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NOISE IMPACT ASSESSMENT

THE LAKES HOTEL – PLANNING PROPOSAL

Date: Monday, 9th October 2017

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Issue Date	Monday, 9th October 2017		
Revision	INT	27/07/2017	Issued for internal quality control
	V1	09/08/2017	Report issued to Client
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Prepared By	Adam Semple		
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The information contained herein should not be reproduced except in full. The information provided in this report relates to acoustic matters only. Supplementary advice should be sought for other matters relating to construction, design, structural, fire-rating, waterproofing, and the likes.

NOISE IMPACT ASSESSMENT

THE LAKES HOTEL – PLANNING PROPOSAL

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1.0 INTRODUCTION

Koikas Acoustics Pty Ltd (KA) has been commissioned by Thomas Hotels to prepare a noise impact assessment report that will accompany a Planning Proposal submission to Bayside Council seeking to amend the Botany Local Environment Plan 2013 such that a future expansion of the Lakes Hotel car park may be considered.

This report details predicted acoustic impacts to nearby residents, in accordance with the standard planning guidelines of the NSW Industrial Noise Policy (EPA, 2000). Further analysis regarding the change in traffic patterns along Macquarie and Maloney Street's that would result from an expansion of the existing car park is also included based on planning guidelines included in the NSW Road Noise Policy (EPA, 2011).

2.0 SUMMARY OF PLANNING PROPOSAL

The Planning Proposal seeks to amend the Botany LEP 2013 to allow a potential future expansion of the car park onto adjacent properties (No. 3 Macquarie Street and No. 3A Maloney Street). These properties are on land currently zoned R2 – Low-Density Residential which currently prohibits a car park development.

The proposal seeks to rezone the land to allow for a car park.

3.0 CAR PARK EXPANSION - CONCEPT

A concept plan for the car park expansion, prepared by Darren Mah Design – Project No. 1716 – dated 8.05.2017 – is shown in Figure 1. This report assesses the acoustic impact of the car park concept design to surrounding residents.

The concept plan shows:

- The expanded car park would occupy 3 Macquarie Street and 3A Maloney Street.
- 14 additional parking spaces, resulting in a total of 33 parking spaces on completion.
- Entry only from Macquarie Street and exit only onto Maloney Street, differing from the current two-way entry/exit to Macquarie Street and Maloney Street.

KA has been made aware that the existing 3-metre high noise barrier currently located along the southern boundary of the car park would be relocated to the newly shared boundary between the car park and 5 Macquarie Street/5 Maloney Street. This will ensure that adjoining residents will be significantly shielded from noise associated with the car park.

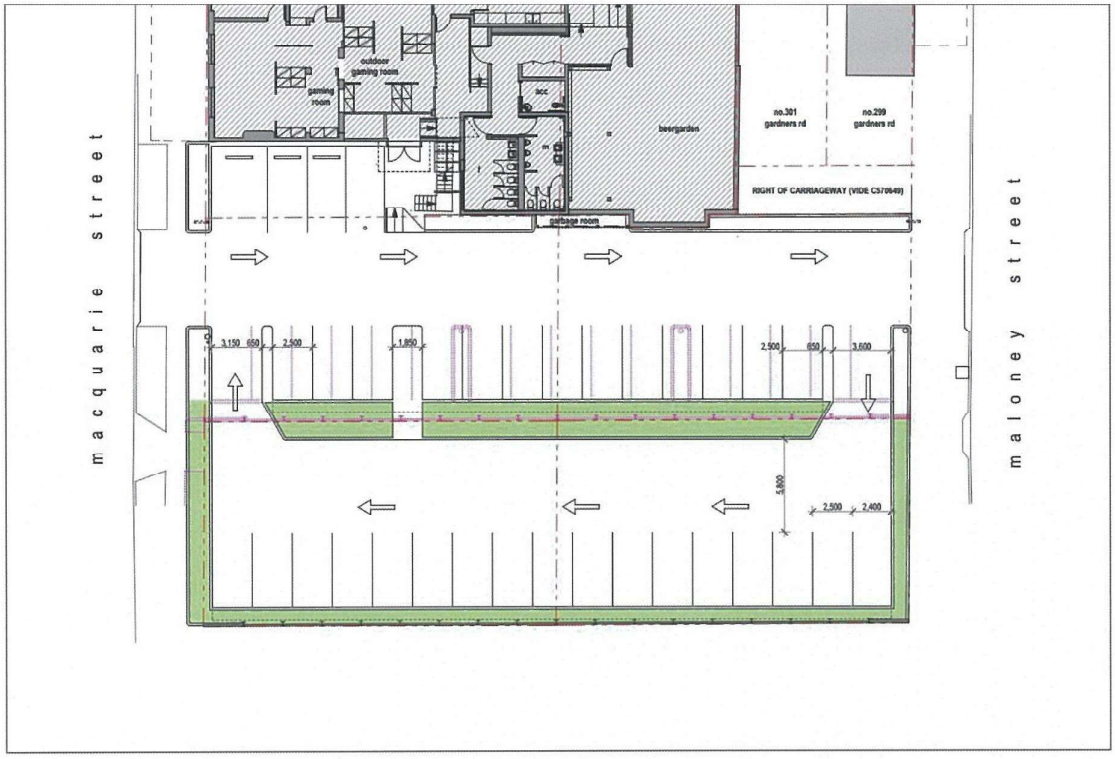


Figure 1. Proposed parking concept

Existing surveys conducted by Hotel staff have found that, at times, all 19 existing parking spaces can be occupied. It is reasonable to then assume that an existing proportion of on-street parking in Macquarie Street and Maloney Street is being occupied by the vehicles of Hotel patrons. By supplying additional off-street Hotel parking, the demand for on-street parking will be reduced. This will afford local residents greater access to on-street parking.

No change is proposed to the floor area of the Hotel, therefore, the increase in parking spaces will not generate additional traffic. Rather, the increase in parking will serve to reduce the demand for on-street parking by relocating those cars into the expanded car park. The resulting change in traffic pattern along Macquarie Street and Maloney Street is considered in this assessment.

3.1 NEARBY RESIDENTIAL DWELLINGS

Noise sensitive premises in the vicinity of the subject site are:

- 5 Macquarie Street, Rosebery – single storey residential dwelling
- 5 Maloney Street, Rosebery – single storey residential dwelling
- 2 Macquarie Street, Rosebery – single storey residential dwelling
- 4 Macquarie Street, Rosebery – single storey residential dwelling
- 6 Macquarie Street, Rosebery – single storey residential dwelling
- 2 Maloney Street, Eastlakes – multi-storey residential flat building
- 4 Maloney Street, Eastlakes – multi-storey residential flat building

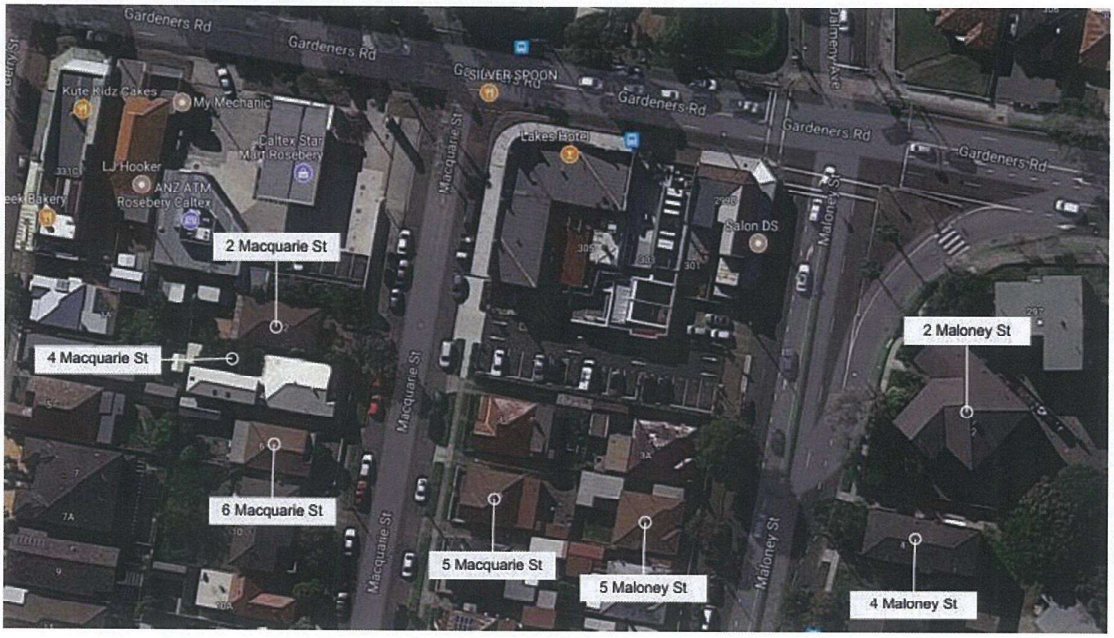


Figure 2. Surrounding noise sensitive development

4.0 ENVIRONMENTAL NOISE LEVELS

Existing environmental noise levels were surveyed by KA at the front and rear of 3 Macquarie Street over the week-long period from Tuesday 18th to Monday 24th July 2017. The noise survey locations are shown in Figure 3 (below).

The installed loggers were both Type 1 precision instruments - Svantek 977 (front) and BSWA 801 (rear). Both instruments were set to Fast-time response and A-frequency weighting filter. Noise levels were stored at 15-minute intervals within the logger memory. Field calibration checks were performed

using a NATA certified Larson Davis CAL200 precision acoustic calibrator before and after the noise survey with no system drift being observed.

Analysis of the logger data provided the following summary results in terms of the overall L_{A90} background noise levels and L_{Aeq} ambient noise levels:

Table 1. Noise logging summary results

Location	Period, T	Background noise, RBL $L_{A90,T}$ [dB]	Ambient noise $L_{Aeq,T}$ [dB]
FRONT 3 Macquarie Street	Day	49	62
	Evening	48	59
	Night	42	55
REAR 3 Macquarie Street	Day	43	63
	Evening	45	57
	Night	36	53

Notes 1.	Day: 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and public holidays Evening: 6pm to 10pm Night: 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays
Definitions Leq, T: L90, T:	 The continuous steady-state sound level that represents the same amount of acoustic energy as a varying sound level over the nominated period, T. The 10th percentile minimum noise level over a defined monitoring period, T. Taken as the average minimum level on an analogue sound level meter.

Figure 3. Noise logging survey locations

5.0 NOISE CRITERIA

5.1 NSW INDUSTRIAL NOISE POLICY

Noise from the use of the car park is assessed to the standard planning guidelines of the NSW Industrial Noise Policy (EPA, 2000). The INP is applied in two parts:

1. Intrusive noise is assessed over the worst case 15-minute interval during each of the day, evening, and night periods.
2. To maintain noise level amenity within a residential neighbourhood, an upper planning level is recommended based on the classification of that neighbourhood as either rural, suburban, urban, or urban/industrial interface.

The most stringent of the Intrusive and Amenity criteria is applied as the Project Specific Noise Level (PSNL). Establishing the PSNL must consider that intrusive noise is assessed over 15 minutes, whereas amenity noise is assessed over each period, as 11 hours (day), 4 hours (evening), and 9 hours (night).

5.2 SLEEP DISTURBANCE/AROUSAL

A sleep disturbance screening assessment has been completed to investigate the potential for impulsive-type noise sources associated with the car park to affect the sleep of nearby residents during night-time hours. Such impulsive-type noise sources include car doors closing and engines starting.

As no definitive criteria have been established that classifies the point at which sleep disturbance occurs, currently accepted guidelines included within the NSW Road Noise Policy (DECCW, 2011) suggests that a low probability of sleep disturbance is expected where the following conditions are met:

1. L_{Amax} noise levels within a bedroom are kept below 50-55dB, and
2. $L_{A1,\ 1\ minutes}$ not more than the background level + 15dB. This equates to 57dB for facades fronting Macquarie and Maloney Street, and 50dB for backyard areas. Noise is assessed outside the most affected bedroom window at a distance of 1 metre from the facade.

5.3 TRAFFIC NOISE – CHANGE OF TRAFFIC PATTERNS

An expansion of the existing car park at Lakes Hotel will mean that a number of cars that are currently parking on the street will now be able to park within the dedicated parking area. This will alter the existing traffic pattern along Macquarie and Maloney Streets.

As a car park development would be considered a 'traffic-generating' type development, the planning guidelines of the NSW Road Noise Policy (EPA, 2011) require that any noise from vehicles as they arrive and/or leave the car park along the local road network is assessed to an applied upper noise limit as defined in the RNP. For local roads, the nominated traffic noise criteria are:

- $L_{Aeq\ (1\ hour)}$ 55dB assessed during the daytime at 1 metre from the building façade
- $L_{Aeq\ (1\ hour)}$ 50dB assessed during the night-time at 1 metre from the building facade

6.0 CALCULATED NOISE LEVELS

6.1 PROJECT NOISE TARGETS

Noise from the car park is assessed cumulatively with that of mechanical plant and in accordance with the planning levels contained within the NSW INP.

The INP planning levels are largely determined in relation to the existing environmental noise levels. Noise surveys conducted for this assessment show that environmental noise levels can differ based on the location of a particular receiver and its orientation to major contributors of noise in the area, such as Gardeners Road. Therefore, receiver locations that are shielded from traffic noise will be more sensitive to noise emission from the subject site, and as such have lower noise criteria applied.

Table 2. INP planning levels

Period, T (Note 1)	Properties exposed to traffic noise		Properties shielded from traffic noise	
	Intrusive level	Amenity level (2)	Intrusive level	Amenity level (2)
Day	54	60	48	60
Evening	53	50	50	50
Night	47	45	41	45

Notes

1. The NSW EPA Industrial Noise Policy refers to the following time periods, Day – 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and public holidays, Evening – 6pm to 10pm Monday to Sunday, Night – 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.
2. The amenity planning level is based on the area classification of the site as being 'urban' and has been corrected for an assessment in areas of high traffic where applicable.

6.2 CAR PARK AND MECHANICAL PLANT

Noise levels emitted from the expanded car park and the rooftop mechanical plant was simulated within the CadnaA noise prediction software program.

Noise emission from a car park is not related to the number of cars on-site at any one time, but rather to the number of parking movements that occur within a given time period (where 'one parking movement' refers to a car either entering or leaving the parking area). To assist in noise modelling of the car park, KA has been provided with a survey of vehicles entering and leaving the parking area, broken down into hourly intervals from 6pm through to 4am. The survey was completed for each day between the Monday 3rd and Sunday 9th July 2017.

The data shows that the car park is busiest between 6pm and 10pm, after which time there is a significant drop-off in parking activity. The survey results are summarised below:

Table 3. Summary of two-way parking movements survey

Period	Surveyed two-way parking movements						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6pm-7pm	31	39	46 (1)	18	19	15	25
7pm-8pm	24	35	32	13	44	14	25
8pm-9pm	15	19	26	23	31	9	15
9pm-10pm	15	12	23	15	28	20	5
10pm-11pm	5	6	8 (1)	3	6	6	7
11pm-12am	2	0	7	2	3	5	7
12am-1am	2	1	1	4	5	7	0
1am-2am	2	7	2	1	2	2	0
2am-3am	2	1	1	3	2	5	0
3am-4am	1	0	1	1	3	3	0
After 4am	2	2	1	1	1	1	0
Total Evening (6pm-10pm)	85	105	127 (2)	69	122	58	70
Total Night (10pm-close)	16	17	21	15	22	29 (2)	14

Notes

1. Maximum peak hour evening and night-time two-way surveyed parking movements – used to assess intrusive noise levels
2. Maximum Evening and Night-time period total parking movements – used to assess amenity noise levels

Assuming a linear increase in parking movements based on a proposed 74% increase in supplied parking spaces, the following calculation parameters have been extrapolated from surveyed parking movements (Table 3) and were used to model noise emission from the expanded Hotel car park:

Intrusive noise level assessment

- DAY/EVENING: 46 x 1.74 = 80 total peak-hour two-way parking movements, representing 2.4 parking movements per parking space.
- NIGHT: 8 x 1.74 – 14 total peak-hour two-way parking movements, representing 0.4 parking movements per parking space.

Amenity noise level assessment

- DAY/EVENING: 497/221 total two-way parking movements, representing 1.7 parking movements per hour per parking space.
- NIGHT: 50 total two-way parking movements, representing 0.2 parking movements per hour per parking space.

Noise associated with vehicles using the car park has been modelled within the parking module in CadnaA. The program adopts the calculation methodology of *Parking Area Noise, Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Storey Car Parks and Underground Car Parks (2007)*, published by Bayerisches Landesamt für Umwelt (hereby referred to as LfU 2007). The LfU 2007 calculation methodology considers the L_{Aeq} sound power level of a single vehicle undertaking normal parking activity* over a 1 hour period. The overall noise emission level is then corrected to account for the number of total parking movements per parking space per hour, the parking area type, ground surface etc.

** Normal parking operations include entering/leaving the parking area, searching for a parking space, doors opening and closing and engines starting.*

The parking area calculation model was set-up to include 33 parking spaces, with 1 parking space used as a reference value. Parking movement input parameters for each assessment scenario have been included as detailed above.

A calculation constant K_{PA} (dB correction to account for the parking area type) of 3dB has been applied in the calculation based on representative values for 'restaurants'.

The Ki constant (dB correction for the impulsive character of car park noise) has not been included. This parameter is typically only applied in Germany. The LfU 2007 study and other noise prediction software manuals recommend against including the Ki constant.

Sound data for the rooftop mechanical plant was measured where possible and referenced from manufacturer's data elsewhere. A summary of the sound data used in the noise model includes:

Table 4. Gaming Room and rooftop mechanical plant noise levels [dB]

Source	Description	Noise level, LAeq	Distance [m]
Kitchen exhaust fan	Measured sound pressure level	63	6 (fixed point)
Refrigeration compressor	Measured sound pressure level	69	1 (fixed point)
AC condenser unit – Temperzone OSA250	Published sound power level	75	n/a
AC condenser unit – Temperzone OSA300	Published sound power level	82	n/a
AC condenser unit – Mitsubishi FDC100VN	Published sound power level	70	n/a

The noise model results are tabulated and summarised below:

Table 5. Noise model results

Receiver	Period	Intrusive noise assessment		Amenity noise assessment	
		EPA intrusive criteria	Predicted noise level	EPA amenity criteria	Predicted noise level
2 Macquarie St	Day	54	47	60	46
	Evening	53	47	50	46
	Night	47	39	45	36
4 Macquarie St	Day	54	48	60	47
	Evening	53	48	50	47
	Night	47	40	45	38
6 Macquarie St	Day	54	46	60	45
	Evening	53	46	50	45
	Night	47	39	45	36
5 Macquarie St	Day	48	42	60	41
	Evening	50	42	50	41
	Night	51	34	45	32
5 Maloney St	Day	48	42	60	41
	Evening	50	42	50	41
	Night	51	35	45	33
2 Maloney St	Day	54	47	60	46
	Evening	53	47	50	46
	Night	47	39	45	38
4 Maloney St	Day	54	45	60	44
	Evening	53	45	50	44
	Night	47	38	45	37

From the above, it can be concluded that:

- Intrusive noise levels from the car park and mechanical plant when assessed at residential boundaries fronting Macquarie and Maloney Streets are predicted to not exceed $L_{Aeq\ 15\ minutes}$ 48dB day/evening and 40dB night. This is within the INP planning levels of 54/53dB day/evening and 47dB night.
- Intrusive noise levels from the car park and mechanical plant, when assessed at the rear of nearby residential property (5 Macquarie Street and 5 Maloney Street), are predicted to not exceed $L_{Aeq\ 15\ minutes}$ 42dB day/evening and 35dB night. This is within the INP planning levels of 48/50dB day/evening and 41dB night.
- Amenity noise levels from the car park and mechanical plant are predicted to not exceed $L_{Aeq\ Period}$ 47dB day/evening and 38dB night. This is within the INP planning levels of 60/50dB day/evening and 45dB night.

6.3 SLEEP DISTURBANCE SCREENING ASSESSMENT

KA have catalogued noise level measurements of impulsive-type noise sources typically associated with car parks as follows:

- Car doors closing: L_{Amax} 94dB, $L_{A1,\ 1\ minutes}$ 77dB
- Car engine starting: L_{Amax} 87dB, $L_{A1,\ 1\ minutes}$ 84dB

The resulting car park noise levels at the nearest residential dwelling (4 Macquarie Street – See Figure 4) are $L_{Amax\ (car\ doors)}$ 58dB and $L_{A1,\ 1\ minutes\ (car\ engine\ +\ car\ doors)}$ 49dB. The $L_{A1,\ 1\ minutes}$ noise level is well within the limit of 57dB.

The outdoor L_{Amax} level of 58dB for car doors must be adjusted to an internal level for comparison against the maximum noise level guidelines. A worst-case scenario would be where a residential dwelling had open windows to a bedroom, in which case the indoor level is generally 10dB below the external level. L_{Amax} indoors of 48dB is also within the guidelines of 50-55dB. Therefore, a low probability of sleep disturbance is expected from the proposed car park.

By having cars relocated from current on-street parking spaces to the Hotels car park, it is expected that transient noise from car doors and engines will have less of an impact on surrounding residential dwellings. Calculations suggest that this improvement in residential amenity could be up to 12dB for the most affected sites.

6.4 LOCAL TRAFFIC NOISE

The car park concept design considers a one-way circulation design whereby vehicles enter from Macquarie Street and exit onto Maloney Street. A central median strip along Maloney Street will mean that all exiting vehicles must turn left towards the Maloney Street/Gardeners Road intersection.

In predicting future traffic noise levels impacting surrounding properties, a worst-case and average-case operating model have been addressed. The worst-case model suggests that all entering vehicles would approach along Macquarie Street from the south. The average case model suggests that equal numbers of vehicles will enter the car park from the south and the north. All vehicles under all operating models must exit the car park and turn left towards Gardeners Road.

Each operating model considers traffic volumes representing peak hourly vehicle usage of the car park:

- Worst-case model
  - Day and evening: A total of 80 vehicles entering and leaving the parking area, consistent with peak parking movements considered in Section 6.2 of this report. 40 vehicles will enter the parking area, approaching along Macquarie Street from the south. 40 vehicles will exit the parking area to Maloney Street. During the daytime period, 1 heavy vehicle delivery is assumed.
  - Night: A total of 14 vehicles entering and leaving the parking area, consistent with peak parking movements considered in Section 6.2 of this report. 7 vehicles will enter the parking area, approaching along Macquarie Street from the south. 7 vehicles will exit the parking area to Maloney Street.
- Average-case model
  - Day and evening: A total of 80 vehicles entering and leaving the parking area, consistent with peak parking movements considered in Section 6.2 of this report. 40 vehicles will enter the parking area, 20 approaching along Macquarie Street from the south and another 20 approaching along Macquarie Street from the north. 40 vehicles will exit the parking area to Maloney Street. During the daytime period, 1 heavy vehicle delivery is assumed.
  - Night: A total of 14 vehicles entering and leaving the parking area, consistent with peak parking movements considered in Section 6.2 of this report. 7 vehicles will enter the parking area, 3.5 approaching along Macquarie Street from the south and another 3.5 approaching along Macquarie Street from the north. 7 vehicles will exit the parking area to Maloney Street.

Worst-case $L_{Aeq\ (1\ hour)}$ noise levels are found to be 55dB daytime and 45dB night-time at the most affected surrounding residential property of 4 Macquarie Street.

Average-case $L_{Aeq\ (1\ hour)}$ noise levels are found to be 50dB daytime and 43dB night-time at the most affected surrounding residential property of 4 Macquarie Street.

Both the above operating models confirm compliance with the NSW RNP assessment criteria.

7.0 CONCLUSION

KA was requested to assess the acoustic impact of an expanded car park concept design for The Lakes Hotel at Rosebery, and to what extent noise mitigation measures are required to ensure suitable acoustic amenity for surrounding residents with regard to the planning levels contained within the EPA's INP and RNP.

Surrounding noise sensitive development are residential properties located in Macquarie Street and Maloney Street. It is these residential properties that form the basis for the assessment and associated findings.

The INP planning levels are related to the prevailing environmental noise levels. Therefore, determining the applicable acoustic criteria involves conducting noise logging to measure the existing environmental noise levels.

Environmental noise logging was conducted by KA at 3 Macquarie Street between Tuesday 18th and Monday 24th July 2017. Survey results are included within Section 3.0 of this report.

The RNP was referenced to assess noise impacts associated with the changing traffic pattern that will result from the introduction of an expanded car park and the total noise associated with vehicles arriving and leaving the car park on the local road network.

The assessment concludes the following in relation to the proposed car park concept design:

1. The noise barrier that is currently located along the southern boundary of the car park is to be retained in the expanded car park concept design. It will be relocated to the southern car park boundary shared with 5 Macquarie Street and 5 Maloney Street.

2. Noise emission from the car park and mechanical plant is predicted to comply with the intrusive and amenity planning levels of the INP at all surrounding receivers.
3. A screening test for possible sleep disturbance to nearby residential receivers during the night period has identified there will be a low probability of sleep disturbance.
4. By increasing the car park size, vehicles that are currently parking on Macquarie and Maloney Street will now have access to off-street parking. Impulsive-type noises such as car doors and car engines starting are predicted to be up to 12dB lower with cars now parked in the off-street car park as opposed to on-street.
5. For vehicles using the Hotel's car park, associated noise as they arrive along Macquarie Street and depart along Maloney Street is found to comply with the assessment criteria included in the NSW RNP.

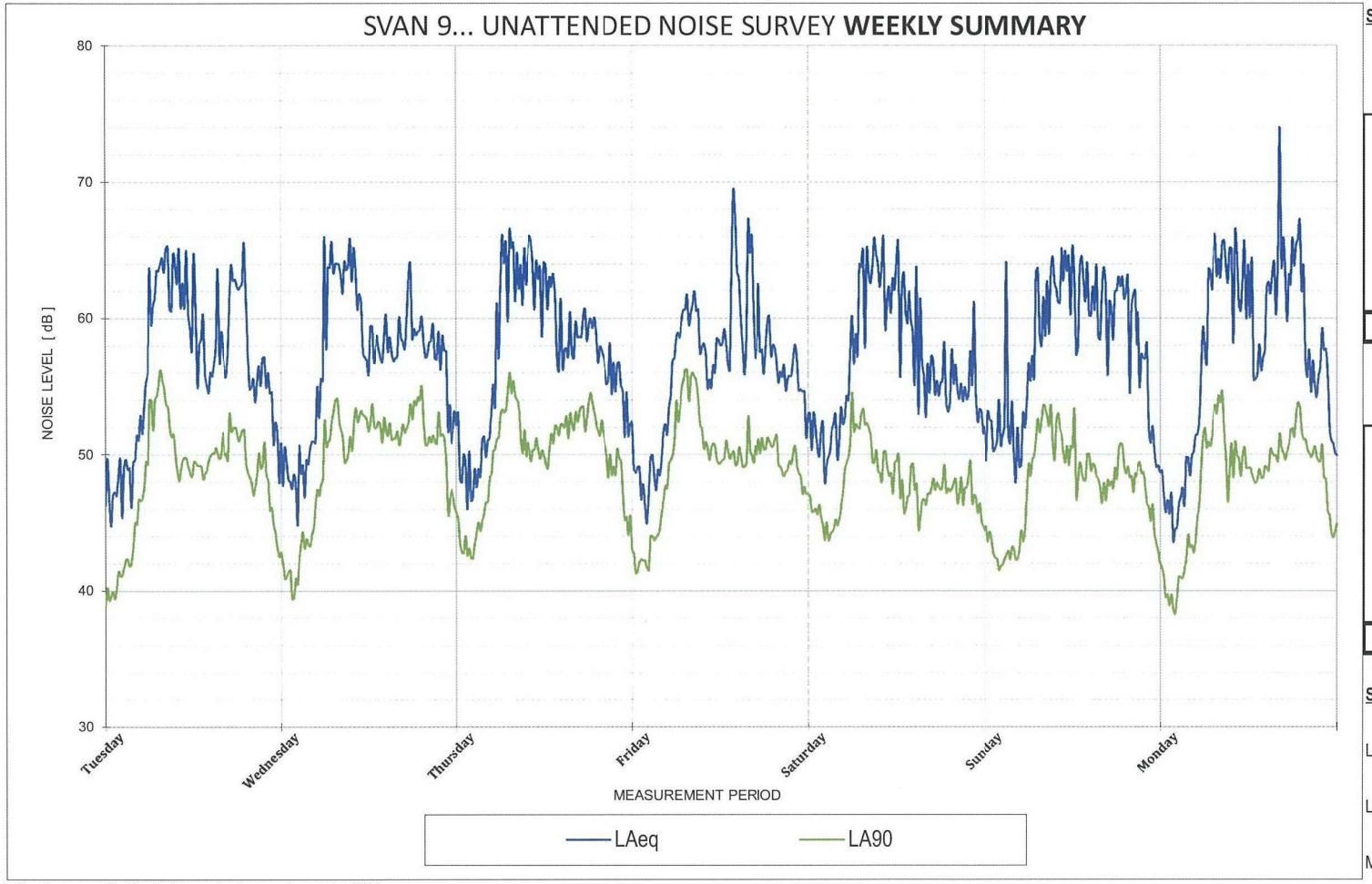
The Planning Proposal has been assessed in terms of its expected acoustic impact to the neighbourhood and has been found to comply with standard acoustic planning guidelines.

APPENDIX A

APPENDIX A

APPENDIX A

WEEKLY SUMMARY **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **PERIOD:** 18th to the 24th July 2017



Sundays and Public Holidays the hours change to 0800

SUMMARY OF AMBIENT LEVELS

	LA90 Daytime	*LA90* Evening	*LA90* Night-time
Day 1	49	48	39
Day 2	51	51	41
Day 3	50	48	43
Day 4	49	49	42
Day 5	46	47	44
Day 6	47	48	42
Day 7	48	50	39
RBL	**49**	**48**	**42**

	LAeq Daytime	*LAeq* Evening	*LAeq* Night-time
Day 1	62	60	55
Day 2	61	58	56
Day 3	62	58	57
Day 4	61	57	54
Day 5	62	55	55
Day 6	62	61	56
Day 7	64	62	55
Average	**62**	**59**	**55**

SUMMARY OF TRAFFIC LEVELS

LAeq 15 hrs	0700-2200	62	dB
LAeq 9 hrs	2200-0700	55	dB
Max LAeq 1 hr	0700-2200	64	dB
Max LAeq 1 hr	2200-0700	59	dB
Maximum noise events as defined in the Environmental Noise Management Manual 7 day average - [LAmax - LAeq ≥ 15]		32	

WEEKKLY SUMMARY	**Period**		**Frequency [Hz]**									
Descritpor	**Start**	**End**	**31.5**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Total A**
10% min LA90 Daytime	7:00 AM	6:00 PM	20	27	34	39	43	45	40	32	24	49
10% min LA90 Evening	6:00 PM	10:00 PM	17	26	34	40	44	44	37	27	21	48
10% min LA90 Night	10:00 PM	7:00 AM	12	20	26	33	37	37	30	21	20	42
10% min LA90 Period	7:00 AM	10:00 PM	19	27	34	39	43	44	39	30	23	48
10% min LA90 Period	10:00 PM	7:00 AM	12	20	26	33	38	37	30	21	19	42
LAeq 15 hours	7:00 AM	10:00 PM	30	39	48	53	57	57	53	48	42	62
LAeq 9 hours	10:00 PM	7:00 AM	25	34	41	46	50	51	47	39	33	55
Max LAeq 1 hour Day	7:00 AM	10:00 PM	30	39	50	55	59	59	55	51	45	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	27	36	45	50	53	54	50	42	33	59

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DAY 1 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **DATE:** Tuesday, 18 July 2017

AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	49	dB
LA90 Evening	1800-2200	48	dB
LA90 Night-time	2200-0700	39	dB
LAeq Daytime	0700-1800	62	dB
LAeq Evening	1800-2200	60	dB
LAeq Night-time	2200-0700	55	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	55	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	59	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		34	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	19	28	35	39	43	45	41	33	24	49
10% min LA90 Evening	6:00 PM	10:00 PM	16	25	33	39	43	43	37	27	21	48
10% min LA90 Night	10:00 PM	7:00 AM	9	18	25	30	35	35	30	22	20	39
10% min LA90 Period	7:00 AM	10:00 PM	19	27	34	39	43	44	39	30	23	48
10% min LA90 Period	10:00 PM	7:00 AM	9	18	25	30	35	35	30	22	20	39
LAeq 15 hours	7:00 AM	10:00 PM	29	39	48	53	56	57	52	45	39	61
LAeq 9 hours	10:00 PM	7:00 AM	23	32	41	46	50	51	47	39	31	55
Max LAeq 1 hour Day	7:00 AM	10:00 PM	31	40	50	55	59	59	54	46	39	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	27	36	46	51	54	54	50	42	32	59

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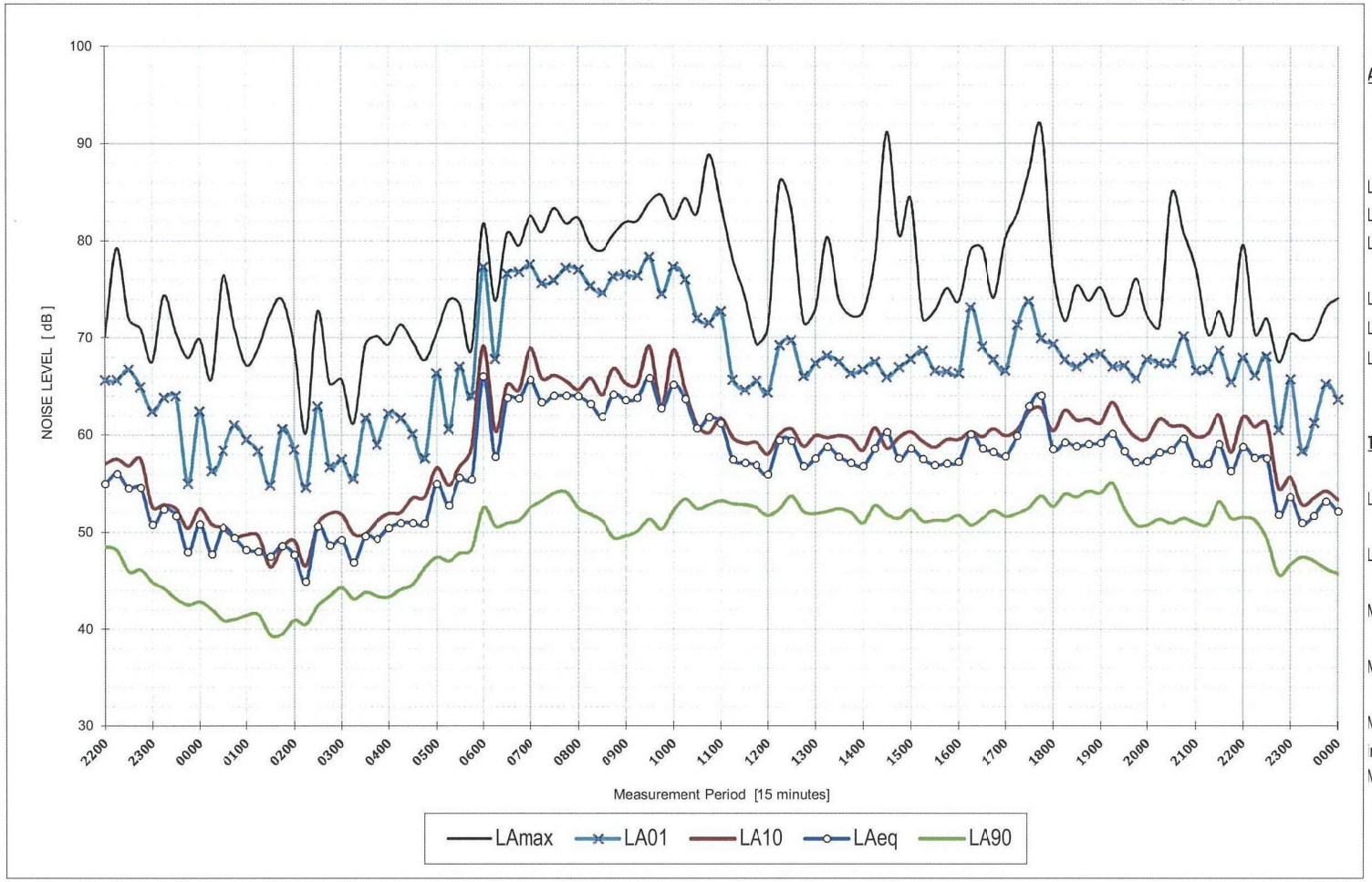
DAY 2 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **DATE:** Wednesday, 19 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	51	dB
LA90 Evening	1800-2200	51	dB
LA90 Night-time	2200-0700	41	dB
LAeq Daytime	0700-1800	61	dB
LAeq Evening	1800-2200	58	dB
LAeq Night-time	2200-0700	56	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	56	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	60	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		34	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	21	29	35	41	46	47	42	34	25	51
10% min LA90 Evening	6:00 PM	10:00 PM	19	27	35	42	47	46	39	28	22	51
10% min LA90 Night	10:00 PM	7:00 AM	9	18	26	32	37	36	28	21	20	41
10% min LA90 Period	7:00 AM	10:00 PM	20	28	35	41	46	47	41	32	24	51
10% min LA90 Period	10:00 PM	7:00 AM	10	18	25	32	37	36	28	21	19	41
LAeq 15 hours	7:00 AM	10:00 PM	31	40	47	53	56	56	52	45	37	61
LAeq 9 hours	10:00 PM	7:00 AM	23	33	42	47	51	51	47	38	29	56
Max LAeq 1 hour Day	7:00 AM	10:00 PM	31	40	51	56	59	59	54	44	35	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	26	36	46	51	55	55	50	41	31	60

KOIKAS ACOUSTICS PTY LTD

DAY 3 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **DATE:** Thursday, 20 July 2017

AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	50	dB
LA90 Evening	1800-2200	48	dB
LA90 Night-time	2200-0700	43	dB
LAeq Daytime	0700-1800	62	dB
LAeq Evening	1800-2200	58	dB
LAeq Night-time	2200-0700	57	dB

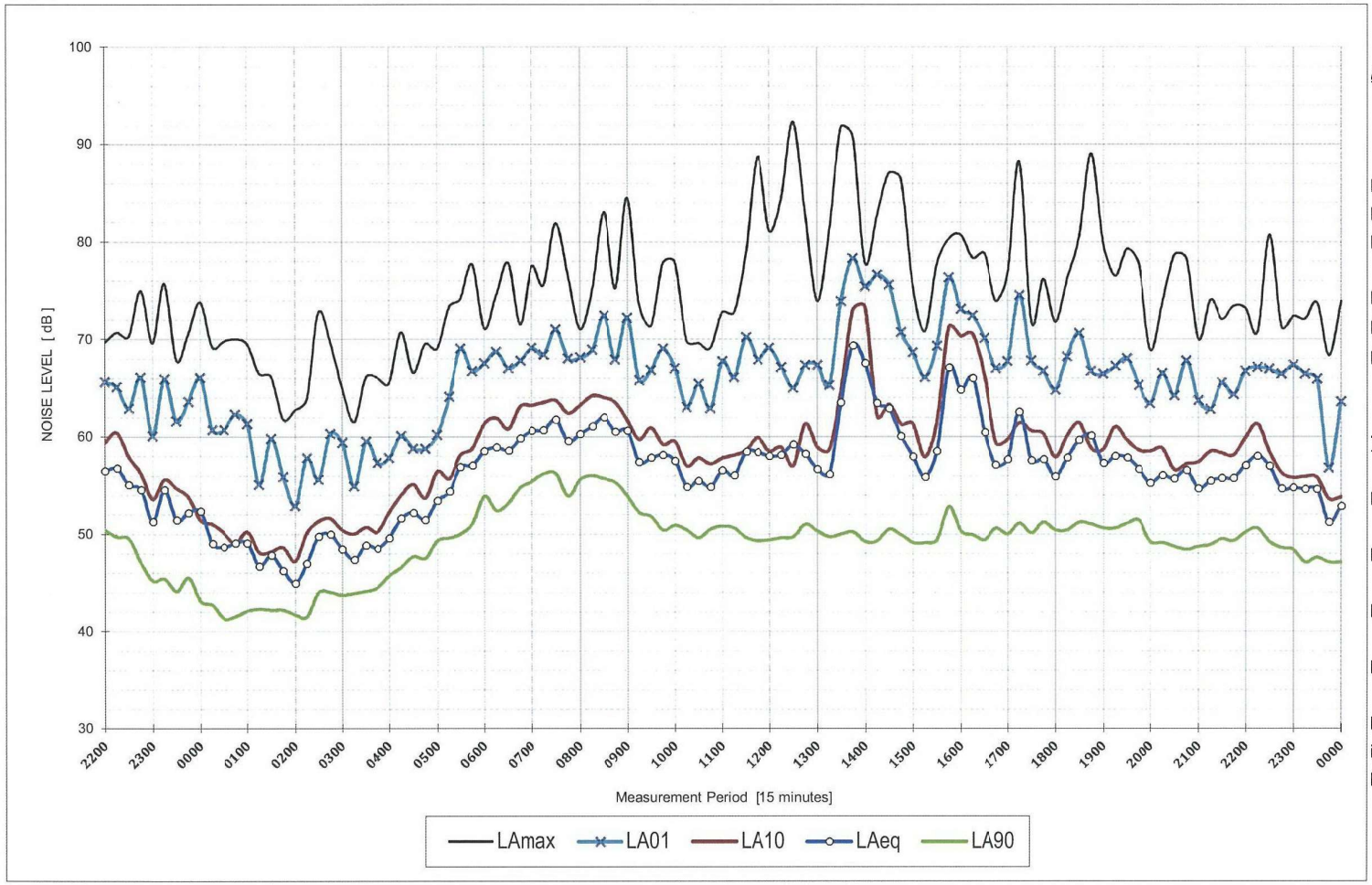
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	57	dB
Max LAeq 1 hour	0700-2200	65	dB
Max LAeq 1 hour	2200-0700	59	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]			27

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	20	28	35	41	45	45	40	32	23	50
10% min LA90 Evening	6:00 PM	10:00 PM	18	26	34	40	45	44	36	27	22	48
10% min LA90 Night	10:00 PM	7:00 AM	12	21	27	34	39	38	30	21	20	43
10% min LA90 Period	7:00 AM	10:00 PM	19	28	34	41	45	45	39	30	23	49
10% min LA90 Period	10:00 PM	7:00 AM	12	21	27	34	39	38	29	20	19	43
LAeq 15 hours	7:00 AM	10:00 PM	31	40	49	53	57	57	52	44	37	61
LAeq 9 hours	10:00 PM	7:00 AM	26	34	44	48	52	53	48	38	30	57
Max LAeq 1 hour Day	7:00 AM	10:00 PM	31	40	52	56	60	60	55	45	35	65
Max LAeq 1 hour Night	7:00 AM	10:00 PM	24	34	47	51	55	55	50	39	29	59

KOIKAS ACOUSTICS PTY LTD

DAY 4 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **DATE:** Friday, 21 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	49	dB
LA90 Evening	1800-2200	49	dB
LA90 Night-time	2200-0700	42	dB
LAeq Daytime	0700-1800	61	dB
LAeq Evening	1800-2200	57	dB
LAeq Night-time	2200-0700	54	dB

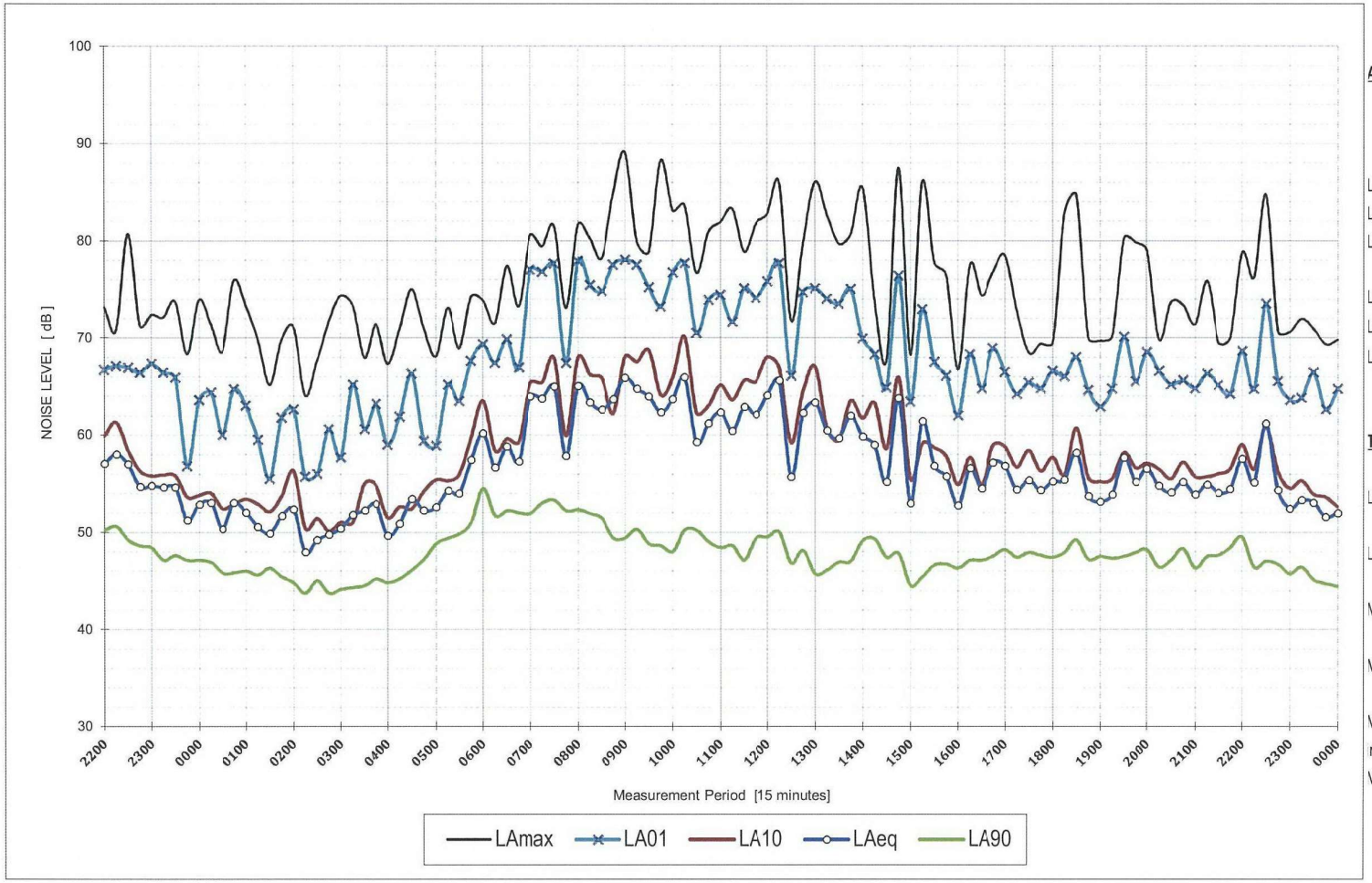
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	57	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		30	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	20	27	34	39	44	45	41	34	26	49
10% min LA90 Evening	6:00 PM	10:00 PM	17	26	34	39	44	45	38	27	22	49
10% min LA90 Night	10:00 PM	7:00 AM	12	20	26	33	37	37	31	25	22	42
10% min LA90 Period	7:00 AM	10:00 PM	19	27	34	39	44	45	40	32	25	49
10% min LA90 Period	10:00 PM	7:00 AM	12	20	26	33	38	37	30	24	20	42
LAeq 15 hours	7:00 AM	10:00 PM	30	40	44	49	53	55	53	54	48	61
LAeq 9 hours	10:00 PM	7:00 AM	26	35	39	45	49	49	45	38	30	54
Max LAeq 1 hour Day	7:00 AM	10:00 PM	29	37	42	51	55	57	57	59	53	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	29	38	42	48	52	52	47	41	31	57

KOIKAS ACOUSTICS PTY LTD

DAY 5 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **DATE:** Saturday, 22 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	46	dB
LA90 Evening	1800-2200	47	dB
LA90 Night-time	2200-0700	44	dB
LAeq Daytime	0700-1800	62	dB
LAeq Evening	1800-2200	55	dB
LAeq Night-time	2200-0700	55	dB

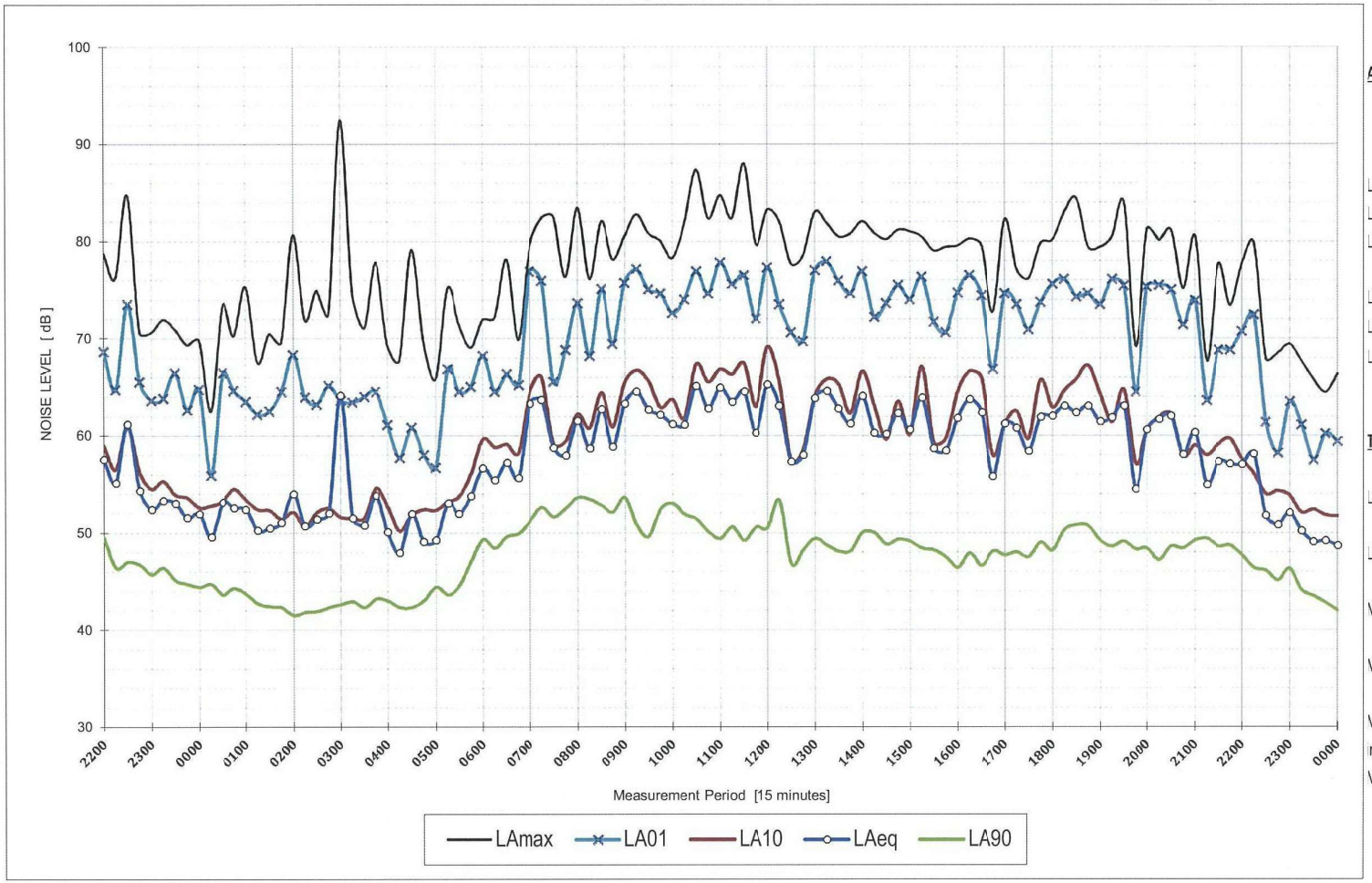
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	55	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	57	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		32	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	20	27	34	37	40	42	39	30	22	46
10% min LA90 Evening	6:00 PM	10:00 PM	15	24	32	36	40	43	39	27	21	47
10% min LA90 Night	10:00 PM	7:00 AM	13	21	27	35	40	41	31	21	20	44
10% min LA90 Period	7:00 AM	10:00 PM	18	26	34	37	40	42	39	30	22	46
10% min LA90 Period	10:00 PM	7:00 AM	13	21	27	34	40	41	31	21	20	44
LAeq 15 hours	7:00 AM	10:00 PM	28	38	48	52	56	56	52	45	39	61
LAeq 9 hours	10:00 PM	7:00 AM	26	35	41	45	49	50	46	39	31	54
Max LAeq 1 hour Day	7:00 AM	10:00 PM	30	40	51	55	59	59	54	46	37	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	29	38	42	48	52	53	48	40	30	57

KOIKAS ACOUSTICS PTY LTD

DAY 6 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **DATE:** Sunday, 23 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0800-1800	47	dB
LA90 Evening	1800-2200	48	dB
LA90 Night-time	2200-0800	42	dB
LAeq Daytime	0800-1800	62	dB
LAeq Evening	1800-2200	61	dB
LAeq Night-time	2200-0800	56	dB

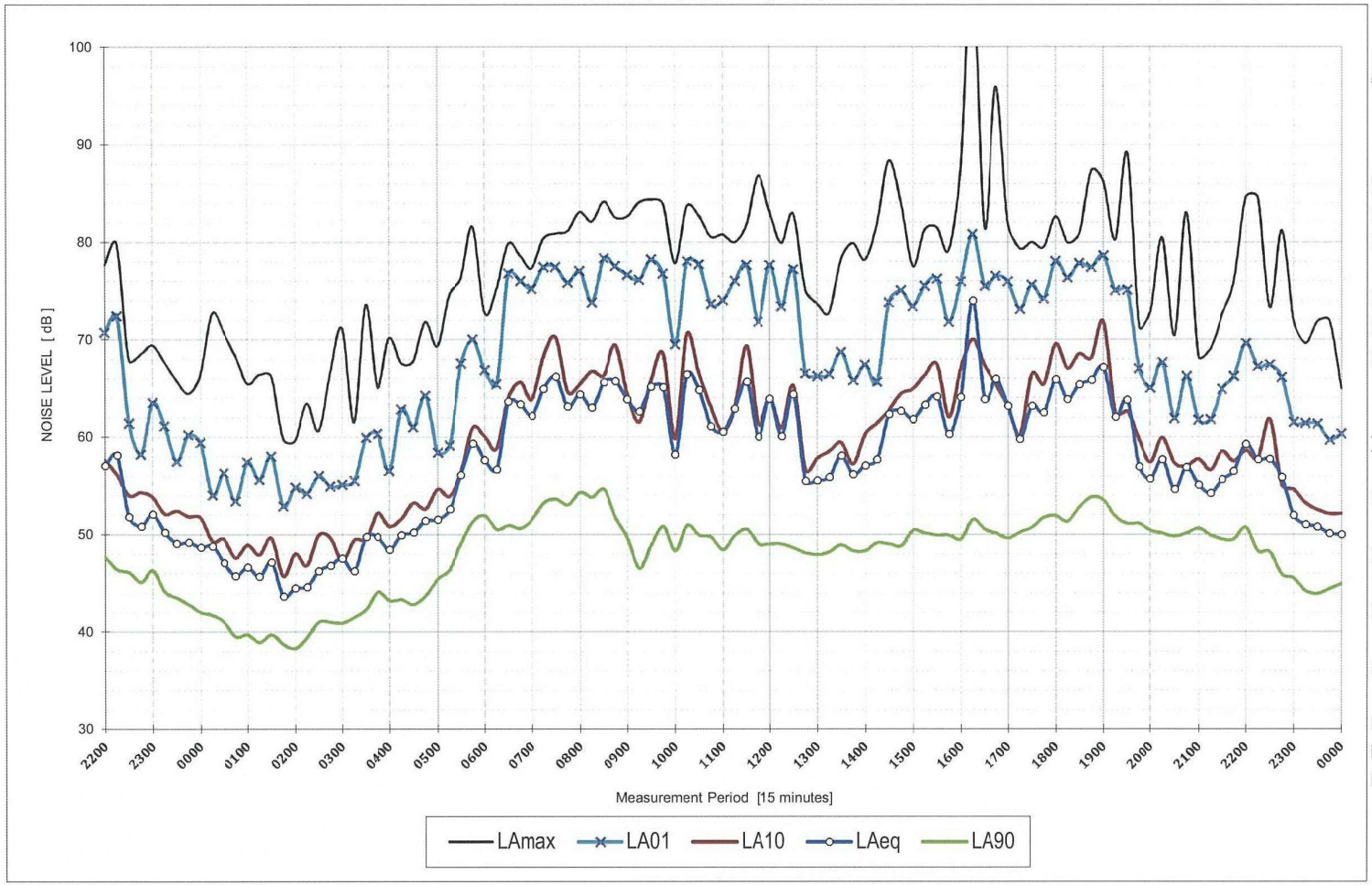
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	62	dB
LAeq 9 hours	2200-0700	55	dB
Max LAeq 1 hour	0700-2200	63	dB
Max LAeq 1 hour	2200-0700	59	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		34	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	8:00 AM	6:00 PM	19	27	34	38	42	43	39	29	22	47
10% min LA90 Evening	6:00 PM	10:00 PM	18	26	34	40	44	43	37	26	21	48
10% min LA90 Night	10:00 PM	8:00 AM	13	20	26	33	38	38	30	21	20	42
10% min LA90 Period	7:00 AM	10:00 PM	18	26	34	39	43	43	38	28	21	48
10% min LA90 Period	10:00 PM	7:00 AM	12	20	26	33	38	38	31	21	19	42
LAeq 15 hours	7:00 AM	10:00 PM	29	37	50	55	58	57	51	43	36	62
LAeq 9 hours	10:00 PM	7:00 AM	25	33	40	44	47	50	49	42	34	55
Max LAeq 1 hour Day	7:00 AM	10:00 PM	30	38	51	56	59	58	52	44	36	63
Max LAeq 1 hour Night	10:00 PM	7:00 AM	24	35	43	48	51	54	53	45	38	59

KOIKAS ACOUSTICS PTY LTD

DAY 7 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - front **DATE:** Monday, 24 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	48	dB
LA90 Evening	1800-2200	50	dB
LA90 Night-time	2200-0700	39	dB
LAeq Daytime	0700-1800	64	dB
LAeq Evening	1800-2200	62	dB
LAeq Night-time	2200-0700	55	dB

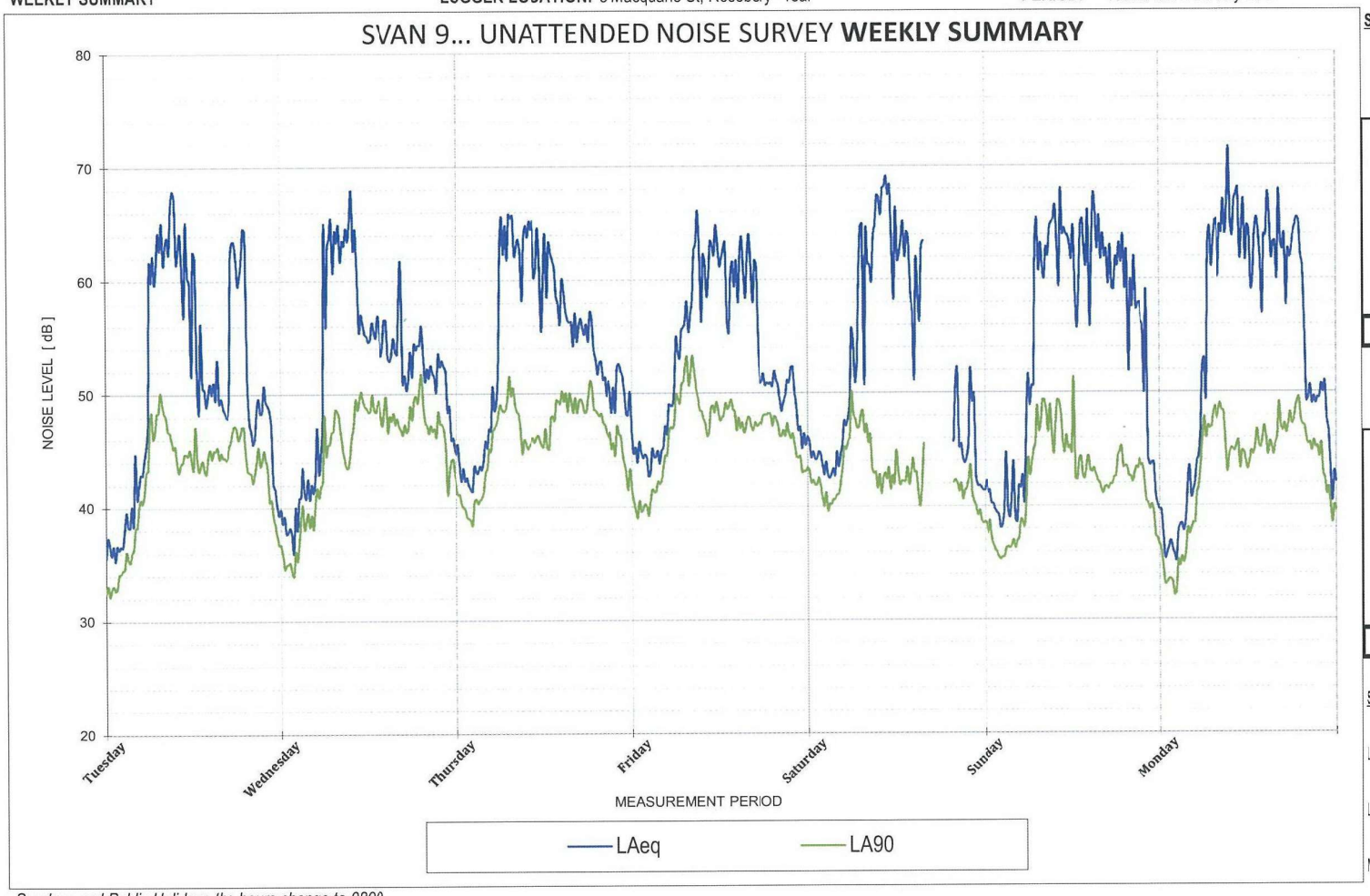
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	64	dB
LAeq 9 hours	2200-0700	55	dB
Max LAeq 1 hour	0700-2200	65	dB
Max LAeq 1 hour	2200-0700	57	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		35	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	19	27	33	39	43	44	39	32	24	48
10% min LA90 Evening	6:00 PM	10:00 PM	17	26	34	41	46	45	37	26	21	50
10% min LA90 Night	10:00 PM	7:00 AM	10	18	25	31	36	34	25	20	20	39
10% min LA90 Period	7:00 AM	10:00 PM	19	27	33	39	43	44	39	32	24	48
10% min LA90 Period	10:00 PM	7:00 AM	10	18	25	31	36	34	25	19	19	39
LAeq 15 hours	7:00 AM	10:00 PM	30	40	51	56	59	59	55	47	39	64
LAeq 9 hours	10:00 PM	7:00 AM	23	32	41	46	49	50	46	37	37	55
Max LAeq 1 hour Day	7:00 AM	10:00 PM	31	41	52	58	61	60	56	46	36	65
Max LAeq 1 hour Night	10:00 PM	7:00 AM	26	35	43	48	52	52	48	40	34	57

KOIKAS ACOUSTICS PTY LTD

WEEKLY SUMMARY **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **PERIOD:** 18th to the 24th July 2017



Sundays and Public Holidays the hours change to 0800

SUMMARY OF AMBIENT LEVELS

	LA90 Daytime	*LA90* Evening	*LA90* Night-time
Day 1	43	43	33
Day 2	45	47	35
Day 3	45	45	39
Day 4	46	46	40
Day 5	41	41	40
Day 6	41	43	36
Day 7	43	45	33
RBL	**43**	**45**	**36**

	LAeq Daytime	*LAeq* Evening	*LAeq* Night-time
Day 1	61	59	53
Day 2	60	53	54
Day 3	62	53	55
Day 4	61	51	49
Day 5	64	47	48
Day 6	64	60	54
Day 7	65	61	53
Average	**63**	**57**	**53**

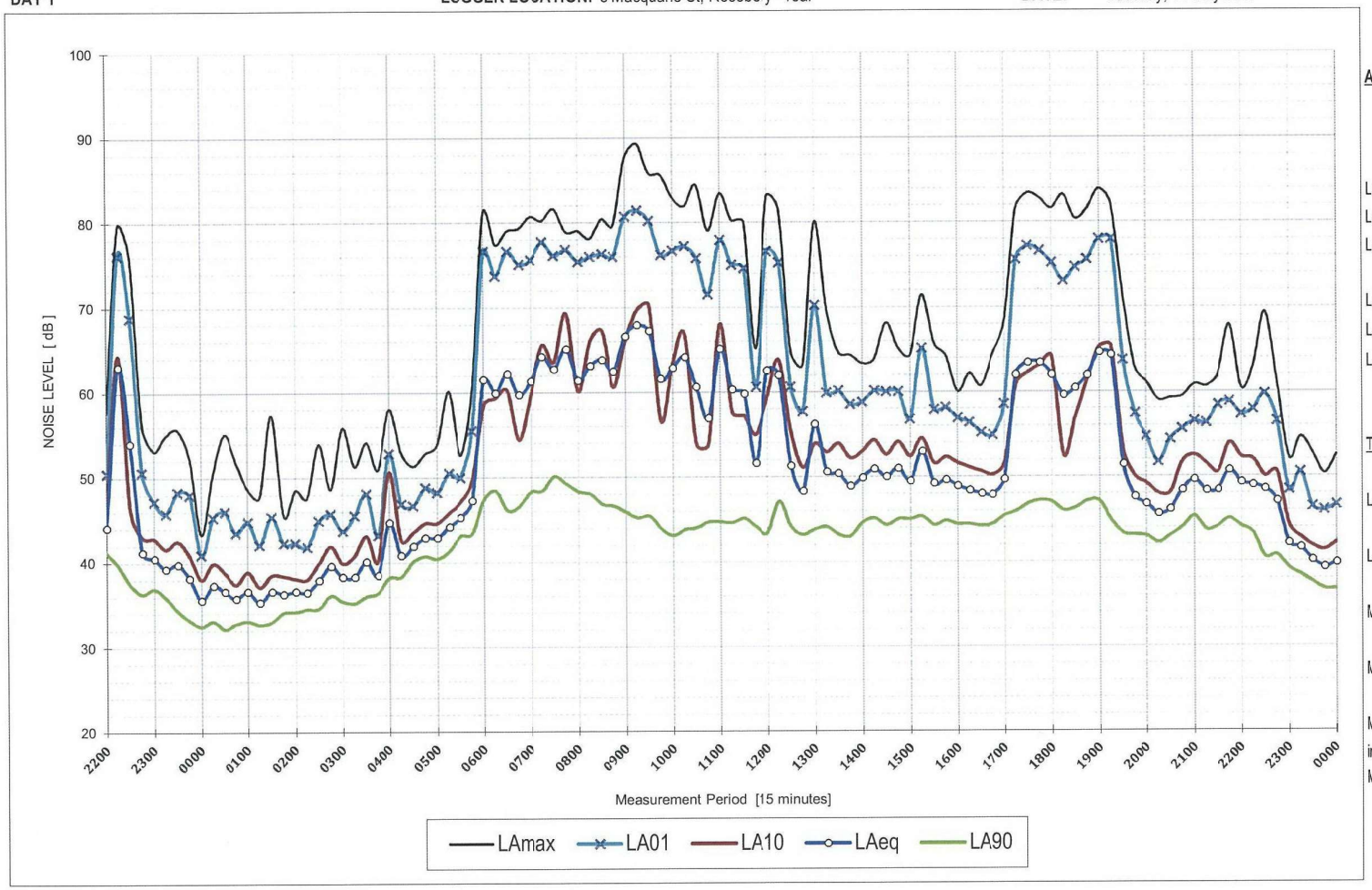
SUMMARY OF TRAFFIC LEVELS

LAeq 15 hrs	0700-2200	62	dB
LAeq 9 hrs	2200-0700	52	dB
Max LAeq 1 hr	0700-2200	64	dB
Max LAeq 1 hr	2200-0700	53	dB
Maximum noise events as defined in the Environmental Noise Management Manual 7 day average - [LAmax - LAeq ≥ 15]		12	

WEEKKLY SUMMARY	**Period**		**Frequency [Hz]**									
Descritpor	**Start**	**End**	**31.5**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Total A**
10% min LA90 Daytime	7:00 AM	6:00 PM	22	26	31	36	38	38	34	28	22	44
10% min LA90 Evening	6:00 PM	10:00 PM	19	23	32	37	40	40	31	22	18	45
10% min LA90 Night	10:00 PM	7:00 AM	13	17	23	28	31	31	23	19	17	36
10% min LA90 Period	7:00 AM	10:00 PM	21	25	32	36	39	39	33	27	21	44
10% min LA90 Period	10:00 PM	7:00 AM	13	17	23	28	31	31	23	18	17	36
LAeq 15 hours	7:00 AM	10:00 PM	31	37	47	53	55	55	50	57	49	62
LAeq 9 hours	10:00 PM	7:00 AM	25	30	40	45	48	47	41	37	30	52
Max LAeq 1 hour Day	7:00 AM	10:00 PM	32	38	49	55	57	57	52	60	51	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	27	32	41	46	48	48	42	37	29	53

KOIKAS ACOUSTICS PTY LTD

DAY 1 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **DATE:** Tuesday, 18 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	43	dB
LA90 Evening	1800-2200	43	dB
LA90 Night-time	2200-0700	33	dB
LAeq Daytime	0700-1800	61	dB
LAeq Evening	1800-2200	59	dB
LAeq Night-time	2200-0700	53	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	53	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	58	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		14	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	22	26	32	35	38	38	34	28	22	43
10% min LA90 Evening	6:00 PM	10:00 PM	19	23	32	36	38	37	30	22	19	43
10% min LA90 Night	10:00 PM	7:00 AM	10	16	21	25	28	27	21	18	17	33
10% min LA90 Period	7:00 AM	10:00 PM	21	25	32	36	38	38	32	26	21	43
10% min LA90 Period	10:00 PM	7:00 AM	10	16	21	25	28	27	21	18	17	33
LAeq 15 hours	7:00 AM	10:00 PM	31	37	48	53	55	55	49	53	44	61
LAeq 9 hours	10:00 PM	7:00 AM	25	30	42	47	49	48	42	32	23	53
Max LAeq 1 hour Day	7:00 AM	10:00 PM	32	38	49	55	58	57	52	49	40	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	32	37	47	50	52	53	47	39	31	58

KOIKAS ACOUSTICS PTY LTD

DAY 2 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **DATE:** Wednesday, 19 July 2017

AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	45	dB
LA90 Evening	1800-2200	47	dB
LA90 Night-time	2200-0700	35	dB
LAeq Daytime	0700-1800	60	dB
LAeq Evening	1800-2200	53	dB
LAeq Night-time	2200-0700	54	dB

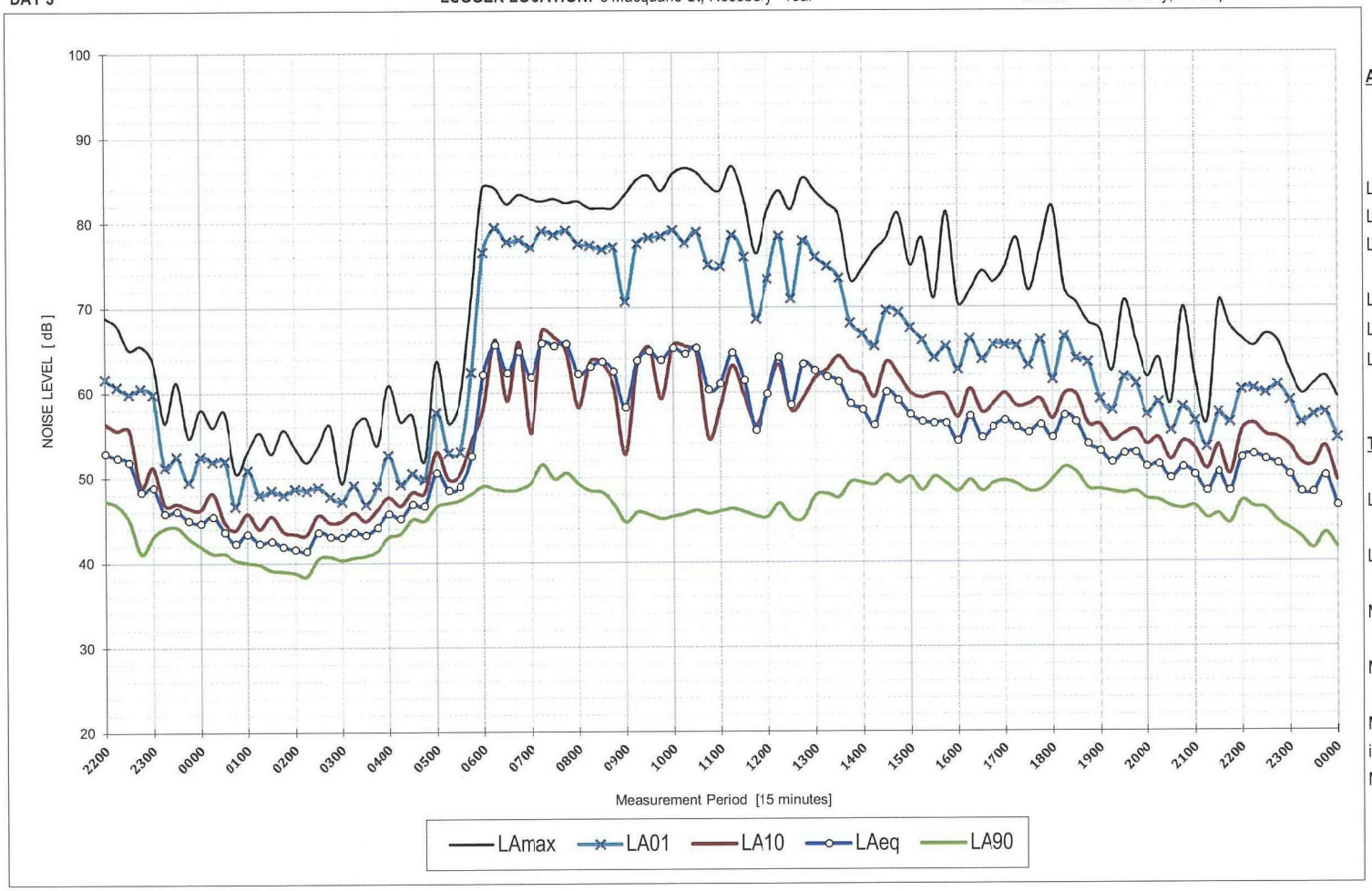
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	59	dB
LAeq 9 hours	2200-0700	54	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	57	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		14	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	23	27	31	37	41	41	35	29	23	45
10% min LA90 Evening	6:00 PM	10:00 PM	20	25	33	39	42	42	33	24	19	47
10% min LA90 Night	10:00 PM	7:00 AM	11	17	23	28	31	29	21	18	18	35
10% min LA90 Period	7:00 AM	10:00 PM	22	26	33	39	41	42	34	27	21	46
10% min LA90 Period	10:00 PM	7:00 AM	11	16	22	28	31	29	21	18	16	35
LAeq 15 hours	7:00 AM	10:00 PM	31	36	46	52	54	54	49	50	45	59
LAeq 9 hours	10:00 PM	7:00 AM	26	31	41	47	49	48	43	32	26	54
Max LAeq 1 hour Day	7:00 AM	10:00 PM	33	39	50	56	59	59	54	45	36	64
Max LAeq 1 hour Night	10:00 PM	7:00 AM	28	33	45	50	52	52	47	33	20	57

KOIKAS ACOUSTICS PTY LTD

DAY 3 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **DATE:** Thursday, 20 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	45	dB
LA90 Evening	1800-2200	45	dB
LA90 Night-time	2200-0700	39	dB
LAeq Daytime	0700-1800	62	dB
LAeq Evening	1800-2200	53	dB
LAeq Night-time	2200-0700	55	dB

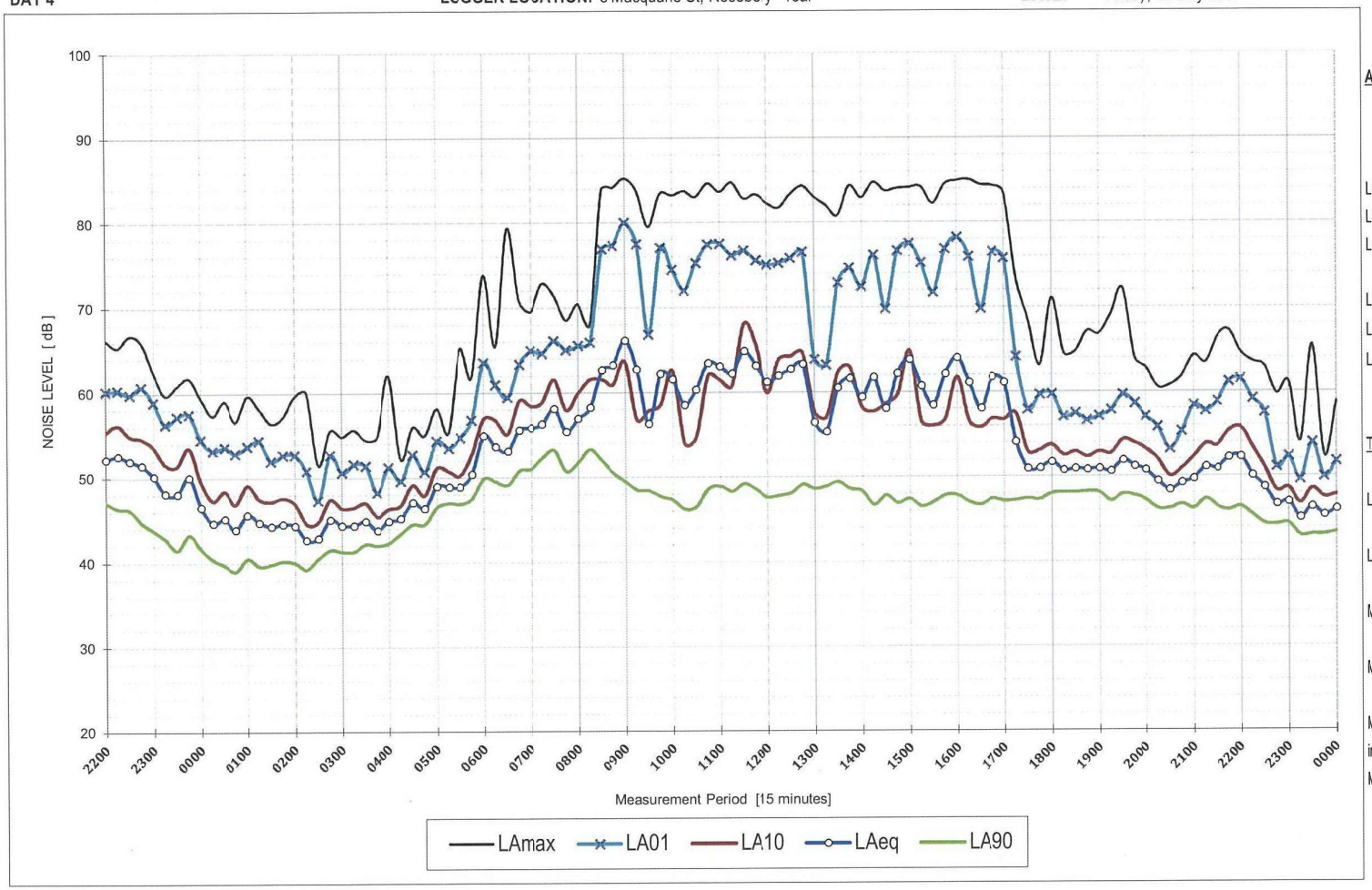
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	61	dB
LAeq 9 hours	2200-0700	55	dB
Max LAeq 1 hour	0700-2200	64	dB
Max LAeq 1 hour	2200-0700	56	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		10	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	22	26	32	38	41	40	34	29	24	45
10% min LA90 Evening	6:00 PM	10:00 PM	19	24	32	38	41	41	32	24	20	45
10% min LA90 Night	10:00 PM	7:00 AM	13	19	25	32	35	35	25	19	17	39
10% min LA90 Period	7:00 AM	10:00 PM	22	26	32	38	41	40	34	28	23	45
10% min LA90 Period	10:00 PM	7:00 AM	13	19	25	32	35	35	25	18	17	39
LAeq 15 hours	7:00 AM	10:00 PM	32	37	47	53	56	55	50	48	46	61
LAeq 9 hours	10:00 PM	7:00 AM	26	31	41	48	51	50	45	35	25	55
Max LAeq 1 hour Day	7:00 AM	10:00 PM	34	40	51	57	60	59	53	42	35	64
Max LAeq 1 hour Night	7:00 AM	10:00 PM	25	30	42	48	52	51	46	34	22	56

KOIKAS ACOUSTICS PTY LTD

DAY 4 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **DATE:** Friday, 21 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	46	dB
LA90 Evening	1800-2200	46	dB
LA90 Night-time	2200-0700	40	dB
LAeq Daytime	0700-1800	61	dB
LAeq Evening	1800-2200	51	dB
LAeq Night-time	2200-0700	49	dB

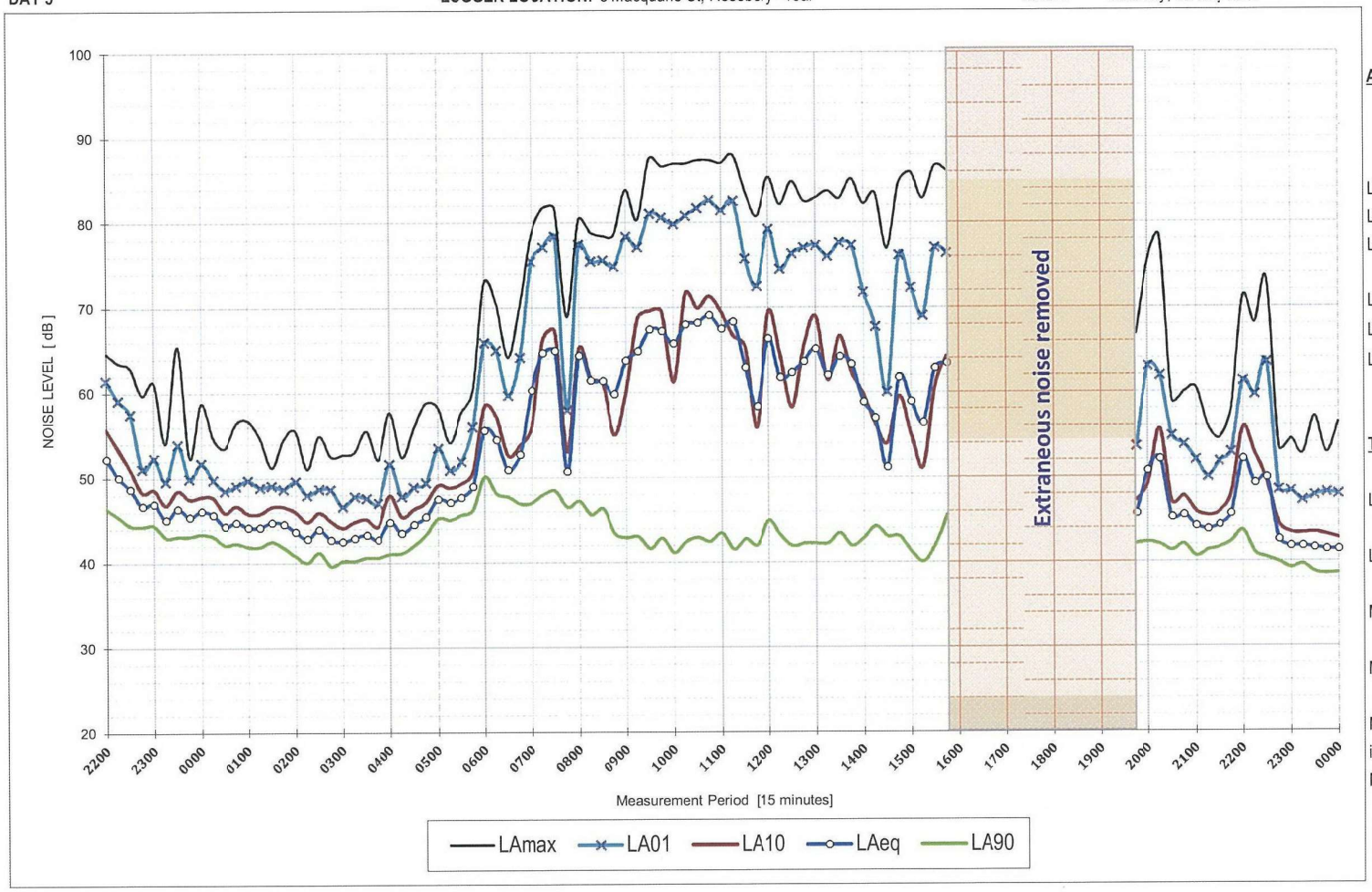
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	60	dB
LAeq 9 hours	2200-0700	49	dB
Max LAeq 1 hour	0700-2200	63	dB
Max LAeq 1 hour	2200-0700	52	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]			7

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	23	27	32	38	41	43	36	29	23	46
10% min LA90 Evening	6:00 PM	10:00 PM	19	23	31	37	40	43	35	23	18	46
10% min LA90 Night	10:00 PM	7:00 AM	14	18	25	32	35	35	27	23	20	40
10% min LA90 Period	7:00 AM	10:00 PM	21	25	32	37	41	43	36	27	21	46
10% min LA90 Period	10:00 PM	7:00 AM	14	18	24	32	35	35	27	23	20	40
LAeq 15 hours	7:00 AM	10:00 PM	30	35	40	46	48	48	47	58	50	60
LAeq 9 hours	10:00 PM	7:00 AM	25	30	36	43	44	43	38	39	36	49
Max LAeq 1 hour Day	7:00 AM	10:00 PM	29	34	39	45	47	48	50	61	54	63
Max LAeq 1 hour Night	10:00 PM	7:00 AM	27	32	38	45	46	45	40	40	36	52

KOIKAS ACOUSTICS PTY LTD

DAY 5 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **DATE:** Saturday, 22 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	41	dB
LA90 Evening	1800-2200	41	dB
LA90 Night-time	2200-0700	40	dB
LAeq Daytime	0700-1800	64	dB
LAeq Evening	1800-2200	47	dB
LAeq Night-time	2200-0700	48	dB

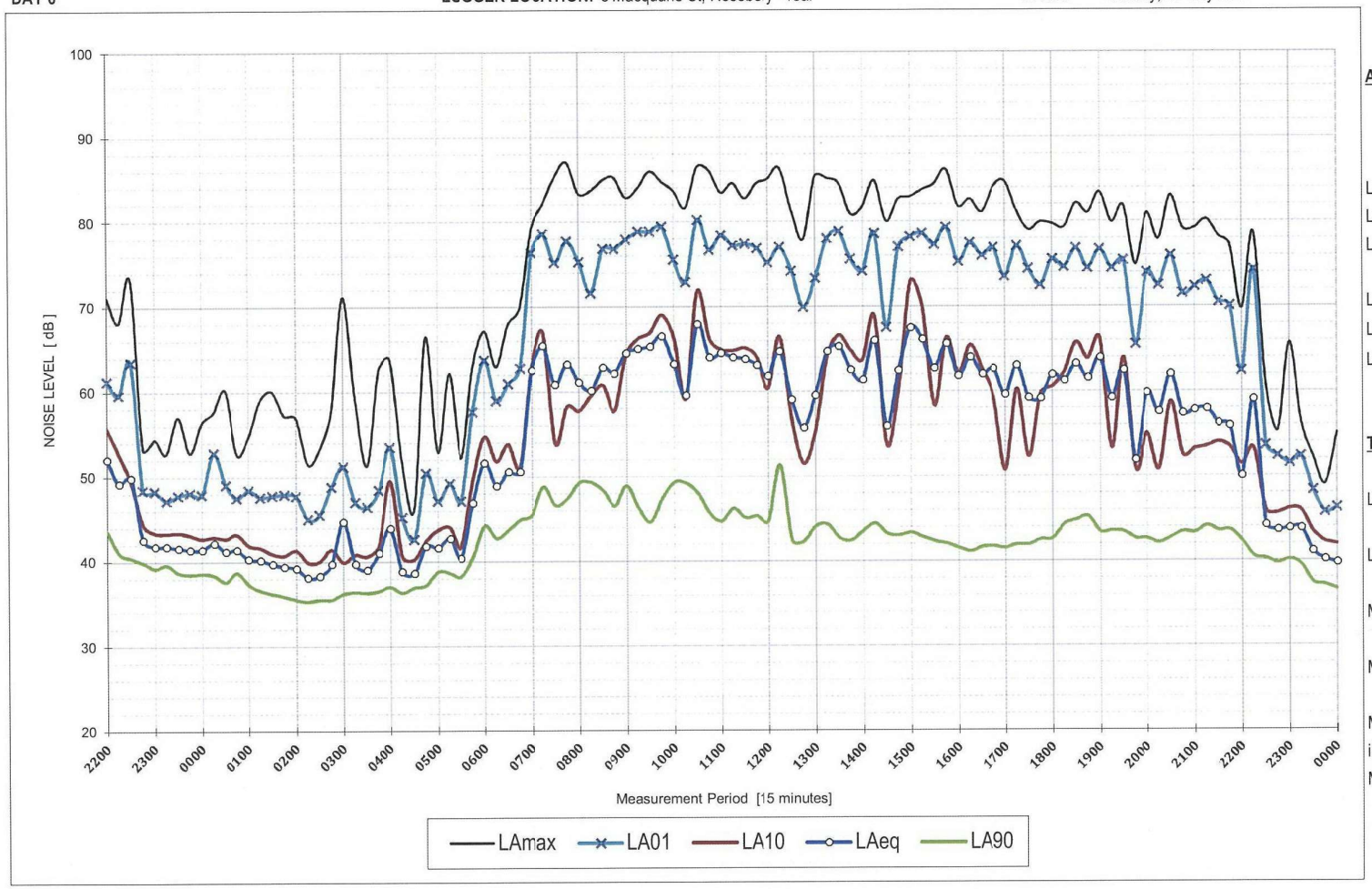
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	63	dB
LAeq 9 hours	2200-0700	48	dB
Max LAeq 1 hour	0700-2200	67	dB
Max LAeq 1 hour	2200-0700	51	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		4	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	23	25	31	33	36	36	31	25	20	41
10% min LA90 Evening	6:00 PM	10:00 PM	18	21	30	32	36	37	31	22	18	41
10% min LA90 Night	10:00 PM	7:00 AM	15	19	24	32	36	37	26	19	17	40
10% min LA90 Period	7:00 AM	10:00 PM	21	23	31	33	36	36	31	24	20	41
10% min LA90 Period	10:00 PM	7:00 AM	14	19	25	32	36	37	27	19	17	40
LAeq 15 hours	7:00 AM	10:00 PM	31	37	48	53	56	55	50	60	50	63
LAeq 9 hours	10:00 PM	7:00 AM	26	30	35	41	43	44	34	28	21	48
Max LAeq 1 hour Day	7:00 AM	10:00 PM	32	37	48	54	57	56	52	64	54	67
Max LAeq 1 hour Night	10:00 PM	7:00 AM	31	34	38	45	46	46	35	31	23	51

KOIKAS ACOUSTICS PTY LTD

DAY 6 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **DATE:** Sunday, 23 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0800-1800	41	dB
LA90 Evenirg	1800-2200	43	dB
LA90 Night-time	2200-0800	36	dB
LAeq Daytime	0800-1800	64	dB
LAeq Evening	1800-2200	60	dB
LAeq Night-time	2200-0800	54	dB

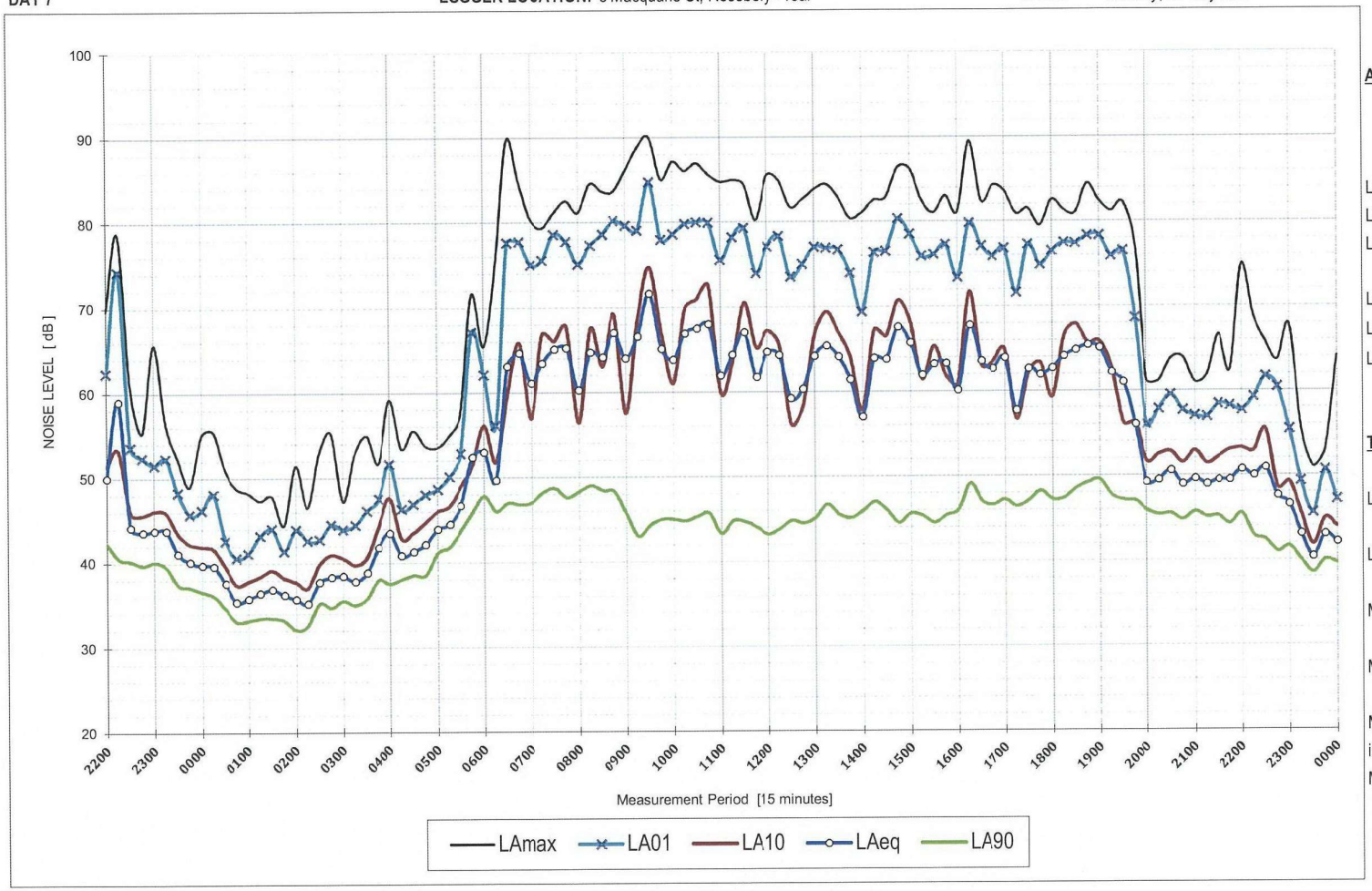
TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	63	dB
LAeq 9 hours	2200-0700	45	dB
Max LAeq 1 hour	0700-2200	65	dB
Max LAeq 1 hour	2200-0700	48	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		21	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	8:00 AM	6:00 PM	21	24	31	34	36	36	30	23	19	41
10% min LA90 Evening	6:00 PM	10:00 PM	19	24	32	36	38	36	29	21	18	43
10% min LA90 Night	10:00 PM	8:00 AM	14	17	23	28	31	31	23	19	17	36
10% min LA90 Period	7:00 AM	10:00 PM	21	24	31	35	37	36	30	23	19	42
10% min LA90 Period	10:00 PM	7:00 AM	13	17	23	28	31	31	23	18	17	36
LAeq 15 hours	7:00 AM	10:00 PM	31	37	49	55	57	56	49	57	51	63
LAeq 9 hours	10:00 PM	7:00 AM	24	28	33	38	40	40	35	33	23	45
Max LAeq 1 hour Day	7:00 AM	10:00 PM	32	37	49	55	58	56	50	60	53	65
Max LAeq 1 hour Night	10:00 PM	7:00 AM	28	31	36	42	43	42	37	32	23	48

KOIKAS ACOUSTICS PTY LTD

DAY 7 **LOGGER LOCATION:** 3 Macquarie St, Rosebery - rear **DATE:** Monday, 24 July 2017



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
LA90 Daytime	0700-1800	43	dB
LA90 Evenirg	1800-2200	45	dB
LA90 Night-time	2200-0700	33	dB
LAeq Daytime	0700-1800	65	dB
LAeq Evenirg	1800-2200	61	dB
LAeq Night-time	2200-0700	53	dB

TRAFFIC & MISC. NOISE METRICS

LAeq 15 hours	0700-2200	64	dB
LAeq 9 hours	2200-0700	53	dB
Max LAeq 1 hour	0700-2200	66	dB
Max LAeq 1 hour	2200-0700	53	dB
Maximum noise events as defined in the Environmental Noise Management Manual [LAmax - LAeq ≥ 15]		16	

	Period		Frequency [Hz]									
Descritpor	Start	End	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min LA90 Daytime	7:00 AM	6:00 PM	22	26	31	36	38	38	33	27	22	43
10% min LA90 Evening	6:00 PM	10:00 PM	19	23	32	38	40	40	31	22	18	45
10% min LA90 Night	10:00 PM	7:00 AM	11	17	21	27	29	26	19	17	17	33
10% min LA90 Period	7:00 AM	10:00 PM	22	26	32	36	39	39	33	27	22	44
10% min LA90 Period	10:00 PM	7:00 AM	11	16	21	27	29	27	19	17	16	33
LAeq 15 hours	7:00 AM	10:00 PM	32	38	49	55	57	57	52	59	50	64
LAeq 9 hours	10:00 PM	7:00 AM	25	30	40	46	48	47	41	43	28	53
Max LAeq 1 hour Day	7:00 AM	10:00 PM	32	38	49	55	57	58	54	63	53	66
Max LAeq 1 hour Night	10:00 PM	7:00 AM	26	31	39	45	47	47	42	44	34	53

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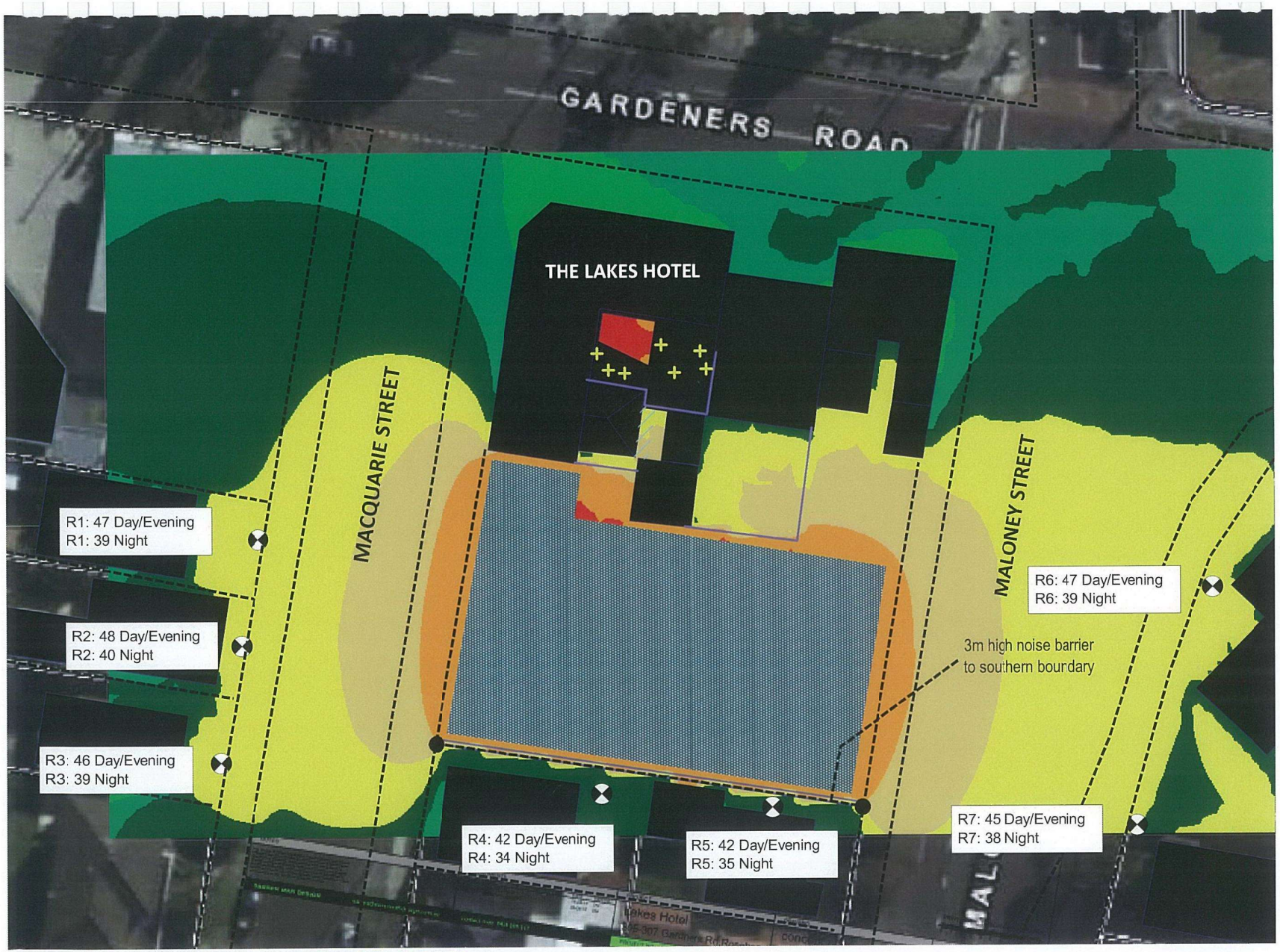
APPENDIX B

APPENDIX B

APPENDIX B



** NOISE SOURCES **

PARKING AREA NOISE
INTRUSIVE NOISE LEVELS

~ 80 peak hour parking movements during day and evening periods

~ 14 peak hour parking movements during night period.

NOTES:

1/ Noise levels shown are LAeq 1hr [dB] Equivalent to LAeq 15 min with approx equal distribution of parking movements over the hour period.

2/ Noise contours at 1.5m above ground. Contours shown for Day/Evening hours.

3/ 3 metre high noise barrier to southern car park boundary

Print Date: 27th July 2017
Version: Intrusive v1

- Point Source
- vert. Area Source
- Parking Lot
- Building
- Barrier
- 3D-Reflector
- Receiver
- Calculation Area

- 35.0 <= ... < 40.0
- 40.0 <= ... < 45.0
- 45.0 <= ... < 50.0
- 50.0 <= ... < 55.0
- 55.0 <= ... < 60.0
- 60.0 <= ... < 65.0
- 65.0 <= ... < 70.0
- 70.0 <= ... < 75.0
- 75.0 <= ... < 80.0
- 80.0 <= ... < 85.0
- 85.0 <= ... < 90.0
- 90.0 <= ... < 95.0
- 95.0 <= ... < 100.0
- 100.0 <= ...

KOIKAS ACOUSTICS PTY LTD
CONSULTANTS IN NOISE & VIBRATION
ABN 12 058 524 771 Commercial 1 (Unit 27), 637 - 645 Forest Road, Bexley 2207
E- mail Nick@KoikasAcoustics.com F (02) 9587 5337 P (02) 9587 9702

JOB NUMBER: 2329
CLIENT: Thomas Hotels
SITE ADDRESS: 305-307 Gardeners Rd, Rosebery "The Lakes Hotel"
ASSESSED TO: EPA INP
LIMITING CRITERIA: See acoustic report

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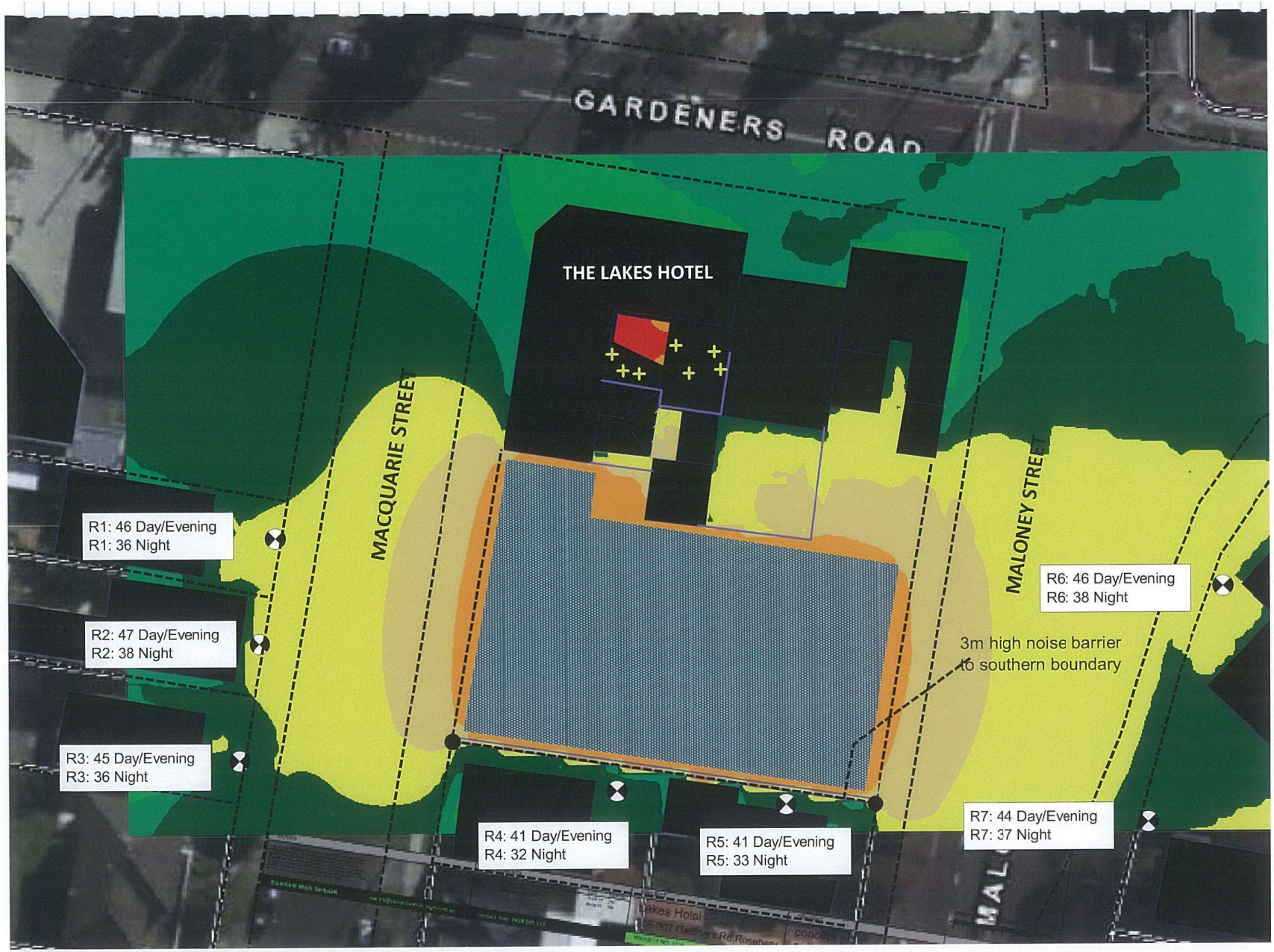

** NOISE SOURCES **

PARKING AREA NOISE
AMENITY NOISE LEVELS

~ 221 total parking movements during evening period

~ 50 total parking movements during night period.

NOTES:

1/ Noise levels shown are LAeq Period [dB]

2/ A conservtive estimate of daytime levels can be considered comparable to evening.

3/ Noise contours at 1.5m above ground. Day/Evening contours shown.

4/ 3 metre high noise barrier to southern car park boundary

Print Date: 27th July 2017
Version: Amenity v1

- Point Source
- vert. Area Source
- Parking Lot
- Building
- Barrier
- 3D-Reflector
- Receiver
- Calculation Area

- 35.0 <= ... < 40.0
- 40.0 <= ... < 45.0
- 45.0 <= ... < 50.0
- 50.0 <= ... < 55.0
- 55.0 <= ... < 60.0
- 60.0 <= ... < 65.0
- 65.0 <= ... < 70.0
- 70.0 <= ... < 75.0
- 75.0 <= ... < 80.0
- 80.0 <= ... < 85.0
- 85.0 <= ... < 90.0
- 90.0 <= ... < 95.0
- 95.0 <= ... < 100.0
- 100.0 <= ...

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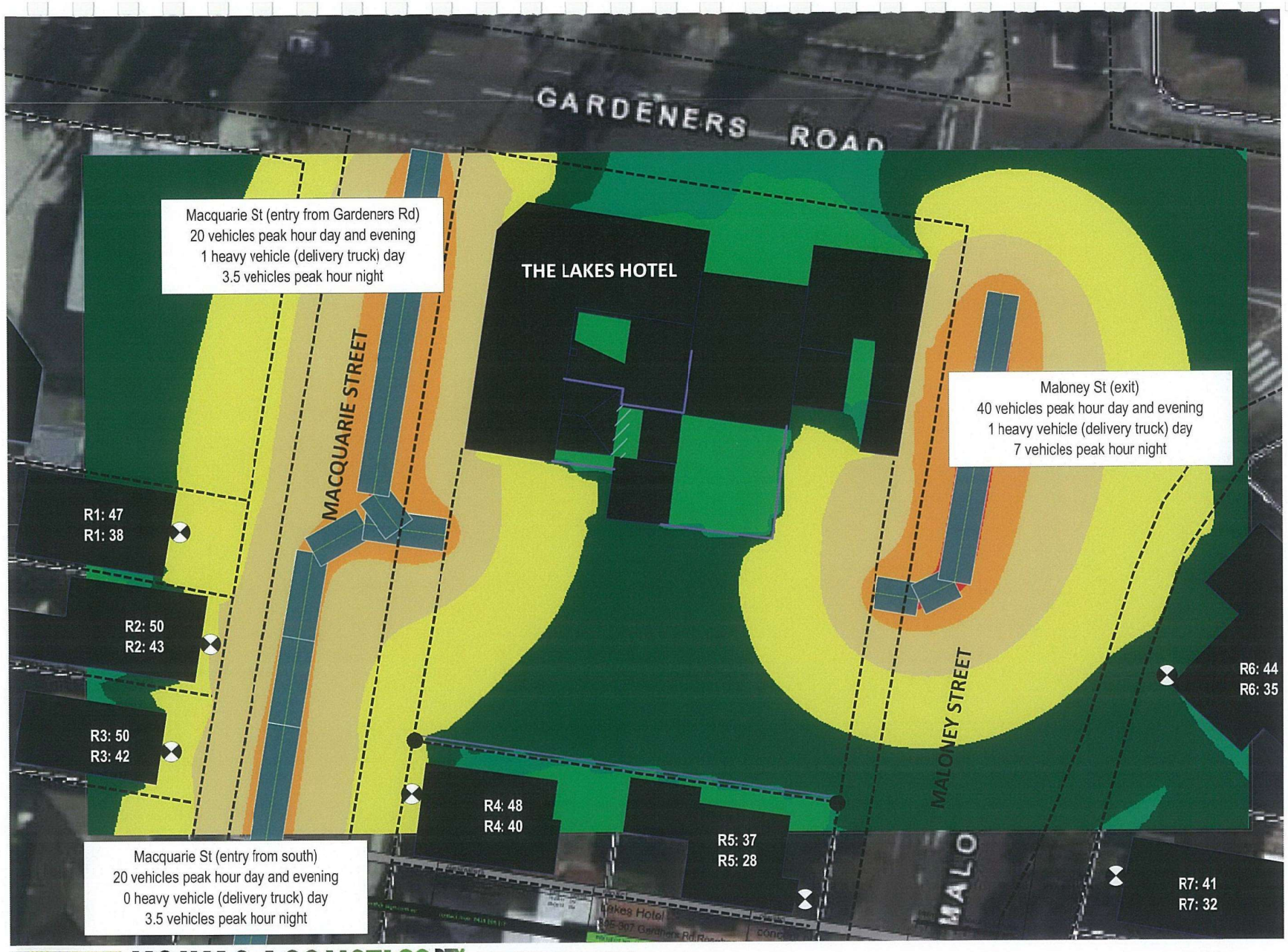

** NOISE SOURCES **

AVERAGE CASE SCENARIO

~ Macquarie St
40 cars + 1 truck enter (day)
14 cars enter (night)

~ Maloney St
40 cars + 1 truck exit (day)
14 cars exit (night)

NOTES:

1/ Noise levels shown are Leq 1hr, dB(A)

2/ Noise contours at 1.5m above ground

3/ 3 metre high noise barrier to southern car park boundary

4/ Noise levels shown at each receiver are day (top) and night (bottom)

PRINT DATE: 9th October 2017
VERSION: Traffic (average)

- Road
- Building
- Barrier
- 3D-Reflector
- Receiver
- Calculation Area

- 35.0 <= ... < 40.0
- 40.0 <= ... < 45.0
- 45.0 <= ... < 50.0
- 50.0 <= ... < 55.0
- 55.0 <= ... < 60.0
- 60.0 <= ... < 65.0
- 65.0 <= ... < 70.0
- 70.0 <= ... < 75.0
- 75.0 <= ... < 80.0
- 80.0 <= ... < 85.0
- 85.0 <= ... < 90.0
- 90.0 <= ... < 95.0
- 95.0 <= ... < 100.0
- 100.0 <= ...

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JOB NUMBER: 2329
CLIENT: Thomas Hotels
SITE ADDRESS: 305-307 Gardeners Rd, Rosebery "The Lakes Hotel"
ASSESSED TO: DECCW Road Noise Policy
LIMITING CRITERIA: 55 (day) / 50 (night)

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** NOISE SOURCES **

MAXIMUM CASE SCENARIO

~ Macquarie St
40 cars + 1 truck enter (day)
14 cars enter (night)

~ Maloney St
40 cars + 1 truck exit (day)
14 cars exit (night)

NOTES:

1/ Noise levels shown are Leq 1hr, dB(A)

2/ Noise contours at 1.5m above ground

3/ 3 metre high noise barrier to southern car park boundary

4/ Noise levels shown at each receiver are day (top) and night (bottom)

PRINT DATE: 9th October 2017
VERSION: Traffic (maximum)

- Road
- Building
- Barrier
- 3D-Reflector
- Receiver
- Calculation Area

- 35.0 <= ... < 40.0
- 40.0 <= ... < 45.0
- 45.0 <= ... < 50.0
- 50.0 <= ... < 55.0
- 55.0 <= ... < 60.0
- 60.0 <= ... < 65.0
- 65.0 <= ... < 70.0
- 70.0 <= ... < 75.0
- 75.0 <= ... < 80.0
- 80.0 <= ... < 85.0
- 85.0 <= ... < 90.0
- 90.0 <= ... < 95.0
- 95.0 <= ... < 100.0
- 100.0 <= ...

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E- mail Nick@KoikasAcoustics.com F (02) 9587 5337 P (02) 9587 9702

JOB NUMBER: 2329
CLIENT: Thomas Hotels
SITE ADDRESS: 305-307 Gardeners Rd, Rosebery "The Lakes Hotel"
ASSESSED TO: DECCW Road Noise Policy
LIMITING CRITERIA: 55 (day) / 50 (night)

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