ACOUSTICS AND AIR

638 PITTWATER ROAD, BROOKVALE
MIXED USE DEVELOPMENT

DA NOISE ASSESSMENT

REPORT NO. 19035
VERSION A

JANUARY 2019

PREPARED FOR

BROOKVALE PROPERTY INVESTMENT TRUST
C/- BARRY RUSH AND ASSOCIATES
SUITE 25A, 2 BEATTIE STREET
BALMAIN NSW 2041

WILKINSON MURRAY

DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Final	22 January 2019	Brian Clarke	Ben Lawrence

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TABLE OF CONTENTS

GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

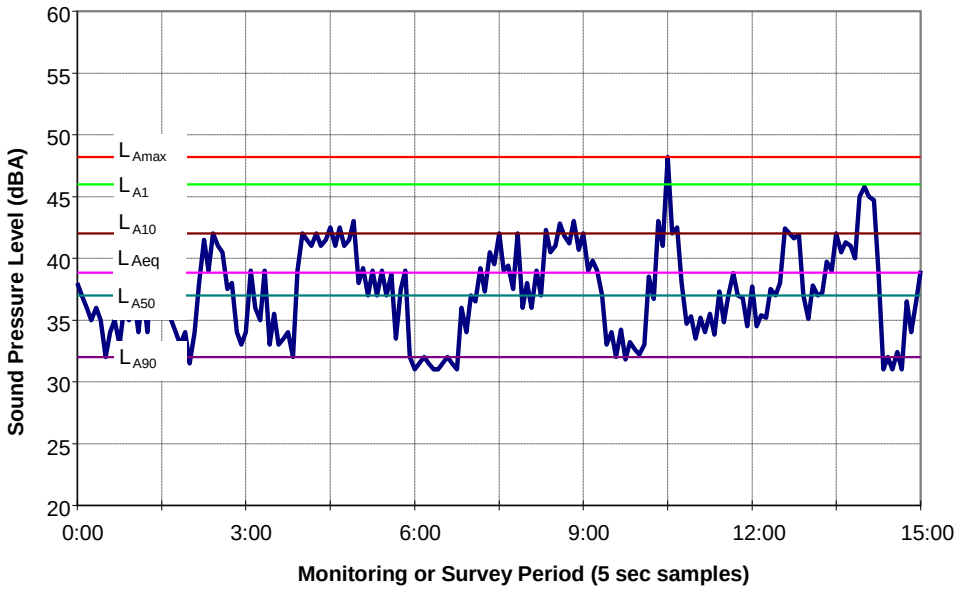
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

Wilkinson Murray has been engaged by Brookvale Property Investment Trust to conduct a Development Application Noise Assessment of the proposed mixed use development at 638 Pittwater Road, Brookvale. The site is currently occupied by a clothing retail premises.

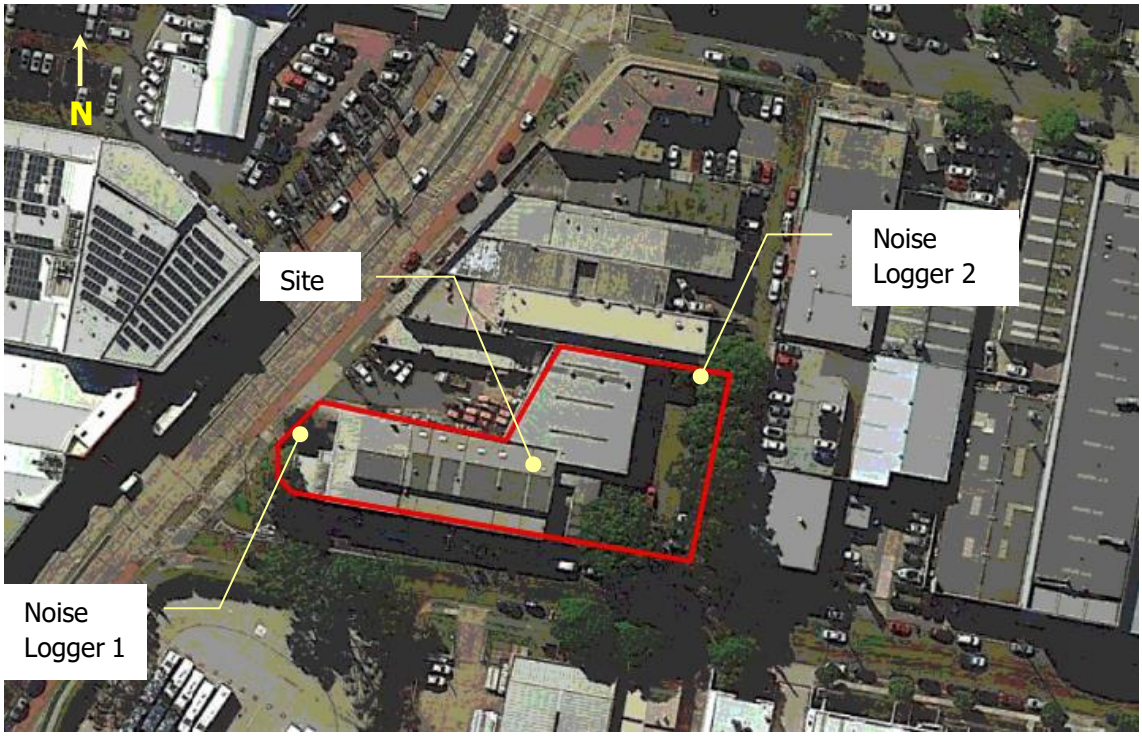
The scope of the noise assessment involves:

- Ambient noise measurements;
- Control of traffic noise at future residences on Pittwater Road;
- Review of noise from light industry;
- Review of mechanical services noise emission; and
- Review of internal acoustic amenity of future residents of the development.

The following sections of this assessment detail the methodology, assessment criteria, results and acoustical recommendations.

Figure 1-1 shows the site and surrounding environs.

Figure 1-1 Site location



The site is bounded by:

- Commercial properties on Pittwater Road to the north and west of the site;
- A bus depot south of the site; and
- Light industrial to the east across Charlton Lane.

No existing residences are near to the site.

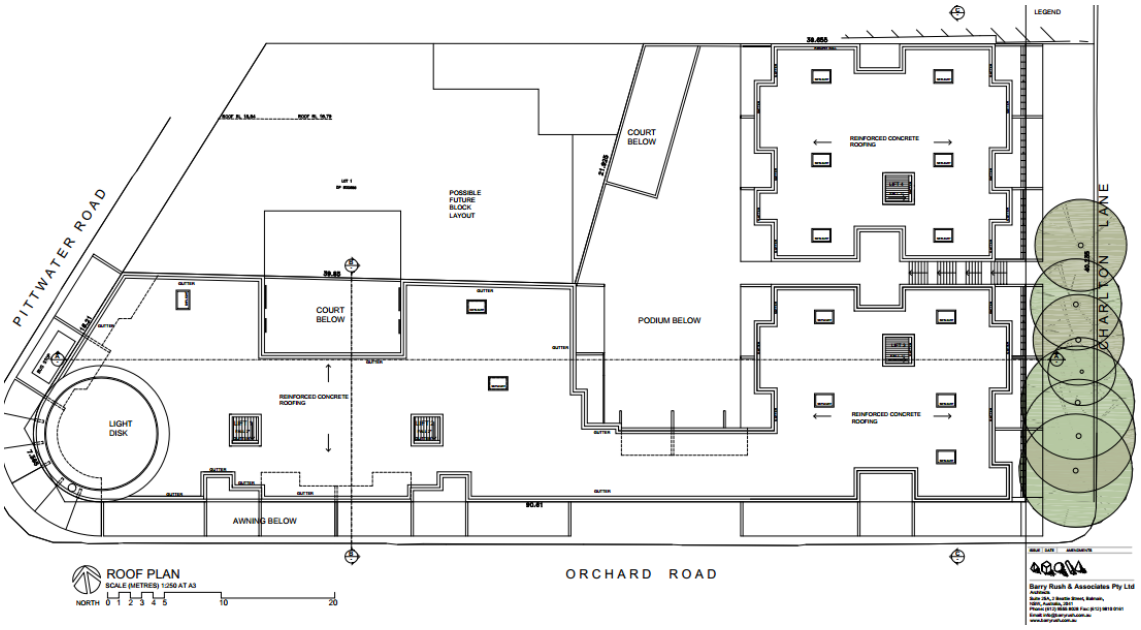
2 SITE DESCRIPTION & PROPOSAL

The site is located in a commercial area at 638 Pittwater Road. The proposed development consists of:

- 3 levels of lower ground carpark;
- Basement commercial area;
- Ground level commercial, retail and 8 SOHO tenancies;
- Level 1 with 20 residential apartments; and
- Level 2 with 20 residential apartments.

The development is shown on Figure 2-1.

Figure 2-1 Proposed development roof plan



The use of the commercial and retail areas is unknown at this stage. However, the use of these areas will be the subject of future Development Applications by the end user of these tenancies.

3 AMBIENT NOISE LEVELS & NOISE CRITERIA

3.1 Council Requirements

Northern Beaches Council utilises the Warringah Council DCP 2011 which states the following with respect to noise in Section D3.

D3 Noise

Applies to Land

This control applies to land to which Warringah Local Environmental Plan 2011 applies.

Objectives

- *To encourage innovative design solutions to improve the urban environment.*
- *To ensure that noise emission does not unreasonably diminish the amenity of the area or result in noise intrusion which would be unreasonable for occupants, users or visitors.*

Requirements

1. *Noise from combined operation of all mechanical plant and equipment must not generate noise levels that exceed the ambient background noise by more than 5dB(A) when measured in accordance with the NSW Industrial Noise Policy at the receiving boundary of residential and other noise sensitive land uses.*

See also NSW Industrial Noise Policy Appendices (now superseded by the Noise Policy for Industry).

2. *Development near existing noise generating activities, such as industry and roads, is to be designed to mitigate the effect of that noise.*
3. *Waste collection and delivery vehicles are not to operate in the vicinity of residential uses between 10pm and 6am.*
4. *Where possible, locate noise sensitive rooms such as bedrooms and private open space away from noise sources. For example, locate kitchens or service areas closer to busy road frontages and bedrooms away from road frontages.*
5. *Where possible, locate noise sources away from the bedroom areas of adjoining dwellings/properties to minimise impact.*

The above objectives have been considered in developing site-specific noise criteria for this development.

3.2 Existing Ambient Noise Levels

Unattended noise monitoring was conducted at two locations considered representative of noise on the site as follows:

Logger Location 1

These measurements were conducted between 10 and 21 January 2019 at the front of the site on Pittwater Road.

Logger Location 2

These measurements were conducted between 10 and 21 January 2019 at the rear of the site on Charlton Lane.

At both locations, monitoring was conducted using ARL EL-215 noise loggers set to A-weighted, fast response, continuously monitoring each 15-minute period. This equipment is capable of monitoring and storing noise various level descriptors for later detailed analysis. From the background noise levels (L_{A90}) the Rating Background Levels (RBL's) were determined using methodology as recommended by the *INP/NPfI*. The EPA considers the RBLs to represent the background noise level. The equipment calibration was checked before and after the survey and no significant drift was noted.

Table 3-1 and Table 3-2 and summarise the results, for daytime, evening and night time periods as defined in the *Noise Policy for Industry (NPfI)*. The summary values are:

Table 3-1 Measured ambient noise levels (Logger 1) Pittwater Road

Time Period	Noise Level (dBA)	
	$L_{Aeq,(period)}$	RBL (Background)
Daytime (7am to 6pm)	72	60
Evening (6pm to 10pm)	72	57
Night Time (10pm to 7am)	69	41

Table 3-2 Measured ambient noise levels eastern facade of the site (Logger 2)

Time Period	Noise Level (dBA)	
	$L_{Aeq,(period)}$	RBL (Background)
Daytime (7am to 6pm)	63	48
Evening (6pm to 10pm)	56	44
Night Time (10pm to 7am)	50	38

Results of noise logging are presented in Appendix A.

In addition, traffic noise descriptors for the day and night periods were processed for the western noise logger facing Pittwater Road, which are as follows:

- L_{Aeq} Daytime (7am to 10pm) 72 dBA
- L_{Aeq} Night Time (10pm to 7am) 69 dBA

3.3 Traffic Noise Criteria

The site is subject to the requirements of the NSW State Environmental Planning Policy (Infrastructure) 2007 – (iSEPP) which requires assessment for traffic noise intrusion when an adjacent road has more than 40,000 vehicles on an average day.

Clauses 102 are relevant to this project and are reproduced below:

102 Impact of road noise or vibration on non-road development

(1) This clause applies to development for any of the following purposes that is on land in or adjacent to a road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:

(a) a building for residential use,

(b) a place of public worship,

(c) a hospital,

(d) an educational establishment or child care centre.

The noise criteria relevant is summarised below:

(3) If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:

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

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

The Interim Guideline 2008 that has been prepared by the NSW Department of Planning also provides additional information regarding the above noise criteria. In particular it clarifies the parameter to be used for day and night. During the night an $L_{Aeq,9hr}$ is to be used and for the day $L_{Aeq,15hr}$.

Therefore, assessment is based on the above requirements with respect to the day and night periods of the Interim Guideline 2008.

3.4 Site Noise Emission Noise Criteria

Table 3-3 presents the relevant intrusiveness noise criteria for this assessment based on logger 1 background noise levels.

Table 3-3 Intrusiveness criteria – all sources

Time Period[1]	RBL	Intrusiveness Criterion $L_{Aeq,15min}$
Daytime	54	59
Evening	49	54
Night Time	41	46

Note 1: Daytime 7.00am–6.00am; Evening 6.00pm–10.00pm; Night 10.00pm-7.00am

In the case of commercial and industrial receivers the following noise emission criteria, based on the NSW *Noise Policy for Industry*, is applicable:

- Commercial Receivers 65 dBA
- Industrial Receivers 70 dBA

4 ASSESSMENT

4.1 Traffic Noise

The proposed development will not generate significant traffic volumes. Therefore, no appreciable increase in traffic noise is predicted at surrounding residences. It is also noted that the carpark entrance is located on Orchard Road which accesses the light industrial area to the east. As such, there will be no noticeable increase in traffic noise levels at any noise sensitive receivers associated with the operation of the new building.

In the case of traffic noise intrusion into future apartments facing Pittwater Road, calculations of internal traffic noise levels at apartments have been conducted.

Preliminary internal traffic noise calculations indicate that the following glazing that is above standard glazing (typically 6 mm float glass) will be required:

- Type A – R_W 28 – 6mm Laminated Glass
- Type B – R_W 35 – 10.38mm Laminated Glass
- Type C – R_W 38 – 10.5mm VLam Hush Laminated Acoustic Glass
- Type D – Winter Garden effectively Double Glazing

The following table details recommended facade constructions to control traffic noise ingress to the apartments noting that all other units that are not listed do not require improved glazing for traffic noise control.

Table 4-1 Recommended glazing for areas where improved glazing is required

Level	Unit	Living	Bed 1	Bed 2	Bed 3
1	1	C	B	C	
	2	D	D	C	
	3	D	D	C	
	4	D	D	C	
	5	D	C	Standard	
	6	Standard	Standard	C	C
2	21	C	B	C	
	22	D	D	C	
	23	D	D	C	
	24	D	D	C	
	25	D	C	Standard	
	26	Standard	Standard	C	C

It is noted that the use of the 10.38mm laminated glass in lieu of 10.5 VLam Hush glass (where shown above) is predicted to result in a marginal exceedance of the noise criteria by 1-2 dBA. However, this margin is considered acoustically small, whereby the serviceability and uniformity of a single glazed unit is likely to outweigh a slight exceedance of noise objectives.

In the case of apartments where no recommendation is made, it is noted that the exposure to traffic noise will be significantly reduced due to increased distance from Pittwater Road and the acoustic shielding provided by the building. As such, standard glazing will be sufficient in all other apartments.

4.2 Industrial Noise

Noise from light industry that is located to the east of the proposed development has been measured at Location 2. In summary, the highest typical noise levels reach as high as 66 dBA in the morning periods on weekdays.

Therefore, to protect the internal acoustic amenity of residents adjacent to Charlton Lane, the following glazing is recommended:

- Bedrooms facing Charlton Lane: 10.38mm Laminated Glass
- Living rooms facing Charlton Lane: 6.38Laminated Glass

The above recommendations apply to the following Apartments:

- Level 1 – 10, 12, 14, 16, 18, 20
- Level 2 – 30, 32, 34, 36, 38 40

4.3 Mechanical Noise Emissions

No details of mechanical plant have been determined at this early stage of the project. Likely sources of mechanical noise from the proposed development will be the air conditioning and ventilation plant located on the roof, basement level carpark fan ventilation shafts, and possibly some pumps within the basement.

Mechanical plant such as rooftop exhausts, air conditioning and refrigeration associated with the development should be assessed at the time of detailed design and selection, having regard to nearby industrial and commercial properties surrounding the development and the noise criteria detailed in Section 3-3.

It is unlikely that any noise control measures will need to be incorporated into the development. Therefore, no particular difficulty is foreseen in meeting the noise emission requirements from the development.

4.4 Noise Transfer between Habitable Areas of the Development

The details of wall and floor constructions that meet the requirements of the NCC will be determined in the detail design stage of the project. Potential measures that can be adopted include:

- Masonry and / or plasterboard walls with acoustic insulation;
- Concrete floor slabs with suspended ceiling and insulation in cavities; and
- Acoustic treatment of waste water pipework.

5 CONCLUSION

An acoustic assessment has been undertaken for the Development Application for the proposed mixed use development at 638 Pittwater Road, Brookvale.

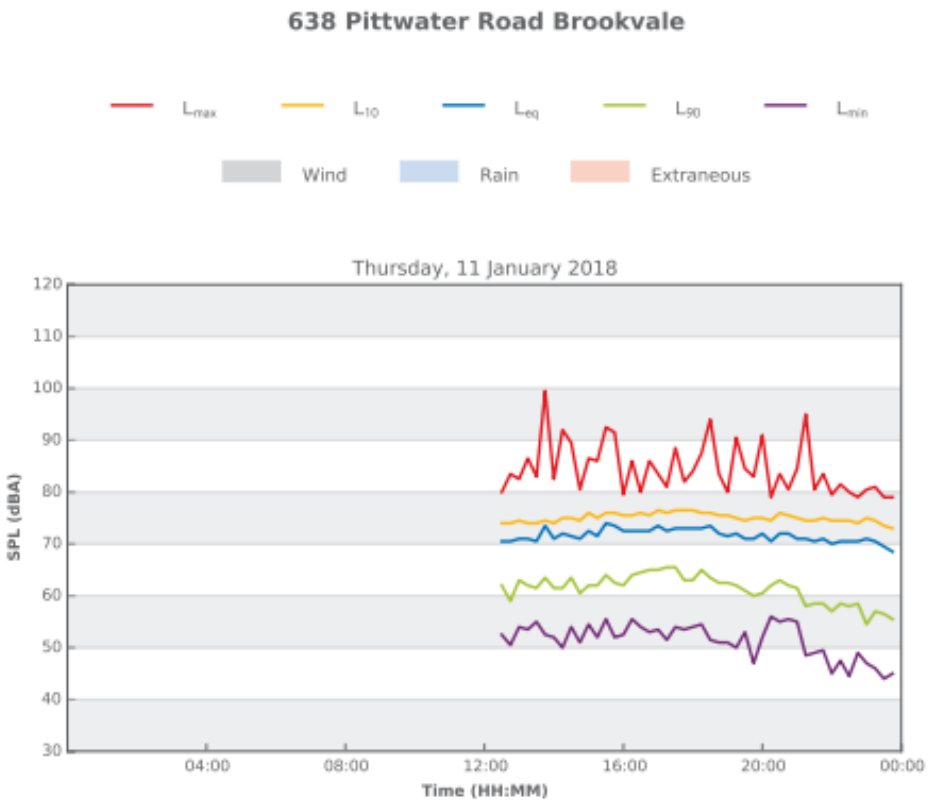
The following findings have been determined:

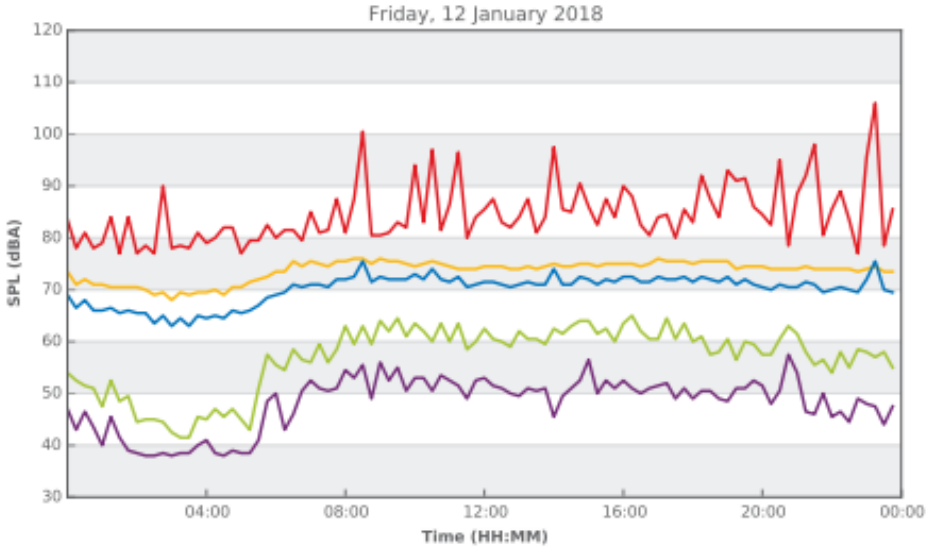
- Site-specific noise emission criteria have been established for surrounding receivers. It is noted that mechanical services and plant have not been selected; however, it is envisaged that compliance with criteria can be achieved. Whilst unlikely to be needed, standard engineering noise controls can be implemented at design stage to meet established noise criteria if required.
- Traffic associated the development will not adversely impact on the acoustic amenity of surrounding residences.
- Apartments facing Pittwater Road will require improved glazing to ensure that the acoustic amenity of future residences is protected. Preliminary recommendations provide options for glazing.
- Improved glazing is recommended for apartments facing Charlton Lane to control noise emissions from the light industrial area.
- No special glazing is required on all other apartments.
- Internal noise isolation requirements in accordance with the NCC will be achieved by adopting appropriate constructions.

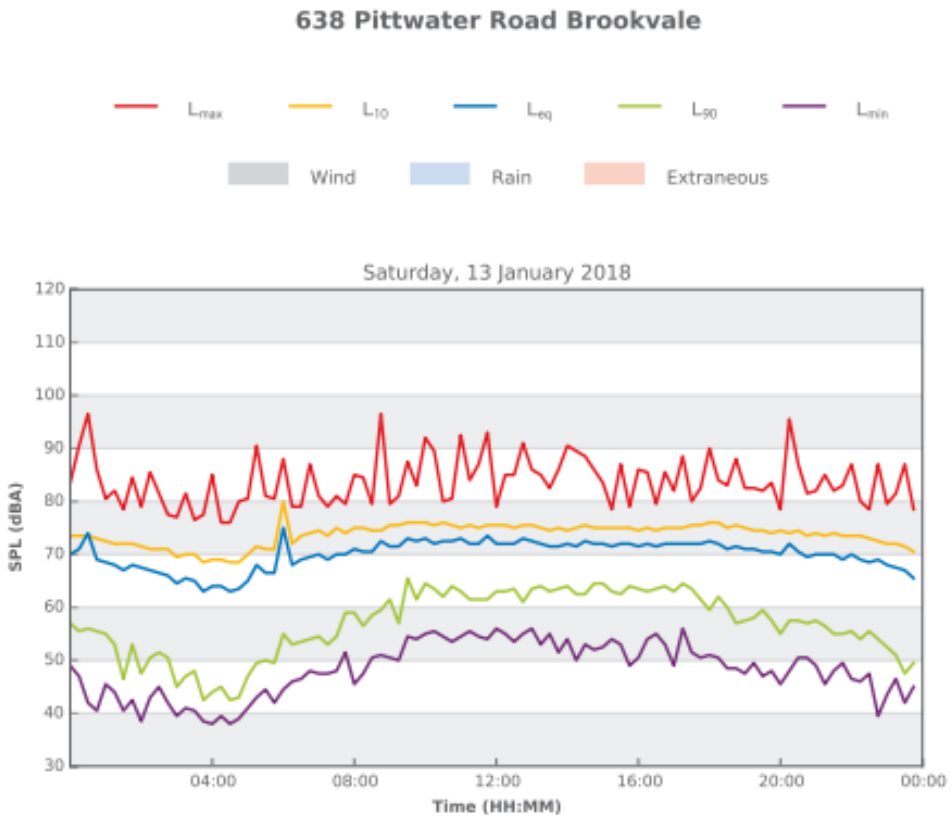
APPENDIX A

NOISE MEASUREMENT RESULTS

PITTWATER ROAD NOISE LOGGER RESULTS



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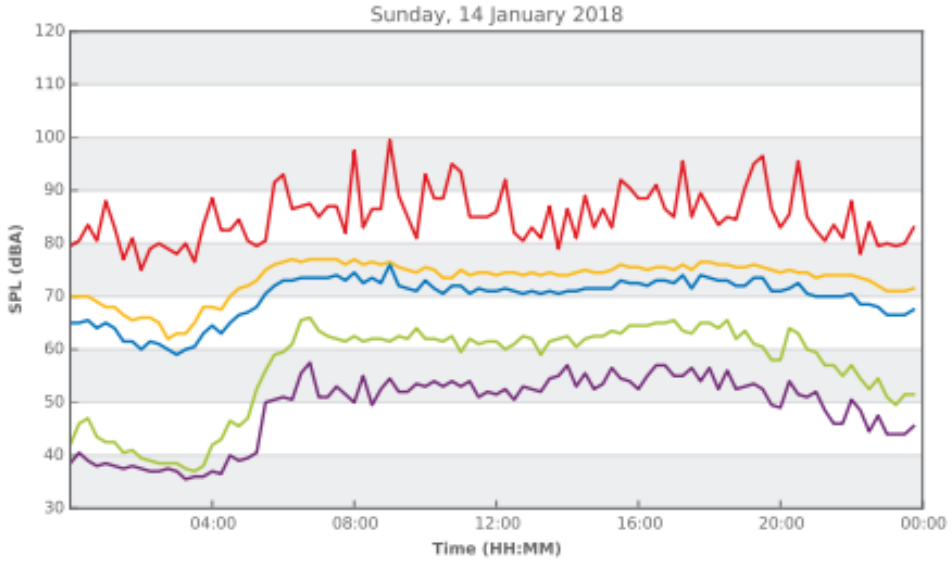
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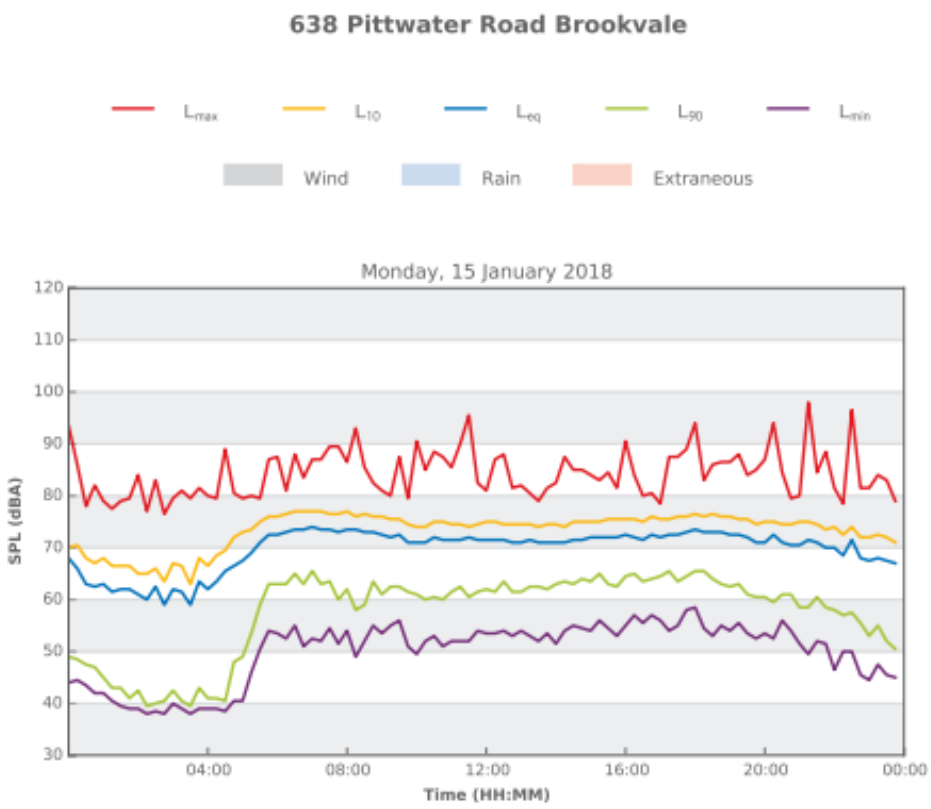
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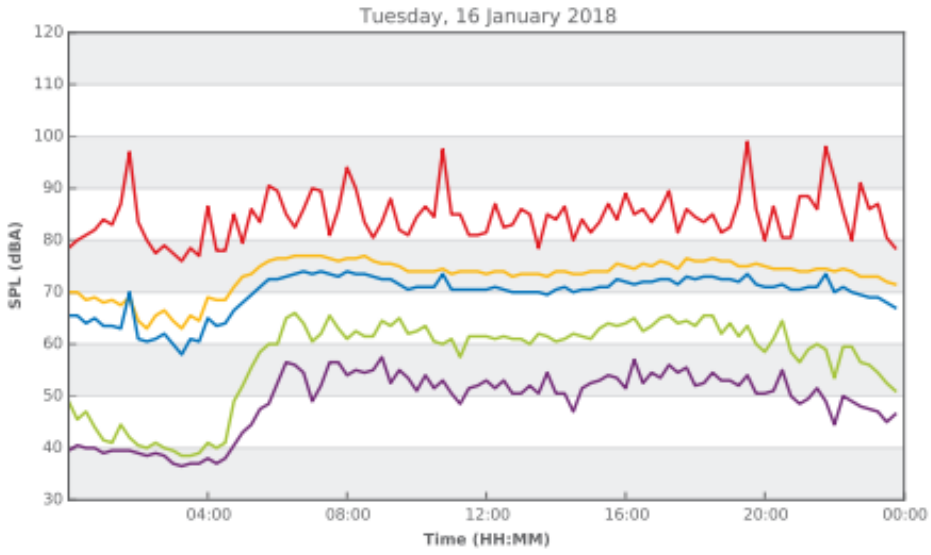
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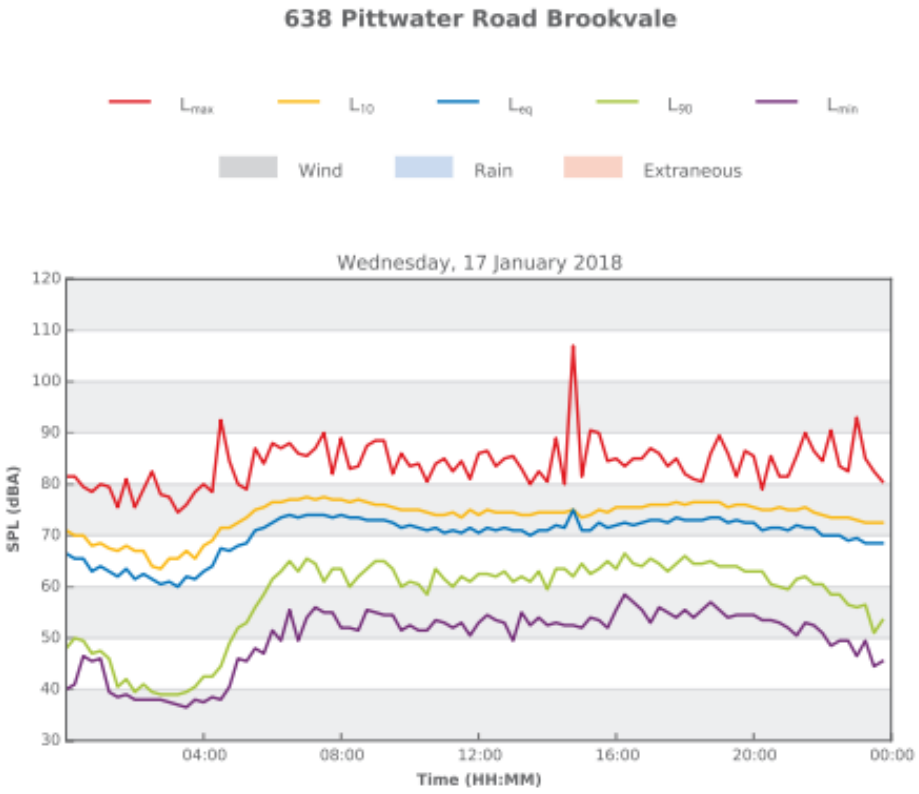
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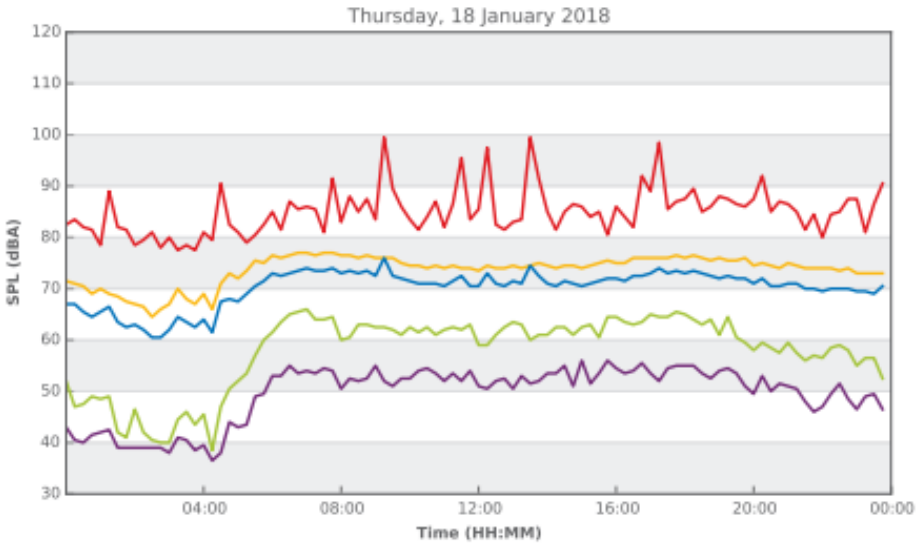
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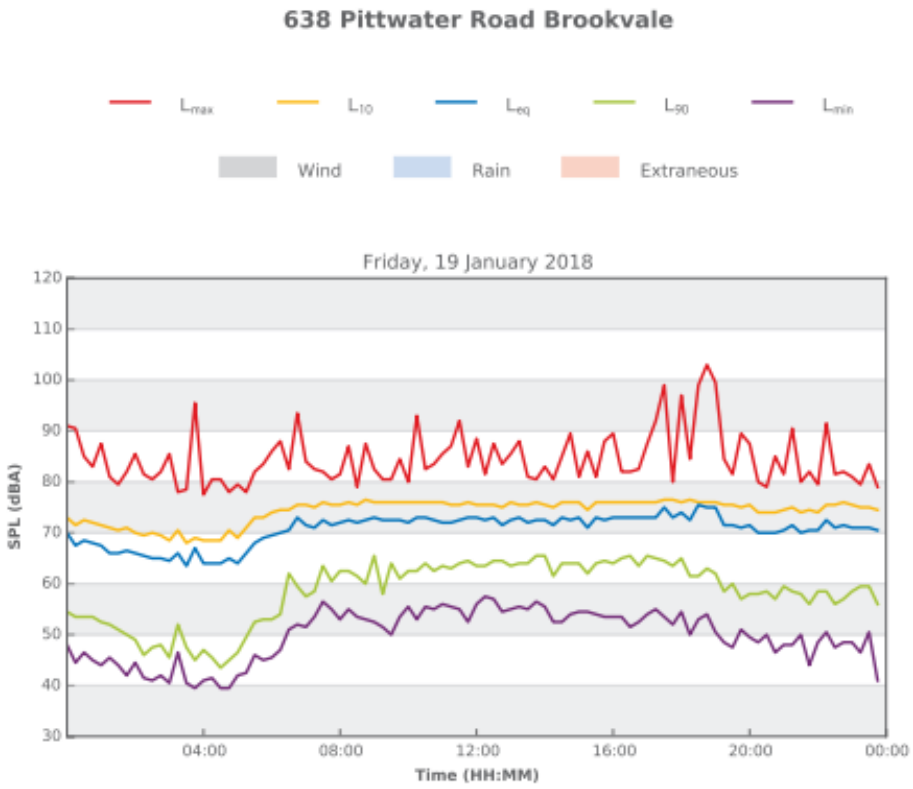
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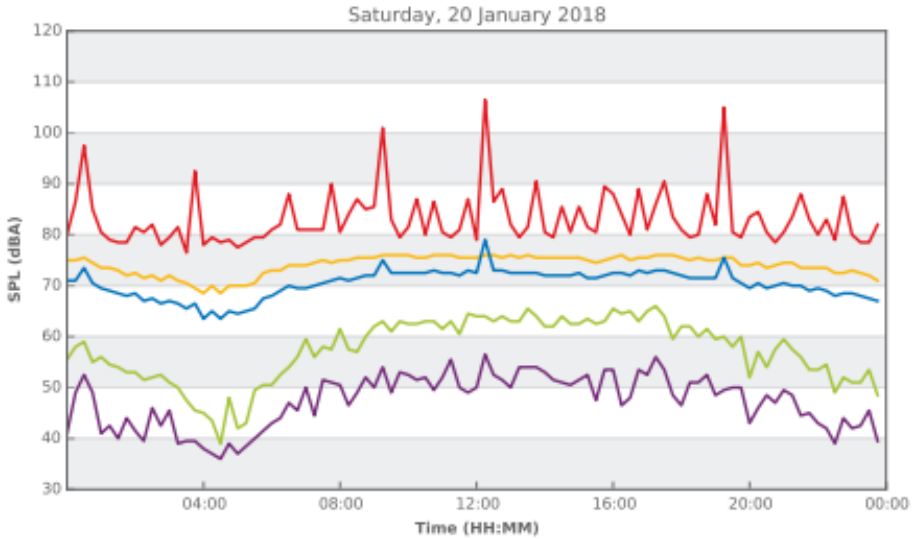
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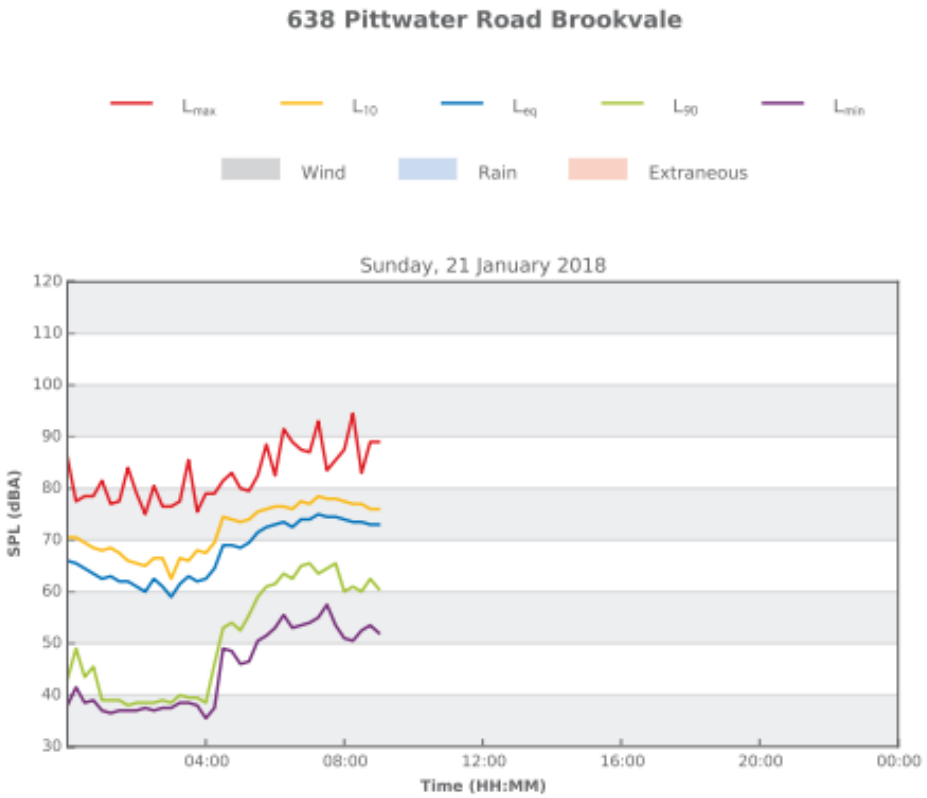
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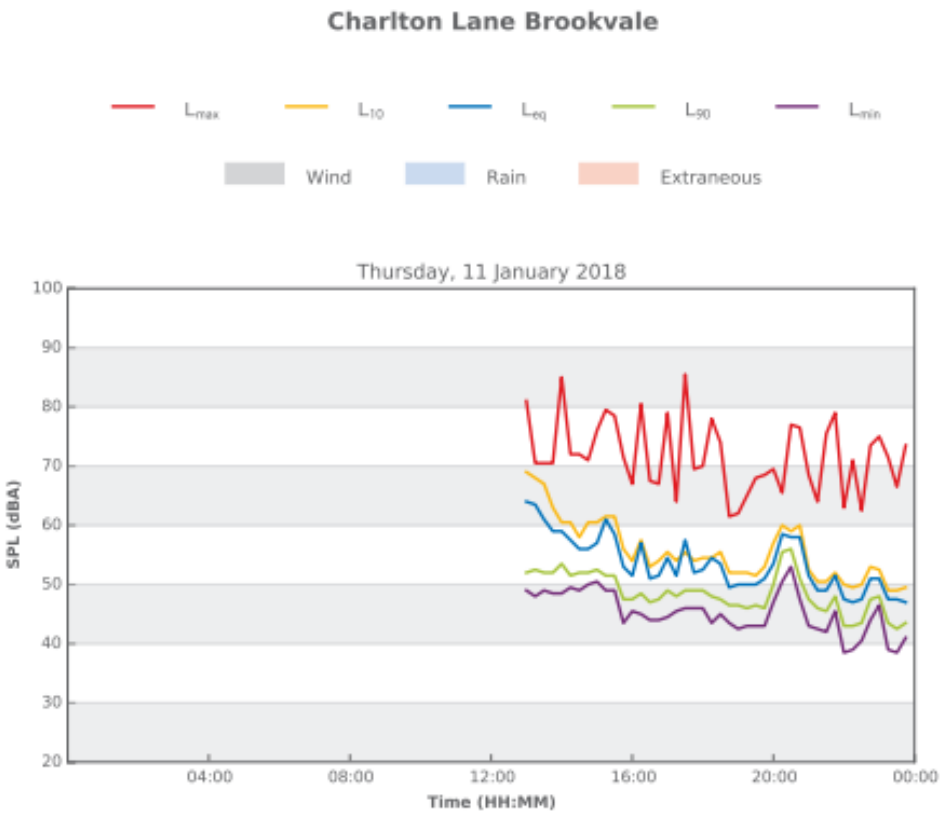
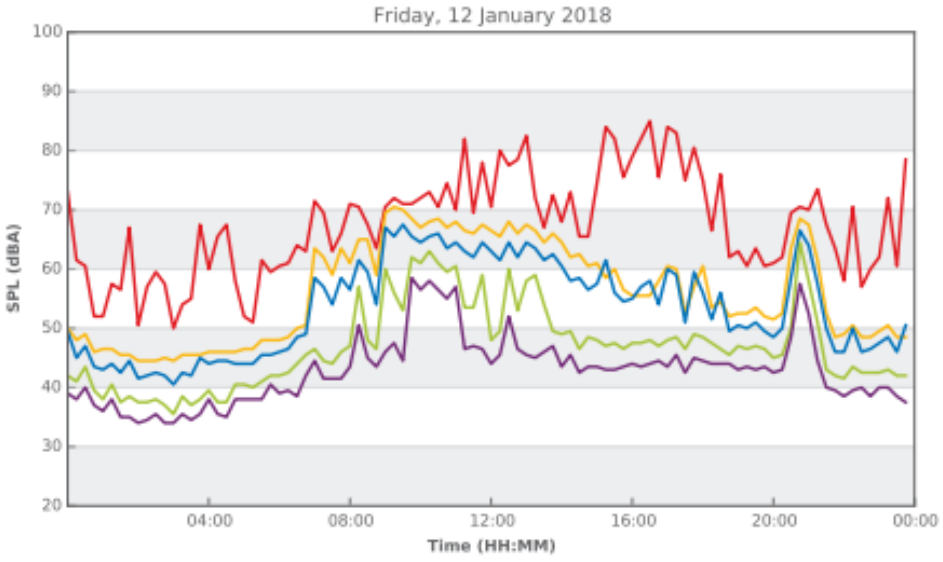
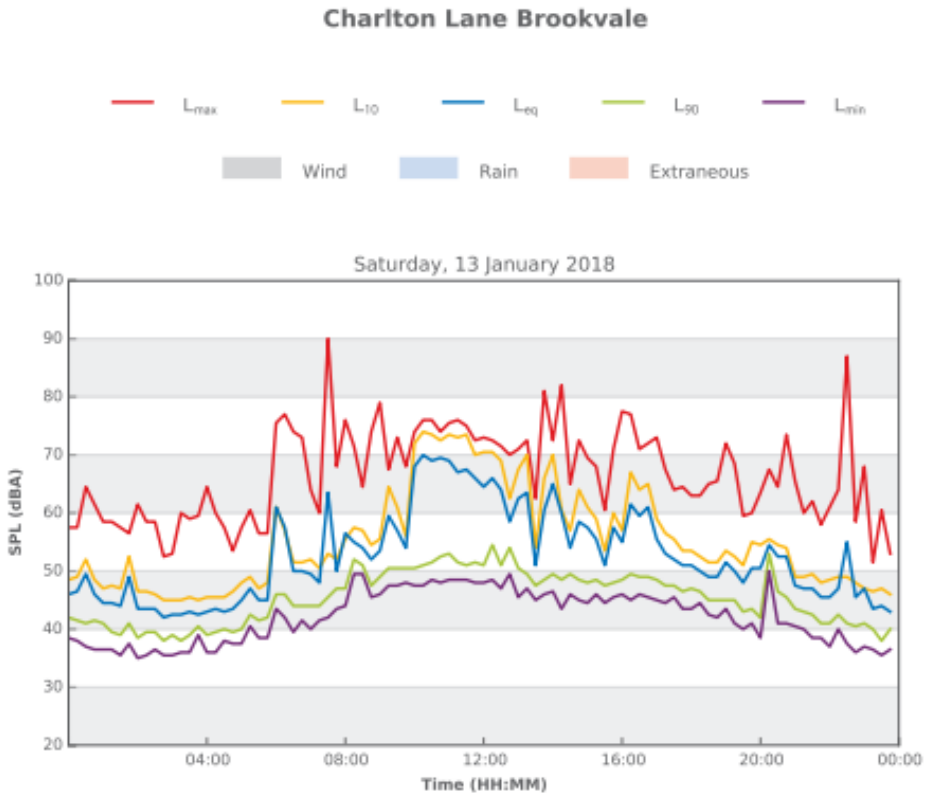
CHARLTON LANE NOISE LOGGER RESULTS



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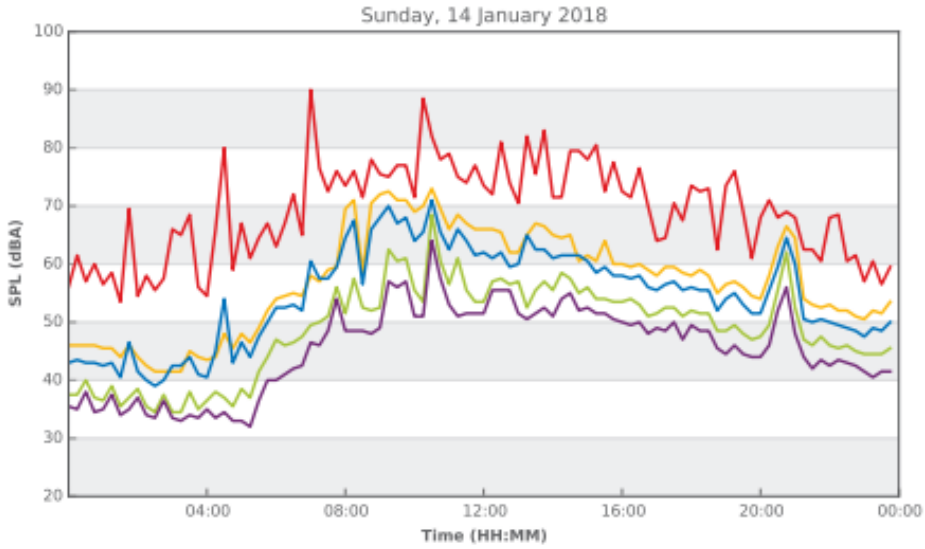
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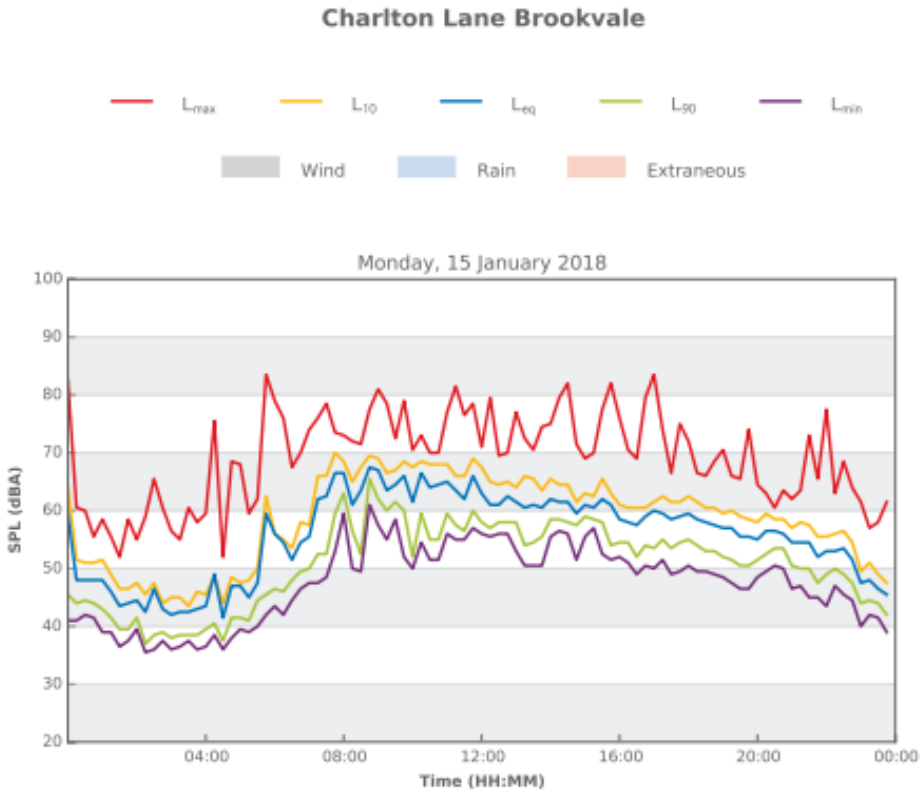
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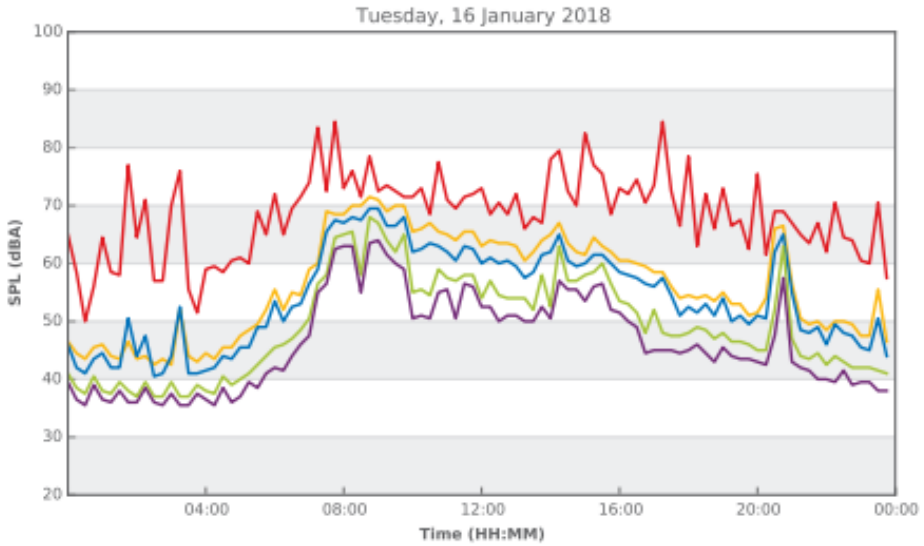
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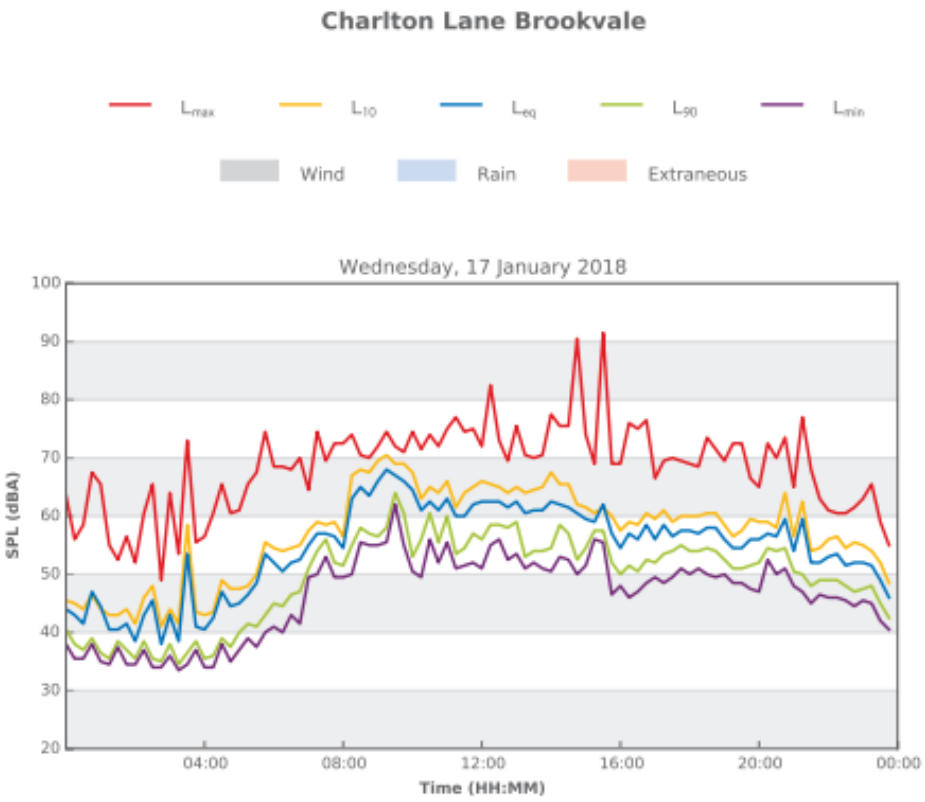
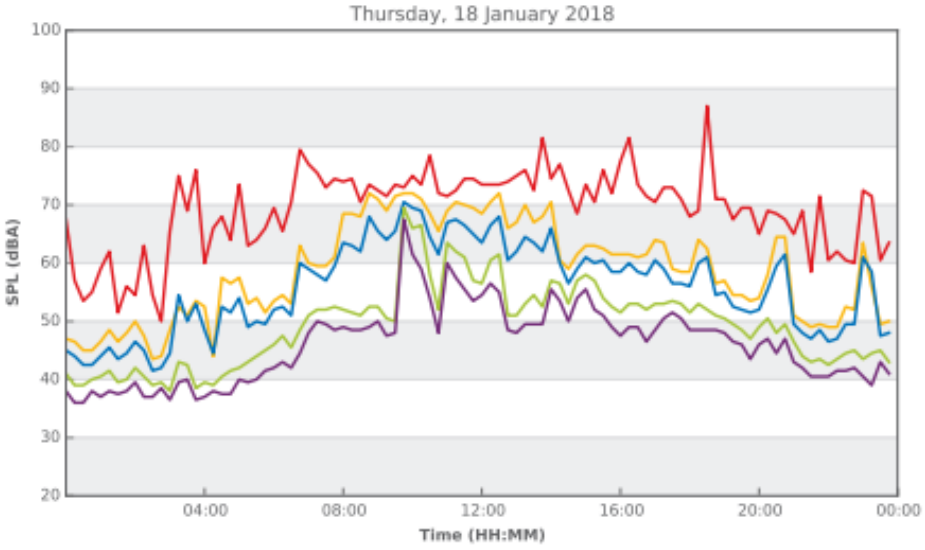
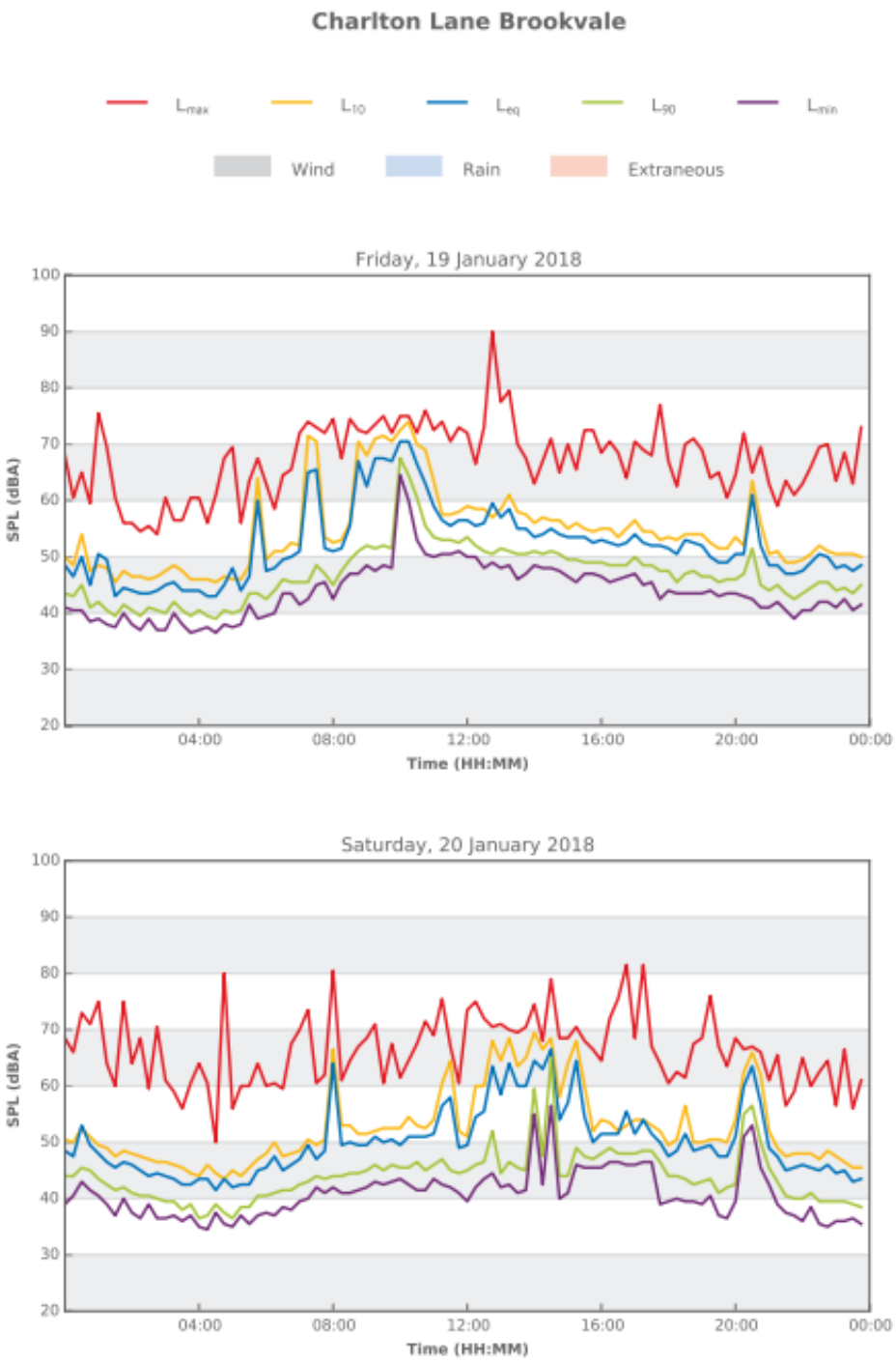
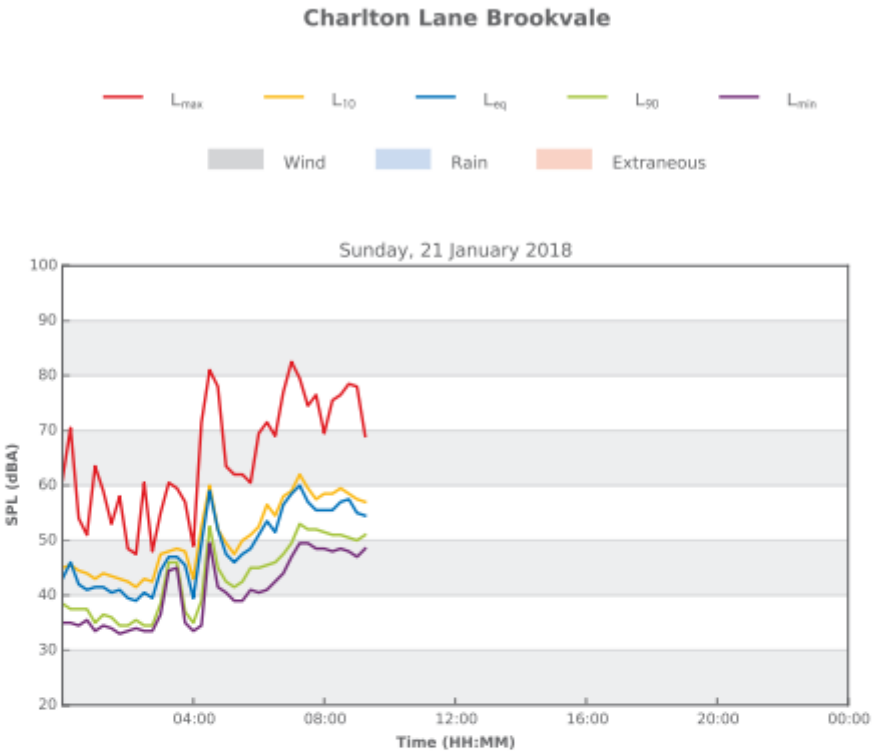

Charlton Lane Brookvale
L_{max}
L_{10}
L_{eq}
L_{90}
L_{min}
Wind
Rain
Extraneous
Wednesday, 17 January 2018
SPL (dBA)
100
90
80
70
60
50
40
30
20
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)


Thursday, 18 January 2018
SPL (dBA)
100
90
80
70
60
50
40
30
20
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)


Charlton Lane Brookvale
L_{max}
L_{10}
L_{eq}
L_{90}
L_{min}
Wind
Rain
Extraneous
Friday, 19 January 2018
SPL (dBA)
100
90
80
70
60
50
40
30
20
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)
Saturday, 20 January 2018
SPL (dBA)
100
90
80
70
60
50
40
30
20
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)


Charlton Lane Brookvale
L_{max}
L_{10}
L_{eq}
L_{90}
L_{min}
Wind
Rain
Extraneous
Sunday, 21 January 2018
SPL (dBA)
100
90
80
70
60
50
40
30
20
04:00
08:00
12:00
16:00
20:00
00:00
Time (HH:MM)