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ACOUSTICAL REPORT

PROPOSED BOOKSTORE AND BAR

GROUND FLOOR SHOP 11 THE CORSO, MANLY NSW

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1.0 INTRODUCTION

Koikas Acoustics Pty Ltd was engaged by Bresact Pty Ltd and Estia Pty Ltd to prepare a noise impact assessment for a proposed fit-out and change of use of an existing retail tenancy (Ground Floor Shop 11 The Corso, Manly) to a bookstore and bar.

For the DA proposal, the acoustic adequacy of the proposed design must be assessed in terms of standard planning guidelines issued by Council in their Local Environment Plan (LEP) and Development Control Plan (DCP), and also in terms of other standard planning guidelines related to common sources of noise.

In accordance with Council guidelines and other standard planning instruments, Koikas Acoustics has determined the following acoustical components require an assessment at the current DA stage:

1. Noise emission from the use of the premises as a licensed venue.
2. Noise generated by mechanical plant and equipment servicing the premises.

Note: The use of the premises as a bookstore will not generate any discernible noise to surrounding noise-sensitive receivers and as such will not generate any adverse noise impacts requiring acoustical analysis. The operation of the bookstore is therefore considered acoustically acceptable and is not discussed further.

This report presents the results and findings of an acoustic assessment for the subject proposal. In-principle acoustic treatments and noise control recommendations are included (where required) so that the premises may operate in compliance with the nominated acoustic planning levels.

2.0 THE PROPOSAL

The development proposal is to provide an internal fit-out to the existing retail tenancy at Ground Floor Shop 11 The Corso, Manly and have the premises operate as a bookstore during the daytime and a small bar during evening and night hours.

Proposed operating hours are as follows:

	Bookstore hours	Bar hours
• Monday	9 am to 5 pm	nil
• Tuesday – Saturday	9 am to 10 pm	5 pm to 12 midnight
• Sunday and public holidays	9 am to 10 pm	5 pm to 10 pm

Maximum internal patronage as derived from the current seating proposal is 32.

The current floor plan is shown in drawings prepared by Design Studio 407, dated 5 May 2019, Project Number 888-NCCOO. All calculations and noise modelled scenarios conducted for this assessment are referenced to these drawings.

The subject tenancy is located on the ground floor level of a mixed-use building with access to the premises via The Corso. Directly above on Level 1 of the same building is a commercial office, presumed to be operating over standard business hours (9 am to 5 pm). Also on Level 1 of the subject building is a residential unit, however, the unit is located at the rear of the building, thus not directly above the proposed bookstore and bar.

Noise transfer from the proposed bar to the Level 1 commercial and residential units must be considered in the assessment. In addition, access to the bar via a single swing door opening onto The Corso will provide another means for noise to escape into the surrounding environment. Residential apartments in mixed-use building 38-42 and 8-28 The Corso may be impacted by this noise and are also assessed in this report.

Prevailing ambient noise conditions within the retail precinct of The Corso are defined by a number of typical noise sources, such as passing traffic on local roads, pedestrians using the numerous thoroughfares, and mechanical plant and equipment servicing other retail stores and entertainment establishments.

Figure 1. Aerial photo of the subject site and surrounding area (Image source – SixMaps)

3.0 NOISE MEASUREMENT

3.1 AMBIENT NOISE LOGGING

Existing external ambient noise levels were measured by installing a sound level meter data logger on top of the pedestrian awning along The Corso (See Figure 1). A Type 1 precision Svantek 977 noise logger was used for the survey. The installed location on the awning meant that the microphone was approximately 4.5 metres above the ground level.

The instrument was set-up to measure A-frequency and 'Fast' time-weighted noise levels. Noise level data was stored within the logger memory at 15-minutes intervals for a period of one week between Wednesday 20 and Tuesday 26 February 2019.

Calibration readings were taken before and after each survey with a NATA calibrated and certified Larson Davis CAL200 precision acoustic calibrator. No system drift was observed for this meter.

BOM weather records for the nearest available weather station indicate that inclement weather conditions did not adversely impact on the noise survey.

The noise survey results are used to derive the project noise criteria applying to the premises. Full band noise levels are used to establish the criteria relevant to mechanical plant noise that is assessed under the NSW EPA Noise Policy for Industry 2017. Assessing noise from licensed premises requires a more detailed understanding of the spectral composition of the existing background noise. Tables 1 and 2 provide summary data for the full band and 1/1 octave band noise survey results.

Table 1. Noise logger results – Full band [dB]

Location	Period, T [1]	Ambient noise level LAeq	Rating Background Level LA90
The Corso	Day	63	57
	Evening	63	57
	Night	60	47

Notes
1: The NSW EPA NPI refers to Night as 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

Table 2. Noise logger results – 1/1 octaves [dB]									
	1/1 octave band centre frequency [Hz]								
Description	63	125	250	500	1000	2000	4000	8000	Total
LA90 background noise 5pm to 10pm	33	41	45	50	51	51	50	44	57
LA90 background noise 10pm to 12am	28	38	42	45	44	43	38	28	50

3.2 ATTENDED NOISE MEASUREMENT

To further assist with the noise assessment, attended measurements were conducted on-site to establish typical indoor background noise levels in the residential unit located on Level 1 of the subject building, and also to define how much acoustic separation currently exists between the proposed bookstore/bar and the residential unit on Level 1.

Indoor background noise levels were measured in the main bedroom of the residential unit. This measurement location was selected as it is the nearest habitable space in the apartment to the future bookstore/bar premises, therefore, it is the most sensitive to any noise that may be generated in the bookstore/bar.

To establish the existing level of acoustic separation between the residential apartment and the future bookstore/bar, an acoustic test signal was played through a dodecahedral loudspeaker and amplification system on the ground floor. Simultaneous measurements were conducted in the source room (GF retail tenancy) and receiver room (L1 residential apartment). The arithmetic difference between the source and receiver rooms defines the existing acoustic separation. This can then be used to analyse what, if any, impact the proposed bar may have on the existing noise amenity in the residence.

All measurements were conducted with NATA certified and calibrated NTi Audio XL2 sound level meters. A summary of the survey results is included below:

Table 3. Attended noise results [dB]									
	1/1 octave band centre frequency [Hz]								
Description	63	125	250	500	1000	2000	4000	8000	Total
LA90 background noise – door open	14	26	36	35	32	27	20	11	40
LA90 background noise – door closed	6	13	18	18	13	11	11	10	23
Acoustic separation between GF and L1 residential unit (Level difference)	43	44	49	57	64	66	61	57	-

4.0 NOISE CRITERIA

4.1 L&GNSW – LICENSED VENUES

The standard noise condition that is applied to licensed venues was originally determined by the Liquor Administration Board (LAB) and is now adopted by Liquor and Gaming NSW (L&GNSW). The criteria require an assessment of noise before and after midnight and in accordance with the 1/1 octave band components of the noise (31.5Hz to 8kHz inclusive).

Before midnight (7am to midnight), the L_{A10} noise level from a licensed venue must not exceed the background by more than 5dB in any 1/1 octave band centre frequency from 31.5Hz to 8kHz inclusive at the boundary of any residential premises.

After midnight (midnight to 7am) the L_{A10} noise level from a licensed venue must not exceed the background noise level in any 1/1 octave band centre frequency from 31.5Hz to 8kHz inclusive at any residential boundary and must not to be audible within any habitable room of any residential premises.

The proposed bar, being the only subject of the proposal requiring a liquor license, will not operate past midnight, therefore, only the 'before midnight' component of the noise condition applies. In accordance with the existing measured background noise levels relevant to each noise assessment location (R1: Residential apartment on Level 1 of the subject building, and R2: Upper floor residential apartment adjacent to the bar across The Corso), the following project noise criteria apply:

Table 4. L&GNSW assessment criteria [dB]

	1/1 octave band centre frequency [Hz]								
Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Total**
Background noise in L1 apartment	6	13	18	18	13	11	11	10	23
NOISE CRITERIA: Background + 5	11	18	23	23	18	16	16	15	28
Background noise in The Corso	28	38	42	45	44	43	38	28	50
NOISE CRITERIA: Background + 5	33	43	47	50	49	48	43	33	55

4.2 MECHANICAL PLANT NOISE

Where the development proposal requires the installation of new mechanical plant and equipment to service the business, noise generated by this equipment must not unreasonably impact upon surrounding development.

Mechanical plant noise is generally assessed on the grounds of ensuring that it is not "intrusive" at any residential receiver. Intrusive noise is defined in the EPA Noise Policy for Industry 2017 as being 5dB above the prevailing background noise level, where the source noise is assessed as an $L_{Aeq\ 15\ minutes}$.

At this stage of the project, it is unclear if any additional plant and equipment will be required, and furthermore, no final equipment designs and selections have been issued. It is, therefore, not possible to predict future noise levels.

However, based on existing outdoor background noise levels in the local area, the following intrusive noise limits will apply:

- Daytime hours (until 6pm) $L_{Aeq\ 15\ minutes}$ 62dB
- Evening hours (6pm until 10pm) $L_{Aeq\ 15\ minutes}$ 62dB
- Night-time hours (10pm until 12 midnight) $L_{Aeq\ 15\ minutes}$ 55dB

Where new plant and equipment is proposed, noise emission should be reviewed in accordance with the above intrusive noise limits.

5.0 ASSESSMENT OF LICENSED PREMISES NOISE

The assessment reviews operational noise generated within the proposed bar and its impact on surrounding noise-sensitive residential receivers. The basis for the assessment is to demonstrate compliance with the standard noise conditions adopted by L&GNSW.

5.1 DESIGN SCENARIOS

The calculation presumes up to 32 patrons and includes the provision of ambient background music within the bar.

Noise levels are predicted to the two identified nearest and most noise-sensitive residential receiver locations, being:

R1: The residential unit located on Level 1 of the subject building

R2: Upper floor level residential apartments in mixed-use buildings across The Corso, the nearest of which are located at 38-42 The Corso.

5.2 SOURCE NOISE LEVELS

To calculate noise levels at the identified residential receiver locations, the indoor noise levels associated with the bar must be known. As this is not an existing functioning business where noise levels can be directly measured, the calculation must be conducted by referencing typical noise levels measured in similar premises.

Internal average noise levels typically associated with a small bar operating with 32 patrons and ambient background music have been measured by Koikas Acoustics at L_{A10} 78-80dB. The associated noise level spectra are included below.

Table 5. Source noise levels, LA10 [dB]

Description	1/1 octave band centre frequency [Hz]								Total
	63	125	250	500	1000	2000	4000	8000	
Typical average internal bar noise level (patrons and music)	45	58	63	74	76	74	66	56	80

5.3 CALCULATED NOISE AT RESIDENTIAL RECEIVERS

Noise levels were calculated at the two identified most sensitive residential receiver locations to establish whether the proposed development can operate without generating excessive noise to surrounding development.

The calculation to R1 considers the anticipated indoor bar noise levels and the noise reduction achieved by the existing building structure. Calculations to R2 also consider the indoor average bar noise levels and further assume that the entry door opening onto The Corso as being open.

Table 6. Predicted receiver noise levels – R1, LA10 [dB]

	1/1 octave band centre frequency [Hz]								
Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Total**
Noise level inside the bar	45	58	63	74	76	74	66	56	80
Noise reduction – bar to residence	-43	-44	-49	-57	-64	-66	-61	-57	-
Noise level in residential bedroom	2	14	14	17	12	8	5	-1	21
Noise criteria for R1	11	18	23	23	18	16	16	15	28
Exceedance	-	-	-	-	-	-	-	-	-

Table 7. Predicted receiver noise levels – R2, LA10 [dB]

	1/1 octave band centre frequency [Hz]								
Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Total**
Noise level inside the bar	45	58	63	74	76	74	66	56	80
Calculated sound power level of open entry door (approx. $2m^2$)	45	58	63	74	76	74	66	56	80
Distance attenuation to receiver	-34	-34	-34	-34	-34	-34	-34	-34	-
Noise level at receiver location	11	24	29	40	42	40	32	22	46
Noise criteria for R2	33	43	47	50	49	48	43	33	55
Exceedance	-	-	-	-	-	-	-	-	-

6.0 RECOMMENDED NOISE CONTROLS

The calculated noise levels generated from the use of the proposed bar are shown to comply with the relevant L&GNSW noise conditions. This conclusion is reached on the presumption of typical indoor noise levels for a small bar occupied by up to 32 patrons and background music played within the premises. It is expected that indoor noise levels could reach L_{A10} 80dB when average throughout the internal floor area.

The calculations suggest that compliance could be maintained with internal noise levels that are somewhat higher than those presumed typical of the bar. A provisional limit on indoor noise levels in the bar may be set at L_{A10} 87dB whilst maintaining compliance with the respective noise criteria. As the criteria are assessed spectrally, the following would be applied as the spectral noise limits for indoor noise in the bar:

Table 8. Maximum allowable bar noise levels, LA10 [dB]

	1/1 octave band centre frequency [Hz]								
Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Total**
Maximum average internal bar noise level (patrons and music)	54	62	72	80	82	82	77	67	87

In addition to the proposed limitations on operational noise, any new mechanical plant and equipment that must be installed are to be assessed to the project noise criteria established in Section 4.2 of this report.

In the case that new equipment is necessary, a review of mechanical plant noise should be conducted prior to it being installed and commissioned.

7.0 CONCLUSION

This report presents the results of an assessment of noise emission from a new bookstore/bar that is proposed to be located at Ground Floor Shop 11 The Corso, Manly. The site would be operated as a bookstore predominantly during daytime and evening hours and as a licensed bar during evening and night hours. Trading will not extend beyond 12 midnight.

The basis for the assessment is to demonstrate that noise attributed to the use of the premises can meet the noise emission requirements of L&GNSW based on their standard L_{A10} noise conditions.

To establish the relevant project noise criteria, background noise levels were measured at the two most noise-sensitive residential receiver locations identified near the subject site. The first identified assessment location was within a residential apartment on Level 1 of the subject building. The second identified assessment location was residential apartments located on the upper floor levels of a mixed-use building adjacent to the subject site across The Corso.

The assessment has found that the proposed development will meet the required noise emission objectives on the basis of adopting the following recommendations:

- Ensuring that internal noise levels generated by patrons and background music do not exceed an upper limit of L_{A10} 87dB (spectral limits provided in Table 8). Typical indoor noise levels for this type of development generally do not exceed L_{A10} 80dB. This means that Koikas Acoustics does not anticipate excessive noise resulting from the operation of the business.
- Where new mechanical plant and equipment is required, noise generated from its use should be reviewed for compliance with the established project noise criteria prior to its installation and commissioning.

In conclusion, where the recommendations of this report are implemented in the design and operation of the proposed bookstore/bar, it is the professional opinion of Koikas Acoustics that noise resulting from its use and operation will not generate adverse noise impacts to nearby residential receivers.

APPENDIX A

APPENDIX A

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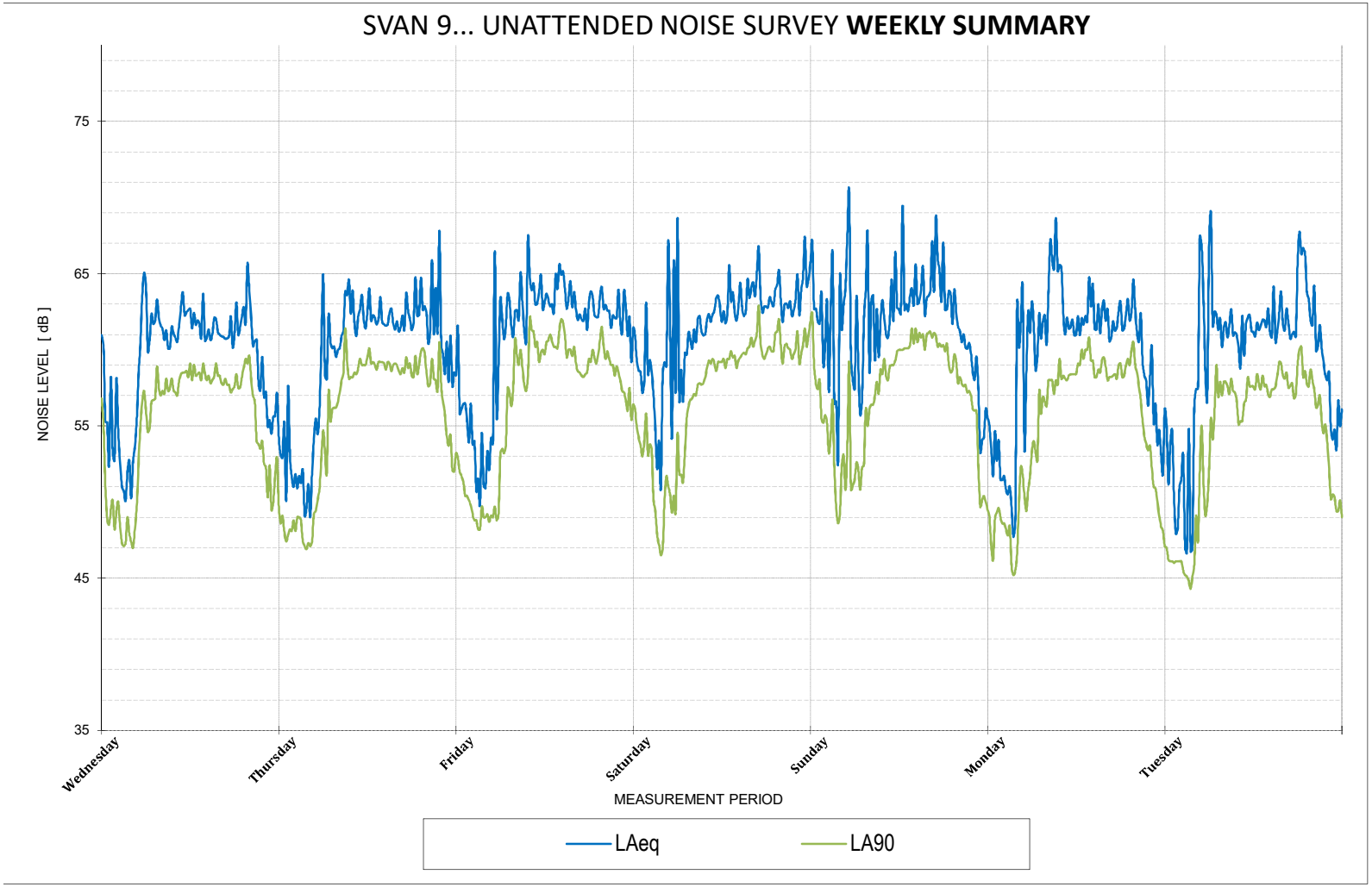
WEEKLY SUMMARY **LOGGER LOCATION:** 27 The Corso, Manly **PERIOD:** 20-26 February 2019



Sundays and Public Holidays the hours change to 0800

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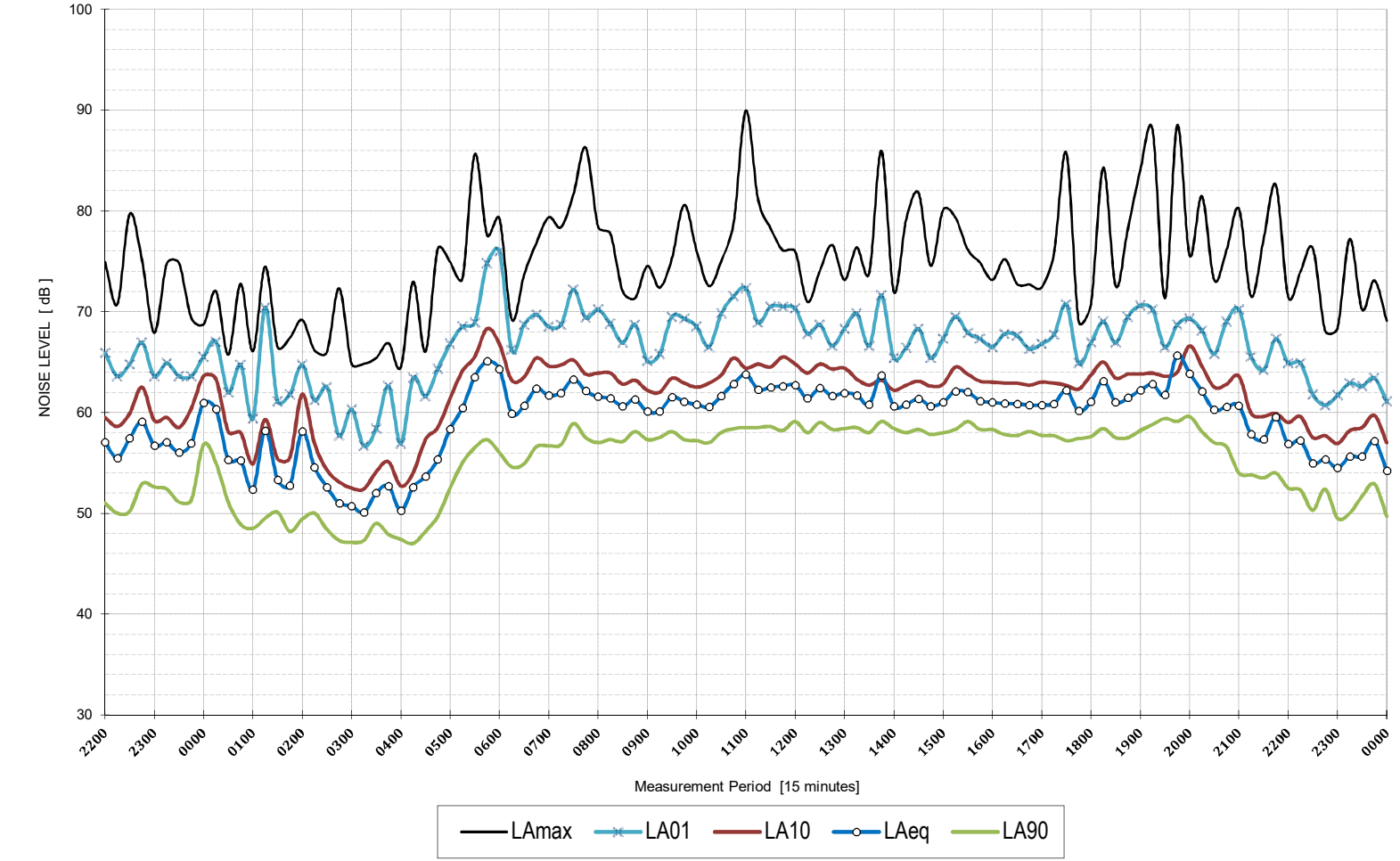
DAY 1 **LOGGER LOCATION:** 27 The Corso, Manly **DATE:** Wednesday, 20 February 2019



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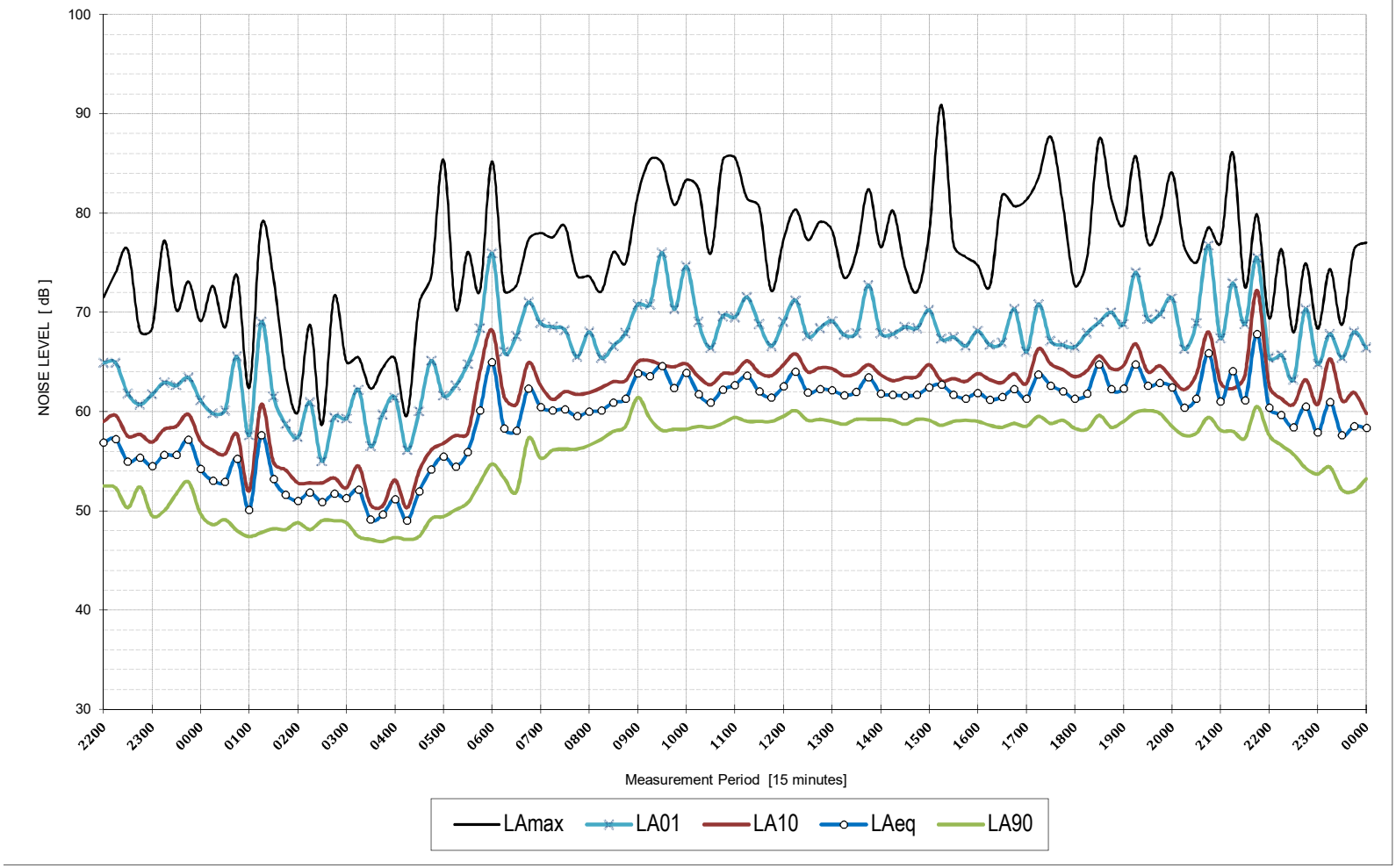
DAY 2 **LOGGER LOCATION:** 27 The Corso, Manly **DATE:** Thursday, 21 February 2019



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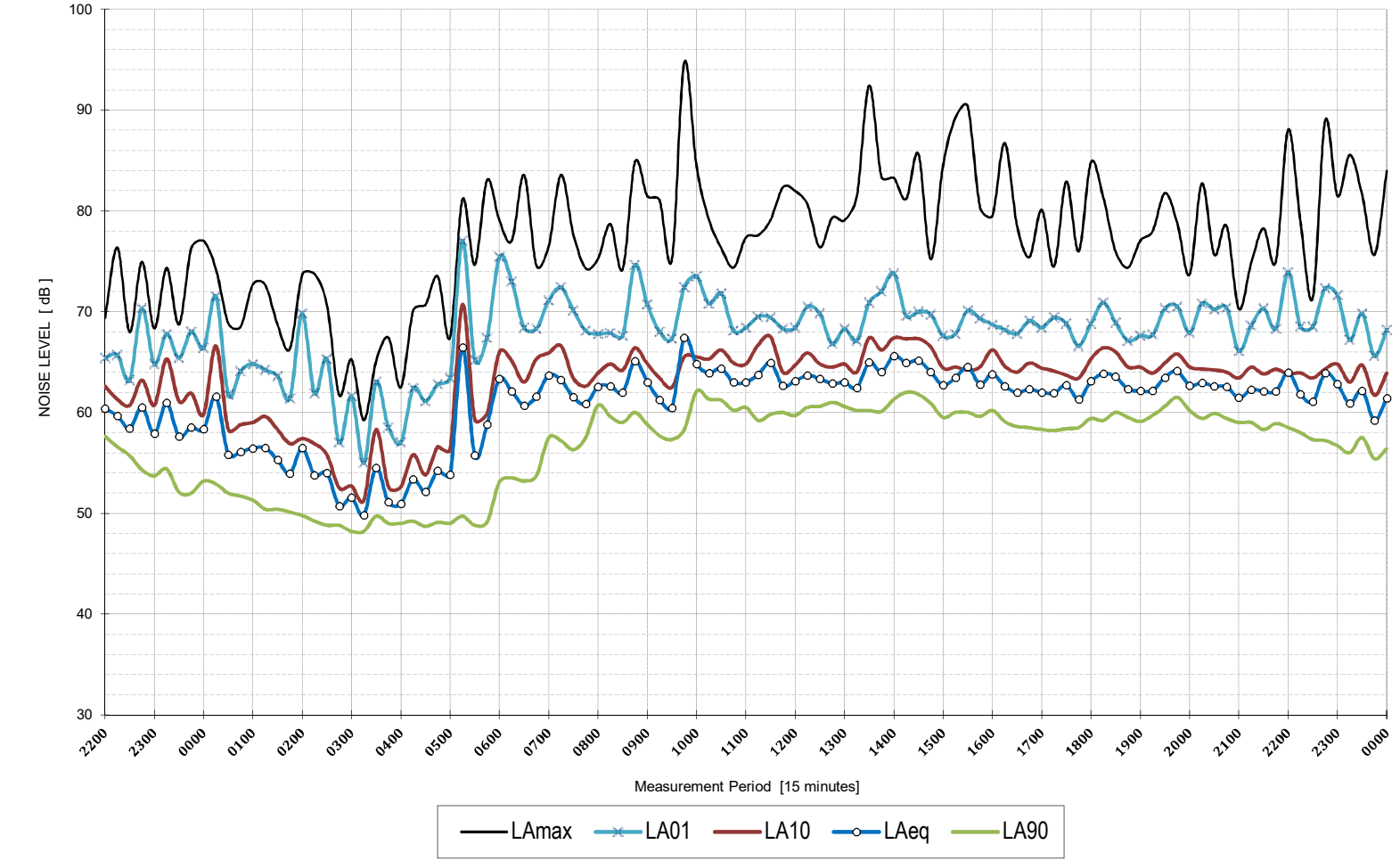
DAY 3 **LOGGER LOCATION:** 27 The Corso, Manly **DATE:** Friday, 22 February 2019



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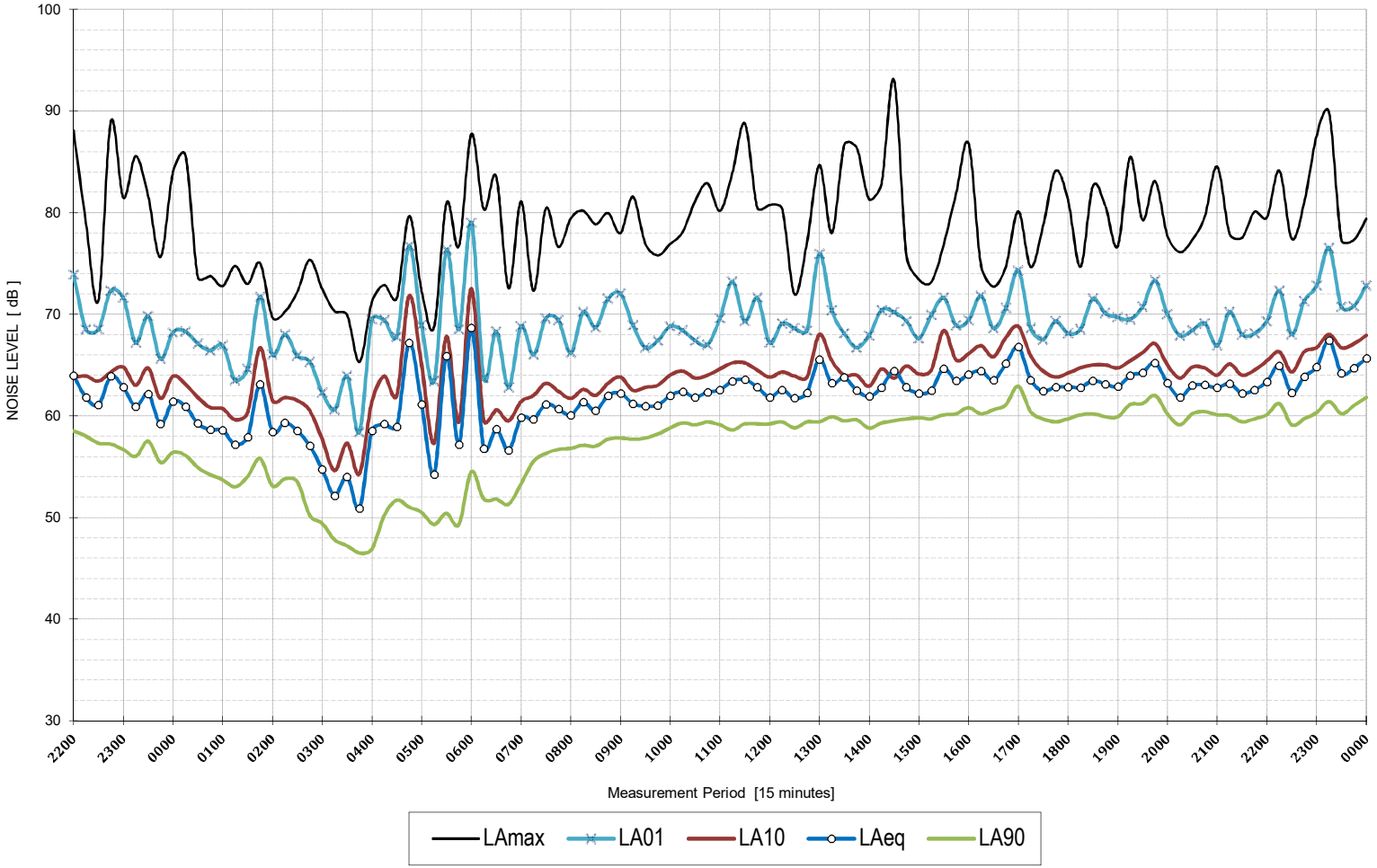
DAY 4 **LOGGER LOCATION:** 27 The Corso, Manly **DATE:** Saturday, 23 February 2019



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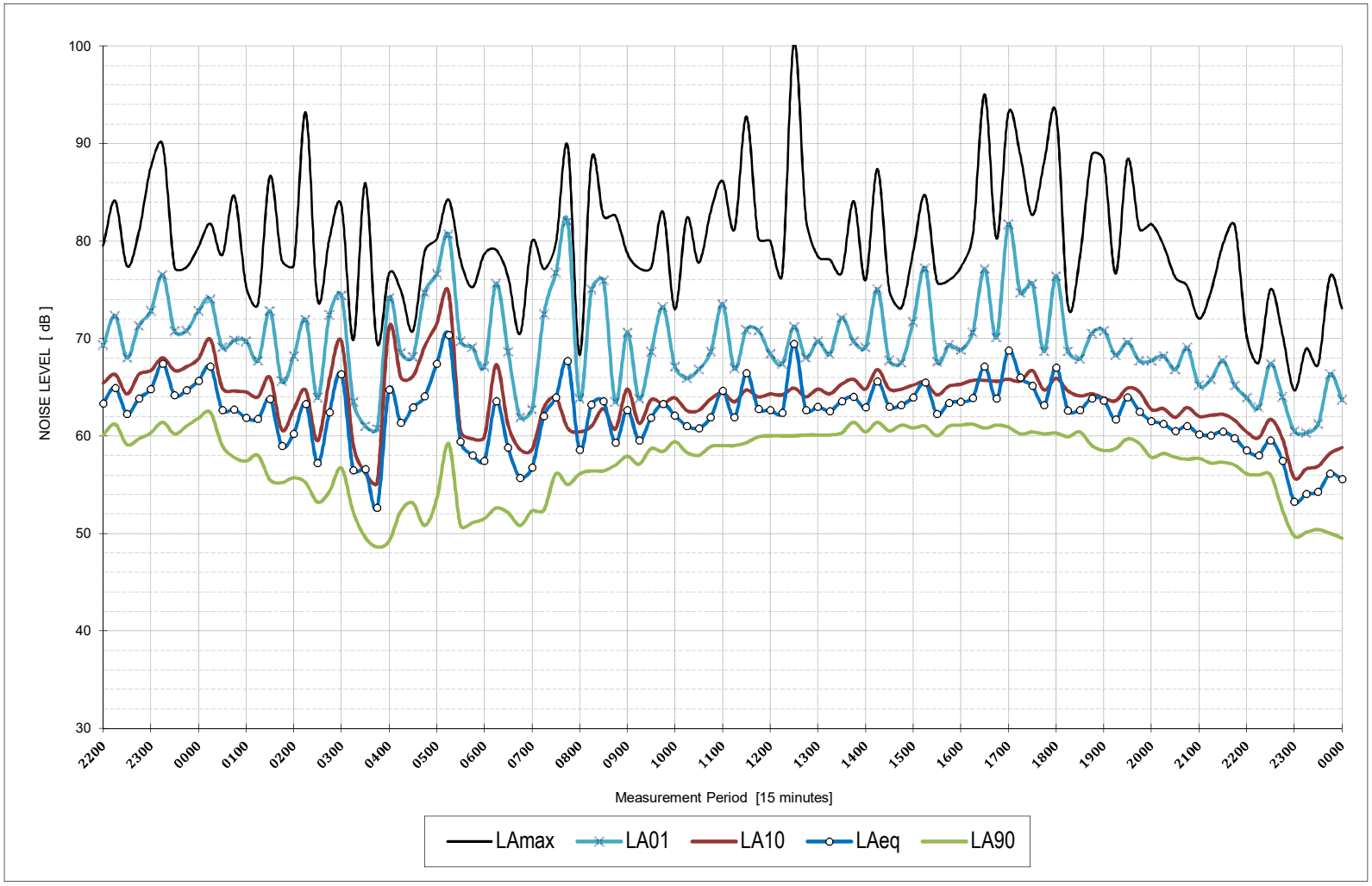
DAY 5 **LOGGER LOCATION:** 27 The Corso, Manly **DATE:** Sunday, 24 February 2019



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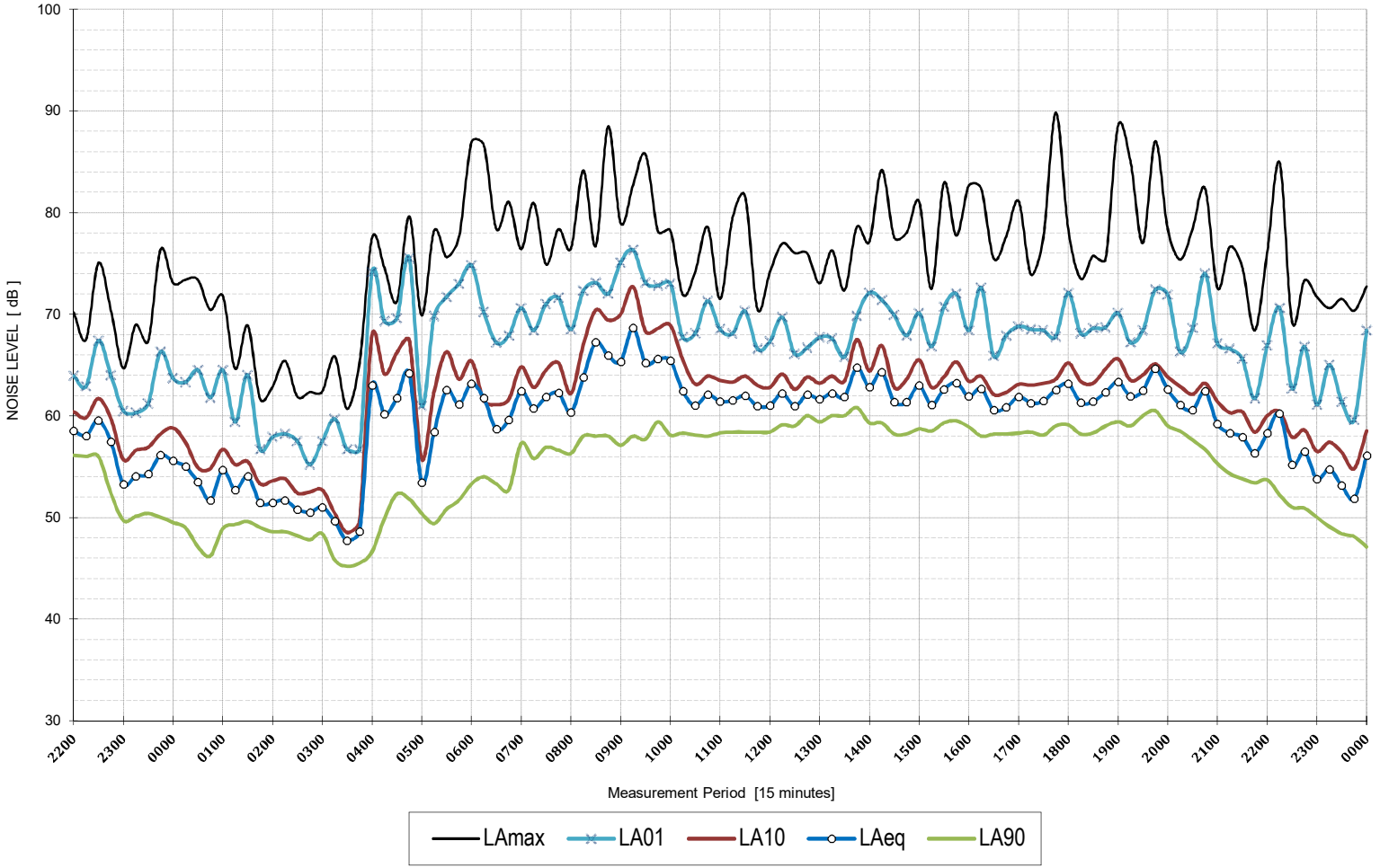
DAY 6 **LOGGER LOCATION:** 27 The Corso, Manly **DATE:** Monday, 25 February 2019



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DAY 7 **LOGGER LOCATION:** 27 The Corso, Manly **DATE:** Tuesday, 26 February 2019

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