



REPORT 160095R1

Revision 1

Patrick Port Botany Terminal
Biannual Environmental
Noise Compliance Monitoring
November 2022

PREPARED FOR:
Patrick Stevedores Operations Pty Ltd,
Port Botany Terminal
PO Box 197, Botany NSW 1455

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Patrick Port Botany Terminal Biannual Environmental Noise Compliance Monitoring November 2022

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EXECUTIVE SUMMARY

Rodney Stevens Acoustics Pty Ltd (RSA) has been commissioned by Patrick Port Botany Terminal's Health, Safety & Environment (HSE) Manager to undertake environmental noise compliance monitoring for Patrick Port Botany Terminal (PBT) operations.

This report presents the findings of environmental noise compliance monitoring, carried out every 6-months, for Patrick PBT operations between the dates of 7 November and 20 November 2022.

Attended and unattended noise monitoring was carried out to determine compliance with the established noise limits at the nearest affected receivers as per EPL 6962, 1 September 2020.

Existing noise levels at the nearest receptors are considered high. Noise generated by surrounding industrial premises, container storage facilities, road traffic, local fauna, residential activities and aircraft activities were the primary contributors to the L_{Aeq} and L_{A1} descriptors during the daytime, evening and night-time measurements.

It was observed that operational noise was not audible at the Chelmsford Avenue, Dent Street and Australia Avenue monitoring locations, and was just audible at the Botany Road, Jennings Street and Military Road monitoring location when ambient levels were low, but the direct source was indeterminable. Based on this observation, Patrick PBT operational noise is considered to comply with the EPL day, evening and night-time noise limits.

It is a finding of this compliance assessment that the current operation will comply with the established license limits at all locations during the daytime, evening and night-time periods.

Assessment of the measured residential noise levels indicated no annoying characteristics (tonality) were present. No sleep disturbance issues were present.



1 INTRODUCTION

Rodney Stevens Acoustics Pty Ltd (RSA) has been commissioned by Patrick's Health, Safety & Environment Manager to undertake environmental noise compliance monitoring for Patrick Port Botany Terminal (PBT) operations.

This report presents the findings of environmental noise monitoring compliance for Patrick PBT operations.

The noise assessment has been completed with reference to the requirements of the PBT site's current Environment Protection Licence (EPL) No.6962 (dated 1 September 2020), Clauses L3 and E1 at specified locations.

Ambient noise monitoring was undertaken at the nearest potentially affected receivers in the vicinity of the PBT site. Results from the unattended and attended noise monitoring have been reported.

Noise monitoring for this assessment was undertaken between 7 November and 20 November 2022. The PBT site was operating under standard conditions during the monitoring period.

Comparison of the measured noise levels has been made to previous reported results, although it should be noted that the terminal started its automated operations in April 2015.

Specific acoustic terminology is used in this report. An explanation of common acoustic terms is provided in Appendix A.

2 SCOPE OF ASSESSMENT

The scope of work for this study was to prepare a noise compliance assessment for the existing site operations with reference to the NSW Environment Protection Authority (EPA) Environmental Protection Licence (EPL) and other relevant EPA noise guidelines and requirements.

This required the following items:

- assess the existing ambient noise environment in the areas surrounding the subject site;
- compare the measured noise levels to EPL noise limits;
- compare results to previous investigations undertaken for the subject site; and
- provide recommendations for further courses of action (where required).

3 ENVIRONMENT PROTECTION LICENCE (NOISE)

The noise emissions from the on-site operations are required to satisfy specific NSW EPA requirements outlined in the site's EPL (Licence No. 6962).

Condition L3 Noise Limits specifies the following:

L3.1 Noise from the premises must not exceed the noise limits presented in the table below. Note the limits represent the noise contribution at the nominated receiver locations in the table.



Table 3-1 Noise Limits – LAeq

Most affected residential location	Day L _{Aeq} (15 min)	Evening L _{Aeq} (15 min)	Night L _{Aeq} (15 min)	Night L _{Aeq} (9hours)
Chelmsford Avenue	40 dB(A)	40 dB(A)	40 dB(A)	38 dB(A)
Dent Street	45 dB(A)	43 dB(A)	43 dB(A)	43 dB(A)
Jennings Street	36 dB(A)	36 dB(A)	36 dB(A)	35 dB(A)
Botany Road	47 dB(A)	43 dB(A)	43 dB(A)	45 dB(A)
Australia Avenue	35 dB(A)	35 dB(A)	35 dB(A)	35 dB(A)
Military Road	42 dB(A)	42 dB(A)	42 dB(A)	40 dB(A)

L3.2 Noise from the premises must not exceed the noise limits presented in the Table below. Note the limits represent the noise contribution at the nominated receiver locations in the table.

Table 3-2 Noise Limit – Night

Most affected residential location	Night L _{A1} (1min)
Chelmsford Avenue	53 dB(A)
Dent Street	55 dB(A)
Jennings Street	55 dB(A)
Botany Road (North Golf Club)	55 dB(A)
Australia Avenue	55 dB(A)
Military Road	55 dB(A)



L3.3 For the purposes of Conditions L3.1 and L3.2

- *Day* is defined as the period from 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sundays and Public Holidays.
- *Evening* is defined by the period from 6 pm to 10 pm on any day.
- *Night* is defined as the period from 10 pm to 7 am Monday to Saturday and 10 pm to 8 am Sundays and Public Holidays.

L3.4 For the purposes of Condition L3.1 noise from the premises must be measured or computed at the most affected point on or within the residential boundary.

L3.5 For the purpose of Condition L3.1, if a residential dwelling is located more than 30m from the residential boundary, noise from the premises must be measured or computed at the most affected point within 30m of the dwelling.

L3.6 Noise from the premises is to be measured at one metre from the dwelling façade to determine compliance with the L_{A1} (one minute) noise limits in condition L3.2.

L3.7 The noise limits specified in condition L3.1 and L3.2 apply under the following meteorological conditions:

- (a) wind speeds up to 3 m/s at 10 m above ground level
- (b) temperature inversion conditions of up to 1.5 degrees C/100 m.

Condition E1 Noise Monitoring and Compliance Reporting specifies the following:

E1.1 The licensee must undertake noise monitoring as follows:

- (a) The noise monitoring must be undertaken within 6 months of the commencement of operations on the new extension – Lot 202, DP 1183399; and
- (b) The noise monitoring must verify the assumptions and the noise limits as outlined in the Port Botany Container Terminal Expansion Noise Assessment (2003), part of the Environment Impact Assessment submitted in accordance with the Environmental Planning and Assessment Act 1979 for the approved container terminal development.

E1.2. Every 6 months after the commencement of operations of the new extension – Lot 202, DP 1183399, the Licensee must undertake a periodic noise monitoring program consisting of the attended and unattended monitoring and provide a report within one month after the completion of the monitoring to the EPA's Manager, Sydney Industry at PO Box 668 Parramatta NSW 2124 containing the following information:

- (a) Unattended monitoring data for a continuous period of no less than two weeks;
- (b) Attended monitoring data during the period outlined in subsection (a);
- (c) Monitoring data from locations specified in Conditions L3.1 and L3.2;
- (d) An assessment of the noise levels against Condition L3 including trend analysis; and
- (e) Details of any feasible and reasonable noise mitigation measures that have been or are proposed to be implemented further reduce noise levels below the limits prescribed in this license.



4 SITE IDENTIFICATION

4.1 Location and Operation

The Patrick PBT is located at Penrhyn Road (Inter-modal Access Road), Banksmeadow, NSW 2019 (inside the Port Botany precinct). Foreshore Road and Botany Road are located to the north of the site and Brotherson Dock to the south. Figure 3-1 provides an overview of the site context. On 2 April 2015 the terminal replaced its manual straddle fleet with automated straddles (AutoStrads™).

The site operates 24 hours a day, seven days a week. Operations undertaken within the site boundary include:

- *Truck processing and container exchange activities.* Road transport trucks enter the Terminal along Penrhyn Road. The trucks access the applicable truck grid where they are either loaded or unloaded by an AutoStrad. Four truck weighbridges are utilised on the site. An empty container exchange area is positioned parallel to Penrhyn Road (eastern side of the terminal). Road transport trucks enter the Terminal from Penrhyn Road via Gate B110 and unloaded by heavy forklifts.
- *Automated rail activities.* Three Automated Rail Mounted Gantry (ARMG) Cranes service two 300m sidings discharging and loading train wagons to and from the intermediate stacking area (ISA). AutoStrads move container to and from the ISA to AutoYard stacks. By mid 2022, the AutoRail will increase four 300m sidings.
- *Automated yard activities.* Containers transit through the terminal via the automated yard. Current operations provide a storage capacity of approximately 5,000 ground slots, with an average of 4,000–8,000 containers located in the yard at any one time (depending on the time of year). The containers are manoeuvred through the automated yard, and to and from trucks at the truck grid via the use of AutoStrads. Approximately fifty AutoStrads are available for use throughout the automated at any given time.
- *Quay (ship-to-shore) crane activities.* Vessels are currently serviced at the site by nine operational quay cranes on Brotherson Dock. The cranes load and unload vessels with containers transferred to and from the automated container yard by AutoStrad.
- *Maintenance Activities.* Routine maintenance on equipment and plant is carried out in the purpose-built workshop, and when required on mobile plant in-situ e.g. quay cranes.

4.2 Adjacent Land Use

Areas surrounding the site comprises industrial, port relate, commercial, residential and recreational land uses, as described below.



4.2.1 Industrial and Commercial Uses

The main industrial land uses adjacent to the terminal are the Hutchison Ports Australia (Hutchison Ports container terminal, also known as Sydney International Container Terminal), Caltex Oil Terminal and DP World Australia (DP World container terminal). A number of additional industrial sites are located in the vicinity of the site, including the Opal, Orora Recycling, Orica, BOC, Air Liquid, Mobil and British Petroleum Oil Terminals, Savino Del Bene Australia, Warehouse Solutions International and Owens Transport. The Botany Industrial Park is located approximately one kilometre from the site.

Sydney (Kingsford Smith) Airport, Sydney's major domestic and international airport, is located approximately five kilometres west of the site. The Discovery Cove Business Park, a commercial business centre, is located in the vicinity of the Patrick PBT on Botany Road.

A goods freight rail line operates from Port Botany and services Patrick PBT, Hutchinson Ports, DP World container terminal, Qube Logistics and Veolia. The Line links with the metropolitan freight and intermodal terminal Storage for goods occurs at the Cooks River and Botany Goods Yards, at Patrick PBT, Hutchinson Ports container terminal, DP World container terminal and various nearby transport and logistic, and haulage and container handling facilities e.g., Sydney Haulage.

4.2.2 Residential, Recreation and Open Space Uses

Residential land uses are located to the east, north-east and north-west of the site, and include the suburbs of Botany, Banksmeadow, and Matraville. Residential receivers to the north-east and north-west are located from between 750 metres and 1,000 metres away. These residential areas identified are considered to be nearest to Patrick PBT facility.

The nearest schools, as measured from the Terminal's northern point, are Banksmeadow Primary and Matraville Primary. Both are located 1.6 kilometres away.

There are a number of recreational areas in the surrounding suburbs, including several areas of open space.

Figure 4-1 Ambient noise monitoring locations (local context)





5 NOISE MONITORING METHODOLOGY

A brief outline of the methodology applied to the measurement of the existing ambient noise environment has been detailed below.

5.1 Instrumentation

Background noise level measurements were carried out using a Svantek 979 Type 1 Precision Sound Level Meter (serial number 21039) (operator attended noise monitoring), Acoustic Research Laboratories' statistical Environmental Noise Loggers, Type RION NL- 42 (serial numbers 878012, 878079, 572559, 878005, 87807C and 87812B) (long-term unattended noise monitoring). The instruments comply with Australian Standard AS 1259 *Acoustics – Sound Level Meters*.

All instrument sets were calibrated by a NATA accredited laboratory. A copy of the instrument sets calibration certificates has been included in Appendix H of this report.

The microphones were positioned approximately 1.5 m above ground level and were fitted with windsocks. Each instrument was calibrated before and after the measurement period to ensure the reliability and accuracy of the instrument. There were no significant variances observed in the reference signal between the pre-measurement and post-measurement calibrations.

The instruments were set on A-weighted, fast response and logged noise levels over fifteen-minute statistical intervals. Observations were recorded during logger establishment for unattended noise monitoring and during the measurement interval for attended noise monitoring.

5.2 Measurement Locations

Locations consistent with those previously reported for the area were specifically referenced from the Patrick PBT biannual noise compliance studies, and as specified in Conditions L3.12 and L3.2 of the latest EPL (dated 13 June 2017).

The monitoring program comprised of monitoring at a total of six locations. These locations are shown in Figure 4-1. Information obtained during the noise monitoring program provides an adequate characterisation of the existing ambient noise profiles for the local area.

A description of each noise monitoring location is as follows.

5.2.1 Location 1: 34 Chelmsford Avenue, Botany

The unattended noise logger was located in the front yard of the residential property (facing the subject site). The noise logger was deployed approximately 2 metres from the front façade of the residential building, at a height of 1.5 metres above ground. Due to security reasons the logger was not able to be deployed at the front (western) boundary which is the nearest boundary to the subject site. The location was approximately 1,800 metres from the northwest boundary of the Patrick PBT site and approximately 2,170 metres from the berth docks. Attended monitoring was also carried out at this location.

Road traffic on Foreshore Road and Chelmsford Avenue, industry noise from the intervening Hutchison Ports container terminal and aircraft noise from Sydney Airport are the main noise contributors observed as influencing the local ambient noise environment.

5.2.2 Location 2: 26 Dent Street, Botany

The unattended noise logger was located in the backyard of the residential property (facing the subject site). The noise logger was deployed approximately 10 m from the rear façade of the property, at a height of 1.5 metres above ground. The location was approximately 950 metres from the northwest boundary of the Patrick PBT site and approximately 1,350 metres from the berth docks. Attended monitoring was also carried out at this location.

Road traffic on Foreshore Road and Dent Street and the nearby Hutchison Ports container terminal, industrial activity and residential activity in the vicinity are the part noise contributors observed as influencing the local



ambient noise environment. The ambient noise setting was consistent with that of an urban noise environment. Road traffic noise from Botany Road and Foreshore Road were dominant noise sources for the area.

5.2.3 Location 3: 1424 Botany Road, Botany

The unattended noise logger was located at the rear of the residential property (facing the subject site). The noise logger was deployed approximately 10 m from the rear façade of the property, at a height of 1.5 metres above ground. The location was approximately 850 metres from the northwest boundary of the Patrick PBT site and approximately 1,200 metres from the berth docks. Attended monitoring was also carried out at this location.

Road traffic on Foreshore and Botany Roads, industrial activity in the area and the nearby Hutchison Ports container terminal are the part noise contributors observed as influencing the local ambient noise environment.

The ambient noise setting was consistent with that of an urban noise environment. Road traffic noise from Botany Road and Foreshore Road were dominant noise sources for the area.

5.2.4 Location 4: 80 Australia Avenue, Matraville

The logger was positioned at the front of the property, facing Australia Avenue. The location was considered indicative of the nearest potentially affected noise catchment area and positioned with an acceptable distance of separation from the nearby industrial buildings. Attended noise monitoring was also carried out at this location.

The monitoring location has a separation distance of approximately 900 metres from the eastern boundary of the site.

The noise monitoring location was typical of an urban noise environment affected by local traffic and intervening industrial premises between the subject site and the monitoring location (refer to Figure 4-1). The intervening industrial premises to the residences on Australia Avenue are Orora Recycling facility and Sydney Haulage Container facility.

5.2.5 Location 5: 46 Jennings Street, Matraville

Noise logging was conducted in the front yard of 46 Jennings Street. This location has previously been a source of complaints regarding noise emissions from the Patrick PBT site and was not part of the original biannual noise compliance monitoring. As part of Conditions L3.1 and L3.2 of the EPL version 13 June 2017, unattended and attended noise monitoring were conducted at this location. The unattended noise logger was located at the rear of the front yard of the residential property. Attended noise monitoring was also undertaken at this location.

The monitoring location is at a separation distance of approximately 1,100 m from the site's eastern boundary.

The noise monitoring location was typical of an urban noise environment mainly affected by local road traffic and intervening industrial premises between the subject site and the monitoring location (refer to Figure 4-1). Intervening industries observed to be contributing to the local ambient noise environment are Orora Recycling facility and Sydney Haulage Container facility.

5.2.6 Location 6: Military Road, Matraville

Unattended and attended noise monitoring was undertaken within the Eastern Suburbs Crematorium. The noise logger was placed along the south-eastern fence of the site. Attended noise measurements were obtained from the same location.

The monitoring location has a separation distance of approximately 1,000 metres from the south boundary of the site.

Local traffic and intervening industries, such as DP World container terminal, P&O Trans Australia facility and Warehouse Solution International facility and activity associated with the crematorium are main noise contributors observed as influencing the local ambient noise environment.



5.3 Meteorological Conditions

Attended noise monitoring results were not affected by adverse meteorological conditions based on real-time local observations during the monitoring period.

Any unattended noise monitoring data affected by inclement weather has been removed from the assessment with reference to the Bureau of Meteorology's (BOM) daily rainfall data.

6 AMBIENT NOISE MONITORING

Unattended noise monitoring was undertaken for a period of not less than 2 weeks as per Condition E1.2 of the EPL. The monitoring period was between 7 November and 20 November 2022. Locations indicated in Figure 4-1.

Attended noise monitoring at all of the locations was undertaken during the daytime period on Wednesday 23 November, evening and night period on Tuesday 29 November 2022.

Local meteorological conditions were satisfactory during the attended monitoring program.

Observations made as part of these studies categorise the local noise environment as being urban/urban with industrial interface. Observations of existing noise sources support this definition and are described as follows:

- an 'urban hum' is a distinct feature of the ambient noise environment;
- the primary noise source for the area is traffic noise originating from heavy and passenger vehicles travelling along major and local traffic routes; and
- noise from multiple industrial sources is audible at several of the monitoring locations.

Residential activity and local fauna such as birds, bats and insects were also sporadically audible. Aircraft noise was sporadically audible. Noise emissions from train warning bells, installed at Goods Railway Line between the Caltex and the Patrick PBT was also audible. Truck engines, engine brakes, forklifts and reversing beepers from surrounding roads and nearby industrial and container storage facilities were frequently audible during the monitoring. Ambient noise profiles were typical of an urban area.

The daily noise descriptor graphs obtained as part of this assessment (included in the Appendices) show that the current ambient noise environment, as measured at each monitoring location, generally fluctuated in accordance with diurnal patterns.

Noise levels for the areas surrounding the monitoring locations were found to be primarily influenced by urban and industrial noise sources consistent with the setting of the area.

Background noise levels measured through the use of the environmental noise loggers are influenced by all local sources of noise. The results are to be viewed in conjunction with the attended noise levels presented in Section 6.2 of this report.

Observations during the attended noise monitoring program indicated short term peaks (warning alarms and impact events) either at Port Botany or surrounding industrial premises were generally audible at the nearest residential receivers to the site. Residential activity, off-site industrial noise and traffic flow noise (both distant and local) were primary influences of the measured ambient noise levels.



6.1 Unattended Noise Monitoring Results

Unattended noise monitoring was carried out at six noise monitoring locations (Locations 1 to 6) during the daytime, evening and night-time periods. The results of the unattended monitoring are discussed below.

6.1.1 Location 1: 34 Chelmsford Avenue, Botany

Table 6-1 presents the unattended noise monitoring results at Chelmsford Avenue, Botany.

Table 6-1 Unattended monitoring results (Location 1: 34 Chelmsford Avenue)

Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	L _{Aeq}	L _{A1}	L _{A90}	L _{Aeq}	L _{A1}	L _{A90}	L _{Aeq}	L _{A1}	L _{A90}
7/11/2022	55.1	62.5	43.7	51.7	61.2	42.6	46.7	50.7	40.4
8/11/2022	58.3	64.8	43.5	52.7	61.7	41.9	48.8	52.2	37.9
9/11/2022	54.0	63	42.2	51.4	60.8	43.2	48.7	52.2	40.7
10/11/2022	54.6	63.3	42.1	52.9	61.5	43.3	48.3	52.9	36.8
11/11/2022	54.6	64.2	42.5	51.9	61.5	39.9	45.9	50.1	35.8
12/11/2022	52.7	61.4	41.2	49.8	58.5	41.6	46.1	50.9	38.8
13/11/2022	56.8	63.8	40.9	53.9	63.9	43.4	57.3	60.3	39.0
14/11/2022	<i>55.1</i>	<i>62.1</i>	<i>44.2</i>	<i>54.4</i>	<i>63.9</i>	<i>43.0</i>	<i>48.9</i>	<i>53.1</i>	<i>36.8</i>
15/11/2022	51.8	59.6	43.8	50.6	59	44.1	51.8	58.6	43.3
16/11/2022	57.5	63.2	47.0	53.7	61.2	45.4	50.7	56	39.4
17/11/2022	55.9	62.2	47.4	54.9	61.5	49.0	52.9	56.1	38.9
18/11/2022	55.1	61.9	48.3	50.5	58.5	42.9	46.9	51.7	35.8
19/11/2022	55.0	64.6	40.6	52.8	60.7	45.2	48.4	52.9	37.7
20/11/2022	52.7	60.2	45.3	51.6	60	42.2	49.0	52.2	34.1
Median	55.3	62.7	43.5	52.6	61.2	43.1	50.6	52.6	38.3

Notes: Values expressed as dB(A)

Values in italics removed from Median calculation due to inclement weather

dB(A) = decibels, A-weighted, values rounded to nearest 1 dB(A)

L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level

L_{A1} = A-weighted sound pressure level exceeded for 1% of the time

L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)

Data measured during inclement weather has been removed from the median values shown.

Median L_{Aeq} unattended noise measurements exceed the EPL day, evening and night-time L_{Aeq} noise limits for Chelmsford Avenue. The daily average daytime, evening and night-time L_{Aeq} noise levels also exceed the EPL noise limits.



The median night-time L_{A1} noise level of 52.6 dB(A) complies with the night-time L_{A1} noise limit of 53 dB(A) for Chelmsford Avenue on all days except 13, 15, 16 and 17 November 2022.

It should be noted that operational noise from Patrick PBT was not audible during daytime, evening and night-time operator attended noise monitoring. Hence, the exceedances of the EPL from the unattended monitoring are unlikely to be due to Patrick PBT operations. Based on this observation, operational noise from Patrick PBT facility is considered to comply with the EPL noise limits at the residences on Chelmsford Avenue.

6.1.2 Location 2: 26 Dent Street, Botany

Table 6-2 presents the unattended noise monitoring results at Dent Street, Botany.

Table 6-2 Unattended monitoring results (Location 2: 26 Dent Street)

Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}
7/11/2022	55.3	56.4	43.5	58.4	58.9	48.5	52.8	54.8	43.4
8/11/2022	58.7	59.1	46.9	51.1	55.5	43.2	47.5	48.5	40.0
9/11/2022	55.4	57.3	41.4	50.8	56.3	42.7	46.0	47.3	39.0
10/11/2022	54.6	53.7	39.8	51.1	54.8	45.5	47.3	48.2	40.7
11/11/2022	54.8	54	39.6	52.7	57.8	45.3	50.9	51.5	41.7
12/11/2022	51.7	55.1	42.7	53.8	57.6	46.8	51.0	53.4	43.4
13/11/2022	56.9	56.3	42.6	50.7	55.2	44.2	50.7	52.5	41.0
14/11/2022	54.5	58	48.2	53.1	56.7	46.1	50.7	52.7	41.5
15/11/2022	50.7	54.2	43.7	51.6	55.6	44.2	49.5	51.8	43.2
16/11/2022	58.3	60.6	47.5	54.4	57.5	46.1	57.9	54.7	43.6
17/11/2022	49.6	52.7	45.1	50.2	51.9	42.9	46.2	47.6	41.4
18/11/2022	51.0	52.4	44.2	51.1	56.6	45.8	46.7	52.7	39.0
19/11/2022	49.4	52.5	43.1	52.7	56.7	46.2	47.7	51.8	40.7
20/11/2022	52.5	57.8	39.9	53.8	58.1	44.1	50.1	54.7	41.8
Median	55.2	54.6	43.7	53.3	56.7	45.3	51.5	52.2	41.5

Notes: Values expressed as dB(A)

Values in italics removed from Median calculation due to inclement weather

dB(A) = decibels, A-weighted, values rounded to nearest 1 dB(A)

L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level

L_{A1} = A-weighted sound pressure level exceeded for 1% of the time

L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)

Data measured during inclement weather has been removed from the median values shown.



Median L_{Aeq} unattended noise measurements exceed the EPL day, evening and night-time L_{Aeq} noise limits for Dent Street. The daily average daytime, evening and night-time L_{Aeq} noise levels also exceed the EPL noise limits.

The median night-time L_{A1} noise level of 52 dB(A) complies with the night-time L_{A1} noise limit of 55 dB(A) for Dent Street. The daily average night-time L_{A1} noise levels complied with the EPL noise limit on all of the monitoring days.

It should be noted that operational noise from Patrick PBT was not audible during daytime, evening and night-time operator attended noise monitoring. Hence, the exceedances of the EPL from the unattended monitoring are unlikely to be due to Patrick PBT operations. Based on this observation, operational noise from Patrick PBT facility is considered to comply with the EPL noise limits at the residences on Dent Street.

6.1.3 Location 3: 1424 Botany Road, Botany

Table 6-3 presents the unattended noise monitoring results at Botany Road, Botany.

Table 6-3 Unattended monitoring results (Location 3: 1424 Botany Road)

Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}
7/11/2022	55.8	59.1	46.0	50.2	58.6	43.1	47.7	52.5	41.3
8/11/2022	53.9	62.8	46.5	51.6	59.6	43.4	51.2	54.6	40.2
9/11/2022	52.7	60.2	46.4	51.7	57.8	43.6	50.5	53.7	40.9
10/11/2022	53.3	61.2	46.4	61.9	60	44.1	49.5	54.8	41.1
11/11/2022	53.1	61.2	46.2	52.0	61.1	43.3	49.7	54.7	41.4
12/11/2022	53.0	60.1	45.5	49.7	55.5	43.2	48.2	53.6	40.0
13/11/2022	54.2	60.4	43.4	52.6	60.4	44.9	55.6	58.4	40.6
14/11/2022	58.4	63.7	51.1	56.5	63.5	48.9	52.6	57.5	44.7
15/11/2022	53.0	58.3	46.0	51.7	58.8	45.6	54.2	59	46.4
16/11/2022	57.4	63.1	49.4	54.5	61.8	48.8	53.3	58.4	46.4
17/11/2022	56.3	61.2	50.9	55.1	60.6	50.3	54.5	59.4	44.9
18/11/2022	55.3	60.6	49.5	50.7	56.4	45.5	49.2	54.6	42.2
19/11/2022	55.6	65.1	44.4	50.9	57.8	46.0	49.7	52.7	40.6
20/11/2022	57.2	62.4	51.4	54.9	61.7	48.0	50.9	55.6	39.0
Median	55.3	61.2	46.4	54.7	59.8	45.2	51.9	54.8	41.2

Notes: Values expressed as dB(A)

Values in italics removed from Median calculation due to inclement weather

dB(A) = decibels, A-weighted, values rounded to nearest 1 dB(A)

L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level

L_{A1} = A-weighted sound pressure level exceeded for 1% of the time



L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)

Data measured during inclement weather has been removed from the median values shown.

Median L_{Aeq} unattended noise measurements exceed the EPL day, evening and night-time L_{Aeq} noise limits for Botany Road. The daily average daytime, evening and night-time L_{Aeq} noise levels also exceed the EPL noise limits.

The median night-time L_{A1} noise level of 55 dB(A) complies with the night-time L_{A1} noise limit of 55 dB(A) for Botany Road. The daily average night-time L_{A1} noise levels achieved the EPL noise limit on all days except for 13, 15, 16, and 17 November 2022.

It should be noted that operational noise was observed during the operator attended noise monitoring was not audible during daytime periods, and slightly audible during evening and night-time periods during low ambient levels of between 49 dB(A) to 56 dB(A) and the source could not be determined. Hence, the exceedances of the EPL from the unattended monitoring are unlikely to be due to Patrick PBT operations. Based on this observation, operational noise from Patrick PBT facility is considered to comply with the EPL noise limits at the residences on Botany Road.

6.1.4 Location 4: 80 Australia Avenue, Matraville

Table 6-4 presents the unattended noise monitoring results at Australia Avenue, Matraville.

Table 6-4 Unattended monitoring results (Location 4: 80 Australia Avenue)

Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}
7/11/2022	53.9	66.8	41.8	50.4	58.5	38.5	43.9	47.4	36.0
8/11/2022	53.0	61.9	40.5	54.8	59.4	38.2	45.6	49.7	37.1
9/11/2022	52.0	61.4	41.7	47.3	57.2	38.7	45.8	50.5	36.8
10/11/2022	51.2	61.2	40.8	51.4	58.6	39.2	45.3	50.5	37.3
11/11/2022	52.6	62	41.4	47.1	57.6	39.1	47.9	52.5	39.6
12/11/2022	52.2	60.7	44.8	50.2	57.6	44.0	49.1	54.7	44.4
13/11/2022	51.8	59.1	40.2	50.4	57	40.6	56.7	59.3	38.0
14/11/2022	57.2	62.9	47.7	54.8	59.8	50.4	52.3	55.6	46.3
15/11/2022	52.4	60.9	41.6	50.2	58.3	42.4	53.5	57.6	49.8
16/11/2022	55.3	62.5	48.4	53.2	58.8	50.4	53.0	56.8	48.6
17/11/2022	55.3	62.1	50.6	53.7	59.6	50.5	54.0	57.8	44.3
18/11/2022	56.0	63	49.5	50.2	57.6	44.8	45.3	54.1	37.3
19/11/2022	52.8	62.5	41.4	47.3	58.8	40.6	47.9	56.8	39.6
20/11/2022	52.7	62.1	44.8	51.4	59.6	50.4	49.1	57.8	38.4
Median	54.0	62.0	41.7	51.8	58.6	41.5	51.6	55.2	39.6

Notes: Values expressed as dB(A)



Values in *italics* removed from Median calculation due to inclement weather

dB(A) = decibels, A-weighted, values rounded to nearest 1 dB(A)

L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level

L_{A1} = A-weighted sound pressure level exceeded for 1% of the time

L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)

Data measured during inclement weather has been removed from the median values shown.

Median L_{Aeq} unattended noise measurements exceed the EPL day, evening and night-time L_{Aeq} noise limits for Australia Avenue. The daily average daytime, evening and night-time L_{Aeq} noise levels also exceed the EPL noise limits.

The median night-time L_{A1} noise level of 55 dB(A) complies with the night-time L_{A1} noise limit of 55 dB(A) for Australia Avenue. The daily average night-time L_{A1} noise levels complies with the EPL noise limit on 7 - 12th November 2022.

It should be noted that operational noise from Patrick PBT was not audible during daytime, evening and night-time operator attended noise monitoring. Hence, the exceedances of the EPL from the unattended monitoring are unlikely to be due to Patrick PBT operations. Based on this observation, operational noise from Patrick PBT facility is considered to comply with the EPL noise limits at the residences on Australia Avenue.

6.1.5 Location 5: 46 Jennings Street, Matraville

Table 6-5 presents the unattended noise monitoring results at Jennings Street, Matraville.

Table 6-5 Unattended monitoring results (Location 5: 46 Jennings Street)

Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}	L_{Aeq}	L_{A1}	L_{A90}
7/11/2022	52.0	65.8	40.8	50.4	63	38.5	43.9	50.6	36.0
8/11/2022	53.0	65.9	40.5	54.8	62.5	38.2	45.6	50.7	37.1
9/11/2022	52.0	65.8	41.7	47.3	62.1	38.7	45.8	50.9	36.8
10/11/2022	51.2	65.8	40.8	51.4	61.7	39.2	45.3	51	37.3
11/11/2022	52.6	65.7	41.4	47.1	61.5	39.1	47.9	51.1	39.6
12/11/2022	52.2	65.6	44.8	50.2	61	44.0	49.1	51.4	44.4
13/11/2022	51.8	65.6	40.2	50.4	60.3	40.6	51.8	55.8	38.0
14/11/2022	57.2	65.5	47.7	54.8	59.7	41.8	52.3	52	46.3
15/11/2022	52.4	65.5	41.6	50.2	58.1	42.4	53.5	52.8	49.8
16/11/2022	55.3	65.4	48.4	53.2	57.2	44.4	53.0	53.2	48.6
17/11/2022	55.3	65.4	50.6	53.7	56.4	43.8	54.0	53.7	50.3
18/11/2022	56.0	65.3	49.5	50.2	55.3	44.8	45.8	54.2	37.3
19/11/2022	51.2	65.2	41.7	51.0	54.4	39.8	45.3	54.8	39.6
20/11/2022	52.6	65	40.8	48.9	53.6	41.0	44.1	55.4	44.4



Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>
Median	54	65.5	41.7	51.8	60	41.5	51.6	51.9	39.6

Notes: Values expressed as dB(A)

Values in italics removed from Median calculation due to inclement weather

dB(A) = decibels, A-weighted, values rounded to nearest 1 dB(A)

L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level

L_{A1} = A-weighted sound pressure level exceeded for 1% of the time

L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)

Data measured during inclement weather has been removed from the median values shown.

Median *L_{Aeq}* unattended noise measurements exceed the EPL day, evening and night-time *L_{Aeq}* noise limits for Jennings Street. The daily average daytime, evening and night-time *L_{Aeq}* noise levels also exceed the EPL noise limits.

The median night-time *L_{A1}* noise level of 52 dB(A) complies with the night-time *L_{A1}* noise limit of 55 dB(A) for Jennings Street. The daily average night-time *L_{A1}* noise levels exceeds the EPL noise limit on the following monitoring days; 20 November 2022.

It should be noted that operational noise was observed during the operator attended noise monitoring was not audible during daytime and night-time periods, and slightly audible during evening periods during low ambient levels of between 45 dB(A) to 52 dB(A) and the source could not be determined. Hence, the exceedances of the EPL from the unattended monitoring are unlikely to be due to Patrick PBT operations. Based on this observation, operational noise from Patrick PBT facility is considered to comply with the EPL noise limits at the residences on Jennings Street.

6.1.6 Location 6: Military Road, Matraville

Table 6-6 presents the unattended noise monitoring results at Military Road, Matraville.

Table 6-6 Unattended monitoring results (Location 6: Military Road)

Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>
7/11/2022	54.6	61.4	42.0	55.9	62.8	40.7	50.2	58.9	41.8
8/11/2022	53.0	62.7	42.3	55.9	62.9	42.0	50.6	59.1	43.0
9/11/2022	52.5	62	44.3	50.2	61.8	38.8	49.8	59	36.8
10/11/2022	52.9	62.1	41.8	55.3	62.5	43.2	51.4	59.8	43.9
11/11/2022	53.1	62.4	42.8	58.5	63.4	42.1	49.0	56.6	41.1
12/11/2022	51.8	62.2	38.9	57.1	62.4	37.0	46.2	55.9	34.2
13/11/2022	52.4	61.6	41.6	59.5	63.5	43.9	53.8	60.9	41.3
14/11/2022	55.5	63.3	46.5	55.8	63.4	47.0	52.5	59.2	44.1



Date	Day (7.00 am–6.00 pm)			Evening (6.00 pm–10.00 pm)			Night (10.00 pm–7.00 am)		
	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>	<i>L_{Aeq}</i>	<i>L_{A1}</i>	<i>L_{A90}</i>
15/11/2022	53.8	63.6	41.0	51.7	62	38.5	53.5	60.9	43.3
16/11/2022	56.8	64.8	43.1	53.1	63.5	43.3	51.7	60.1	44.8
17/11/2022	55.1	64.2	45.2	54.0	63.5	44.7	51.9	59.8	44.2
18/11/2022	59.7	64.1	44.4	53.0	62.2	38.5	46.8	60.3	43.5
19/11/2022	54.6	64.3	44.3	55.3	63.5	43.2	51.4	55.8	43.0
20/11/2022	54.2	63.6	41.8	58.5	62.2	42.1	49.0	60.6	36.8
Median	54.9	63.0	42.3	55.8	62.9	42.0	51.4	60.0	43.0

Notes: Values expressed as dB(A)

Values in italics removed from Median calculation due to inclement weather

dB(A) = decibels, A-weighted, values rounded to nearest 1 dB(A)

L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level

L_{A1} = A-weighted sound pressure level exceeded for 1% of the time

L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)

Median *L_{Aeq}* unattended noise measurements exceed the EPL day, evening and night-time *L_{Aeq}* noise limits for Military Road. The daily average daytime, evening and night-time *L_{Aeq}* noise levels also exceed the EPL noise limits.

The median night-time *L_{A1}* noise level of 60 dB(A) exceeds the night-time *L_{A1}* noise limit of 55 dB(A) for Military Road.

It should be noted that operational noise was observed during the operator attended noise monitoring was not audible during daytime periods, and slightly audible during evening and night-time periods during low ambient levels of between 52 dB(A) to 58 dB(A) and the source could not be determined. Hence, the exceedances of the EPL from the unattended monitoring are unlikely to be due to Patrick PBT operations. Based on this observation, operational noise from Patrick PBT facility is considered to comply with the EPL noise limits at the residences on Military Road.

6.2 Attended Noise Monitoring Results

Attended noise monitoring was carried out at the six sensitive receiver noise monitoring locations during the daytime, evening and night-time periods. The results of the attended monitoring are presented in Table 6-7 to Table 6-12.

The results of the attended monitoring are discussed below.

6.2.1 Location 1: 34 Chelmsford Avenue, Botany

The results of the attended background noise monitoring undertaken at 34 Chelmsford Avenue are presented in Table 6-7 below.



Table 6-7 Attended monitoring results (Location 1: 34 Chelmsford Avenue)

Period	Date of measurement	Time	Measured Noise Level			Comments
			L _{A90}	L _{Aeq}	L _{A1}	
Day	23/11/2022	13:36	45	50	59	Distant road traffic 46-50 dB(A) Residential activity 50-55 dB(A) Vehicle pass by 58-62 dB(A)
Evening	29/11/2022	21:10	46	51	58	Distant road traffic (Foreshore Rd 48-51dB(A) Car pass by 63 - 69 dB(A)
Night	29/11/2022	22:19	44	49	60	Distant road traffic (Foreshore Rd 46-48 dB (A)

Notes: Values expressed as dB(A) and rounded to nearest 1 dB(A)
 L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)
 L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level
 L_{A1} = A-weighted sound pressure level exceeded for 1% of the time
 dB(A) = decibels, A-weighted
 All values from comments are approximate readings
 SS (steady state) noise level is the operator observed baseline noise level where sources influencing the statistical results are determined.

From the attended measurements presented in Table 6-7 above, the operational noise from Patrick PBT was not audible during day, evening and night-time periods. Based on this observation, the operational noise from Patrick PBT is considered to comply with the EPL day, evening and night noise limits at this monitoring location.

Road traffic noise on Chelmsford Avenue and Foreshore Road were the dominant noise sources during the attended measurements and influenced the L_{Aeq} and L_{A1} descriptors. Aircraft fly overs, residential and community activity on Chelmsford Avenue and flora and fauna were also audible.

6.2.2 Location 2: 26 Dent Street, Botany

The results of the attended background noise monitoring undertaken at 26 Dent Street are presented in Table 6-8 below.

Table 6-8 Attended monitoring results (Location 2: 26 Dent Street)

Period	Date of measurement	Time	Measured Noise Level			Comments
			L _{A90}	L _{Aeq}	L _{A1}	
Day	23/11/2022	14:07	49	53	58	Distant road traffic (Foreshore Rd) 49-56 dB(A) Car pass by 65 dB(A) Intermittent Port Botany crane operation 51-57 dB(A)
Evening	29/11/2022	20:28	50	52	58	Distant road traffic (Foreshore Rd) 50-53dB(A) Port Botany container noise 56 dB(A)
Night	29/11/2022	22:41	47	50	59	Distant road traffic (Foreshore Rd) 52-56 dB(A) Distant industrial activity 47 dB(A) Port Botany misc. noise 57 dB(A)

Notes: Values expressed as dB(A) and rounded to nearest 1 dB(A)
 L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)
 L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level
 L_{A1} = A-weighted sound pressure level exceeded for 1% of the time
 dB(A) = decibels, A-weighted
 All values from comments are approximate readings
 SS (steady state) noise level is the operator observed baseline noise level where sources influencing the statistical results are determined.



From the attended measurements presented in Table 6-8 above, the operational noise was not audible during day, evening and night time periods. Based on this observation, the operational noise from Patrick PBT is considered to comply with the EPL day, evening and night noise limits at this monitoring location.

Road traffic noise from Botany Road and Foreshore Road was the dominant noise source during the attended measurements and influenced the L_{Aeq} and L_{Amax} descriptors. Noise generated by industrial activity on the opposite side of Botany Road, traffic on Dent Street, aircraft fly overs and flora and fauna were also audible during the measurements.

6.2.3 Location 3: 1424 Botany Road, Botany

The results of the attended background noise monitoring undertaken at 1424 Botany Road are presented in Table 6-9 below.

Table 6-9 Attended monitoring results (Location 3: 1424 Botany Road)

Period	Date of measurement	Time	Measured Noise Level			Comments
			L_{A90}	L_{Aeq}	L_{A1}	
Day	23/11/2022	14:29	61	56	66	Road traffic 57-60 dB(A) Fauna 60-64 dB(A) Trucks pass by 59 dB(A)
Evening	29/11/2022	20:48	50	53	60	Traffic noise from Foreshore Road (constant throughout measurement) 50-55 dB(A) Port Botany Container metal on metal noise 50-55 dB(A)
Night	29/11/2022	22:07	47	51	56	Road traffic 46-49 dB(A) Container set down metal on metal noise (intermittently) 54-58 dB(A)

Notes: Values expressed as dB(A) and rounded to nearest 1 dB(A)
 L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)
 L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level
 L_{A1} = A-weighted sound pressure level exceeded for 1% of the time
 dB(A) = decibels, A-weighted
 All values from comments are approximate readings
 SS (steady state) noise level is the operator observed baseline noise level where sources influencing the statistical results are determined.

From the attended measurements presented in Table 6-9 above, the operational noise was not audible during daytime periods. The operational noise was audible during evening and night time periods at ambient levels of between 54 dB(A) and 58 dB(A) and the direct source could not be determined. Based on this observation, the operational noise from Patrick PBT is considered to comply with the EPL day, evening and night noise limits at this monitoring location.

Road traffic noise from Botany Road and Foreshore Road was the dominant noise source during the attended measurements and influenced the L_{Aeq} and L_{A1} descriptors. Noise generated by aircraft fly overs, residential activity and flora and fauna were also audible during the measurements.



6.2.4 Location 4: 80 Australia Avenue, Matraville

The results of the attended background noise monitoring undertaken at 80 Australia Avenue are presented in Table 6-10 below.

Table 6-10 Attended monitoring results (Location 4: 80 Australia Avenue)

Period	Date of measurement	Time	Measured Noise Level			Comments
			L _{A90}	L _{Aeq}	L _{A1}	
Day	23/11/2022	14:56	49	53	60	Distant road traffic 47-52 dB(A) Vehicle pass by 53-58 dB(A)
Evening	29/11/2022	21:10	43	45	51	Distant road traffic (Foreshore Rd 48-51dB(A)) Vehicle pass by 65-68 dB(A) Aircraft noise 62 dB(A)
Night	29/11/2022	23:24	41	43	47	Distant traffic (Foreshore Rd 45-47 dB (A)) Vehicle pass by 59-61 dB(A) Sirens 44 dB(A)

Notes: Values expressed as dB(A) and rounded to nearest 1 dB(A)
 L_{A90} = A-weighted sound pressure level exceeded for 90% of the time (background)
 L_{Aeq} = equivalent continuous (energy average) A-weighted sound pressure level
 L_{A1} = A-weighted sound pressure level exceeded for 1% of the time
 dB(A) = decibels, A-weighted
 All values from comments are approximate readings
 SS (steady state) noise level is the operator observed baseline noise level where sources influencing the statistical results are determined.

From the attended measurements presented in Table 6-10 above, the operational noise was not audible during day, evening and night time periods. Based on this observation, the operational noise from Patrick PBT is considered to comply with the EPL day, evening and night noise limits at this monitoring location.

Nearby industrial noise (Orora Recycling) and road traffic on Australia Avenue and Botany Road were the primary influence during the day, evening and night-time periods at Australia Avenue. Noise generated by aircraft fly overs, residential activity and flora and fauna were also audible during the measurements.

6.2.5 Location 5: 46 Jennings Street, Matraville

The results of the attended background noise monitoring undertaken at Jennings Street are presented in Table 6-11 below. It should be noted that attended noise measurements were conducted outside of the residential premises, at the front boundary on Jennings Street.

Table 6-11 Attended monitoring results (Location 5: Jennings Street)

Period	Date of measurement	Time	Measured Noise Level			Comments
			L _{A90}	L _{Aeq}	L _{A1}	
Day	23/11/2022	15:39	43	56	68	Distant road traffic (Beauchamp Rd 51-55 dB(A)) Vehicle pass by 63-67 dB(A) Aircraft noise by 65 dB(A)
Evening	29/11/2022	21:30	42	53	56	Distant road traffic (Beauchamp Rd) 51-53 dB(A) Vehicle pass by 61-68 dB(A) Aircraft noise 64 dB(A)
Night	29/11/2022	22:30	30	33	40	Distant road traffic (Perry Street, Botany Road 48-50dB(A)) Vehicle pass by 68-70 dB(A) Aircraft noise 65 dB(A)

Notes: Values expressed as dB(A) and rounded to nearest 1 dB(A)



LA90 = A-weighted sound pressure level exceeded for 90% of the time (background)
 LAeq = equivalent continuous (energy average) A-weighted sound pressure level
 LA1 = A-weighted sound pressure level exceeded for 1% of the time
 dB(A) = decibels, A-weighted
 All values from comments are approximate readings
 SS (steady state) noise level is the operator observed baseline noise level where sources influencing the statistical results are determined.

From the attended measurements presented in Table 6-11 above, the operational noise was not audible during day and night-time periods. The operational noise was audible during evening periods at ambient levels of between 40 dB(A) and 45 dB(A) and the direct source could not be determined. Based on this observation, the operational noise from Patrick PBT is considered to comply with the EPL day, evening and night noise limits at this monitoring location.

Road traffic on Jennings Street and surrounding streets and residential activity was the primary influence during the day, evening and night-time measurements at Jennings Street. Noise generated by aircraft fly overs, and flora and fauna were also audible during the measurements.

6.2.6 Location 6: Military Road, Matraville

The results of the attended background noise monitoring undertaken at Military Road are presented in Table 6-12 below.

Table 6-12 Attended monitoring results (Location 6: Military Road)

Period	Date of measurement	Time	Measured Noise Level			Comments
			LA90	LAeq	LA1	
Day	23/11/2022	14:10	45	55	67	Road traffic Foreshore Road 52-57 dB(A) Factory Noise 50-55 dB(A) Vehicle pass by 60-65 dB(A)
Evening	29/11/2022	21:55	40	58	70	Traffic noise from Foreshore Road (constant throughout measurement) 50-55 dB(A) Port Botany noise (Slightly Audible) 40-43dB(A)
Night	29/11/2022	00:07	39	42	48	Truck Pass by 85dB(A) Vehicle pass by 72 dB(A) Aircraft noise 61 dB(A) Port Botany noise 45-53 dB(A)

Notes: Values expressed as dB(A) and rounded to nearest 1 dB(A)
 LA90 = A-weighted sound pressure level exceeded for 90% of the time (background)
 LAeq = equivalent continuous (energy average) A-weighted sound pressure level
 LA1 = A-weighted sound pressure level exceeded for 1% of the time
 dB(A) = decibels, A-weighted
 All values from comments are approximate readings
 SS (steady state) noise level is the operator observed baseline noise level where sources influencing the statistical results are determined.

From the attended measurements presented in Table 6-12 above, the operational noise was audible during evening and night time periods at ambient levels of between 45 dB(A) and 55 dB(A) and the direct source could not be determined. Based on this observation, the operational noise from Patrick PBT is considered to comply with the EPL day, evening and night noise limits at this monitoring location.

Road traffic on Military Road and activity associated with the crematorium in the facility were the primary influences during the day, evening and night-time measurements at Military Road. Noise generated by aircraft fly overs and flora and fauna were also audible during the measurements.



7 STATEMENT OF EXISTING INDUSTRIAL NOISE COMPLIANCE

In providing the statement of existing noise compliance status, the results of the noise monitoring have been reviewed. The steady state noise levels from Patrick PBT operations at locations that were just audible were estimated through observations during periods of minimal extraneous noise. Multiple noise sources were audible at all locations and could not be totally eliminated from the monitoring period, therefore estimates are likely to be overly conservative and overall compliance is generally based on the observed site influence, and measurement statistics.

7.1 Operations

It is understood that standard operations of Patrick PBT facility were generally present during the two weeks monitoring period over two occasions.

7.2 Review of Measured Noise Levels

7.2.1 Daytime Period

Measured ambient noise levels from the unattended monitoring and attended measurements show exceedances of the EPL daytime L_{Aeq} limits at Chelmsford Avenue, Dent Street, Botany Road, Australia Avenue, Jennings Street and Military Road.

However, operational noise from Patrick PBT was inaudible at all 6 monitoring locations during the daytime attended noise surveys. Based on this observation, operational noise impacts from Patrick PBT facility are considered to comply with the EPL daytime noise limits.

Dominant noise sources at all 6 monitoring locations were mainly road traffic noise from surrounding roads and local activity (residential, industrial and aircraft).

7.2.2 Evening Period

Measured ambient noise levels from the unattended monitoring and attended measurements show exceedances of the EPL evening L_{Aeq} limits at Chelmsford Avenue, Dent Street, Botany Road, Australia Avenue, Jennings Street and Military Road.

Operational noise was just audible at Botany Road, Jennings Street and Military Road locations at low ambient levels of between 50-60 dB(A), but the source could not be determined. The operation noise observed was over a very short duration (usually no more than 30 seconds). Operational noise was observed at a level reaching 61 dB(A) however, the duration of this noise was of an impulsive nature and largely intermittent and the exact source could not be determined. This observed noise level from the monitoring locations complies with the relevant noise limits. It also complies with the Botany Road - 43 dB(A) $L_{Aeq(15min)}$ evening noise limits, Jennings Street - 36 dB(A) $L_{Aeq(15min)}$ evening noise limits and Military Road - 42 dB(A) $L_{Aeq(15min)}$ evening noise limits.

Operational noise from Patrick PBT was not audible at the Chelmsford Avenue, Dent Street and Australia Avenue monitoring locations during the attended noise surveys. Based on these observations, operational noise impacts from Patrick PBT facility are considered to comply with the EPL evening noise limits.

Dominant noise sources at all 6 monitoring locations were mainly road traffic noise from surrounding roads and local activity (residential, industrial and aircraft).

7.2.3 Night-time Period

Measured ambient noise levels from the unattended monitoring and attended measurements show exceedances of the EPL night-time L_{Aeq} limits at Chelmsford Avenue, Dent Street, Botany Road, Australia Avenue, Jennings Street and Military Road.

Operational noise was just audible at the Botany Road and Military Road locations at low ambient levels of between 46-53 dB(A), but the source could not be determined. The operation noise observed was over a very short duration (usually no more than 30 seconds). Operational noise was observed at a level reaching 62 dB(A) however, the duration of this noise was of an impulsive nature and largely intermittent and the exact source



could not be determined. This observed noise level from the monitoring locations complies with the relevant noise limits. It also complies with the Botany Road - 43 dB(A) $L_{Aeq(15min)}$, 45 dB(A) $L_{Aeq(9hours)}$ and 55 dB(A) $L_{A1(1min)}$ night-time noise limits, and Military Road - 42 dB(A) $L_{Aeq(15min)}$, 40 dB(A) $L_{Aeq(9hours)}$ and 55 dB(A) $L_{A1(1min)}$ night-time noise limits.

Operational noise from Patrick PBT was not audible at the Chelmsford Avenue, Dent Street, Australia Avenue and Jennings Street monitoring locations during the attended noise surveys. Based on these observations, operational noise impacts from Patrick PBT facility are considered to comply with the EPL night time noise limits.

Dominant noise sources at all 6 monitoring locations were mainly road traffic noise from surrounding roads and local activity (residential and industrial).

8 CONCLUSION

This report presents the findings of the November 2022 environmental noise compliance monitoring for the Patrick Stevedores' Port Botany Terminal (Patrick PBT) operations.

Attended and unattended noise monitoring were carried out to determine compliance with the established noise limits at the nearest affected receivers.

Existing noise levels at the nearest receptors are considered high. Noise generated by surrounding industrial premises, container storage facilities, road traffic, local fauna, residential activities and aircraft activities were the primary contributors to the L_{Aeq} and L_{A1} descriptors during the daytime, evening and night-time measurements.

It was observed that operational noise was not audible at the Chelmsford Avenue, Dent Street and Australia Avenue monitoring locations, and was slightly audible at the Botany Road, Jennings Street and Military Road monitoring location when ambient levels were low, but the direct source was indeterminable. Based on this observation, Patrick PBT operational noise is considered to comply with the EPL day, evening and night-time noise limits.

It is a finding of this compliance assessment that the current operation will comply with the established licence limits at all locations during the daytime, evening and night-time periods.

Assessment of the measured residential noise levels indicated no annoying characteristics (tonality) were present. No sleep disturbance issues were present.

Approved: -

Rodney Stevens - MAAS



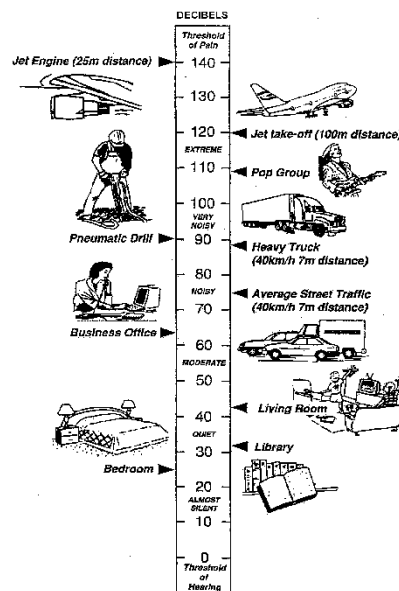
Appendix A – Acoustic Terminology

A-weighted sound pressure	The human ear is not equally sensitive to sound at different frequencies. People are more sensitive to sound in the range of 1 to 4 kHz (1000 – 4000 vibrations per second) and less sensitive to lower and higher frequency sound. During noise measurement an electronic ' <i>A-weighting</i> ' frequency filter is applied to the measured sound level $dB(A)$ to account for these sensitivities. Other frequency weightings (B, C and D) are less commonly used. Sound measured without a filter is denoted as linear weighted dB(linear).
Ambient noise	The total noise in a given situation, inclusive of all noise source contributions in the near and far field.
Community annoyance	Includes noise annoyance due to: <ul style="list-style-type: none">▪ character of the noise (e.g. sound pressure level, tonality, impulsiveness, low-frequency content)▪ character of the environment (e.g. very quiet suburban, suburban, urban, near industry)▪ miscellaneous circumstances (e.g. noise avoidance possibilities, cognitive noise, unpleasant associations)▪ human activity being interrupted (e.g. sleep, communicating, reading, working, listening to radio/TV, recreation).
Compliance	The process of checking that source noise levels meet with the noise limits in a statutory context.
Cumulative noise level	The total level of noise from all sources.
Extraneous noise	Noise resulting from activities that are not typical to the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Feasible and reasonable measures	Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, considering the following factors: <ul style="list-style-type: none">▪ Noise mitigation benefits (amount of noise reduction provided, number of people protected).▪ Cost of mitigation (cost of mitigation versus benefit provided).▪ Community views (aesthetic impacts and community wishes).▪ Noise levels for affected land uses (existing and future levels, and changes in noise levels).
Impulsiveness	Impulsive noise is noise with a high peak of short duration or a sequence of these peaks. Impulsive noise is also considered annoying.
Low frequency	Noise containing major components in the low-frequency range (20 to 250 Hz) of the frequency spectrum.
Noise criteria	The general set of non-mandatory noise levels for protecting against intrusive noise (for example, background noise plus 5 dB) and loss of amenity (e.g. noise levels for various land use).



Noise level (goal)	A noise level that should be adopted for planning purposes as the highest acceptable noise level for the specific area, land use and time of day.
Noise limits	Enforceable noise levels that appear in conditions on consents and licences. The noise limits are based on achievable noise levels, which the proponent has predicted can be met during the environmental assessment. Exceedance of the noise limits can result in the requirement for either the development of noise management plans or legal action.
Performance-based goals	Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them.
Rating Background Level (RBL)	The rating background level is the overall single figure background level representing each day, evening and night time period. The rating background level is the 10 th percentile min L _{A90} noise level measured over all day, evening and night time monitoring periods.
Receptor	The noise-sensitive land use at which noise from a development can be heard.
Sleep disturbance	Awakenings and disturbance of sleep stages.
Sound and decibels (dB)	Sound (or noise) is caused by minute changes in atmospheric pressure that are detected by the human ear. The ratio between the quietest noise audible and that which should cause permanent hearing damage is a million times the change in sound pressure. To simplify this range the sound pressures are logarithmically converted to decibels from a reference level of 2 x 10 ⁻⁵ Pa.

The picture below indicates typical noise levels from common noise sources.



dB is the abbreviation for decibel – a unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.

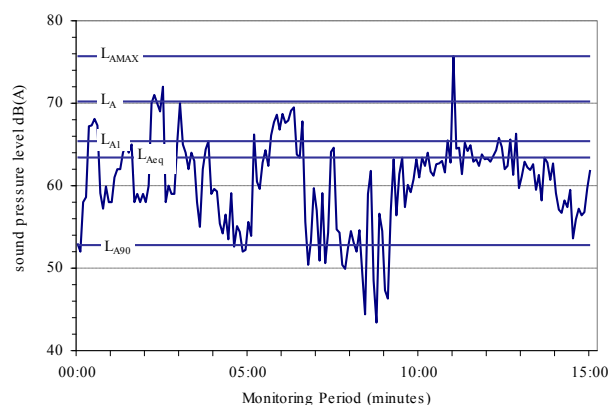
Sound Power Level (SWL)	The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in dB(A).
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Sound Pressure Level (SPL) The level of noise, usually expressed as SPL in $dB(A)$, as measured by a standard sound level meter with a pressure microphone. The sound pressure level in $dB(A)$ gives a close indication of the subjective loudness of the noise.

Statistical noise levels Noise levels varying over time (e.g. community noise, traffic noise, construction noise) are described in terms of the statistical exceedance level.

A hypothetical example of A weighted noise levels over a 15-minute measurement period is indicated in the following figure:



Key descriptor

- LAmx Maximum recorded noise level.
- LA1 The noise level exceeded for 1% of the 15-minute interval.
- LA10 Noise level present for 10% of the 15-minute interval. Commonly referred to the average maximum noise level.
- LAeq Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.
- LA90 Noise level exceeded for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

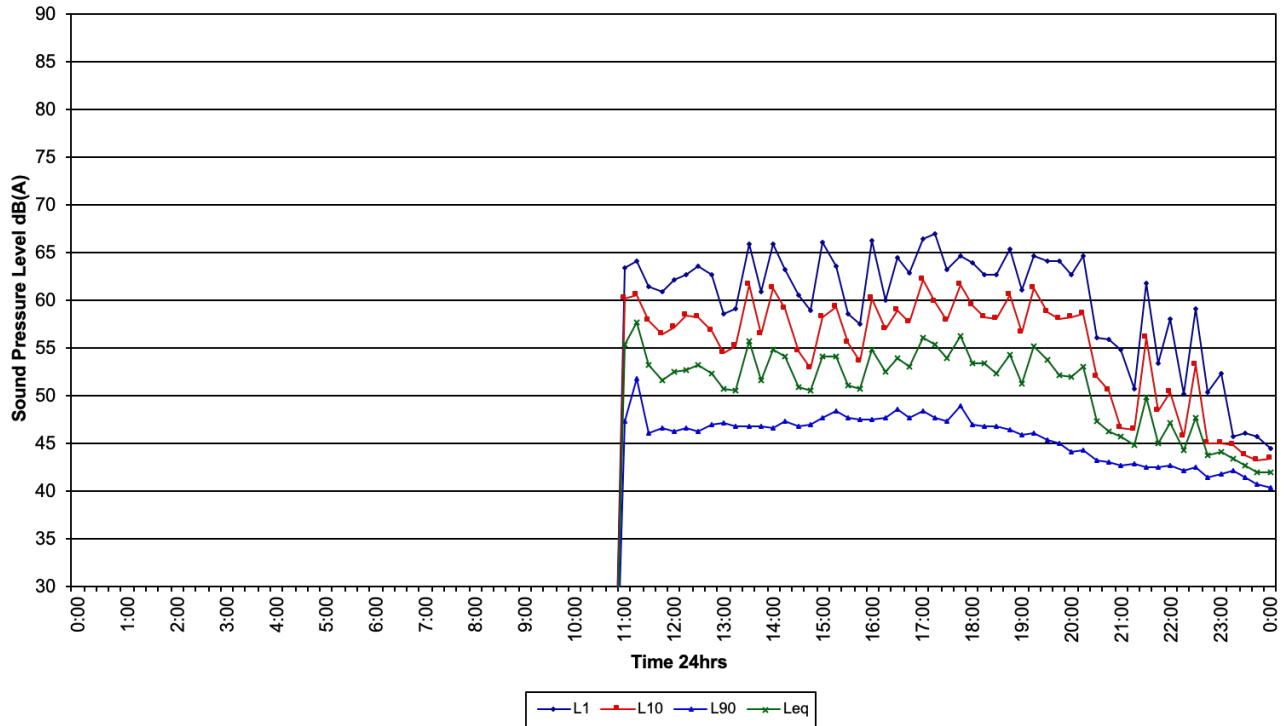
Threshold The lowest sound pressure level that produces a detectable response (in an instrument/person).

Tonality Tonal noise contains one or more prominent tones (and characterised by a distinct frequency components) and is considered more annoying. A 2 to 5 dBA penalty is typically applied to noise sources with tonal characteristics.

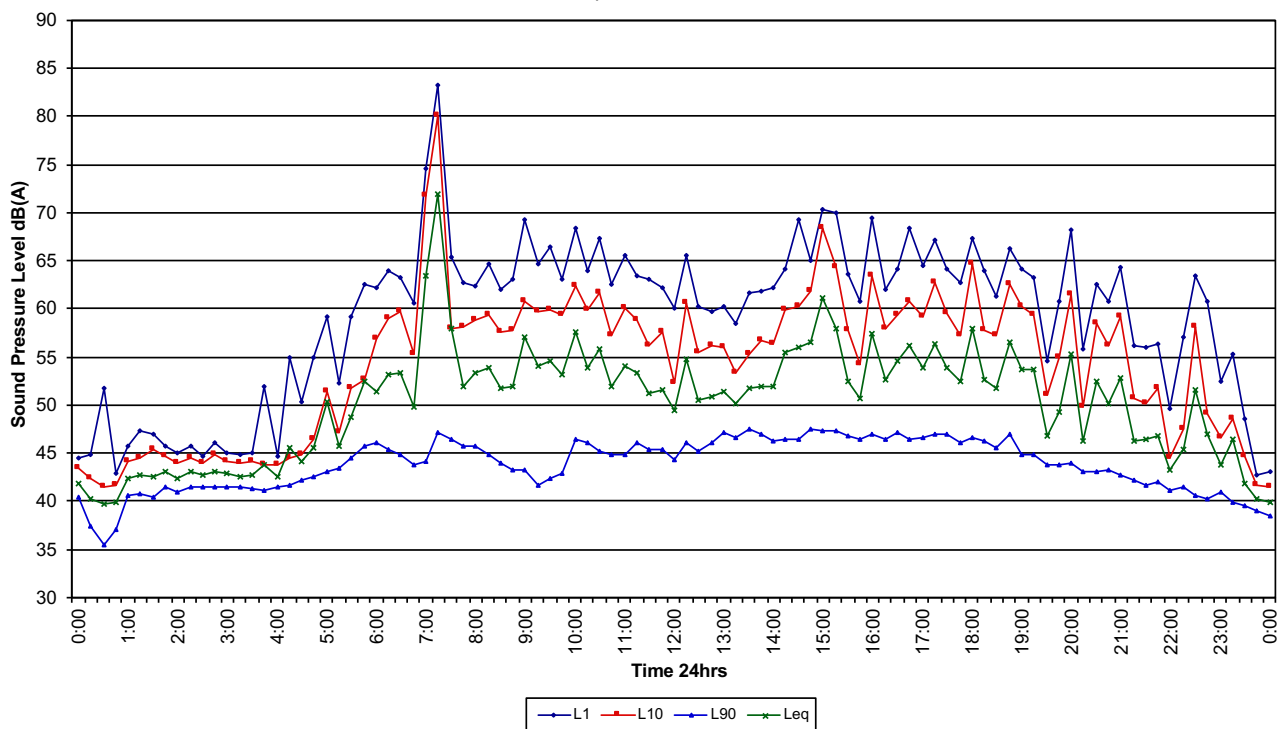


Appendix B – Unattended Logger Graphs

Traffic Noise Logger
34 Chelmsford Avenue, Botany
Monday 7/11/2022



Traffic Noise Logger
34 Chelmsford Avenue, Botany
Tuesday 8/11/2022

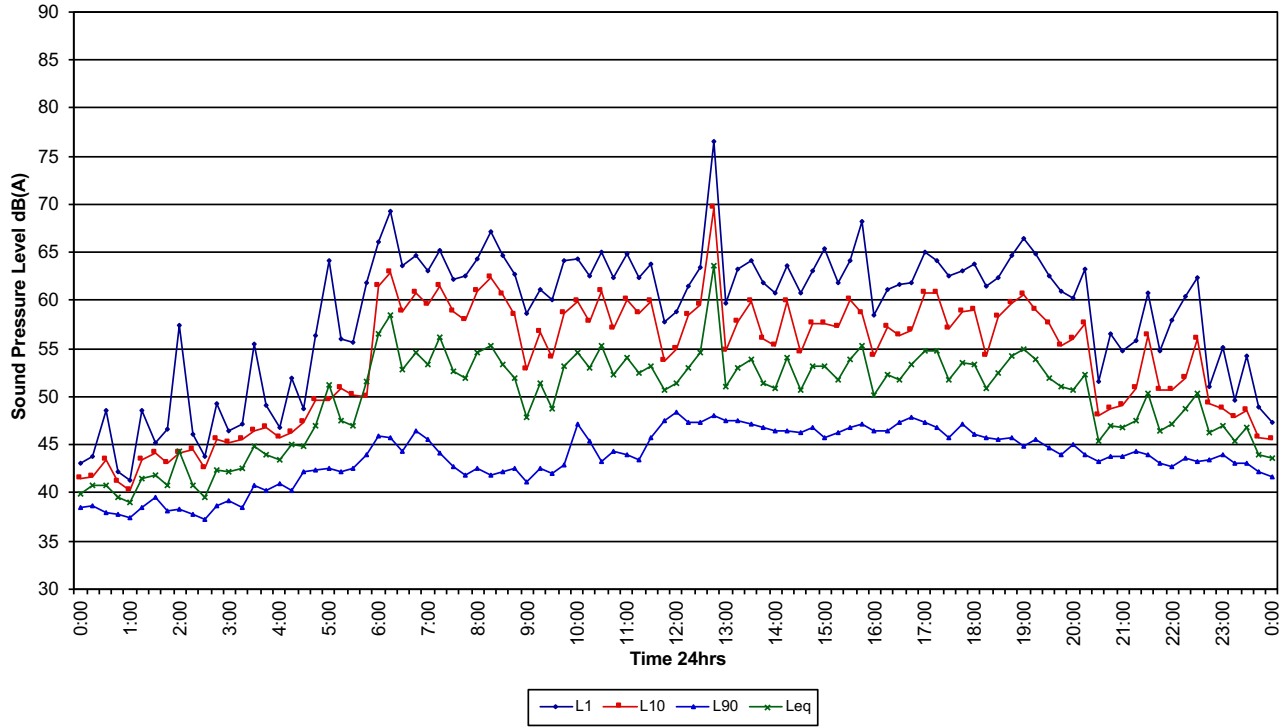




Traffic Noise Logger

34 Chelmsford Avenue, Botany

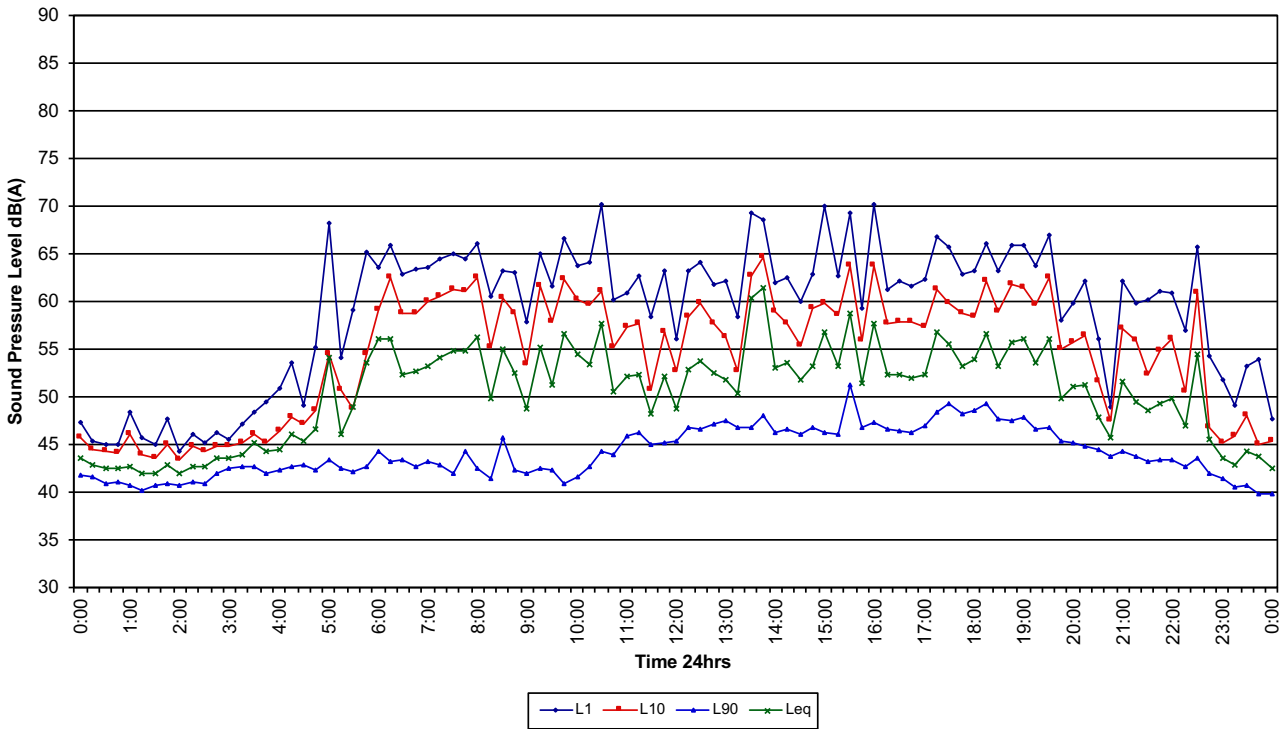
Wednesday 9/11/2022



Traffic Noise Logger

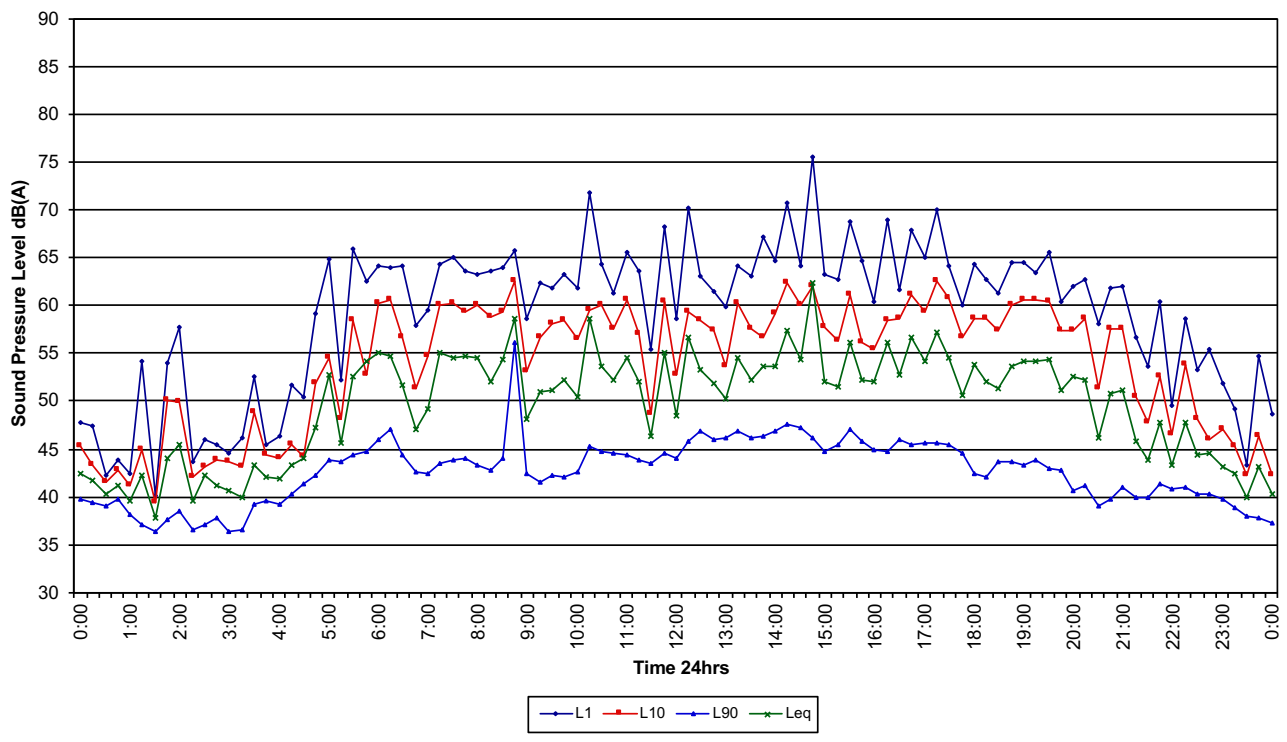
34 Chelmsford Avenue, Botany

Thursday 10/11/2022

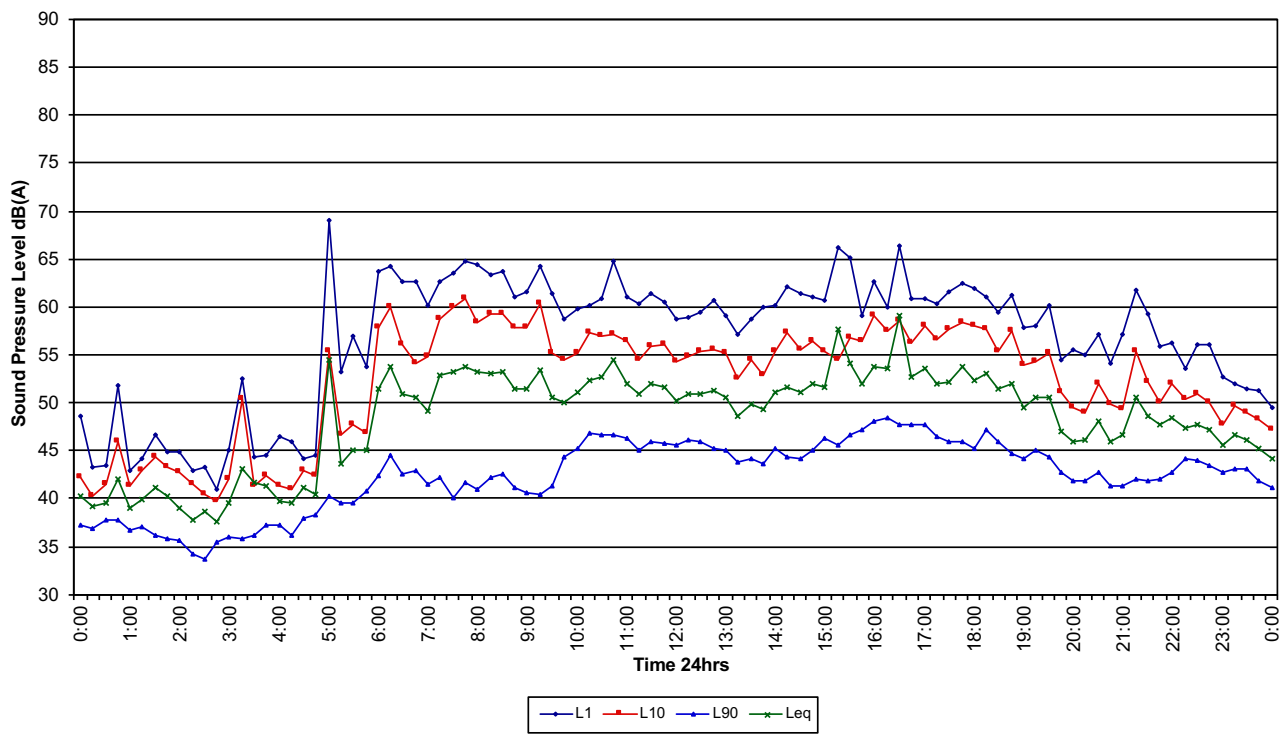




Traffic Noise Logger
34 Chelmsford Avenue, Botany
Friday 11/11/2022

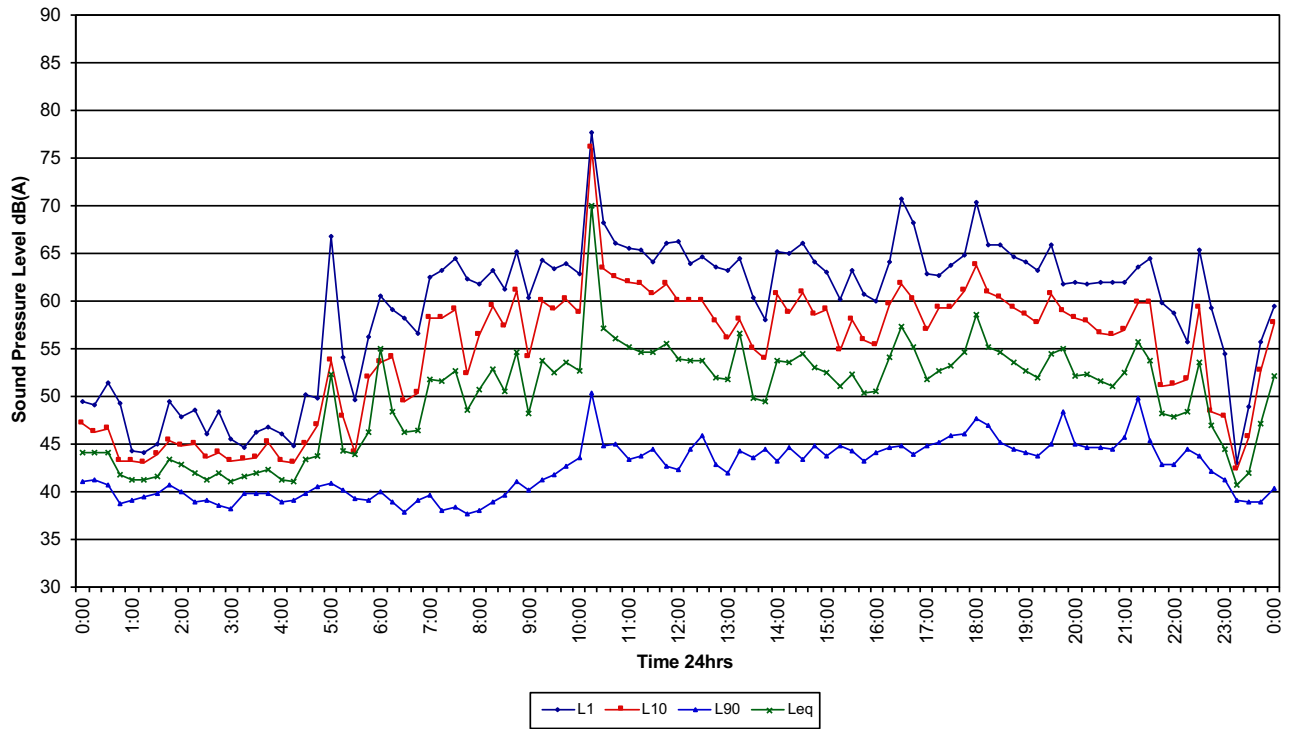


Traffic Noise Logger
34 Chelmsford Avenue, Botany
Saturday 12/11/2022

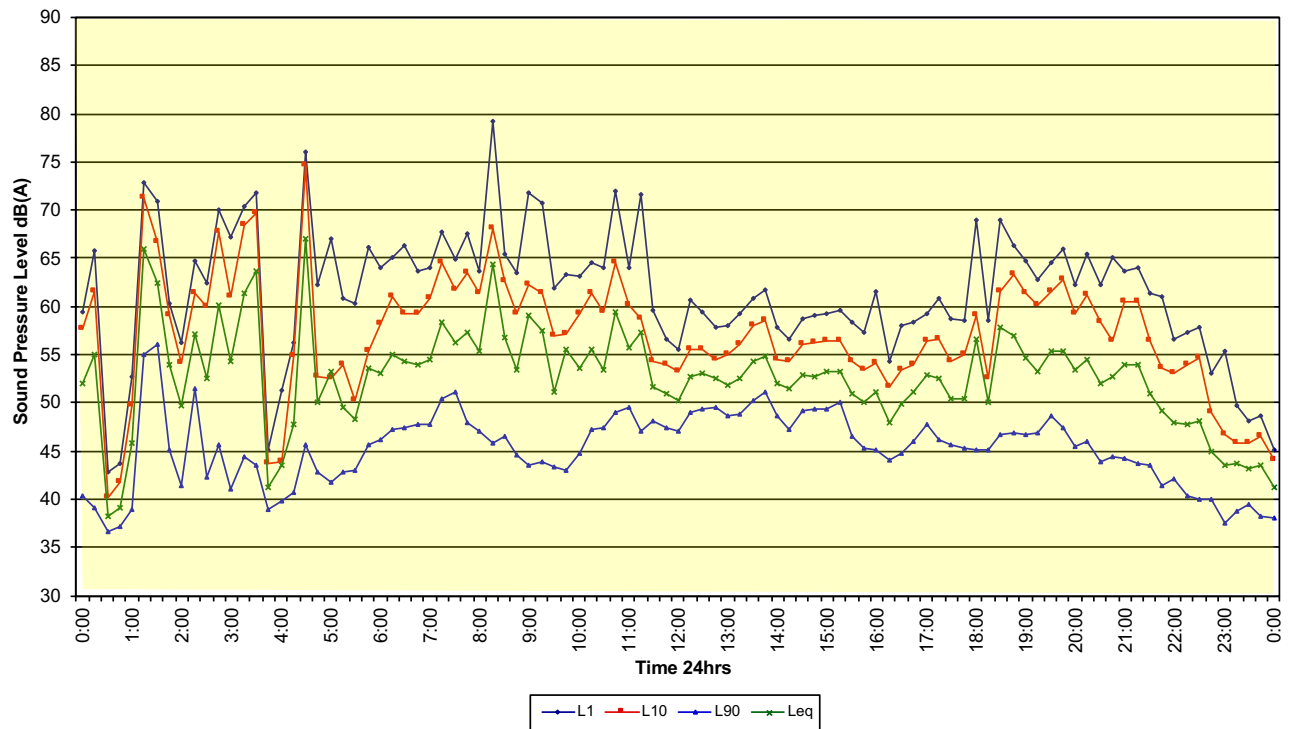




Traffic Noise Logger
34 Chelmsford Avenue, Botany
Sunday 13/11/2022

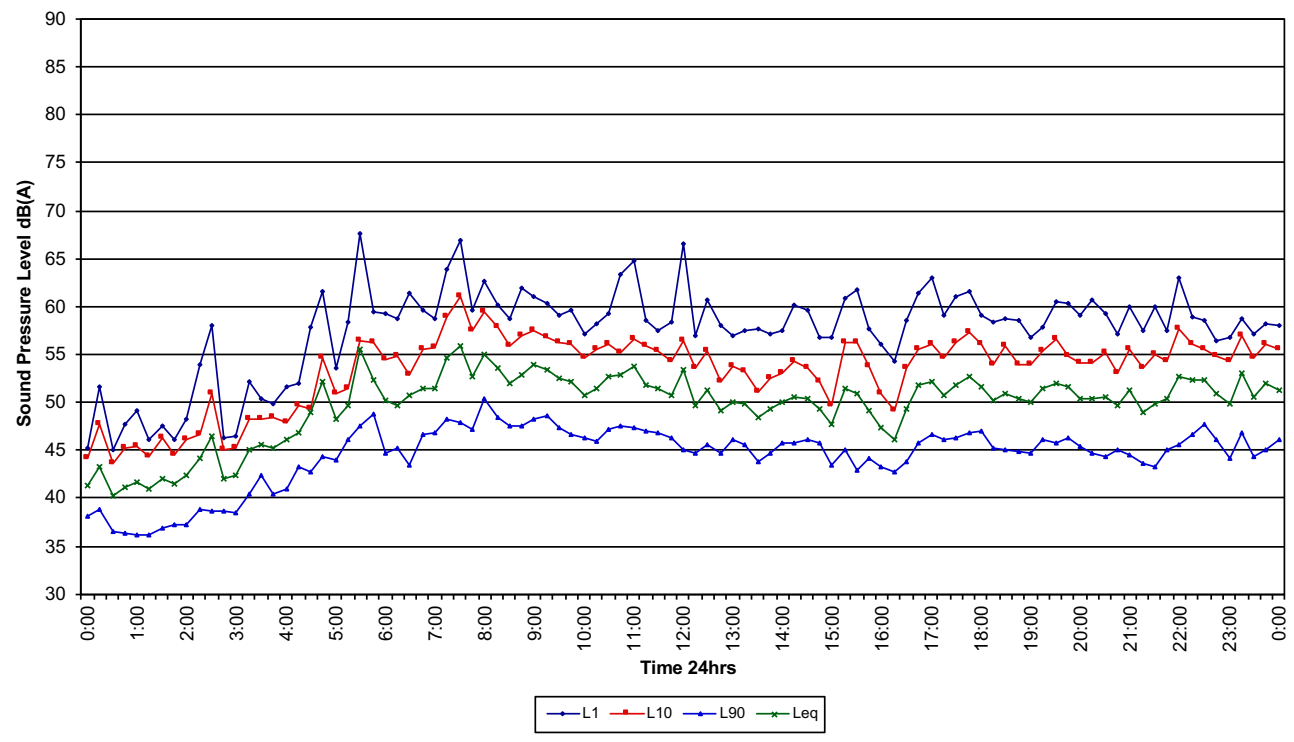


Traffic Noise Logger
34 Chelmsford Avenue, Botany
Monday 14/11/2022

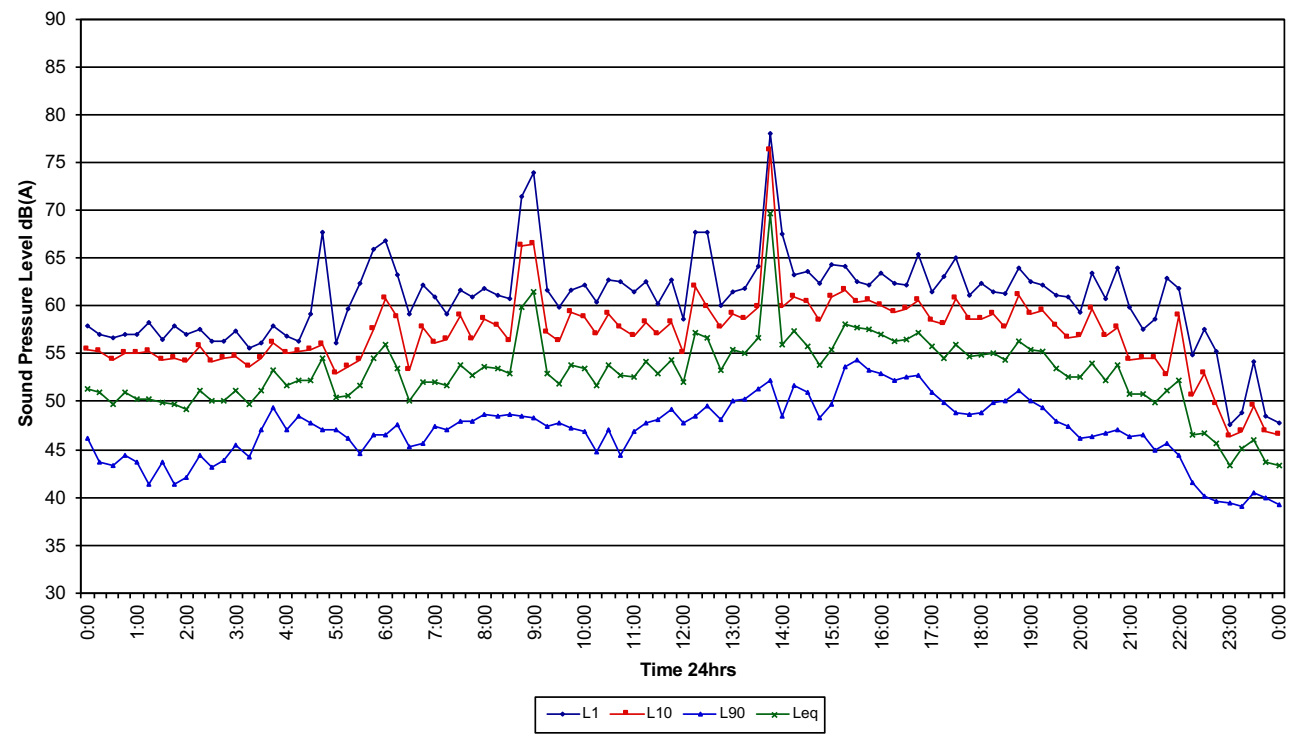




Traffic Noise Logger
34 Chelmsford Avenue, Botany
Tuesday 15/11/2022

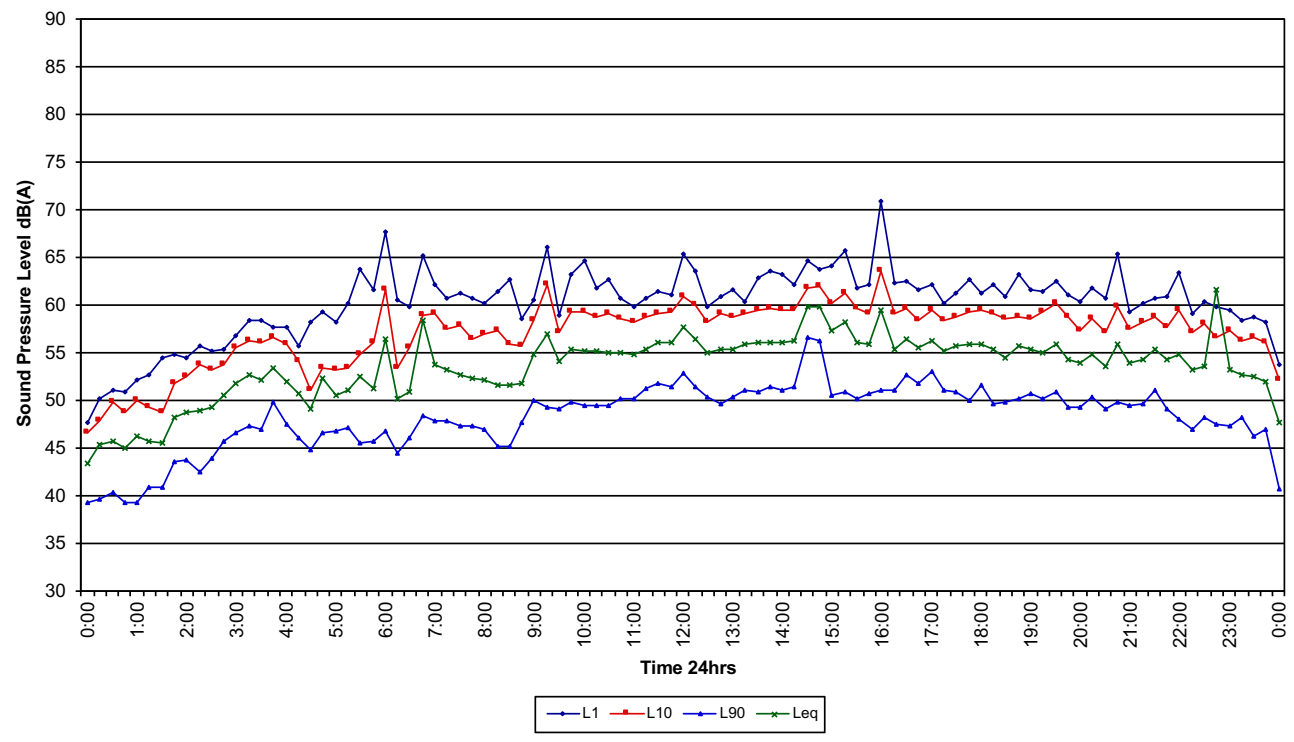


Traffic Noise Logger
34 Chelmsford Avenue, Botany
Wednesday 16/11/2022

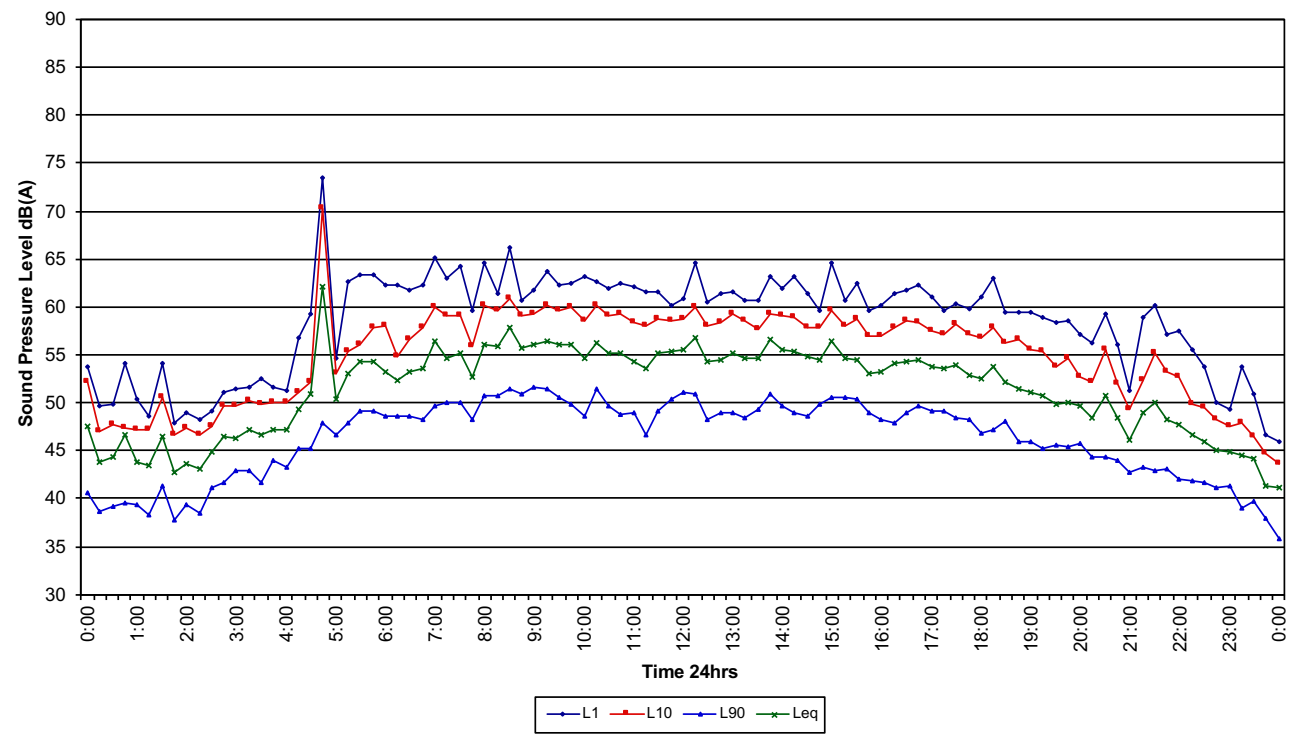




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Thursday 17/11/2022

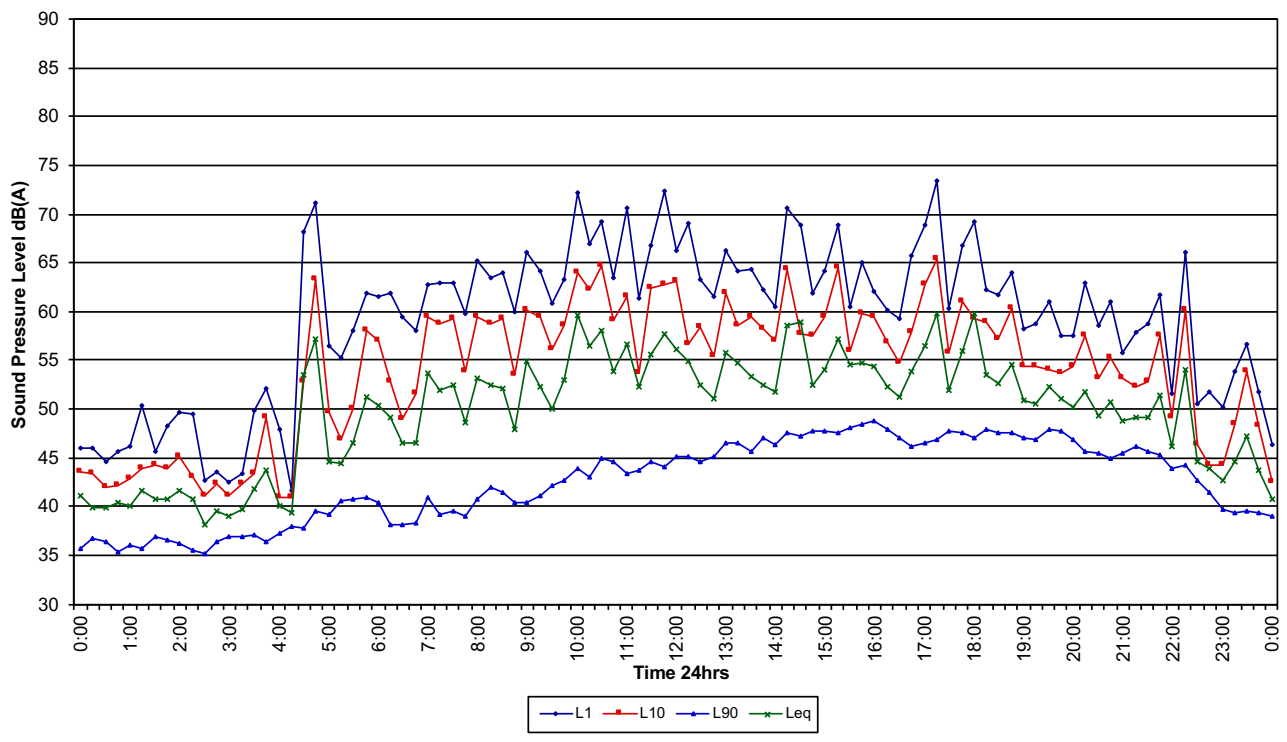


Traffic Noise Logger
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Friday 18/11/2022

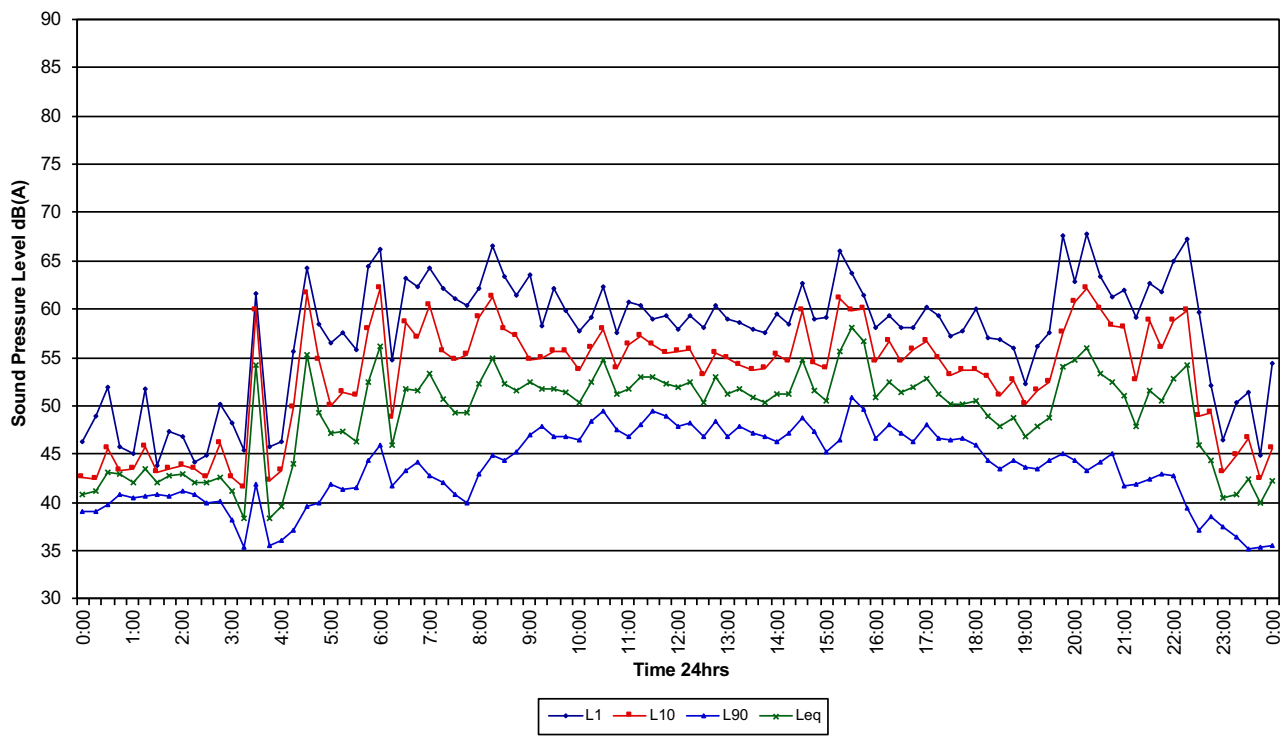




Traffic Noise Logger
34 Chelmsford Avenue, Botany
Saturday 19/11/2022

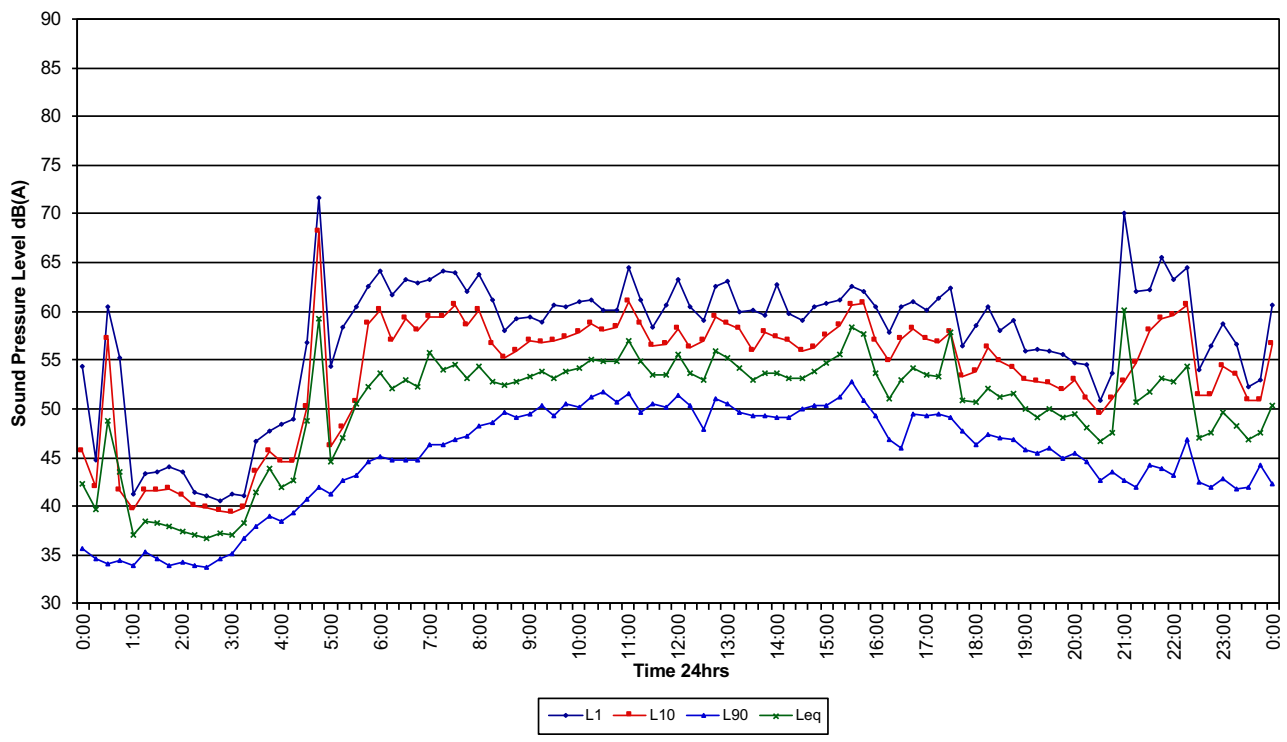


Traffic Noise Logger
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Sunday 20/11/2022

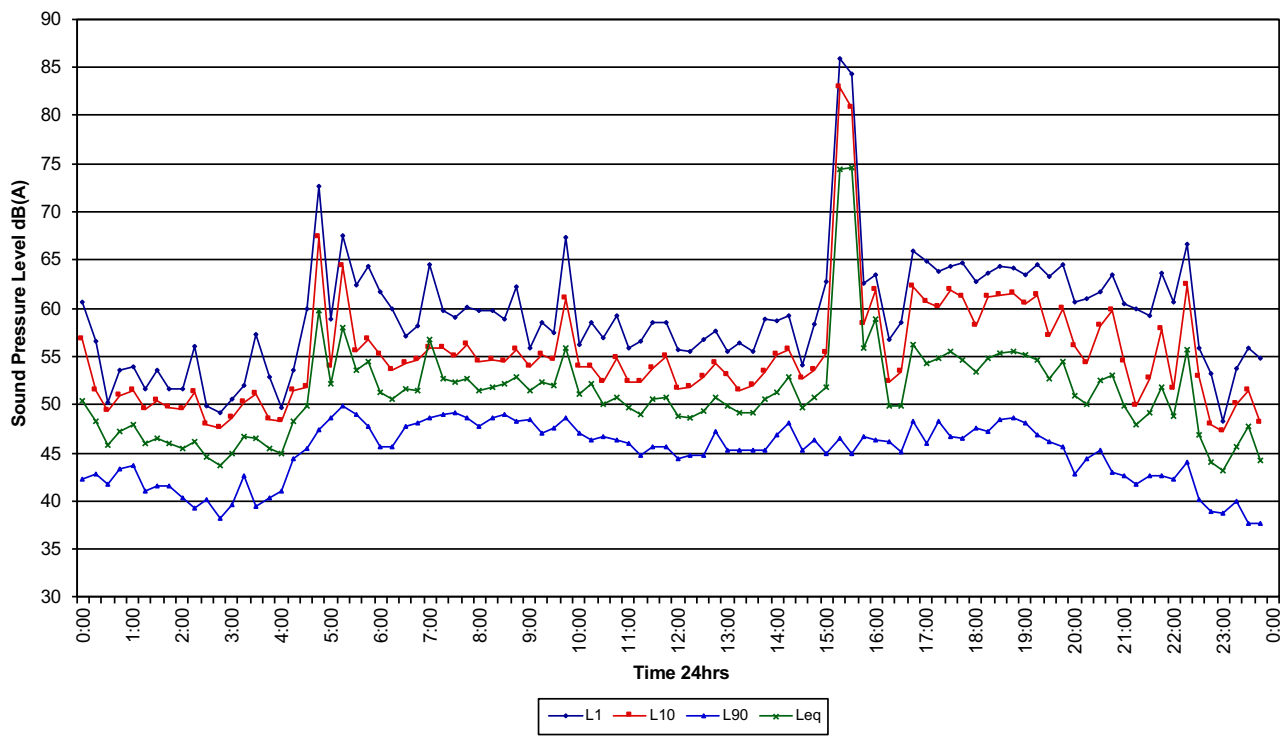




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Monday 21/11/2022

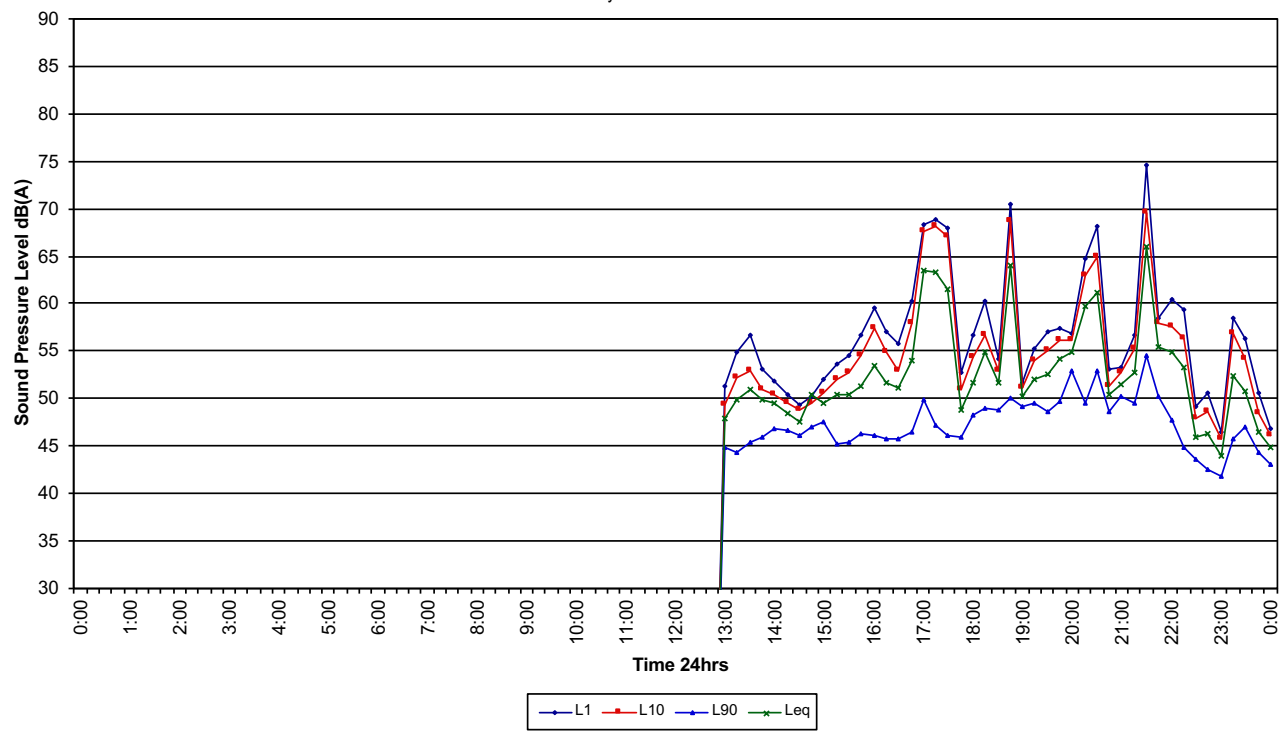


Traffic Noise Logger
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Tuesday 22/11/2022

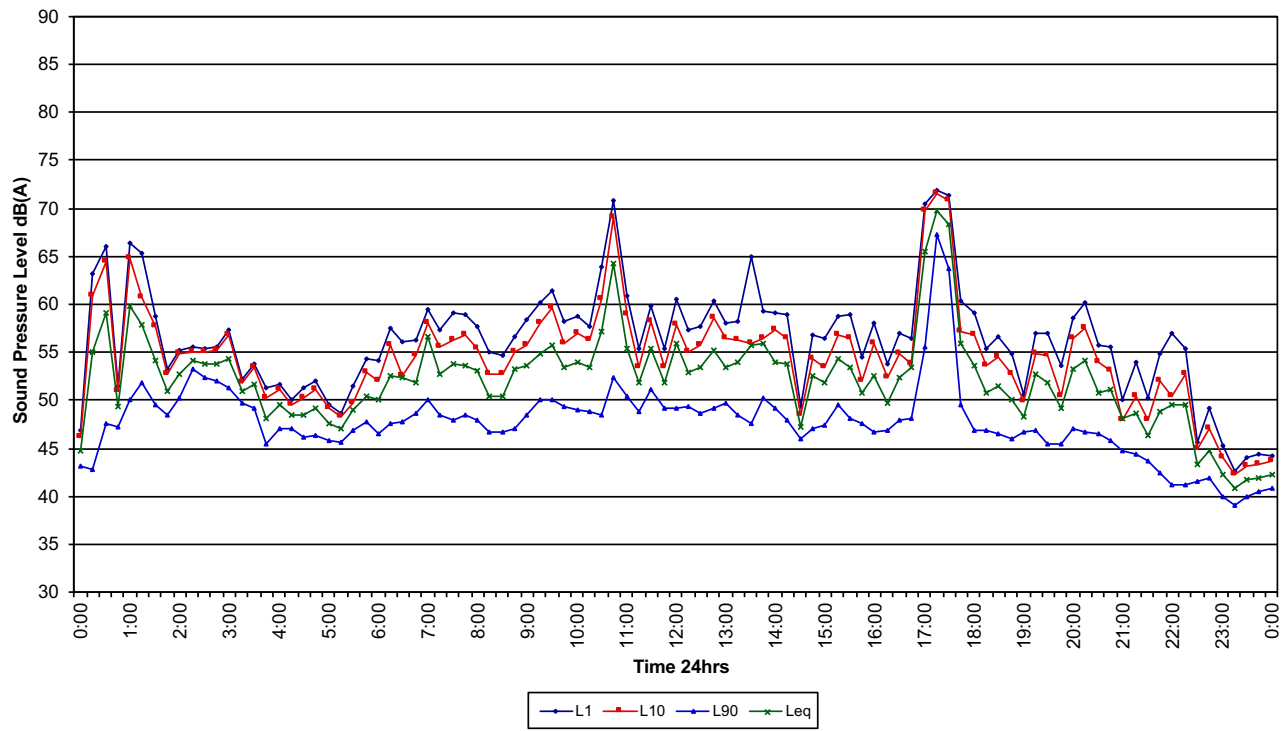




Ambient
26 Dent Street, Botany
Wednesday 11/5/2022



Ambient
26 Dent Street, Botany
Thursday 12/5/2022

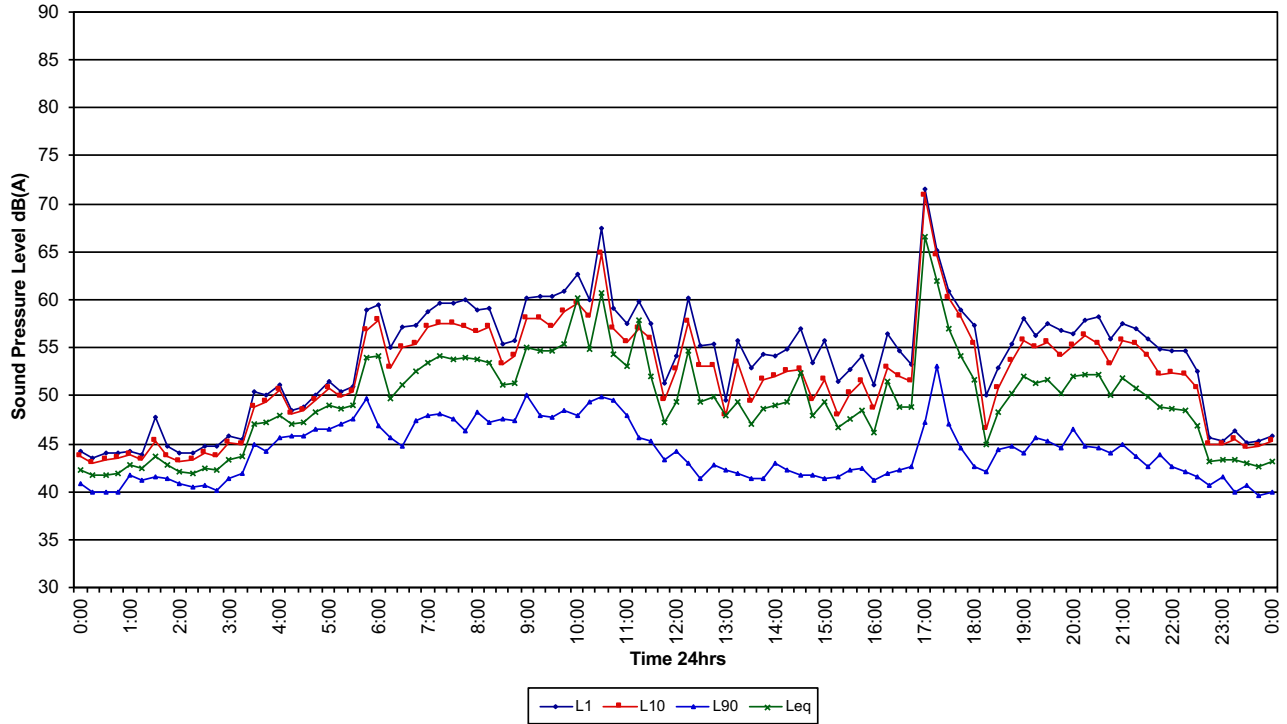




Ambient

26 Dent Street, Botany

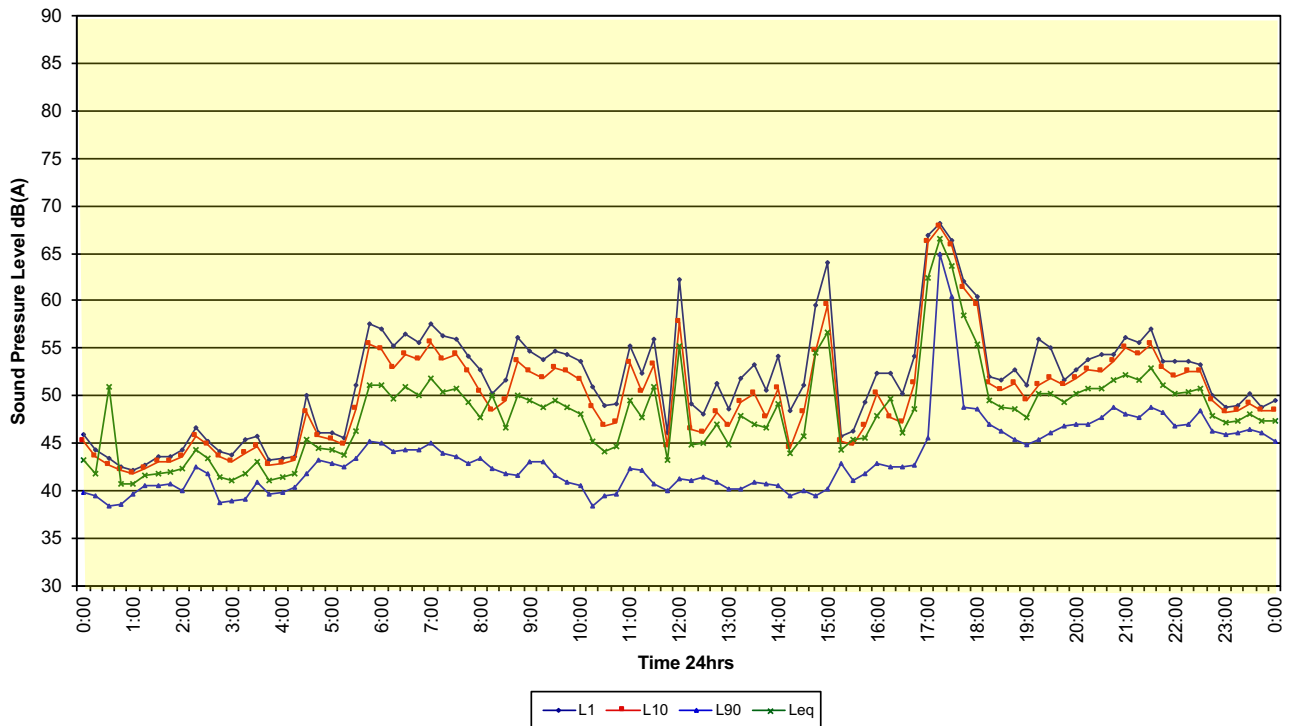
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Ambient

26 Dent Street, Botany

Saturday 14/5/2022

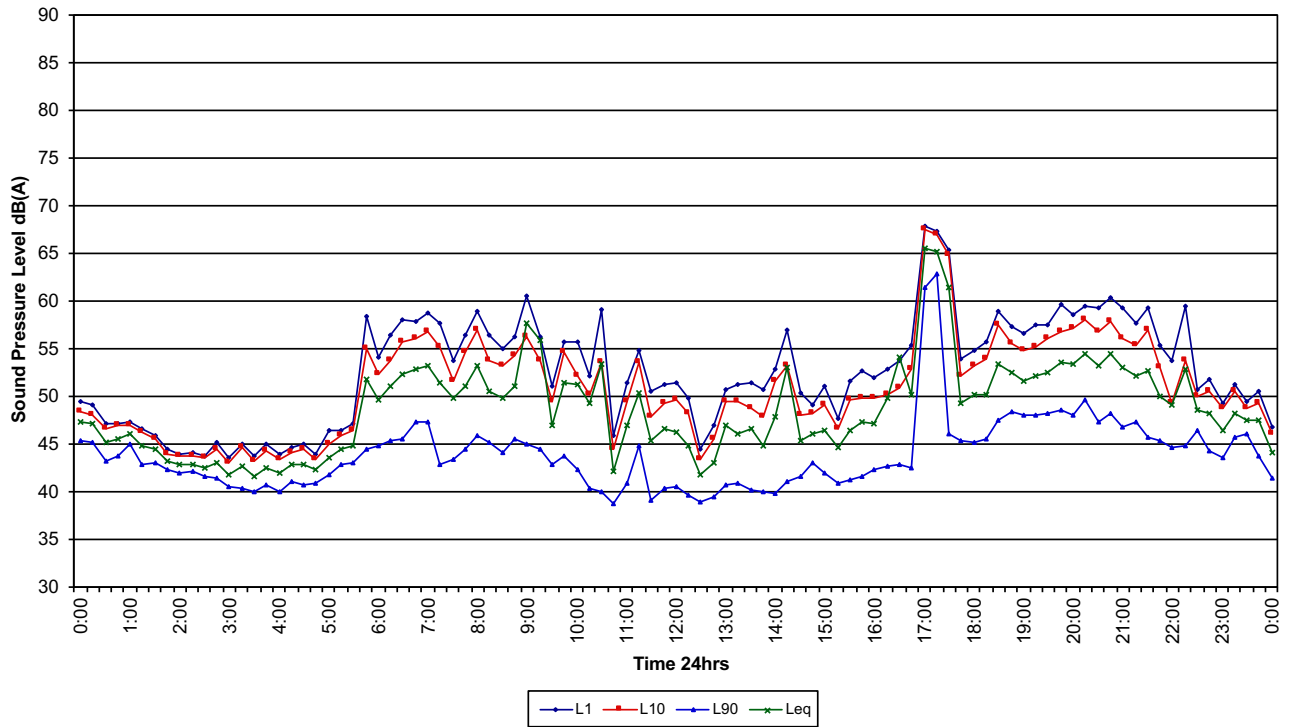




Ambient

26 Dent Street, Botany

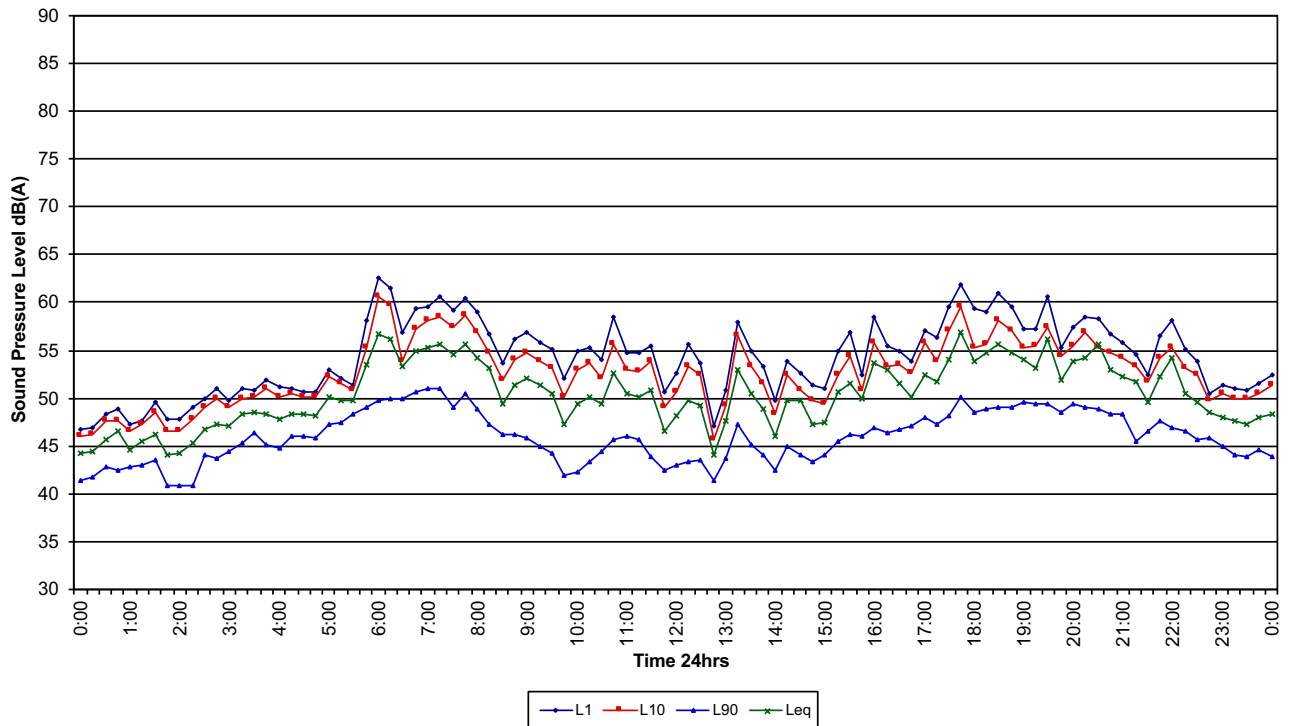
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Ambient

26 Dent Street, Botany

Monday 16/5/2022

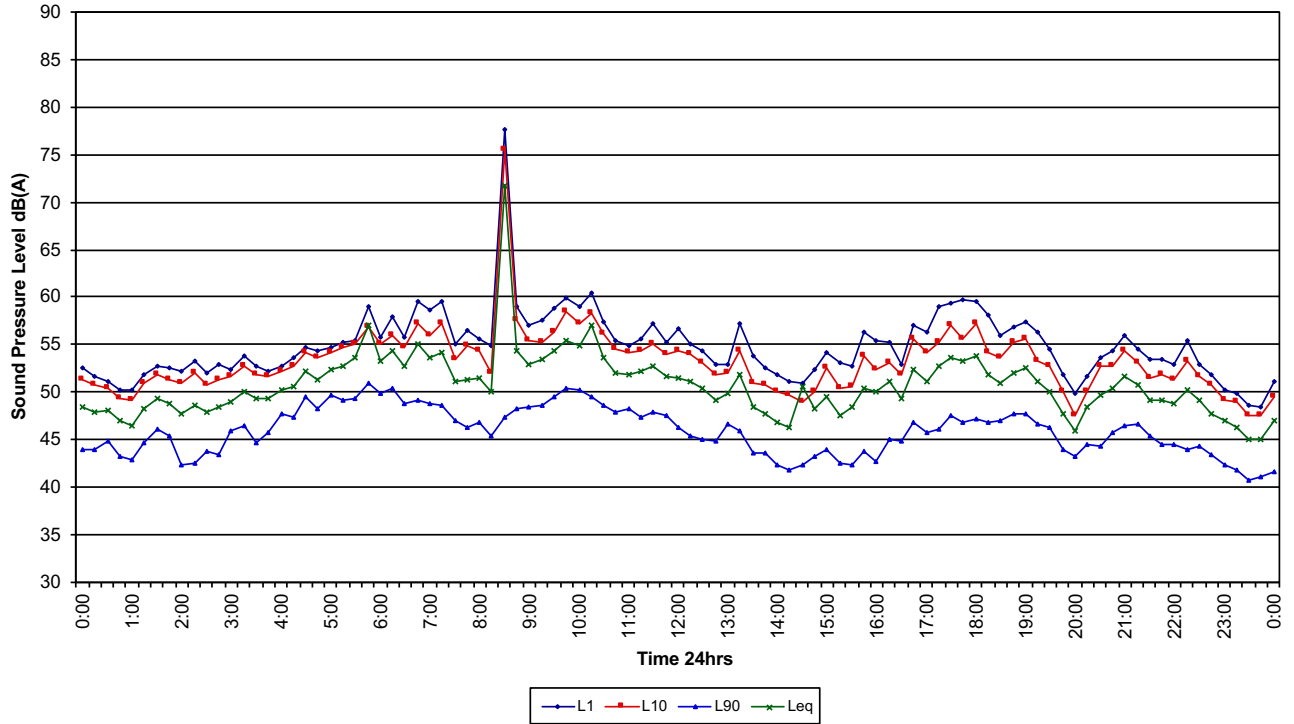




Ambient

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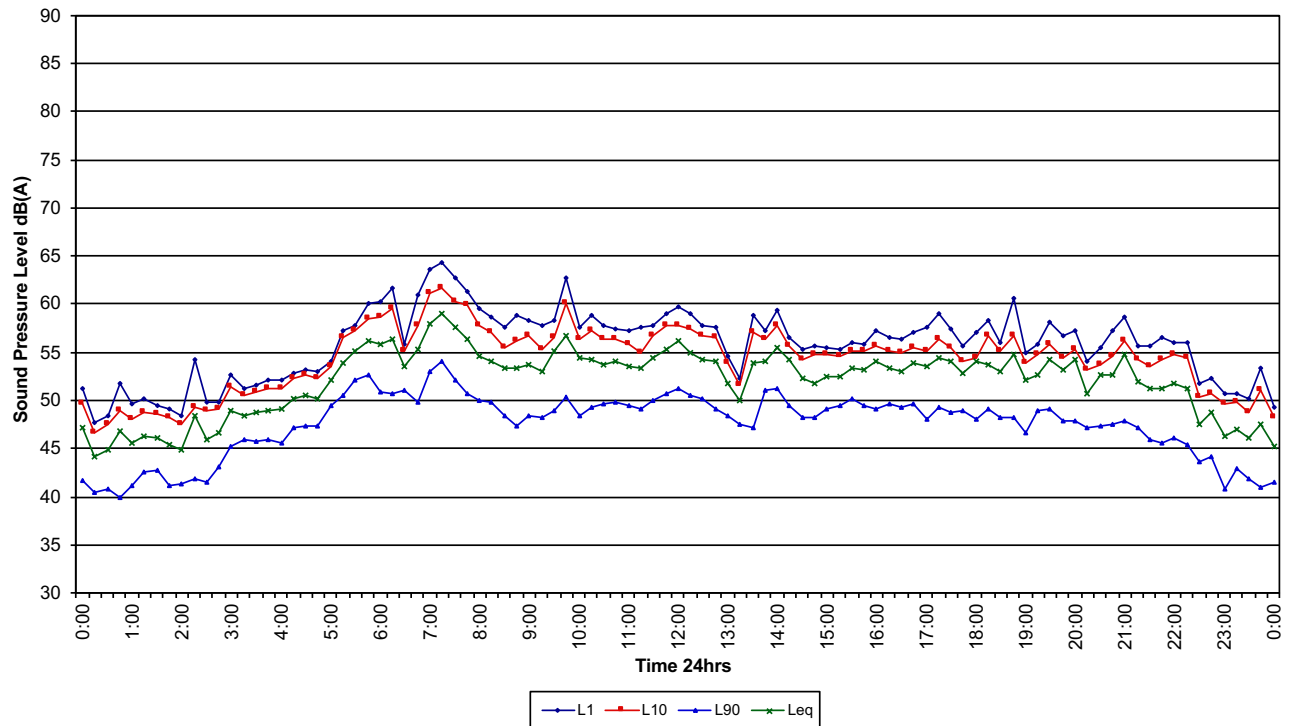
Tuesday 17/5/2022



Ambient

26 Dent Street, Botany

Wednesday 18/5/2022

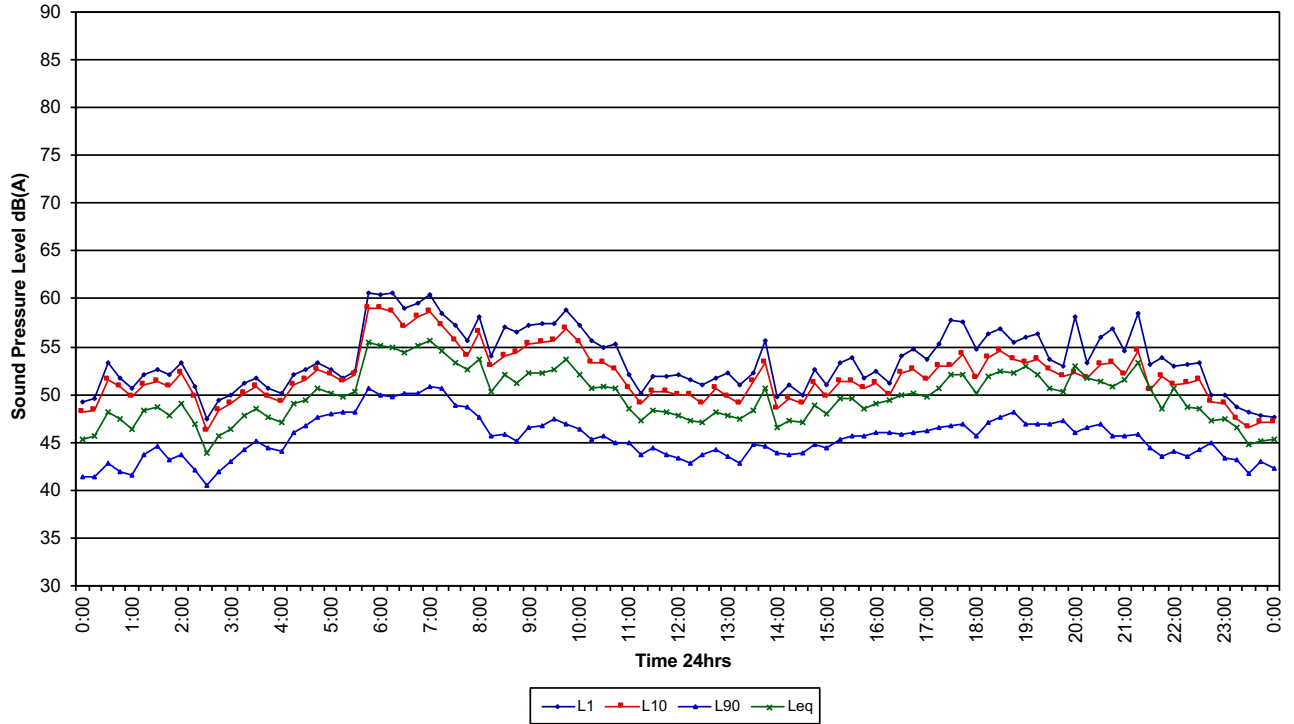




Ambient

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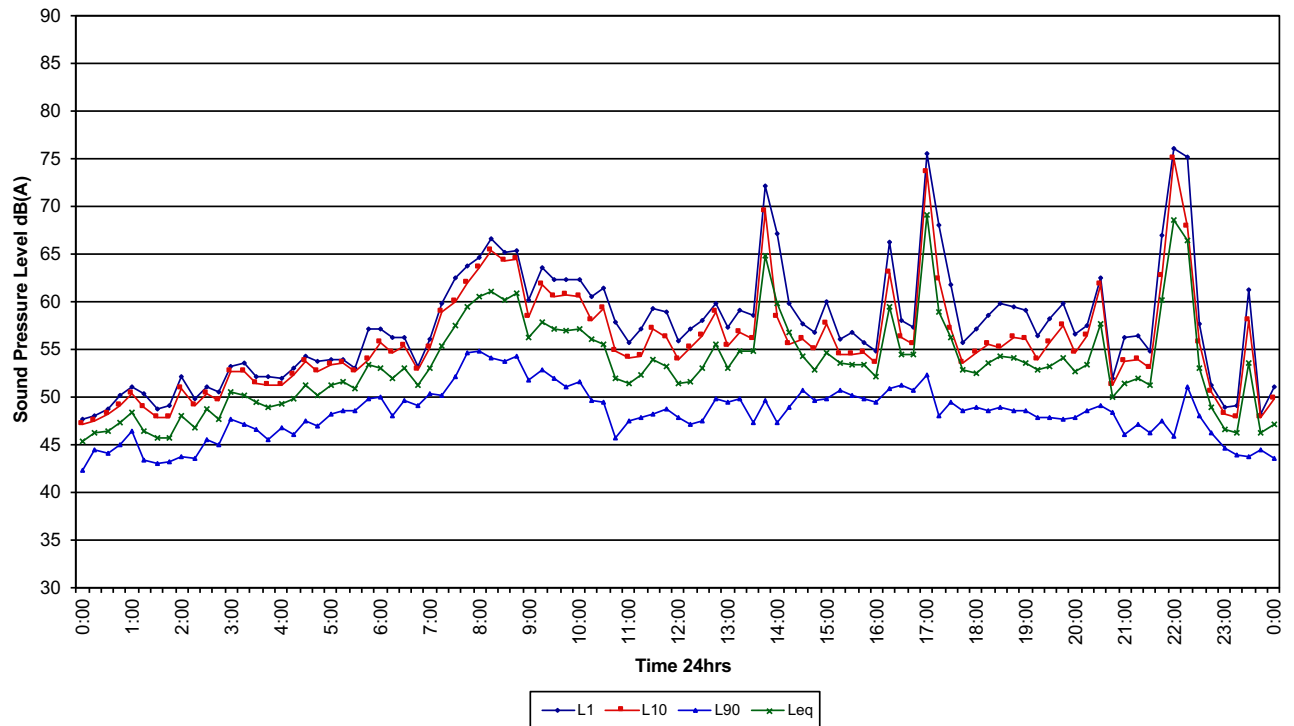
Thursday 19/5/2022



Ambient

26 Dent Street, Botany

Friday 20/5/2022

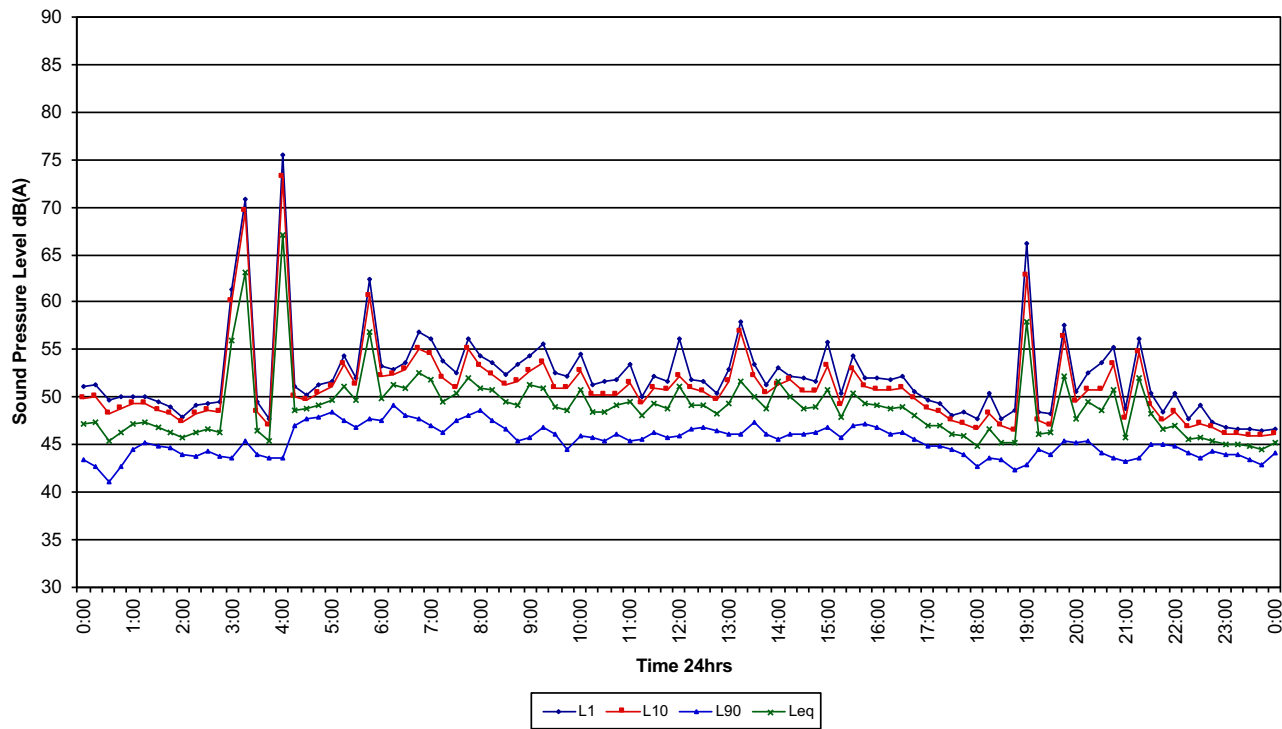




Ambient

26 Dent Street, Botany

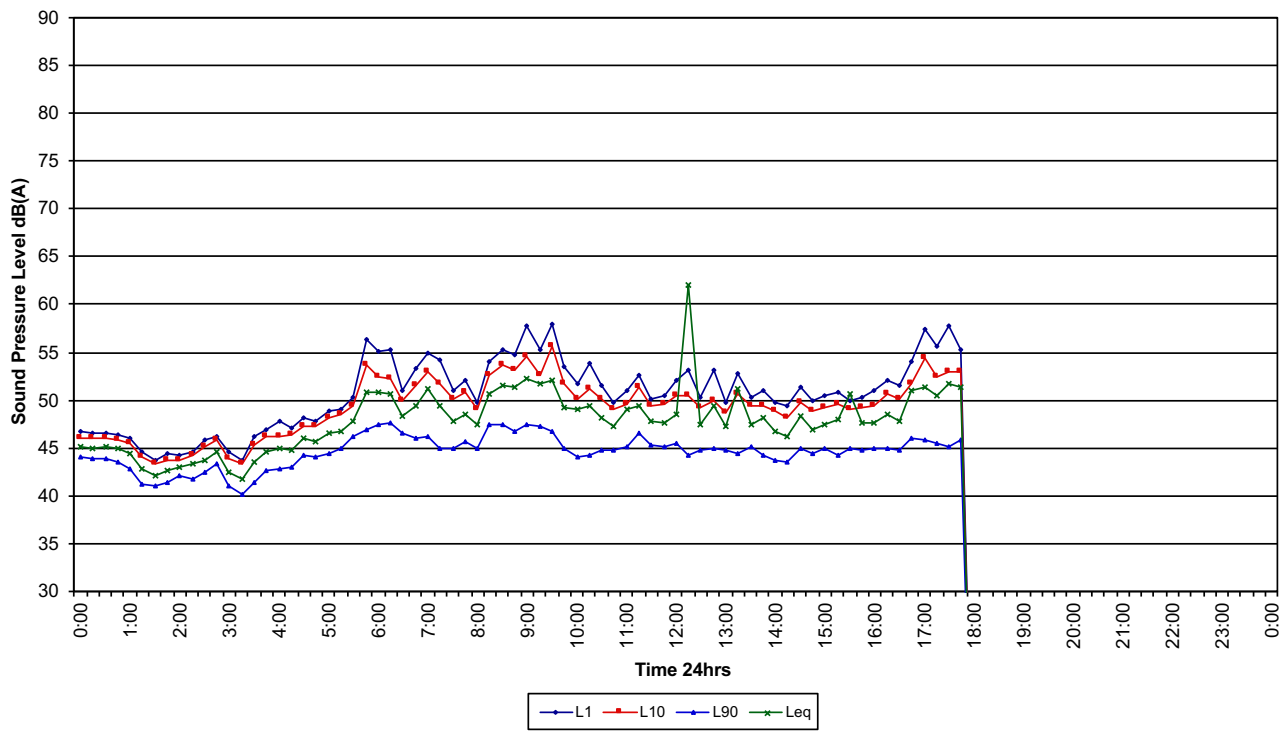
Saturday 21/5/2022



Ambient

26 Dent Street, Botany

Sunday 22/5/2022

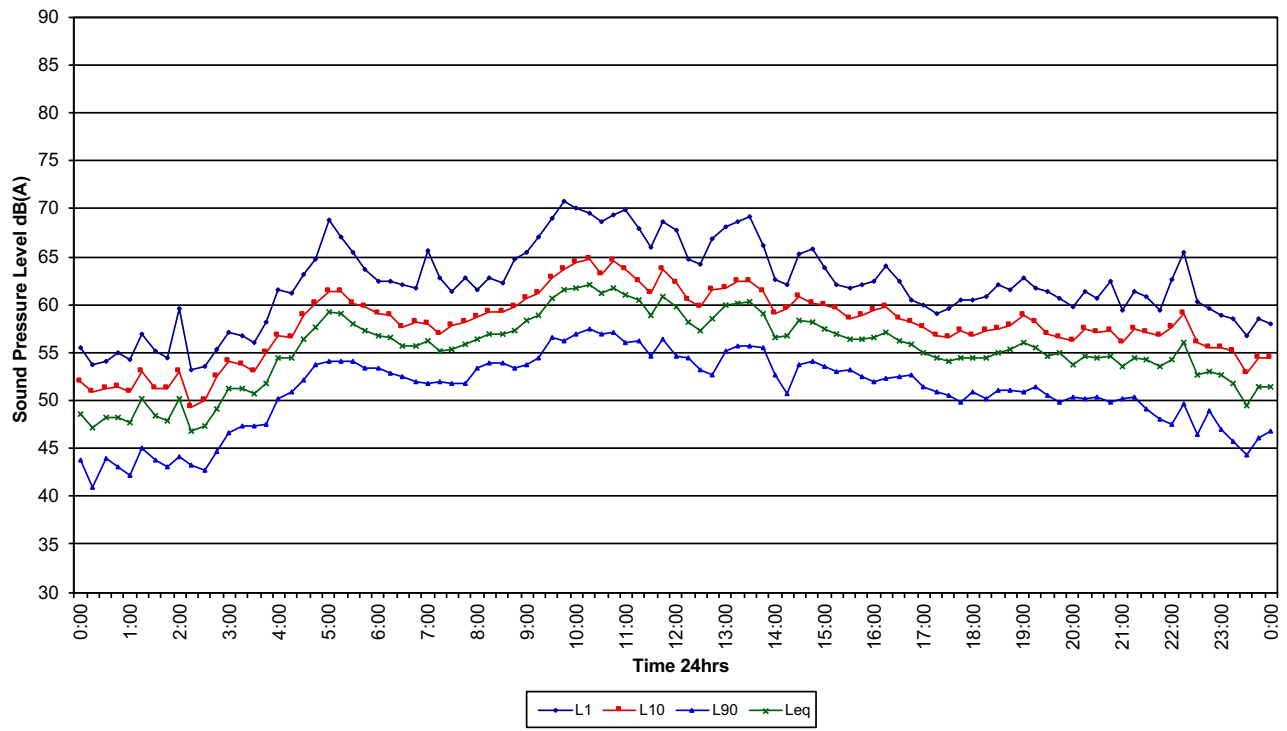




Ambient
26 Dent Street, Botany
Tuesday 31/5/2022



Ambient
26 Dent Street, Botany
Wednesday 1/6/2022

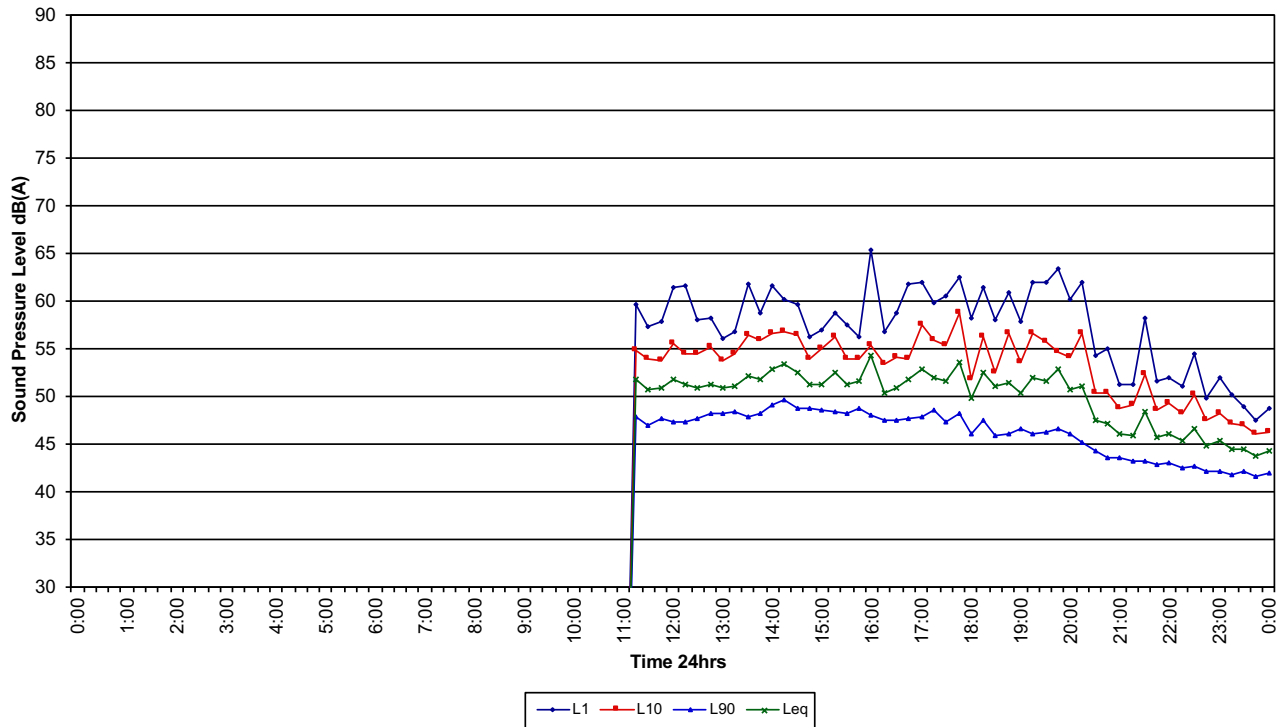




Ambient Noise Logger

1424 Botany Road, Botany

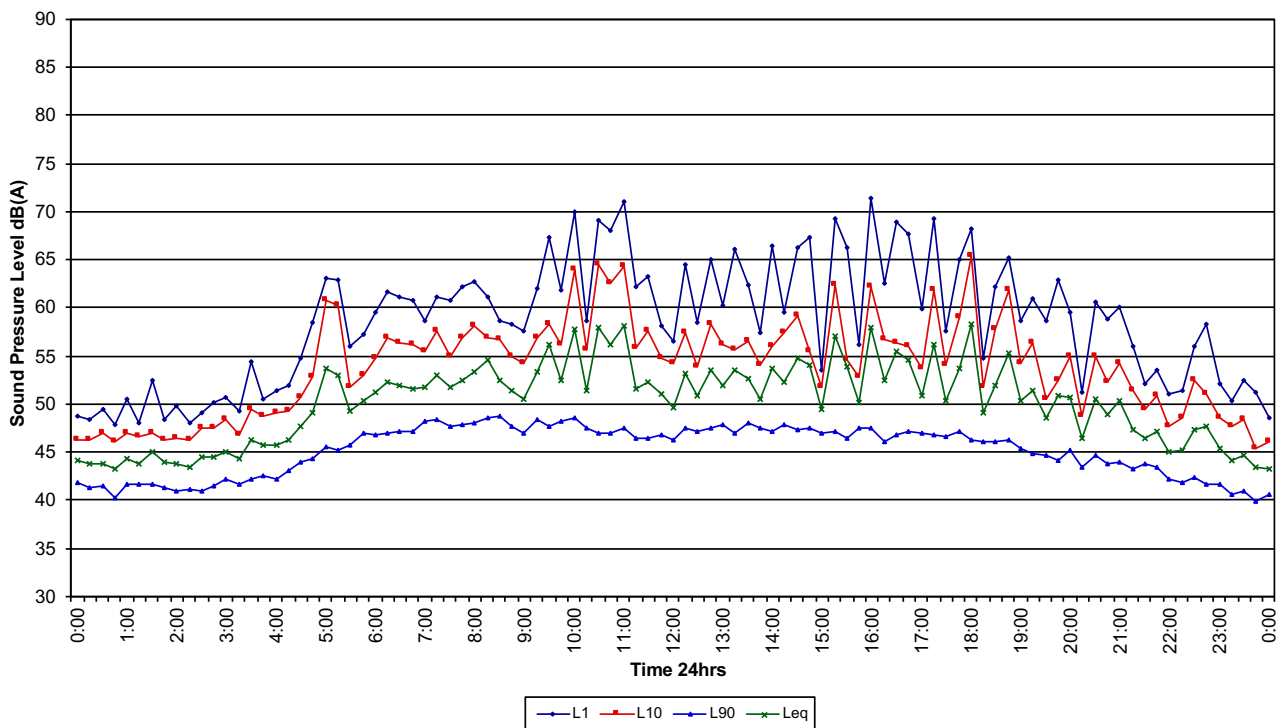
Monday 7/11/2022



Ambient Noise Logger

1424 Botany Road, Botany

Tuesday 8/11/2022

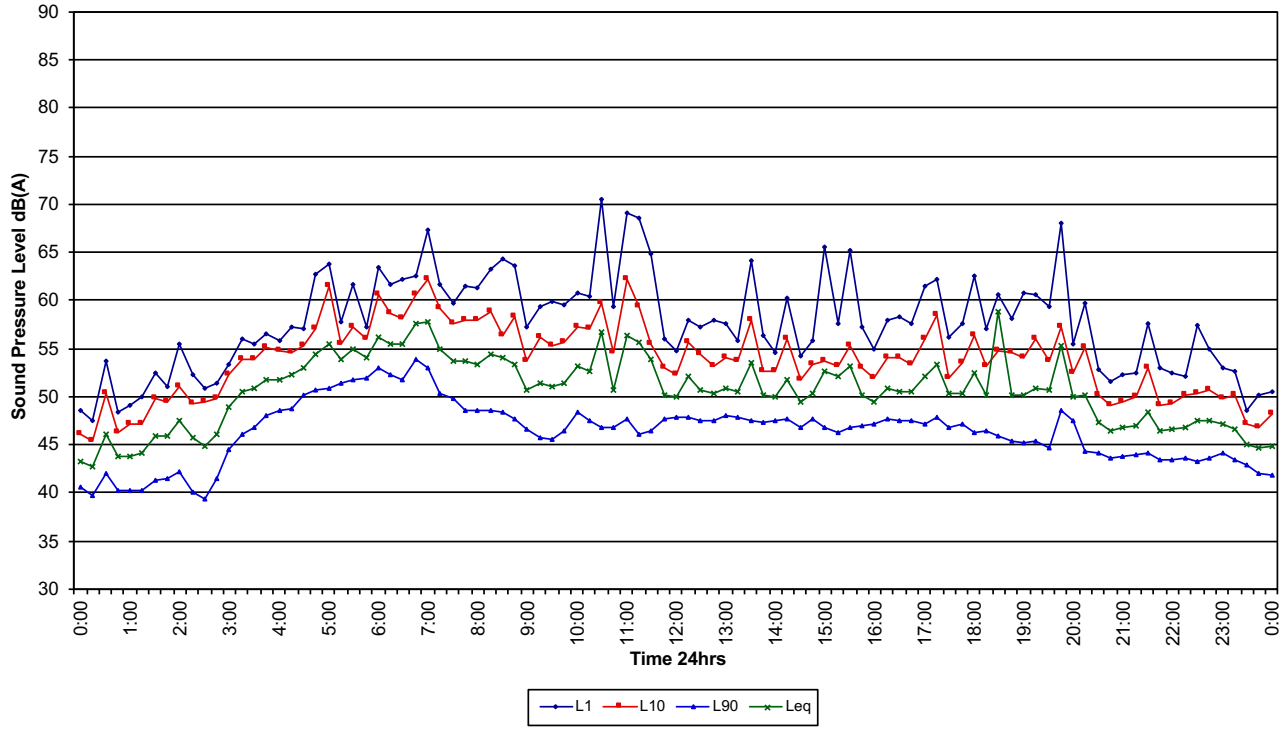




Ambient Noise Logger

1424 Botany Road, Botany

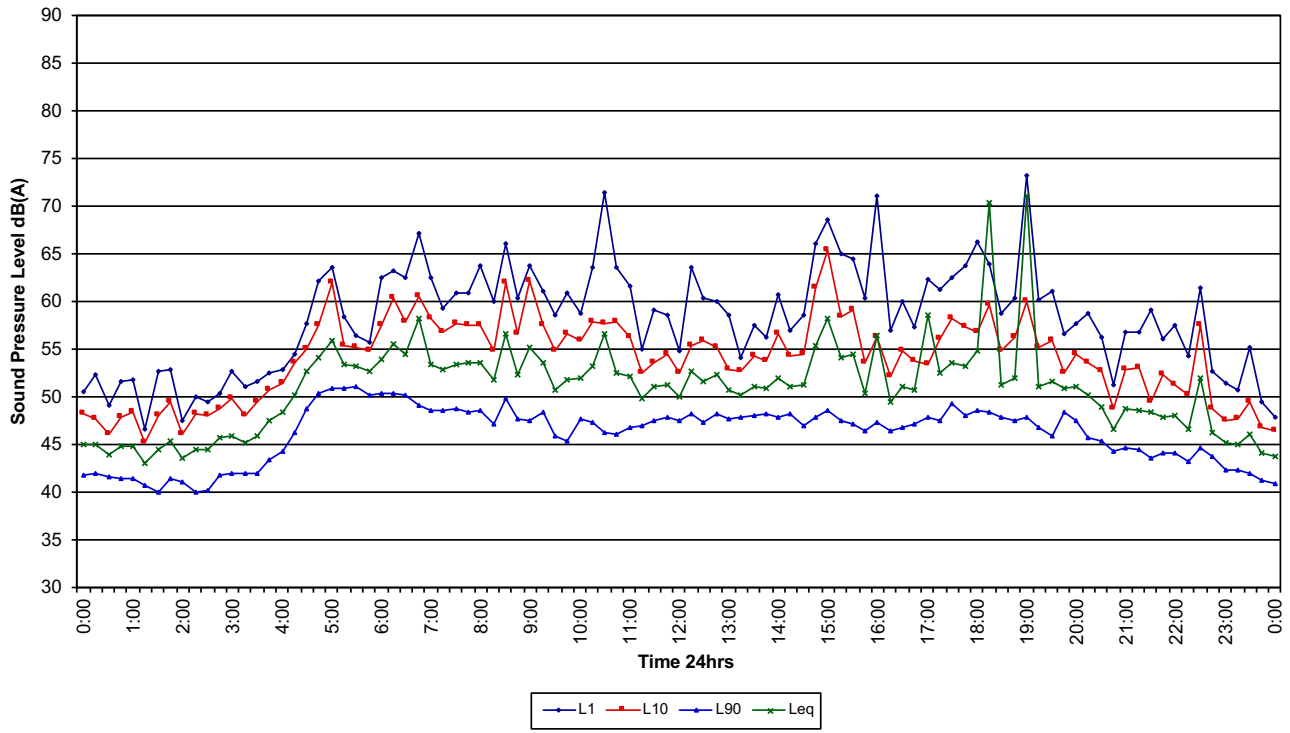
Wednesday 9/11/2022



Ambient Noise Logger

1424 Botany Road, Botany

Thursday 10/11/2022

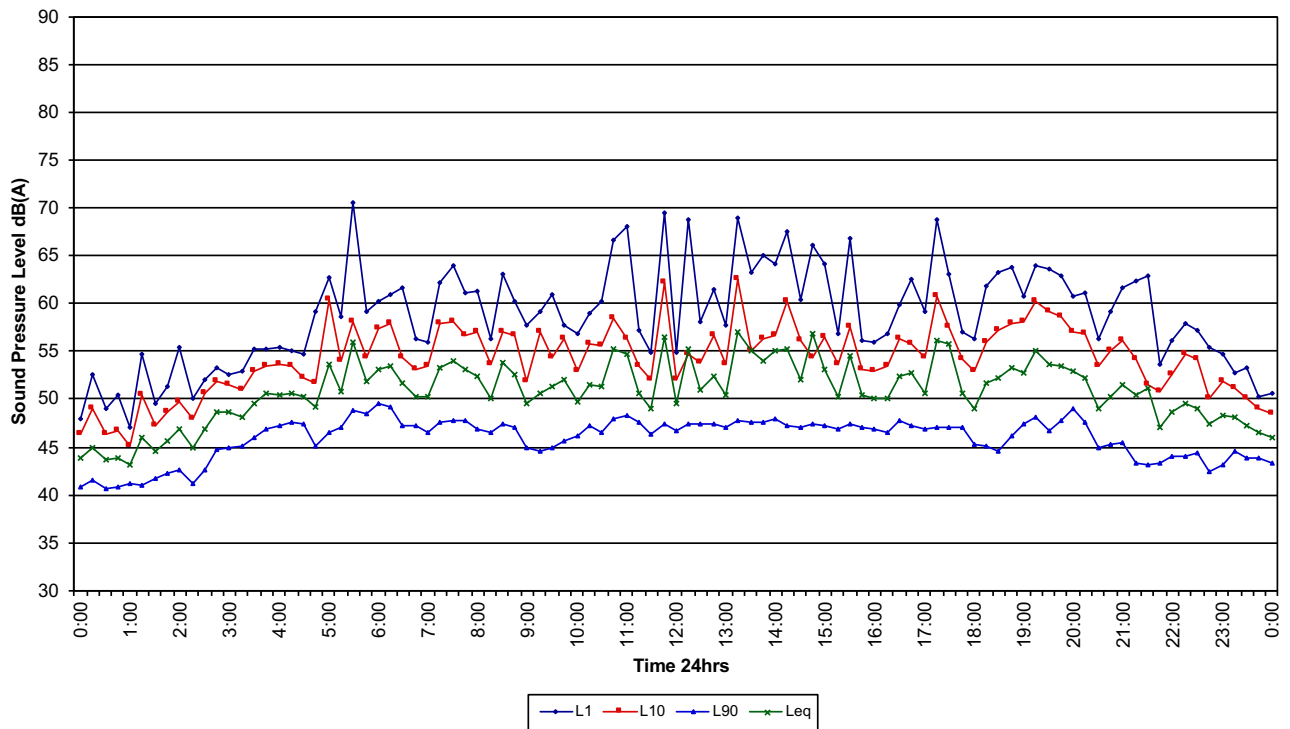




Ambient Noise Logger

1424 Botany Road, Botany

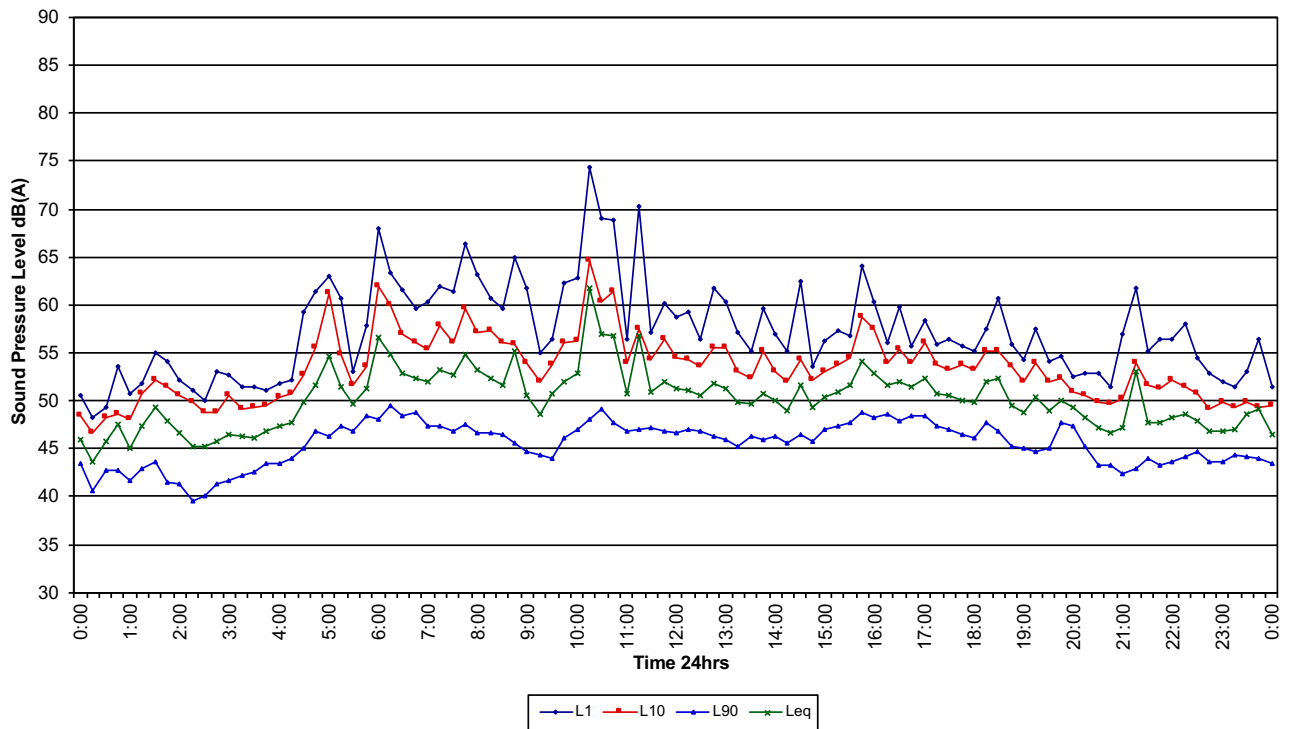
Friday 11/11/2022



Ambient Noise Logger

1424 Botany Road, Botany

Saturday 12/11/2022

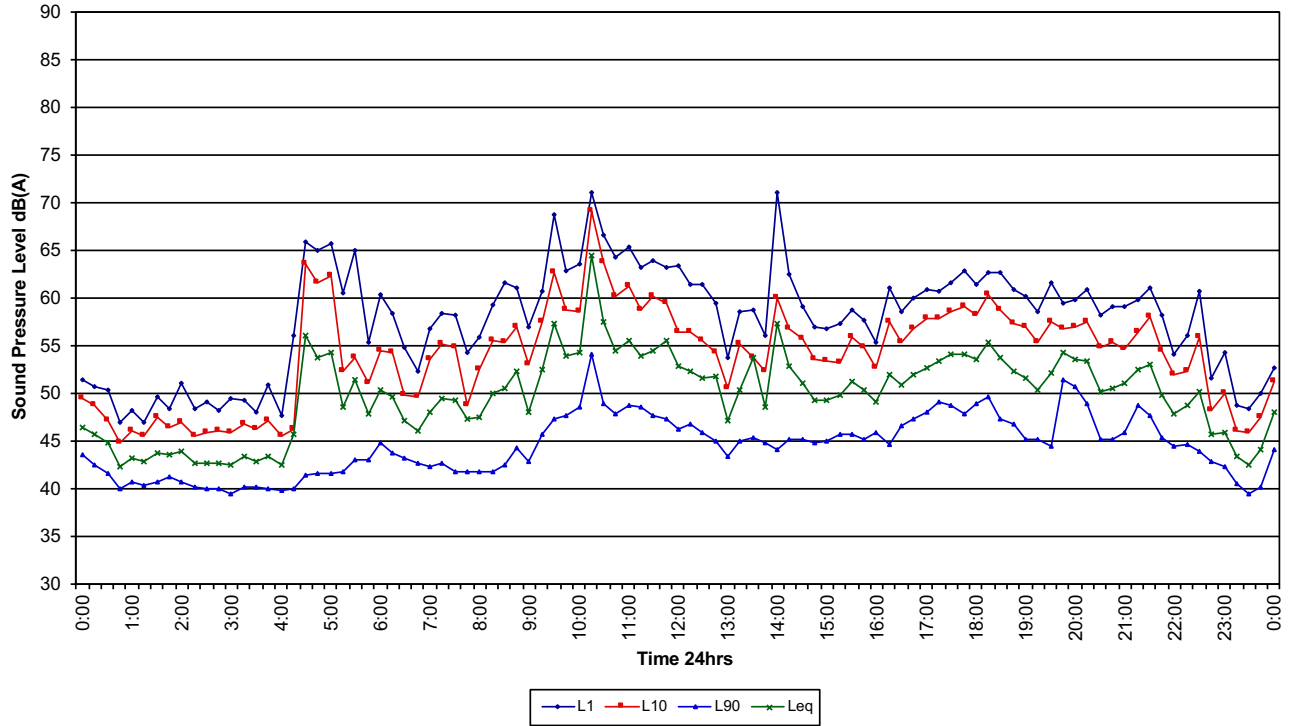




Ambient Noise Logger

1424 Botany Road, Botany

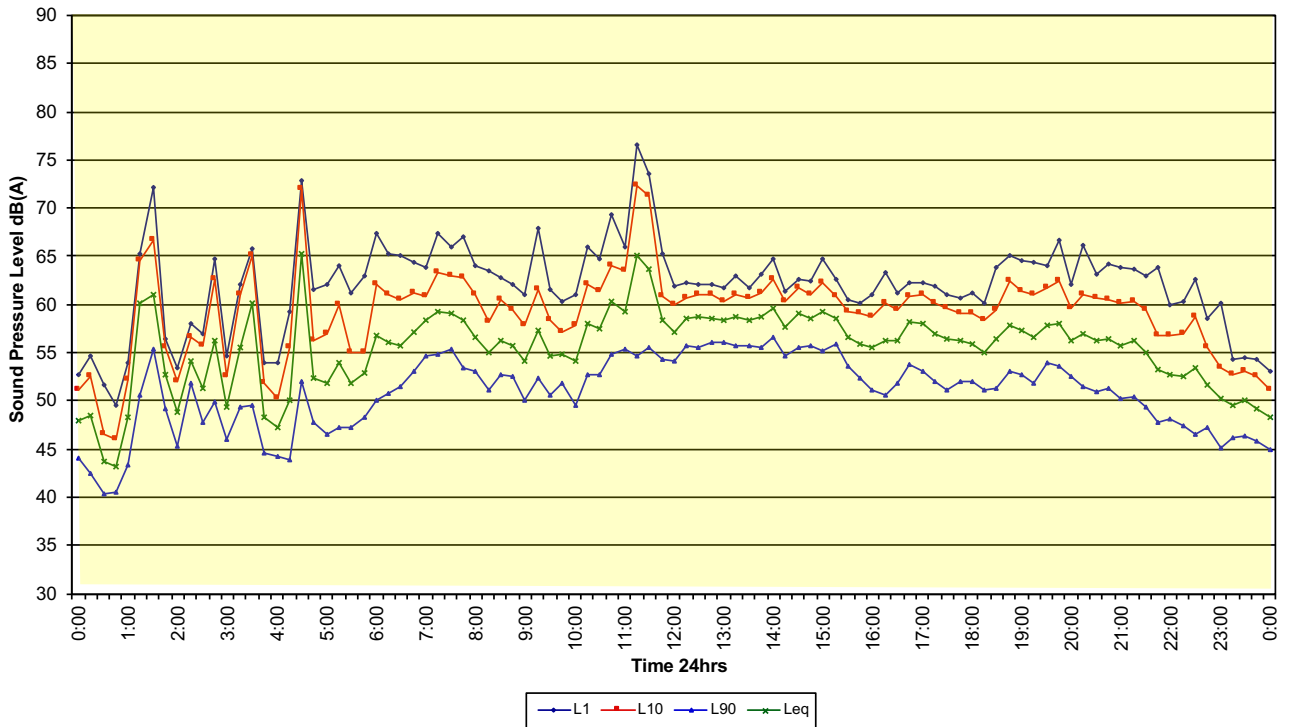
Sunday 13/11/2022



Ambient Noise Logger

1424 Botany Road, Botany

Monday 14/11/2022

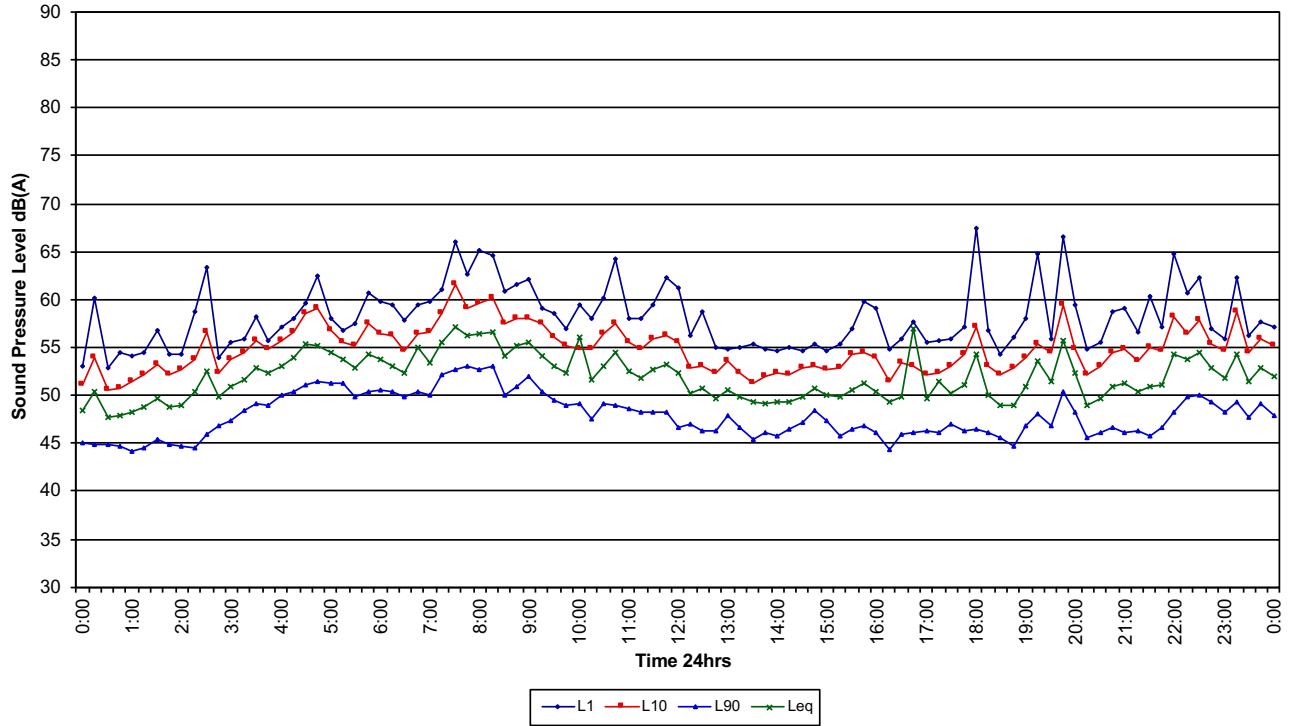




Ambient Noise Logger

1424 Botany Road, Botany

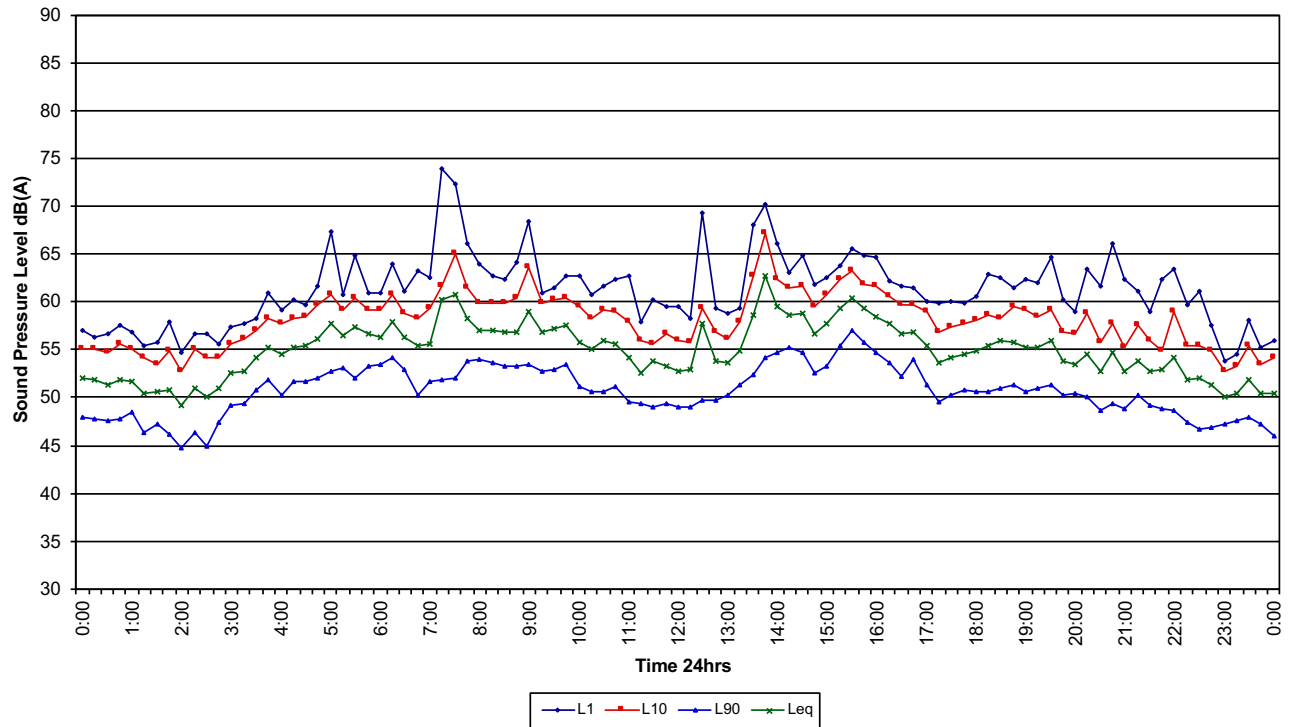
Tuesday 15/11/2022



Ambient Noise Logger

1424 Botany Road, Botany

Wednesday 16/11/2022

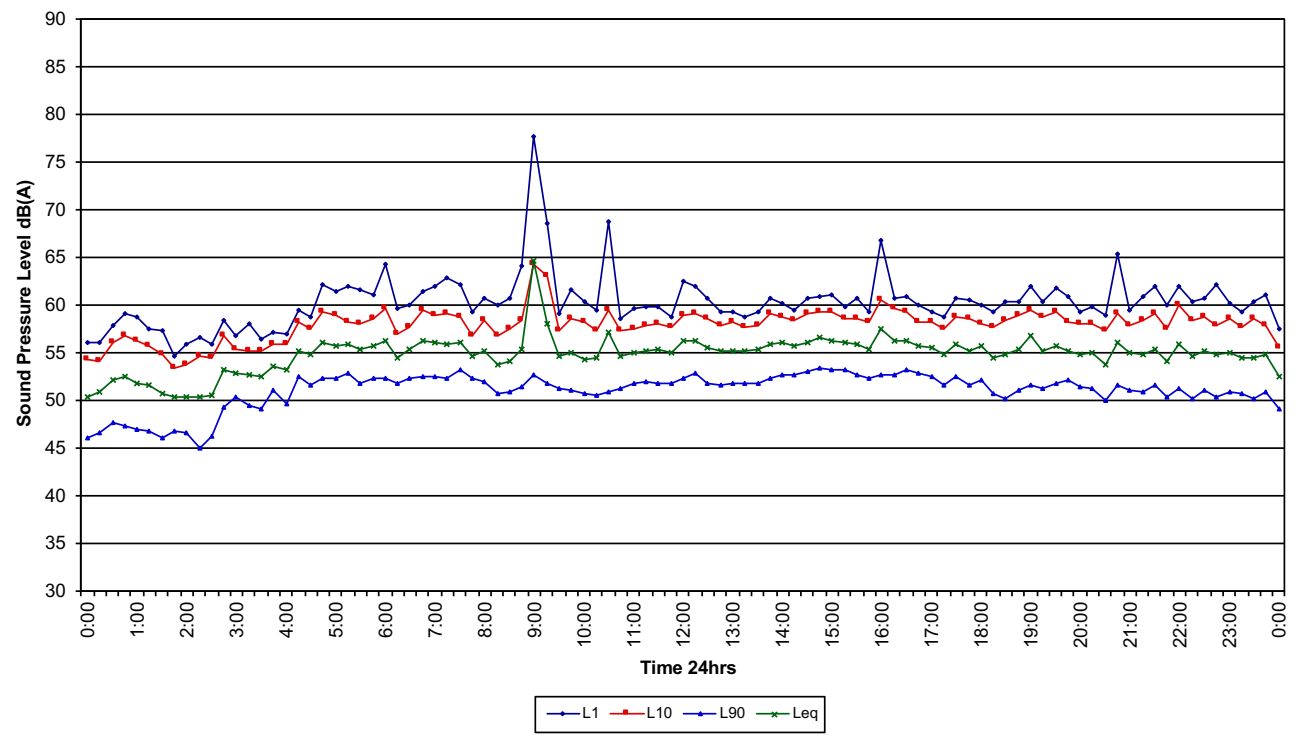




Ambient Noise Logger

1424 Botany Road, Botany

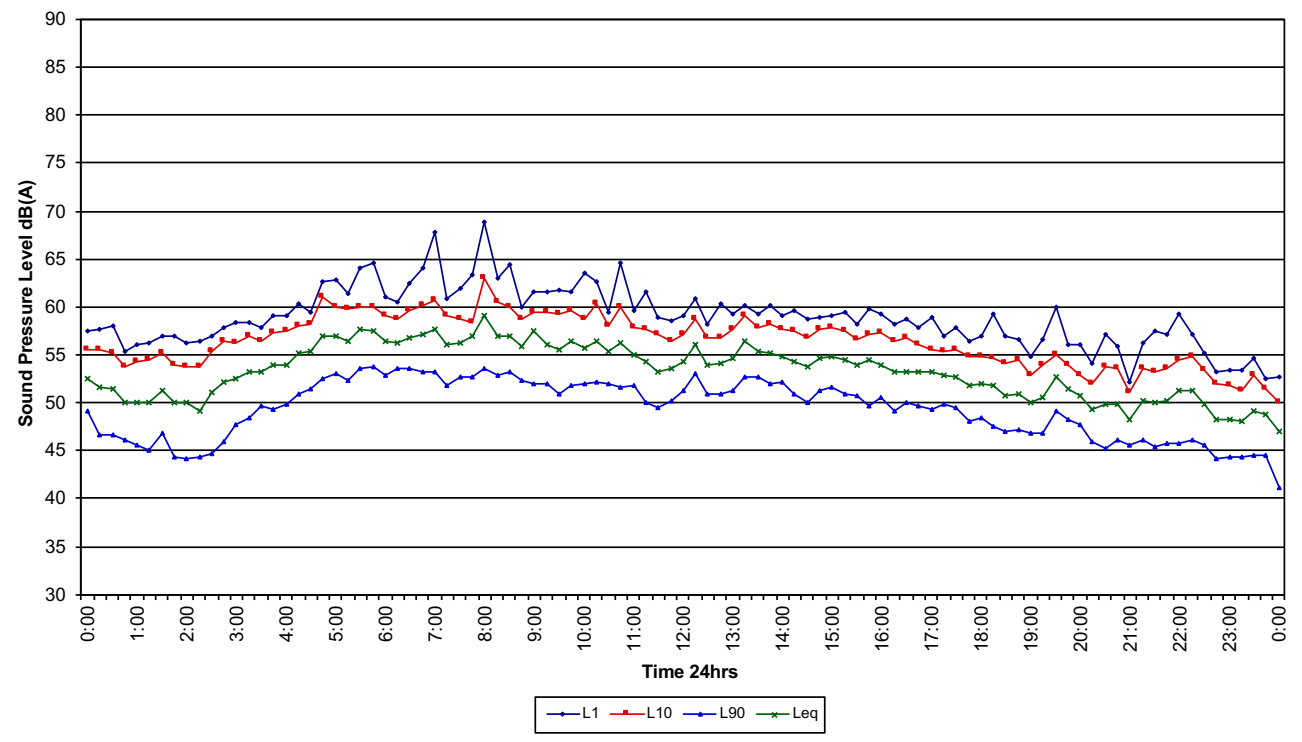
Thursday 17/11/2022



Ambient Noise Logger

1424 Botany Road, Botany

Friday 18/11/2022

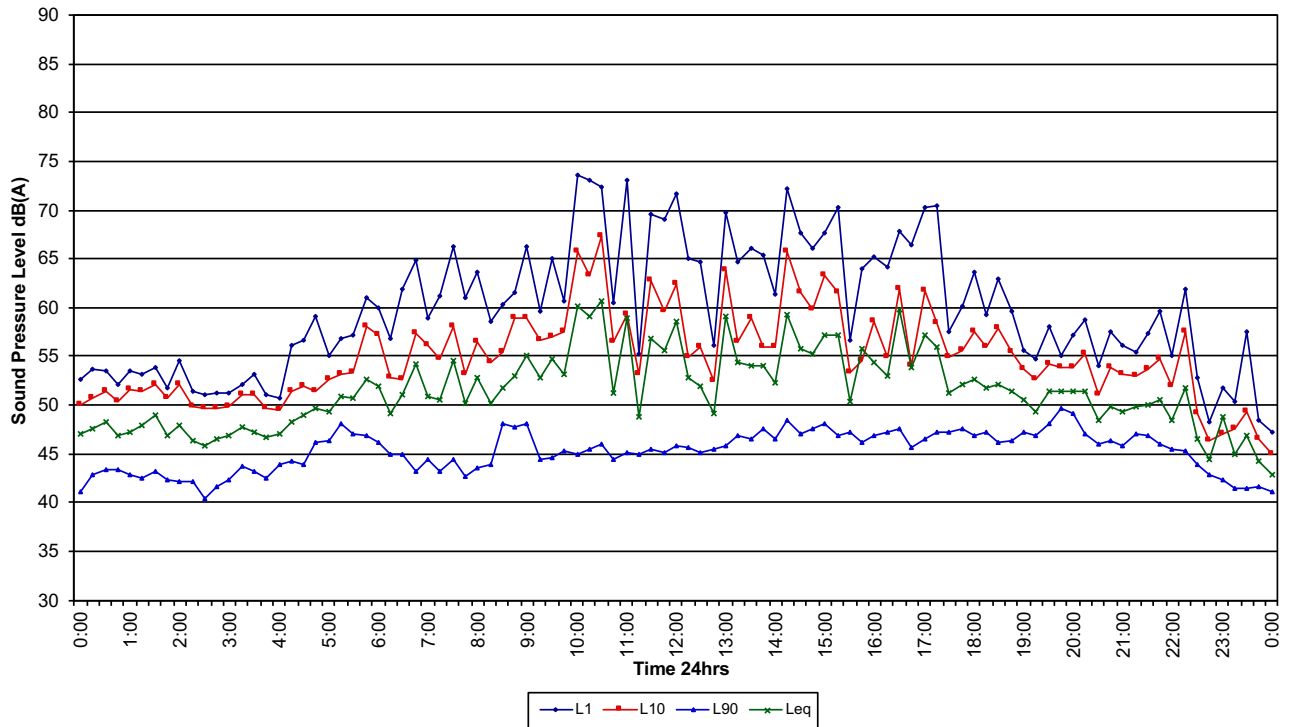




Ambient Noise Logger

1424 Botany Road, Botany

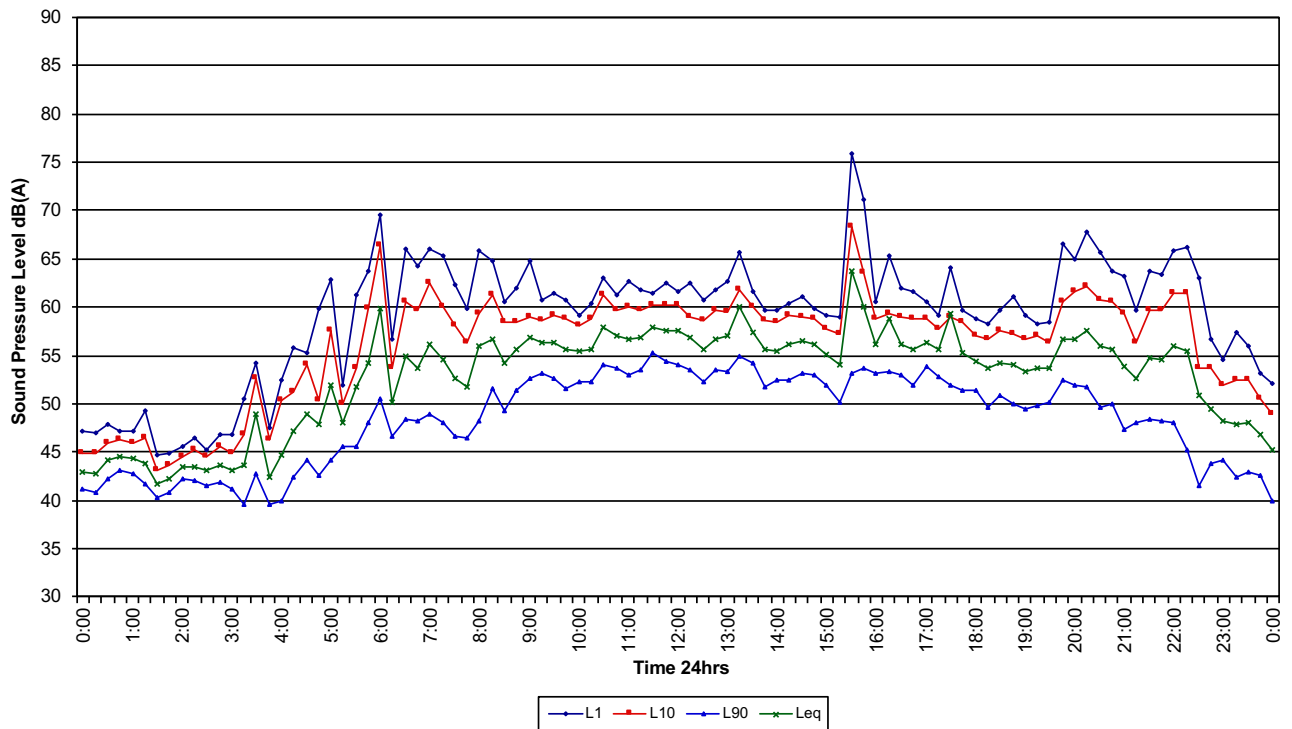
Saturday 19/11/2022



Ambient Noise Logger

1424 Botany Road, Botany

Sunday 20/11/2022

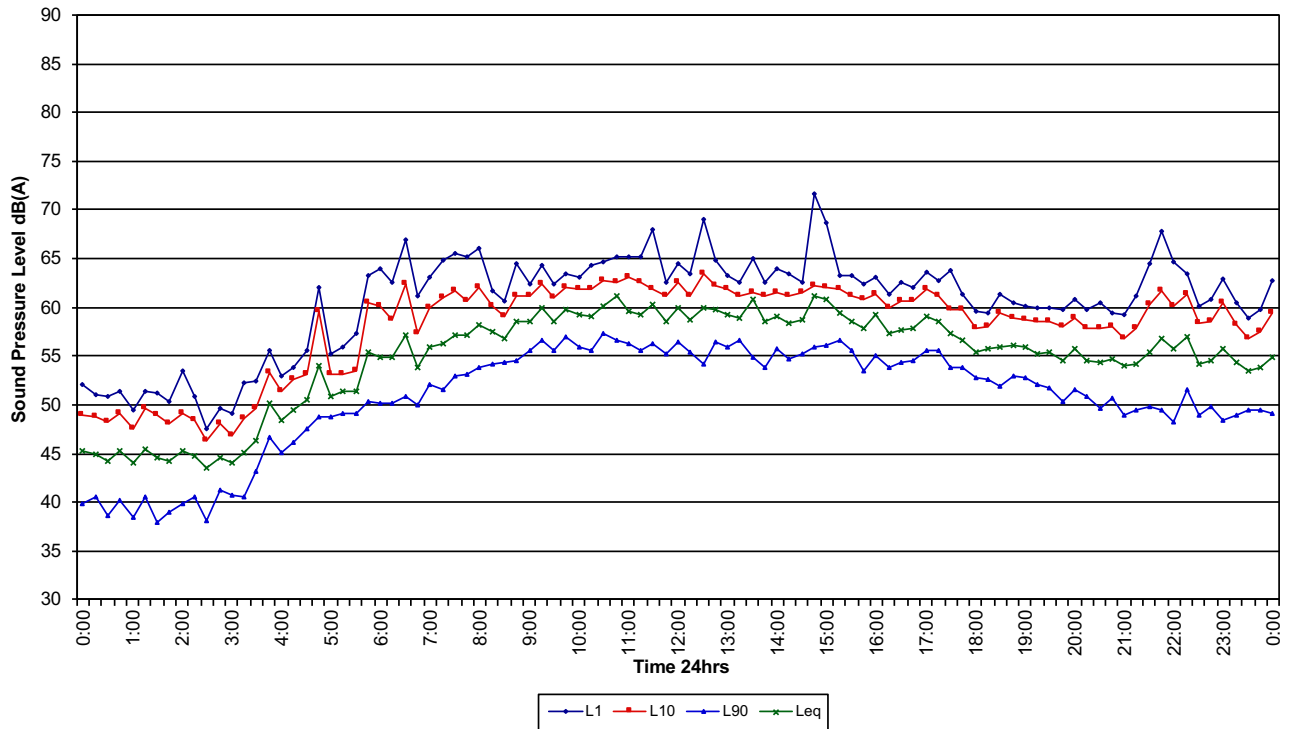




Ambient Noise Logger

1424 Botany Road, Botany

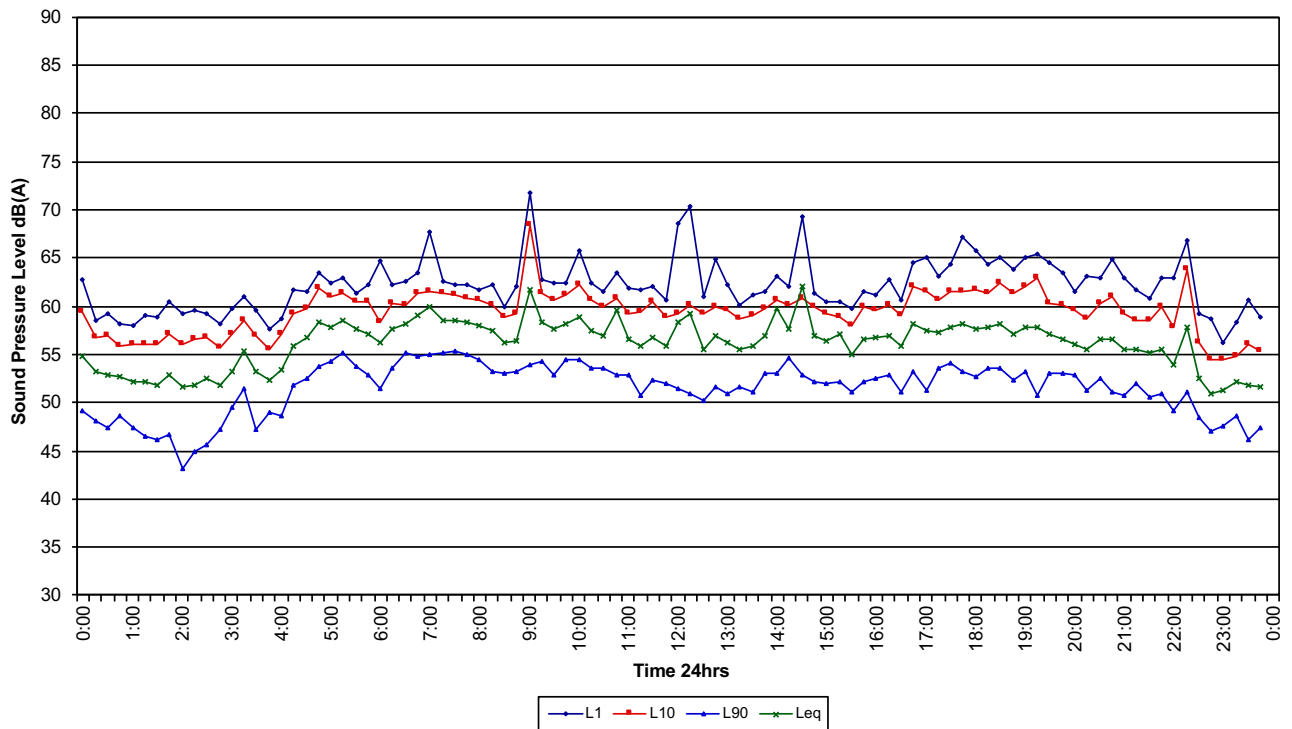
Monday 21/11/2022



Ambient Noise Logger

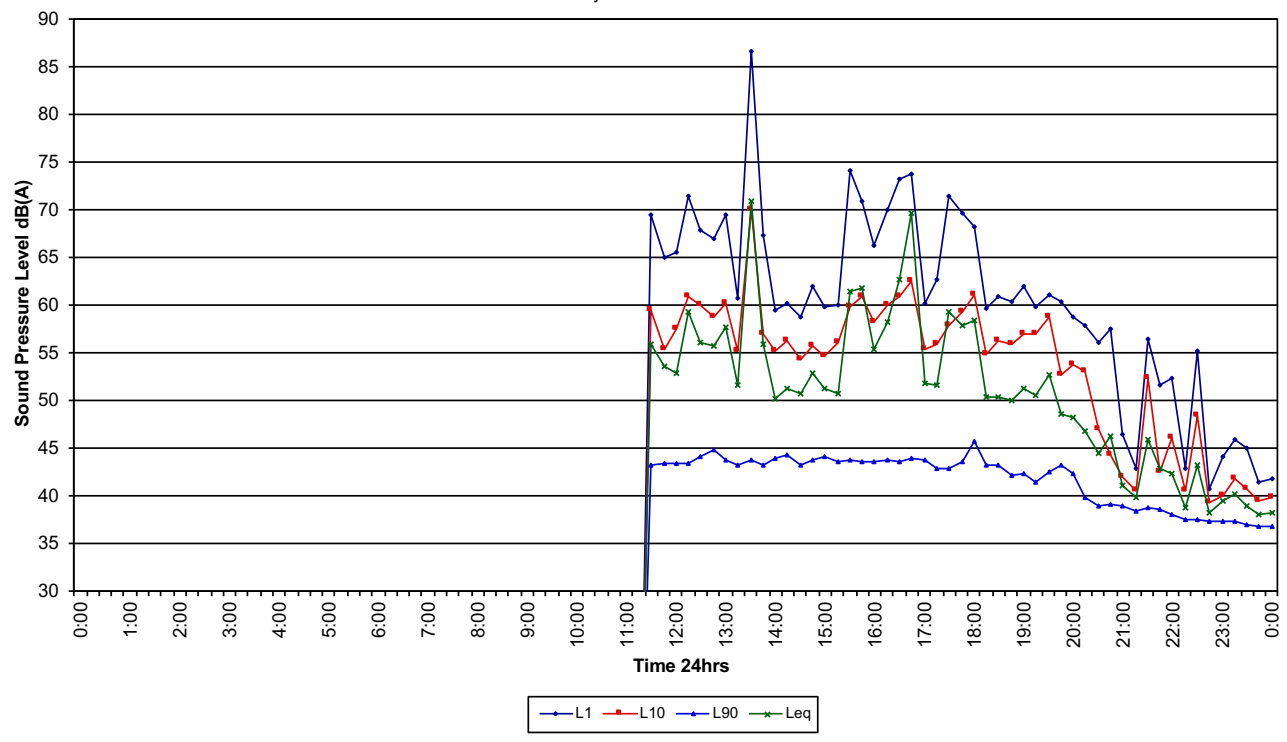
1424 Botany Road, Botany

Tuesday 22/11/2022

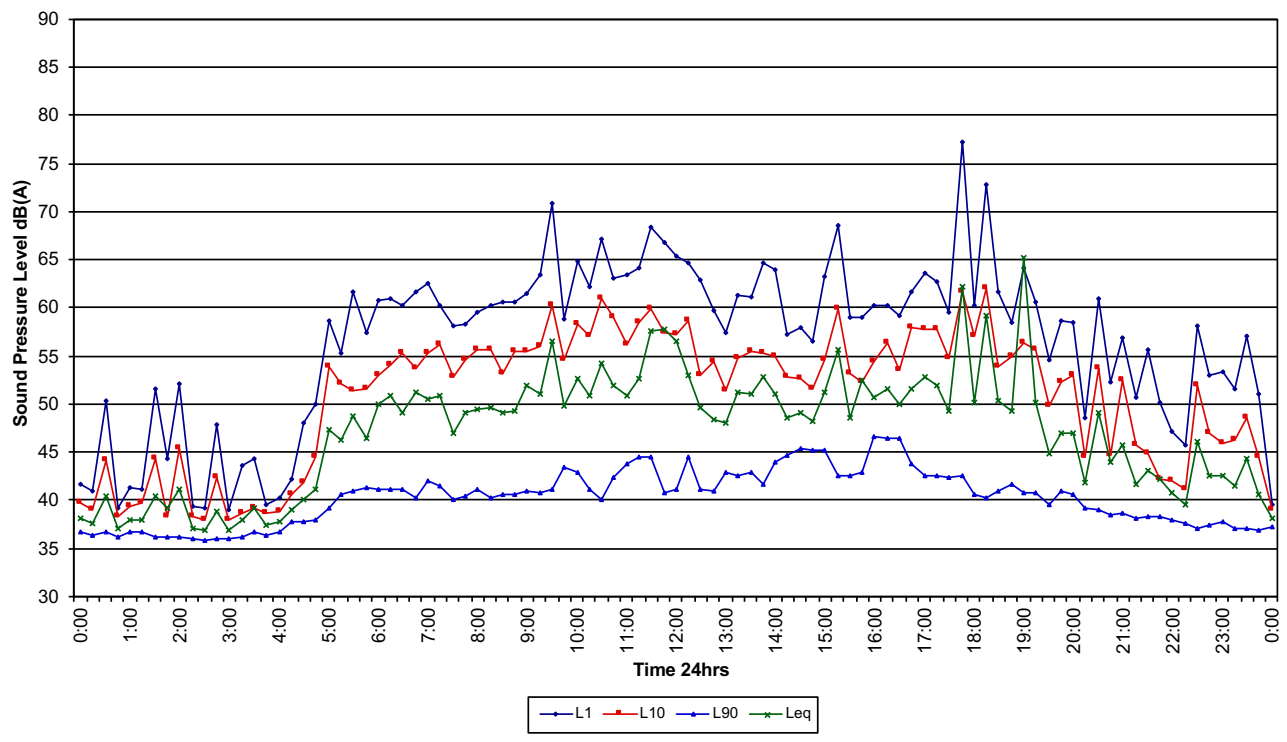




Ambient Noise Logger
80 Australia Avenue, Matraville
Monday 7/11/2022



Ambient Noise Logger
80 Australia Avenue, Matraville
Tuesday 8/11/2022

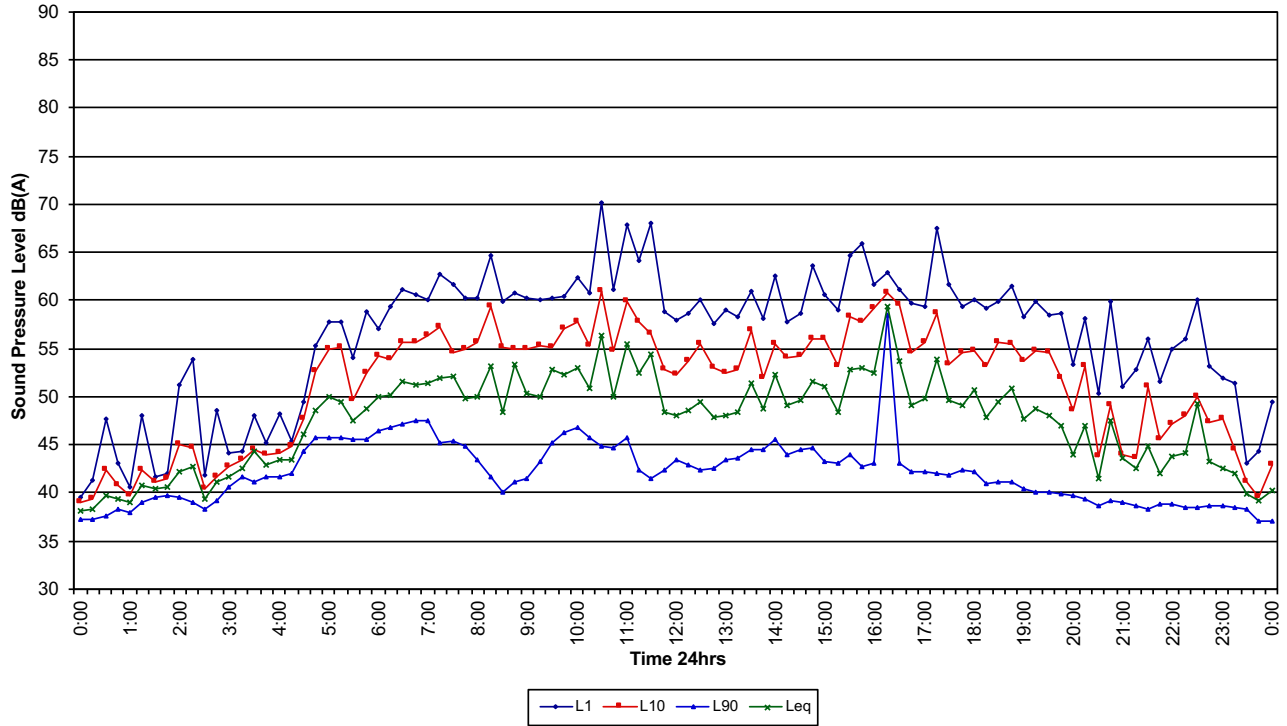




Ambient Noise Logger

80 Australia Avenue, Matraville

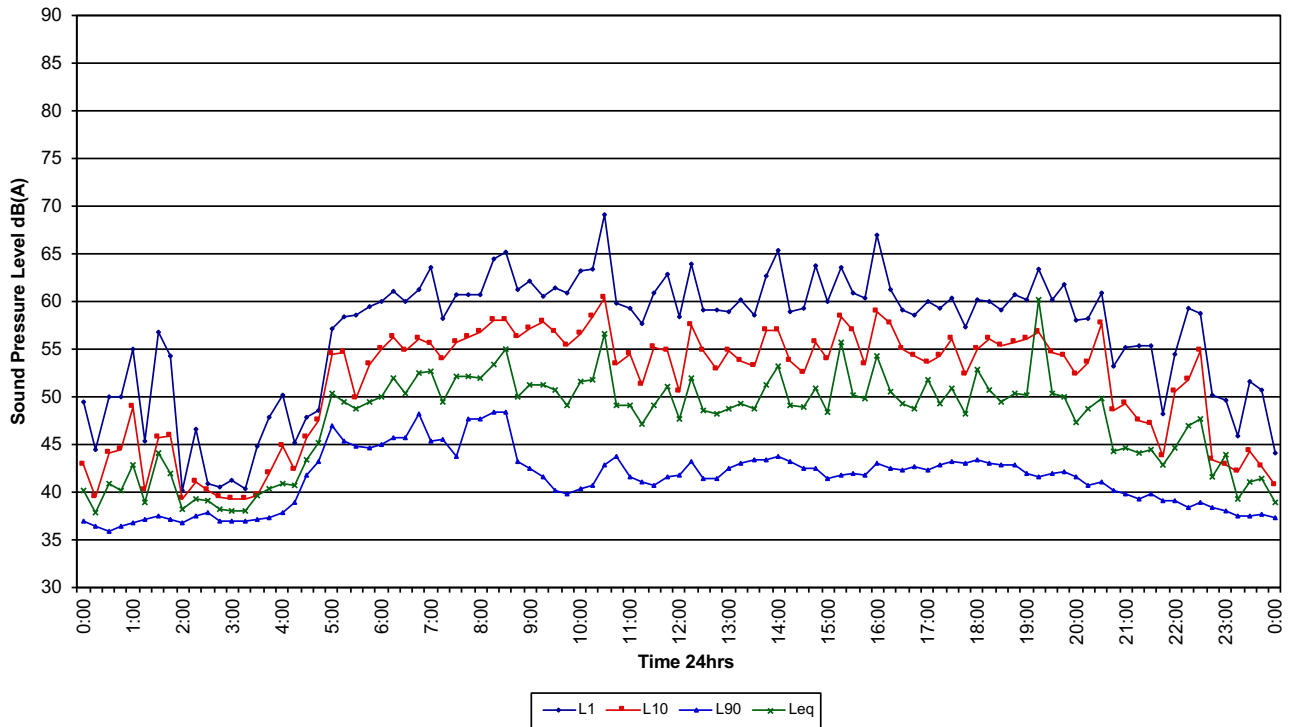
Wednesday 9/11/2022



Ambient Noise Logger

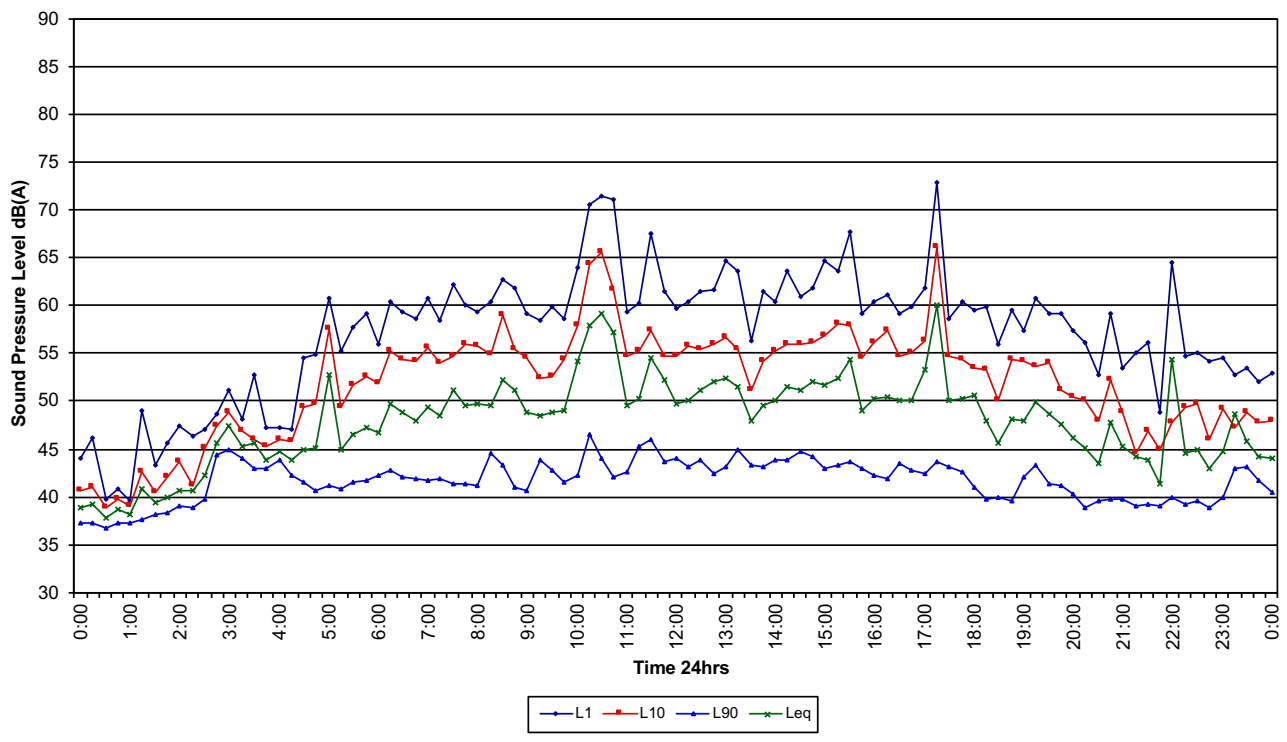
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Thursday 10/11/2022

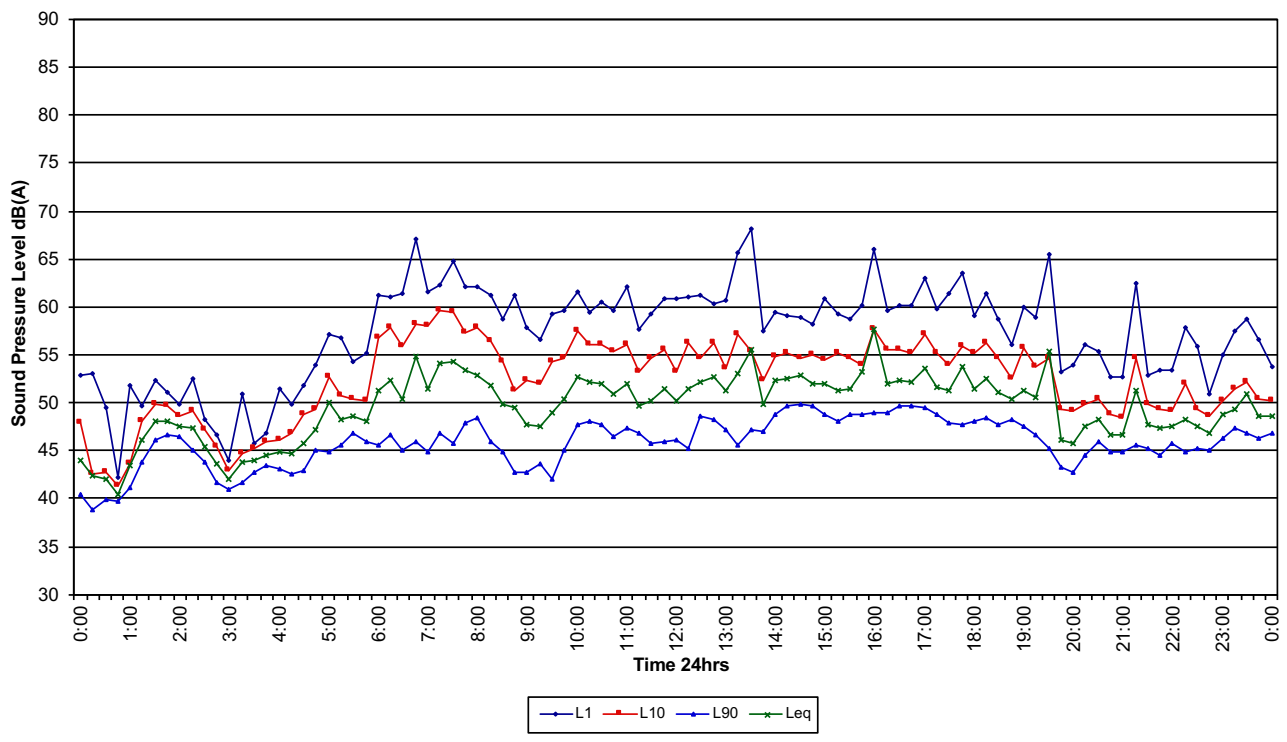




Ambient Noise Logger
80 Australia Avenue, Matraville
Friday 11/11/2022

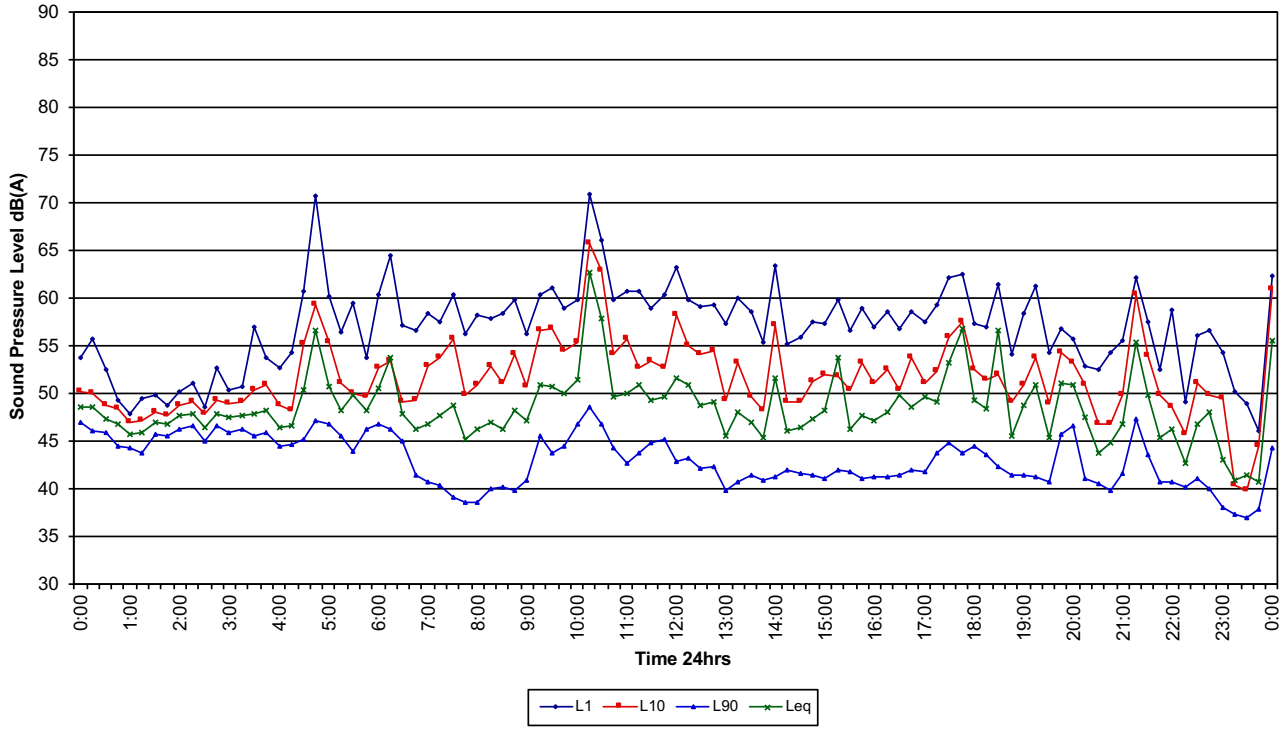


Ambient Noise Logger
80 Australia Avenue, Matraville
Saturday 12/11/2022

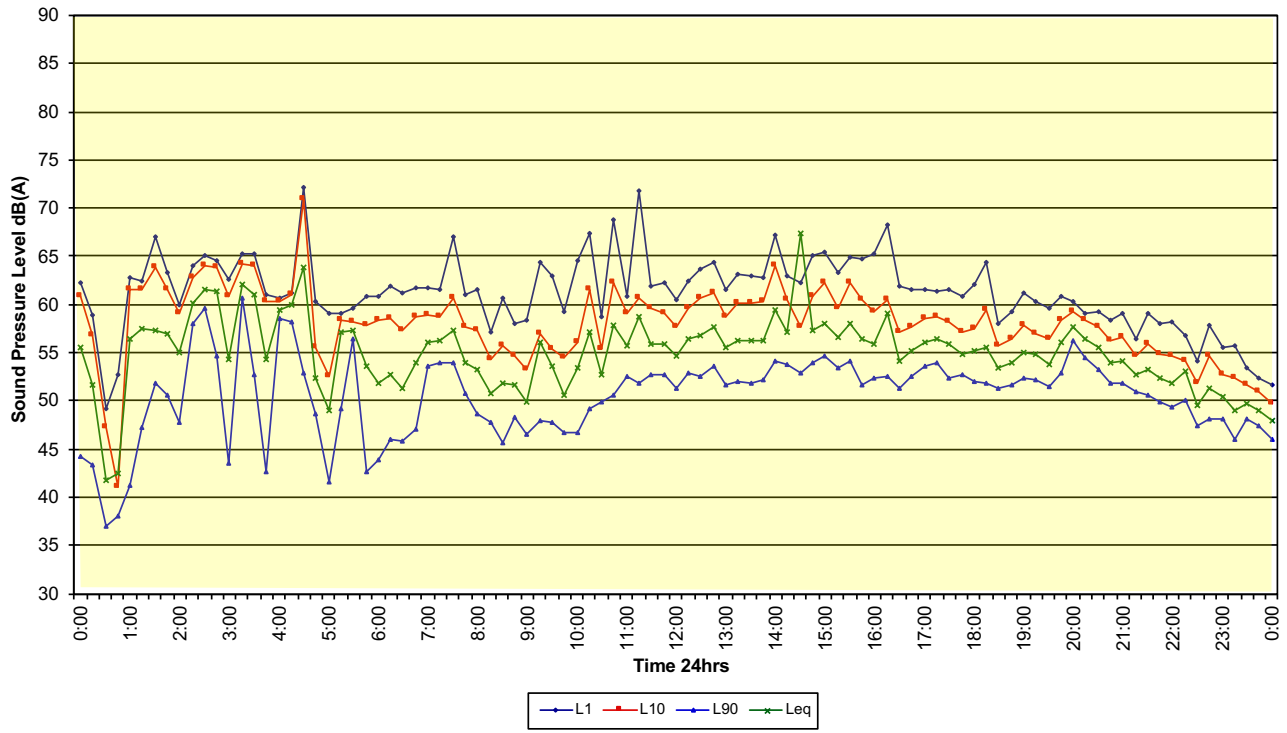




Ambient Noise Logger
80 Australia Avenue, Matraville
Sunday 13/11/2022

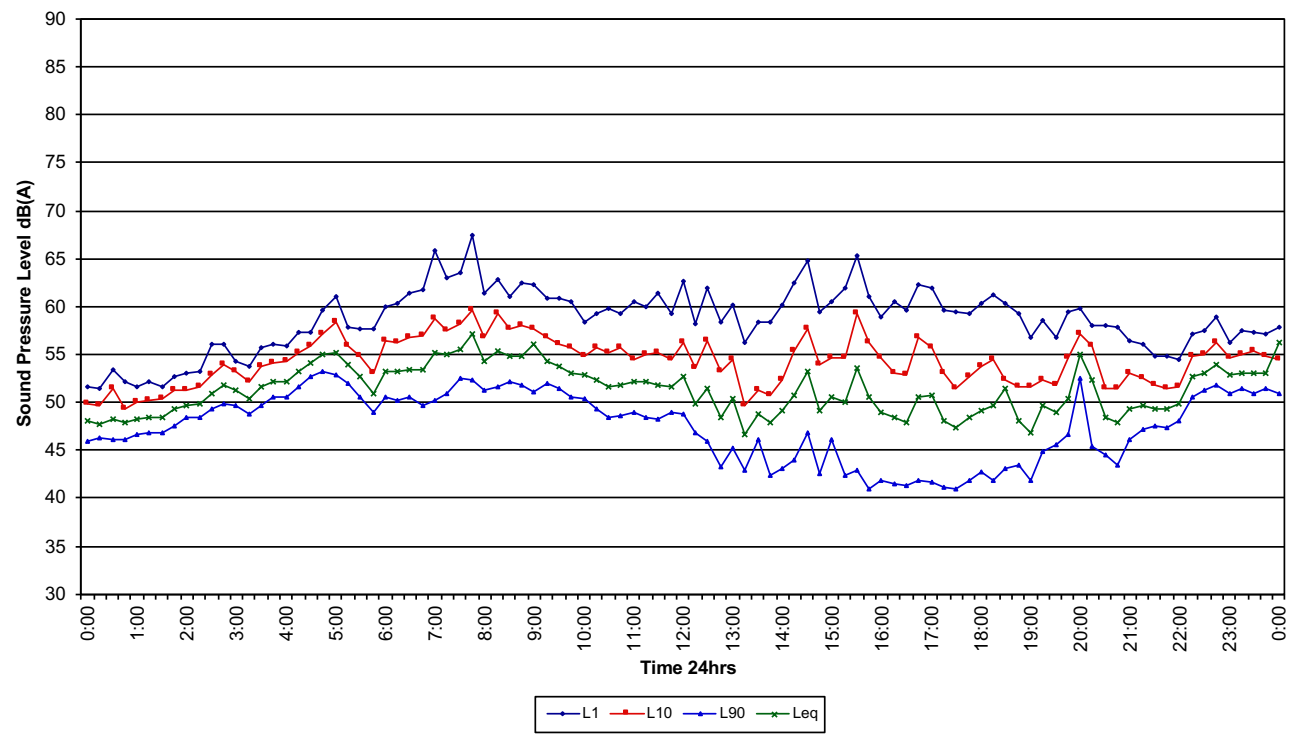


Ambient Noise Logger
80 Australia Avenue, Matraville
Monday 14/11/2022

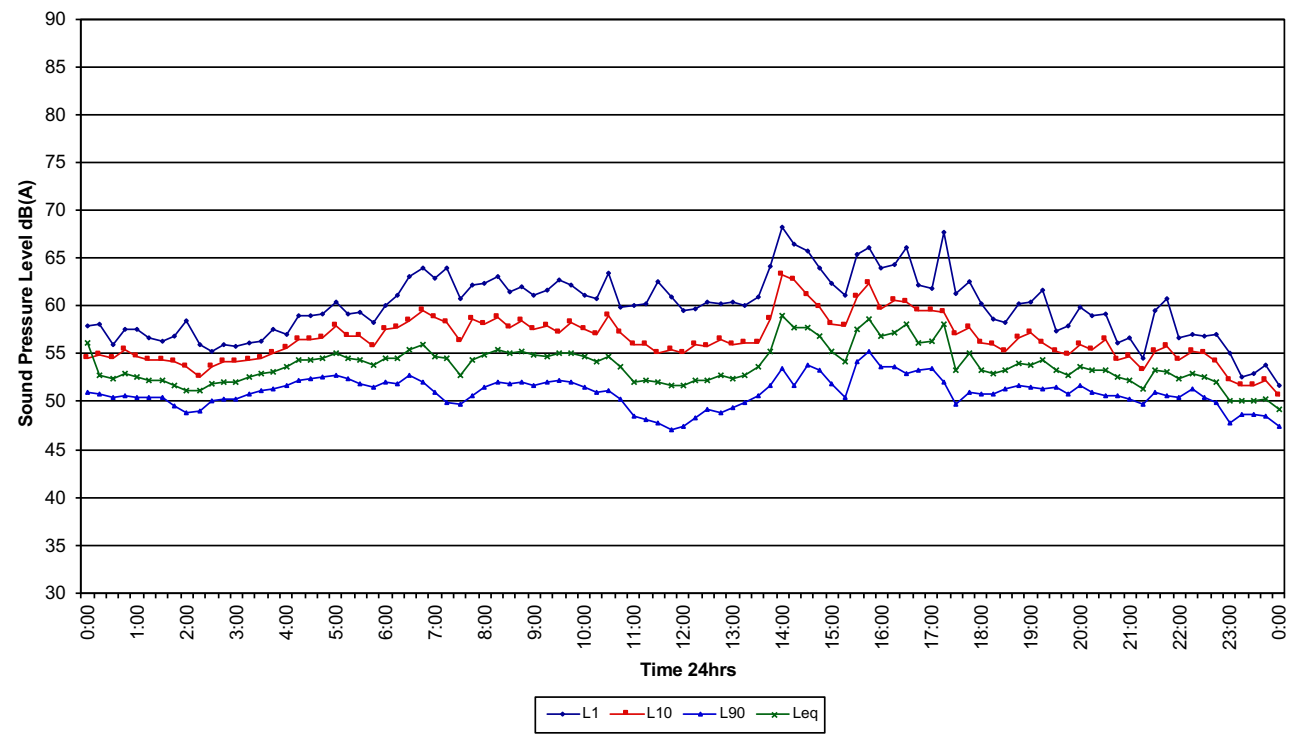




Ambient Noise Logger
80 Australia Avenue, Matraville
Tuesday 15/11/2022

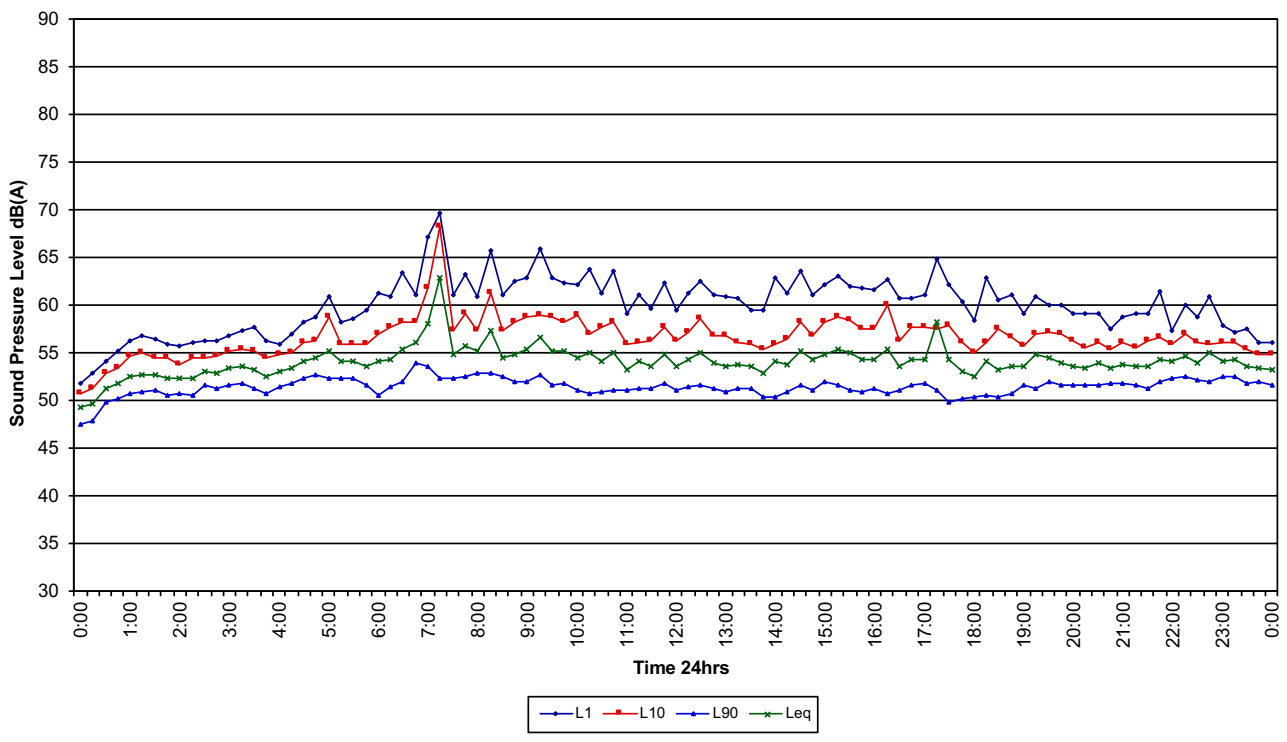


Ambient Noise Logger
80 Australia Avenue, Matraville
Wednesday 16/11/2022

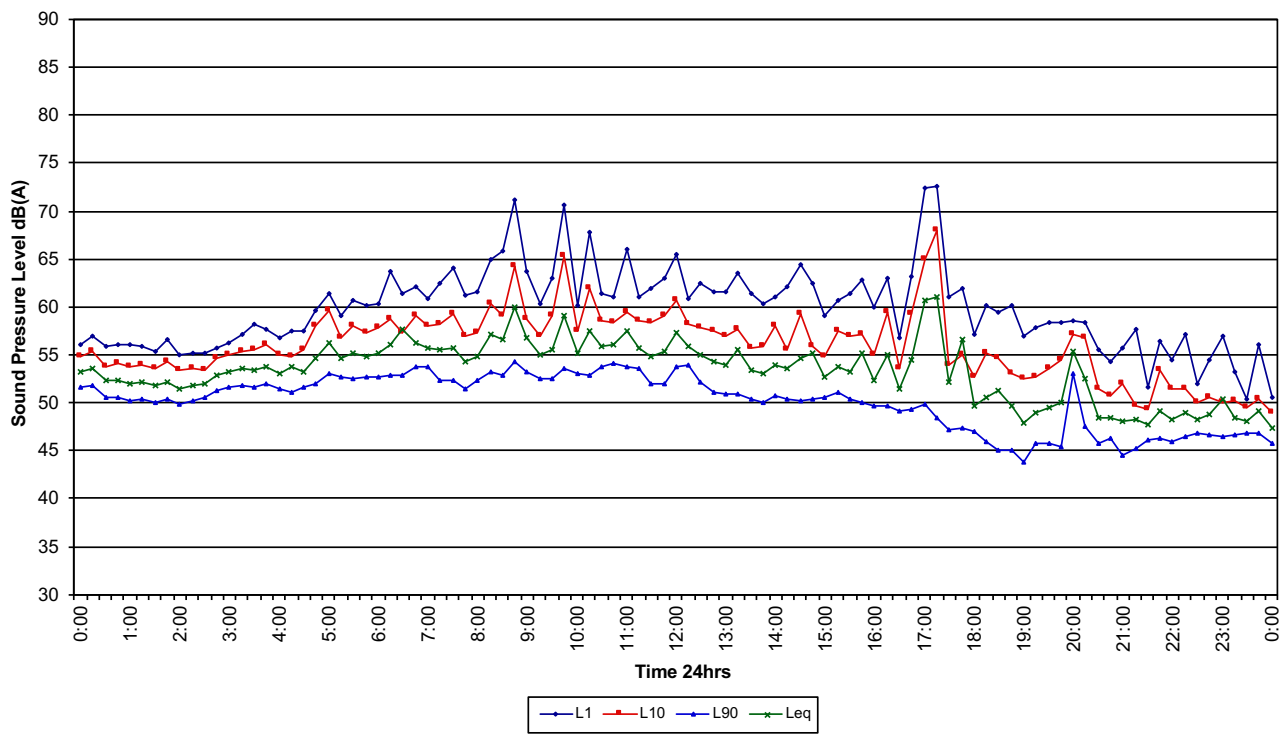




Ambient Noise Logger
80 Australia Avenue, Matraville
Thursday 17/11/2022

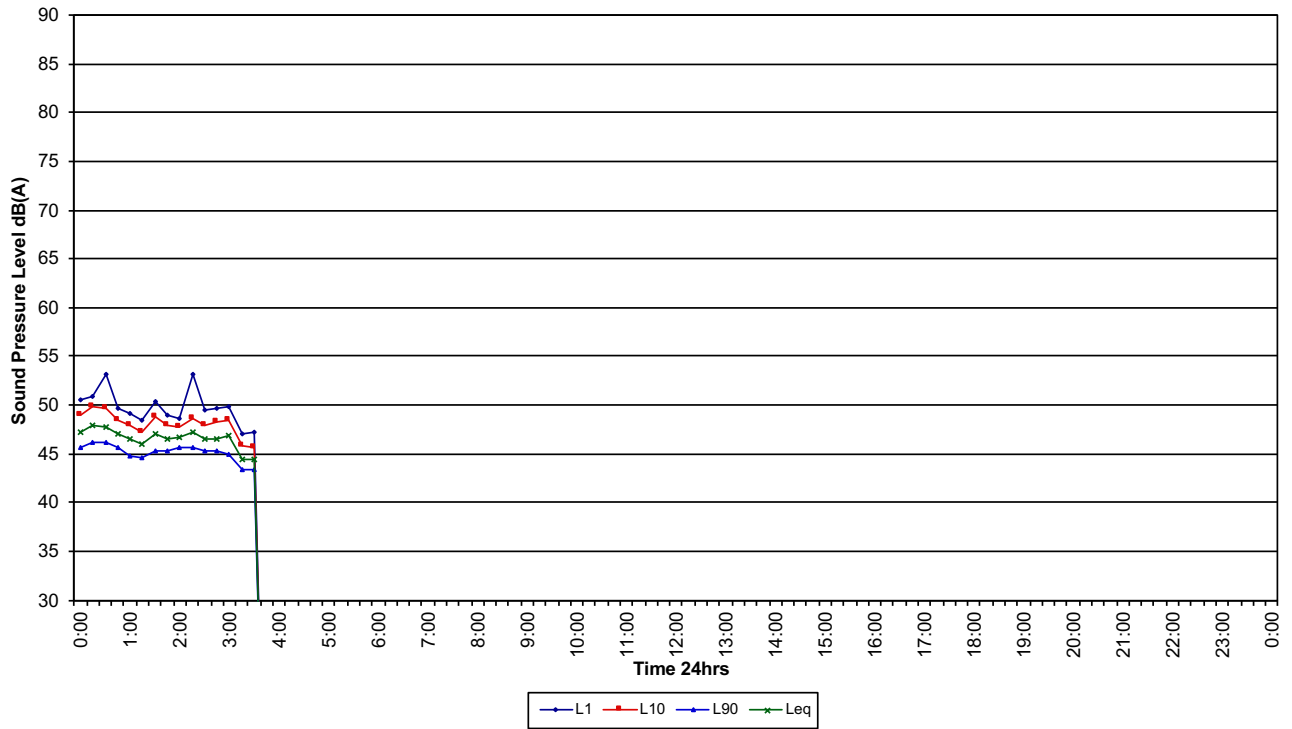


Ambient Noise Logger
80 Australia Avenue, Matraville
Friday 18/11/2022

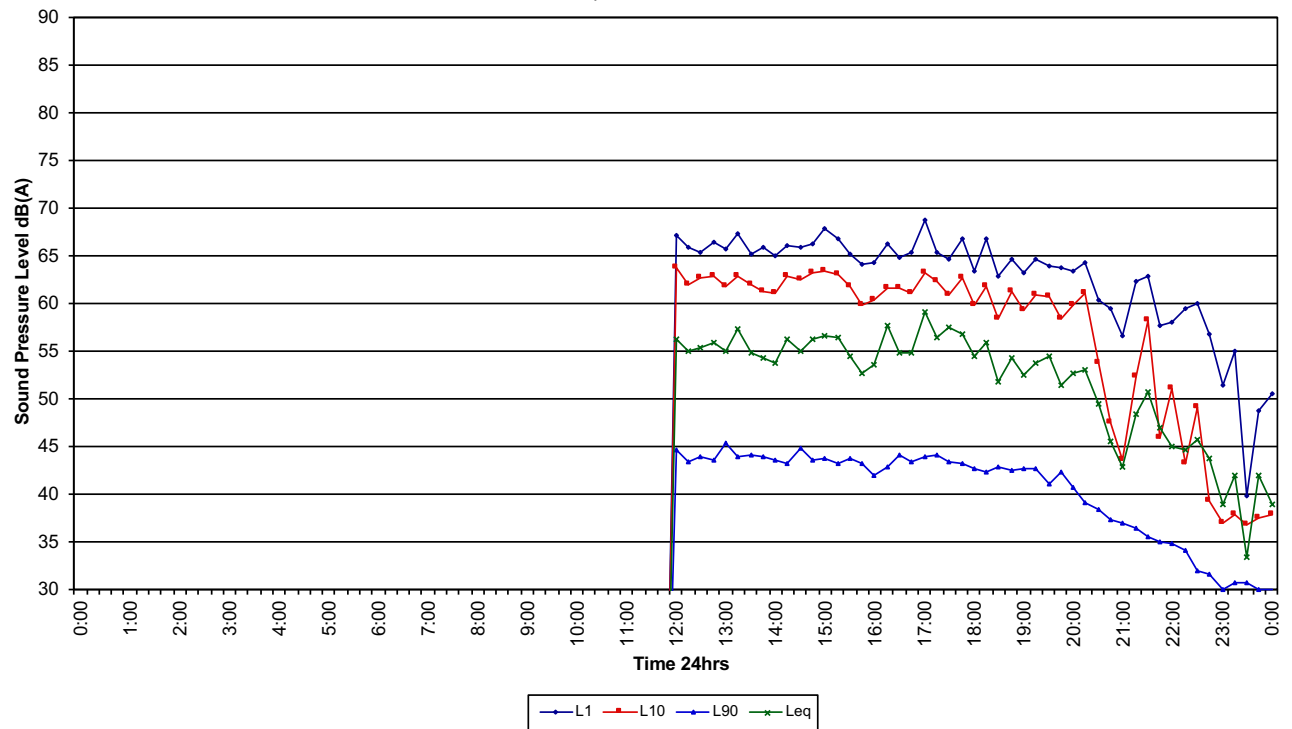




Ambient Noise Logger
80 Australia Avenue, Matraville
Saturday 19/11/2022

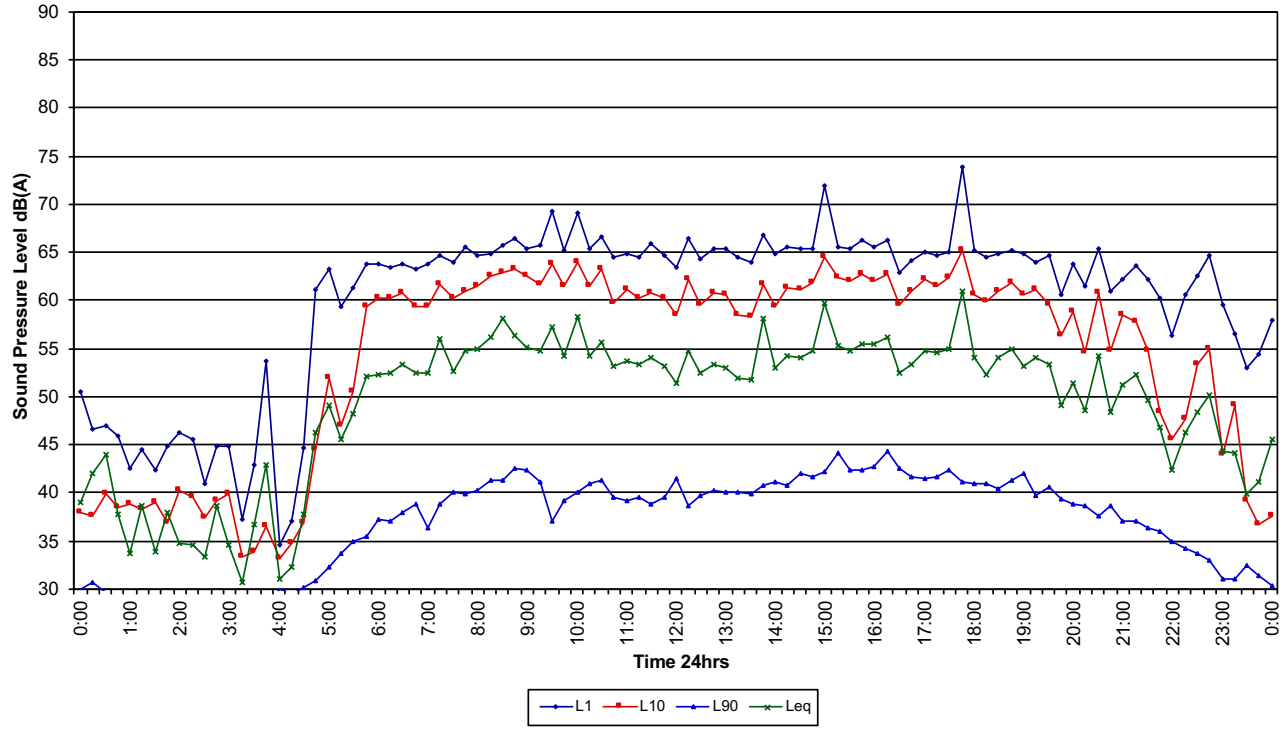


Ambient Noise Logger
46 Jennings Street, Matraville
Monday 7/11/2022

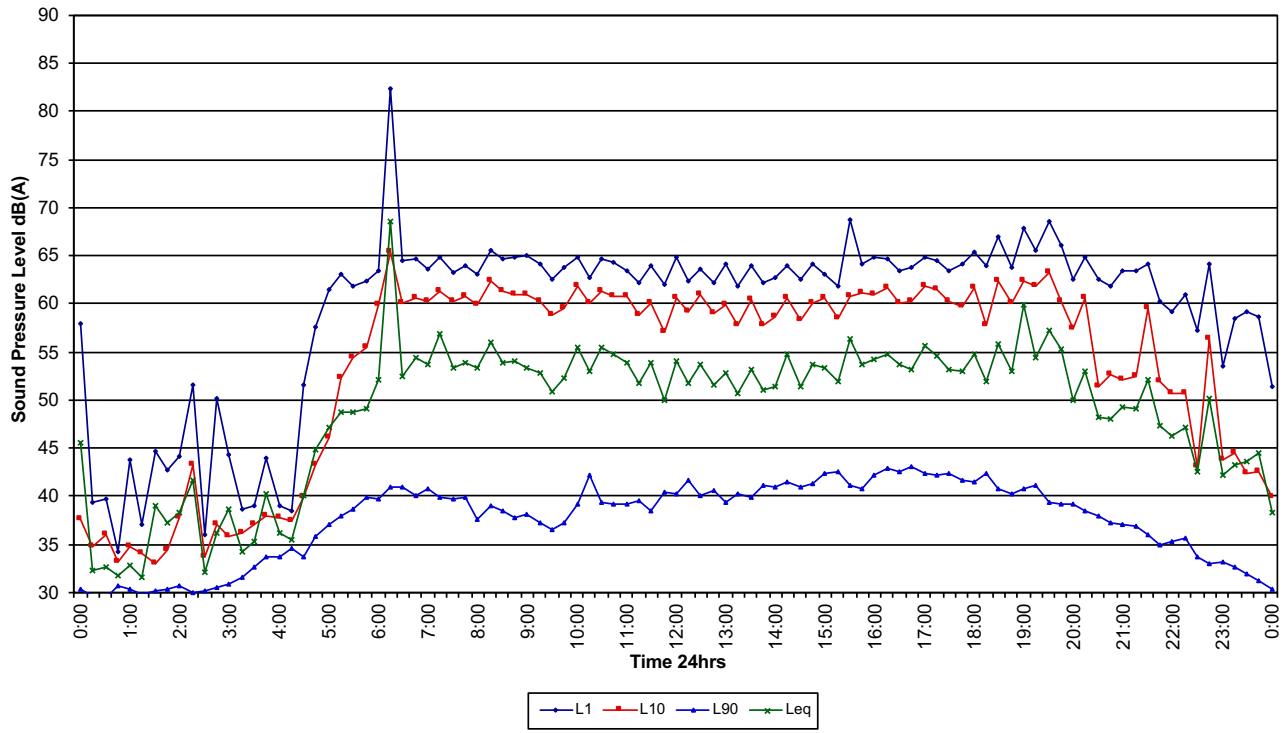




Ambient Noise Logger
46 Jennings Street, Matraville
Tuesday 8/11/2022

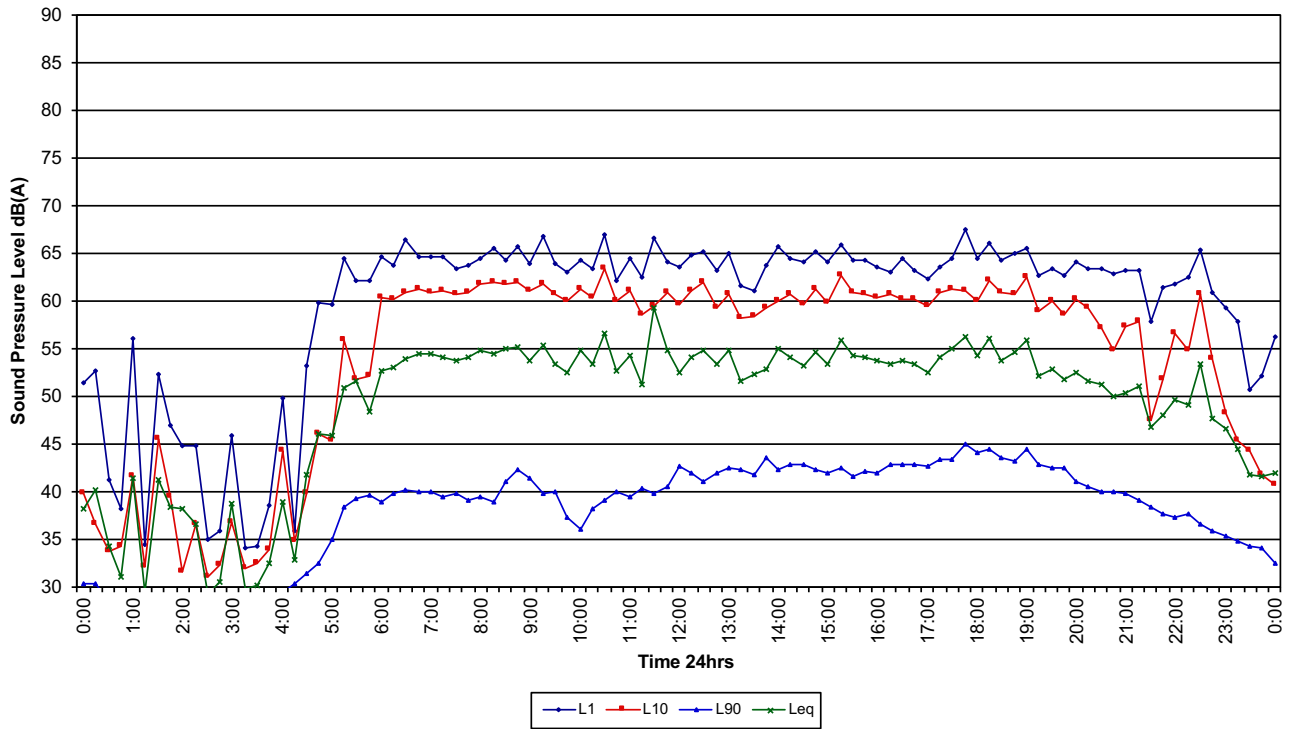


Ambient Noise Logger
46 Jennings Street, Matraville
Wednesday 9/11/2022

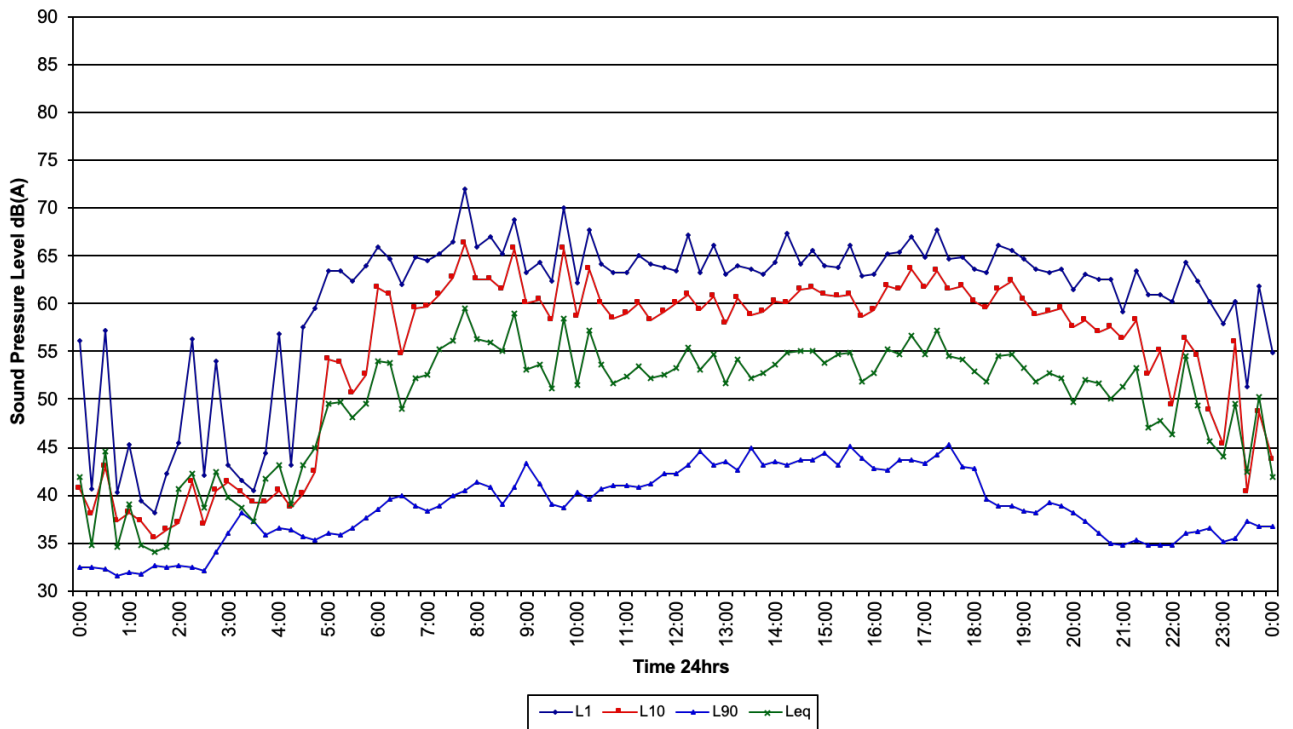




Ambient Noise Logger
46 Jennings Street, Matraville
Thursday 10/11/2022

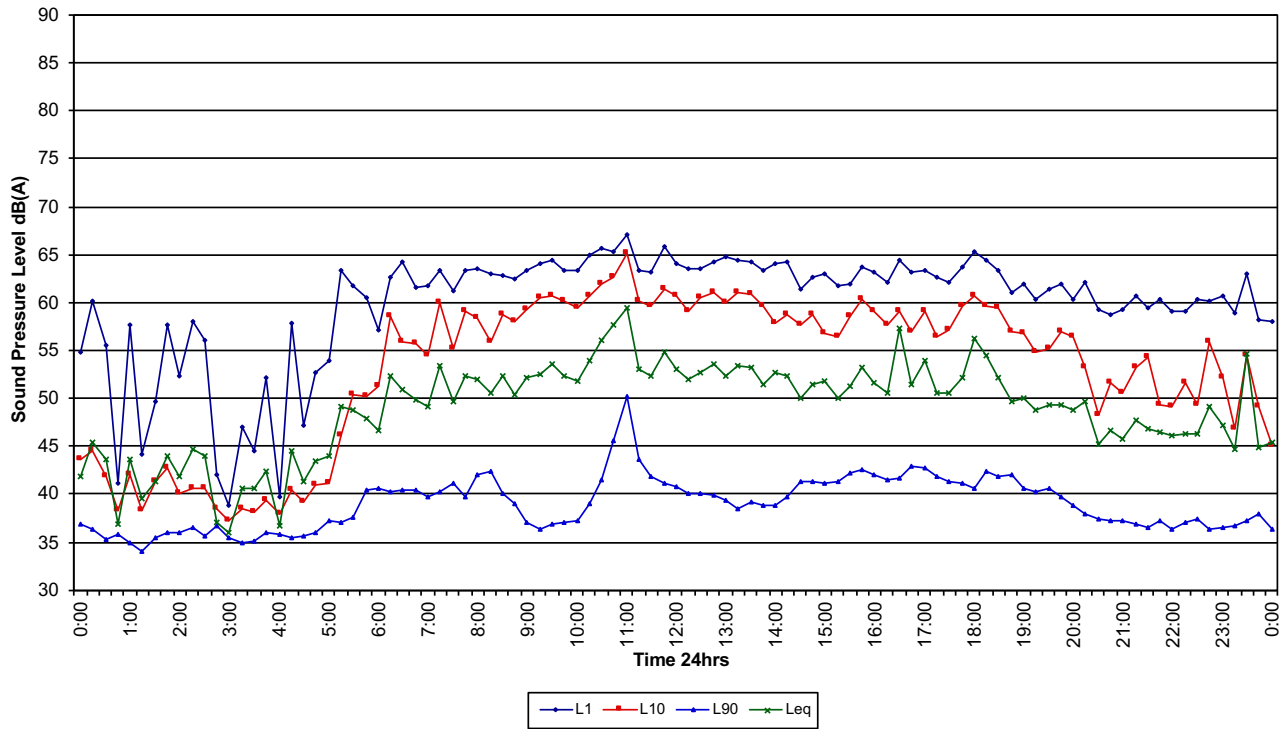


Ambient Noise Logger
46 Jennings Street, Matraville
Friday 11/11/2022

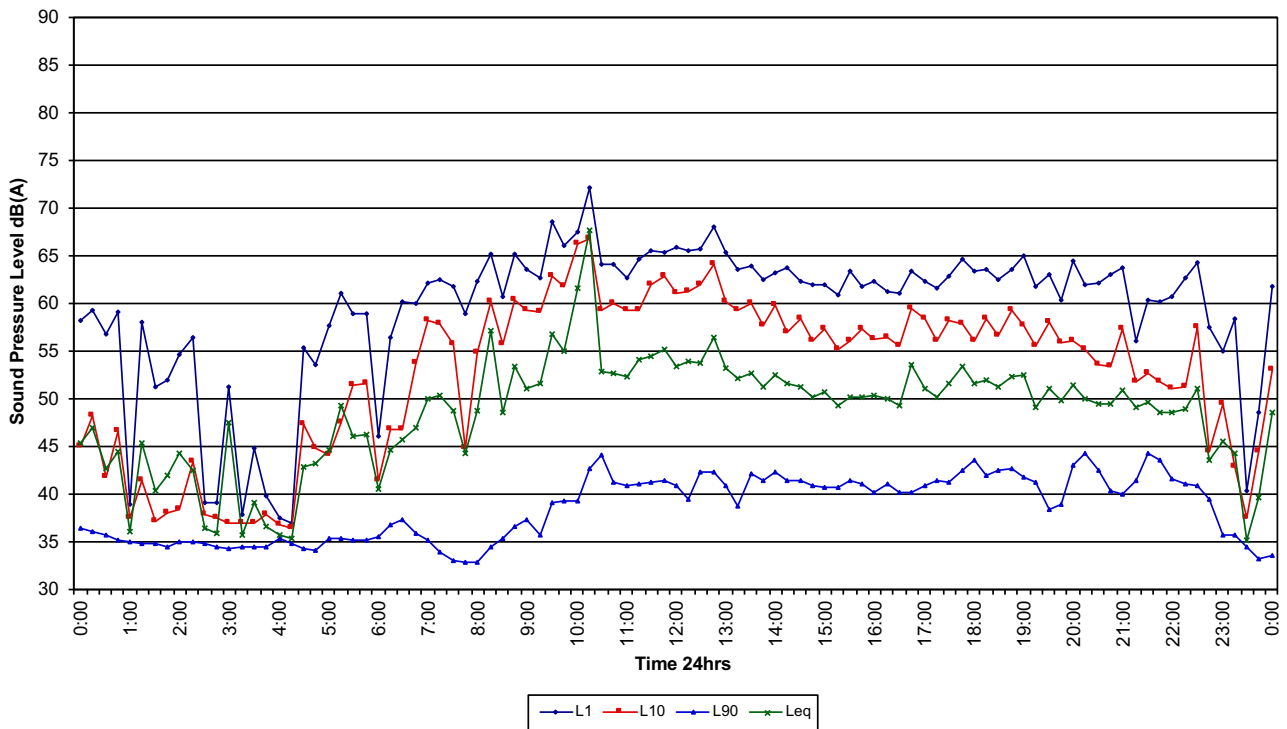




Ambient Noise Logger
46 Jennings Street, Matraville
Saturday 12/11/2022

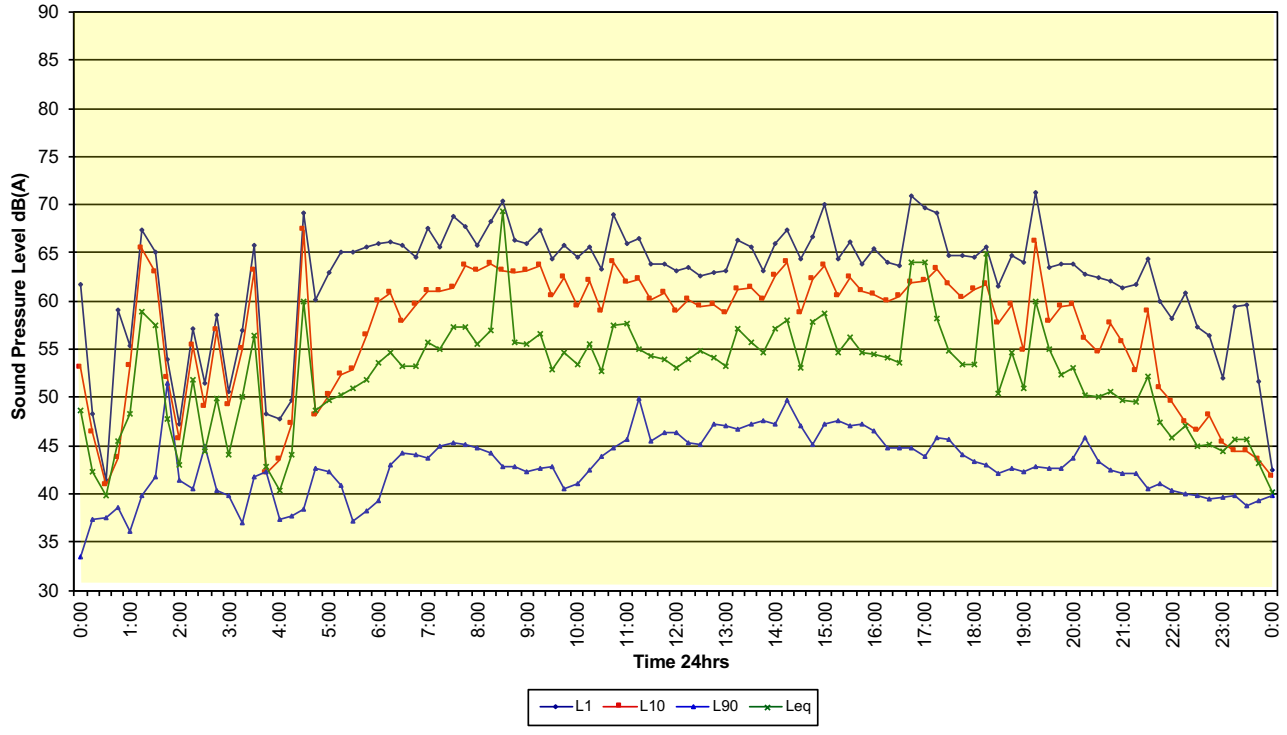


Ambient Noise Logger
46 Jennings Street, Matraville
Sunday 13/11/2022

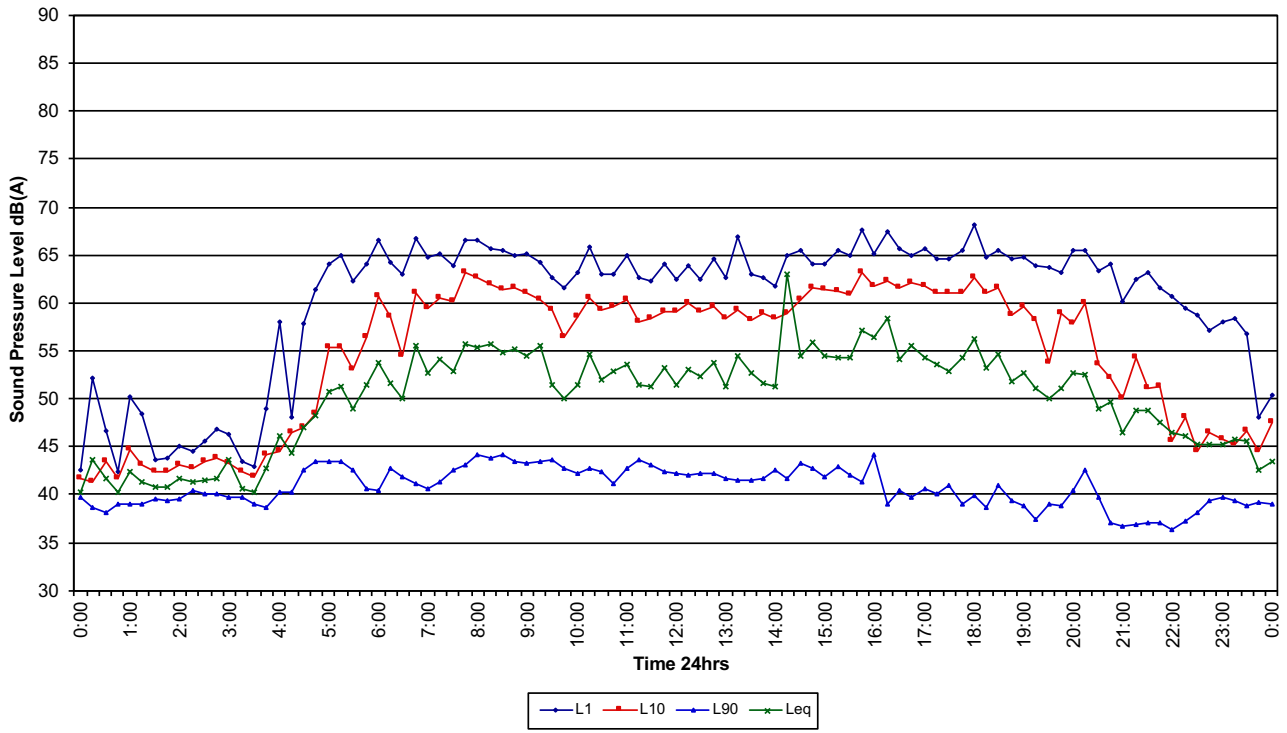




Ambient Noise Logger
46 Jennings Street, Matraville
Monday 14/11/2022

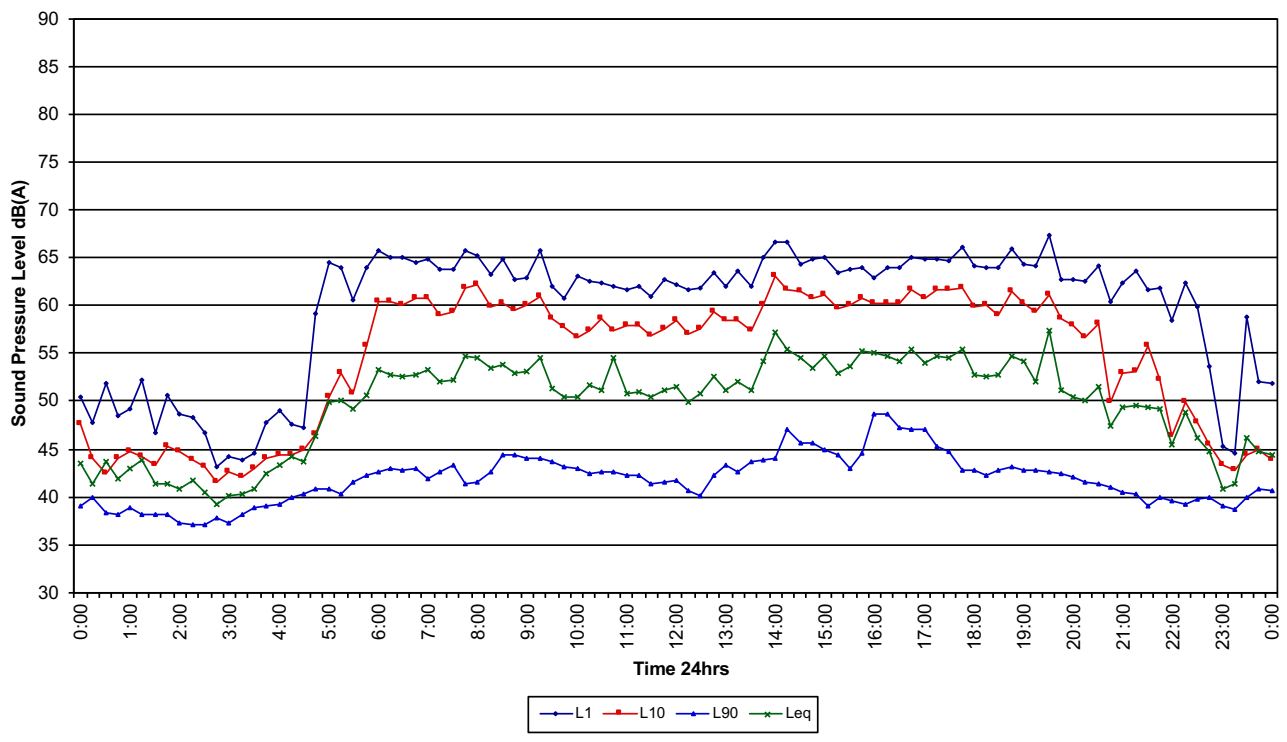


Ambient Noise Logger
46 Jennings Street, Matraville
Tuesday 15/11/2022

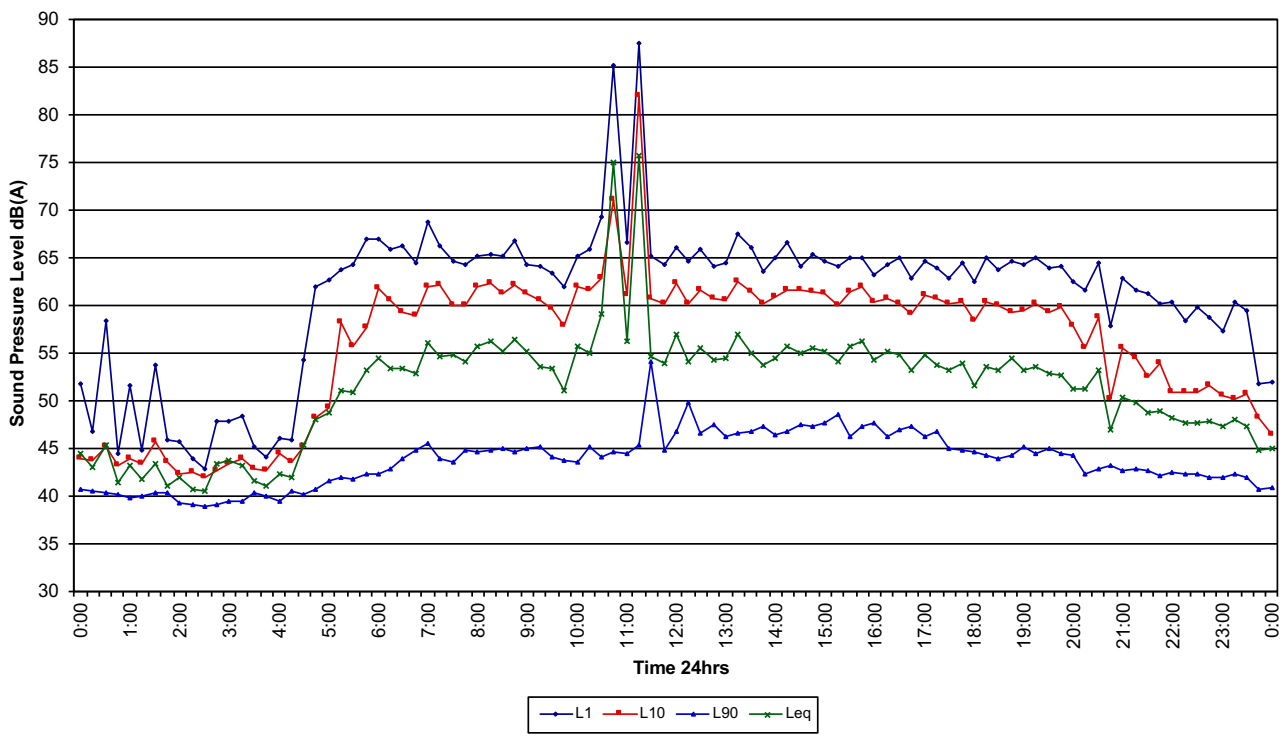




Ambient Noise Logger
46 Jennings Street, Matraville
Wednesday 16/11/2022

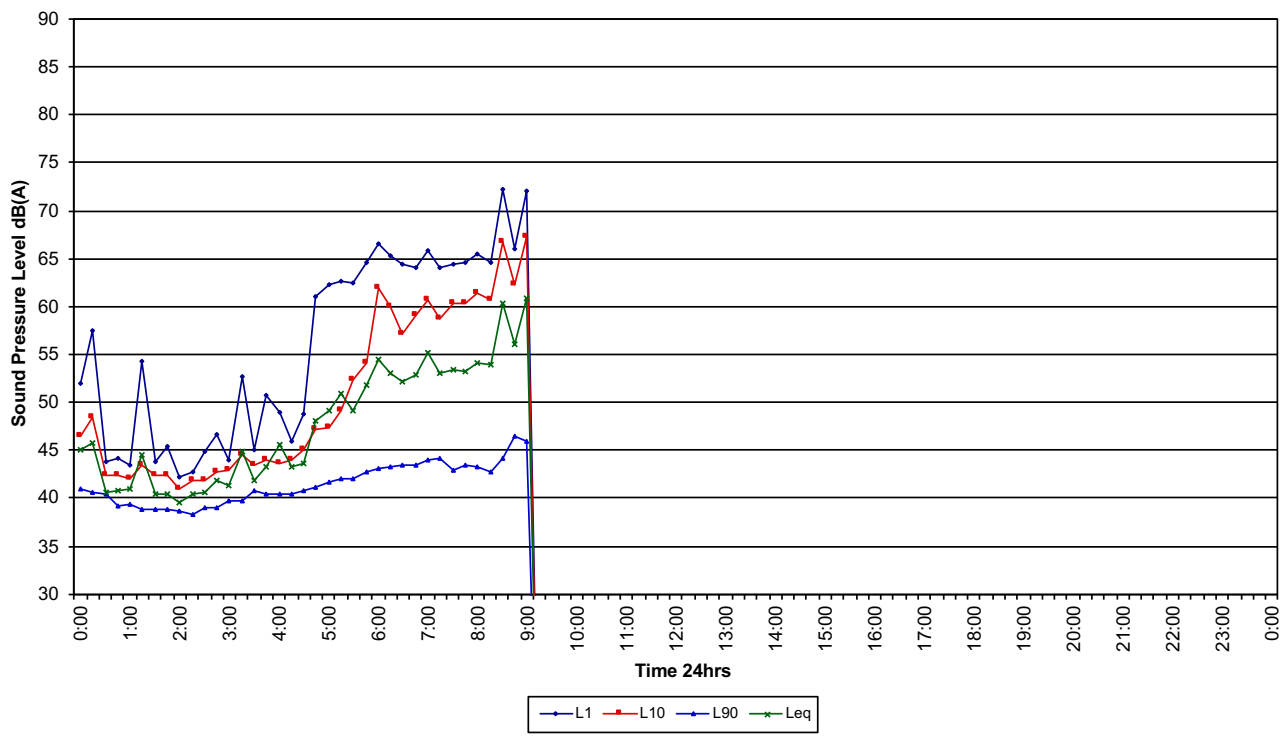


Ambient Noise Logger
46 Jennings Street, Matraville
Thursday 17/11/2022

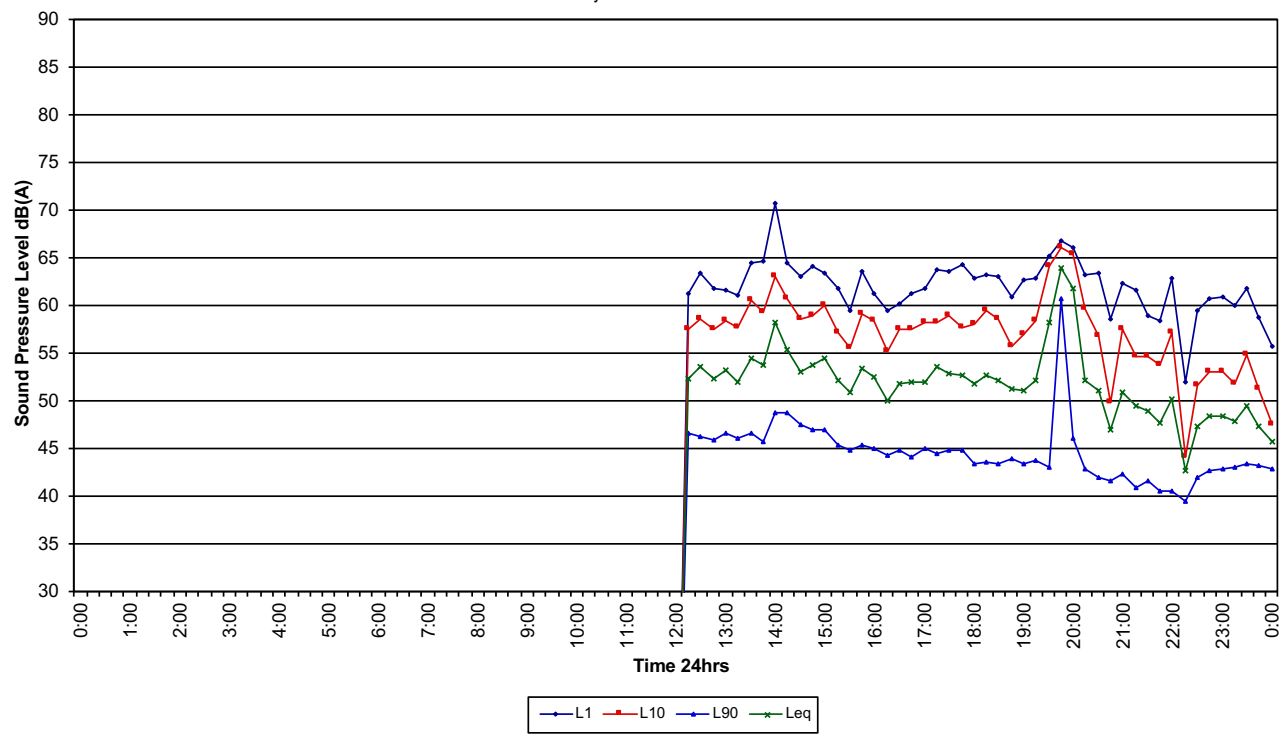




Ambient Noise Logger
46 Jennings Street, Matraville
Friday 18/11/2022



Crematorium Matraville
Traffic Logger
Monday 7/11/2022

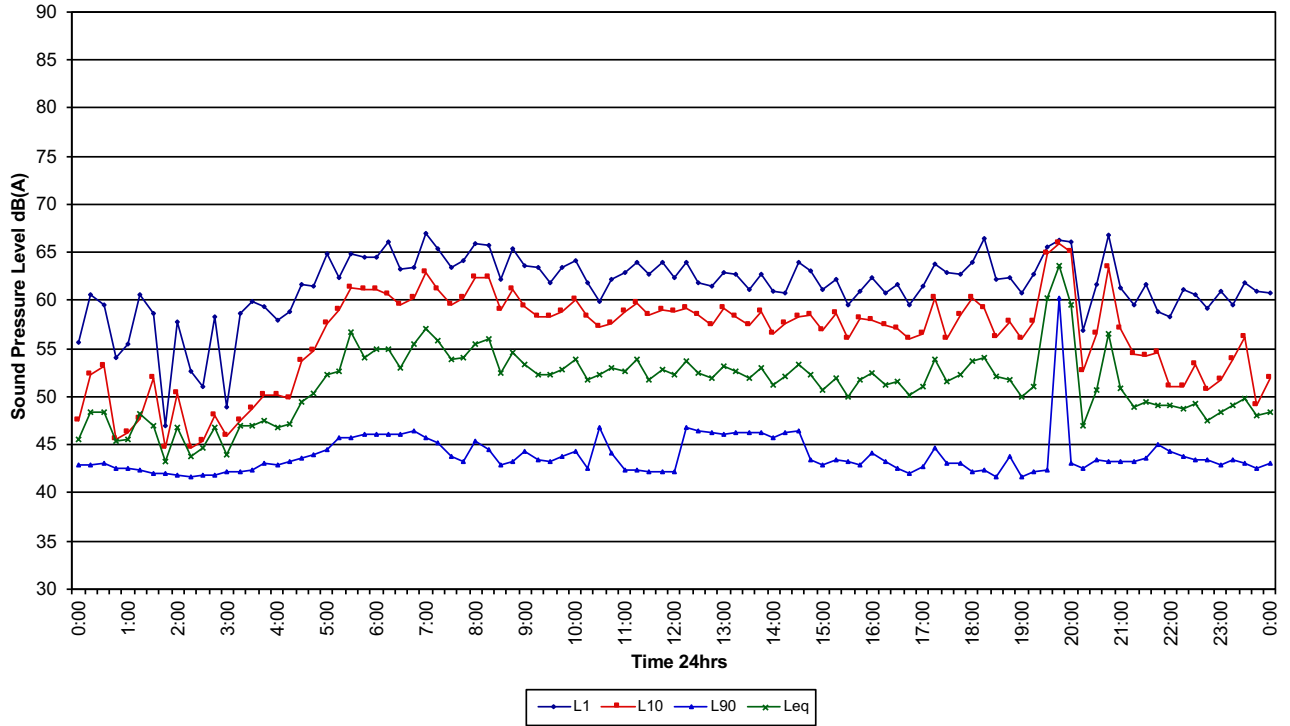




Crematorium Matraville

Traffic Logger

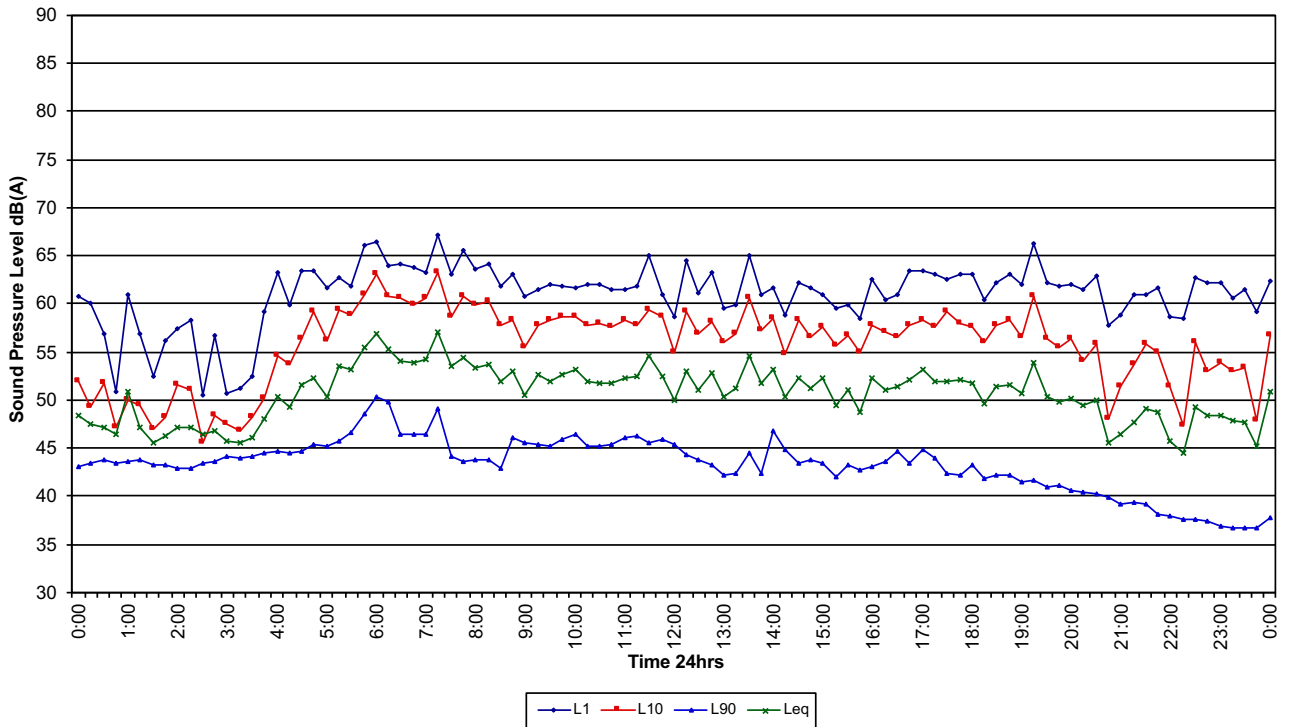
Tuesday 8/11/2022



Crematorium Matraville

Traffic Logger

Wednesday 9/11/2022

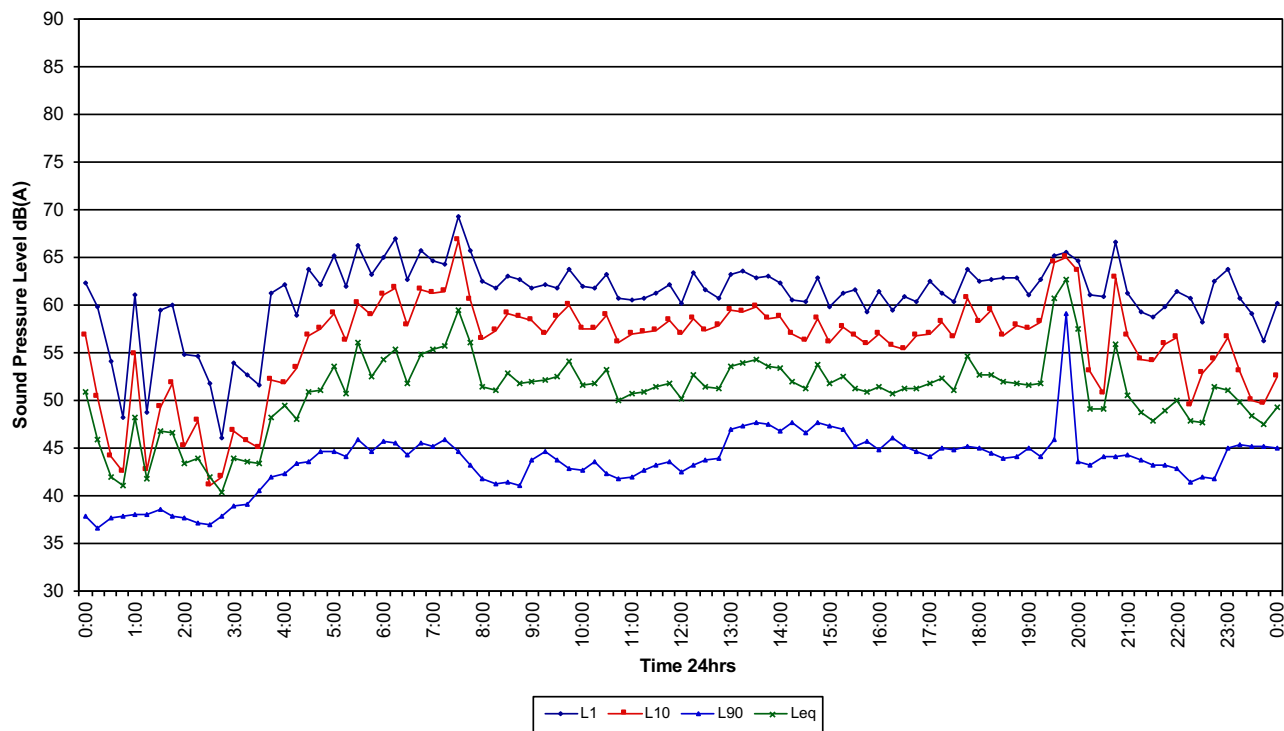




Crematorium Matraville

Traffic Logger

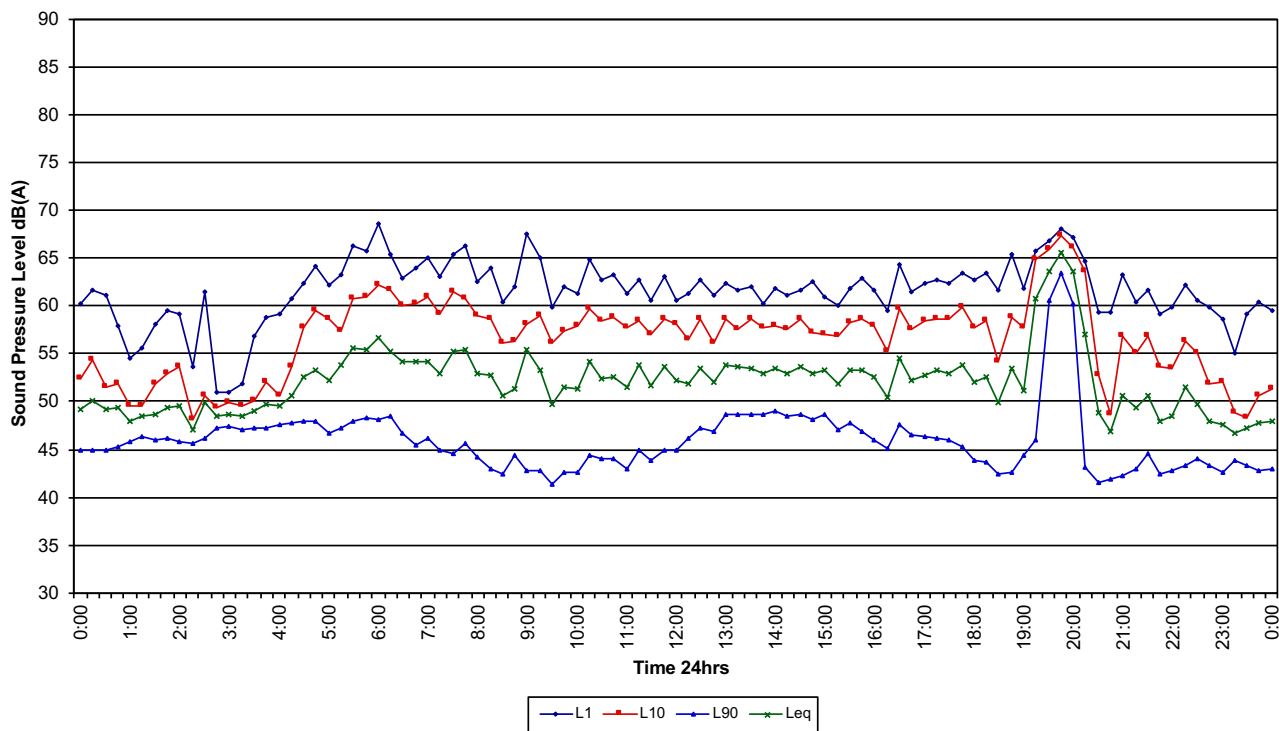
Thursday 10/11/2022



Crematorium Matraville

Traffic Logger

Friday 11/11/2022

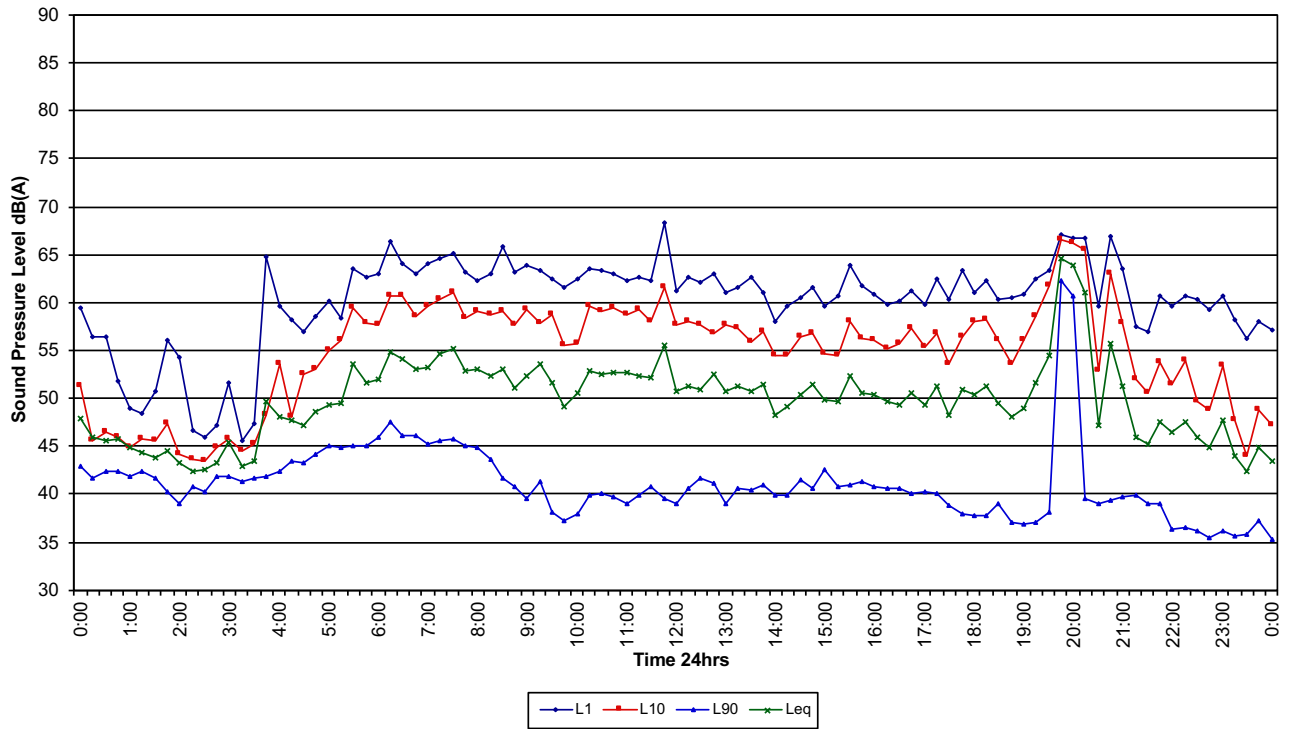




Crematorium Matraville

Traffic Logger

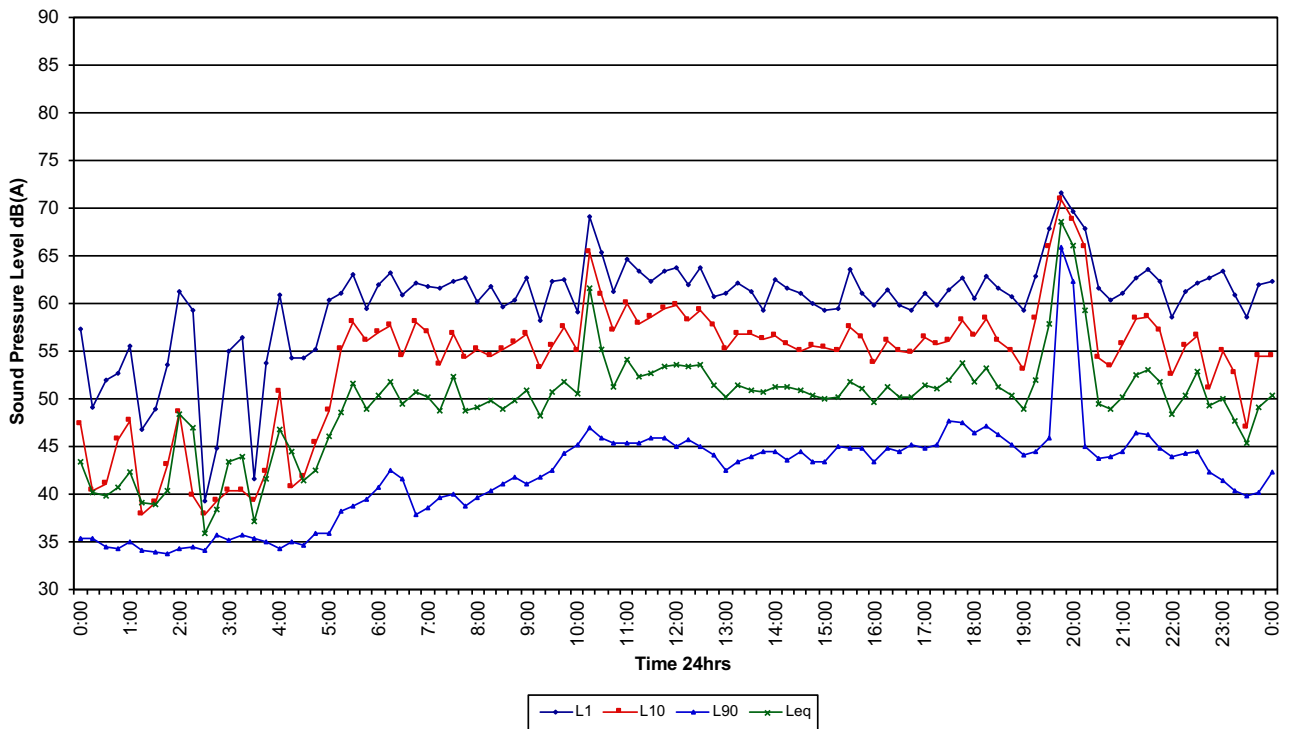
Saturday 12/11/2022



Crematorium Matraville

Traffic Logger

Sunday 13/11/2022

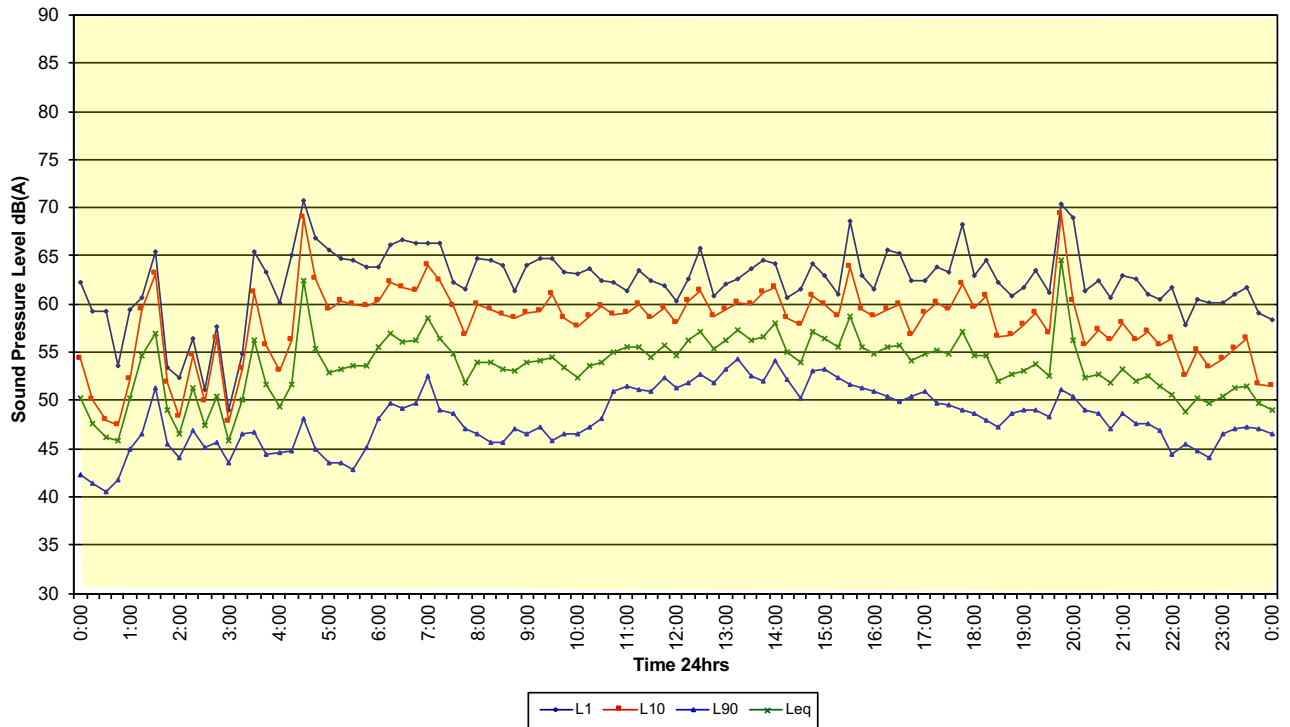




Crematorium Matraville

Traffic Logger

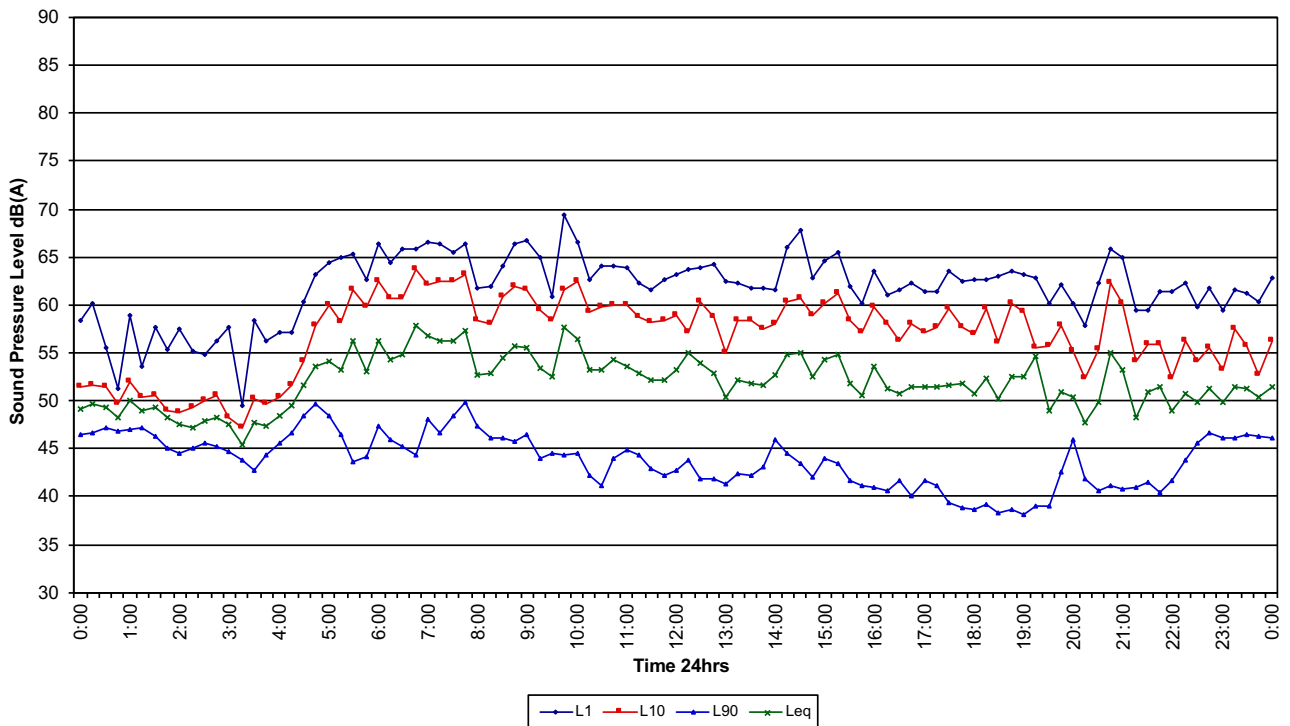
Monday 14/11/2022



Crematorium Matraville

Traffic Logger

Tuesday 15/11/2022

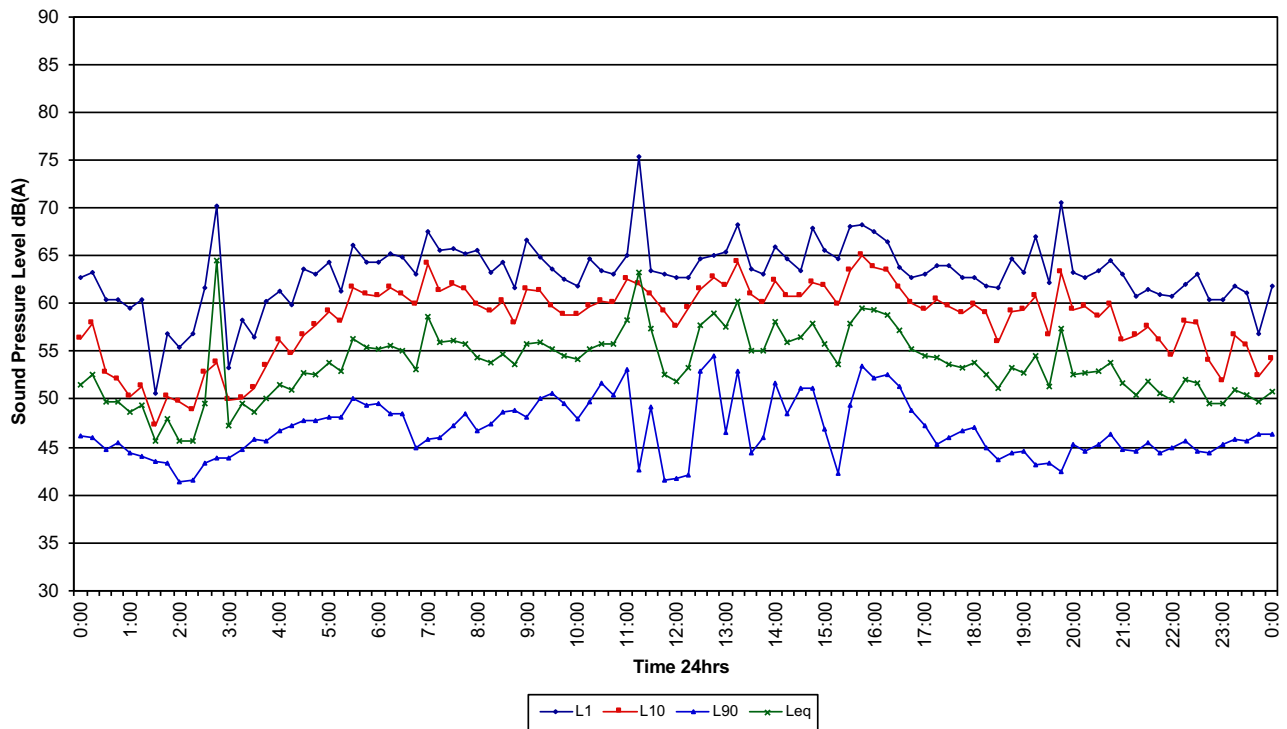




Crematorium Matraville

Traffic Logger

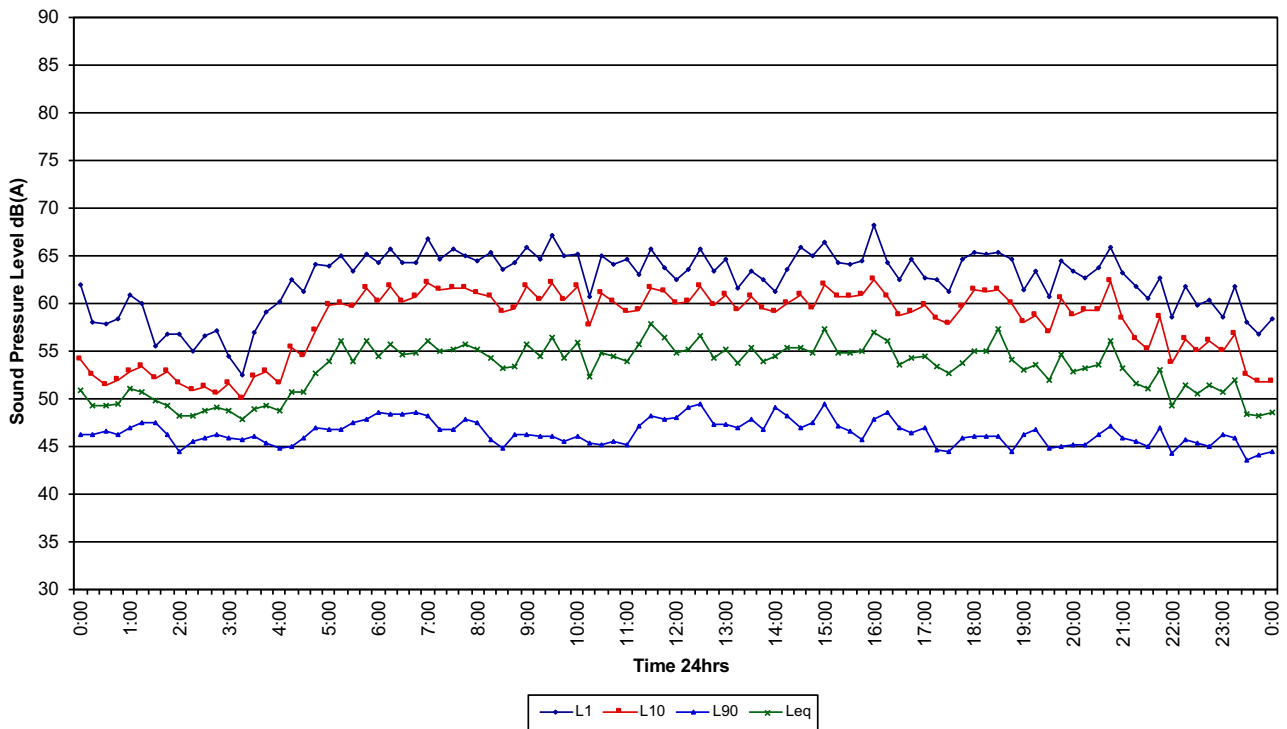
Wednesday 16/11/2022



Crematorium Matraville

Traffic Logger

Thursday 17/11/2022

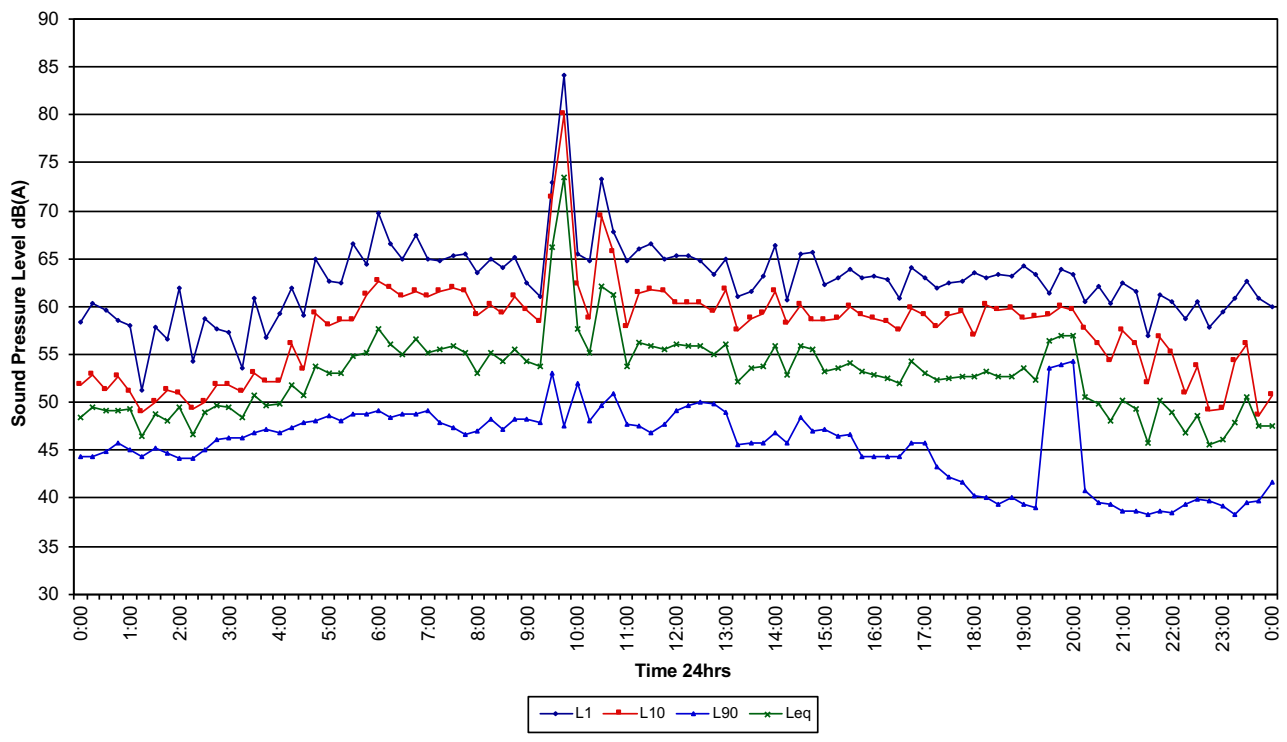




Crematorium Matraville

Traffic Logger

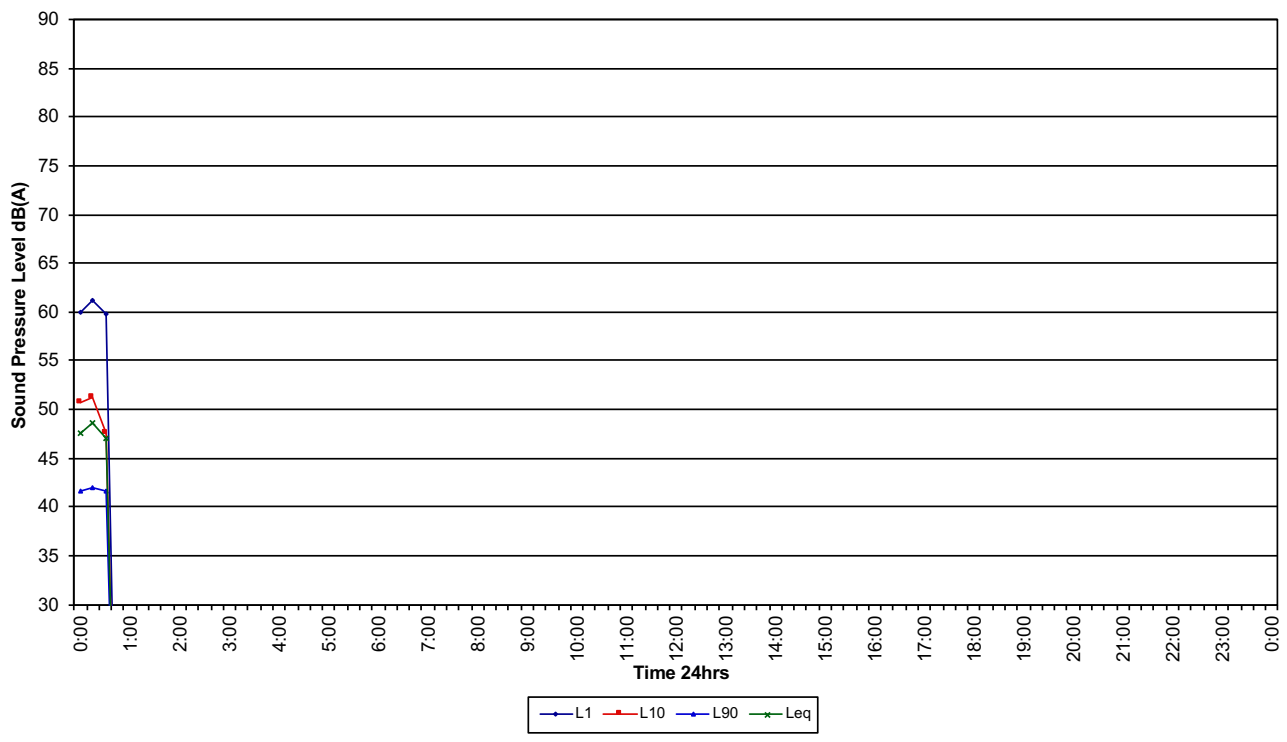
Friday 18/11/2022



Crematorium Matraville

Traffic Logger

Saturday 19/11/2022






Appendix C – Instrument Calibration Certification



**Acoustic
Research
Labs Pty Ltd**

Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter IEC 61672-3:2013 Calibration Certificate Calibration Number C21799

Client Details	Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151
Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878012
Microphone Serial Number :	27938
Pre-amplifier Serial Number :	319575
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24.4°C	Ambient Temperature : 24.5°C
Relative Humidity : 53.4%	Relative Humidity : 53.4%
Barometric Pressure : 99.6kPa	Barometric Pressure : 99.6kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Harrison Kim
Calibration Date : 9 Dec 2021	Report Issue Date : 9 Dec 2021
Approved Signatory : 	Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement - Environmental Conditions			
Acoustic Tests		Temperature	±0.1°C
125Hz	±0.13dB	Relative Humidity	±1.9%
1kHz	±0.13dB	Barometric Pressure	±0.014kPa
8kHz	±0.14dB		
Electrical Tests	±0.10dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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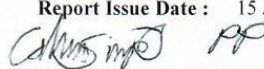


**Acoustic
Research
Labs Pty Ltd**

Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

**Sound Level Meter
IEC 61672-3.2013
Calibration Certificate**

Calibration Number C19414

Client Details	Rodney Stevens Acoustics Pty Ltd 1 Majura Close St Ives Chase NSW 2075
Equipment Tested/ Model Number :	Rion NL-42EX
Instrument Serial Number :	00572559
Microphone Serial Number :	170395
Pre-amplifier Serial Number :	72897
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24°C	Ambient Temperature : 24.2°C
Relative Humidity : 42.9%	Relative Humidity : 42.1%
Barometric Pressure : 99.94kPa	Barometric Pressure : 99.9kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Eloise Burrows
Calibration Date : 11 Jul 2019	Report Issue Date : 15 Jul 2019
Approved Signatory :	 Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	Pass
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Least Uncertainties of Measurement - Environmental Conditions			
Acoustic Tests		Temperature	±0.2°C
31.5 Hz to 8kHz	±0.15dB	Relative Humidity	±2.4%
12.5kHz	±0.21dB	Barometric Pressure	±0.015kPa
16kHz	±0.29dB		
Electrical Tests			
31.5 Hz to 20 kHz	±0.12dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.


NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.



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Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3.2013
Calibration Certificate
Calibration Number C21247

Client Details	Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151	
Equipment Tested/ Model Number :	ARL Ngara	
Instrument Serial Number :	878079	
Microphone Serial Number :	317152	
Pre-amplifier Serial Number :	27877	
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions	
Ambient Temperature : 21.7°C	Ambient Temperature : 23.2°C	
Relative Humidity : 51.1%	Relative Humidity : 50.7%	
Barometric Pressure : 101.57kPa	Barometric Pressure : 101.49kPa	
Calibration Technician : Charlie Neil	Secondary Check: Harrison Kim	
Calibration Date : 25 May 2021	Report Issue Date : 5 Jul 2021	
Approved Signatory : 		Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	Pass
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Least Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.12dB	Temperature	±0.2°C
1kHz	±0.11dB	Relative Humidity	±2.4%
8kHz	±0.13dB	Barometric Pressure	±0.015kPa
Electrical Tests	±0.10dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.


PAGE 1 OF 1



**Acoustic
Research
Labs Pty Ltd**

Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C22370

Client Details	Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151	
Equipment Tested/ Model Number :	ARL Ngara	
Instrument Serial Number :	8780C7	
Microphone Serial Number :	318886	
Pre-amplifier Serial Number :	28005	
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions	
Ambient Temperature : 25.6°C	Ambient Temperature : 25.3°C	
Relative Humidity : 33.5%	Relative Humidity : 31.3%	
Barometric Pressure : 100.18kPa	Barometric Pressure : 100.17kPa	
Calibration Technician : Lucky Jaiswal	Secondary Check: Rhys Gravelle	
Calibration Date : 10 Jun 2022	Report Issue Date : 15 Jun 2022	
Approved Signatory : 		Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
8kHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.13dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

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
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**Acoustic
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Unit 36/14 Loyalty Rd
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www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C22485

Client Details	Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151
Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878005
Microphone Serial Number :	313673
Pre-amplifier Serial Number :	27566
Firmware Version :	12.6
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 24.7°C	Ambient Temperature : 24.3°C
Relative Humidity : 47.7%	Relative Humidity : 49.4%
Barometric Pressure : 99.82kPa	Barometric Pressure : 99.78kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Dhanush Bonu
Calibration Date : 26 Jul 2022	Report Issue Date : 27 Jul 2022
Approved Signatory :	 Juan Agüero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
8kHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.13dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C21840

Client Details	Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151	
Equipment Tested/ Model Number :	ARL Ngara	
Instrument Serial Number :	87812B	
Microphone Serial Number :	41754	
Pre-amplifier Serial Number :	28325	
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions	
Ambient Temperature : 25.1°C	Ambient Temperature : 25.3°C	
Relative Humidity : 53.5%	Relative Humidity : 54.1%	
Barometric Pressure : 100.2kPa	Barometric Pressure : 100.24kPa	
Calibration Technician : Lucky Jaiswal	Secondary Check: Rhys Gravelle	
Calibration Date : 8 Dec 2021	Report Issue Date : 8 Dec 2021	
Approved Signatory : 	Ken Williams	

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
8kHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.10dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

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