



REPORT 220453R1

Revision 5

Noise Impact Assessment
Proposed Residential Subdivision
614 - 626 Old Northern Road, Dural

PREPARED FOR:
Legacy Property

4 August 2025



Noise Impact Assessment

Proposed Residential Subdivision

614 - 626 Old Northern Road, Dural

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DOCUMENT CONTROL

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1 INTRODUCTION

Rodney Stevens Acoustics Pty Ltd (hereby referred to as RSA), has been engaged by Legacy Property to conduct a Road Noise Impact Assessment for a Planning Proposal for the proposed residential subdivision development at 614 - 626 Old Northern Road, Dural.

The report addresses the traffic noise impact from both Old Northern Road and Derrington Road in addition to potential noise from Dural Public School and the future road corridor passing through the site on the amenity of the proposed residential developments.

This assessment is to form part of the supporting documentation for submission to Hills Shire Council.

This report was prepared to support a Planning Proposal request by Legacy Property to The Hills Shire Council (Council) to rezone land at Old Northern Road and Derriwong Road, Dural.

The site has an area of 12.879 hectares and comprises five existing lots.

The Planning Proposal request seeks to rezone the site from RU6 Rural Transition to R2 Low Density Residential and SP2 Infrastructure (Local Road), facilitating the delivery of 110 residential dwellings and a new local park. The proposal also seeks to amend the maximum height of the buildings from 10 metres to 9 metres. The Planning Proposal request is accompanied by a site-specific development control plan and offer to enter into a Voluntary Planning Agreement to secure public benefits associated with the proposal.

The indicative subdivision layout submitted with the Planning Proposal request provides a mix of larger residential areas ranging from 600sqm to 3,400sqm. This will contribute additional housing supply, diversity, and choice in the local area, and support the viability of the Dural village centre.

Specific acoustic terminology is present throughout this report. An explanation of these acoustic terms is provided in Appendix A

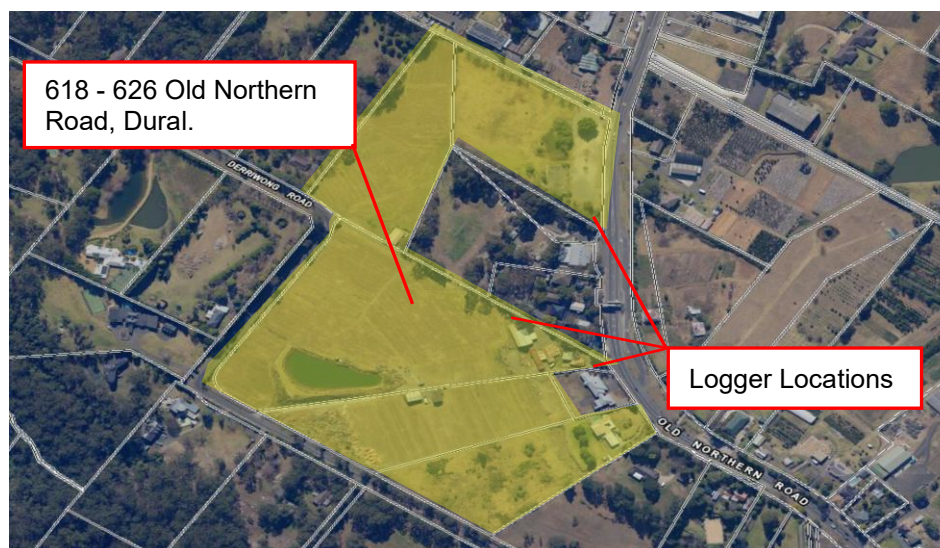
2 PROPOSED DEVELOPMENT

2.1 Site Location

The proposed residential development sites are located at 614 - 626 Old Northern Road, Dural. The site is bounded by residential/rural premises to the north, south and west with Old Northern Road to the east and Dural Public School to the North.

The location of the proposed site and surrounding area is presented in Figure 2-1.

Figure 2-1 Site Location



Aerial image courtesy of Six Map © 2024



2.2 Proposed Development

The proposal consists of a subdivision development at 614 - 626 Old Northern Road, Dural. The site plans of the proposed residential development are presented in Appendix E.

3 EXISTING ACOUSTIC ENVIRONMENT

3.1 Unattended Noise Monitoring

In order to characterise the existing acoustical environment of the area, unattended noise monitoring was conducted between Friday 8th July and Monday 18th July 2022 at the logging locations shown in Figure 2-1. Three noise loggers were set up on site. The first logger and second loggers were located on the south east boundary and the north east boundary of the site overlooking Old Northern Road these locations are representative of the traffic noise levels that the site will be exposed to.

The third logger was located on, noise monitoring at this location is representative of the ambient noise levels that the centre of the site bordering Dural Public school will be exposed to.

Logger locations were selected with consideration to other noise sources which may influence readings, security issues for noise monitoring equipment and gaining permission for access from residents and landowners.

Instrumentation for the survey comprised of 3 RION NL-42 environmental noise loggers (serial numbers 597172, 1173791 and 873125) fitted with microphone windshields. Calibration of the logger was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dB(A). All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. Weather affected data has been removed. Removed data is highlighted in yellow in Appendix B logger graphs.

The logger determines LA1, LA10, LA90 and LAeq levels of the ambient noise. LA1, LA10, LA90 are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary for Definitions in Appendix A). Detailed results at the monitoring location are presented in graphical format in Appendix B. The graphs show measured values of LA1, LA10, LA90 and LAeq for each 15-minute monitoring period.

4 NOISE CRITERIA

4.1 Road Noise and Vibration Criteria

The determination of an acceptable level of road noise that will impact internal residential spaces requires consideration of the activities carried out within the space and the degree to which noise will interfere with those activities.

As sleep is the activity most affected by traffic noise, bedrooms are considered to be the most sensitive internal living areas. Higher levels of noise are acceptable in living areas without interfering with activities such as reading, listening to the television etc. Noise levels in utility spaces such as kitchens, bathrooms, laundries etc. can be higher.

4.2 Hills Shire Council Requirements

Hills Shire Council has specific requirements for traffic noise intrusion into residential spaces. These requirements are detailed in the Hills Shire Council's DCP and pertain to the SEPP (Transport & Infrastructure) 2021 they are as follows:

State Environmental Planning Policy (Infrastructure) 2021

Appropriate measures must be taken to ensure that the following LAeq levels are not exceeded:

In any bedroom in the building – 35 dB(A) at any time between 10 pm and 7 am



Anywhere else in the building (other than a garage, kitchen, bathroom, or hallway) – 40 dB(A) at any time

Environmental Health

An acoustic report is to be prepared by an appropriately qualified acoustic consultant having the technical eligibility criteria required for membership of the Association of Australian Acoustical Consultants (AAAC) and/or grade membership of the Australian Acoustical Society (MAAS). The report shall consider noise intrusion from the road and measures to ensure compliance with SEPP (Transport & Infrastructure) 2021. The report should also consider noise emissions from the development including but not limited to proposed mechanical plant (air conditioners, lift shift, automatic roller doors, and ventilation plant for the underground car park) and construction/vibration impacts. The report should be prepared in accordance with the NSW Environment Protection Authority Industrial Noise Policy, EPA's Interim Construction Noise Guidelines & NSW DP&I's Development near Rail Corridors and Busy Roads – Interim Guideline

4.3 State Environmental Planning Policy (Transport & Infrastructure) 2021

Road and Rail Noise Criteria

The NSW Government's State Environmental Planning Policy (Infrastructure) 2021 (SEPP (Infrastructure) 2021) was introduced to facilitate the delivery of infrastructure across the State by improving regulatory certainty and efficiency. In accordance with the SEPP, Table 3.1 of the NSW Department of Planning and Infrastructure's "Development near Rail Corridors and Busy Roads - Interim Guideline" (the DP&I Guideline) of December 2008 provides noise criteria for residential and non-residential buildings. These criteria are summarized in Table 4-1.

Table 4-1 DP&I Interim Guideline Noise Criteria

Type of occupancy	Noise Level dB(A)	Applicable time period
Sleeping areas (bedroom)	35	Night 10 pm to 7 am
Other habitable rooms (excl. garages, kitchens, bathrooms & hallways)	40	At any time

Note 1: Airborne noise is calculated as $L_{Aeq(15\text{hour})}$ daytime and $L_{Aeq(9\text{hour})}$ night-time

The following guidance is provided in the DP&I Guideline:

"These criteria apply to all forms of residential buildings as well as aged care and nursing home facilities. For some residential buildings, the applicants may wish to apply more stringent design goals in response to market demand for a higher quality living environment.

The night-time "sleeping areas" criterion is 5 dB (A) more stringent than the "living areas" criteria to promote passive acoustic design principles. For example, designing the building such that sleeping areas are less exposed to road or rail noise than living areas may result in less onerous requirements for glazing, wall construction and acoustic seals. If internal noise levels with windows or doors open exceed the criteria by more than 10 dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia."

The noise criteria presented in Section 4.3 and in Table 4-1 apply to a 'windows closed condition'. Standard window glazing of a building will typically attenuate noise ingress by 20 dB(A) with windows closed and 10 dB(A) with windows open (allowing for natural ventilation). Accordingly, the external noise threshold above which a dwelling will require mechanical ventilation is an $L_{Aeq(9\text{hour})}$ of 55 dB(A) for bedrooms and $L_{Aeq(15\text{hour})}$ of 60 dB(A) for other areas.



Where windows must be kept closed, the adopted ventilation systems must meet the requirements of the Building Code of Australia and Australian Standard 1668 – The use of ventilation and air conditioning in buildings.

5 NOISE IMPACT ASSESSMENT

5.1 Road Traffic Noise

5.1.1 Noise Intrusion (State Environmental Planning Policy (Transport & Infrastructure) 2021)

In order to ascertain the existing noise levels from Boundary Road and Menin Road, the measured noise logger data was processed in accordance with the State Environmental Planning Policy (Transport & Infrastructure) 2021 and the Development near Rail Corridors and Busy Roads Interim Guideline. Table 5-1 details the traffic noise levels.

Table 5-1 Measured Traffic Noise Levels

Logger Location	Noise Level – dB(A) re 20 µPa	
	L _{Aeq} (15hour)	L _{Aeq} (9hour)
	07:00 – 22:00	22:00 to 07:00
614 Old Northern Road	70	64
626 Old Northern Road	73	66
Dural Public School centre Boundary	51	47

Traffic noise levels recorded by the noise logger have been corrected to account for distance from the road to the proposed façade. They are representative of the noise levels the proposed façade will encounter.

6 RECOMMENDED NOISE CONTROL TREATMENT

The calculation procedure establishes the required noise insulation performance of each surface component such that the internal noise level is achieved whilst an equal contribution of road noise energy is distributed across each component. Building envelope components with a greater surface area must therefore offer increased noise insulation performance.

The recommended acoustic treatment is based on the following floor finishes:

- Bedrooms: Carpet and underlay
- Living Room Hard Flooring
- Kitchen/Wet Areas: Tiles

The acoustic requirements shown in this report will increase further where the bedroom floor finishes are tiled or timber.

All recommendations must be checked by others to ensure compliance with other non-acoustic requirements that Council or other authority may impose (e.g. Thermal requirements for BASIX compliance).



6.1 Glazing

The R_w rating required for each window may vary from room to room. Recommendations for windows also apply to any other item of glazing located on the external facade of the building in a habitable room unless otherwise stated.

Note that the R_w rating is required for the complete glazing and frame assembly. The minimum glazing thicknesses will not necessarily meet the required R_w rating without an appropriate frame system. It will be therefore necessary to provide a window glass and frame system having a laboratory tested acoustic performance meeting the requirements in this section.

The window systems must be tested in accordance with both of the following:

- Australian Window Association Industry Code of Practice Window and Door – Method of Acoustic Testing; and
- AS 1191 Acoustics – Method for laboratory measurement of airborne sound insulation of building elements.

The entire frame associated with the glazing must be sealed into the structural opening using acoustic mastics and backer rods. Normal weather proofing details do not necessarily provide the full acoustic insulation potential of the window system. The manufacturers' installation instructions for the correct acoustic sealing of the frame must be followed.

We note that wooden frame systems have low acoustic performance due to the nature of the frame and must **NOT** be used.

It is possible that structural demands for wind and fire loading may require more substantial glass and framing assemblies than nominated above. Where this is the case, the acoustic requirements must clearly be superseded by the structural or fire rating demands.

6.1.1 R_w Requirements for Glazing

The highlighted Red, Blue, and Green dwellings in Appendix D will require acoustic treatment.

The glazing for dwellings in close proximity to Old Northern Road (affected dwellings are highlighted in RED in Appendix D) will be required to achieve a rating of R_w 41 for bedrooms and R_w 36 for living areas. This R_w rating is generally achieved with an acoustically sealed aluminium frame, seals and:

- (R_w 41) Double glazed laminated glass system
- (R_w 36) 10.38mm laminated glass

The glazing for dwellings highlighted in BLUE in Appendix D will be required to achieve a rating of R_w 34 for bedrooms and R_w 30 for living areas. This R_w rating is generally achieved with an acoustically sealed aluminium frame, seals; 8.38mm laminated glass and 6.38mm laminated glass respectively.

The glazing for dwellings highlighted in GREEN in Appendix D will be required to achieve a rating of R_w 28 for bedrooms and R_w 26 for living areas. This R_w rating is generally achieved with an acoustically sealed aluminium frame, seals and 6mm glass recommended for both.

Recommendations have considered future road widening, proposed road corridors and potential school noise. No further acoustic requirements are needed.

7 CONCLUSION

Rodney Stevens Acoustics has conducted a review of the proposed residential developments at 614 - 626 Old Northern Road, Dural. The review has assessed the amenity of the site and compared it with the noise criteria required by Hills Shire Council and other relevant standards.

A noise survey has been carried out and the processed data has been used to determine traffic noise from Old Northern Road and the surrounding area to the project site. Based on the noise impact study conducted, the proposed development is deemed to comply with the SEPP (Transport & Infrastructure) 2021-noise criteria with recommendations from this report. It is therefore recommended that planning approval be granted for the proposed development based on acoustics.

Prepared by:



Dani Awad

Senior Acoustic Consultant

Approved by:



Desmond Raymond

Director



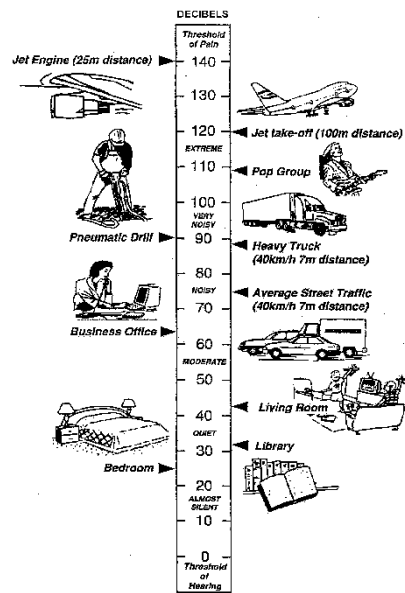
Appendix A.

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 measurements, an electronic ' <i>A-weighting</i> ' frequency filter is applied to the measured sound level <i>dB(A)</i> 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 <i>dB(linear)</i> .
Ambient noise	The total noise in a given situation, inclusive of all noise source contributions in the near and far field.
Community annoyance	<p>Includes noise annoyance due to:</p> <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	<p>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:</p> <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)	<p>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 2×10^{-5} Pa.</p> <p>The picture below indicates typical noise levels from common noise sources.</p>



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 $dB(A)$.

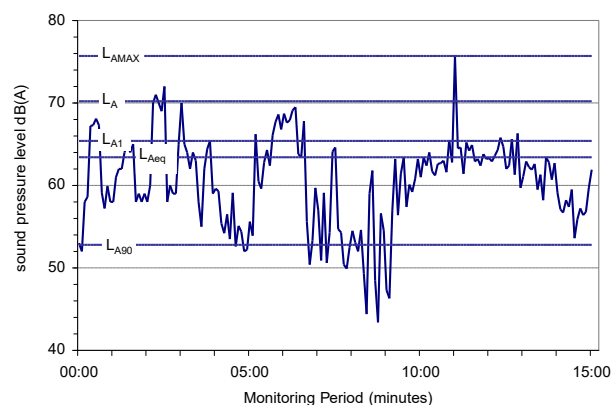
Sound Pressure Level (SPL)

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.

Statistic 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 descriptors:

L_{Amax} Maximum recorded noise level.

L_{A1} The noise level exceeded for 1% of the 15 minute interval.



L_{A10} Noise level present for 10% of the 15-minute interval. Commonly referred to the average maximum noise level.

L_{Aeq} 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.

L_{A90} Noise level exceeded for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

Threshold

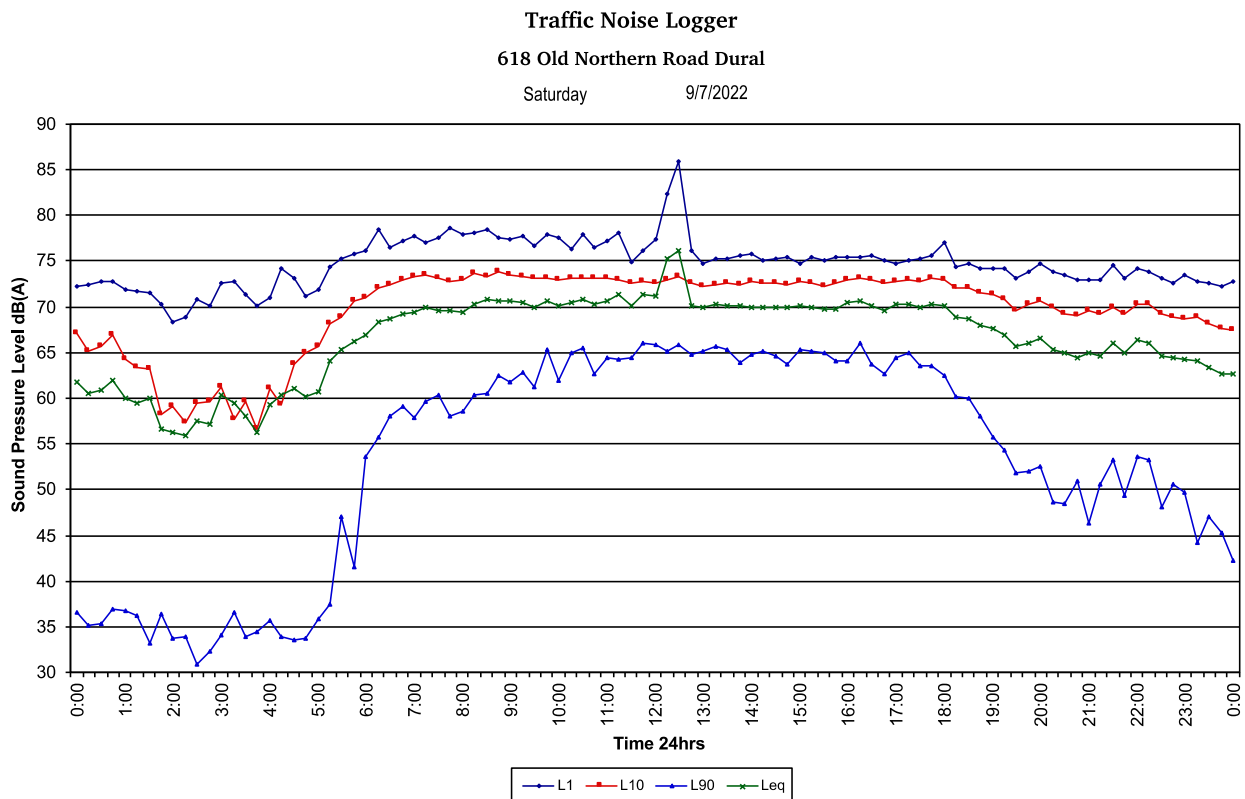
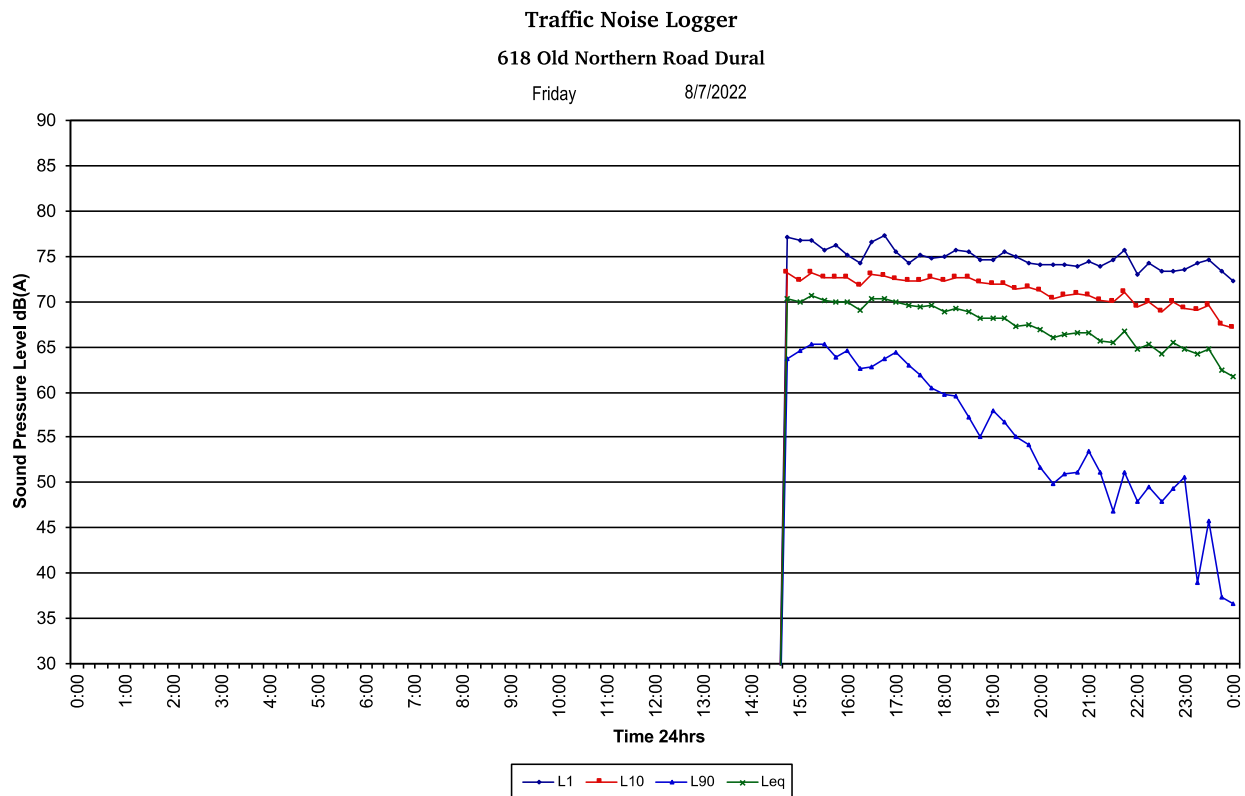
The lowest sound pressure level that produces a detectable response (in an instrument/person).

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 dB(A) penalty is typically applied to noise sources with tonal characteristics



Appendix B Logger Graphs

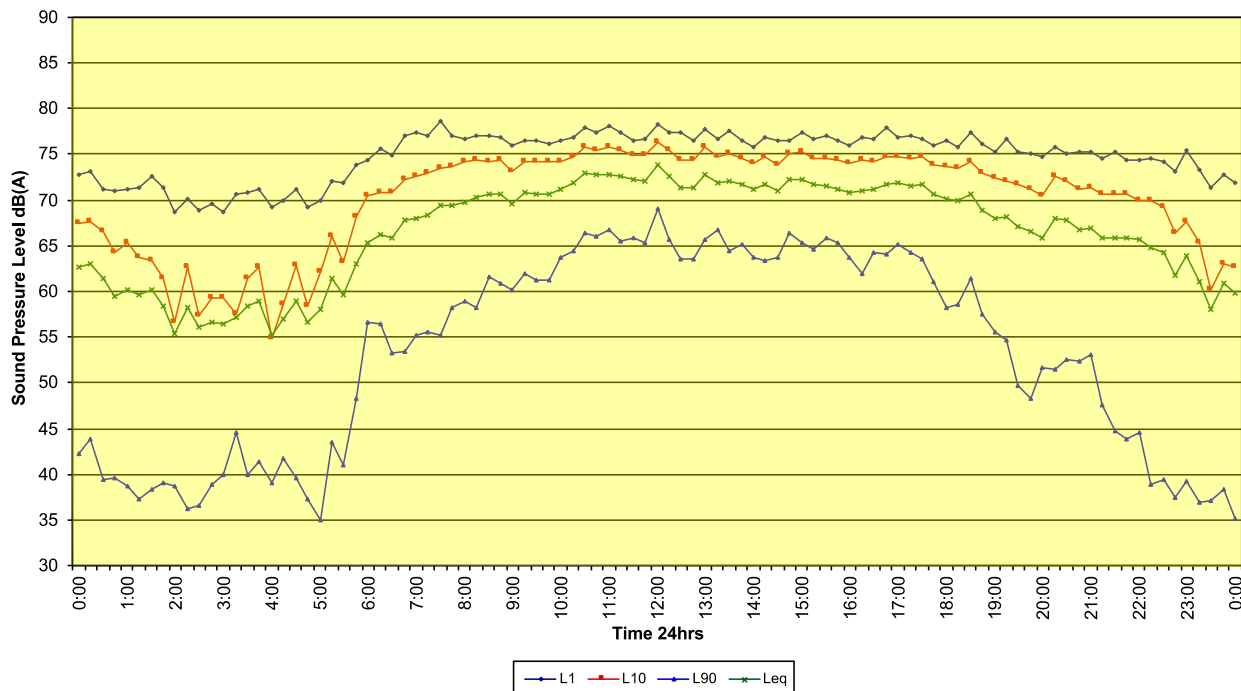




Traffic Noise Logger

618 Old Northern Road Dural

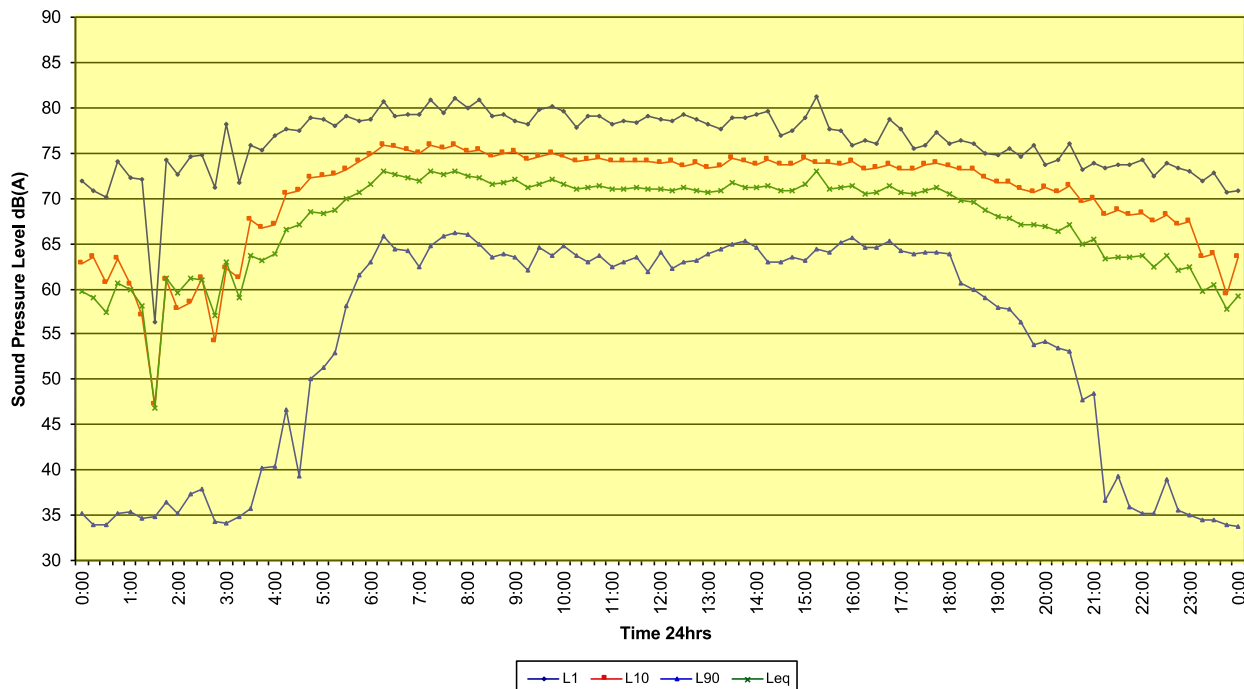
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Traffic Noise Logger

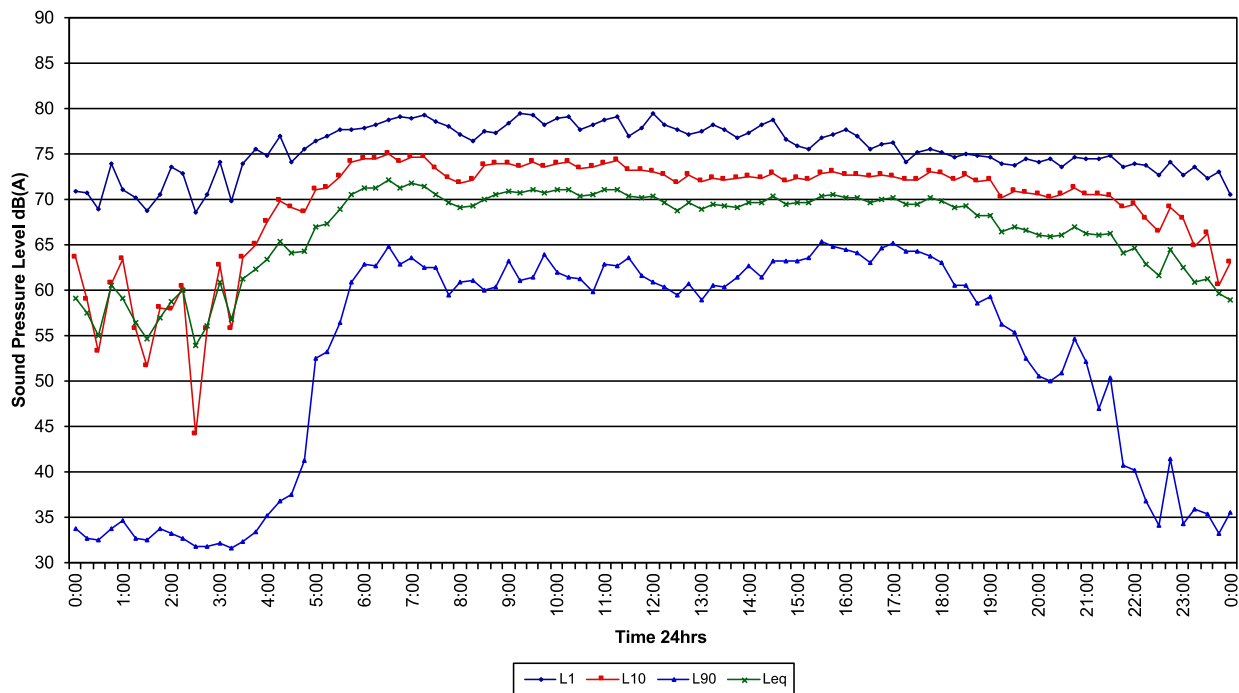
618 Old Northern Road Dural

Monday 11/7/2022

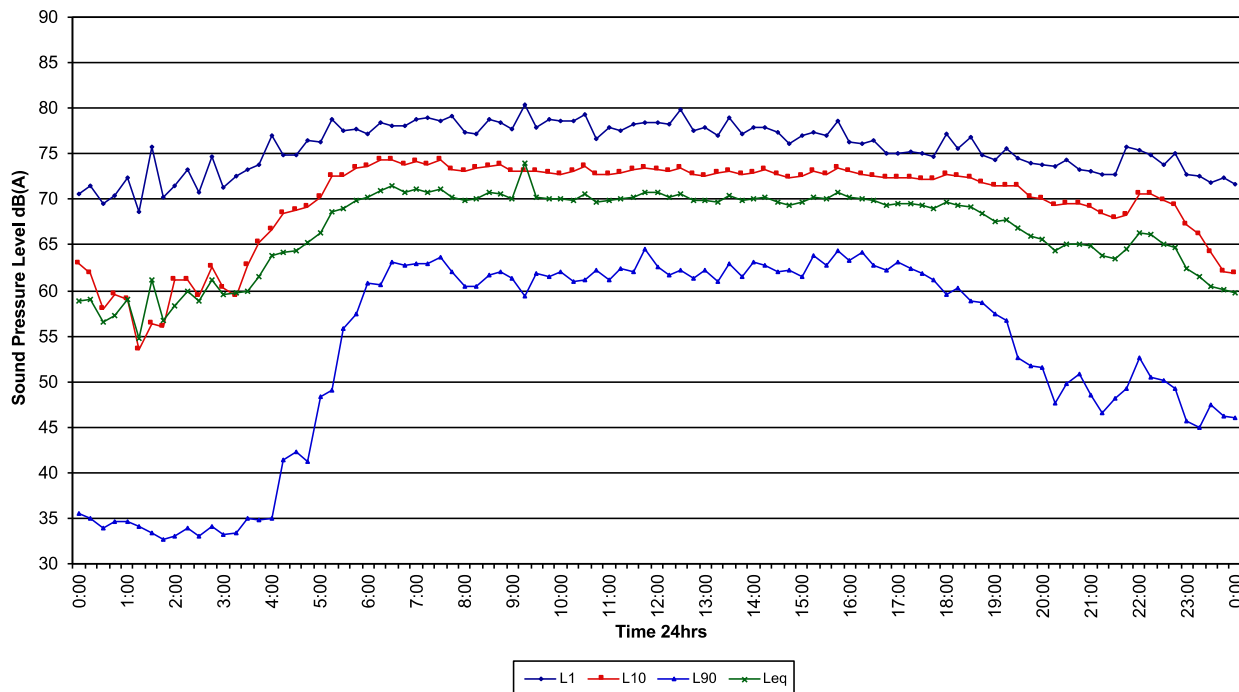




Traffic Noise Logger
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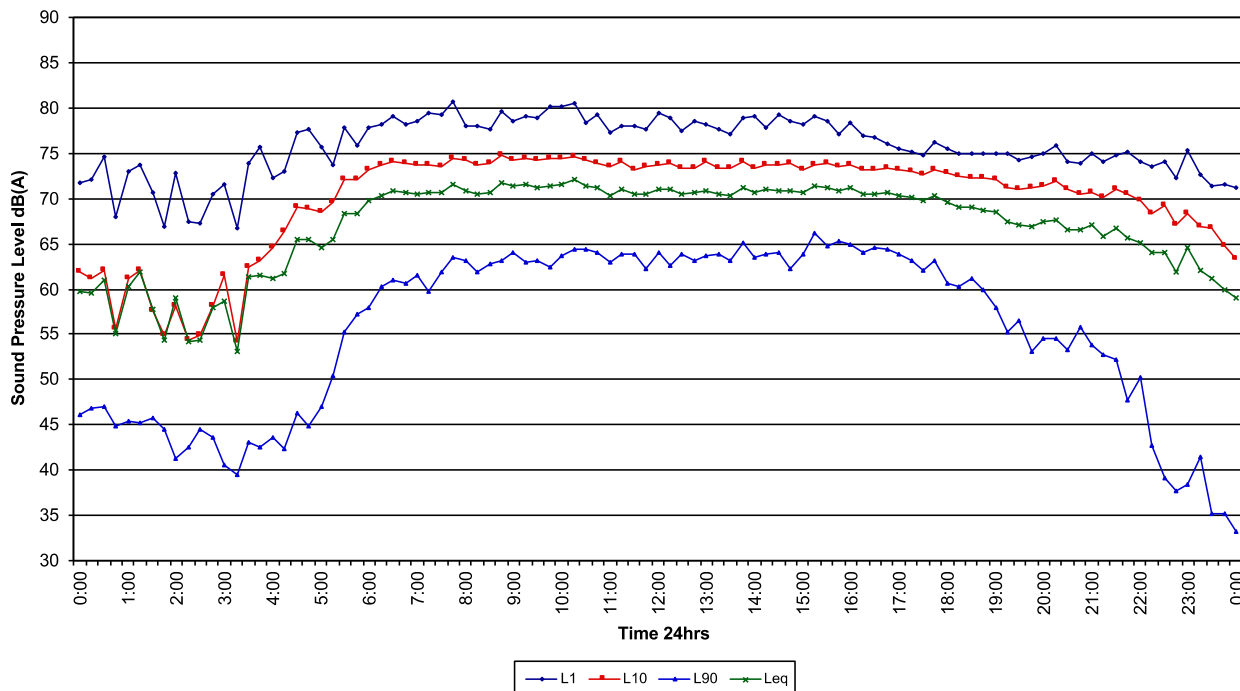


Traffic Noise Logger
618 Old Northern Road Dural
Wednesday 13/7/2022

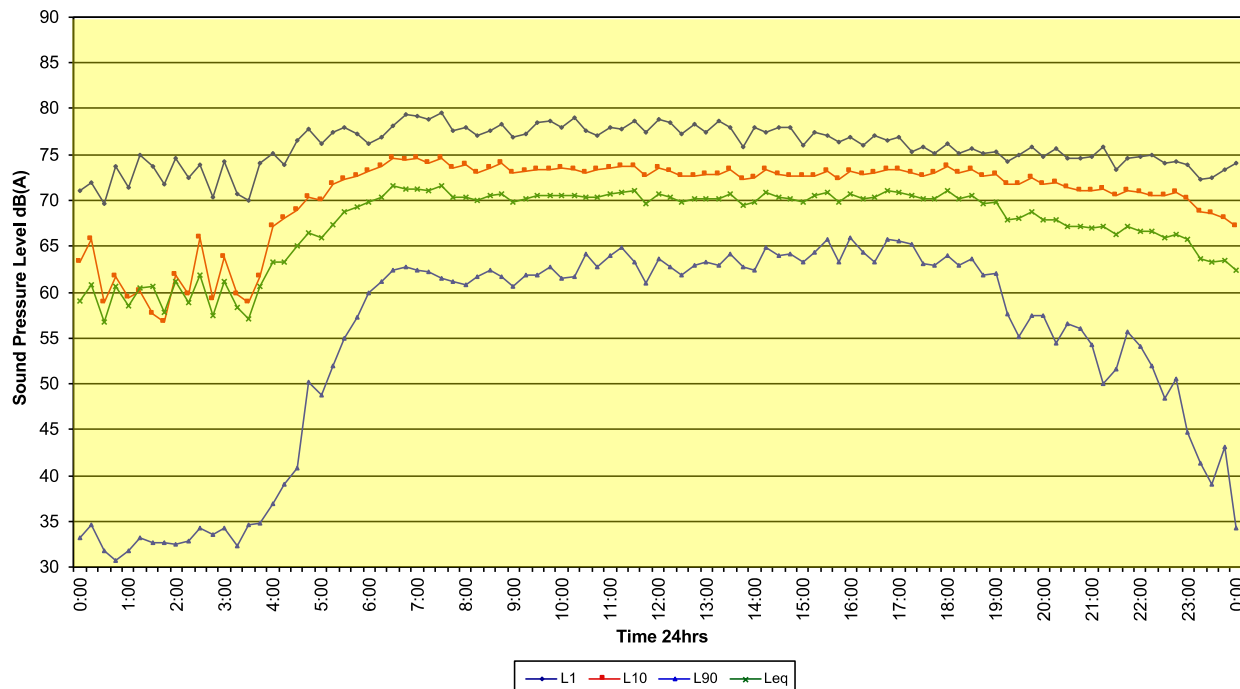




Traffic Noise Logger
618 Old Northern Road Dural
Thursday 14/7/2022

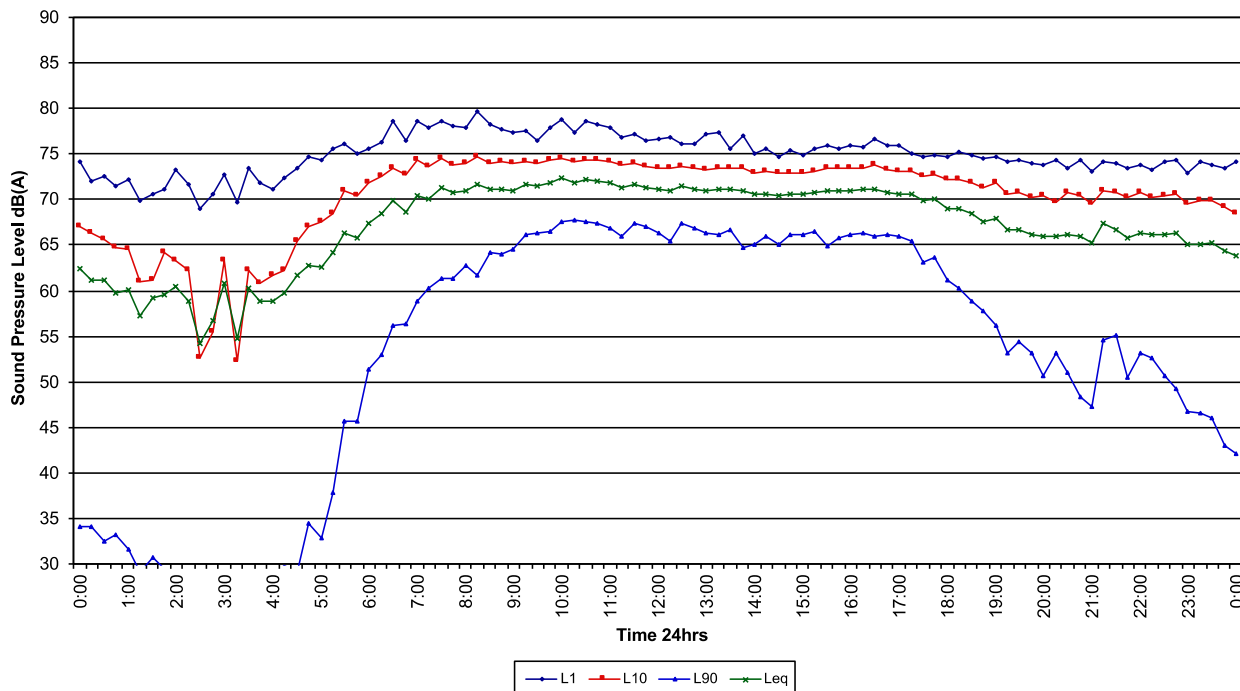


Traffic Noise Logger
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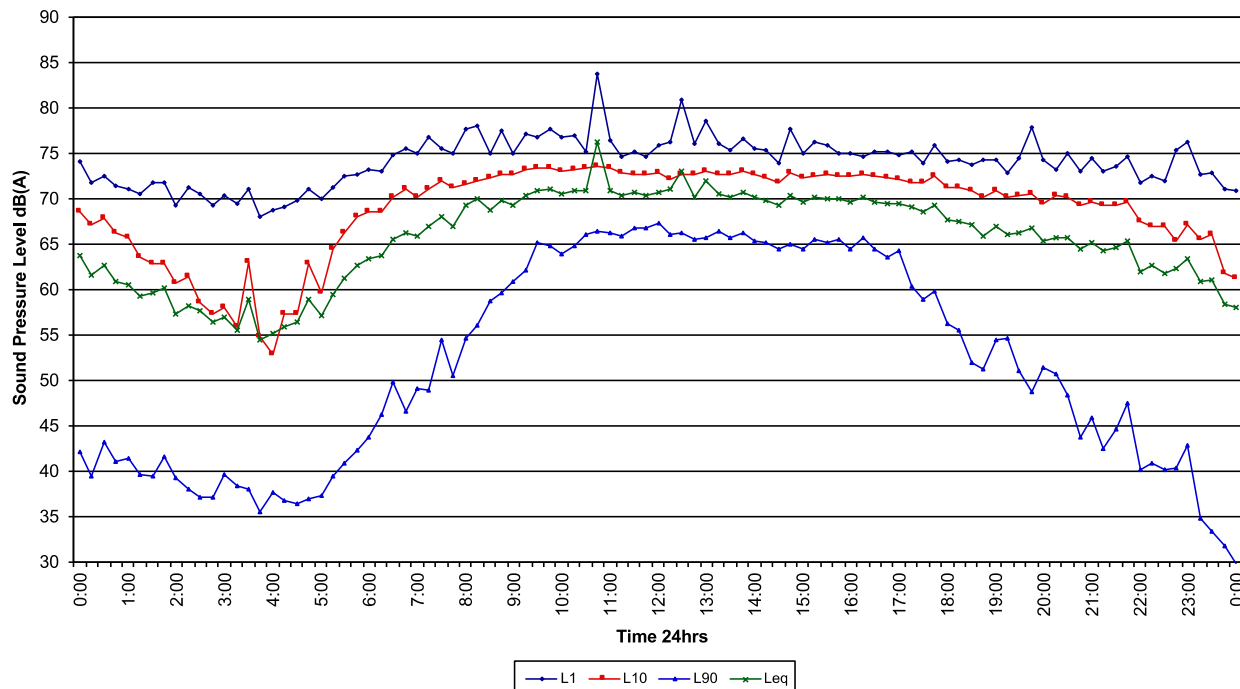




Traffic Noise Logger
618 Old Northern Road Dural
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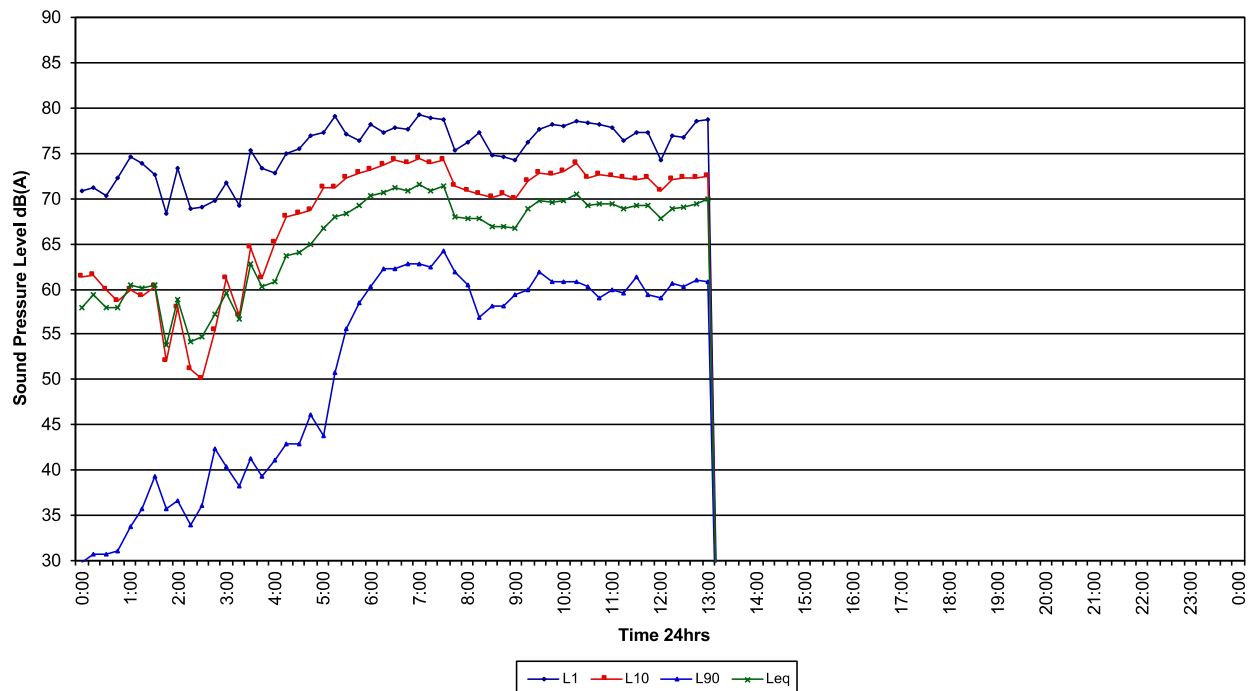


Traffic Noise Logger
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Sunday 17/7/2022

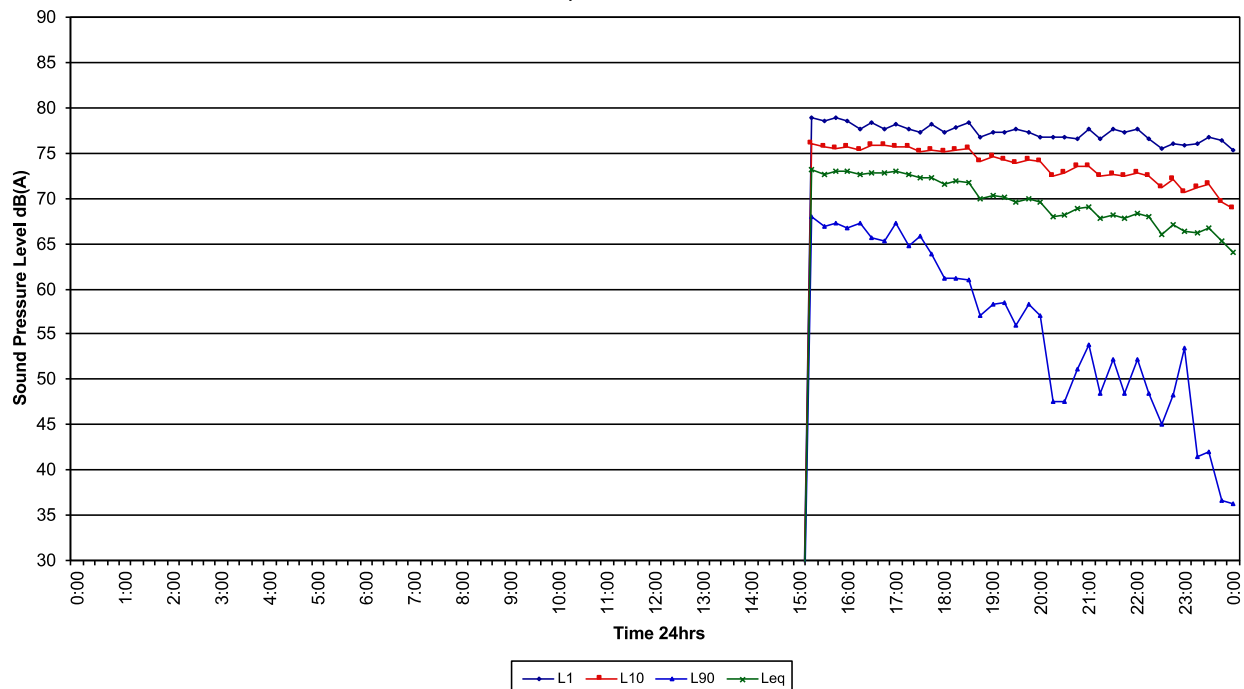


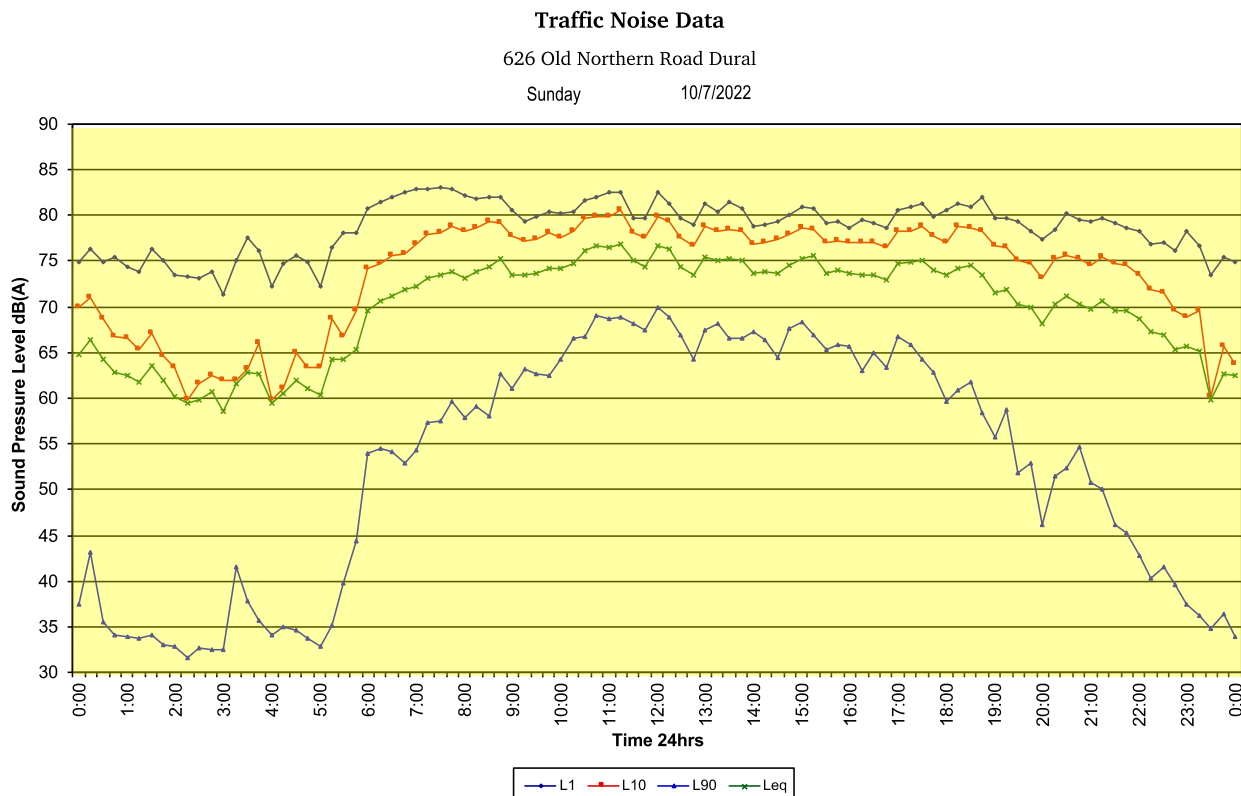
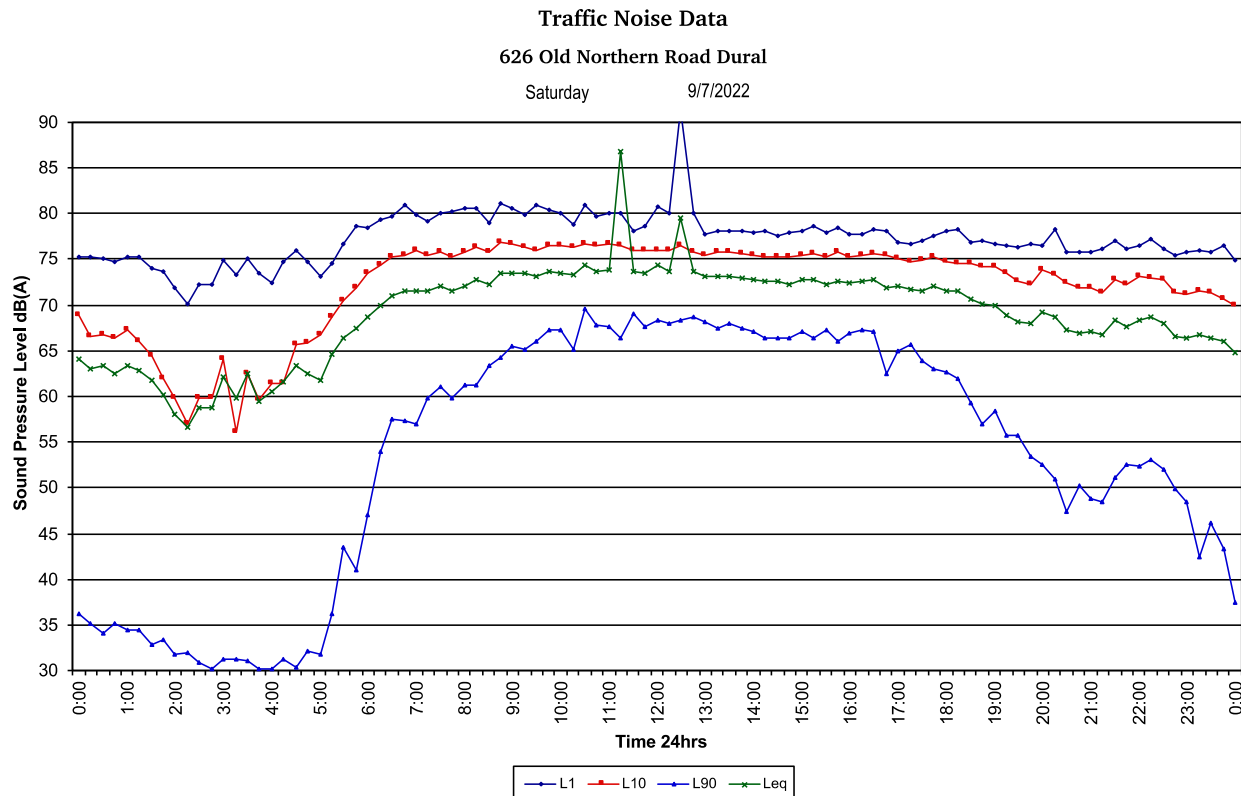


Traffic Noise Logger
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Monday 18/7/2022



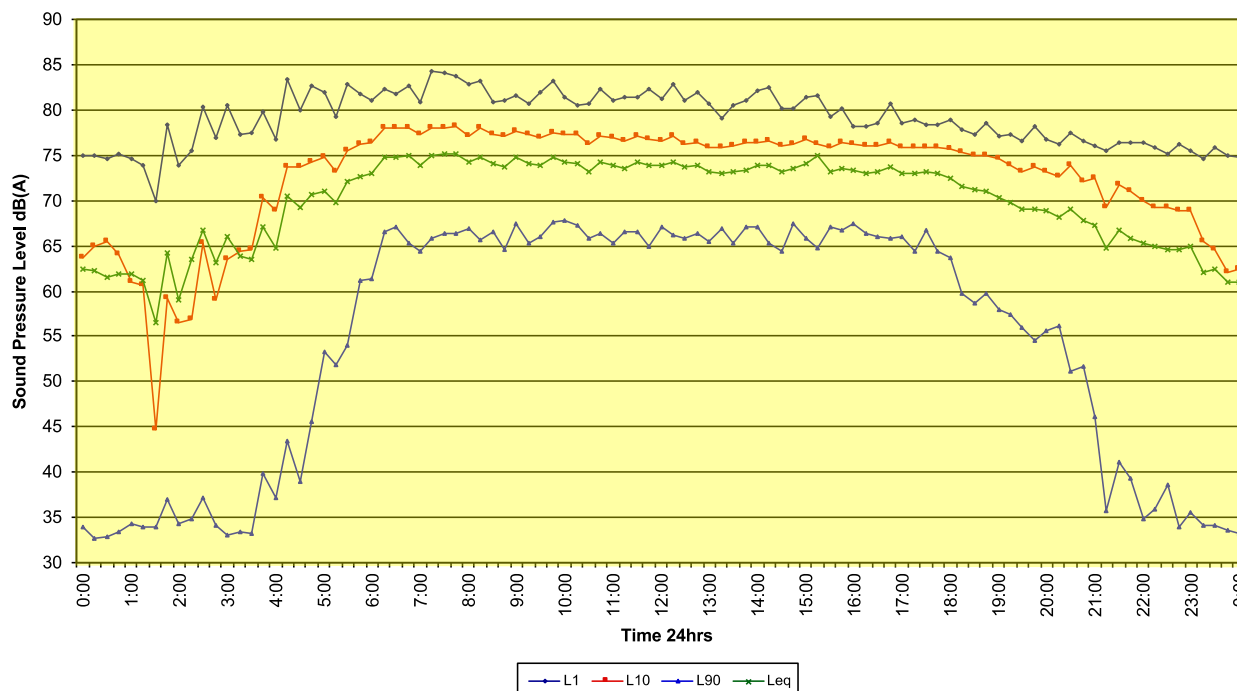
Traffic Noise Data
626 Old Northern Road Dural
Friday 8/7/2022



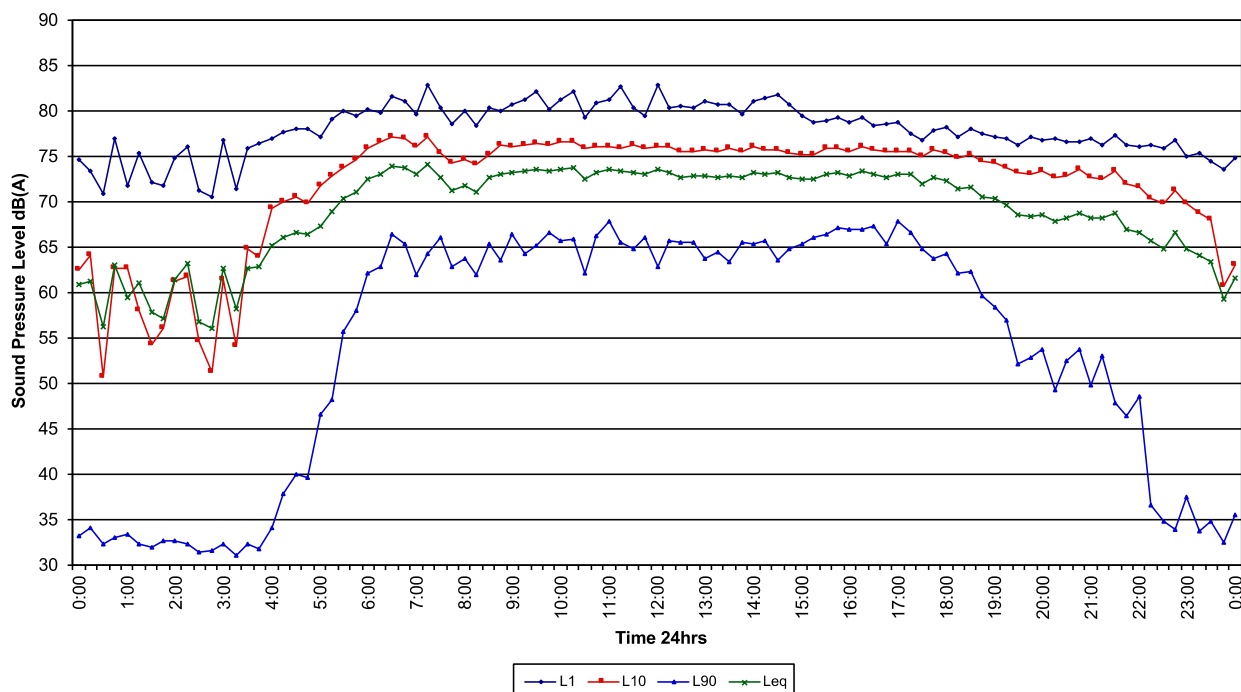




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Monday 11/7/2022

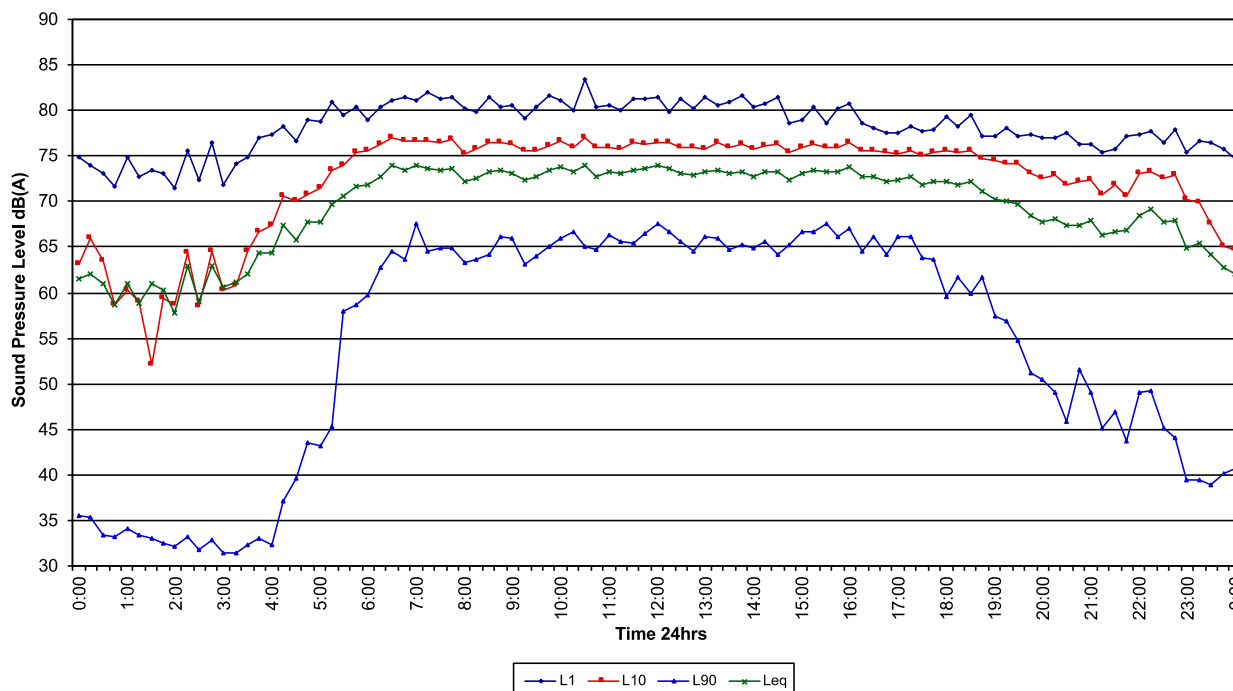


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Tuesday 12/7/2022

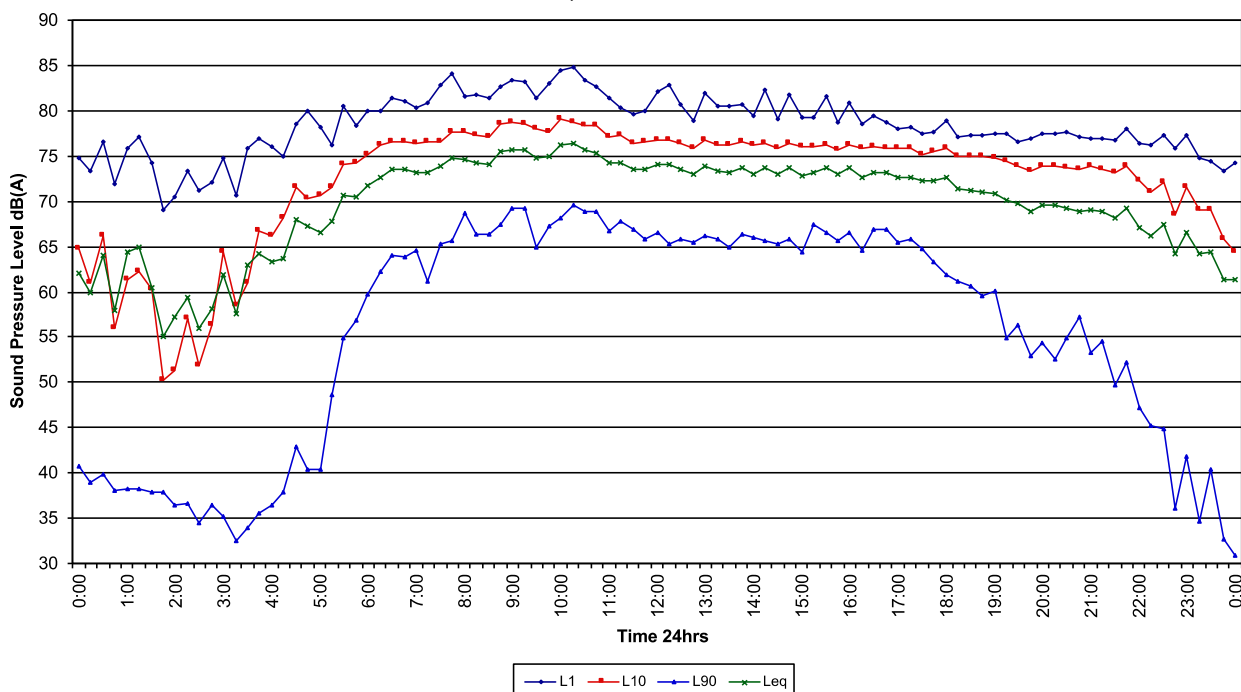




Traffic Noise Data
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Wednesday 13/7/2022

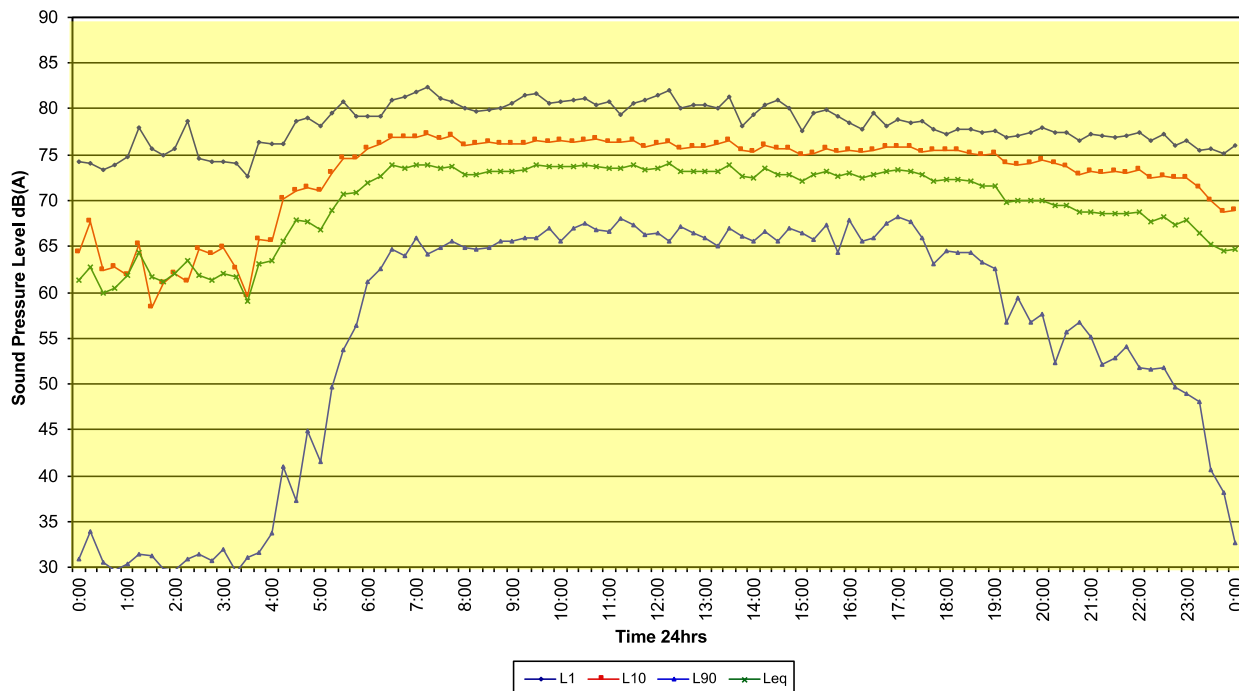


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Thursday 14/7/2022

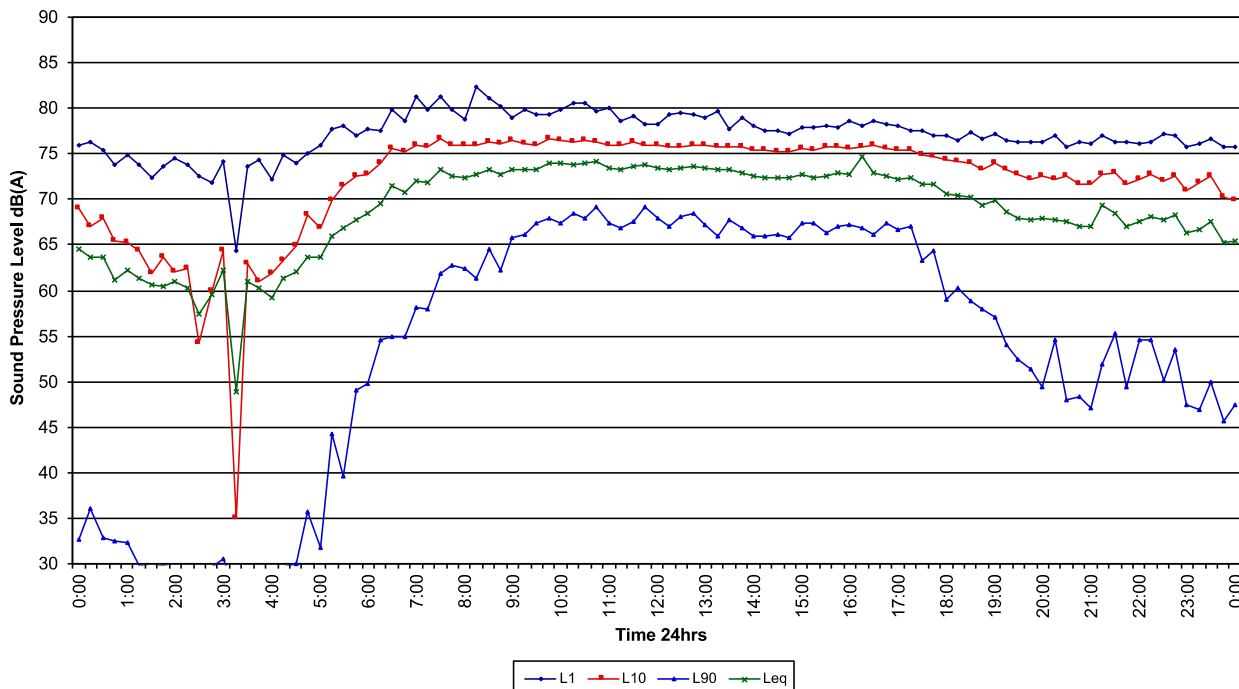




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Friday 15/7/2022

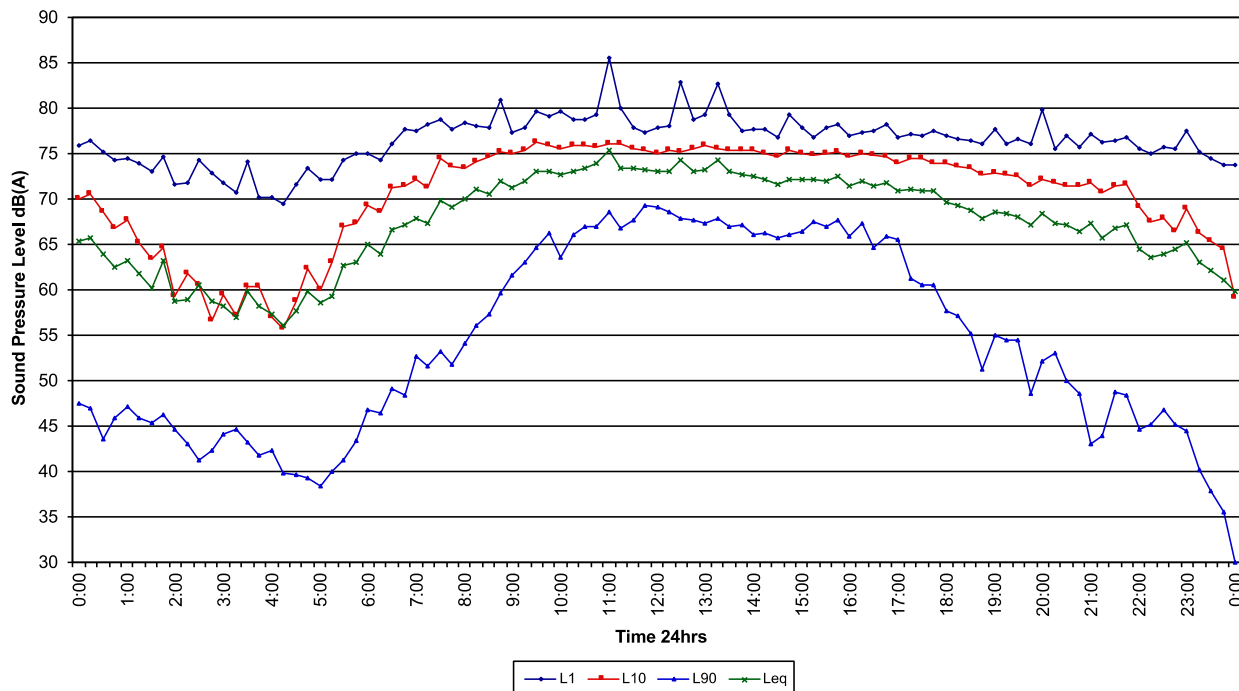


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Saturday 16/7/2022

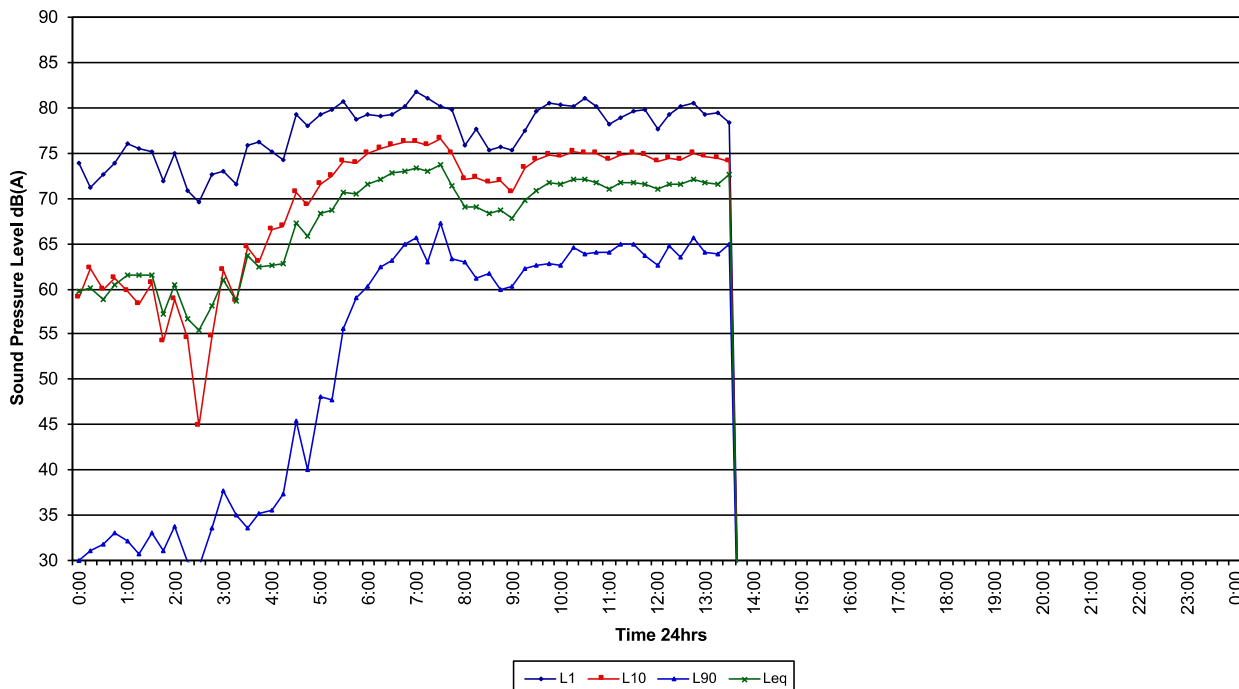




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Sunday 17/7/2022

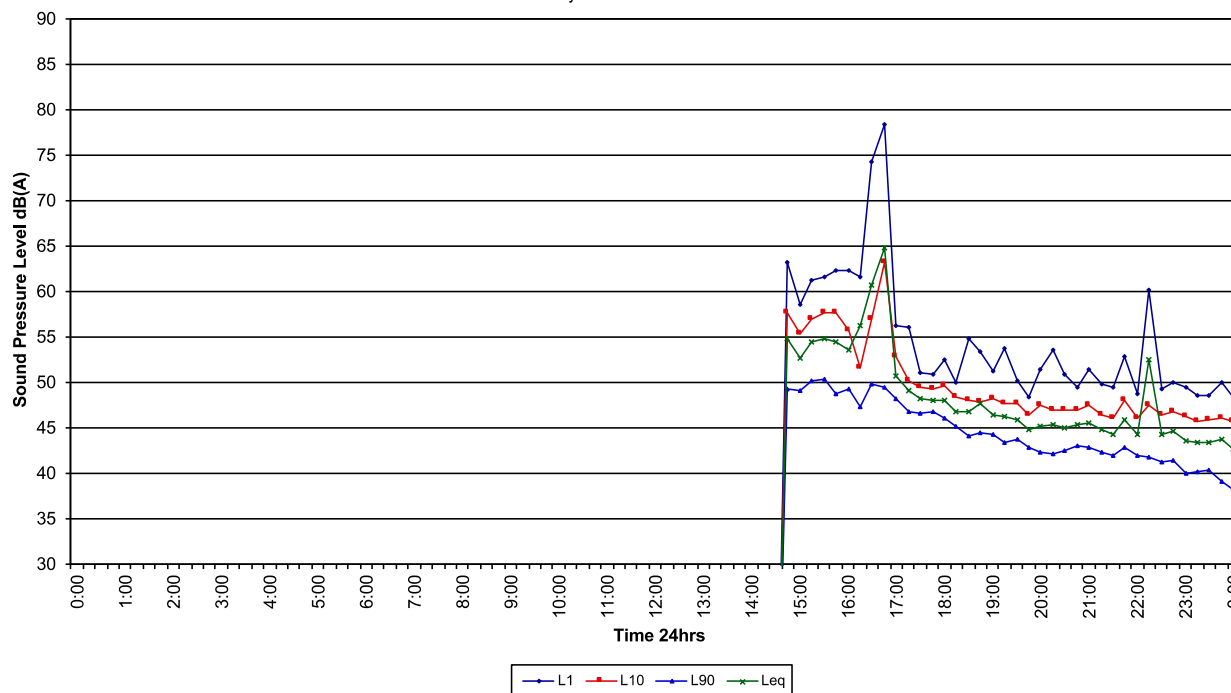


Traffic Noise Data
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Monday 18/7/2022

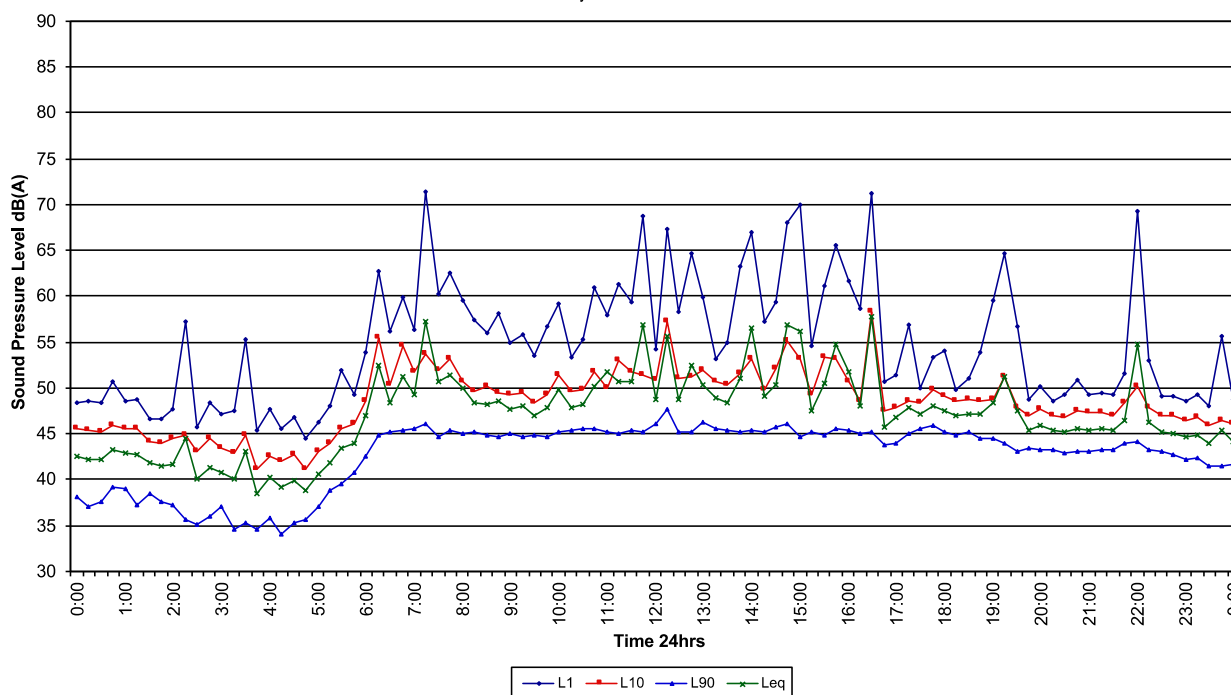




Ambient Noise Data
618-626 Old Northern Road Dural
Friday 8/7/2022



Ambient Noise Data
618-626 Old Northern Road Dural
Saturday 9/7/2022

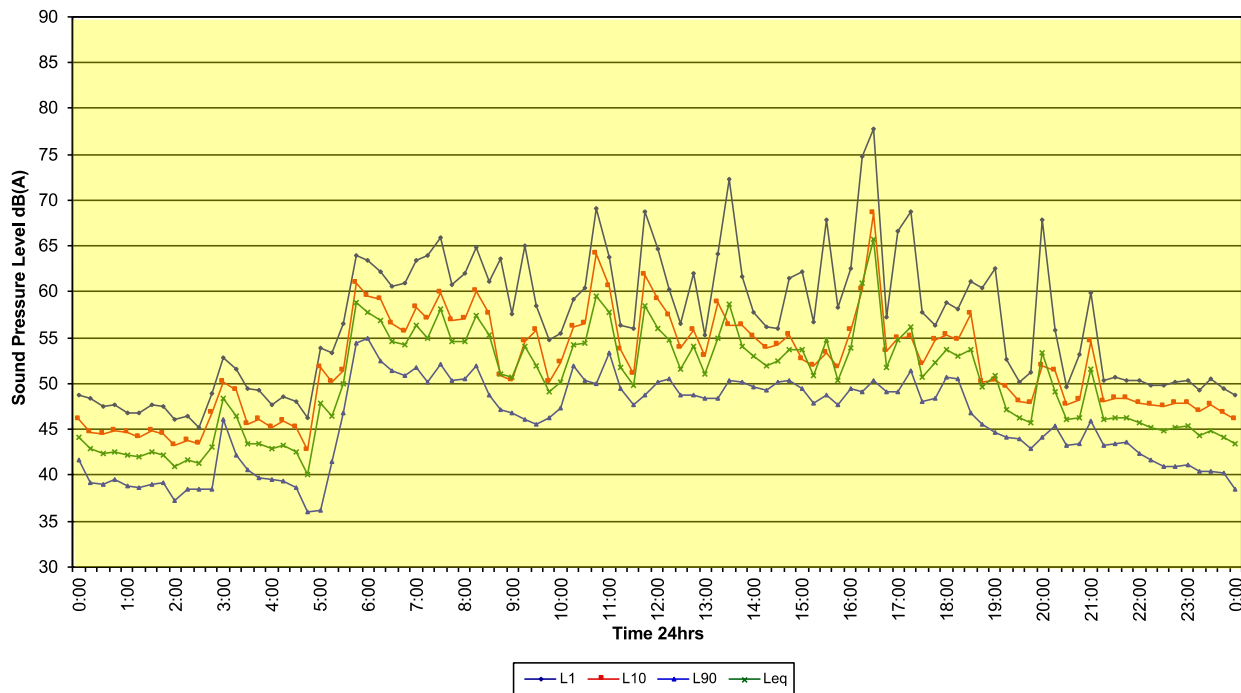




Ambient Noise Data

618-626 Old Northern Road Dural

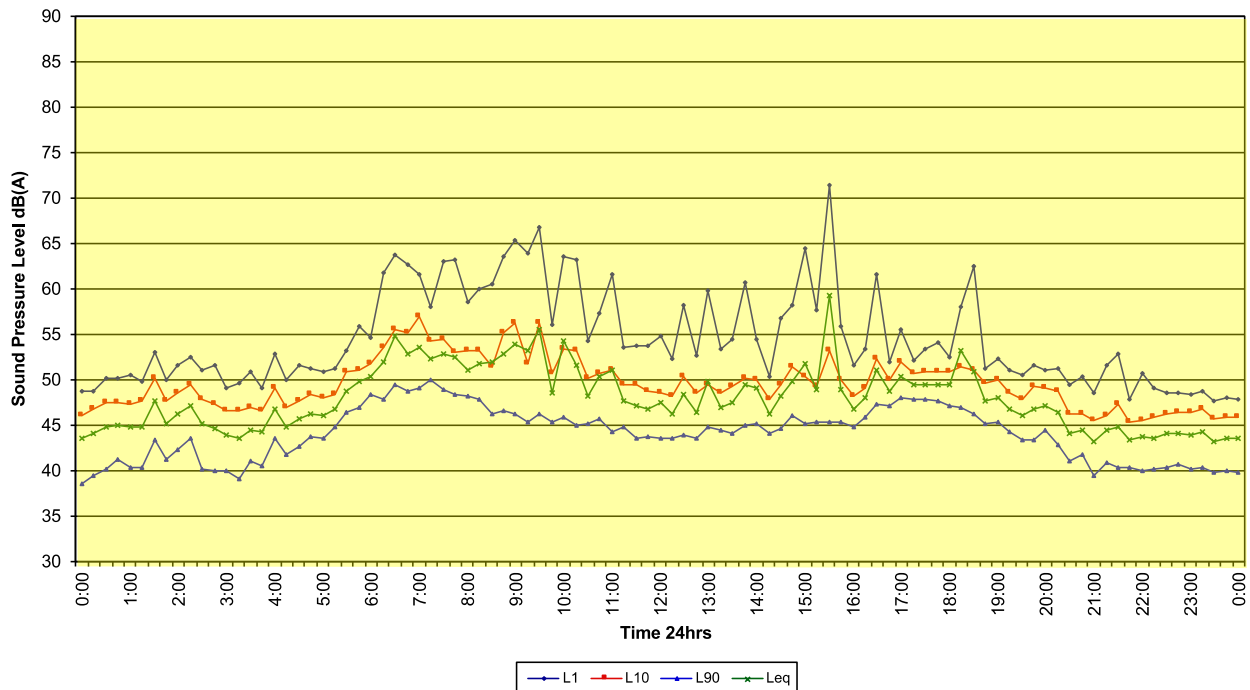
Sunday 10/7/2022



Ambient Noise Data

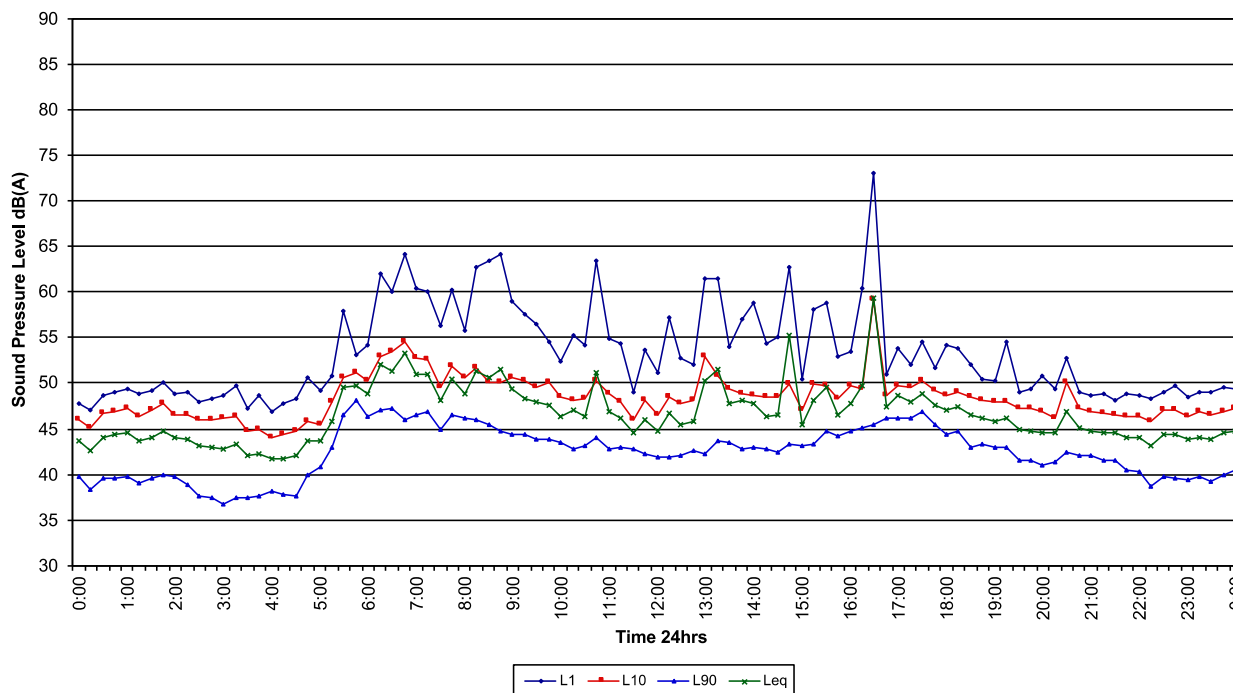
618-626 Old Northern Road Dural

Monday 11/7/2022

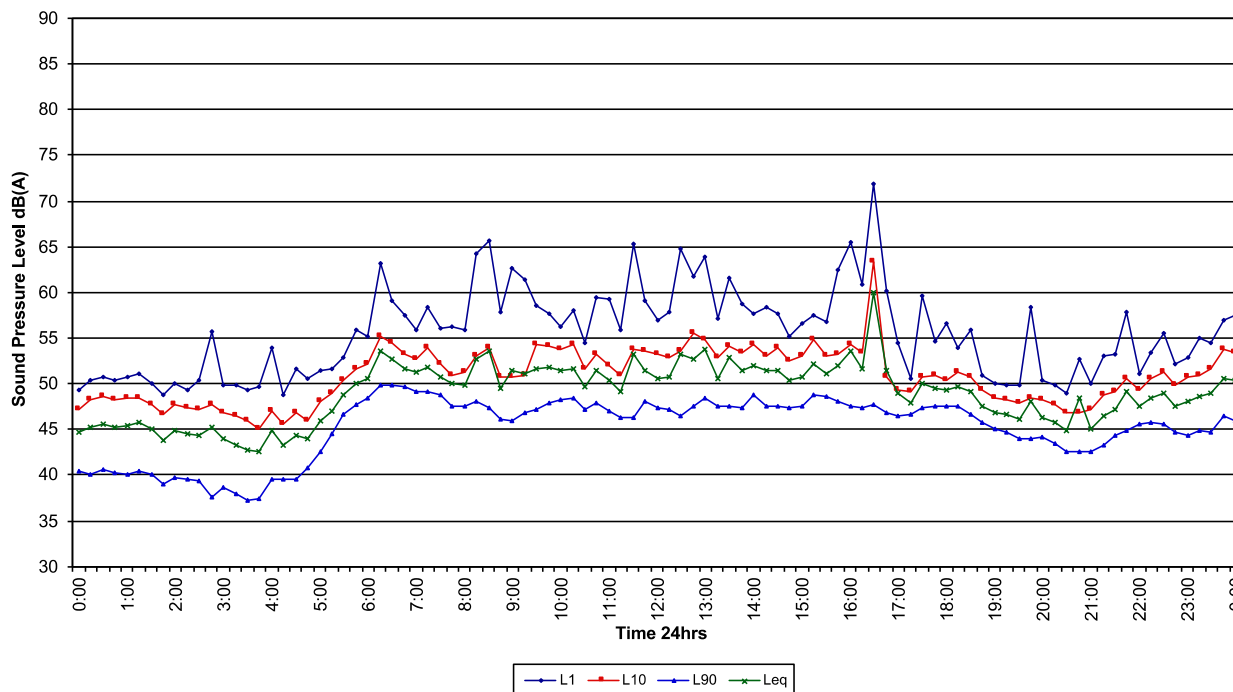




Ambient Noise Data
618-626 Old Northern Road Dural
Tuesday 12/7/2022



Ambient Noise Data
618-626 Old Northern Road Dural
Wednesday 13/7/2022



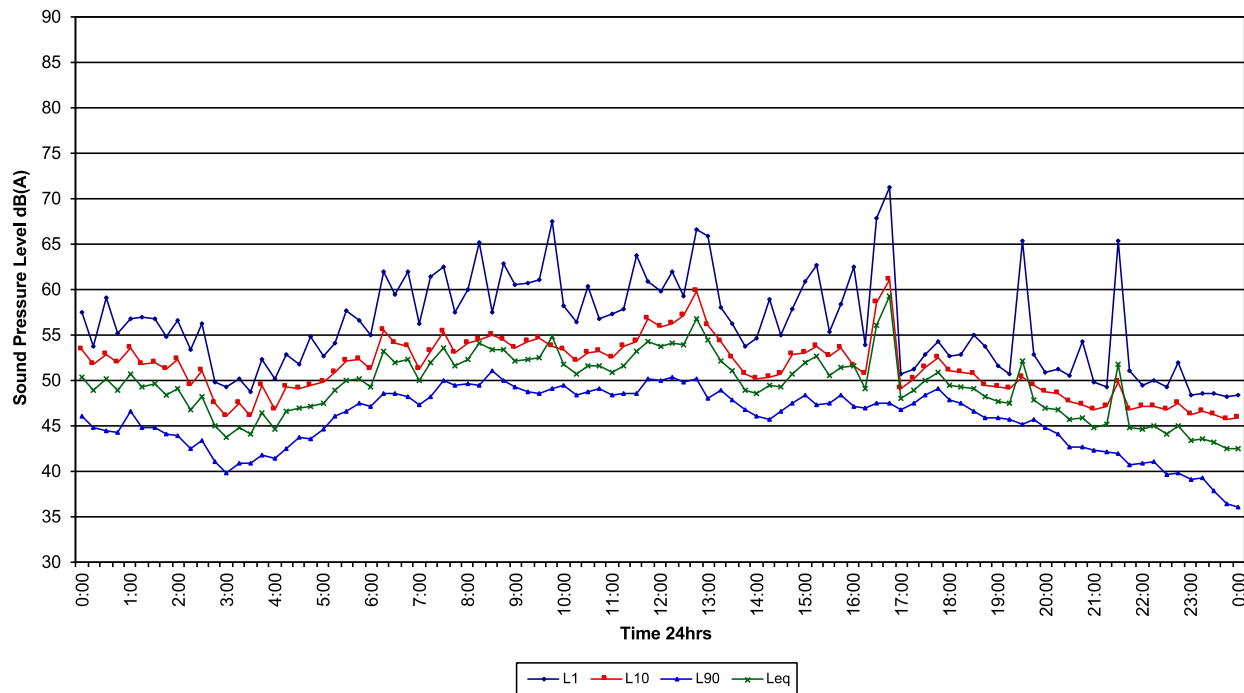


Ambient Noise Data

618-626 Old Northern Road Dural

Thursday

14/7/2022

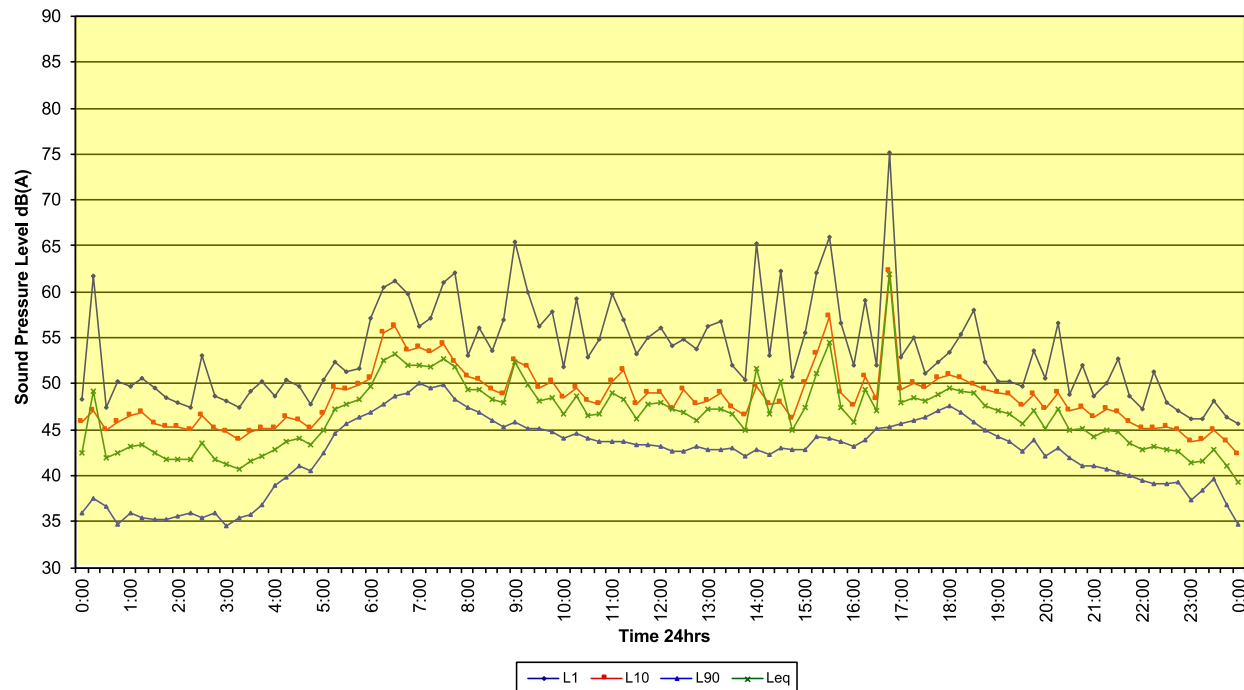


Ambient Noise Data

618-626 Old Northern Road Dural

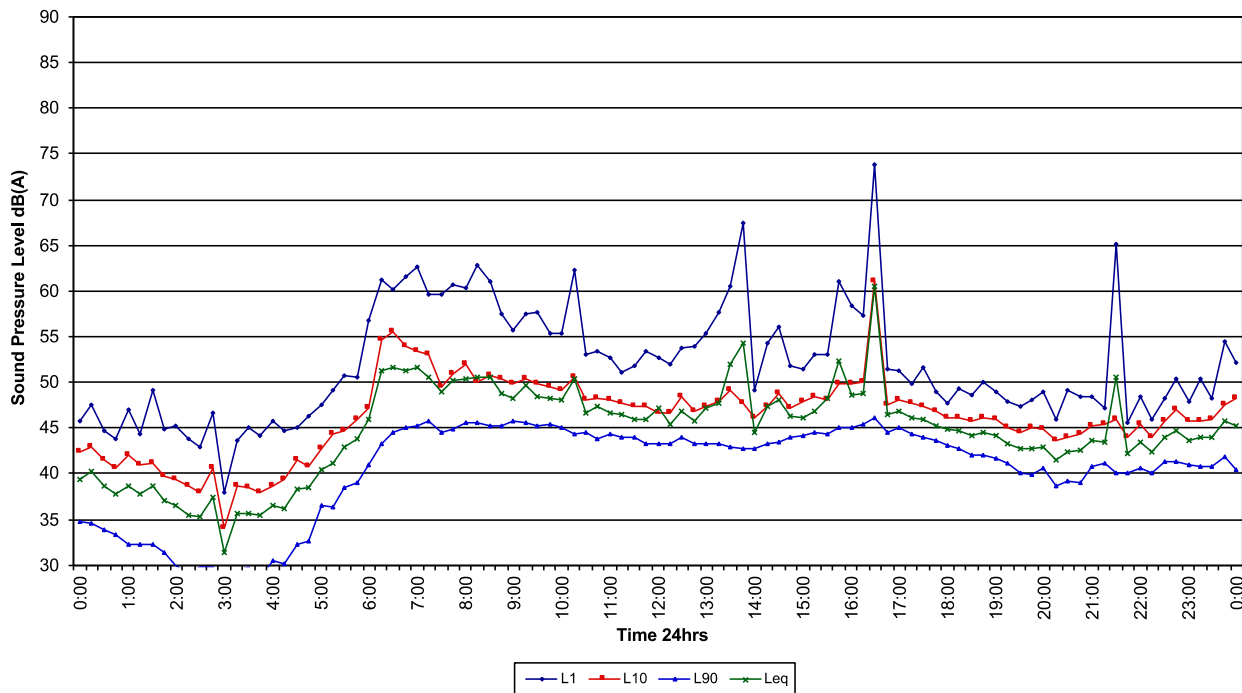
Friday

15/7/2022

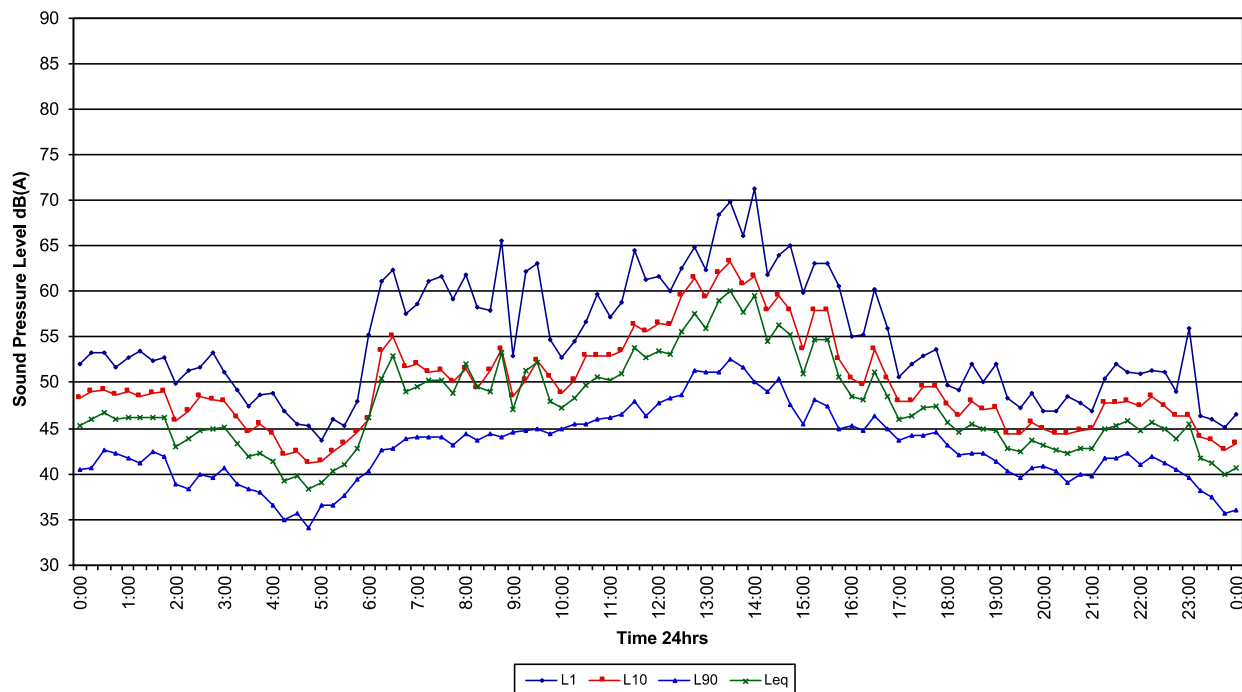




Ambient Noise Data
618-626 Old Northern Road Dural
Saturday 16/7/2022

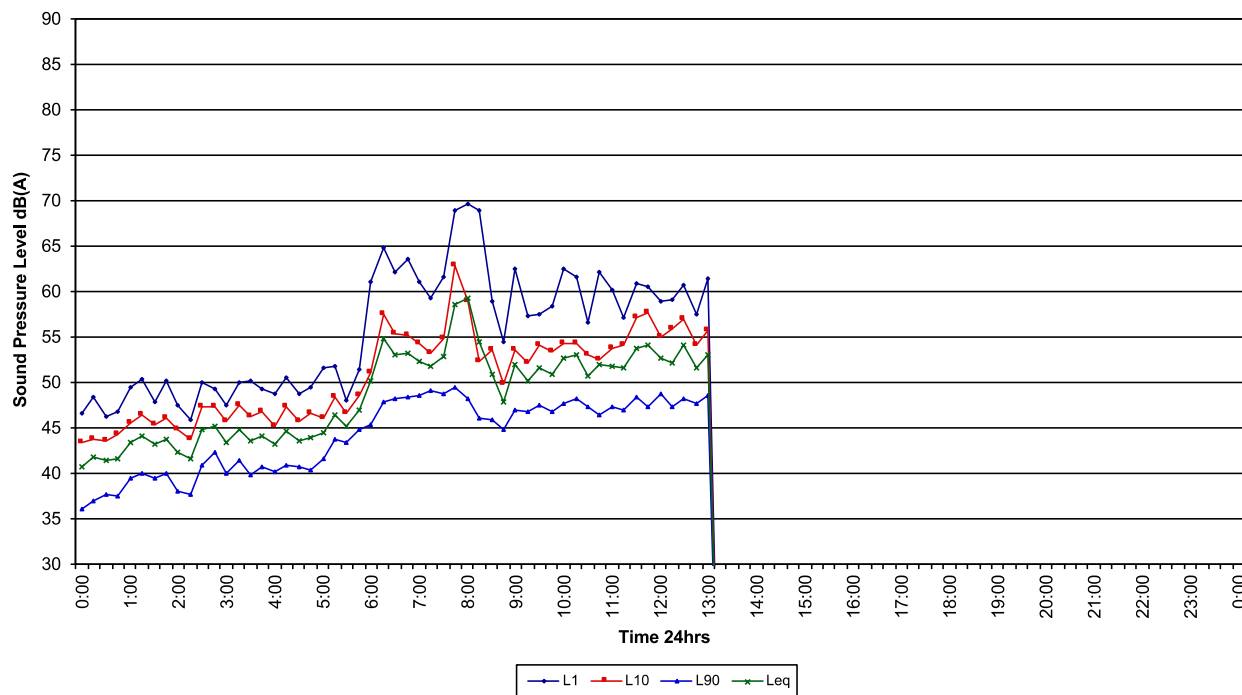


Ambient Noise Data
618-626 Old Northern Road Dural
Sunday 17/7/2022





Ambient Noise Data
618-626 Old Northern Road Dural
Monday 18/7/2022





Appendix C

Calibration Certificates




**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 C21794

Client Details	Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151
Equipment Tested/ Model Number :	Rion NL-42EX
Instrument Serial Number :	00597172
Microphone Serial Number :	189336
Pre-amplifier Serial Number :	99616
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 25.4°C	Ambient Temperature : 25.2°C
Relative Humidity : 53.8%	Relative Humidity : 54.5%
Barometric Pressure : 100.2kPa	Barometric Pressure : 100.2kPa
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	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.

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.

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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North Rocks NSW AUSTRALIA 2151
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www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C22193

Client Details Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151	
Equipment Tested/ Model Number : Rion NL-42EX Instrument Serial Number : 00873125 Microphone Serial Number : 185149 Pre-amplifier Serial Number : 99650	
Pre-Test Atmospheric Conditions Ambient Temperature : 24°C Relative Humidity : 58.3% Barometric Pressure : 100.51kPa	Post-Test Atmospheric Conditions Ambient Temperature : 24.2°C Relative Humidity : 58.9% Barometric Pressure : 100.47kPa
Calibration Technician : Lucky Jaiswal Calibration Date : 11 Apr 2022	Secondary Check: Rhys Gravelle Report Issue Date : 12 Apr 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	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.

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	±0.13dB		

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.

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Accredited for compliance with ISO/IEC 17025 - Calibration.

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www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number **C22035**

Client Details Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151	
Equipment Tested/ Model Number : Rion NL-42EX Instrument Serial Number : 01173759 Microphone Serial Number : 172326 Pre-amplifier Serial Number : 74171	
Pre-Test Atmospheric Conditions Ambient Temperature : 24.9°C Relative Humidity : 38.6% Barometric Pressure : 98.86kPa	Post-Test Atmospheric Conditions Ambient Temperature : 24.9°C Relative Humidity : 37.9% Barometric Pressure : 98.8kPa
Calibration Technician : Lucky Jaiswal Calibration Date : 1 Feb 2022	Secondary Check: Max Moore Report Issue Date : 2 Feb 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	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.

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.

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Appendix D Glazing Layout





Appendix E Site Layout

LEGEND

The Site

LAND USE

- Large Lots (2,000+ sqm)
- Medium Lots (1,000+ sqm)
- Standard Lots (600+ sqm)

OPEN SPACE & PUBLIC DOMAIN

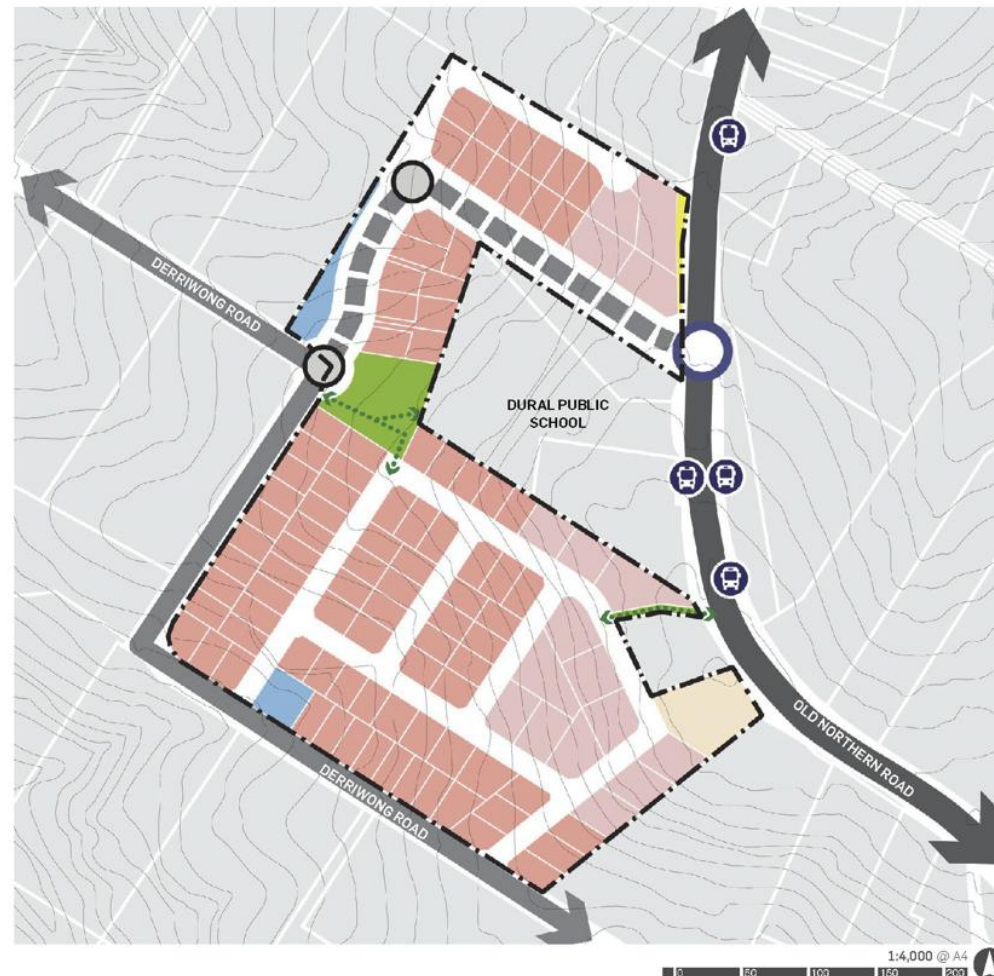
- Local Park
- Pedestrian Through Site Link
- Proposed Stormwater Basins
- SP2 Road Reserve

PUBLIC & ACTIVE TRANSPORT DEDICATION

- Existing Bus Stop

STREET NETWORK

- Arterial Road / Old Northern Road
- Collector Road/ Derriwong Road
- Proposed Collector Road with Bypass Corridor
- Local Street
- Proposed Roundabout
- Intersection Treatment subject to TfNSW requirements



DERRIWONG RD, DURAL
CONCEPT PLAN