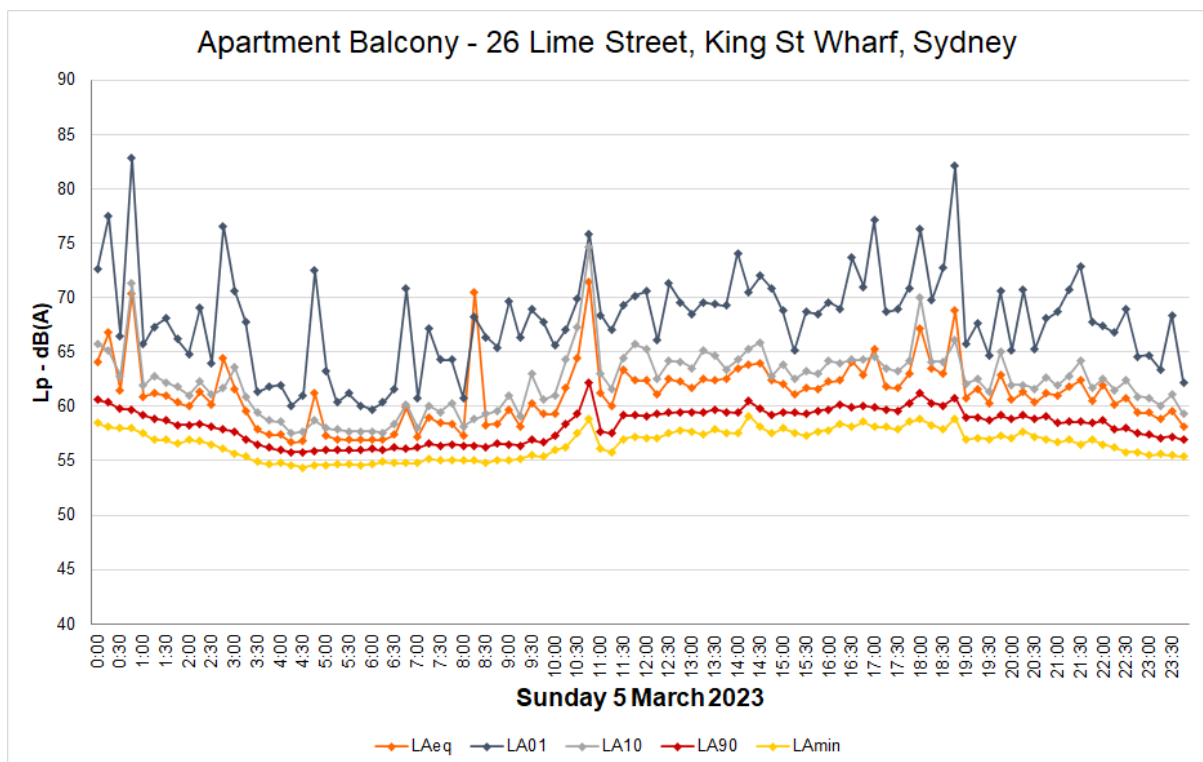
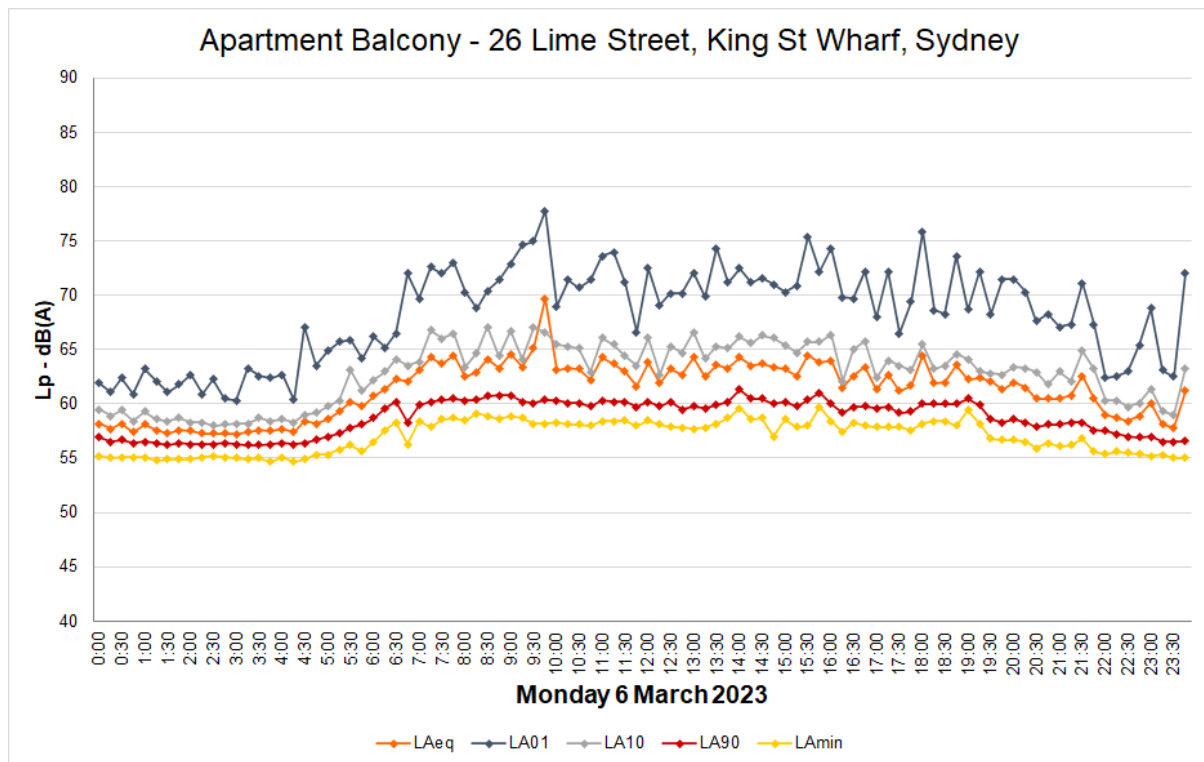


Figure 38: Logger L2 data – day five



*Figure 39: Logger L2 data – day six*



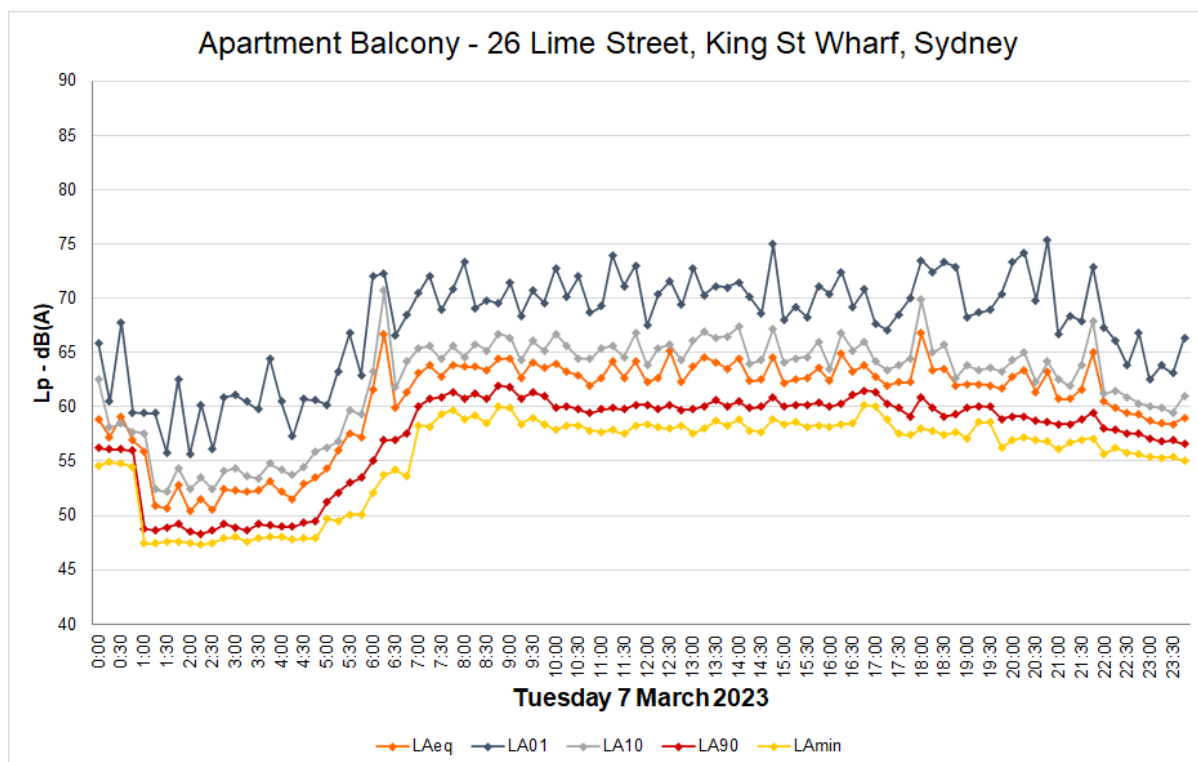


Figure 40: Logger L2 data – day seven

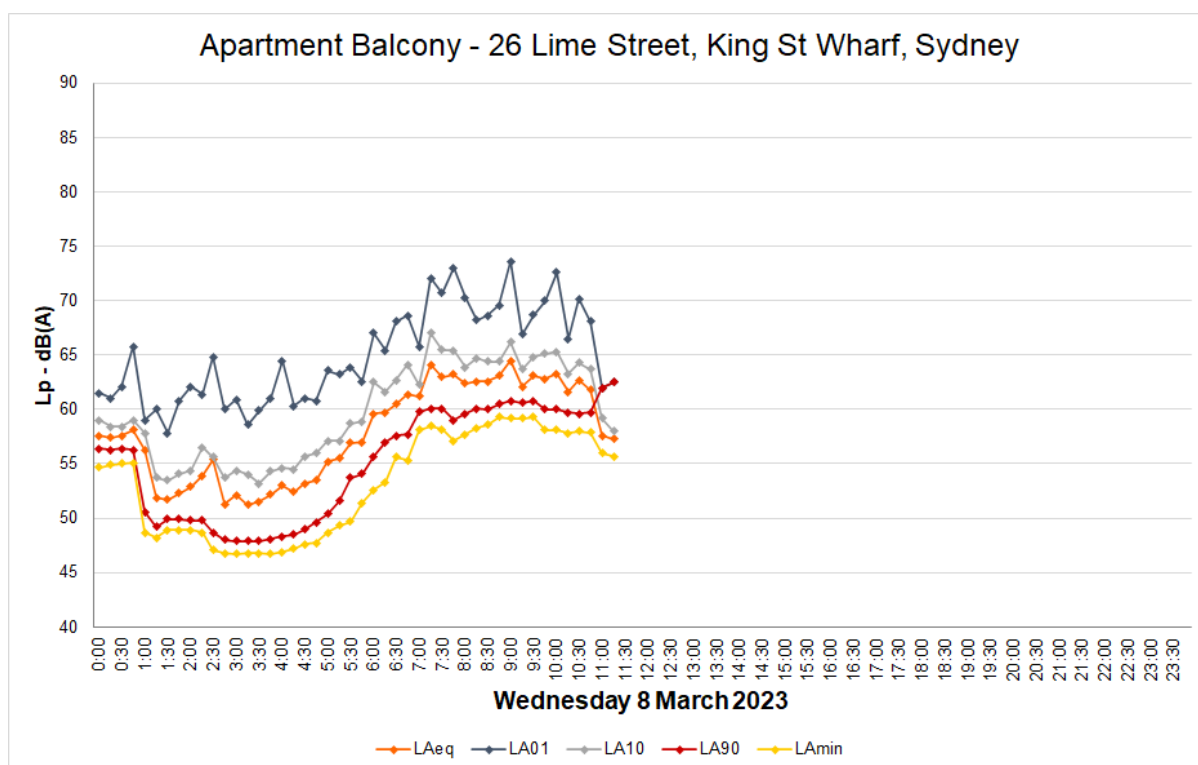


Figure 41: Logger L2 data – day eight

The summary of the noise logger measurements (21-28 Feb 2023) at the 25 Lime St Office balcony above the Alegre Restaurant is as follows. The  $L_{A90}$  is the median background noise level as determined in accordance with the NSW Noise Policy for Industry (2017). The dominant noise sources are from the Sports Bar below the Alegre Restaurant and Harbor Cruise boats moored on the waterfront.

Office balcony 25 Lime St	$L_{Aeq}$	$L_{A01}$	$L_{A10}$	$L_{A90}$
Day (7am-6pm)	59 dB	67 dB	61 dB	56 dB
Evening (6pm-10pm)	66 dB	70 dB	68 dB	63 dB
Night (10pm-7am)	51 dB	58 dB	52 dB	47 dB

*Table 3: Office balcony Noise Logger Measurements (21-28 Feb 2023) Summary*

The summary of the noise logger measurements (1-8 Mar 2023) at the 26 Lime St First Floor balcony opposite the Alegre Restaurant main entry is as follows. The  $L_{A90}$  is the median background noise level as determined in accordance with the NSW Noise Policy for Industry (2017). The dominant noise sources are from the traffic movements and buses idling on Lime Street.

Apartment balcony 26 Lime St	$L_{Aeq}$	$L_{A01}$	$L_{A10}$	$L_{A90}$
Day (7am-6pm)	63 dB	71 dB	65 dB	60 dB
Evening (6pm-10pm)	62 dB	70 dB	64 dB	60 dB
Night (10pm-7am)	62 dB	70 dB	65 dB	59 dB

*Table 4: Lime St Apartment balcony area Noise Logger Measurements (1-8 Mar 2023) Summary*

### 3. Noise Criteria Applicable for the Venue

#### 3.1 NPFI Project Intrusiveness and Amenity Noise Criteria

As per Development Application Acoustic Report, which Norrebro has prepared in 2021, the most stringent criteria are reprinted below for completeness.

Note that as the noise logging was done at the peak of the Covid-19 pandemic restrictions, the data below may not be truly representative of the current situation.

Type of Receiver	Noise Level $L_{eq,15min}$		
	Daytime 0700 to 1800	Evening 1800 to 2200	Night-time 2200 to 0700
Residence - Apartment at 32 Lime Street	Project Intrusiveness Assessment		
	57	49	48
	Project Amenity Assessment - Urban		
	58	48	43
	Project Trigger Noise Level (PTNL)		
	57	48	43

*Table 5: NPFI Project Intrusiveness and Amenity Noise Criteria, dB(A), 2021*

The latest noise logger measurements made between 1 March to 8 March 2023 at the first-floor balcony of 26 Lime Street which is representative of the balcony at the apartment at 32 Lime Street, provides the following criteria.

Type of Receiver	Noise Level $L_{eq,15min}$		
	Daytime 0700 to 1800	Evening 1800 to 2200	Night-time 2200 to 0700
Residence - Apartment at 32 Lime Street	Project Intrusiveness Assessment		
	65	65	64
	Project Amenity Assessment - Urban		
	58	48	43
	Project Trigger Noise Level (PTNL)		
	58	48	43

**Table 6: NPI Project Intrusiveness and Amenity Noise Criteria, dB(A), March 2023**

There is minimal difference between the 2021 data criteria and the March 2023 data criteria.

### 3.2 City of Sydney Entertainment Noise Criteria

The proposed outdoor hours of operation of the Alegre Restaurant are 8:00am to 12:00 midnight, Monday to Sunday.

The City of Sydney acoustic criteria for 'Noise Entertainment' during the operation of the Alegre Restaurant is as follows:

- a. The  $L_{Aeq, 15 \text{ minute}}$  noise level from the use must not exceed the background noise level ( $L_{A90, 15 \text{ minute}}$ ) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive) by more than 5dB between 7.00am and 12.00 midnight when assessed at the boundary of any residential accommodation or tourist and visitor accommodation.
- b. The  $L_{Aeq, 15 \text{ minute}}$  noise level from the use must not exceed the background noise level ( $L_{A90, 15 \text{ minute}}$ ) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive) between 12.00 midnight and 7.00am when assessed at the boundary of any residential accommodation or tourist and visitor accommodation.
- c. Notwithstanding (a) above, the  $L_{Aeq, 15 \text{ minute}}$  noise level from the use must not exceed the greater of the following levels between 7am and 12 midnight inside any habitable room of a residential accommodation or tourist and visitor accommodation, or at any time in an affected commercial premises:
  - i. The existing internal  $L_{A90, 15 \text{ minute}}$  (from external sources excluding the use) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive). Or,
  - ii. If the  $L_{Z90, 15 \text{ minute}}$  background level is below the hearing threshold curve ( $T_f$  - Table 1 of ISO 226 : 2003) in an above octave band, the lowest audible sound level ( $L_p$ ) of the  $T_f$  curve in that octave band shall become that octave's  $L_{Zeq 15 \text{ minute}}$  noise criteria level.

### 3.3 Internal and External Patron Noise

The following internal and external restaurant patron noise is assessed in accordance with the Association of Australian Acoustical Consultants “Licensed Premises Noise Assessment Technical Guideline” Version 1.0 dated August 2019.

#### INTERNAL PATRON NOISE LEVELS

Appendix A from the above Guideline (shown below) shows the Rindel Method for determining the noise level in the restaurant with 300 patrons.

##### **Appendix A: Rindel Method**

- a) Rindel’s equation for the level of ambient noise due to people speaking is:

$$L_{NAeq} = 93 - 20\log(A/N_s) \quad (\text{eq 1})$$

where  $A$  is average absorption area in the space and  $N_s$  is the number of people speaking.

Although  $A$  is equivalent to  $S.alpha$  in Rindel’s work, making  $A = \text{Room Constant } (R)$  provides a better match to measured levels in smaller areas.  $R$  is computed from the average reverberation time in the 250 Hz to 2 kHz range, based on the Eyring equation.

- b) Incorporating the concept of a Group Size  $G$ , equation 1 becomes:

$$L_{NAeq} = 93 - 20\log(AG/N) \quad (\text{eq 2})$$

where  $G = N_s/N$  and  $N$  is the total number of patrons.

Applying the Rindel Method from the above Guideline and based on an average Group Size  $G$  of 3 (i.e. 3 people per table in the restaurant) and a restaurant reverberation time of less than 1.0 seconds (Room Constant  $A=130$ ), the predicted noise level is 89dBA<sub>Leq</sub>.



### 3.4 Noise Control of Background Music within the Alegre Outdoor Dining Area

The acoustic measurements indicate that the predicted patrons sound levels from the DA report are very accurate.

***(NB: This was measured at 84 dBA as detailed below, during Friday evening busiest time in March 2023.)***

Based on the above noise levels and the installed diffusive acoustic treatments the predicted noise levels from the internal patron noise at the nearest residences at 32 Lime Street is 38dBA<sub>Leq</sub>, which is below the night time project trigger noise level (PTNL) of 43dBA<sub>(Leq)</sub>

For compliance, the following recommendations are to be implemented:

1. The loudspeakers installed shall be highly directional, projecting sound only towards the patrons.
2. The loudspeakers levels shall not exceed 80 dB @ 3m, at patrons' tables. (i.e., approximately 9dB quieter than the expected maximum patrons' levels).
3. A number of 9 small-medium size loudspeakers are to be installed, with limited low frequency output. Single, large loudspeakers are not recommended.

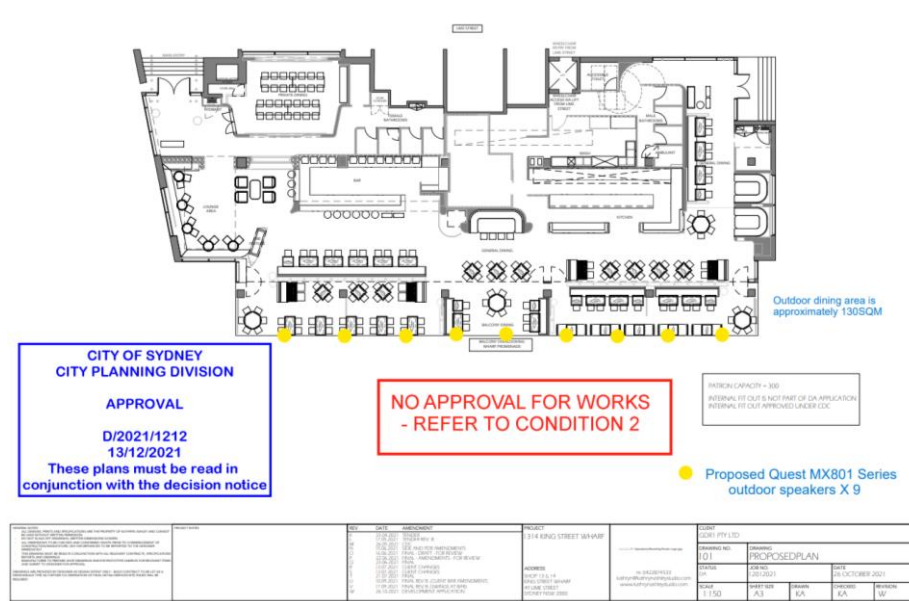
A loudspeaker setting of 9 dB lower than the projected maximum patrons sound levels will not increase the overall receiver sound levels at the residential properties. Also, there is an allowance for approximately 5dB safety margin for the most stringent night-time criteria.

## 4. Discussion of Findings and Recommendations (Original)

The results of the existing conditions measurements and assessment based on proposed operation indicate that compliance can be achieved with the parameters stated by the applicable regulations.

The assessment is conservative due the following facts:

- A. Logger data and hand-held DA data was collected during lockdown, with all the existing restaurants closed. Currently King Street Wharf is a vibrant place with many venues that are significantly louder than Alegre Bar & Dining. Based on our assessment of the acoustic environment at the restaurant, relaxed music is played at a pleasant level.
- B. The proposed highly directional speaker facing towards the venue will have minimal impact at a level of 80 dB @ 3m. The diffusive acoustic ceiling installed will further minimise noise egress. The 9 small-medium size high fidelity loudspeakers (Quest MX801), spaced equidistantly across the outdoor dining area will ensure that sound egress is not excessive.



*Figure 42: Recommended loudspeaker spacing and type*

The acoustic impact of the Alegre outdoor dining area ambient music is expected to be minimal on the adjacent properties. The propagation of restaurant sound is attenuated by the building which is well built and adequate for sound attenuation. The single most important consideration acoustically is the implementation of the Plan of Management as per Reference 2.

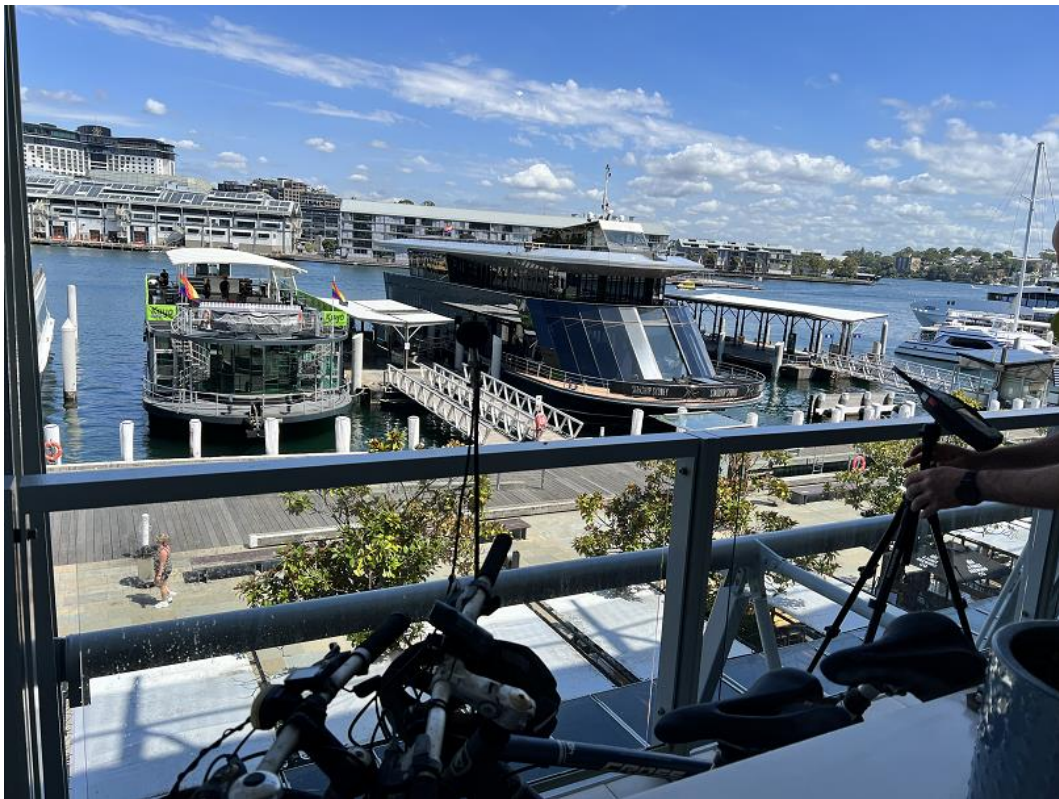
## 4. Executive Summary of Additional Logging

Additional acoustic logging and operator attended measurements have been performed to gather data in order to address the matters raised by the Council. This chapter addresses the requirements and provides additional information on the items raises:

- 1. Background sound levels for daytime, evening and night time. Provide an assessment of the background sound levels at potentially affected premises throughout the proposed operating times of the outdoor speakers.**

Seven days continuous sound monitoring at the nearest affected receivers (both commercial and residential) have been performed at:

- a. 25 Lime Street balcony directly above
- b. 26 Lime Street residential complex across the road from Alegre



*Figure 43: 25 Lime Street Office balcony Logger 1 (21 February 2023)*



*Figure 44: 26 Lime St balcony across the road (8 March 2023)*

The summary of the of the noise monitoring results are presented below:

Office balcony 25 Lime St	L <sub>Aeq</sub>	L <sub>A01</sub>	L <sub>A10</sub>	L <sub>A90</sub>
Day (7am-6pm)	59 dB	67 dB	61 dB	56 dB
Evening (6pm-10pm)	66 dB	70 dB	68 dB	63 dB
Night (10pm-7am)	51 dB	58 dB	52 dB	47 dB
Apartment complex balcony 26 Lime St	L <sub>Aeq</sub>	L <sub>A01</sub>	L <sub>A10</sub>	L <sub>A90</sub>
Day (7am-6pm)	63 dB	71 dB	65 dB	60 dB
Evening (6pm-10pm)	62 dB	70 dB	64 dB	60 dB
Night (10pm-7am)	62 dB	70 dB	65 dB	59 dB

*Table 7: Noise logger measurements summary*

In addition to the 7-day logging at each location, spectral analysis has been performed with hand held analyser to determine the octave band sound levels and provide insight into potentially tonal sound sources and octave band compliance for Alegre sound system and patron noise.



## 2. Provide details of the predicted sound levels from the speakers, and details of the cumulative impact from patron noise at the source.

The proposed outdoor dining area speakers are Quest Engineering Type MX801. The specifications are presented below:

	MX601 / MX601W		MX801 / MX801W	
Max SPL *calculated	108 dB		112 dB	
Sensitivity *5-band average	91 dB		93 dB	
Frequency Response	80Hz – 20kHz ±2dB		75Hz – 20kHz ±2dB	
Impedance	16Ω			
Transformer Taping	100V: 10w/20w/30w/40w		100V: 20w/30w/40w/60w	
	70V: 5w/10w/15w/20w		70V: 10w/15w/20w/30w	
Amplifier Power	RMS:75W	Peak: 150W	RMS: 100W	Peak: 200W
Transducers	HF: 25mm Titanium Dome Tweeter	LF: 6" High Performance Polypropylene Woofer	HF: 25mm Titanium Dome Tweeter	LF: 8" High Performance Polypropylene Woofer
Directivity *H xV	150° x 120° -10dB			
Connections	Captive Screw Terminal Plug (In/Thru)			
Environmental Ingress Rating	Speaker Cabinet IP56 (IP67 when used with IPMX1 kit)			
Dimensions *H x W x D	303 x 184 x 175mm		345 x 202 x 243mm	
Net Weight	3.5 kg		4.3 kg	
Shipping Weight	5.4 kg		6.0 kg	



### MX Series High-Fidelity Weatherproof Loudspeakers

The Quest Engineering MX series are the first audio installation loudspeakers to meet the highest environmental ingress and audio fidelity standards whilst being available at an affordable commercial audio cost. Designed to integrate into any architectural commercial environment, its exceptional audio quality and componentry ensures a long performance service life.

The MX Series is available in black (MX601/MX801) or white (MX601W/MX801W) cabinets finished in clear low sheen finish formulated to resist harsh environmental conditions.



**Figure 45: Loudspeakers specifications**

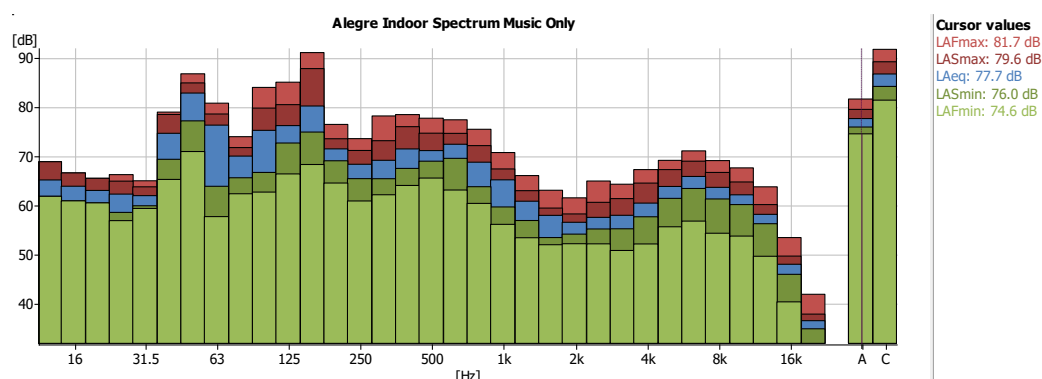
The proposed new loudspeakers type is identical to the existing ones installed in the restaurant currently, as shown below:



*Figure 46: Existing sound system is identical to proposed new equipment*

The sound level set for the indoors speakers is 80 dBA @ 3m.

The spectrum and detailed octave band levels have been measured during daytime, without patrons, to establish the typical output and frequency analysis of music. Music from the restaurant's playlist that is currently in use has been employed for the study.

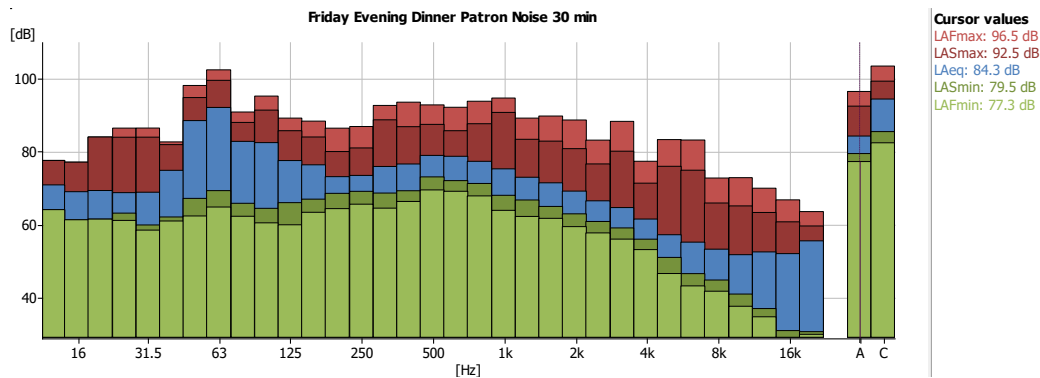


*Figure 47: Existing sound system typical spectrum*

It is to be noted that the level that is typically used as a setting in the restaurant is slightly below the maximum that was recorded LAeq 80 dBA on average (measured LAeq 77.7).

The proposed new outdoor dining area speakers' maximum sound levels are LAeq 80 dBA measured @ 3m.

The spectrum and levels of the indoor measurements presented above will be used for sound propagation calculations of the identical speakers type and music content to be used on the outdoor dining area.



**Figure 48: Peak hour Friday night patrons levels and spectrum**

The patrons noise has been measured during the busiest time of the week, Friday night between 7PM to 9:30PM. The noisiest 30 minutes average has been recorded and presented below, which will be used for the distance and barrier attenuation calculations at the receivers. This is estimated as the worst-case scenario for noise propagation.



**Figure 49: Peak hour Friday night patrons levels and spectrum measurements**



It is to be noted that during the measurements Friday evening, the low frequency from the sports bar subwoofers was clearly audible and at time dominant at the restaurant dining area.

The summary of the expected **maximum** Alegre outdoor dining area music and patron noise is presented below:

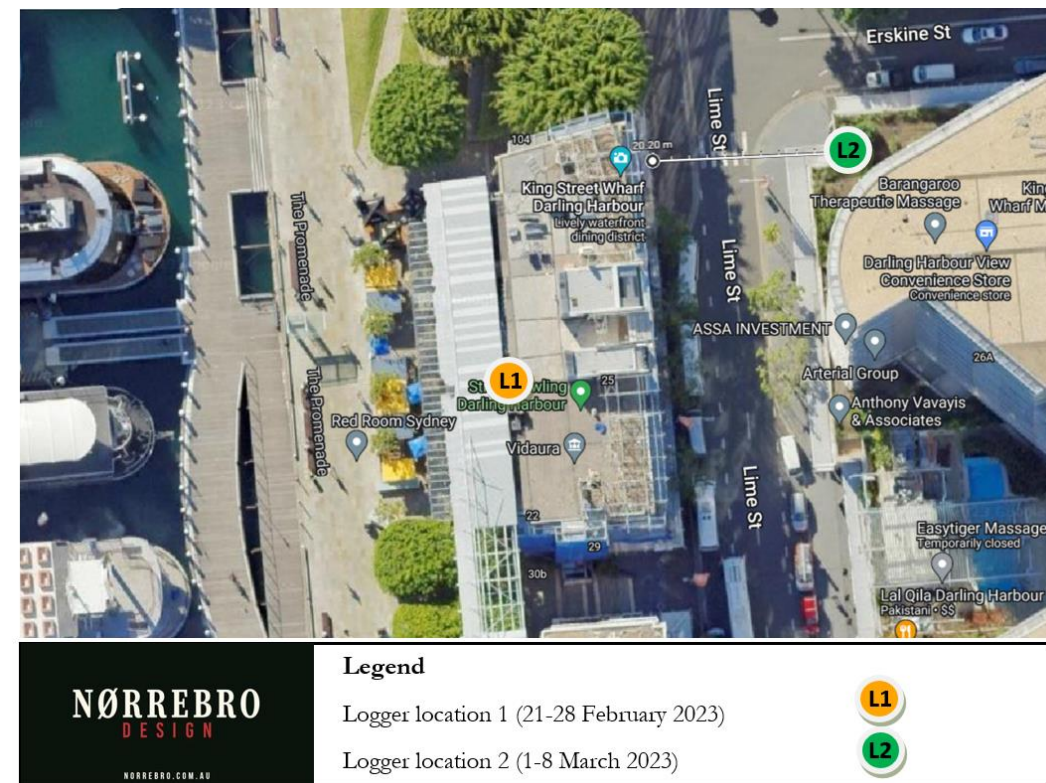
Alegre Outdoor dining area	L <sub>Aeq</sub>
Patrons	84 dB
Music	80 dB

*Table 8: Maximum expected Alegre outdoor dining area levels*

- Provide detailed calculations of the attenuation through distance to provide predicted levels at the potentially affected premises showing a comparison with the background sound levels and the City's acoustic criteria for noise entertainment either demonstrating compliance or providing recommendations to ensure compliance.

### 3.a Nearest receiver – office above

The nearest receiver is the office above, where the logger was placed for establishment of existing sound levels.

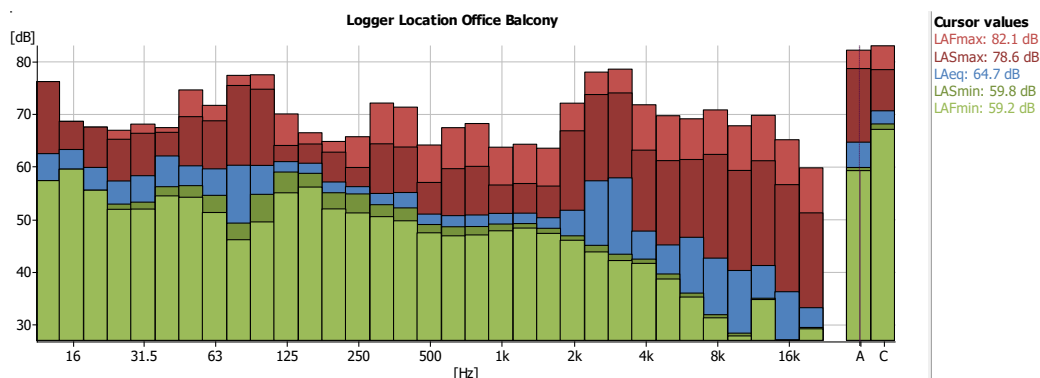


*Figure 50: Logger 1 and logger 2 locations*





*Figure 51: Logger 1 location and hand-held analyser*



*Figure 52: Logger 1 spectrum measurements*

Using a sound power generation from Alegre outdoor dining area of 94.1 dBA (i.e. combined sound power of the patrons and music sources), which is consistent with measurements of existing music and busiest time patrons' levels, the calculated contribution is an overall 46.1 dBA at the office balcony door.



**Figure 53: Logger 1 distance and barrier attenuation calculations**

The calculated contribution is below the logger measured data of LA90 of 56 dBA during the day, 63 dBA during the evening and 47 dBA during the night period.

In terms of spectral compliance, employing the sound spectrum measured, compliance is achieved in all octave bands.

Frequency	63	125	250	500	1k	2k	4k	8k	Sound Level dB(A)	Compliance Y/N
Projected Levels	36.7	35.1	36.2	42	40.4	32.7	21.5	8.1	46.1	Y
Measured Existing Levels (Night)	37.8	36.0	39.1	44.0	36.4	33.9	22.4	9.0	47	Y
Measured Existing Levels (Evening)	57.7	55	51.2	59	51.4	46.7	32.5	16.2	63	Y
Measured Existing Levels (Day)	46.7	49.0	42.2	53.0	44.4	41.7	29.5	13.1	56	Y

*Table 9: Octave bands criteria compliance for Logger location 1*

The calculations show compliance with the following criteria at the nearest affected receiver above:

The City of Sydney acoustic criteria for 'Noise Entertainment' during the operation of the Alegre Restaurant is as follows:

- a. The  $L_{Aeq, 15 \text{ minute}}$  noise level from the use must not exceed the background noise level ( $L_{A90, 15 \text{ minute}}$ ) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive) by more than 5dB between 7.00am and 12.00 midnight when assessed at the boundary of any residential accommodation or tourist and visitor accommodation.
- b. The  $L_{Aeq, 15 \text{ minute}}$  noise level from the use must not exceed the background noise level ( $L_{A90, 15 \text{ minute}}$ ) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive) between 12.00 midnight and 7.00am when assessed at the boundary of any residential accommodation or tourist and visitor accommodation.
- c. Notwithstanding (a) above, the  $L_{Aeq, 15 \text{ minute}}$  noise level from the use must not exceed the greater of the following levels between 7am and 12 midnight inside any habitable room of a residential accommodation or tourist and visitor accommodation, or at any time in an affected commercial premises:
  - i. The existing internal  $L_{A90, 15 \text{ minute}}$  (from external sources excluding the use) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive).

**3.b Residential receiver – across the road from Alegre Entry, above 26 Lime Street**

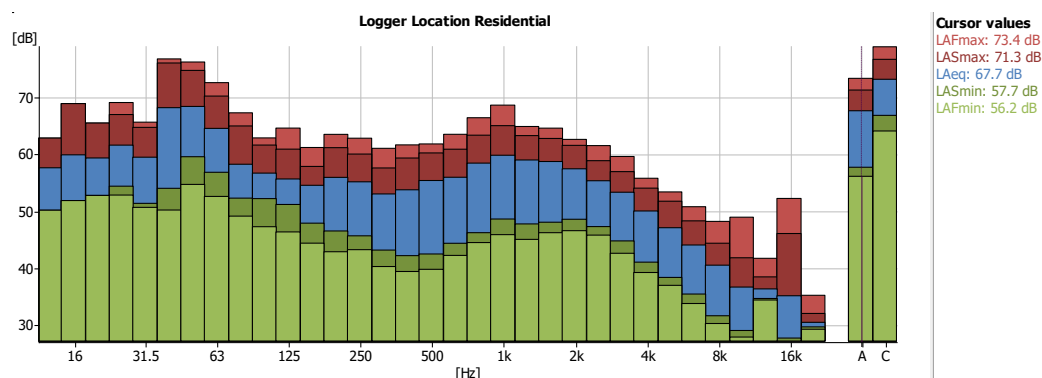
The nearest residential receiver is located across Lime Street from the entry of the Alegre Bar and Dining, at a distance of approximately 23m. The logger was located on a secure location on the balcony of Lapink Skinlab beauty salon, directly below the residential apartments. The logger was

placed near the side wall due to site constraints and the subsequent sound reflection has been taken into account for logger data processing.



*Figure 54: Logger 2 location and hand-held analyser*

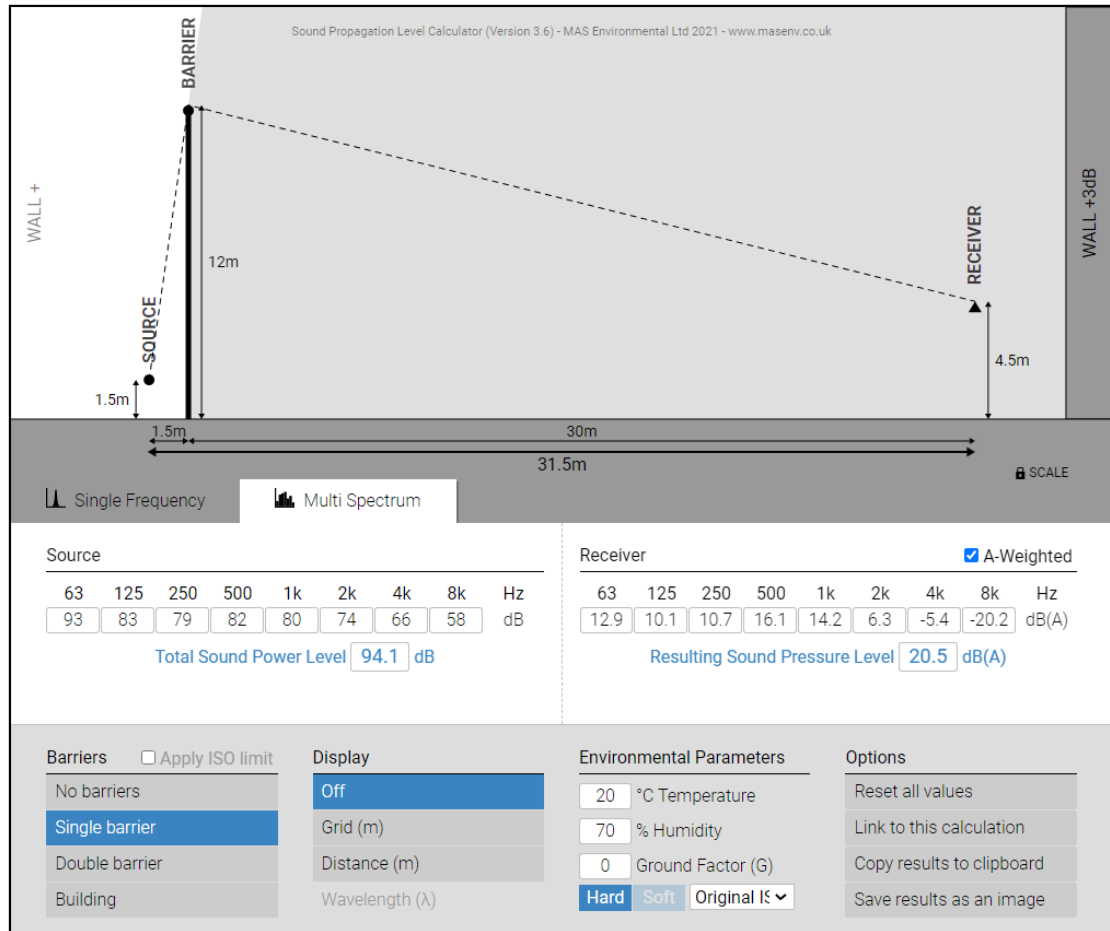
The typical spectrum was measured with the operator attended sound level meter.



*Figure 55: Logger 2 spectrum measurements*

Using a sound power generation from Alegre outdoor dining area of 94.1 dBA (i.e. combined sound power of the patrons and music sources), which is consistent with measurements of existing music and busiest time patrons' levels, the calculated contribution is an overall 20.5 dBA at the residential receiver.





**Figure 56: Logger 2 distance and barrier attenuation calculations**

The large distance and the building shielding ensures inaudibility and compliance with the criteria.

In terms of spectral compliance, employing the sound spectrum measured on the Lapink balcony, compliance is achieved in all octave bands.

The levels from Alegre outdoor dining area are well below the existing levels on Lime Street in each octave bands, with differences between 30-40 dB at low frequencies and 20-30 dB at high frequencies.

Frequency	63	125	250	500	1k	2k	4k	8k	Sound Level dB(A)	Compliance Y/N
<b>Projected Levels</b>	<b>12.9</b>	<b>10.1</b>	<b>20.7</b>	<b>16.1</b>	<b>14.2</b>	<b>6.3</b>	<b>-5.4</b>	<b>-20.2</b>	<b>12.9</b>	<b>Y</b>
Measured Existing Levels (Night)	51.6	57	43.1	47	47.4	42.8	28.4	13.1	51.6	Y
Measured Existing Levels (Evening)	52.7	58	46.2	48	47.4	43.7	30.5	14.6	52.7	Y
Measured Existing Levels (Day)	52.7	58	46.2	48	47.4	43.7	30.5	14.6	52.7	Y

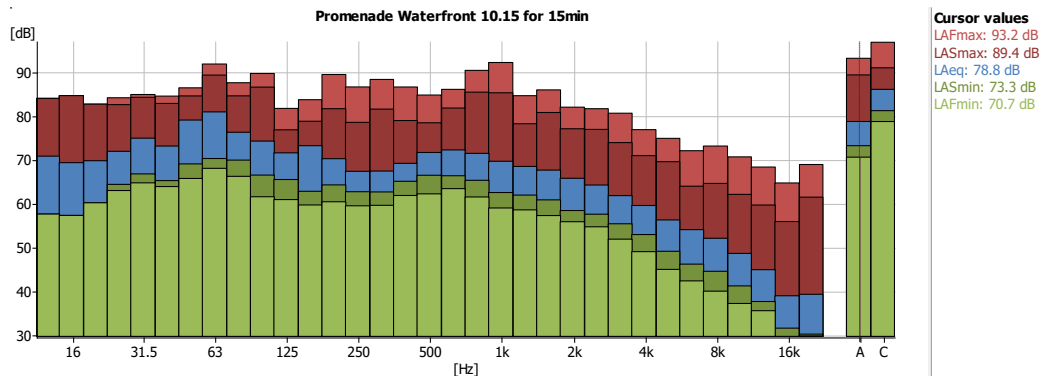
*Table 10: Octave bands criteria compliance for Logger location 2*

## 4. Additional acoustic survey feedback

In addition to the compliance measurements undertaken in the chapter above, additional evening and night measurements both on the waterfront promenade and across the road on Lime Street, indicate that Alegre sounds are totally masked by adjacent sports bar and other venue on the Promenade and by traffic and other street sources on Lime Street.



*Figure 57: Friday night 10:15 to 10:30PM measurements*



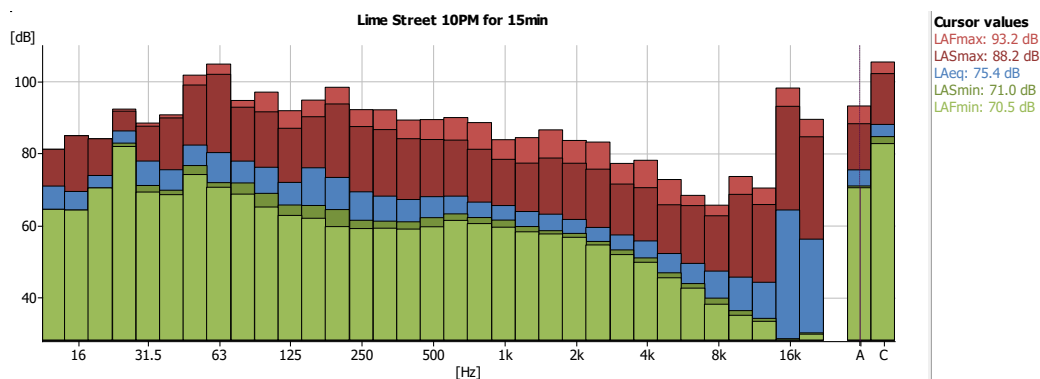
*Figure 58: Friday night 10:15 to 10:30PM measurements results*

It was observed that Alegre environment is quiet, relaxed and refined (Friday night) whilst noise was high from the Sports bar below, with high patron noise and loud low frequency noise.



**Figure 59: Friday night 10:00 to 10:15PM measurements across Lime Street**

On Lime Street, traffic noise is high between 9PM and midnight, with many environmental sound components such as pedestrians, tourist busses and high-performance vehicles sounds.



**Figure 60: Friday night 10:00 to 10:15PM measurements across Lime Street results**

It was also observed during other periods as shown in this report during sound loggers installation and retrieval that the environment is lively and busy and it will generally mask any potential noise egress from Alegre proposed outdoor dining area sound system at the set up level as discussed above.



## 5. Conclusion

Norrebro has been engaged by Alegre Bar & Dining to provide an acoustic assessment for the proposed application to allow outdoor dining area ambient music.

The loudspeaker selection has been recommended, the location, spacing and maximum sound levels have been addressed and it was found that compliance can be achieved with all the applicable criteria, including The City of Sydney acoustic criteria for 'Noise Entertainment'.

It is concluded that acoustic criteria stipulated above are met and additional sound logging and data gathering indicate that Alegre's proposed system at the agreed level will not adversely affect the acoustic environment and the amenity at the adjacent properties, both residential and commercial.

Please do not hesitate to contact the undersigned directly for acoustic matters relating to this project.

Yours faithfully,



**Claudiu Pop**

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