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1 INTRODUCTION

This report presents our environmental noise assessment for the proposed childcare centre to be located at lot 502 Macpherson Street, Warriewood.

The following have been assessed in the report:

- Noise intrusion from traffic on Macpherson Street
- Noise emission from proposed outdoor play areas.
- Noise emission from proposed indoor play activities.

Noise emissions will be assessed with reference to relevant Pittwater Council acoustic guidelines.

Where necessary, building and/or management controls will be recommended in order to reduce noise emissions to acceptable levels.

The assessment is based on the architectural drawings DA01 – DA05 prepared by Achitex issue B.

2 SITE DESCRIPTION

The proposed childcare centre is located at the in the north eastern corner of the 14 – 18 Boondah Road residential development.

To the north of the child care centre is Macpherson Street, which carries low volumes of traffic. The east of the site is bounded by future residential development. To the west of the site (approximately 20m away) is existing residential development located on Possum Way.

The proposed hours of operation of the child care centre are 6am to 8pm Mondays to Fridays. The outdoors play areas are not to be used before 8am and after 6pm, Mondays to Fridays.

The nearest sensitive noise receivers are:

- Receiver 1: Residential development on Possum Way
- Receiver 2: Future residential development to the east of the site in the 14 – 18 Boondah Road residential development.

The proposed layout is presented in Figure 1.

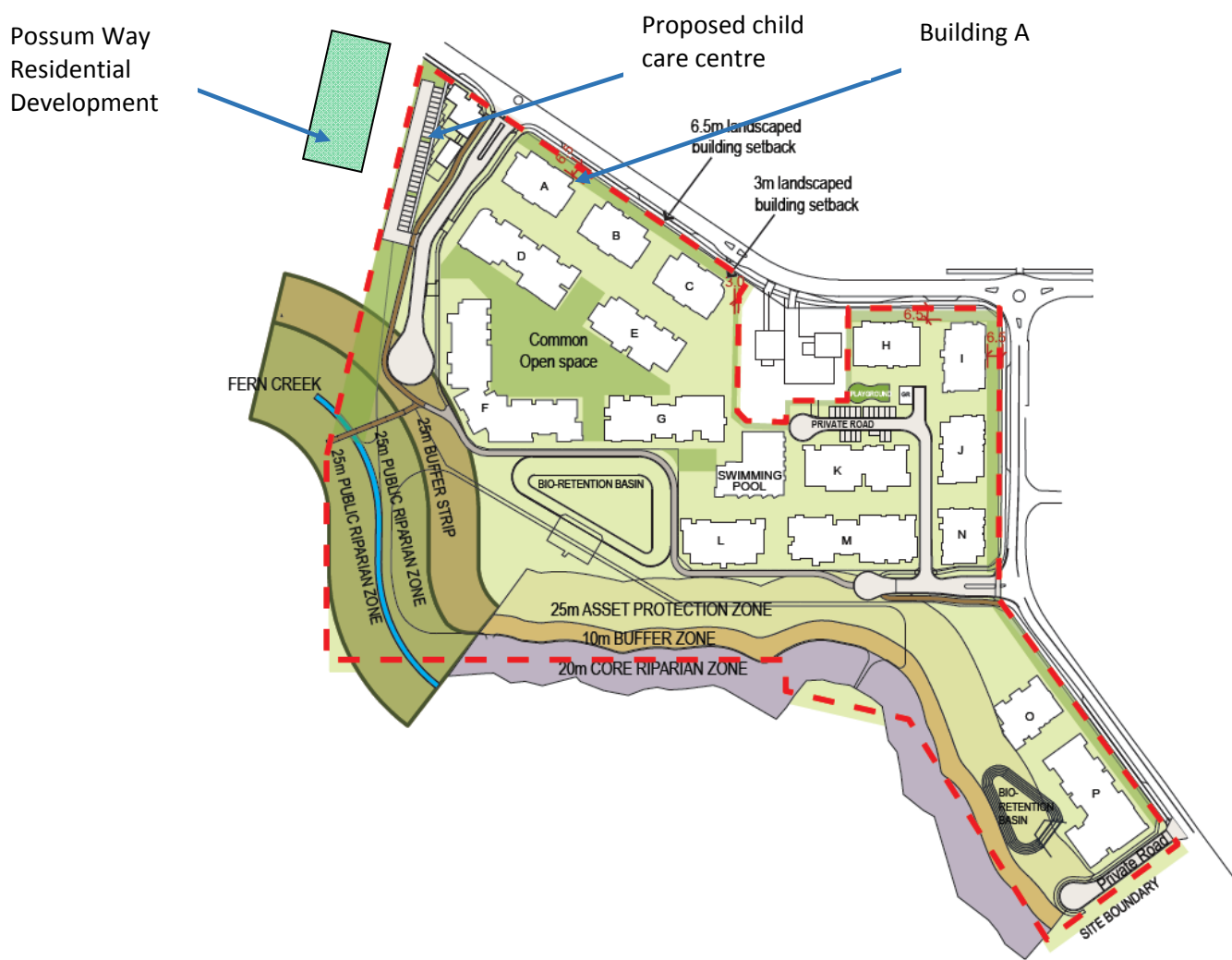


Figure 1 – Site Map

3 NOISE DESCRIPTORS

Environmental noise constantly varies in level, due to fluctuations in local noise sources including road traffic. Accordingly, a 15 minute measurement interval is normally utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In the case of environmental noise three principle measurement parameters are used, namely L_{10} , L_{90} and L_{eq} .

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source depends on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of industrial noise.

4 NOISE EMISSION ASSESSMENT

4.1 BACKGROUND NOISE MEASUREMENTS

Daytime background noise levels for the site have been previously measured at the site during the development application stage of 14-18 Boondah Road, Warriewood.

The following table presents the resultant background noise levels at locations representative of nearby sensitive receivers adjacent to the proposed child care centre.

Table 1 - Noise Objectives for All Receivers

Location	Time of Day	Measured Background Noise Level dB(A) L ₉₀ (15,min)
Residential Development Surrounding the Site	Day (7am – 6pm)	42
	Evening (6pm – 8pm)	38
	Night-Shoulder Period (6am – 7am)	41

4.2 NOISE EMISSION CRITERIA FOR THE PROPOSED CHILDCARE CENTRE

In the absence of any specific noise criteria within the Pittwater Council DCP, the criteria adopted by the Land and Environment Court shall be adopted for the assessment of noise emissions from the proposed child care centre.

4.3 DECISIONS OF THE LAND AND ENVIRONMENT COURT

The Association of Australian Acoustical Consultants adopts a “background+10dB(A)” noise emission goal for the use of outdoor spaces of child care centres.

This more lenient goal is in recognition that:

- Noise from children playing is not typically considered as intrusive as industrial noise (or other noise sources typically required to comply with a “background+5dB(A)” criteria), and should therefore not be held to the same criteria;
- There are very limited building controls that can practically be implemented for control of noise from outdoor areas; and
- The outdoor play areas are used only for limited periods of the day, at times when nearby properties are typically less noise sensitive.

The AAAC guidelines recommend a “background +10dB(A)” criteria for periods of 2 hours per day, and “background+5dB(A)” for other periods, or other noise sources at the site (vehicle, plant noise, noise from internal areas).

These criterion have also been adopted by the Land and Environment Court in a number of decisions, including *Mesabo Pty Limited v Mosman Municipal Council* [2004] NSWLEC 492.

4.4 NOISE EMISSION GOALS TO BE ADOPTED FOR THIS PROJECT

For this assessment, we propose that:

- Outdoor play areas be permitted to generate a noise level of 10dB(A) L_{eq} above the background noise level for up to 2 hours per day.
- All other noise sources must not generate a noise level exceeding background levels by more than 5dB(A) L_{eq} .

A summary is presented below:

Table 2 –Noise Emission Objectives at Residential Receivers

Location	Time of day	Background Level dB(A) L_{90}	Noise Emission Objective	
			Outdoor Play Areas (2 hours per day) dB(A) L_{eq} (15min)	Other Noise Sources dB(A) L_{eq} (15min)
Residences in Building A and B	6:00am-7.00am (early morning)	41	51	46
	Day (7am to 6pm)	42	52	47
	Evening (6pm to 8pm)	38	48	43

4.5 NOISE EMISSION PREDICTIONS

4.5.1 Typical Outdoor Playing Noise Data

4.5.1.1 Outdoor Play Area Noise Measurements

Outdoor play area noise measurements were undertaken at Child Care Centre, 8 Central Avenue Mosman by this office on the 11th February 2005. Details of the measurements are presented below. Noise measurements were taken of the 3 to 6 year age group (8 children) at play. This group represents the most active of the age groups and hence are likely to generate the maximum noise levels. Although noise measurements have not been conducted for the 0-2 year age group, it would be expected that they would be likely to generate lower levels of sound than the older age group

4.5.1.2 Measurement Location

Measurements were taken during the morning play session within the outdoor play area with 8 children present.

The measurements were taken at noted distances to the children playing with the measured levels presented below.

4.5.1.3 Measurement Equipment

Noise measurements were obtained using a CEL-593 Type 1 Sound Level Analyser, set to A-weighted fast response. The sound level meter was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

4.5.1.4 Measured Noise Levels

The measured activity noise levels from the 8 children playing are listed below in table below.

Table 3 - Measured Children Activity Noise Levels dB(A) L_{A10}

LOCATION	Activity	Distance	NOISE LEVEL
Outdoor Play Area	Bikes + Sandpit play	3m	66
	Blocks + Sandpit play	4m	64
	Stepping Blocks + Sandpit play	4m	57
	Play gym + Sand pit play	3-4m	65

4.5.2 Predicted Noise Levels

4.5.2.1 Outdoor Noise

Noise emissions from the play areas are predicted based on the following assumptions:

- The measured typical children's play noise data above.
- Play areas are assumed to be operating at the nominated capacity, and the children are distributed evenly across the outdoor play area.
- Outdoor playing time will be restricted to between 8am and 6pm.
- The recommended constructions and management controls presented in Section 6 of this report have been implemented in the building.

The noise level at the nearest residents was predicted using the above data and by taking into account any expected noise reduction provided by the building fabric, distance losses, directivity, barrier effects, number of children playing etc.

Noise levels are predicted to the residences located at Possum Way and to the future residential development located at

Table below shows the predicted noise levels from the children in outdoor play area.

Table 4 - Predicted Noise Levels from Outdoor Play

Receptor	Predicted Noise Level $L_{eq, 15min}$ dB(A)	Criteria $L_{eq, 15min}$ dB(A)	Complies
Possum Way Receivers	51 External	52 External	Yes
Building A of 14-18 Boondah Road, Warriewood	47 External	52 External	Yes

4.5.2.2 Indoor Noise

Noise Levels generated from indoor structured activities (i.e. lessons) are based on a raised speech sound power level of 78dB(A) for the teacher.

The noise level at the nearest residents was predicted using the above data and by taking into account any expected noise reduction provided by the building fabric, distance losses, directivity, barrier effects, etc. Table below shows the predicted noise levels from lessons. Noise emissions have been assessed to the early morning criterion as indoor play areas could potentially operate at this time.

Table 5 - Predicted Noise Levels from Indoor Play

Receiver	Predicted Noise Level $L_{eq, 15min}$ dB(A)*	Criteria $L_{eq, 15min}$ dB(A)	Complies
Possum Way Receivers	<30	47	Yes
Building A of 14-18 Boondah Road, Warriewood	<30	47	Yes

5 NOISE INTRUSION ASSESSMENT

Noise intrusion to the proposed child care centre will be assessed to comply with the requirements of AS2107:2000.

5.1.1 Australian Standard 2107:2000

Australian Standard 2107:2000 details the following control for external noise intrusion to childcare facility. The applicable criteria from that standard are as follows:

Table 6 – Recommended Design Sound Level

Type of Occupancy/Activity	Recommended Design Sound Level dB(A) $L_{eq, 1\text{hour}}$
Sleeping Rooms	35
Indoor Play Areas	40
Outdoor Play Areas (external)	55

5.2 MEASUREMENTS OF TRAFFIC NOISE

Measurements of traffic noise at the site have been presented in the AECOM Acoustic Assessment Report with reference 60196533 dated 8 March 2011. These daytime traffic noise levels are presented below:

Table 7 – Measured Noise Levels dB(A) L_{eq}

Location	Time	Traffic Noise Level
9m from curb	Day (7am – 10pm)	64 dB(A) L_{Aeq} (Worst 1 hour)

6 RECOMMENDED TREATMENTS – BUILDING AND MANAGEMENT

These recommendations are indicative and based on current architectural plans. A second review of noise emissions should be conducted based on the selected child care operator's plans and final children numbers.

The following building and management controls are required to control:

- Noise intrusion from traffic noise.
- Noise emission from outdoor play and indoor activities.

The development will comply with the criteria listed in Section 4.2 and 5.1 provided the following building and management controls are adopted:

- The number of children within the outdoor play areas should be limited to 45 children aged 2 years to 5 years and 10 children aged 0 – 2 years at any one time.
- Minimum 6mm glass with acoustic seals around perimeter is required, with minimum STC of 29 for all glazing to indoor play areas and sleeping areas.
- Signs reminding staff and visitors to minimise noise at all times shall be installed at ingress/egress points from the child care centre.
- Management is to ensure children are supervised at all times to minimise noise generated by the children whenever practical and possible.
- Install a contact phone number at the front of the centre so that any complaints regarding centre operation can be made.
- A secondary acoustic review of the child care centre should be conducted once there is an operator and final children numbers and ages have been determined.
- If it is found that (after occupation) noise emissions from the outdoor play areas are below the nominated criteria, a secondary assessment based on the ongoing operations of the child care centre should be conducted to determine if the numbers of children in outdoor play areas can be increased.

7 CONCLUSION

Potential noise impacts from the proposed childcare centre to be located at Lot 502 Macpherson Street, Warriewood have been assessed at the nearest potentially affected receivers.

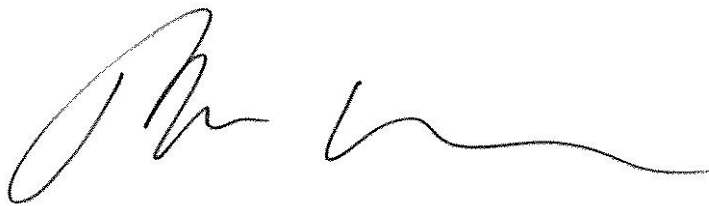
The assessment of noise impacts on neighbouring properties indicates that the proposed childcare centre will comply with the criteria of the Association of Australian Acoustical Consultants and the Land and Environment Court provided that the acoustic treatments/management controls presented in section 6 of this report are adopted.

Noise emissions will therefore be sufficiently controlled/managed to prevent adverse impact on nearby properties and will therefore be satisfactory.

Additionally, an assessment of noise intrusion to the child care centre as a result of traffic on Macpherson Street has been conducted. Recommendations to the child care centre façade have been determined to result in compliance with AS2107:2000.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

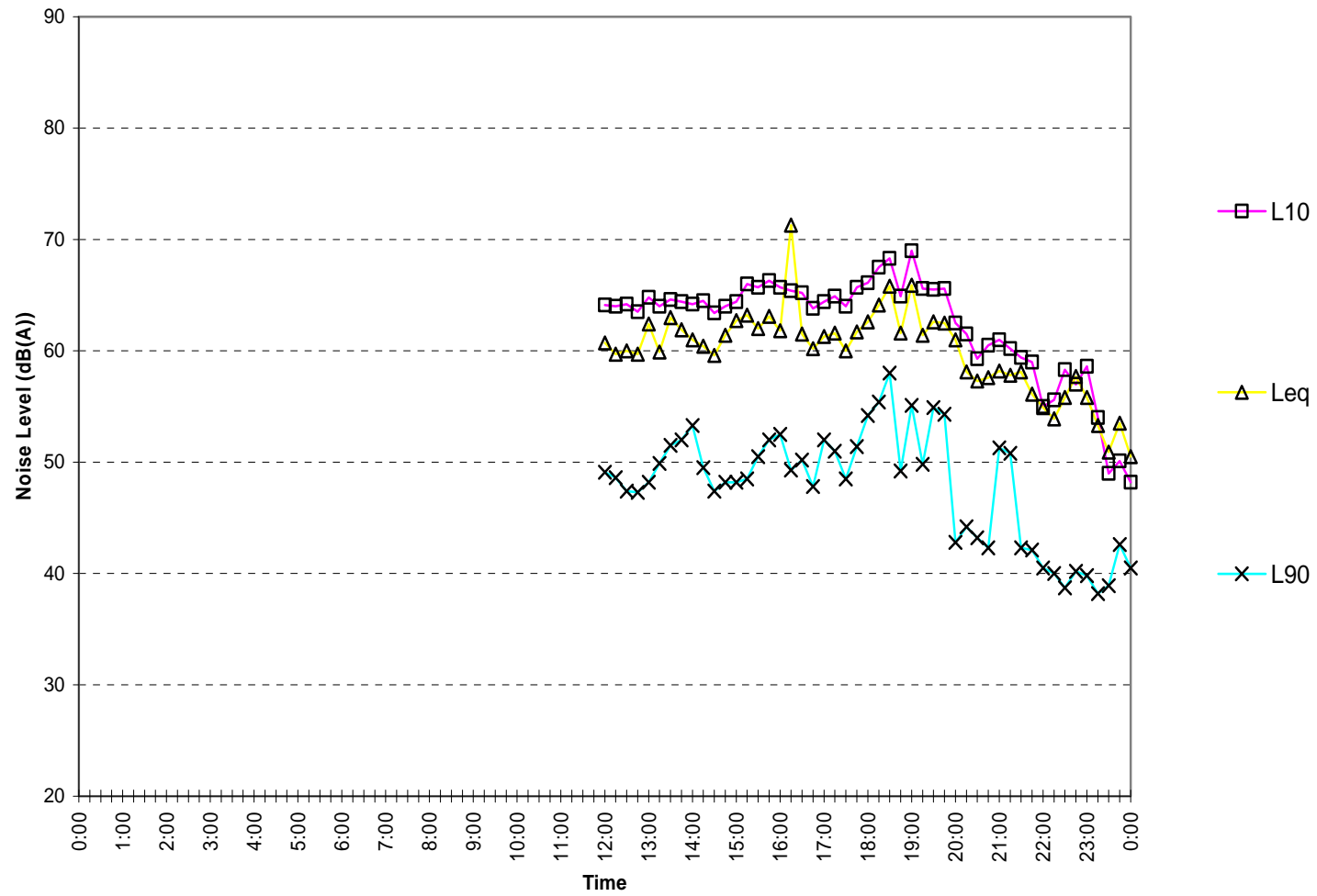
A handwritten signature in black ink, appearing to read 'Tom Aubusson', with a long horizontal flourish extending to the right.

Acoustic Logic Consultancy Pty Ltd
Tom Aubusson

APPENDIX ONE - BACKGROUND NOISE MONITORING

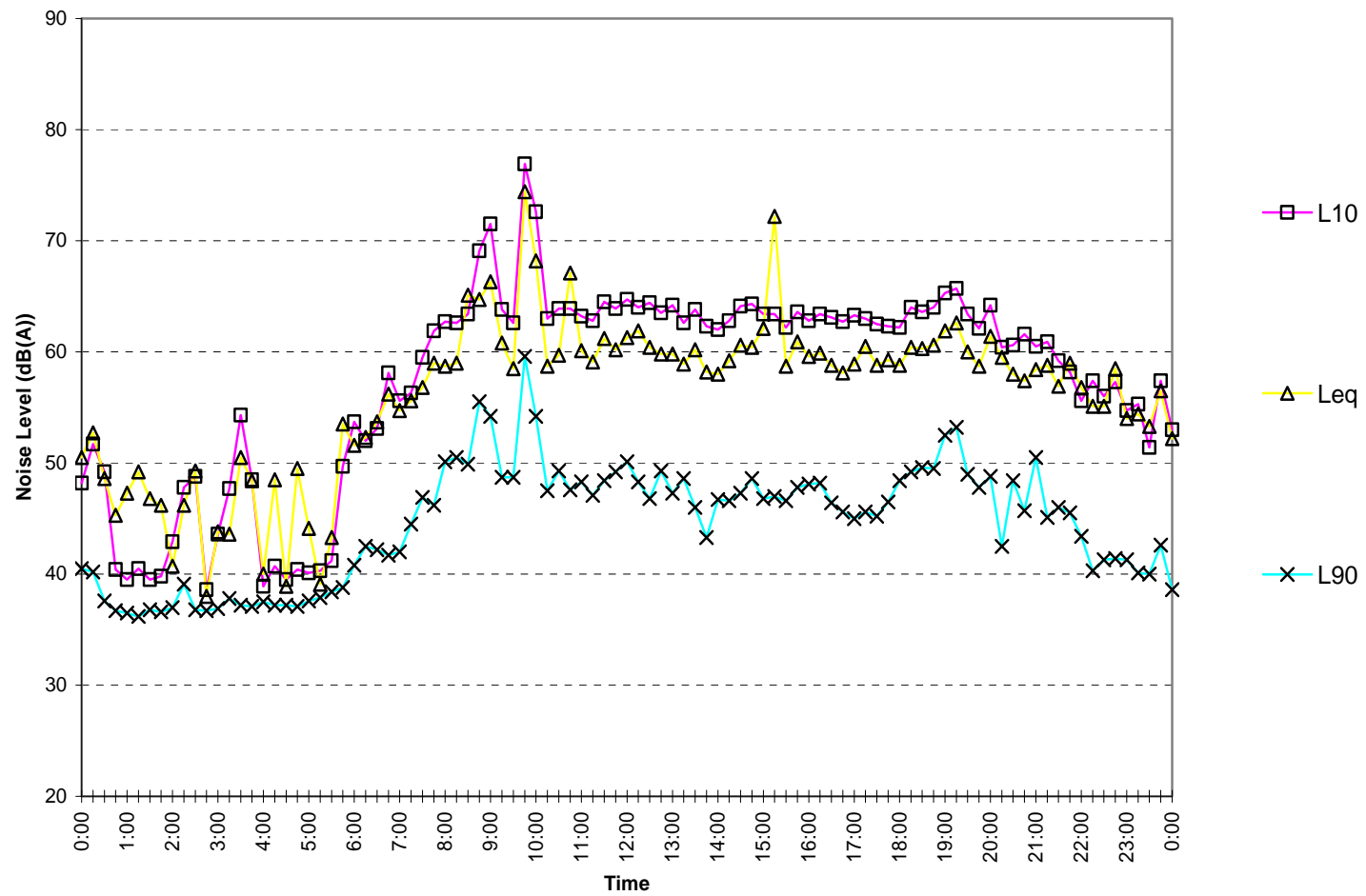
14-18 Boondah Road, Warriewood

Friday February 4, 2011



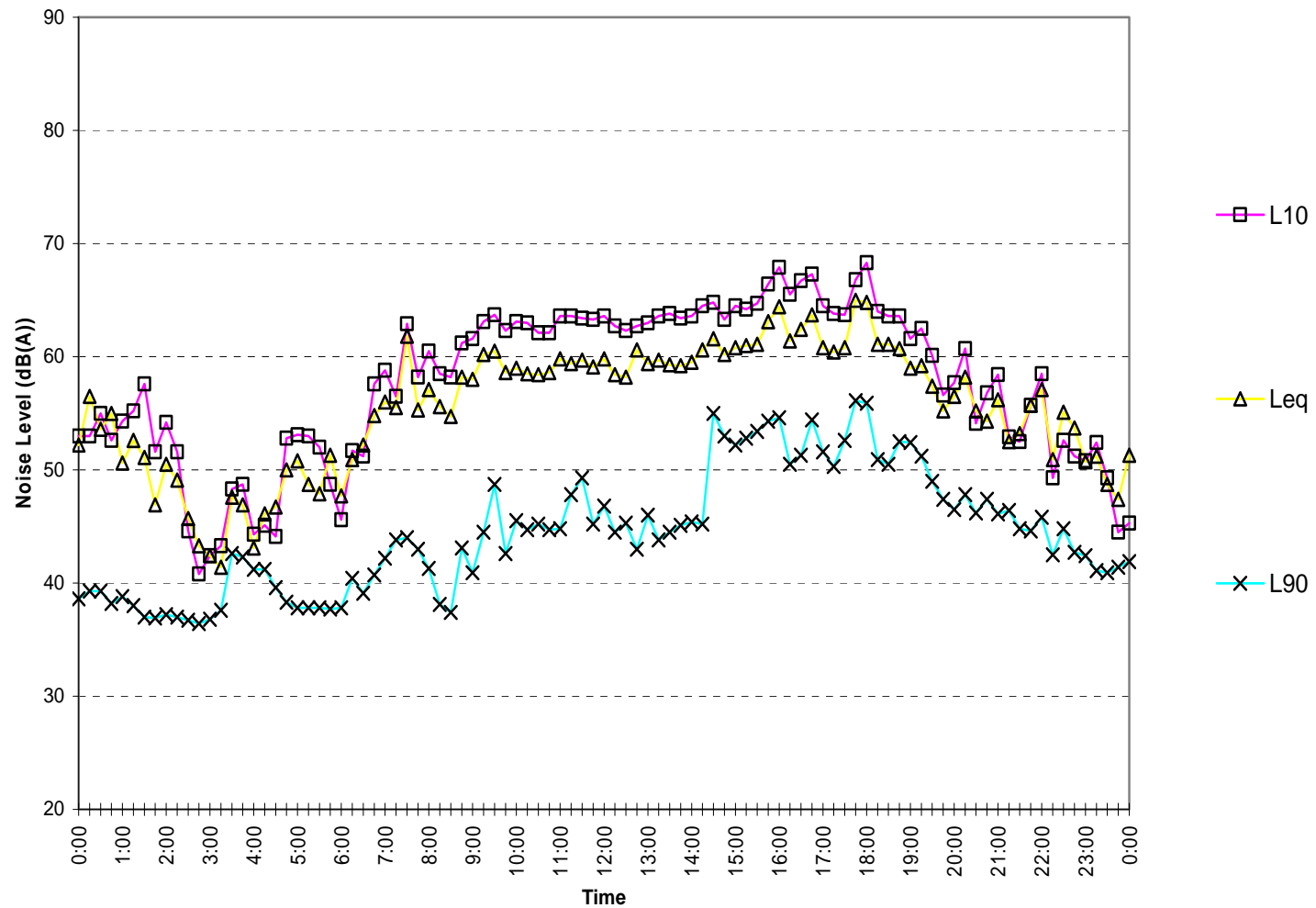
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Saturday February 5, 2011



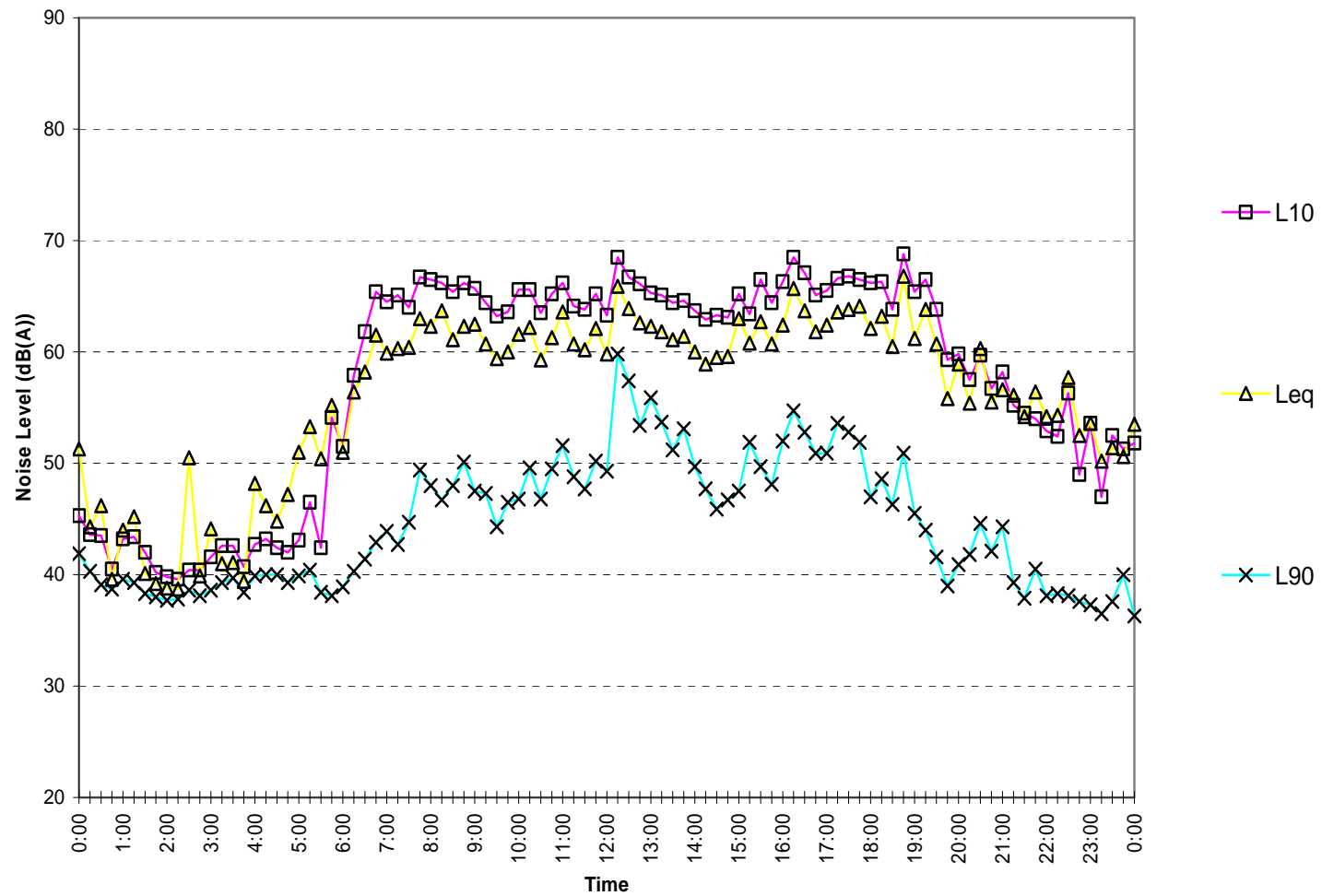
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Sunday February 6, 2011



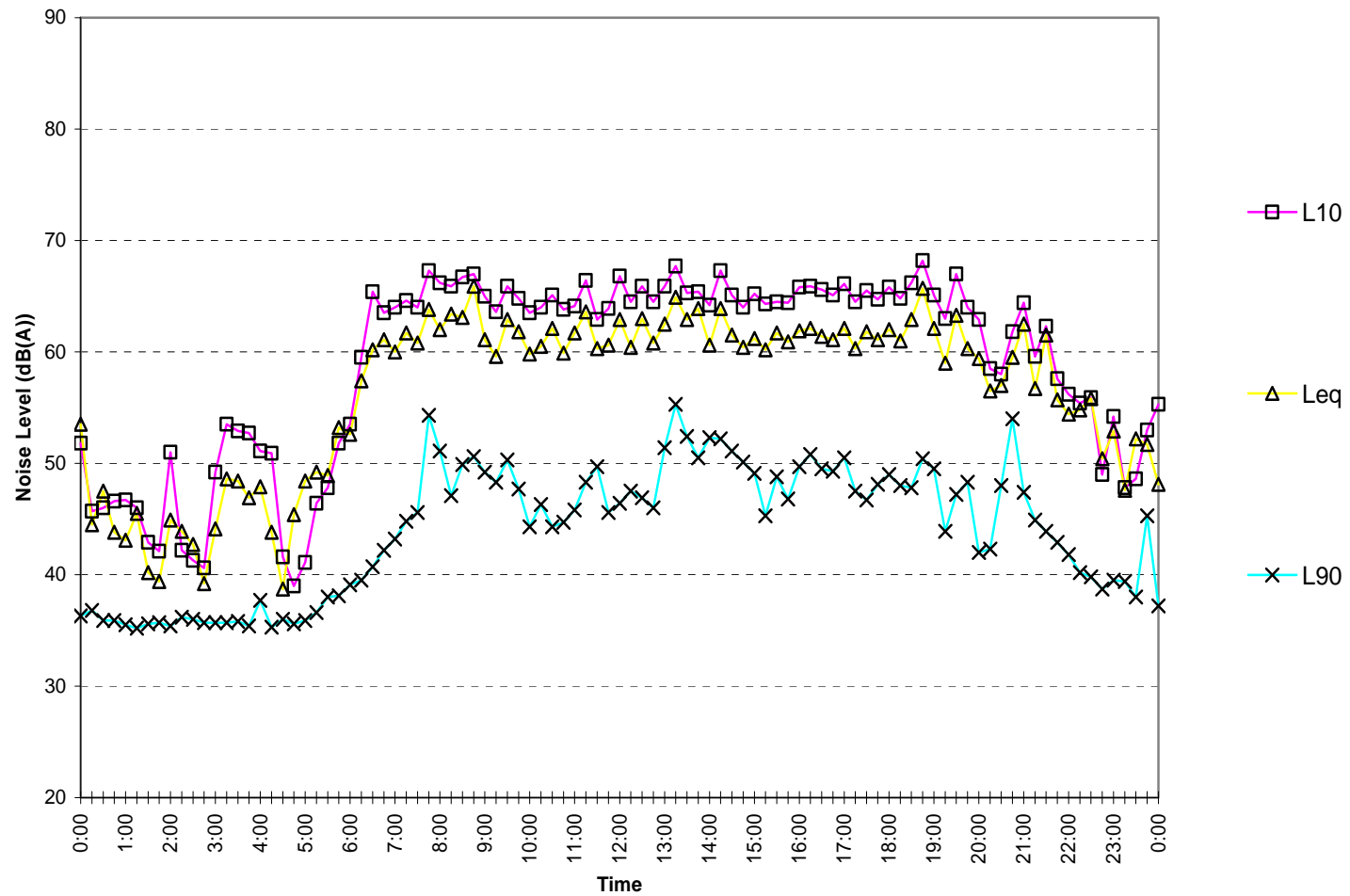
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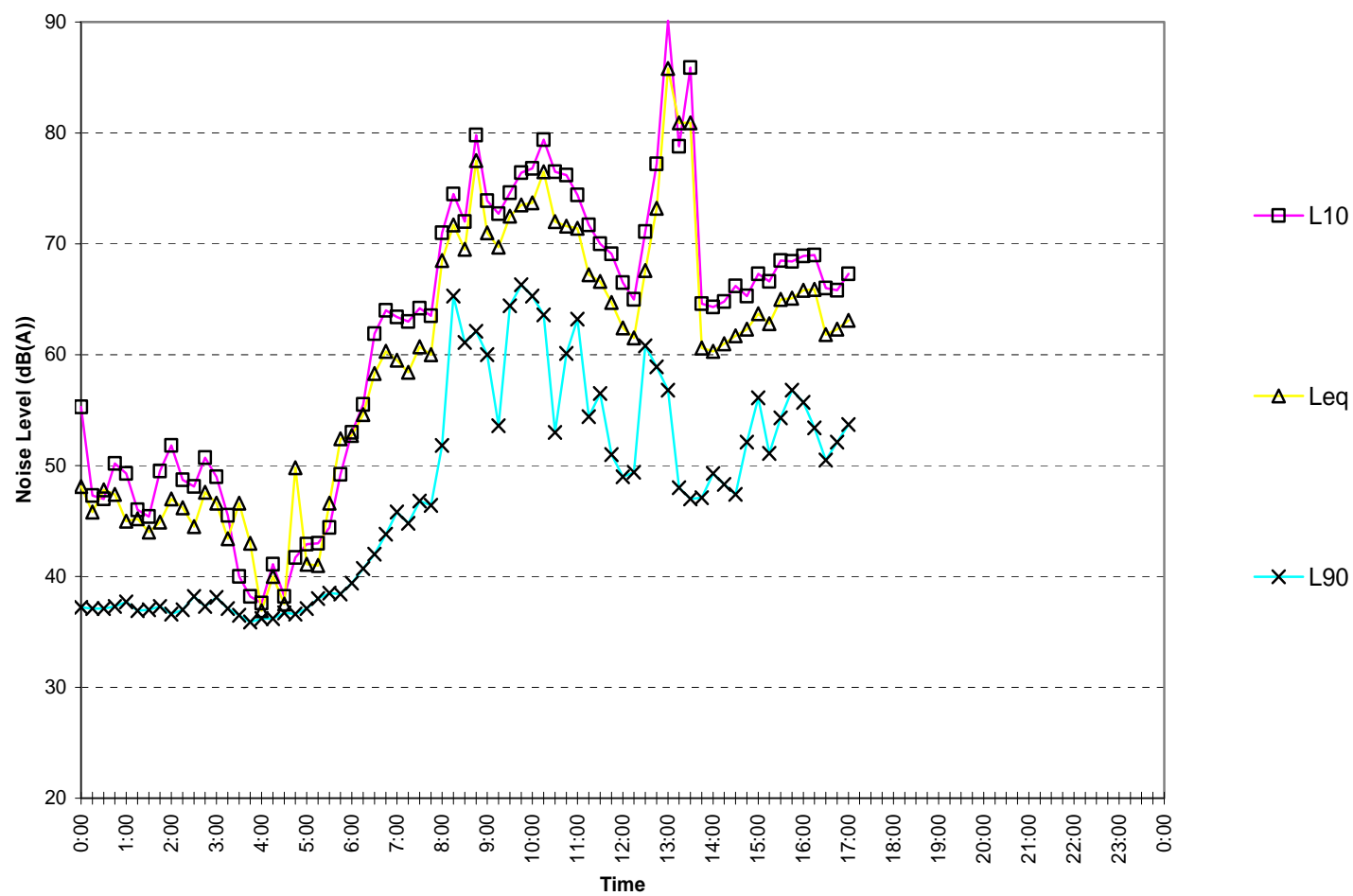
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Tuesday February 8, 2011



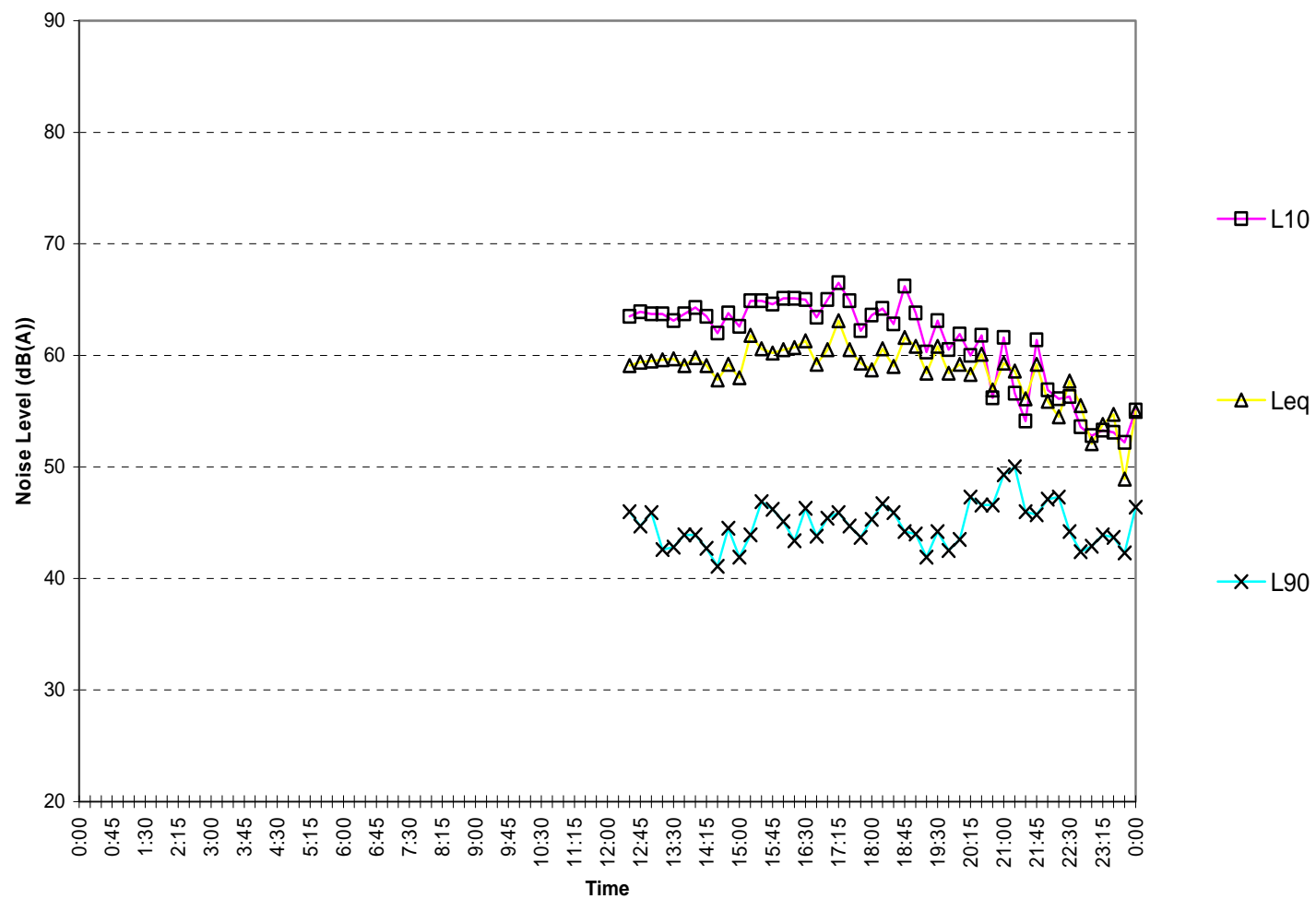
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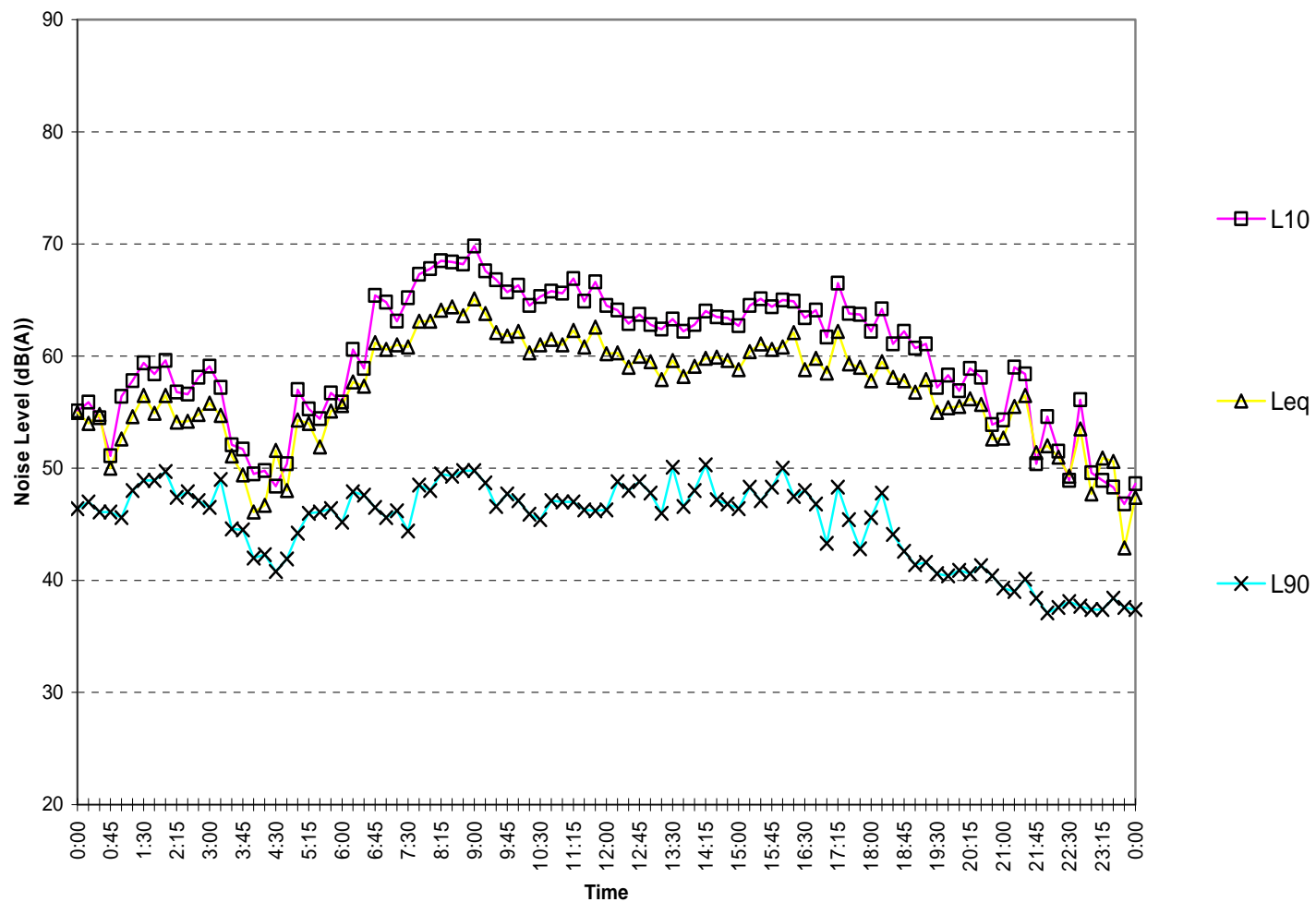
Macpherson Street Background Monitoring

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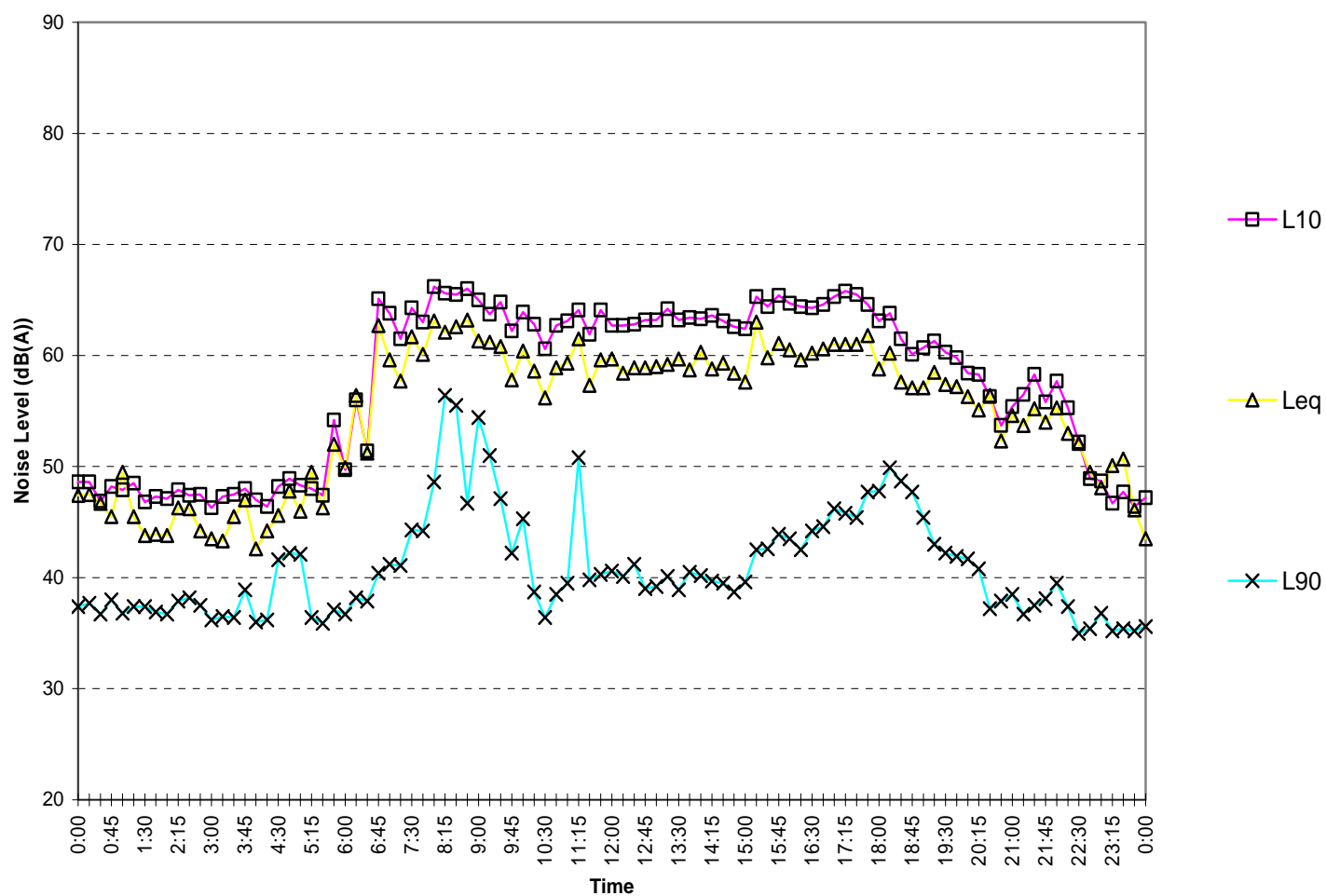
Macpherson Street Background Monitoring

Tuesday August 3, 2010



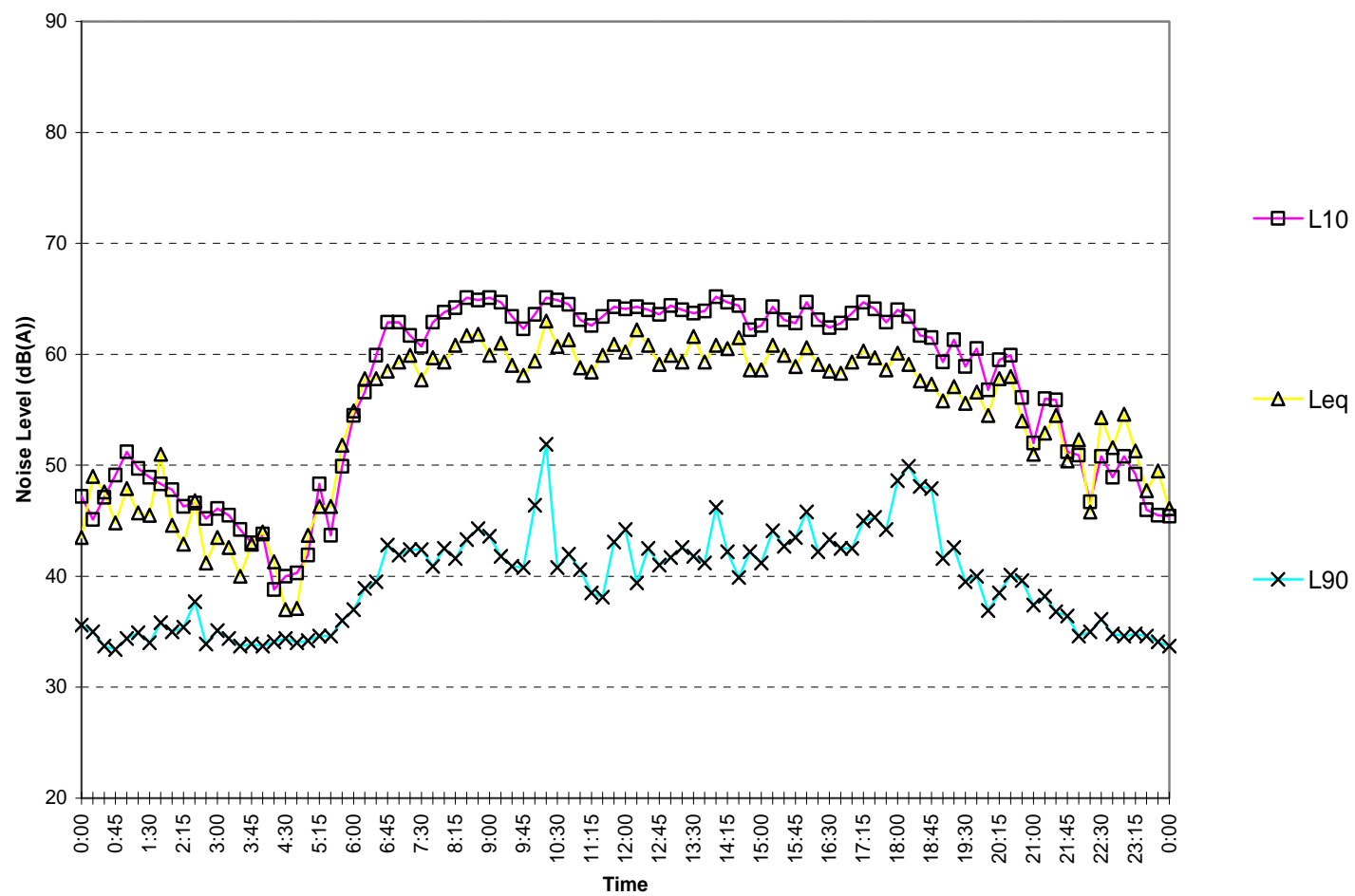
Macpherson Street Background Monitoring

Wednesday August 4, 2010



Macpherson Street Background Monitoring

Thursday August 5, 2010



Macpherson Street Background Monitoring

Friday August 6, 2010

