

Appendices

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Appendix 1

Noise Monitoring Reports

1. Quarterly Noise Monitoring, Quarter Ending March 2018
2. Quarterly Noise Monitoring, Quarter Ending June 2018
3. Quarterly Noise Monitoring, Quarter Ending September 2018
4. Quarterly Noise Monitoring, Quarter Ending December 2018

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Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending March 2018

Report Number Q69 630.01053

27 September 2018

Donaldson Coal Pty Ltd
PO Box 675
Green Hills 2320

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Quarterly Noise Monitoring
Quarter Ending March 2018

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Quarterly Noise Monitoring

Quarter Ending March 2018

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This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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1 INTRODUCTION

1.1 Background

Donaldson Coal Pty Ltd has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct quarterly noise monitoring surveys for the Donaldson Coal Mine and Abel Coal Mine in accordance with the Abel Mine Project Noise Monitoring Program, dated 27 May 2008.

1.2 Objectives of this Report

The objectives of the noise monitoring survey for this operating quarter were as follows:

- Measure the ambient noise levels at six focus receptor locations (potentially worst affected) surrounding Donaldson Coal Mine and Abel Coal Mine.
- Qualify all sources of noise within each of the attended surveys, including estimated contribution or maximum level of individual noise sources.
- Assess the noise emissions of Donaldson Coal Mine and Abel Coal Mine with respect to the limits contained in the Development Consent.

1.3 Acoustic Terminology

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 DEVELOPMENT CONSENT PROJECT APPROVAL

Development consent was obtained by Donaldson Coal Pty Ltd for the Donaldson Mine in October 1999 following a Commission of Inquiry. Development Consent number N97/00147 was issued by the Minister for Urban Affairs pursuant to Section 101 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Project Approval (Application No. 05_0136) granted by the Minister of Planning was obtained by Donaldson Coal Pty Ltd for Abel Coal Mine in 2007.

2.1 Donaldson Coal Mine Development Consent Conditions

The Development Consent nominates hours of operation and mine noise emission goals in the Sections entitled "Operation of Development, Condition No. 3(1) and 3(2)", and "Noise and Vibrational Noise Limits: Condition No. 15" as follows:

3.(1) Subject to (2) the approved hours of operation are as follows:

Works	Period	Hours
Construction, including construction of any bunds	Monday to Friday Saturday	7 am to 6 pm 8 am to 1 pm
Mining operations, including mining, haulage of waste to dumps and coal processing	Monday to Friday Saturday, Sunday	24 hours per day 7 am to 6 pm
Road Transportation and stockpiling of coal	7 days per week	24 hours per day
Rail loading of coal	7 days per week	7 am to 10 pm
Maintenance of mobile and fixed plant	7 days per week	24 hours per day
Blasting, not involving closure of John Renshaw Drive	Monday to Saturday	7 am to 5 pm

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<i>Blasting, involving closure of John Renshaw Drive</i>	<i>Monday to Saturday</i>	<i>10 am to 2 pm</i>
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Notes: Restrictions on Public Holidays are the same as Sundays

- (2) *The Applicant shall submit a report to the Director-General's satisfaction demonstrating the noise limits in Condition 15 can be met while rail loading of coal is occurring during the period from 6 pm to 10 pm. If that report does not demonstrate that the noise limits can be met to the Director-General's satisfaction, then the hours of operation for rail loading of coal shall be restricted to 7 am to 6 pm."*
15. *Unless subject to a negotiated agreement in accordance with Condition 23, the Applicant shall ensure that the noise emission from construction or mining operations, when measured or computed at the boundary of any dwelling not owned by the applicant (or within 30 metres of the dwelling, if the boundary is more than 30 metres from the dwelling), shall not exceed the following noise limits:*

Location	LA10(15minute) Noise Limits (dBA)	
	Daytime	Night-time
<i>Beresfield area (residential)</i>	45	35
<i>Steggles Poultry Farm</i>	50	40
<i>Ebenezer Park Area</i>	46	41
<i>Black Hill Area</i>	40	38
<i>Buchanan and Louth Park Area</i>	38	36
<i>Ashtonfield Area</i>	41	35
<i>Thornton Area</i>	48	40

Note: Daytime is 7 am to 10 pm Monday-Saturday, and 8 am to 10 pm Sundays and Public Holidays. Night-time is 10 pm to 7 am Monday-Saturday, and 10 pm to 8 am Sundays and Public Holidays.

The noise limits apply for prevailing meteorological conditions (winds up to 3 m/s), except under conditions of temperature inversions."

Other Conditions of Consent relevant to noise are as follows:

18. *The applicant shall survey and investigate noise reduction measures from plant and equipment and set targets for noise reduction in each Annual Environmental Management Report (AEMR), taking into consideration valid noise complaints received in the previous year. The Report shall also include remedial measures.*
19. *The Applicant shall revise the Noise Management Plan as necessary and provide an updated Plan five years after commencement of mining to the Director-General, the independent noise expert (Condition 48), EPA, Councils and the Community Consultative Committee.*

2.2 Abel Coal Mine – Project Approval

Approved Operations

The following operations are approved under the Abel Coal Mine Project Approval:

- Extraction of up to 6.1 Mtpa of Run of Mine (ROM) coal from the Abel Underground Coal Mine.
- Transport coal to the existing Bloomfield Coal Handling and Preparation Plant by private haul roads, or by coal conveyor, or by a combination of both methods.
- Operate the Bloomfield Coal Handling Processing Plant (CHPP) to process coal extracted from the Abel Coal Mine and the Bloomfield and Donaldson Coal Mines.

- Transportation of product coal from the Bloomfield site by rail via the Bloomfield rail loading facility.

The Project Approval was modified in June 2010 (05_0136 MOD 1) allowing construction and operation of a downcast ventilation fan. In May 2011 the Project Approval was modified again (05_0136 MOD 2) to allow the construction and operation of an upcast ventilation fan (and associated facilities). In December 2013 the Project Approval was further modified (05_0136 MOD3) to account for the increase in coal extracted including the upgrade of the CHPP.

Consent Conditions

The relevant conditions relating to noise from the Abel Coal Mine approval are reproduced below.

Schedule 4

NOISE

Operational Noise Criteria

1. The Proponent shall ensure that the noise generated by the Project does not exceed the criteria in Table 4 at any residence on privately-owned land.

Table 4: Operational Noise Criteria dB(A)

Location	Receiver Area	Day	Evening	Night	
		LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
Location I	Lord Howe Drive, Ashtonfield	36	36	36	45
Location K	Catholic Diocese Land	37	37	37	45
Location L	Kilshanny Avenue, Ashtonfield	40	40	40	47
All other Locations	All other privately-owned Residences	35	35	35	45

Notes:

- To interpret the locations referred to in Table 4, see plan in Appendix 3 (Appendix A).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

These noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Construction Noise Criteria

1. The proponent shall ensure that the noise generated during the construction of the downcast ventilation shaft as described in EA (MOD3) does not exceed the criteria in Table 5.

Table 5: Construction Noise Criteria dB(A)

Location	Receiver	Day
		LAeq(15minute)
Location R	281 Lings Road, Buttai	50
Location S	189 Lings Road, Buttai	43

Notes:

- The criteria in Table 5 apply only whilst the downcast ventilation shaft is being constructed, and for a maximum of 12 weeks from the commencement of construction.
- To interpret the locations referred to in Table 5, see plan in Appendix 3 (attached to this report as Appendix A).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

However, these noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Rail Noise Criteria

1. The proponent shall ensure that the noise from rail movements on the Bloomfield Rail Spur does not exceed the limits in Table 6 at any residence on privately owned land.

Table 6: Rail Spur noise criteria dB (A)

Location	Day	Evening	Night
	LAeq(period)		
All privately-owned land	55	45	40

Cumulative Noise Criteria

1. The proponent shall implement all reasonable and feasible measures to ensure that the noise generated by the project combined with noise generated by other mines does not exceed the criteria in Table 7 at any residence on privately-owned land.

Table 7: Cumulative noise criteria dB (A)

Location	Day	Evening	Night
	LAeq(period)		
All privately-owned land	55	45	40

Notes: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including meteorological conditions), of the NSW Industrial Noise Policy. Appendix 4 sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

Operating Conditions

1. The proponent shall:
 - a. Implement best management practise to minimise the construction, operational, road and rail noise of the project;
 - b. Operate an on-site noise management system to ensure compliance with the relevant conditions of this approval;
 - c. Minimise the noise impacts of the project during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 4);
 - d. Only receive and/or dispatch locomotives and rolling stock either on or from the site that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142);
 - e. Carry out regular monitoring to determine whether the project is complying with the noise criteria and other relevant conditions of approval, to the satisfaction of the Director-General.

Noise Management Plan

2. The proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:
 - a. Be prepared in consultation with the EPA, and be submitted to the Director-General for approval within 6 months of the date of approval of MOD 3;
 - b. Describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval;

- c. Describe the proposed noise management system in detail; and
- d. Include a monitoring program that:
 - Uses attended monitoring to evaluate the compliance of the project against the noise criteria in this approval;
 - Evaluates and reports on:
 - The effectiveness of the on-site noise management system; and
 - Compliance against the noise operating conditions; and
 - Defines what constitutes a noise incident, and includes protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

Appendix 4

Noise Compliance Assessment

Applicable Meteorological Conditions

1. The noise criteria in Tables 4 and 7 are to apply under all metrological conditions except the following:
 - a. During periods of rain or hail.
 - b. Average wind speed at microphone height exceeds 5 m/s;
 - c. Wind speeds greater than 3 m/s measured at 10m above ground level; or
 - d. Temperature inversion conditions greater than 3°C/100m.

Determination of metrological conditions

2. Except for wind speed at microphone height, the data to be used for determining metrological conditions shall be that recorded by the meteorological station located on the site.

Compliance monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.
4. Unless otherwise agreed with the director-general, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to:
 - a. Monitoring locations for the collection of representative noise data;
 - b. Metrological conditions during which collection of noise data is not appropriate;
 - c. Equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - d. Modification to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

Appendix 5

Statement of Commitments

3. Noise

3.1 Construction Activities

The following noise control measures will be implemented prior to commencement of construction of the Abel Underground Mine or the upgrade of the Bloomfield CHPP.

1. *Maintain all machinery and equipment in working order;*
 - a. *No construction activities at the Abel pit top will take place on Sundays or Public Holidays;*
 - b. *Where possible locate noisy site equipment behind structures that act as barriers or at the greatest distance from noise sensitive areas; and*
 - c. *Orientate equipment so that noise emissions are directed away from noise sensitive areas.*

3.2 Noise Control Measures

- a. *The following noise control measures will be implemented prior to the mining of coal from the Abel underground Mine:*
 - i. *Orientation of the ventilation fans away from residential receivers and angle the output parallel to the ground.*
 - ii. *The sound power level of the front end loader to be used near the portal should not exceed 113 dBA and will be fitted with a noise sensitive reversing alarm.*
- b. *The following noise control measures will be implemented prior to the Bloomfield CHPP receiving any ROM coal from Able Underground Mine;*
 - i. *Noise mitigation works including partial enclosure and noise screening of drives and conveyors of the Bloomfield CHPP to screen residences to the north of the site.*

3.2 Monitoring

The Company will implement a Noise Monitoring Program for the Abel Underground Mine and the Bloomfield CHPP, to the satisfaction of the Director-General. The Noise Monitoring Program shall include a combination of real-time and supplementary attended monitoring measures, and a noise monitoring protocol for evaluating compliance with the noise environmental assessment. This plan will be integrated with the monitoring plans for the Tasman, Donaldson and Bloomfield Mines to provide a single integrated Noise Monitoring Program for all 4 mines.

3.4 Continuous Improvement

The Company shall:

- a. *Report on these investigations and implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director General.*

The operator of the Bloomfield CHPP shall:

- b. *Investigate ways to reduce the noise generated by the Bloomfield CHPP, including maximum noise levels which may result in sleep disturbance;*
- c. *Implement all reasonable and feasible best practice noise mitigation measures on the site; and*
- d. *Report on these investigations and the implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director-General.*

3 NOISE MONITORING METHODOLOGY

3.1 General Requirements

The operational noise monitoring program was conducted with reference to Development Consent N97/00147 (Donaldson Coal Mine), Project Approval 05_0136 (Abel Coal Mine), and in accordance with SLR's Report 630.01053.01300-R1 dated 12 August 2014 (*Noise Management Plan Abel Underground Mine*) and AS 1055-1997 *Acoustics - Description and Measurement of Environmental Noise*.

All acoustic instrumentation employed throughout the monitoring program has been designed to comply with the requirements of IEC 61672.1-2004 *Electroacoustics – Sound Level Meters – Specifications* and carries current NATA or manufacturer calibration certificates.

3.2 Monitoring Locations

Baseline and preceding operational quarterly surveys have been conducted at 11 locations surrounding the Donaldson Mine and Abel Coal Mine sites. With the experience of these previous surveys, it was decided to concentrate noise monitoring at six focus locations that represent the potentially most noise affected areas from Donaldson Mine and Abel Coal Mine. The details of the monitoring locations are contained within **Table 1**

It is relevant to note that Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

Furthermore, Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite during the March noise monitoring period.

Table 1 Monitoring Locations

Noise Monitoring Location	Description
D	Black Hill School, Black Hill
F	Lot 684 Black Hill Road, Black Hill
G	156 Buchanan Road, Buchanan
I	Lord Howe Drive, Ashtonfield
J	Parish Drive, Thornton
L	17 Kilshanny Ave, Ashtonfield

A map giving the approximate location of the noise monitoring sites is contained within **Appendix B**.

3.3 Unattended Continuous Noise Monitoring

An environmental noise logger was deployed for a minimum of seven days between 23 March 2018 and 3 April 2018 at each of the six nominated locations given in **Table 1**.

All unattended monitoring equipment was programmed to continuously record statistical noise level indices in 15 minute intervals including the L_{Amax} , LA_1 , LA_{10} , LA_{90} , LA_{99} , L_{Amin} and LA_{eq} . The statistical noise exceedance levels (LAN) are the levels exceeded for N% of the 15 minute interval. The LA_{90} represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level. The LA_{10} is the level exceeded for 10% of the time and is usually referred to as the average maximum noise level. The LA_{eq} is the equivalent continuous sound pressure level and represents the steady sound level which is equal in energy to the fluctuating level over the interval period. The L_{Amax} is the maximum noise level recorded over the interval.

Instrument calibration was conducted before and after each measurement survey, with the variation in calibrated levels not exceeding ± 0.5 dBA.

3.4 Operator Attended Noise Monitoring

Operator attended surveys were conducted at each of the six monitoring locations during the daytime, evening and night-time periods, to verify the unattended logging results and to determine the character and contribution of ambient noise sources.

4 OPERATOR ATTENDED NOISE MONITORING

4.1 Results of Operator Attended Noise Monitoring

Operator attended noise measurements were conducted commencing during the evening on Tuesday 27 March 2018 and completed during the day on Wednesday 28 March 2018. All operator attended noise surveys were conducted using a Brüel & Kjær 2270 Type 1, integrating sound level meter (s/n: 2679354).

All acoustic instrumentation employed throughout the monitoring programme has been designed to comply with the requirements of AS IEC 61672.1 – 2004 *Electroacoustics—Sound level meters – Specifications*, AS IEC 61672.2-2004, AS IEC 61672.3-2004 and carried current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding ± 0.5 dBA.

Results of the operator attended noise measurements are given in **Table 2** to **Table 9**.

Ambient noise levels given in the tables include all noise sources such as traffic, insects, birds, and mine operations as well as any other industrial operations.

The tables provide the following information:

- Monitoring location.
- Date and start time.
- Wind velocity (m/s) and Temperature ($^{\circ}C$) at the measurement location.
- Typical maximum (L_{Amax}) and contributed noise levels.

Mine contributions listed in the tables are from the Abel Coal Mine and are stated only when a contribution could be quantified.

Mine noise at all monitoring locations was inaudible over the existing ambient noise levels.

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Table 2 Location D, Black Hill School, Black Hill

Period ¹	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (LAmax - dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/03/2018 10:17 26°C m/s 0/8 Cloud Cover	79	62	53	37	53	Birdsong 56-62 Road traffic 37-73 Insects 32-35 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	27/03/2018 18:31 26°C Calm 6/8 Cloud Cover	78	70	56	42	56	Birdsong 53-64 Road traffic 36-78 Train 47 Insects 37-42 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	27/03/2018 22:30 19°C Calm 4/8 Cloud Cover	57	50	47	40	45	Road traffic 41-57 Insects 34-45 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Note 1: EPA periods used for the INP are defined as Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Table 3 Location F, Lot 684 Black Hill Road, Black Hill

Period ¹	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (LAmax - dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/03/2018 10:40 26°C Calm 0/8 Cloud Cover	74	67	56	45	55	Road traffic 45-74 Birdsong 47 Insects 35 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	27/03/2018 18:53 22°C 1 m/s SE 6/8 Cloud Cover	67	61	54	41	50	Road traffic 50-67 Insects 35 Birdsong 48 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	27/03/2018 22:52 19°C Calm 3/8 Cloud Cover	64	55	48	35	45	Birdsong (plover) 49 Insects/frogs 34-36 Road traffic 36-64 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Note 1: EPA periods used for the INP are defined as Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

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Table 4 Location G, 156 Buchanan Road, Buchanan

Period ¹	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (LAmax - dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/03/2018 11:44 22°C 1 m/s W 0/8 Cloud Cover	58	53	51	44	50	Insects 51-52 Traffic 48 Birdsong 47-58 Other industry <35 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	27/03/2018 19:59 21°C 1 m/s E 4/8 Cloud Cover	54	49	46	38	43	Road traffic 40-54 Insects/Frogs 31-37 Other industry 32-43 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	27/03/2018 23:59 18°C 1.5 m/s E 1/8 Cloud Cover	49	47	41	32	38	Road traffic 35-49 Insects 31-34 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Note 1: EPA periods used for the INP are defined as Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Table 5 Location I, 49 Magnetic Drive, Ashtonfield

Period ¹	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (LAmax - dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/03/2018 12:35 23°C 1 m/s W 0/8 Cloud Cover	73	67	60	43	56	Traffic 52-69 Birdsong 52-73 Insects 37 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	27/03/2018 20:48 20°C Calm 7/8 Cloud Cover	66	61	48	39	47	Road traffic 62-66 Aeroplane 59 Insects 32-36 Duck 54 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	28/03/2018 00:48 18°C 1 m/s E 1/8 Cloud Cover	57	53	50	44	47	Night roadworks 43-57 Insects 37-42 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Note 1: EPA periods used for the INP are defined as Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

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Table 6 Location J, Parish Drive, Thornton

Period ¹	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (LAmax - dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/03/2018 12:58 25°C 1 m/s WNW 0/8 Cloud Cover	52	47	45	39	43	Traffic 37-52 Insects 38-44 Birdsong 45 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	27/03/2018 21:38 20°C Calm 4/8 Cloud Cover	64	52	51	41	47	Traffic 41-53 Insects 38-44 Branch falling 64 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	27/03/2018 22:00 19°C Calm 3/8 Cloud Cover	53	52	50	42	47	Traffic 42-53 Insects 39-44 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Note 1: EPA periods used for the INP are defined as Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Table 7 Location L, 17 Killshanny Ave, Ashtonfield

Period ¹	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (LAmax - dBA)
		LAmax	LA1	LA10	LA90	LAeq	
Day	28/03/2018 12:13 22°C 1 m/s WNW 0/8 Cloud Cover	73	68	52	32	53	Lawnmower 32-35 Birdsong 38-47 Traffic 40-73 Residential noise 48-54 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	27/03/2018 20:26 21°C 0.5 m/s ESE 6/8 Cloud Cover	67	61	43	38	47	Traffic 30-67 Insects 38-42 Residential noise 43-46 Able Mine Audible CHPP Stockpile area 28-32
		Estimated Abel Mine Noise Contribution <30					
Night	28/03/2018 00:27 17°C 1 m/s E 2/8 Cloud Cover	60	45	44	38	42	Traffic 60 Dog barking 45-48 Train 41-44 Insects 41-43 Able Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Note 1: EPA periods used for the INP are defined as Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

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4.2 Operator Attended Noise Monitoring Summary

4.2.1 Donaldson Mine

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

4.2.2 Abel Coal Mine

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

The Bloomfield CHPP stockpile area was audible during the evening period. Noise generated by local and distant traffic was a significant contributor to ambient noise levels at all monitored locations as well as 'natural' noises such as birds and insects.

4.3 Compliance Assessment and Discussion of Results

4.3.1 Operations

Results of the operational compliance assessment are given in **Table 8**.

Table 8 Compliance Noise Assessment – Operations

Location	Estimated Abel LAeq(15minute) Contribution			Consent Conditions LAeq(15minute)			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
D – Black Hill School, Black Hill	Inaudible at all times			35	35	35	Yes	Yes	Yes
F – Black Hill Road, Black Hill	Inaudible at all times			35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible at all times			35	35	35	Yes	Yes	Yes
I – Lord Howe Drive, Ashtonfield	Inaudible at all times			36	36	36	Yes	Yes	Yes
J – Parish Drive, Thornton	Inaudible at all times			35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	<30	Inaudible	40	40	40	Yes	Yes	Yes

Results presented in **Table 8** indicate that compliance with the relevant consent conditions was achieved at all noise monitoring locations during all periods.

4.3.2 Sleep Disturbance

Results of the sleep disturbance compliance assessment are given in **Table 9**

Table 9 Compliance Noise Assessment – Sleep Disturbance

Location	Estimated Abel LA1(1minute) Contribution	Consent Conditions LA1(1minute)	Compliance
D – Black Hill School, Black Hill	Inaudible	45	Yes
F – Black Hill Road, Black Hill	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
I – Lord Howe Drive, Ashtonfield	Inaudible	45	Yes
J – Parish Drive, Thornton	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	47	Yes

Results presented in **Table 9** indicate that compliance with the sleep disturbance consent conditions was achieved at all noise monitoring locations during the night-time noise surveys.

5 UNATTENDED CONTINUOUS NOISE MONITORING

5.1 Results of Unattended Continuous Noise Monitoring

Unattended continuous noise monitoring was conducted between 23 March 2018 and 3 April 2018 at each of the six monitoring locations given in **Table 10**.

Table 10 Noise Logger and Noise Monitoring Locations

Location	Noise Logger Serial Number	Date of Logging
D – Black Hill School, Black Hill	ARL EL- 316 16-203-505	23/03/2018-03/04/2018
F – Black Hill Road, Black Hill	ARL EL- 316 16-004-038	23/03/2018-03/04/2018
G – Buchanan Road, Buchanan	ARL EL- 316 16-306-039	23/03/2018-03/04/2018
I – Magnetic Drive, Ashtonfield	ARL EL- 316 16-203-528	23/03/2018-03/04/2018
L – Kilshanny Ave, Kilshanny	ARL EL- 316 16-203-525	23/03/2018-03/04/2018
J – Parish Drive, Thornton	SVAN 957 - 20665	23/03/2018-03/04/2018

The unattended ambient noise logger data from each monitoring location are presented graphically on a daily basis and are attached as **Appendix C**. A summary of the results of the unattended continuous noise monitoring is given in **Table 11**.

The ambient noise level data quantifies the overall noise level at a given location independent of its source or character.

The measured ambient noise levels were divided into three periods representing day, evening and night as designated in the NSW Noise Policy for Industry (NPfI).

Precautions were taken to minimise influences from extraneous noise sources (eg optimum placement of the loggers away from creeks, trees, houses, etc), however, not all these sources or their effects can be eliminated. This is particularly the case during the warmer times of year when noise from insects, frogs, birds and other animals can become quite prevalent.

Weather data for the subject area during the noise monitoring period was provided by Bloomfield Colliery. Noise data during periods of any rainfall and/or wind speeds in excess of 5 m/s (approximately 9 knots) were discarded in accordance with INP weather affected data exclusion methodology.

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Table 11 Unattended Continuous Noise Monitoring Ambient Noise Levels (dBA Re 20 µPa)

Location	Period	Primary Noise Descriptor (dBA re 20 µPa)			
		LA1	LA10	LA90	LAeq
D Black Hill School, Black Hill	Daytime	66	55	36	55
	Evening	61	48	40	51
	Night	45	44	38	48
F Lot 684 Black Hill Road, Black Hill	Daytime	68	57	44	58
	Evening	63	54	39	53
	Night	59	51	35	52
G 156 Buchanan Road, Buchanan	Daytime	51	48	39	47
	Evening	48	45	36	44
	Night	45	41	33	42
I 49 Magnetic Drive, Ashtonfield	Daytime	68	58	40	57
	Evening	57	51	39	58
	Night	53	51	42	59
L 17 Kilshanny Ave, Ashtonfield	Daytime	60	48	31	55
	Evening	58	48	34	50
	Night	56	53	39	53
J 220 Parish Drive, Thornton	Daytime	50	45	37	46
	Evening	48	44	38	61
	Night	45	41	30	42

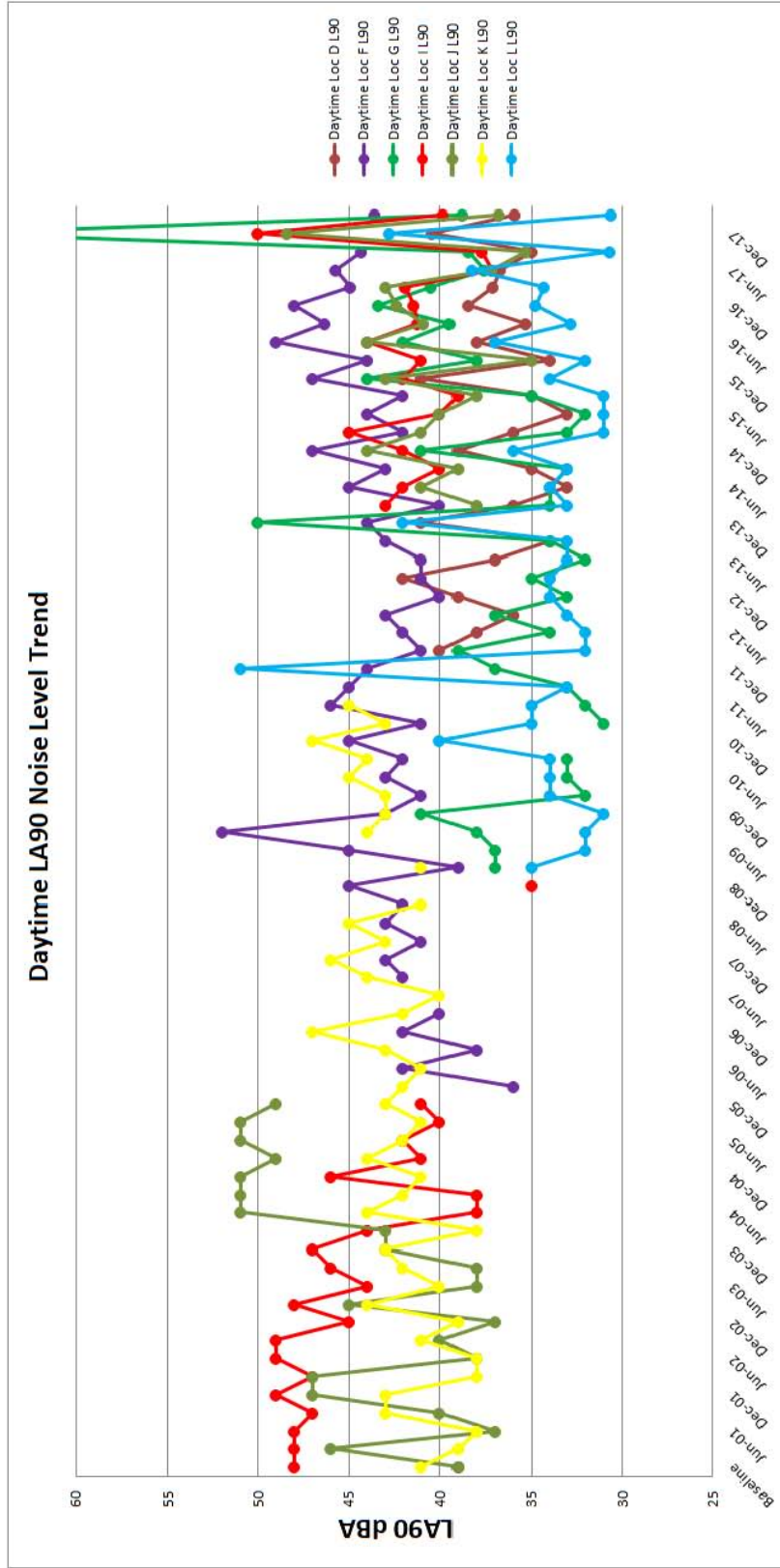
Note 1: Periods are as detailed in the NPfl and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

5.2 Long term Unattended Continuous Monitoring Summary for Donaldson Mine and Abel Coal Mine

5.2.1 Ambient LA90 Noise Levels

The long term ambient LA90 noise levels collected from each monitoring location are presented graphically in **Figure 1**, **Figure 2**, and **Figure 3** for the daytime, evening and night-time periods respectively.

Figure 1 Long term Daytime LA90 Noise Levels



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Figure 2 Long term Evening LA90 Noise Levels

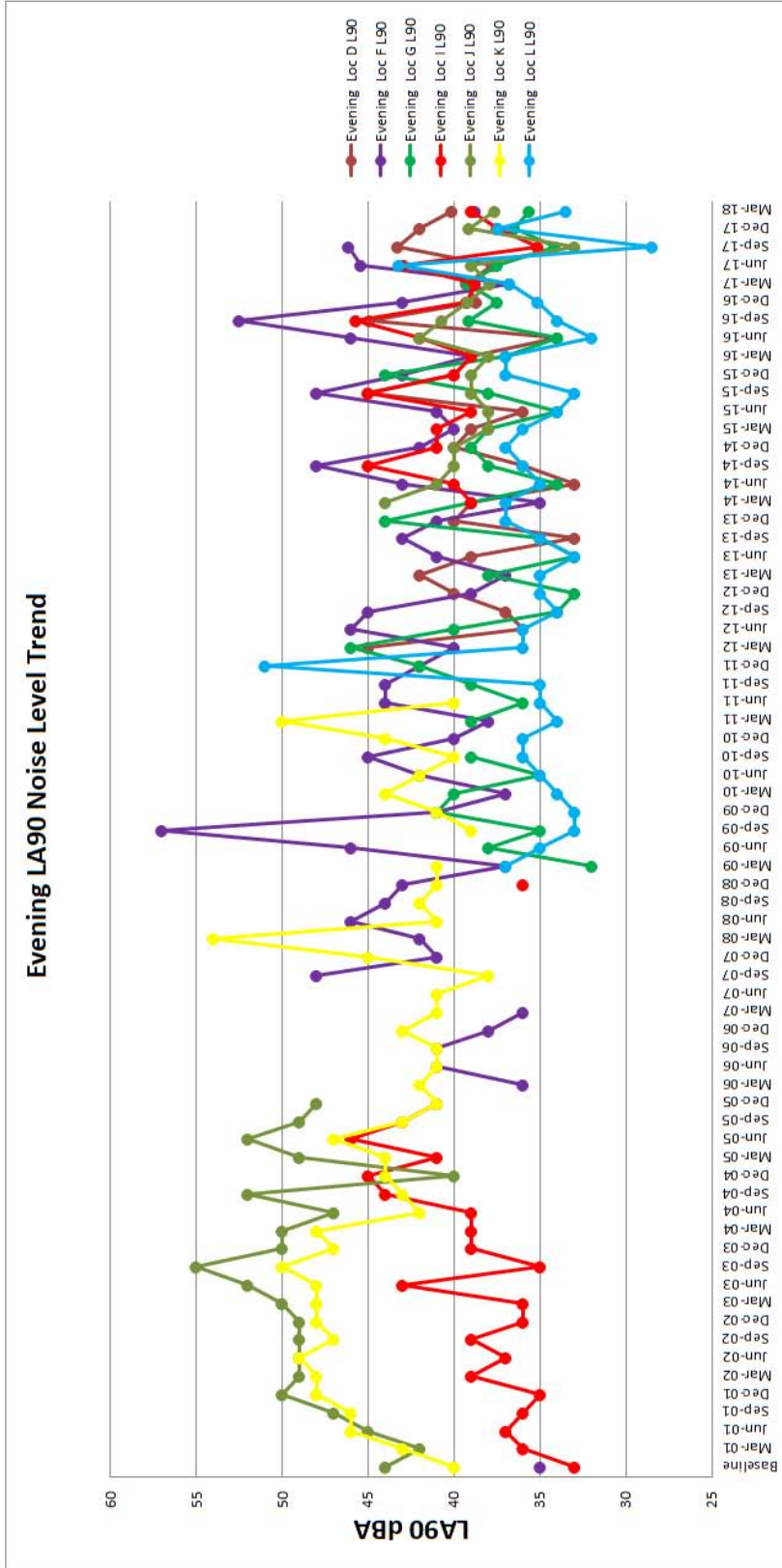
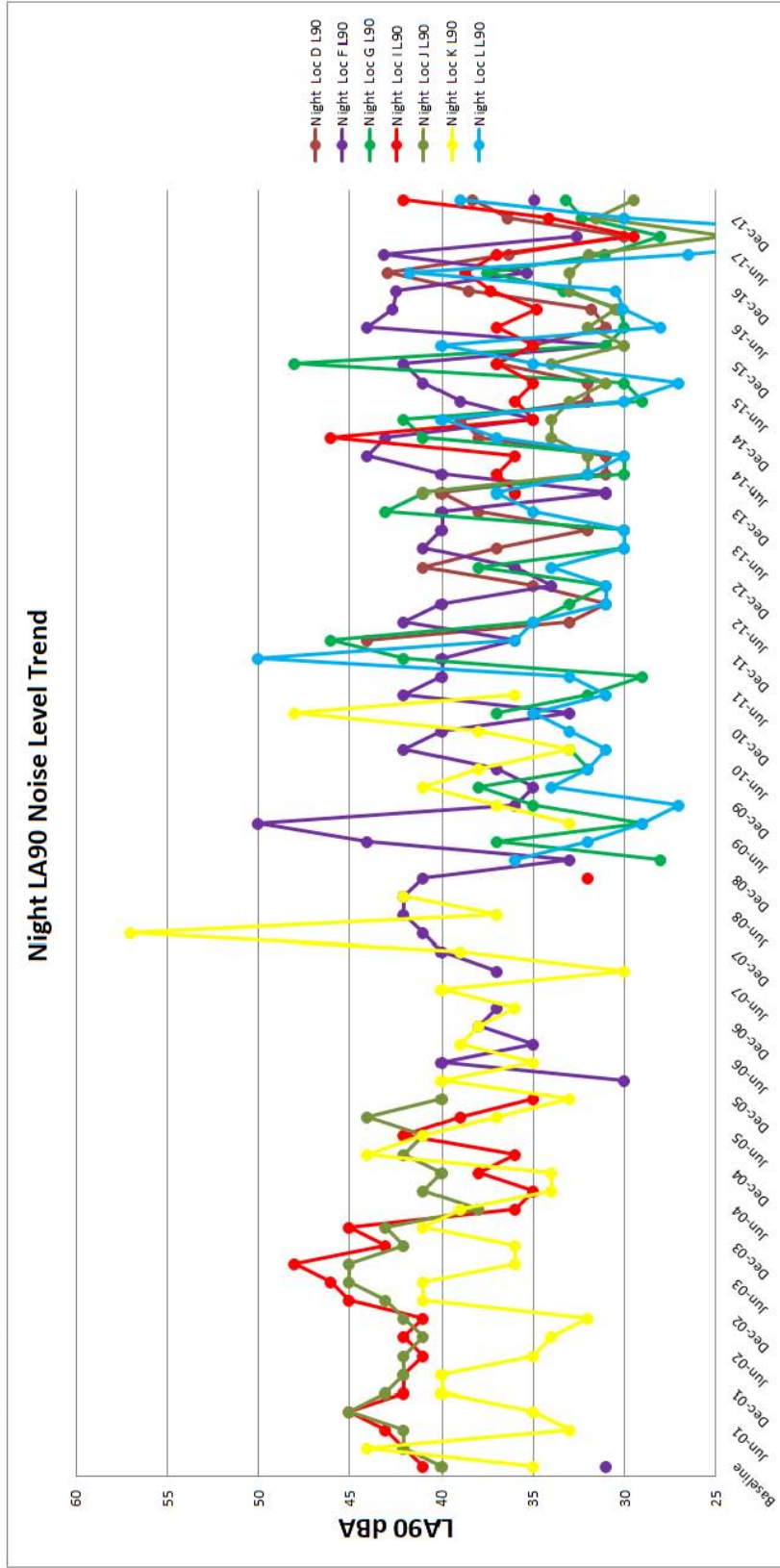


Figure 3 Long term Night-time LA90 Noise Levels



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5.2.1.1 Baseline

The summary of results in **Table 12** shows the ambient LA90 noise levels recorded for the the current monitoring period compared to the levels recorded during the baseline monitoring process (ie. prior to commencement of mining operation at Donaldson).

Table 12 LA90 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ³
		Baseline	March 2018	
D Black Hill School, Black Hill	Day	N/A ²	40	N/A ²
	Evening	N/A ²	42	N/A ²
	Night	N/A ²	36	N/A ²
F Lot 684 Black Hill Road, Black Hill	Day	39	44	5
	Evening	35	39	4
	Night	31	35	4
G 156 Buchanan Road, Buchanan	Day	N/A ²	39	N/A ²
	Evening	N/A ²	36	N/A ²
	Night	N/A ²	33	N/A ²
I 49 Magnetic Drive, Ashtonfield	Day	48	40	-8
	Evening	33	39	6
	Night	41	42	1
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	31	N/A ²
	Evening	N/A ²	34	N/A ²
	Night	N/A ²	39	N/A ²
J 220 Parish Drive, Thornton	Day	39	37	-2
	Evening	44	38	-6
	Night	40	30	-10

Note 1: Periods are as detailed the NPfl and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made

Note 3: Rounded to the nearest whole dB.

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5.2.1.2 Previous Quarter

Table 13 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured in the previous monitoring period.

Table 13 LA90 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		December 2017	March 2018	
D Black Hill School, Black Hill	Day	40	36	-5
	Evening	42	40	-2
	Night	36	38	2
F Lot 684 Black Hill Road, Black Hill	Day	N/A ³	44	N/A ³
	Evening	N/A ³	39	N/A ³
	Night	N/A ³	35	N/A ³
G 156 Buchanan Road, Buchanan	Day	67	39	-28 ⁴
	Evening	37	36	-1
	Night	32	33	1
I 49 Magnetic Drive, Ashtonfield	Day	50	40	-10
	Evening	38	39	2
	Night	34	42	8
L 17 Kilshanny Ave, Ashtonfield	Day	43	31	-12
	Evening	37	34	-4
	Night	30	39	9
J 220 Parish Drive, Thornton	Day	48	37	-12
	Evening	39	38	-2
	Night	32	30	-2

Note 1: 1. Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB

Note 3: Due to a noise logger error no results are available for Location F in December 2017.

Note 4: Large difference due to significant insect noise during December 2017

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5.2.1.3 Coinciding Period Last Year

Table 14 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 14 LA90 Results Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		March 2017	March 2018	
D Black Hill School, Black Hill	Day	37	36	-1
	Evening	39	40	1
	Night	43	38	-5
F Lot 684 Black Hill Road, Black Hill	Day	45	44	-1
	Evening	37	39	2
	Night	35	35	0
G 156 Buchanan Road, Buchanan	Day	41	39	-2
	Evening	39	36	-4
	Night	38	33	-4
I 49 Magnetic Drive, Ashtonfield	Day	42	40	-2
	Evening	39	39	0
	Night	39	42	3
L 17 Kilshanny Ave, Ashtonfield	Day	34	31	-4
	Evening	37	34	-3
	Night	42	39	-3
J 220 Parish Drive, Thornton	Day	43	37	-6
	Evening	38	38	0
	Night	33	30	-4

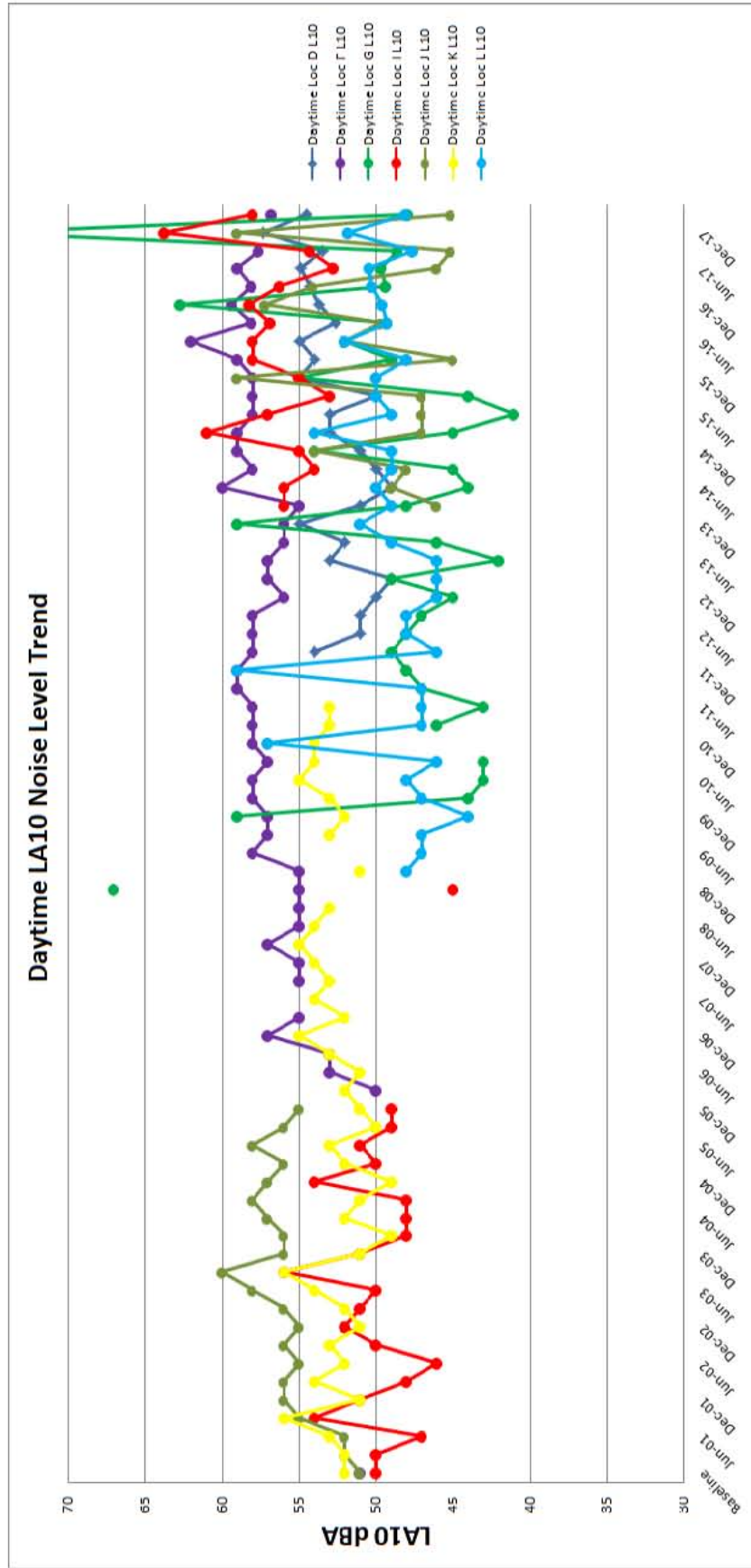
Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.2.2 Ambient LA10 Noise Comparison

The long term ambient LA10 noise levels collected from each monitoring location are presented graphically in **Figure 4**, **Figure 5** and **Figure 6** for the daytime, evening and night-time periods respectively.

Figure 4 Long term Daytime LA10 Noise Levels



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Figure 5 Long term Evening LA10 Noise Levels

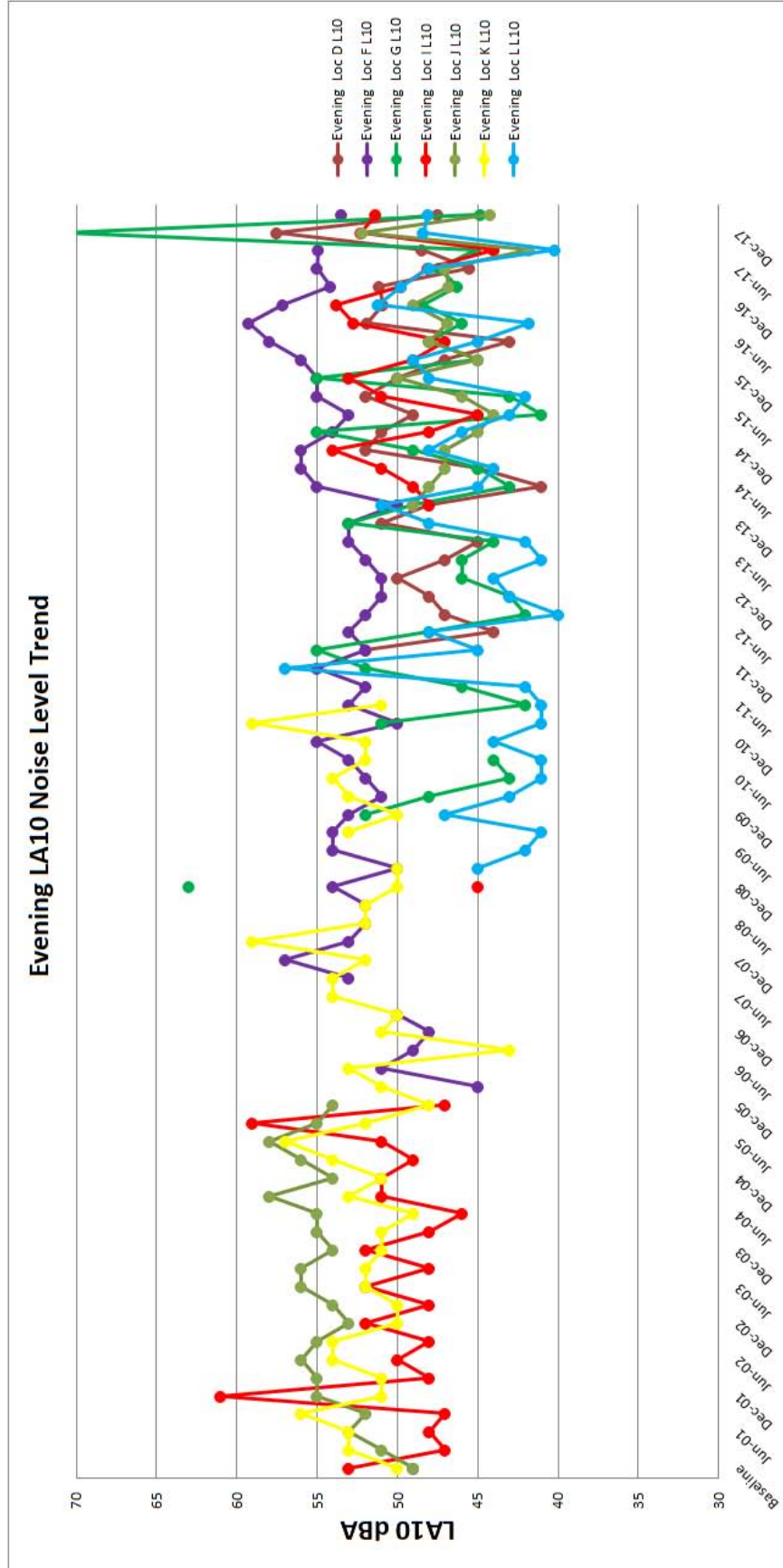
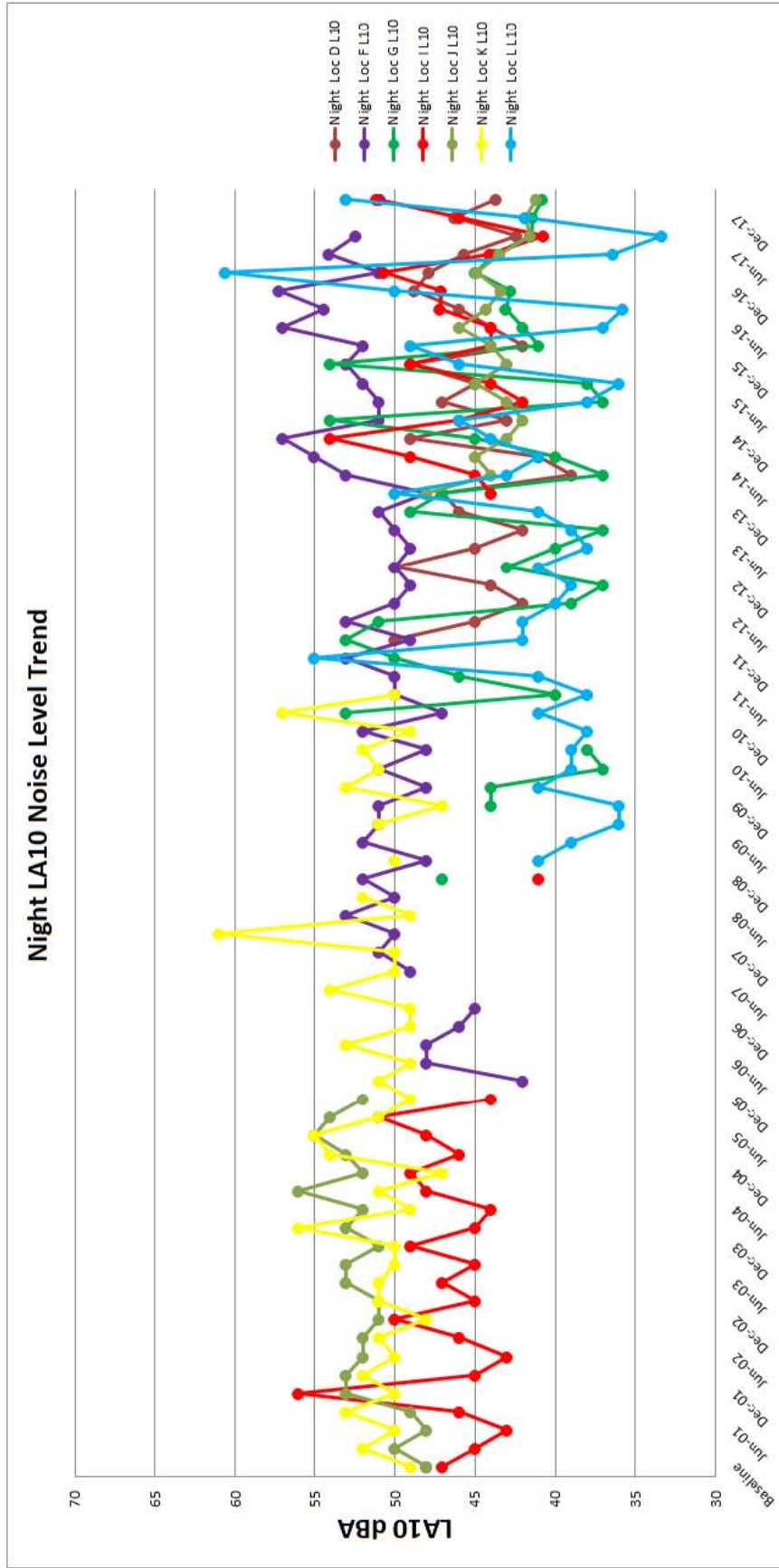


Figure 6 Long term Night-time LA10 Noise Levels



5.2.2.1 Baseline

Table 15 presents the ambient LA10 noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring period.

Table 15 LA10 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ³
		Baseline	March 2018	
D Black Hill School, Black Hill	Day	N/A ²	55	N/A ²
	Evening	N/A ²	48	N/A ²
	Night	N/A ²	44	N/A ²
F Lot 684 Black Hill Road, Black Hill	Day	51	57	6
	Evening	49	54	5
	Night	48	51	3
G 156 Buchanan Road, Buchanan	Day	N/A ²	48	N/A ²
	Evening	N/A ²	45	N/A ²
	Night	N/A ²	41	N/A ²
I 49 Magnetic Drive, Ashtonfield	Day	50	58	8
	Evening	53	51	-2
	Night	47	51	4
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	48	N/A ²
	Evening	N/A ²	48	N/A ²
	Night	N/A ²	53	N/A ²
J 220 Parish Drive, Thornton	Day	51	45	-6
	Evening	49	44	-5
	Night	48	41	-7

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB

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5.2.2.2 Previous Quarter

Table 16 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the previous monitoring period.

Table 16 LA10 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		December 2017	March 2018	
D Black Hill School, Black Hill	Day	57	55	-3
	Evening	58	48	-10
	Night	46	44	-3
F Lot 684 Black Hill Road, Black Hill	Day	N/A ³	57	N/A ³
	Evening	N/A ³	54	N/A ³
	Night	N/A ³	51	N/A ³
G 156 Buchanan Road, Buchanan	Day	76	48	-28 ⁴
	Evening	71	45	-26 ⁴
	Night	41	41	-1
I 49 Magnetic Drive, Ashtonfield	Day	64	58	-6
	Evening	52	51	-1
	Night	46	51	5
L 17 Kilshanny Ave, Ashtonfield	Day	52	48	-4
	Evening	48	48	0
	Night	42	53	11
J 220 Parish Drive, Thornton	Day	59	45	-14
	Evening	52	44	-8
	Night	42	41	-1

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB

Note 3: Due to a noise logger error no results are available for Location F.

Note 4: Large difference due to significant insect noise during December 2017

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5.2.2.3 Coinciding Period Last Year

Table 17 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 17 LA10 Results Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		March 2017	March 2018	
D Black Hill School, Black Hill	Day	54	55	0
	Evening	51	48	-4
	Night	48	44	-4
F Lot 684 Black Hill Road, Black Hill	Day	58	57	-1
	Evening	54	54	-1
	Night	51	51	0
G 156 Buchanan Road, Buchanan	Day	49	48	-2
	Evening	46	45	-2
	Night	45	41	-4
I 49 Magnetic Drive, Ashtonfield	Day	56	58	2
	Evening	50	51	2
	Night	51	51	0
L 17 Kilshanny Ave, Ashtonfield	Day	50	48	-2
	Evening	50	48	-2
	Night	61	53	-8
J 220 Parish Drive, Thornton	Day	54	45	-9
	Evening	47	44	-3
	Night	45	41	-4

Note 1 : Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm 10.00 pm; Night - 10.00 pm to 7.00 am pm Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB

Note 3: Due to a noise logger error no results are available for Location F.

5.3 Rail Noise Impact

No rail movements occurred during the 23 March 2018 to 3 April 2018 noise monitoring period at Location J. As such rail noise levels from the Bloomfield Rail Spur were in compliance with the Abel Mine Project Approval during the noise monitoring period.

6 CONCLUSION

SLR was engaged by Donaldson Coal Pty Ltd to conduct quarterly noise monitoring surveys for Donaldson Coal Mine and Abel Coal Mine in accordance with the Abel Coal Mine Noise Monitoring Program, dated 27 May 2007.

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

The results of the operator-attended noise measurements conducted at six focus locations surrounding the mine site are included in **Table 2** to **Table 7**.

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

Abel portal operations were not observed to be audible at any locations during the monitoring period. Contributed noise levels from Abel Mine did not exceed noise emission goals (including night-time sleep arousal criteria) and compliance with the Abel Mine *Project Approval* was indicated at all locations.

A comparison of ambient LA10 and LA90 noise levels recorded during the current monitoring period (March 2018), the baseline monitoring period, the last monitoring period (December 2017), and the coinciding monitoring period from last year (March 2017) has been conducted.

No rail movements occurred during the 23 March 2018 to 3 April 2018 noise monitoring period at Location J. As such rail noise levels from the Bloomfield Rail Spur were in compliance with the Abel Mine Project Approval during the noise monitoring period.

Appendix A

Acoustic Terminology
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1 Sound Level or Noise Level

The terms "sound" and "noise" are almost interchangeable, except that in common usage "noise" is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or L_p are commonly used to represent Sound Pressure Level. The symbol L_A represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2E-5 Pa.

2 "A" Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an "A-weighting" filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120 110	Heavy rock concert Grinding on steel	Extremely noisy
100 90	Loud car horn at 3 m Construction site with pneumatic hammering	Very noisy
80 70	Kerbside of busy street Loud radio or television	Loud
60 50	Department store General Office	Moderate to quiet
40 30	Inside private office Inside bedroom	Quiet to very quiet
20	Unoccupied recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as "linear", and the units are expressed as dB(Z) or dB.

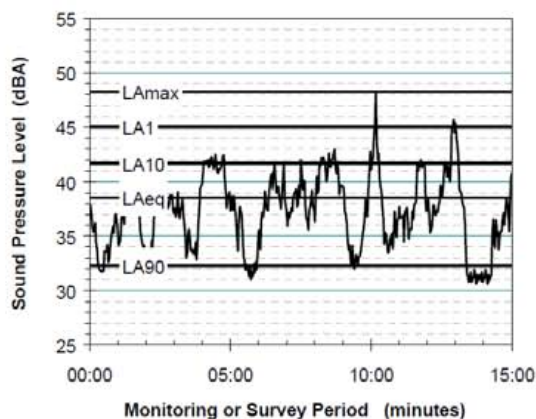
3 Sound Power Level

The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 1E-12 W. The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels L_{AN} , where L_{AN} is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the L_{A1} is the noise level exceeded for 1% of the time, L_{A10} the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

- L_{A1} The noise level exceeded for 1% of the 15 minute interval.
- L_{A10} The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- L_{A90} The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- L_{Aeq} The A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the "repeatable minimum" L_{A90} noise level over the daytime and night-time measurement periods, as required by the EPA. In addition the method produces mean or "average" levels representative of the other descriptors (L_{Aeq} , L_{A10} , etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than "broad band" noise.

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

Appendix A

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7 Frequency Analysis

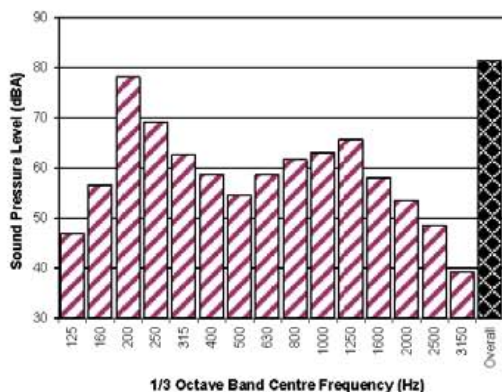
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of "peak" velocity or "rms" velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as "peak particle velocity", or PPV. The latter incorporates "root mean squared" averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (1E-6 mm/s). Care is required in this regard, as other reference levels are used by some organizations.

9 Human Perception of Vibration

People are able to "feel" vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as "normal" in a car, bus or train is considerably higher than what is perceived as "normal" in a shop, office or dwelling.

10 Over-Pressure

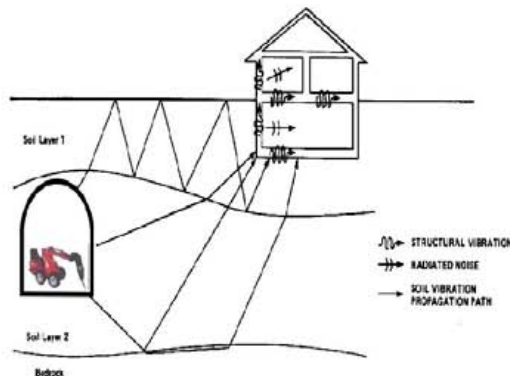
The term "over-pressure" is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

11 Regenerated Noise

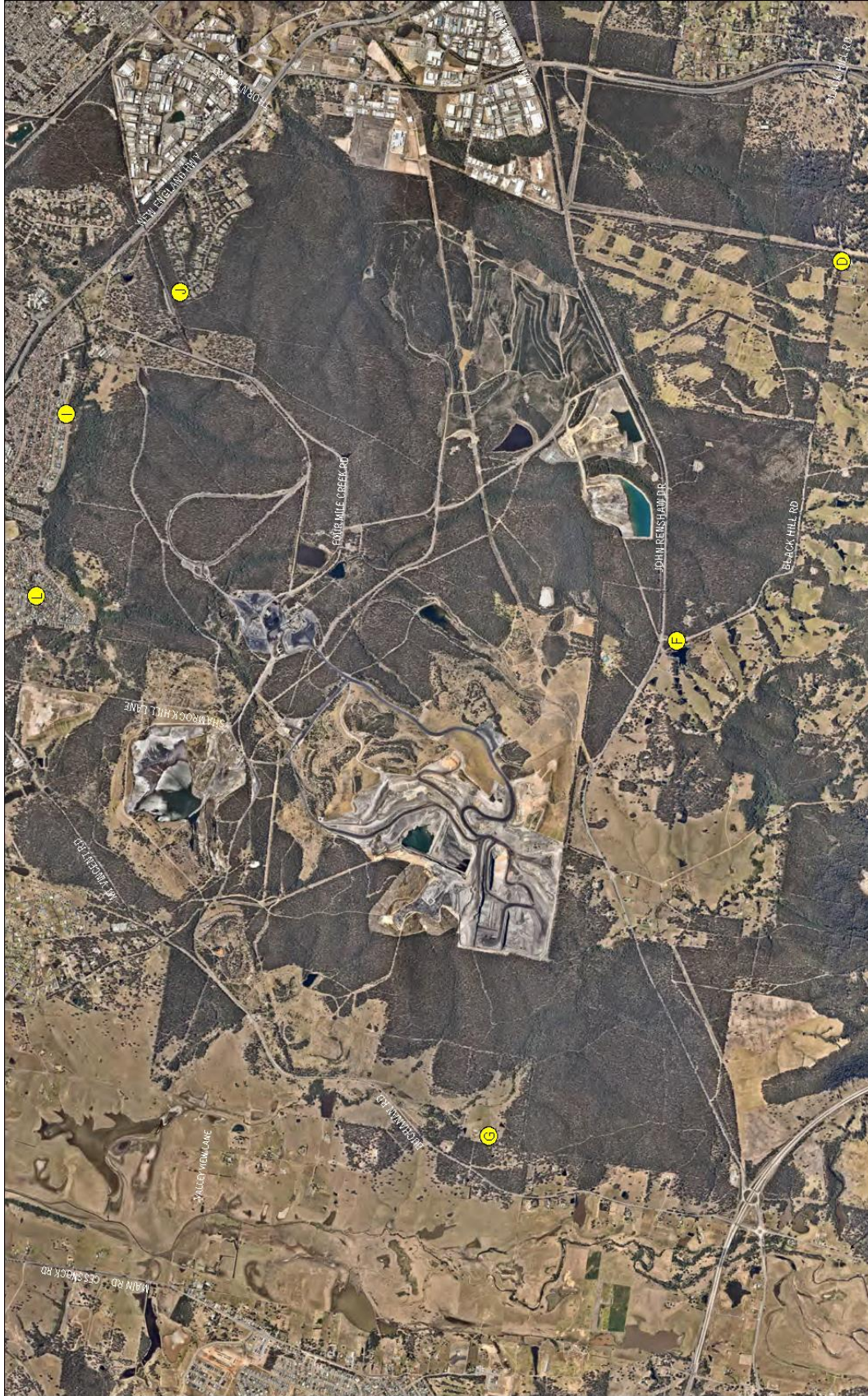
Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed "regenerated noise", "structure-borne noise", or sometimes "ground-borne noise". Regenerated noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of regenerated noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

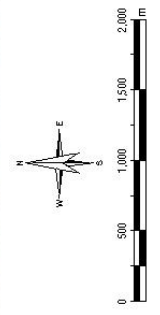
The following figure presents the various paths by which vibration and regenerated noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term "regenerated noise" is also used to describe other types of noise that are emitted from the primary source as a different form of energy. One example would be a fan with a silencer, where the fan is the energy source and primary noise source. The silencer may effectively reduce the fan noise, but some additional noise may be created by the aerodynamic effect of the silencer in the airstream. This "secondary" noise may be referred to as regenerated noise.



Donaldson Coal
Q1 Noise Monitoring
Noise Monitoring Locations
APPENDIX B



LEGEND
● Noise Monitoring Locations

Project No.:	6300.01.063.01.200
Date:	11/01/2018
Drawn by:	NT
Scale:	1:45,000
Sheet Size:	A4
Projection:	GDA 1994 MGA Zone 56


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Appendix C

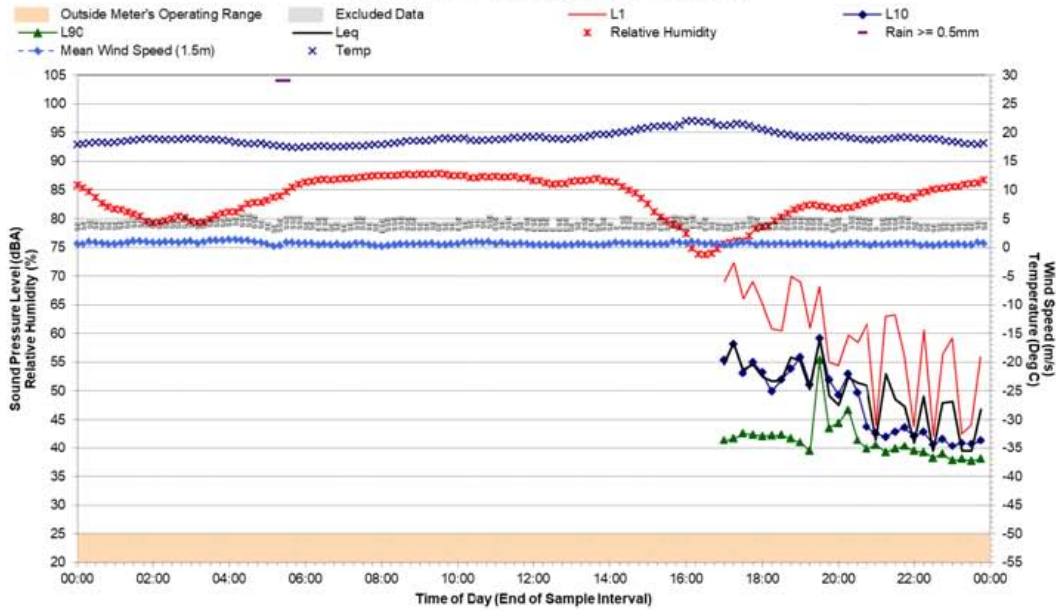
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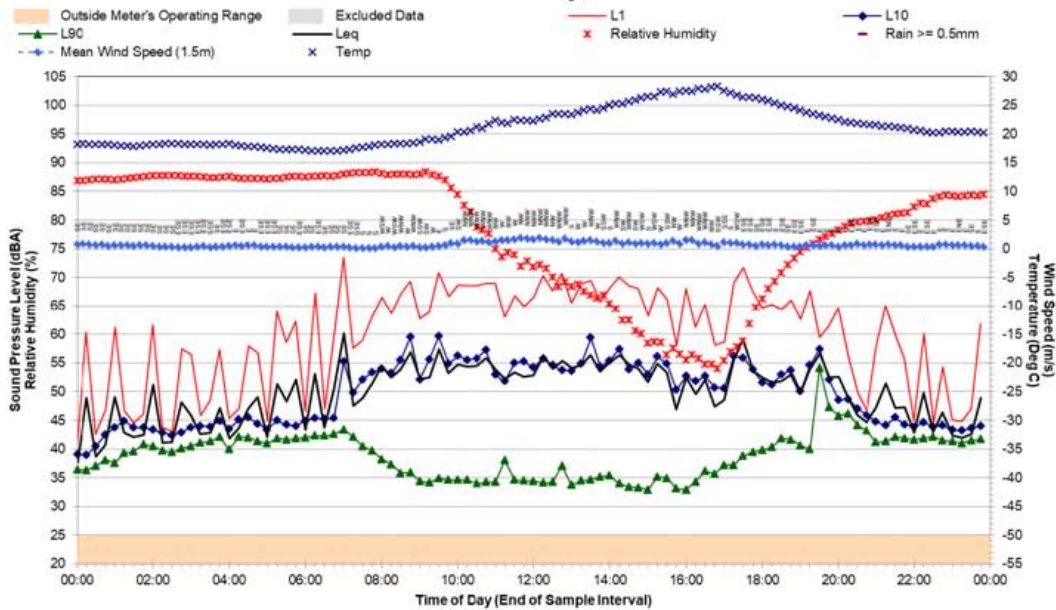
Statistical Ambient Noise Levels

Location D - Friday, 23 March 2018



Statistical Ambient Noise Levels

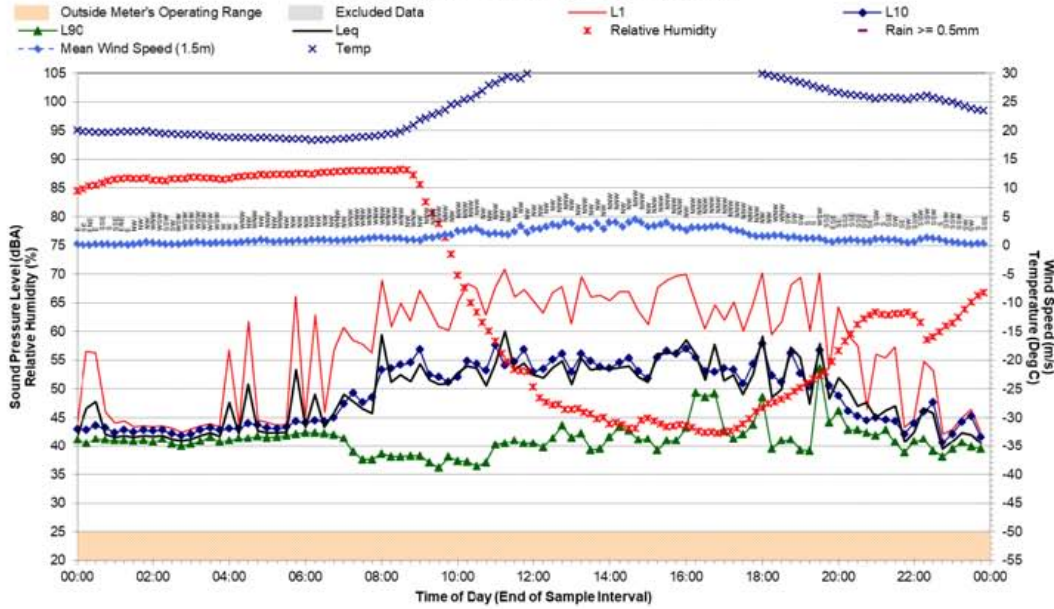
Location D - Saturday, 24 March 2018



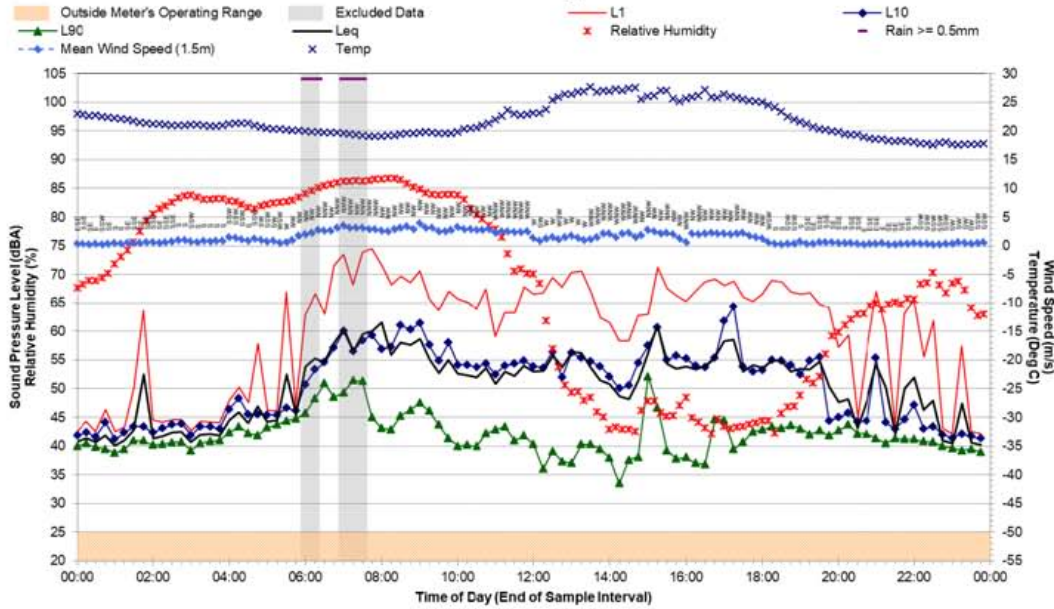
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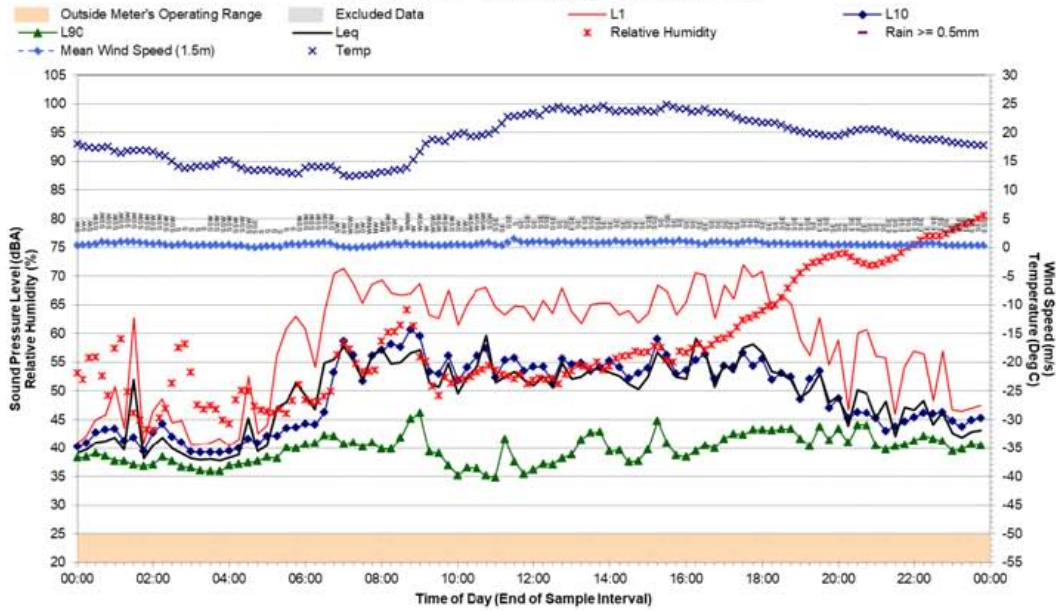
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Location D - Monday, 26 March 2018**



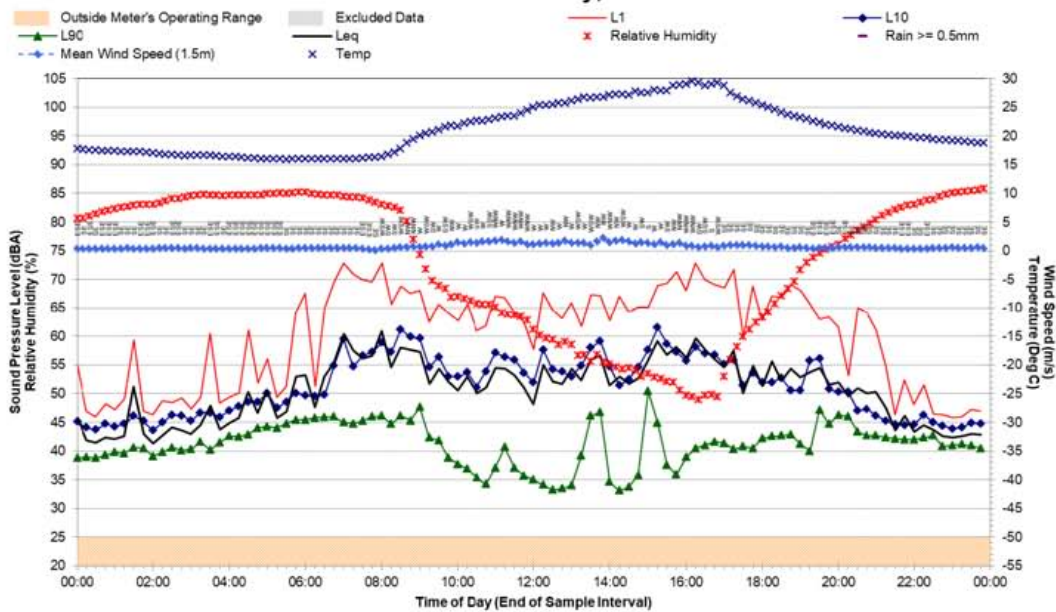
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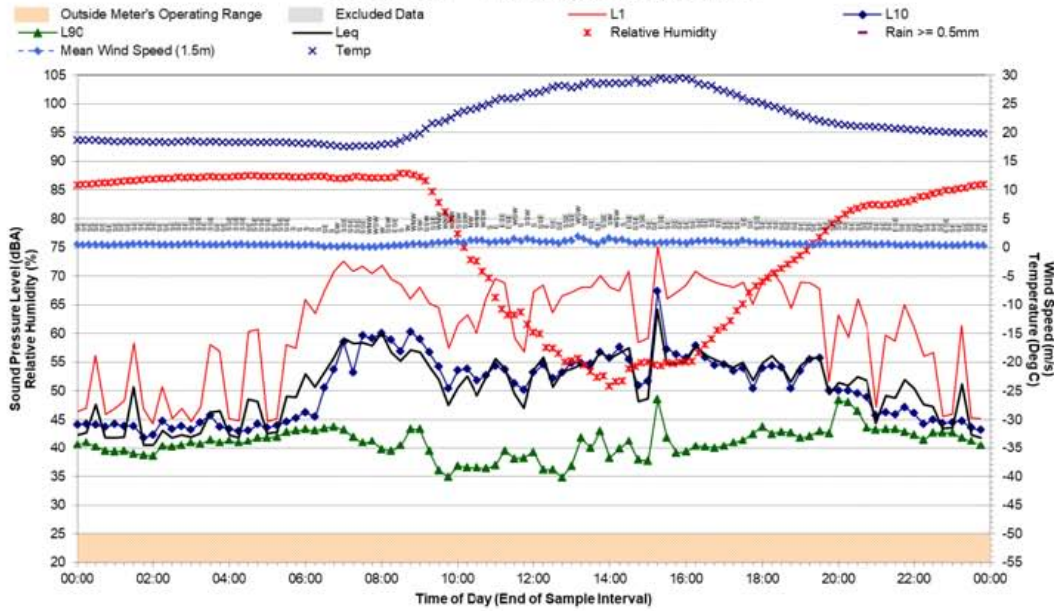
**Statistical Ambient Noise Levels
Location D - Wednesday, 28 March 2018**



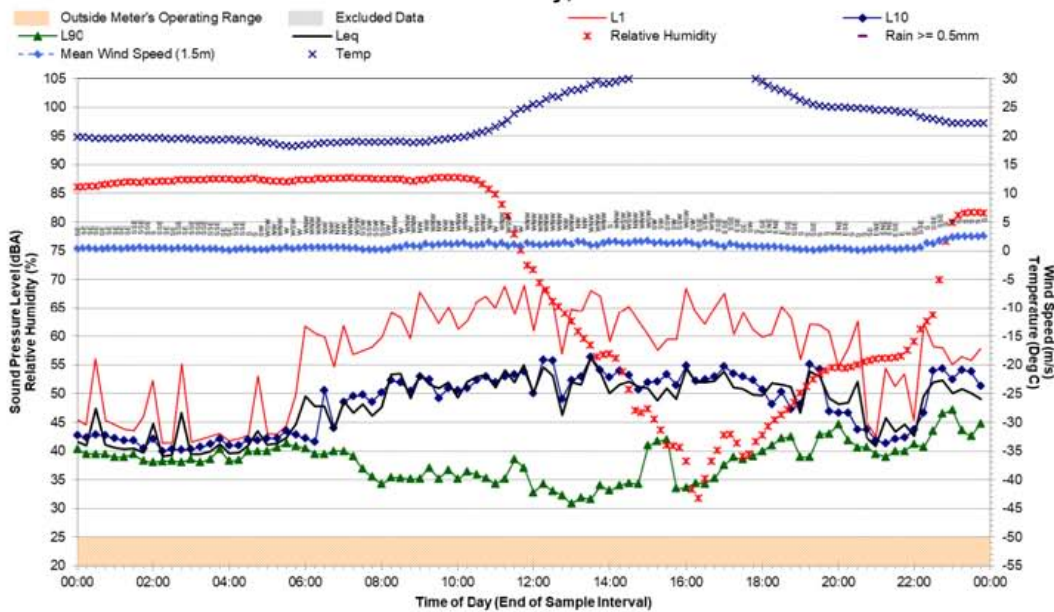
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**Statistical Ambient Noise Levels
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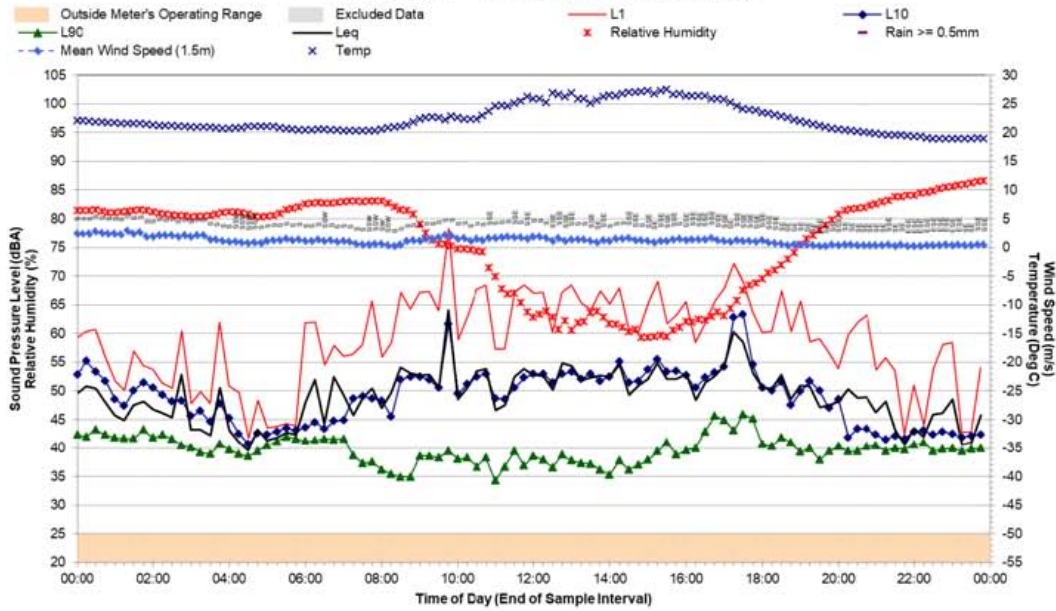
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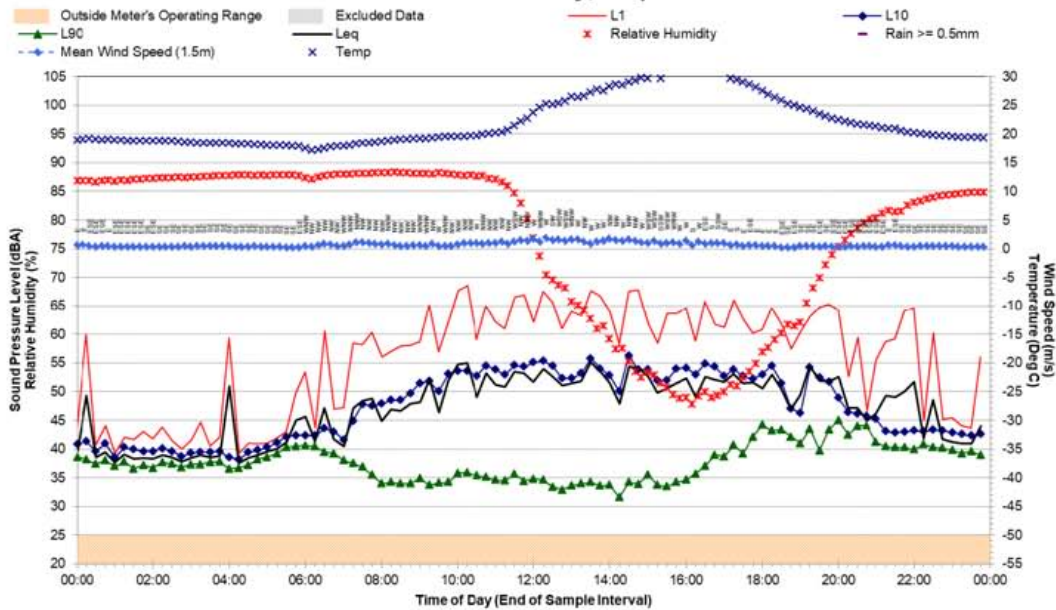
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Statistical Ambient Noise Levels

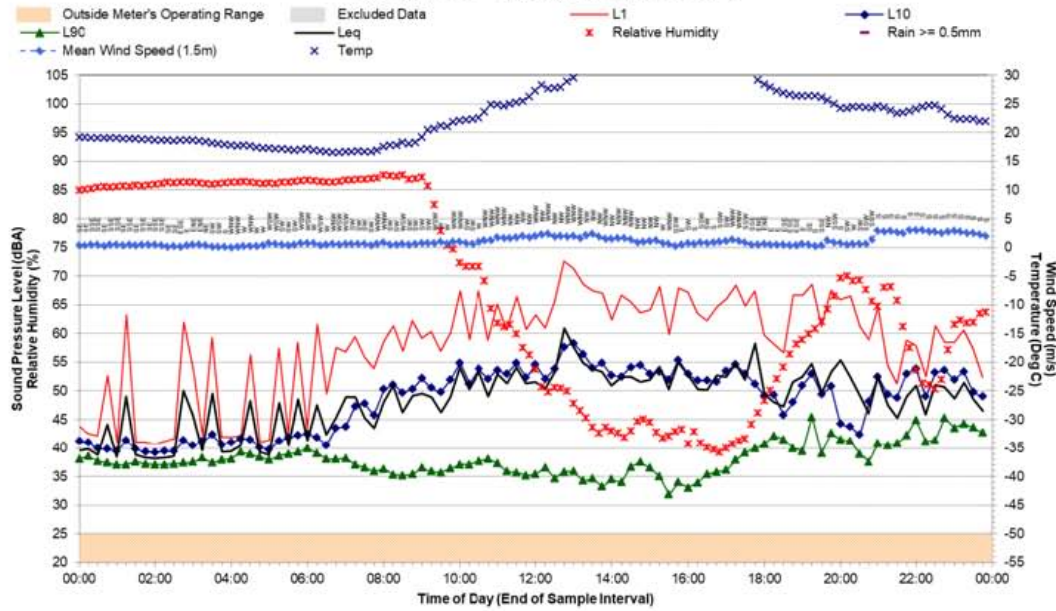
Location D - Sunday, 1 April 2018



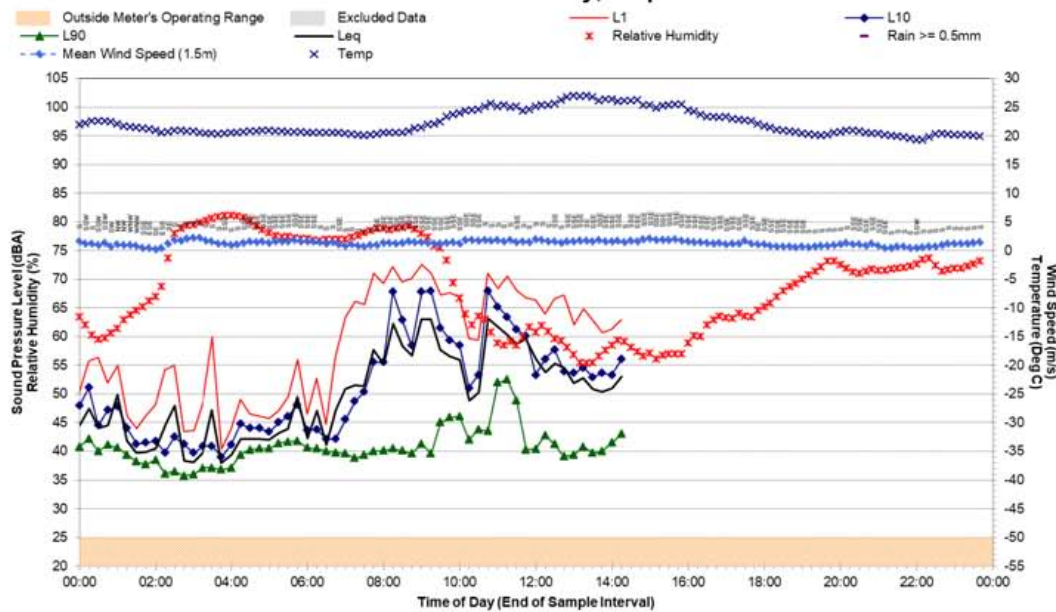
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Statistical Ambient Noise Levels Location D - Tuesday, 3 April 2018



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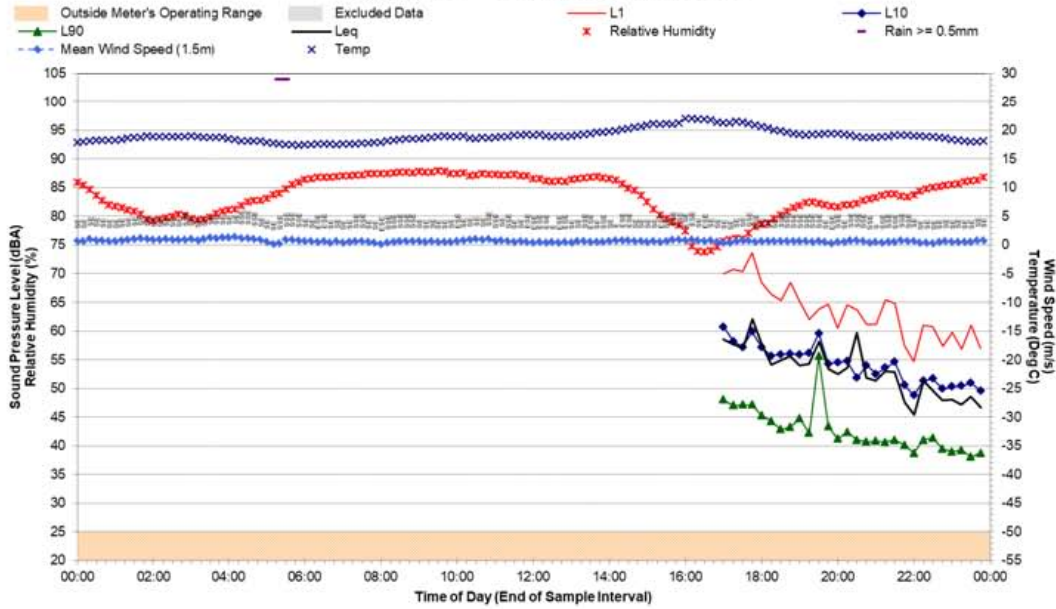
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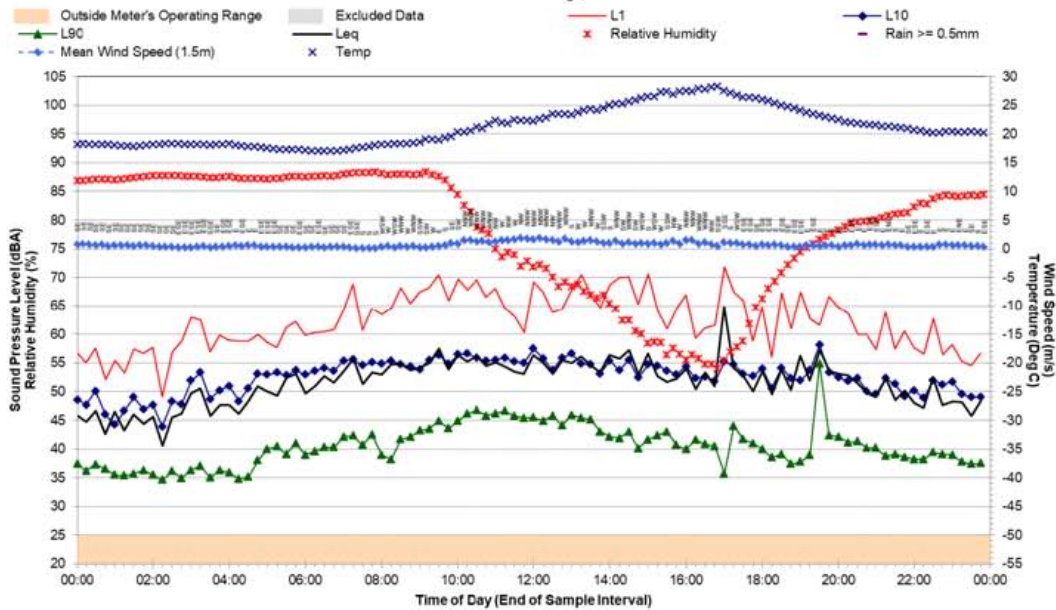
Statistical Ambient Noise Levels

Location F - Friday, 23 March 2018



Statistical Ambient Noise Levels

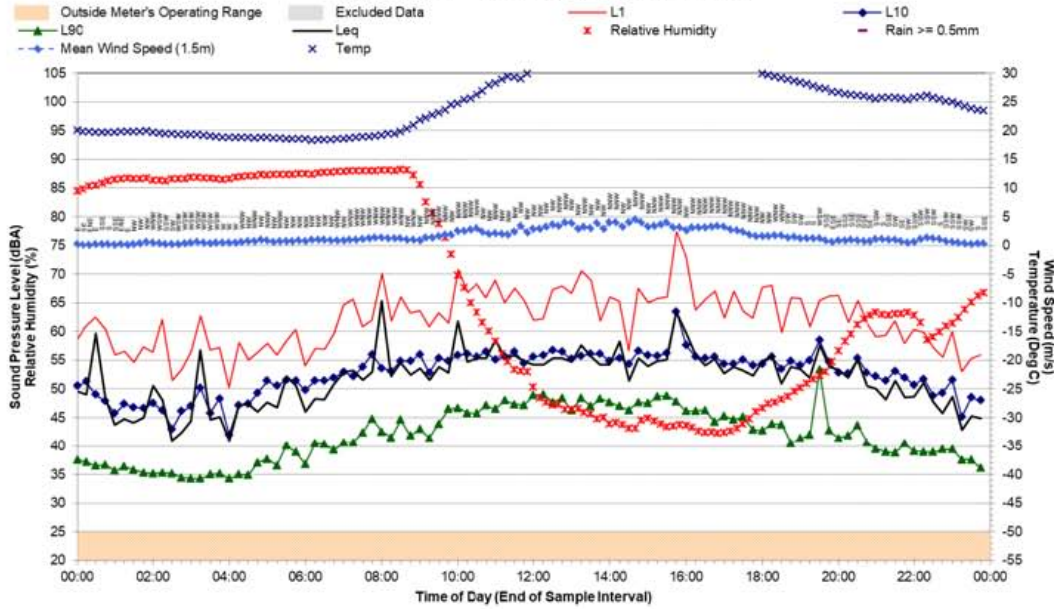
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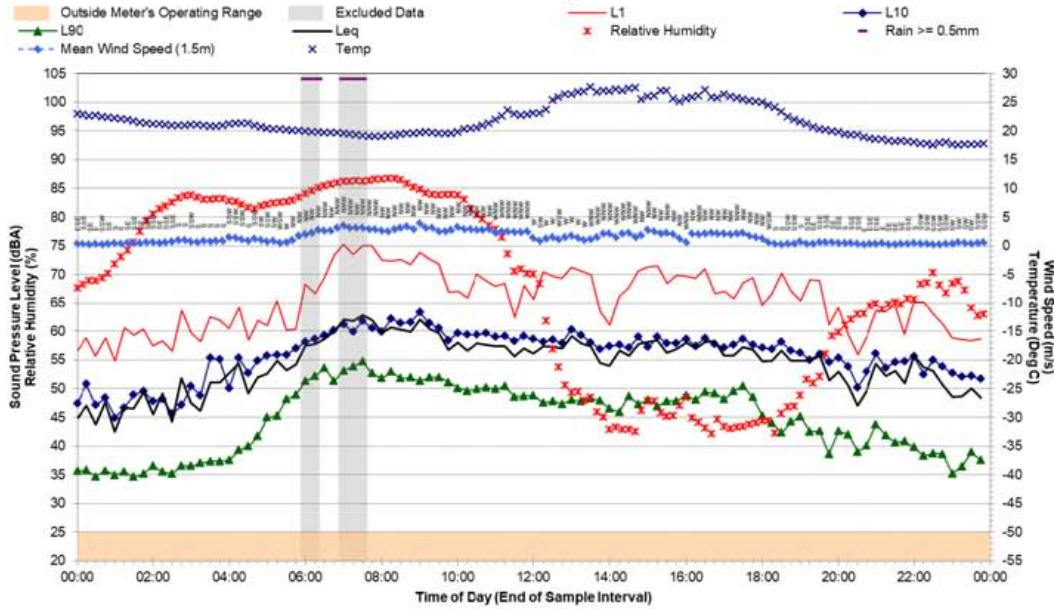
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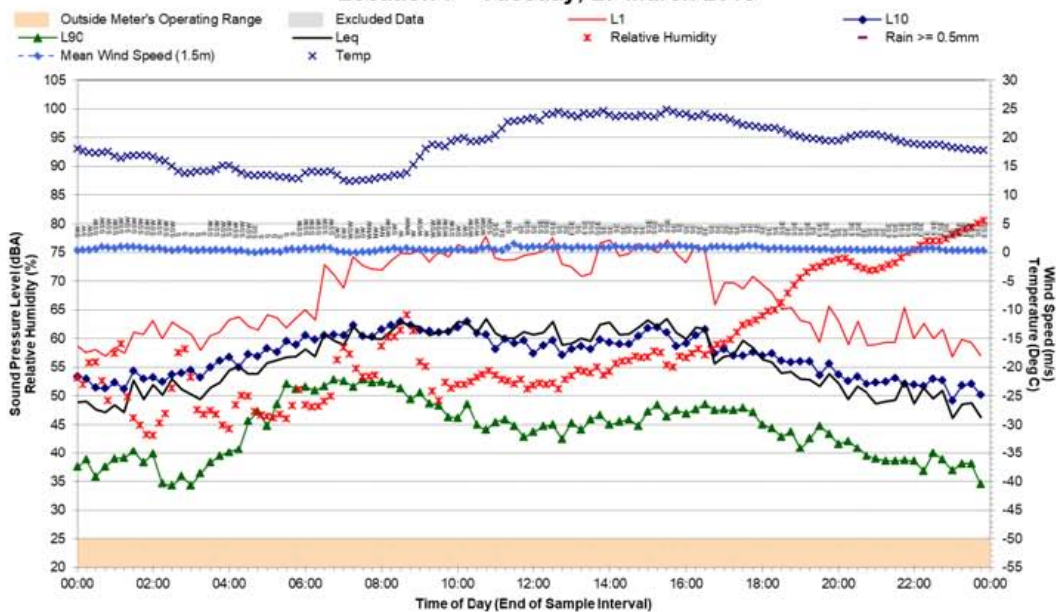
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Location F - Monday, 26 March 2018**



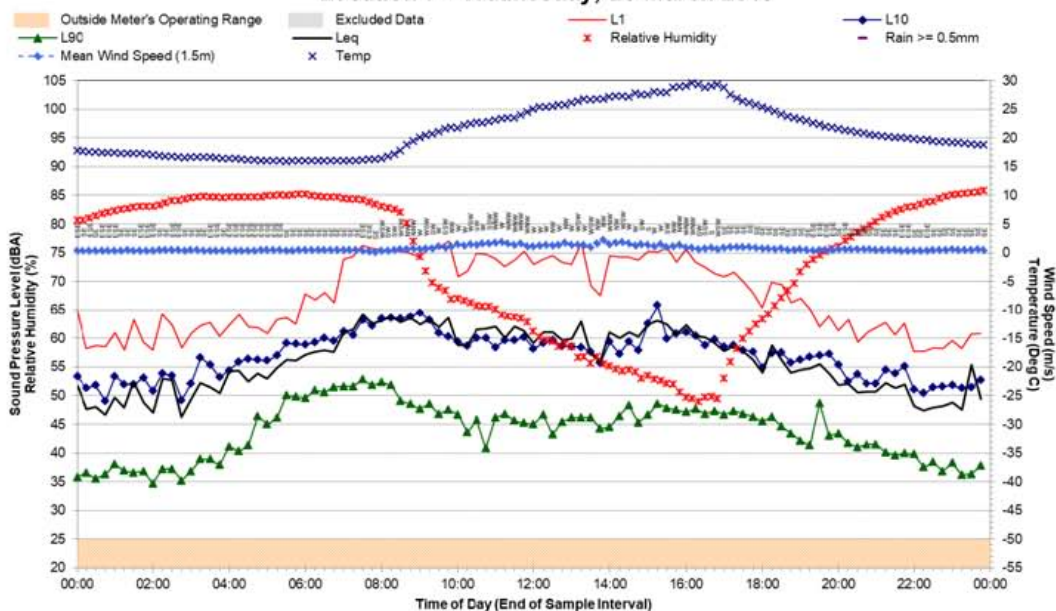
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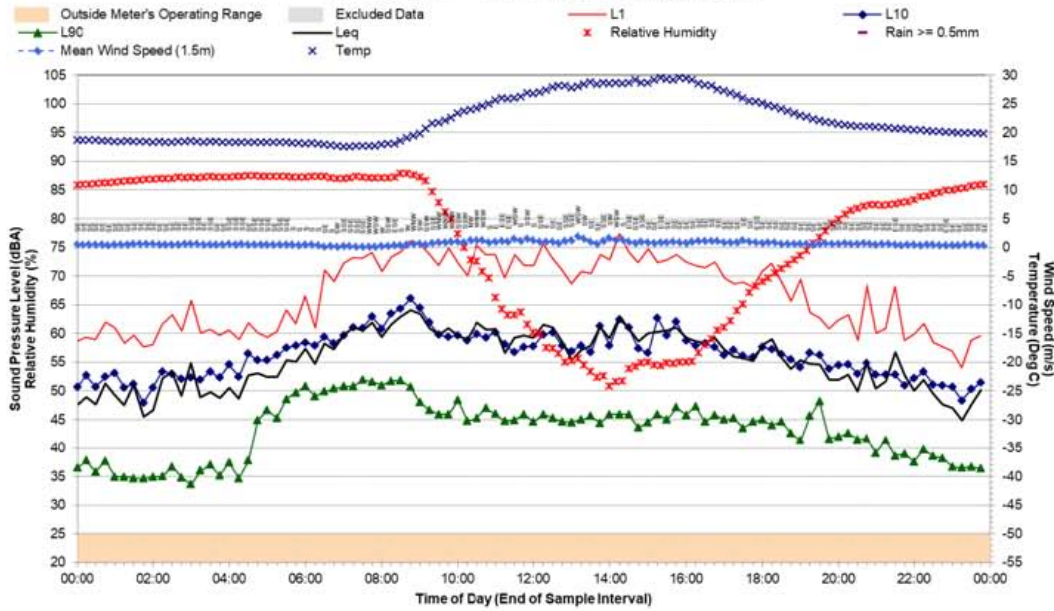
Statistical Ambient Noise Levels Location F - Wednesday, 28 March 2018



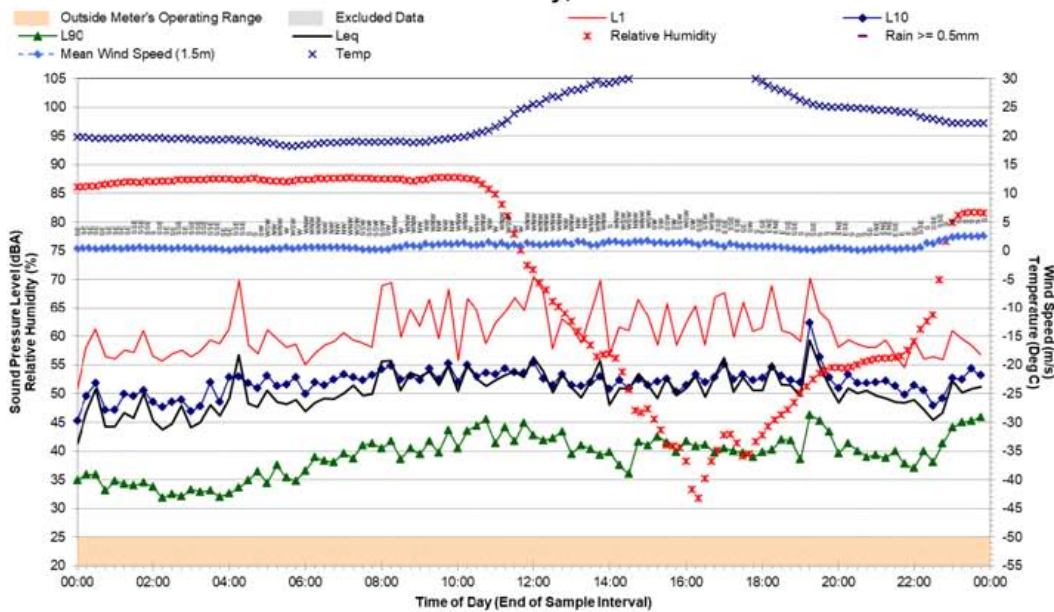
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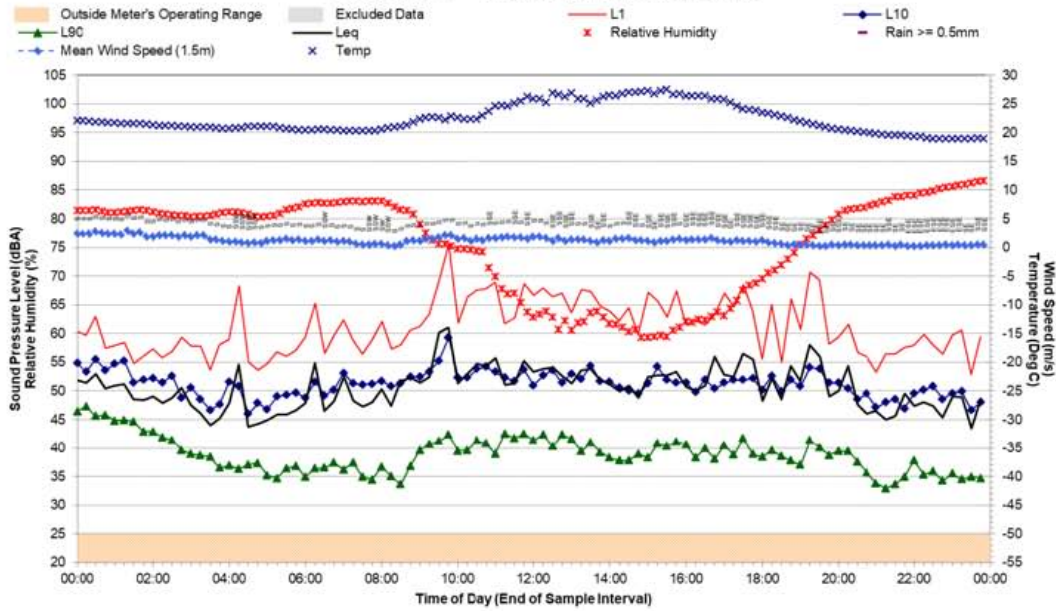
Statistical Ambient Noise Levels Location F - Friday, 30 March 2018



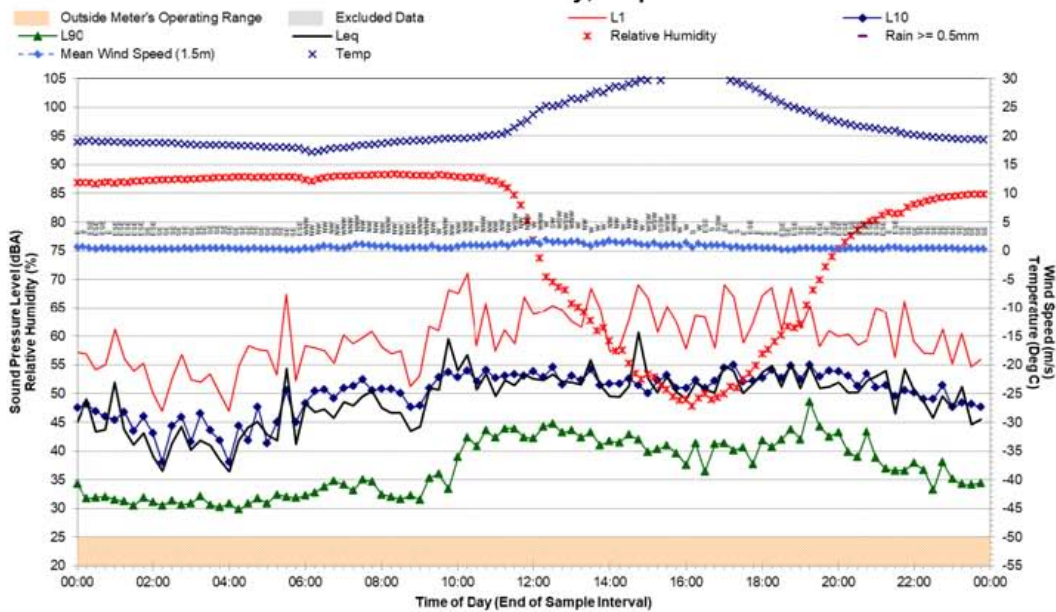
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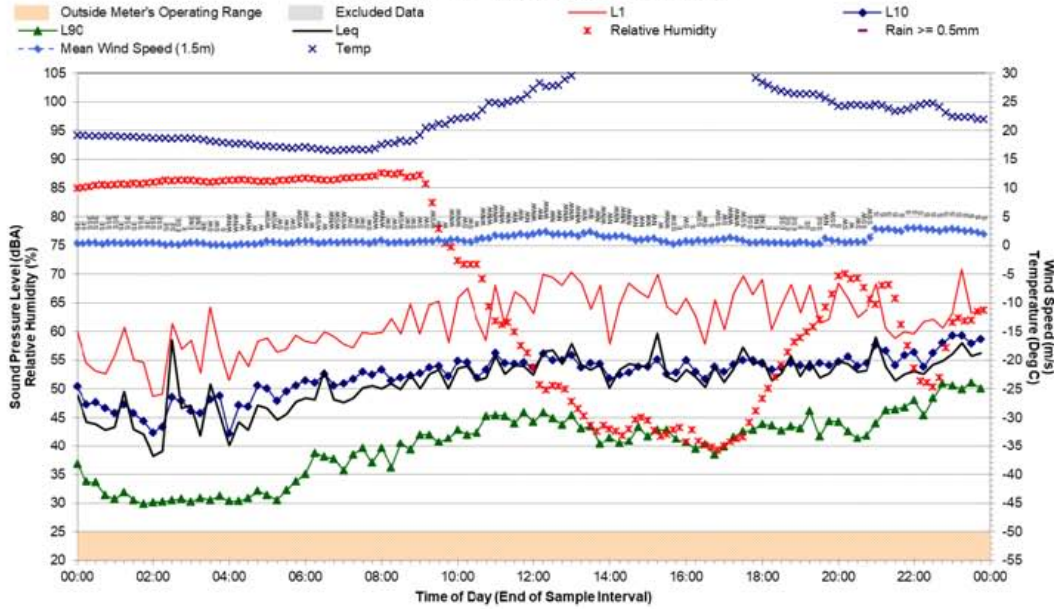
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Location F - Sunday, 1 April 2018**



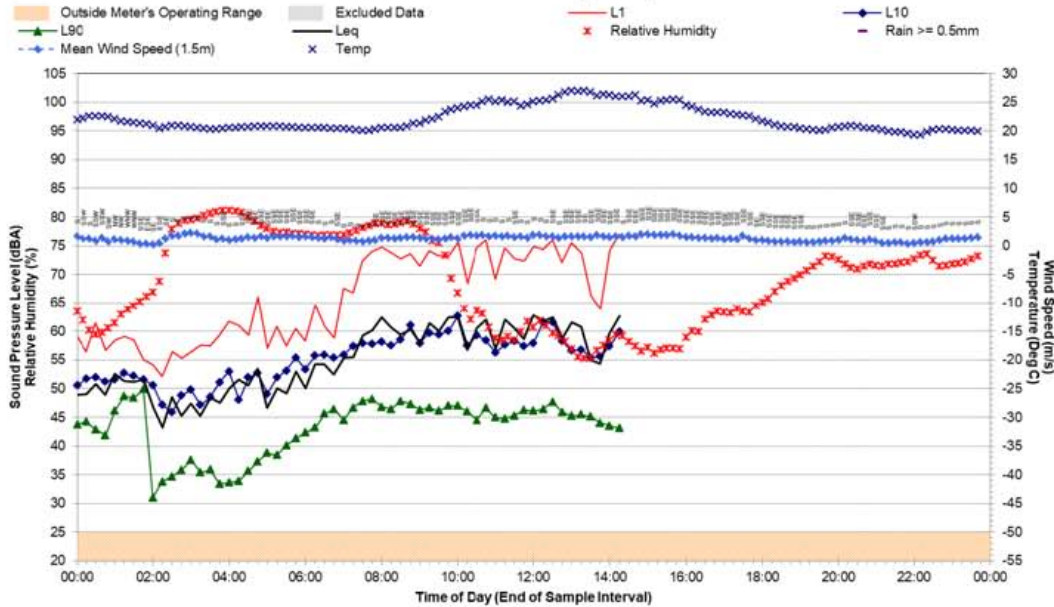
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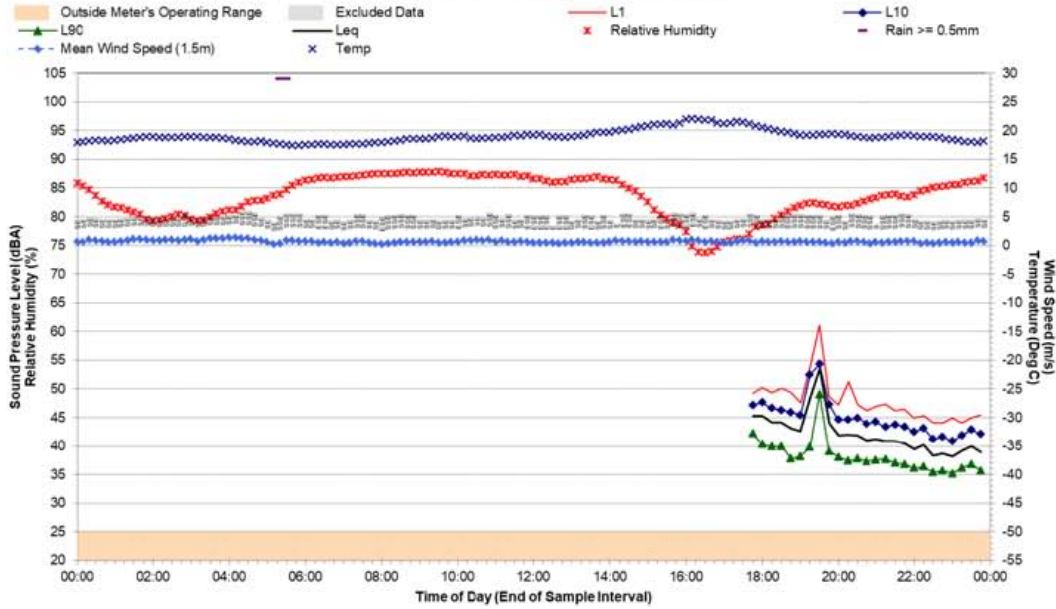
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Location F - Tuesday, 3 April 2018**



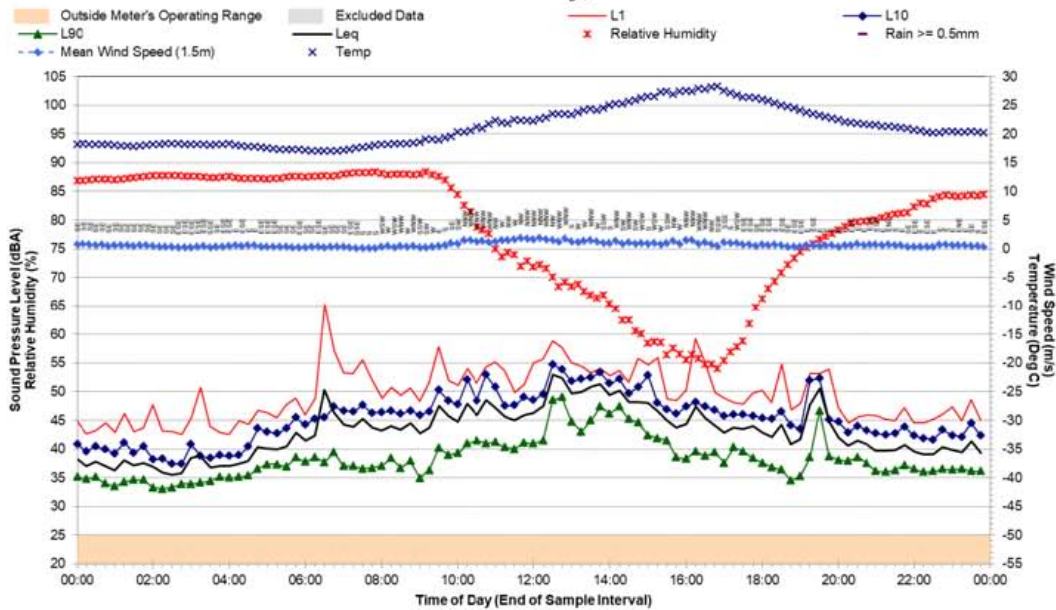
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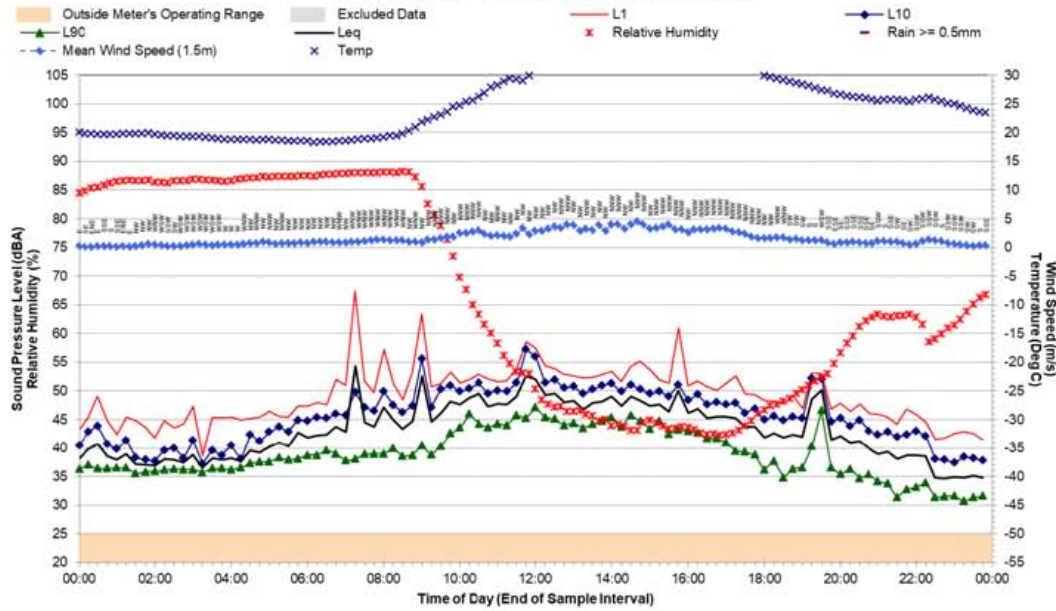
Statistical Ambient Noise Levels Location G - Saturday, 24 March 2018



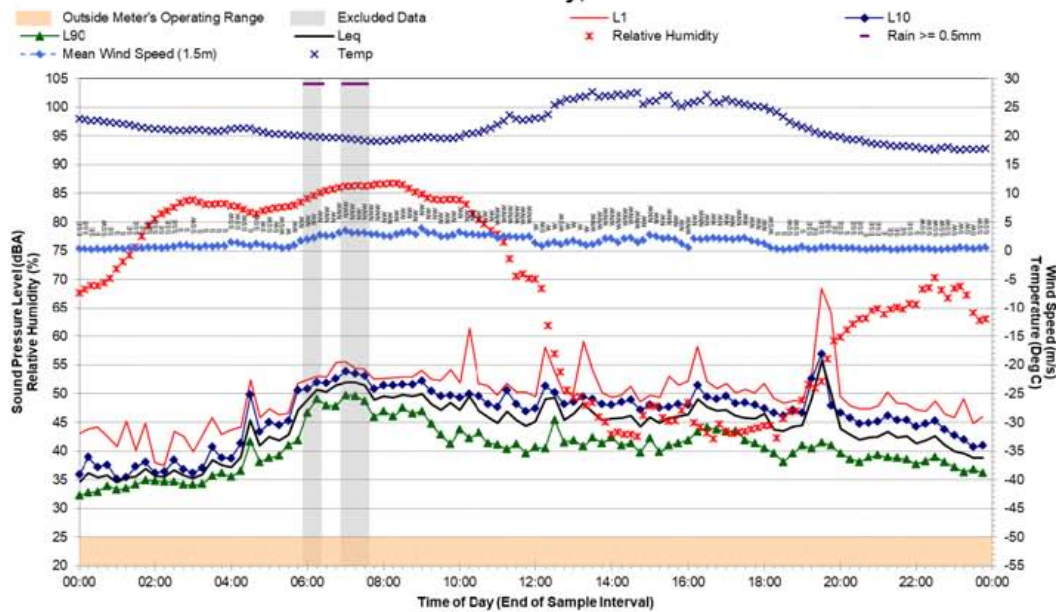
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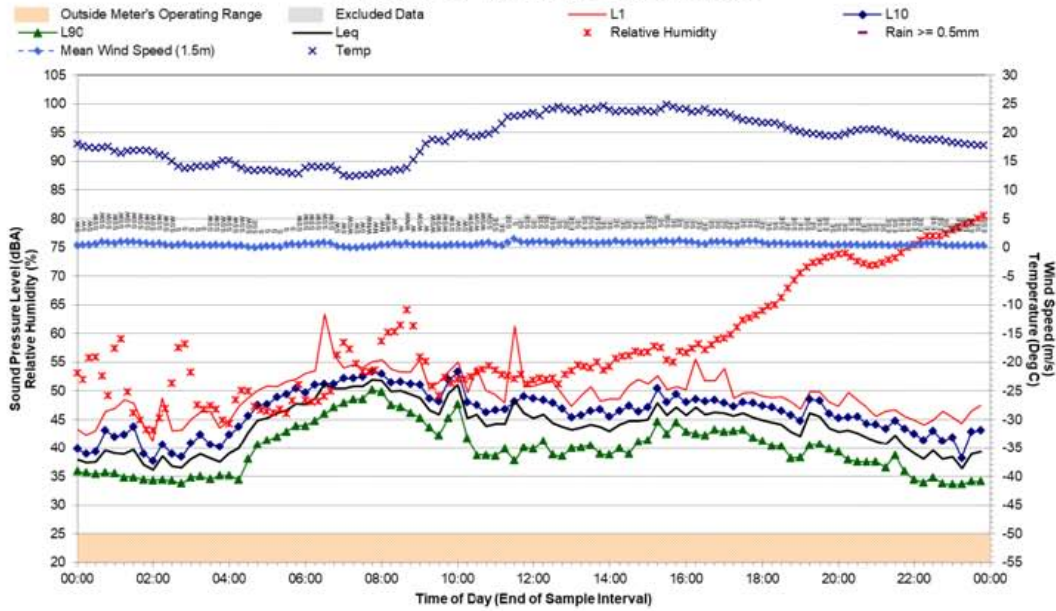
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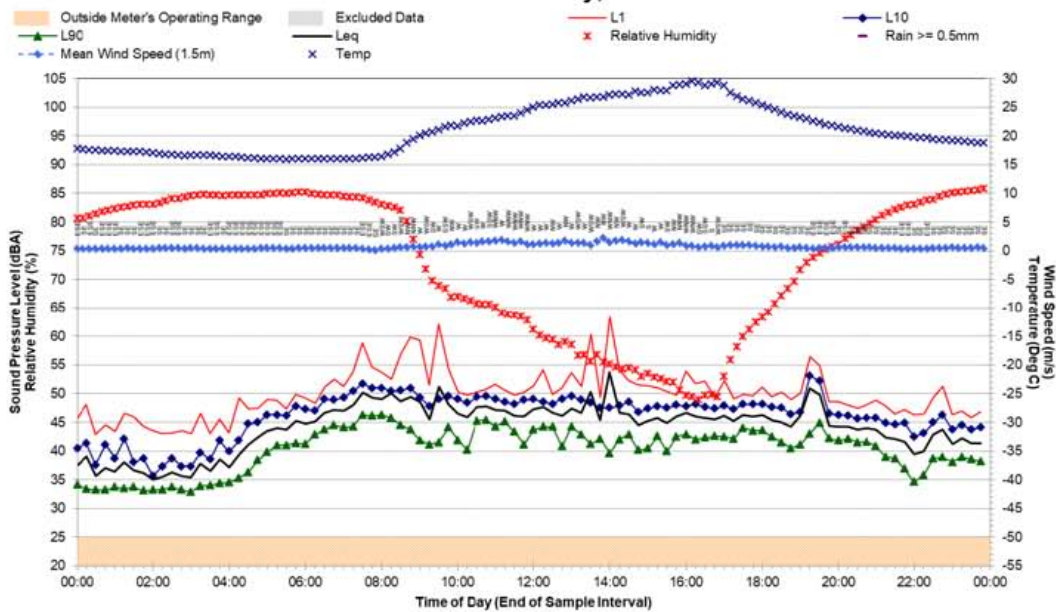
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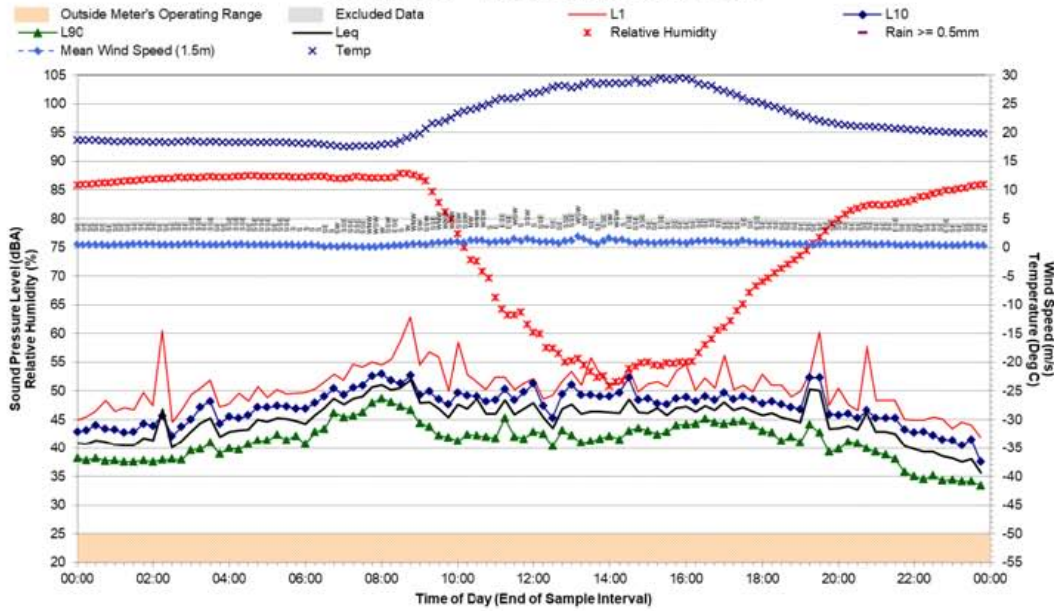
Location G - Wednesday, 28 March 2018



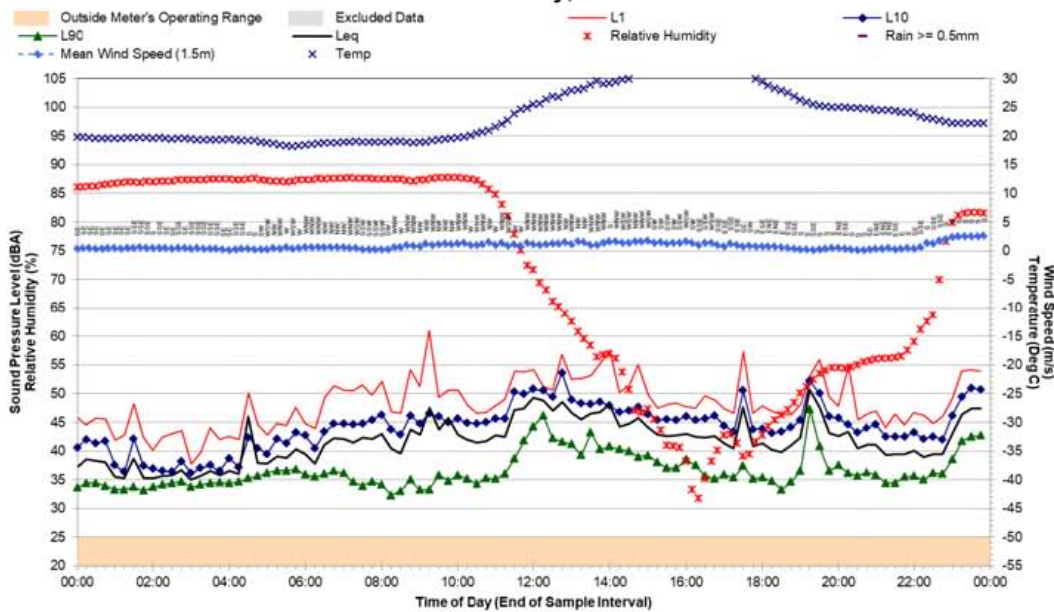
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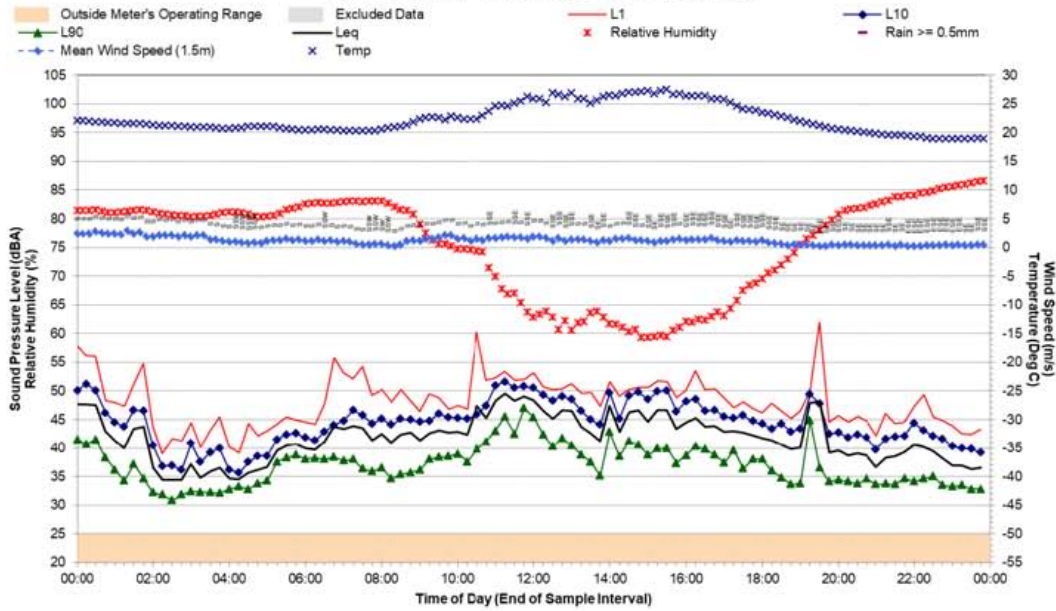
**Statistical Ambient Noise Levels
Location G - Friday, 30 March 2018**



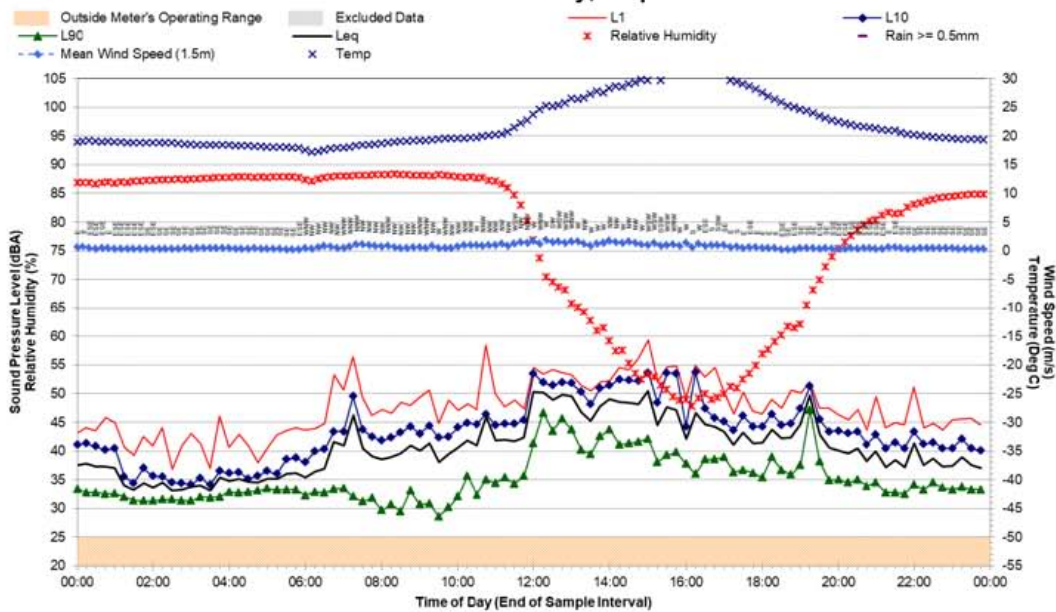
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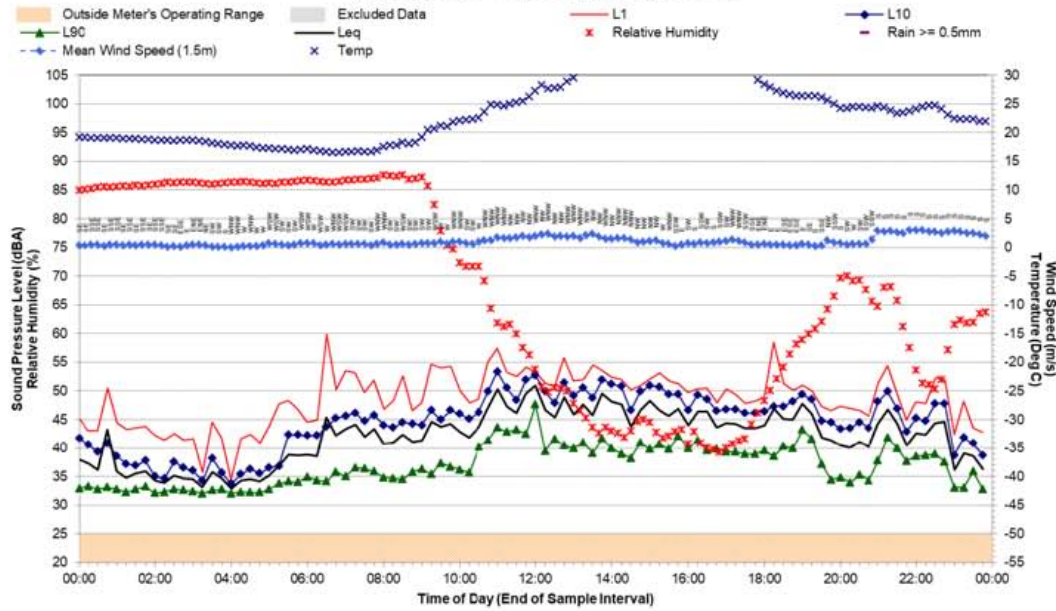
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Location G - Sunday, 1 April 2018**



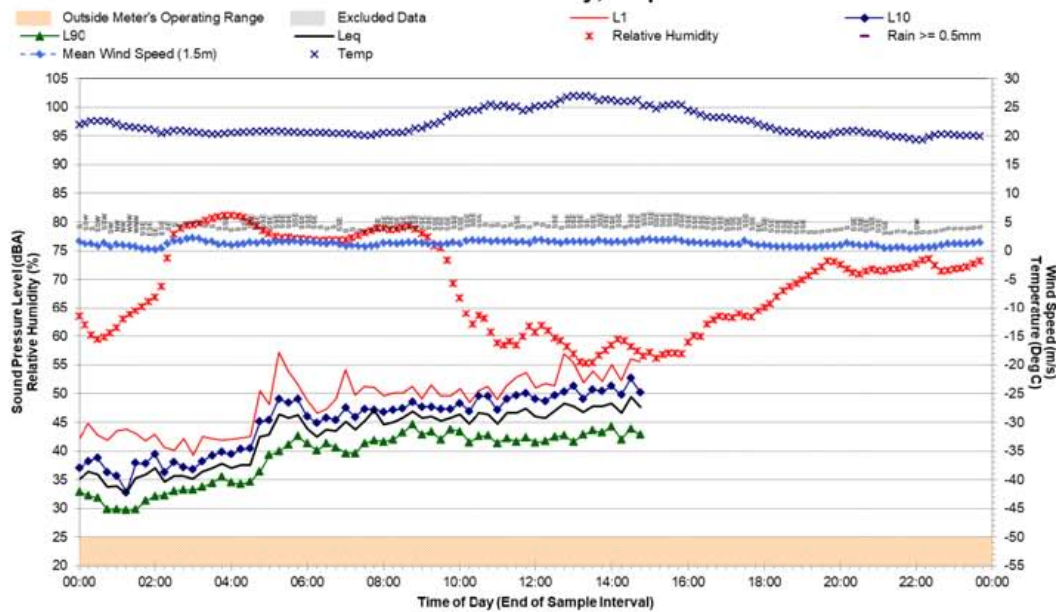
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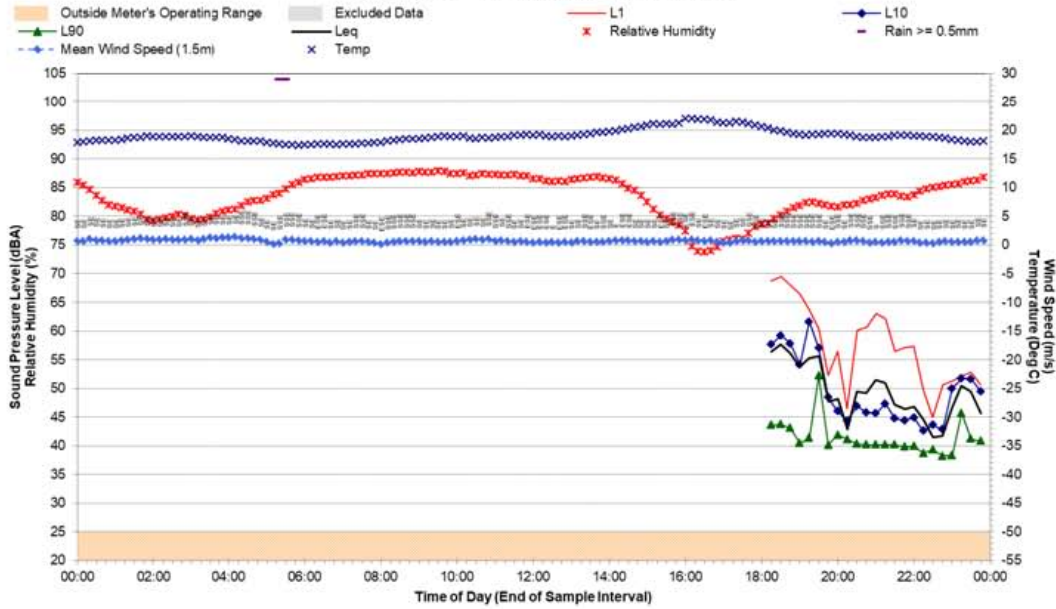
Statistical Ambient Noise Levels Location G - Tuesday, 3 April 2018



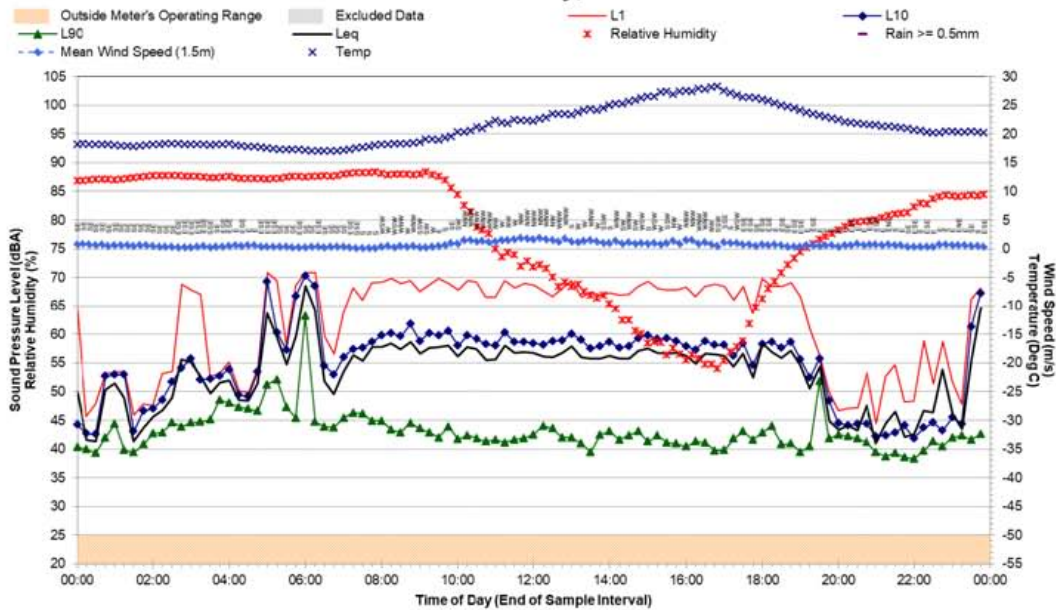
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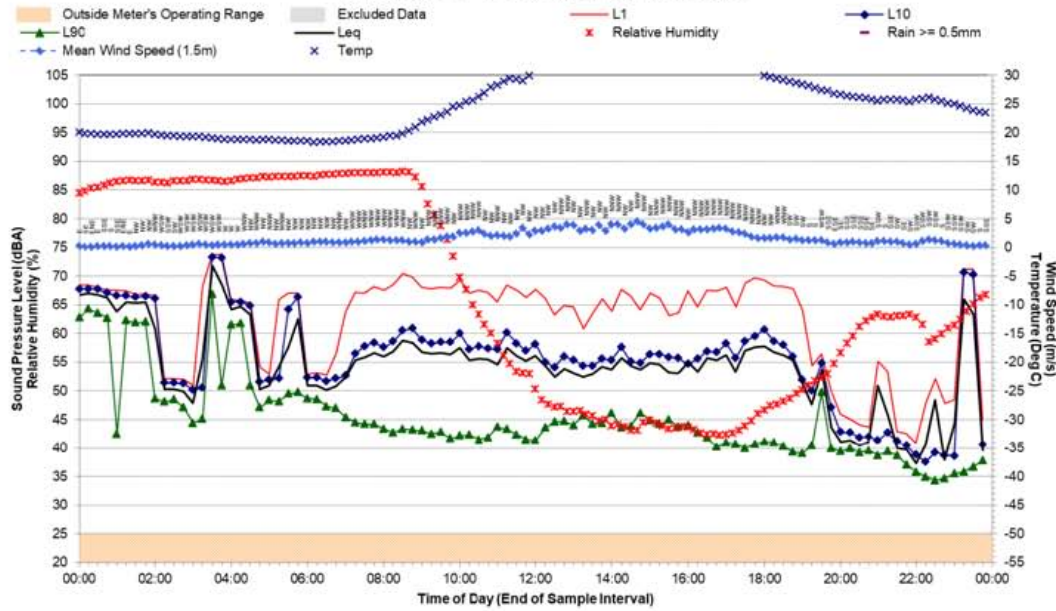
Statistical Ambient Noise Levels Location I - Saturday, 24 March 2018



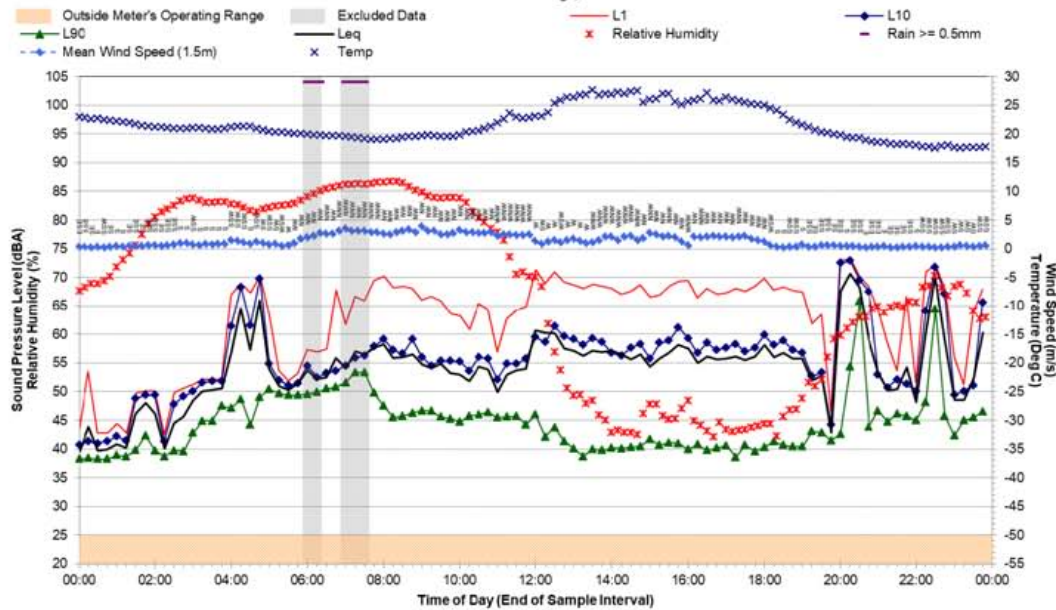
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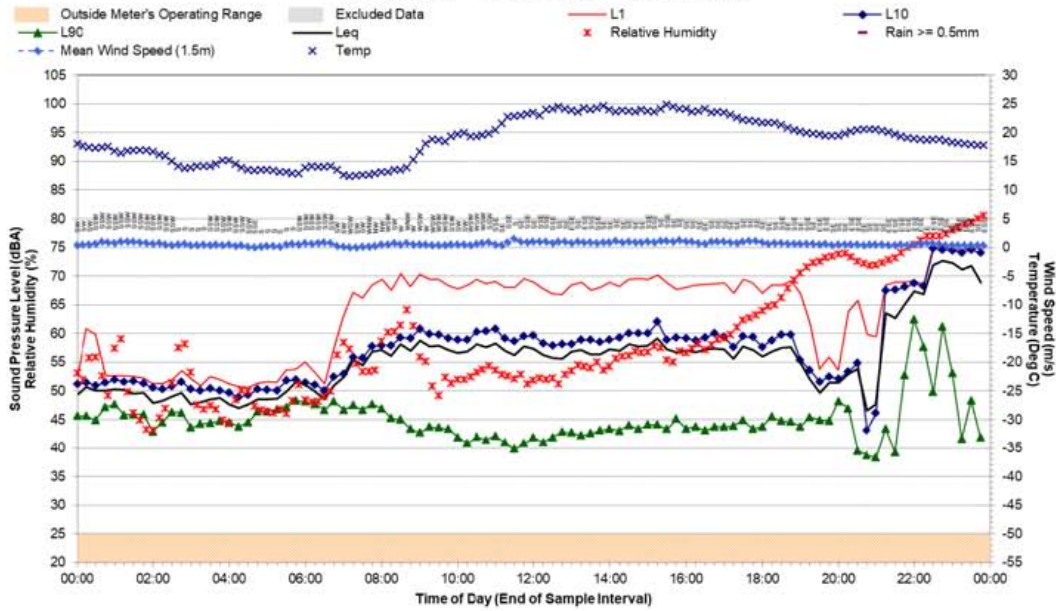
Statistical Ambient Noise Levels Location I - Monday, 26 March 2018



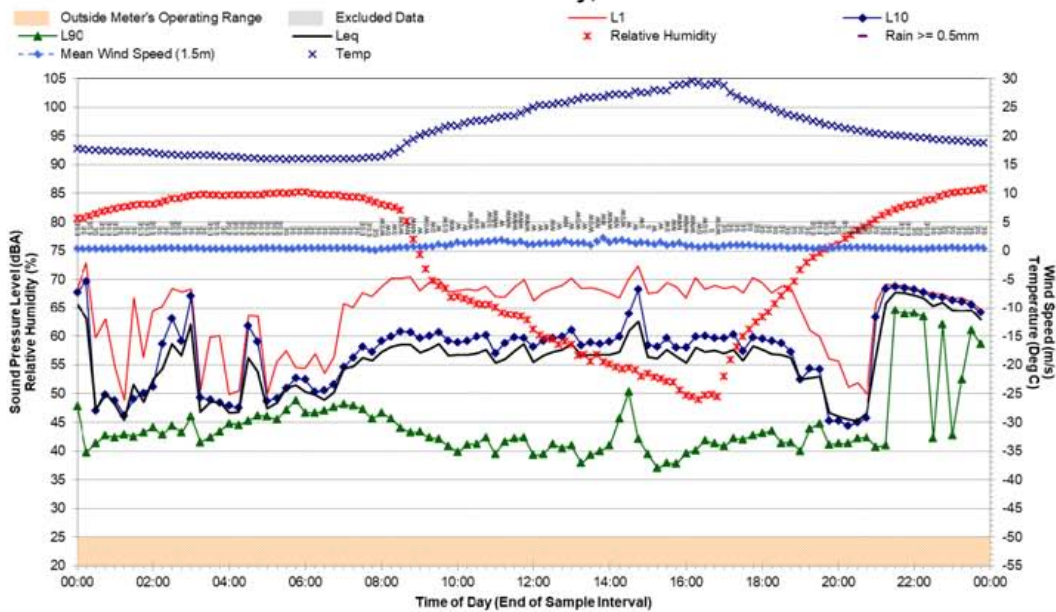
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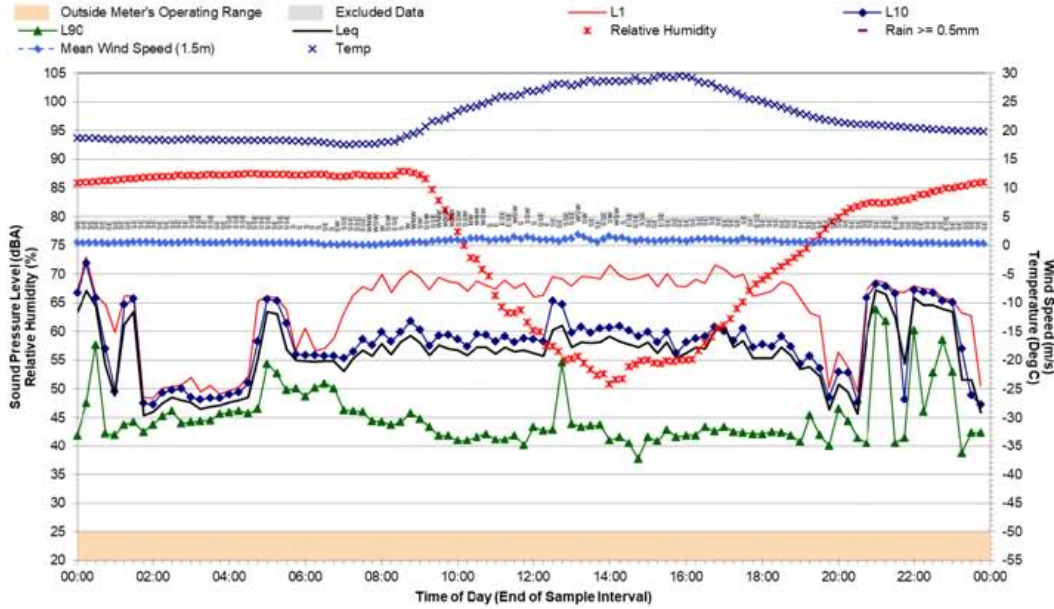
**Statistical Ambient Noise Levels
Location I - Wednesday, 28 March 2018**



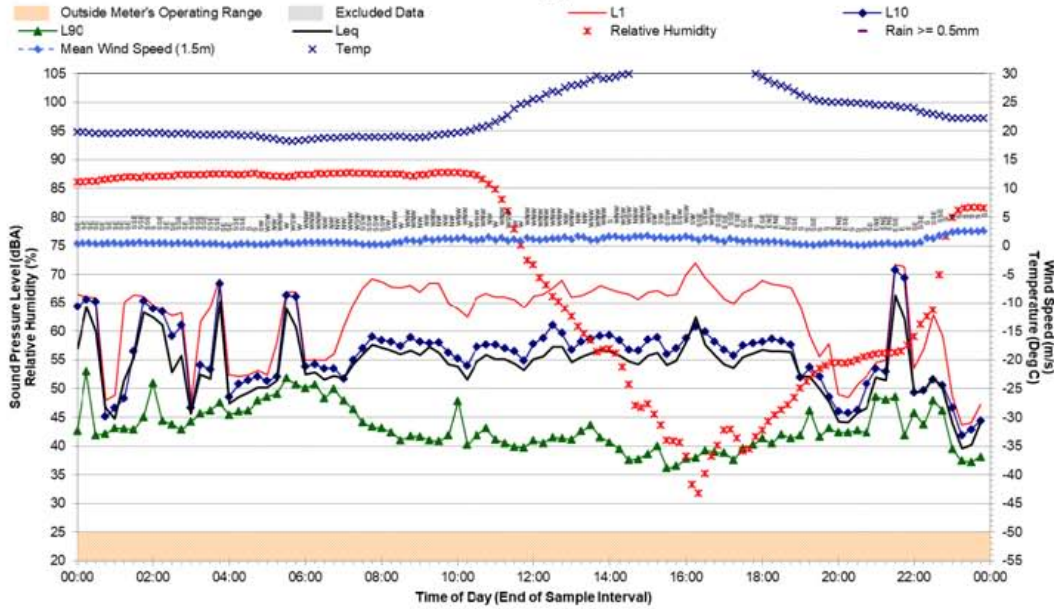
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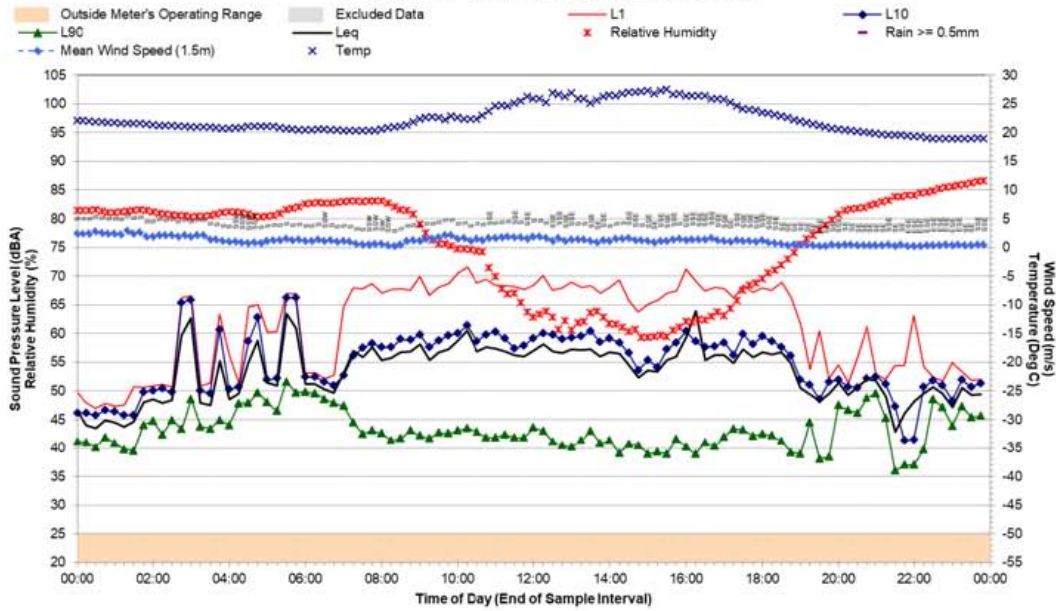
**Statistical Ambient Noise Levels
Location I - Friday, 30 March 2018**



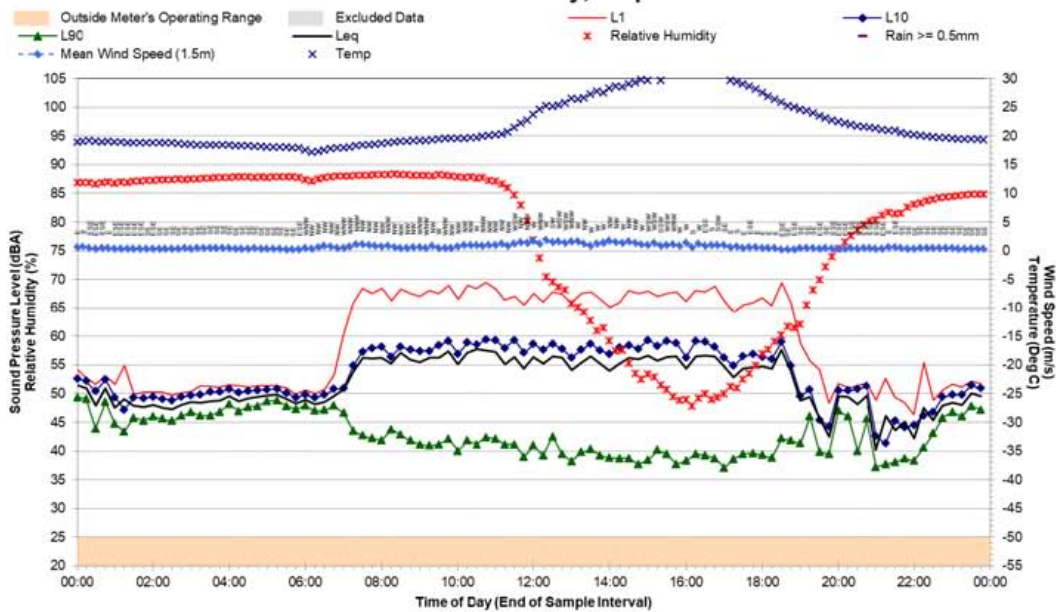
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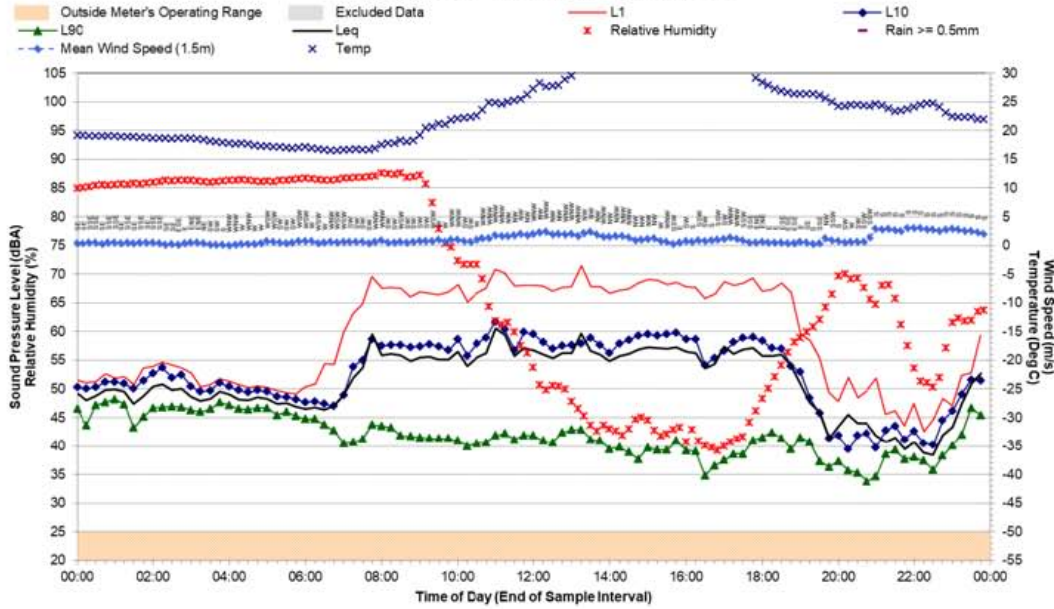
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Location I - Sunday, 1 April 2018**



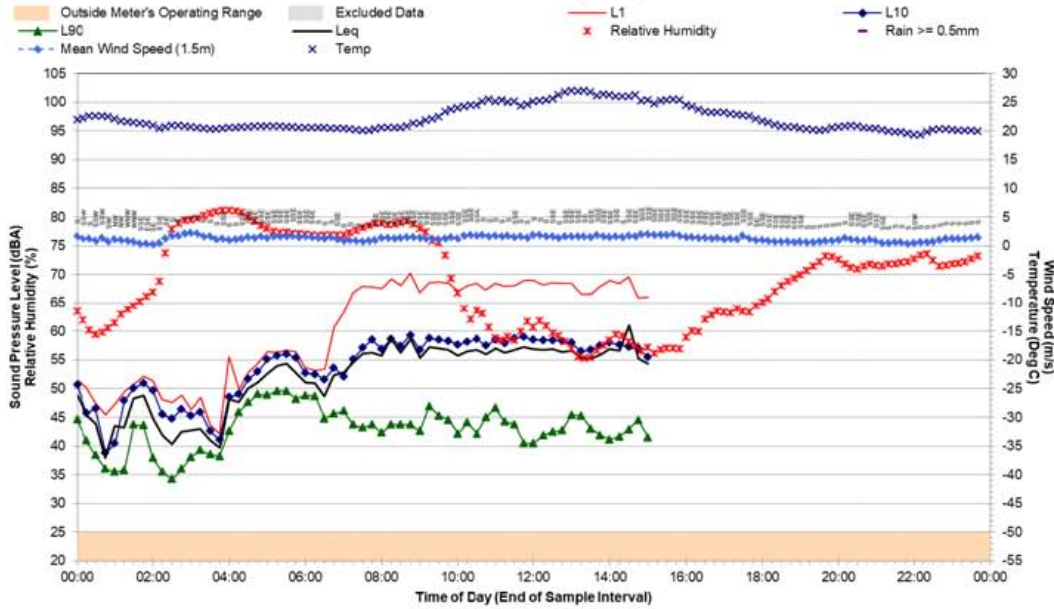
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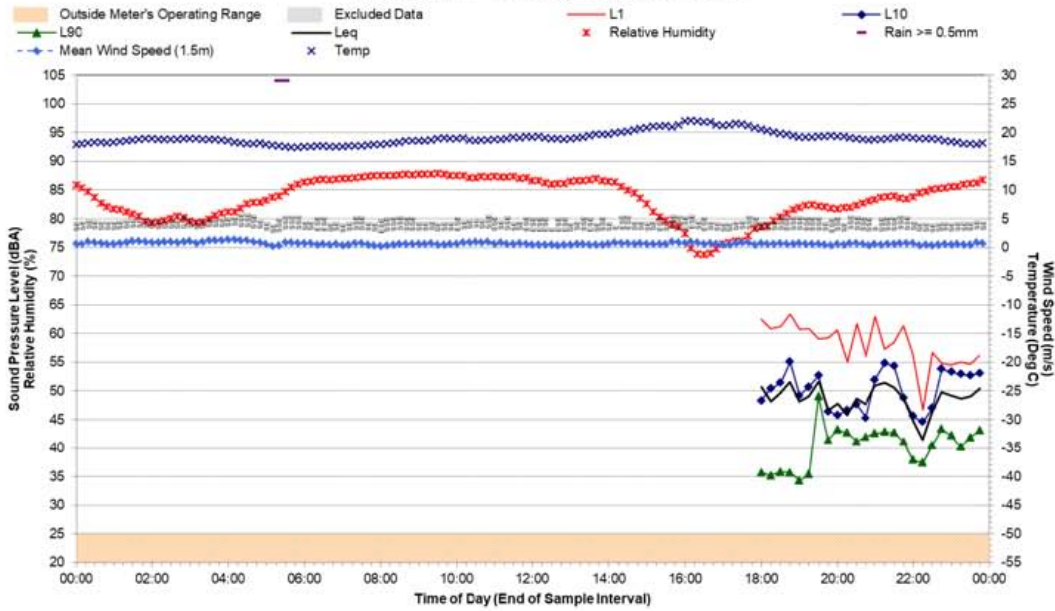
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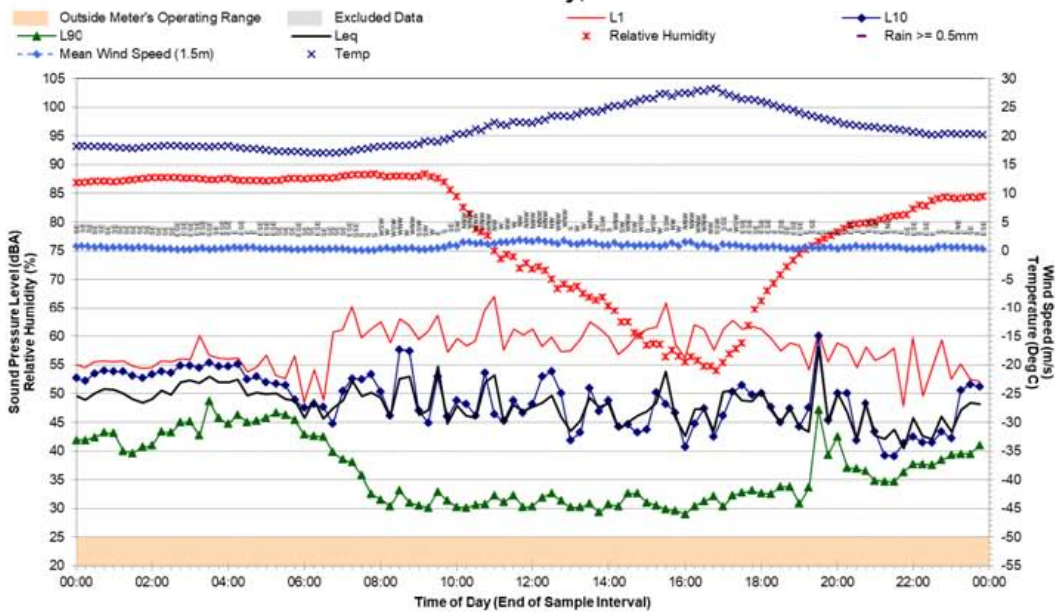
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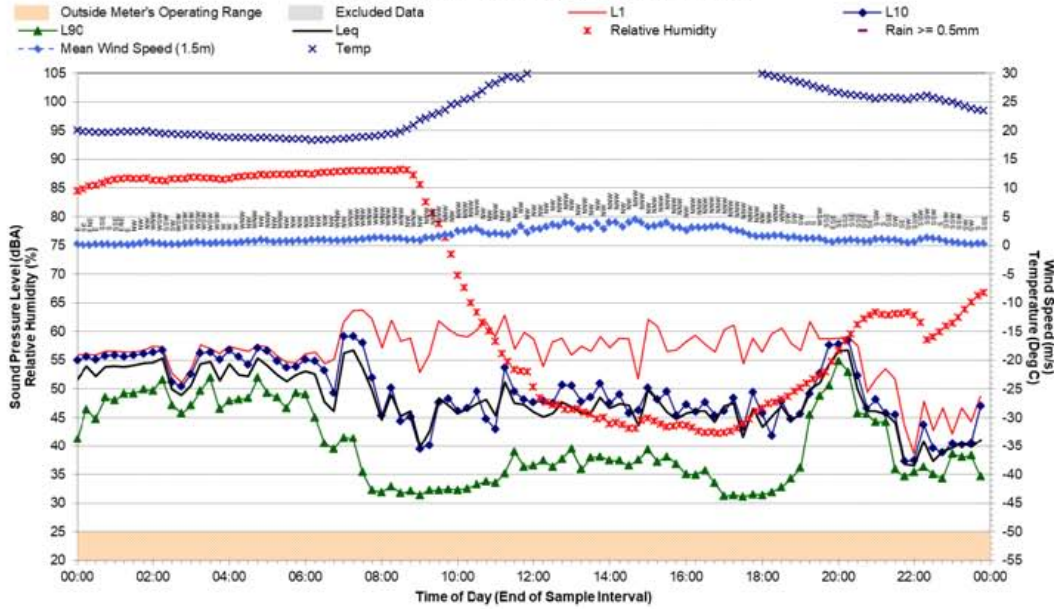
Statistical Ambient Noise Levels Location L - Saturday, 24 March 2018



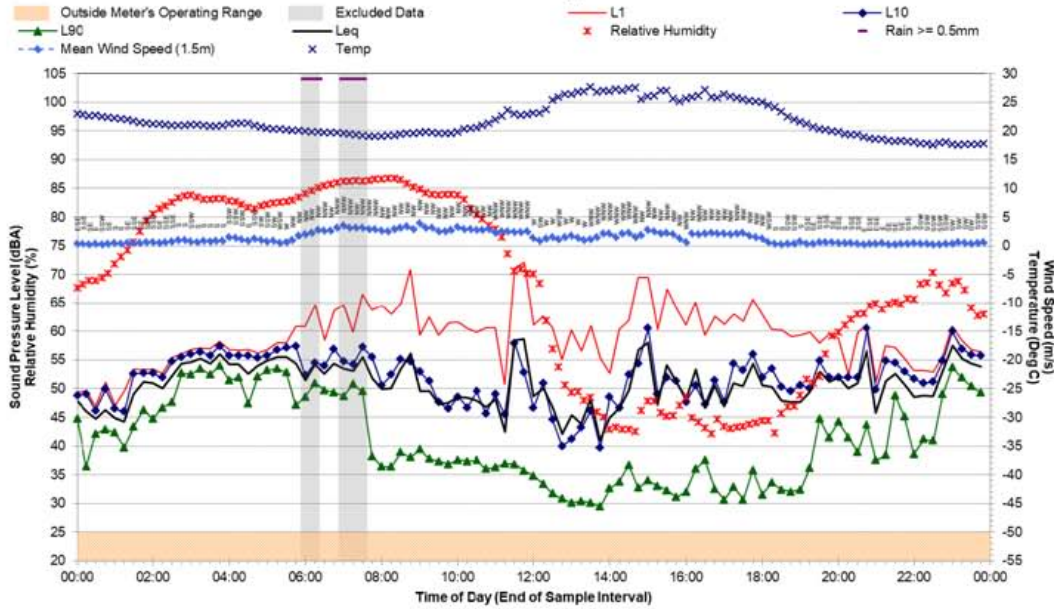
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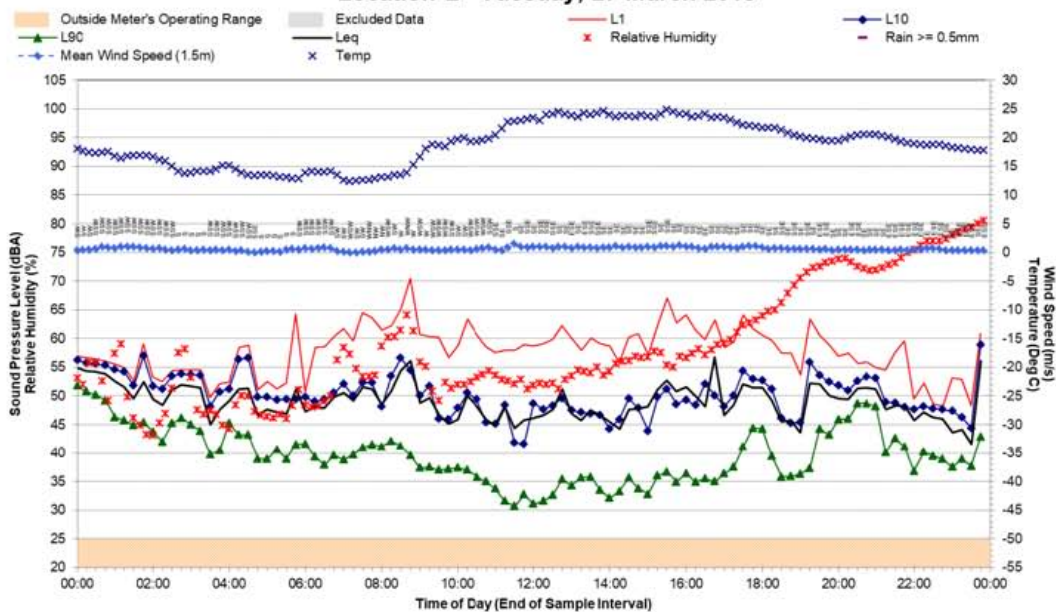
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Location L - Monday, 26 March 2018**



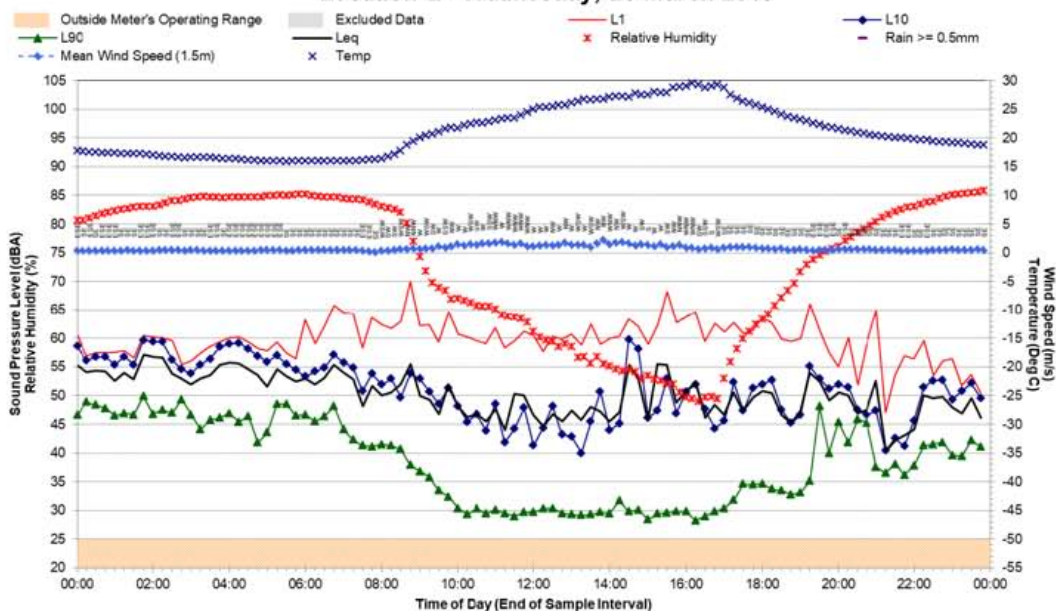
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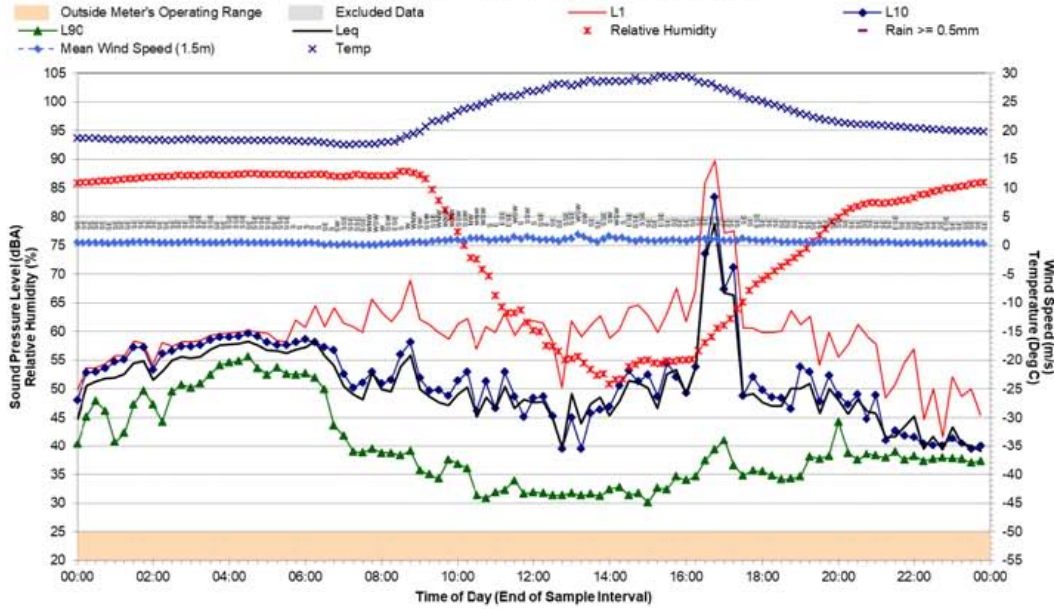
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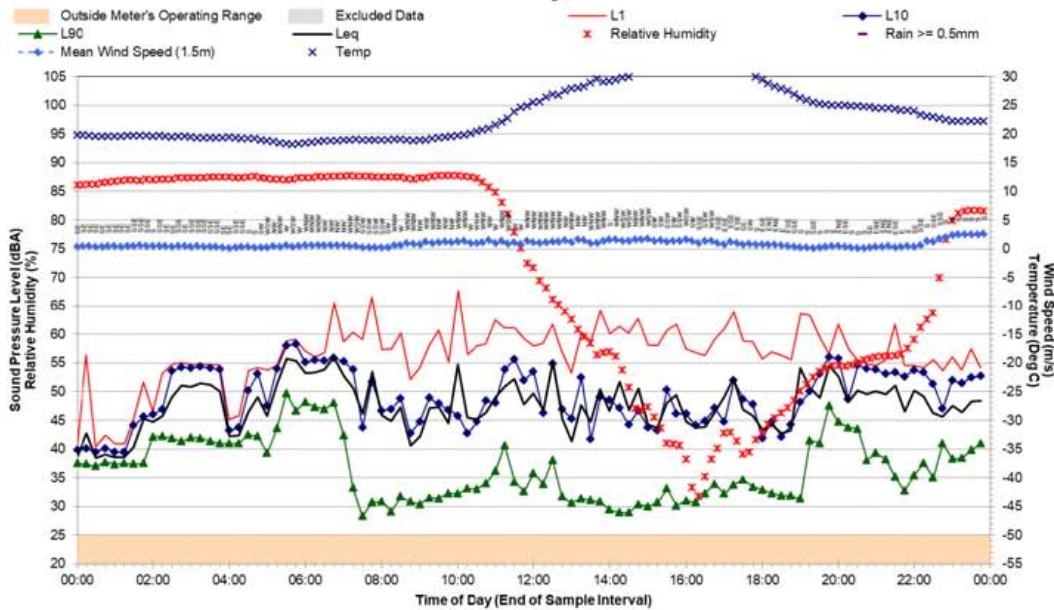
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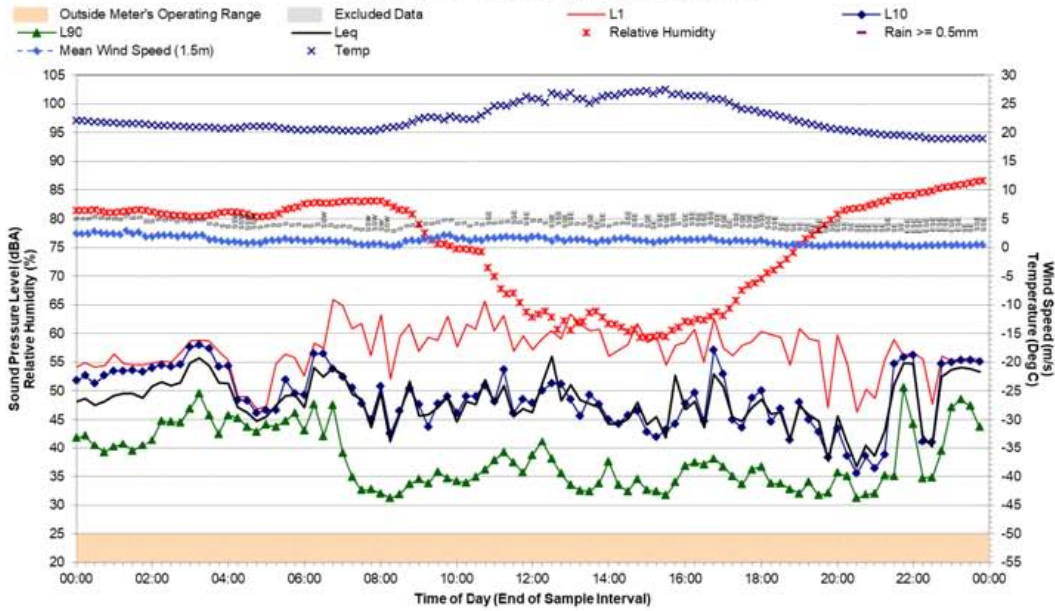


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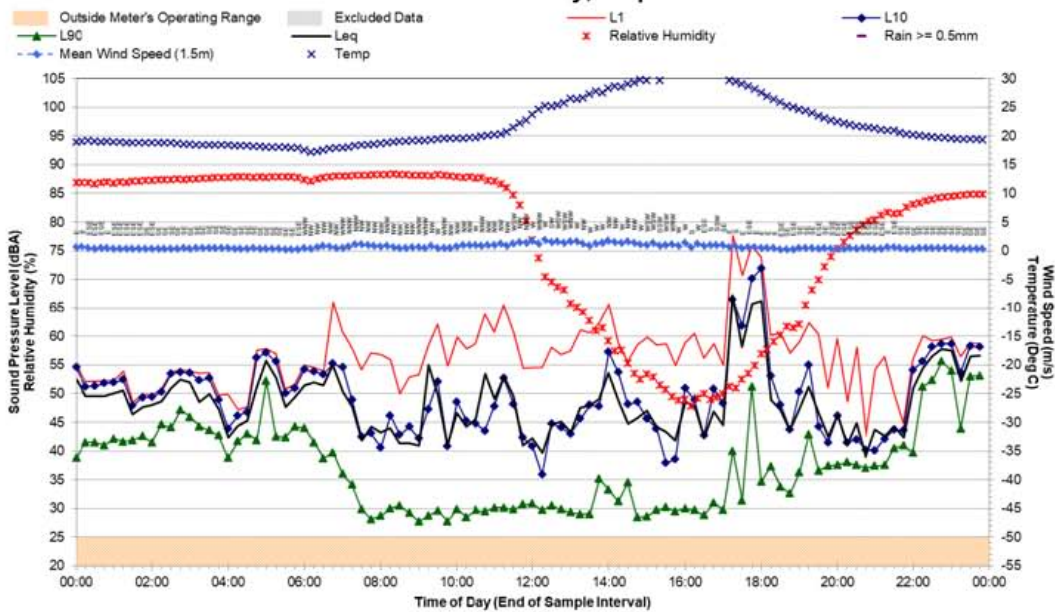
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Statistical Ambient Noise Levels

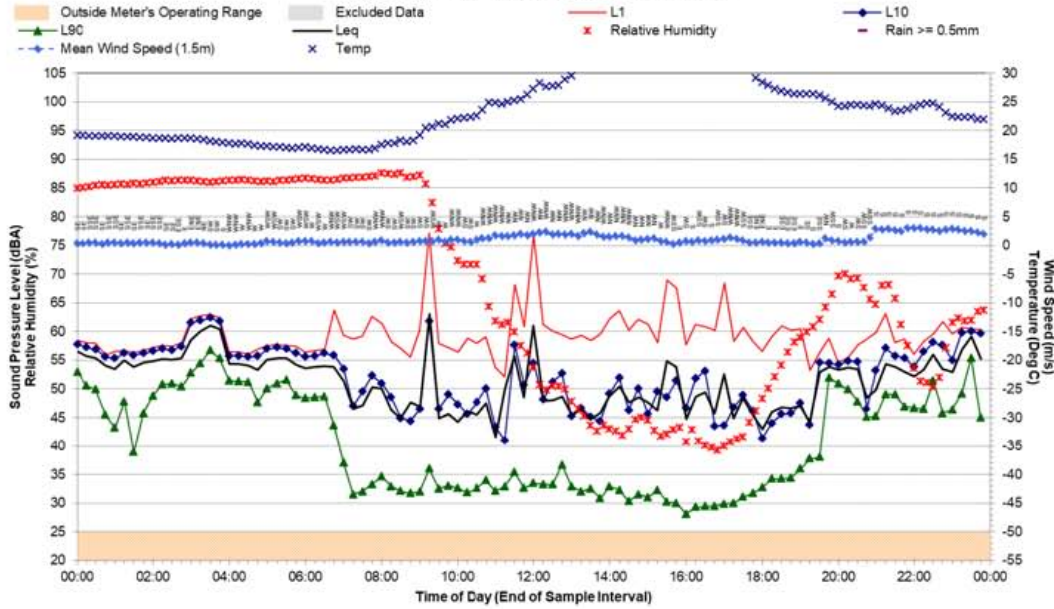
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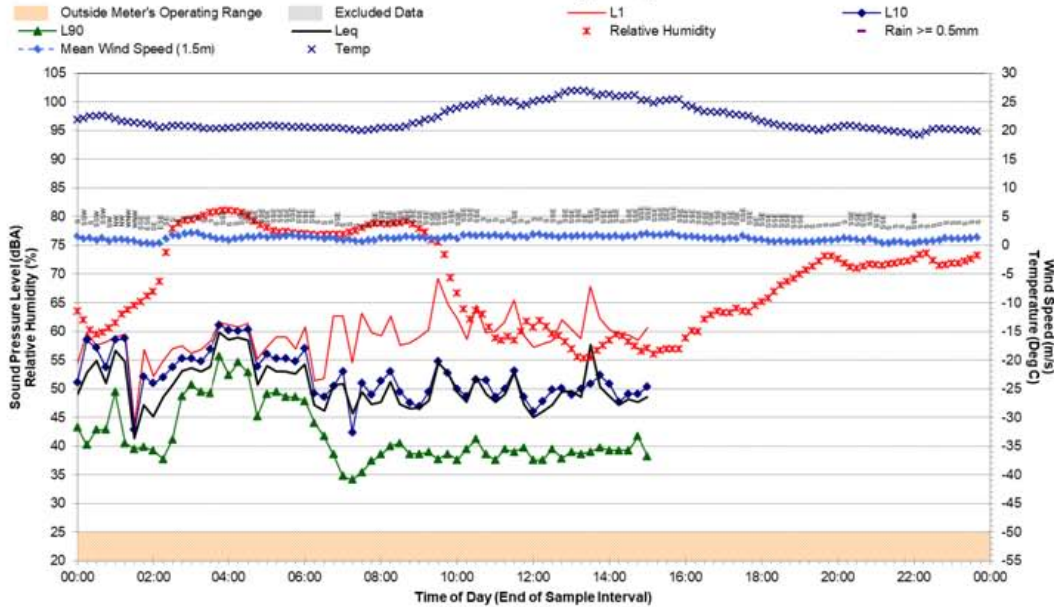
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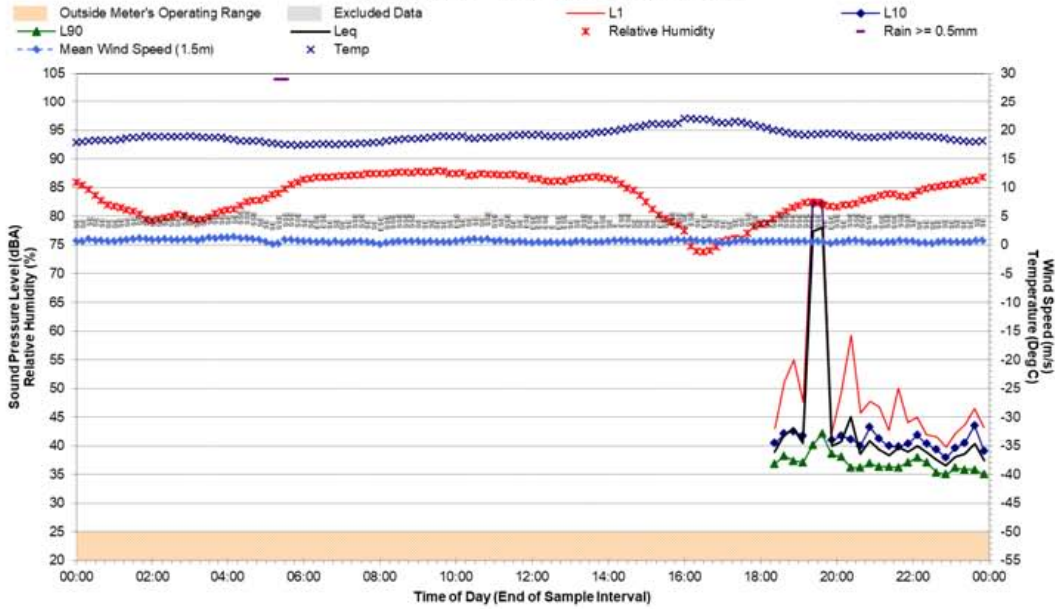
Statistical Ambient Noise Levels

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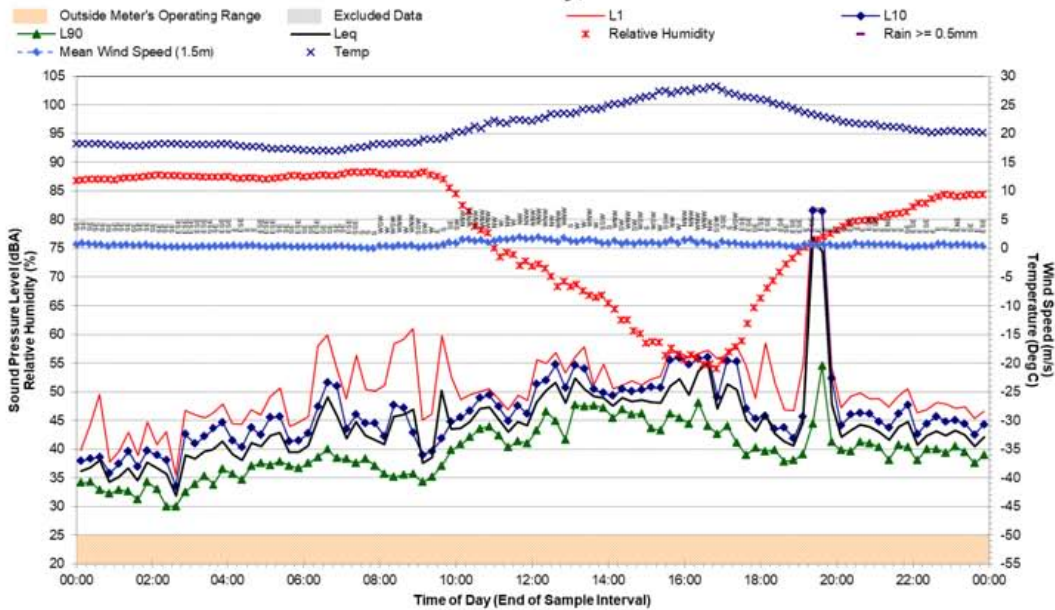
Statistical Ambient Noise Levels

Location J - Friday, 23 March 2018



Statistical Ambient Noise Levels

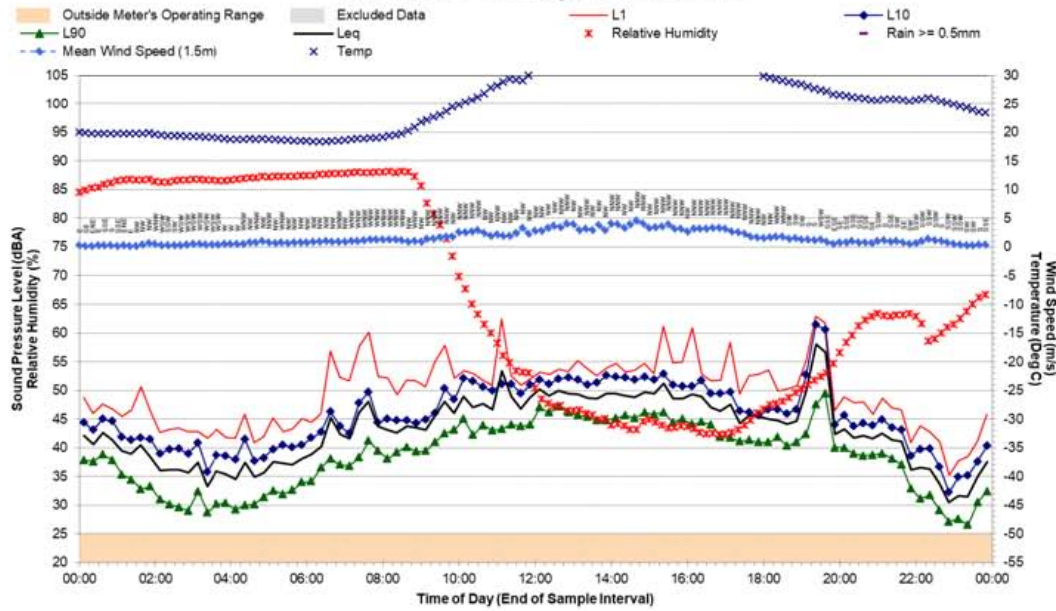
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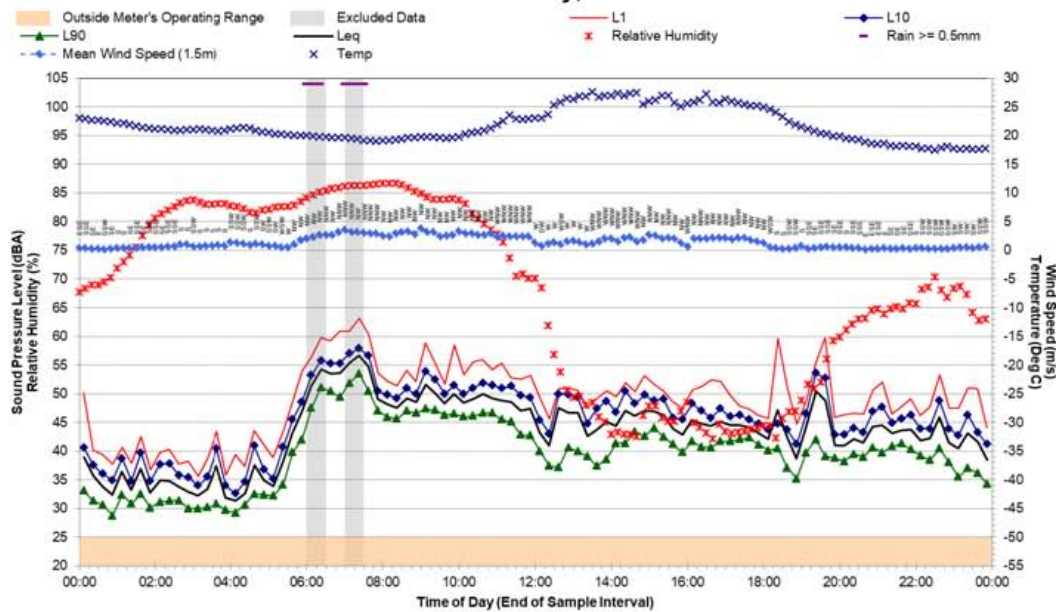
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**Statistical Ambient Noise Levels
Location J - Sunday, 25 March 2018**



**Statistical Ambient Noise Levels
Location J - Monday, 26 March 2018**



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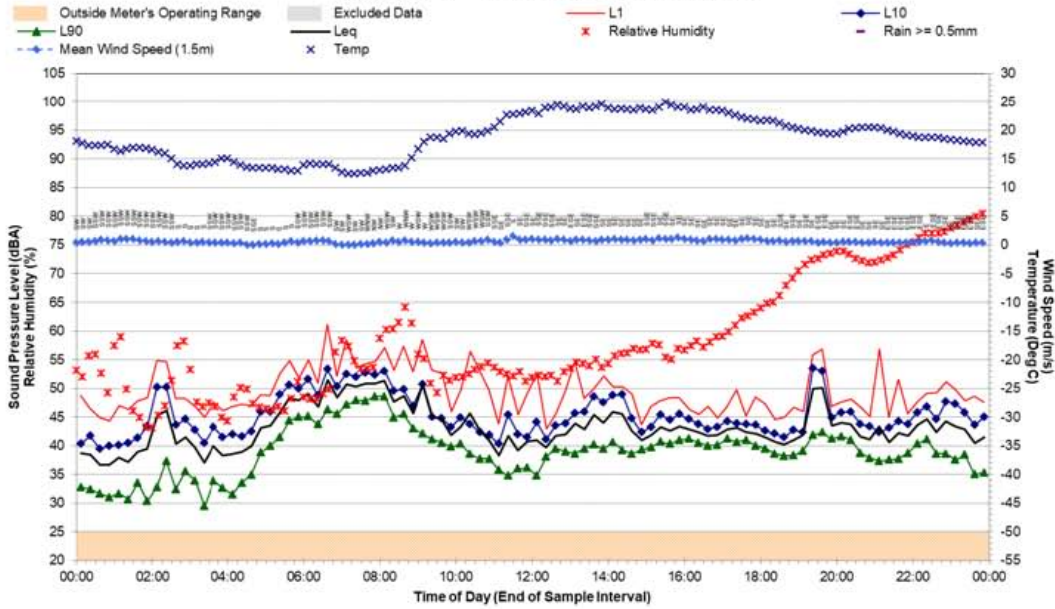
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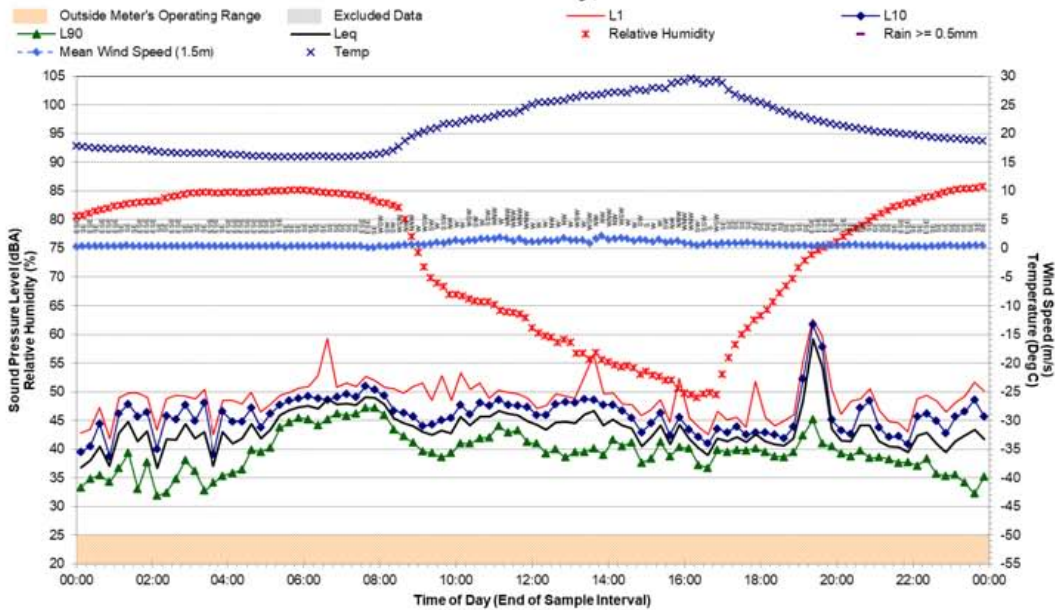
Statistical Ambient Noise Levels

Location J - Tuesday, 27 March 2018



Statistical Ambient Noise Levels

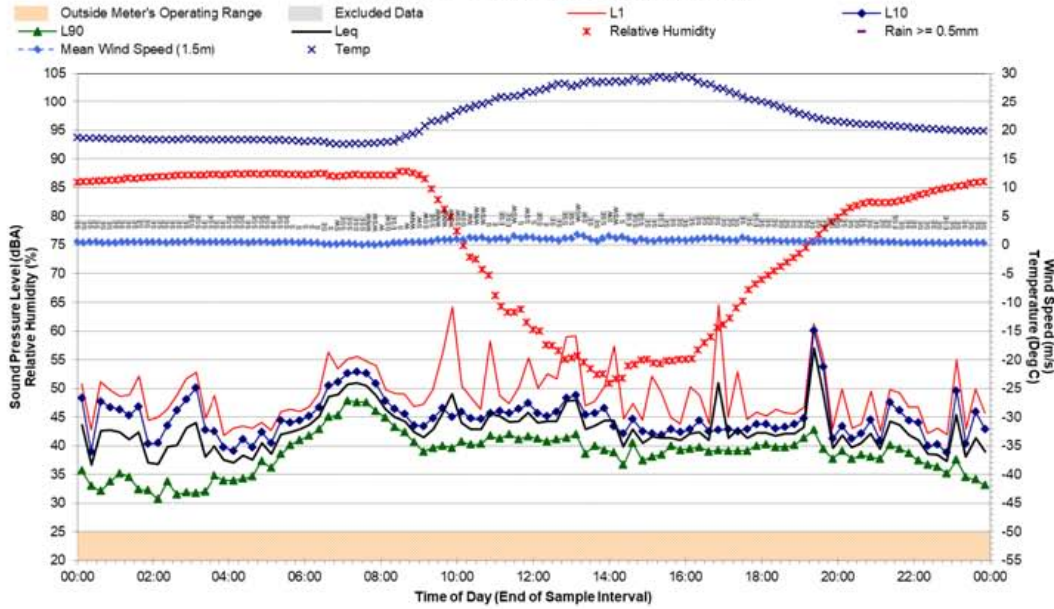
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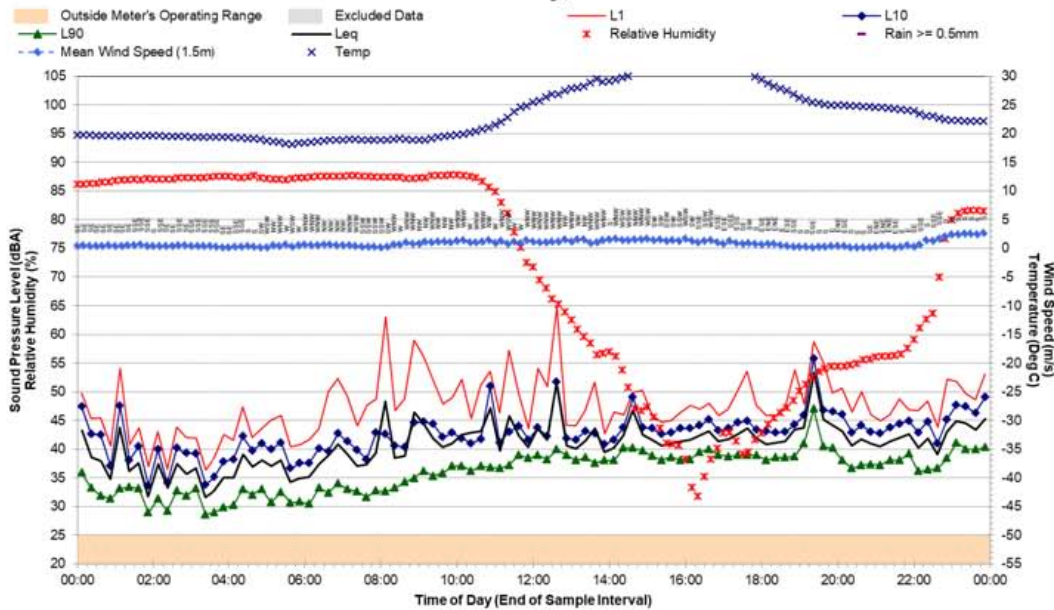
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**Statistical Ambient Noise Levels
Location J - Thursday, 29 March 2018**



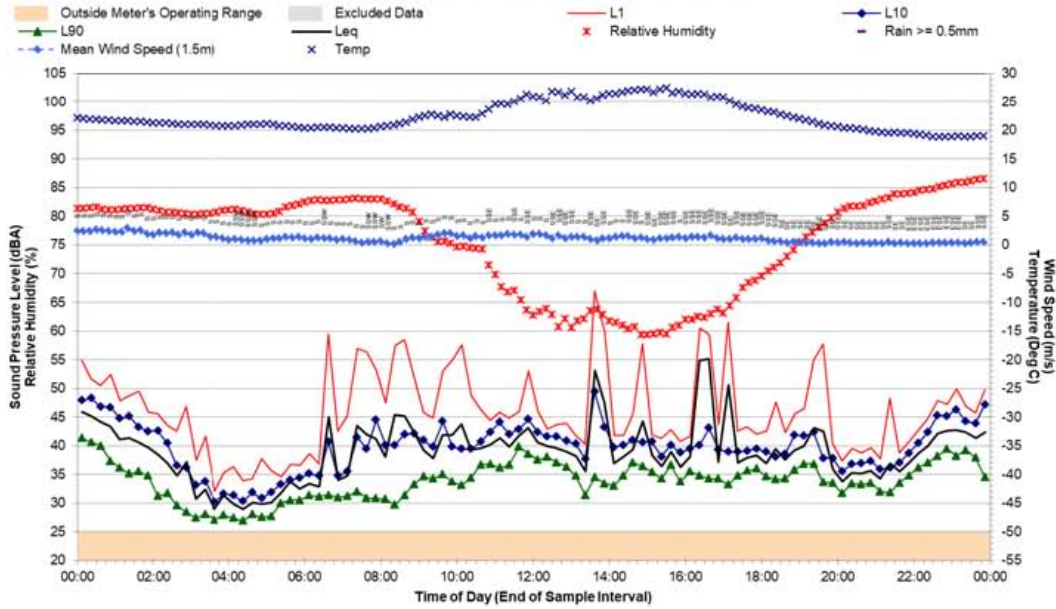
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Location J - Friday, 30 March 2018**



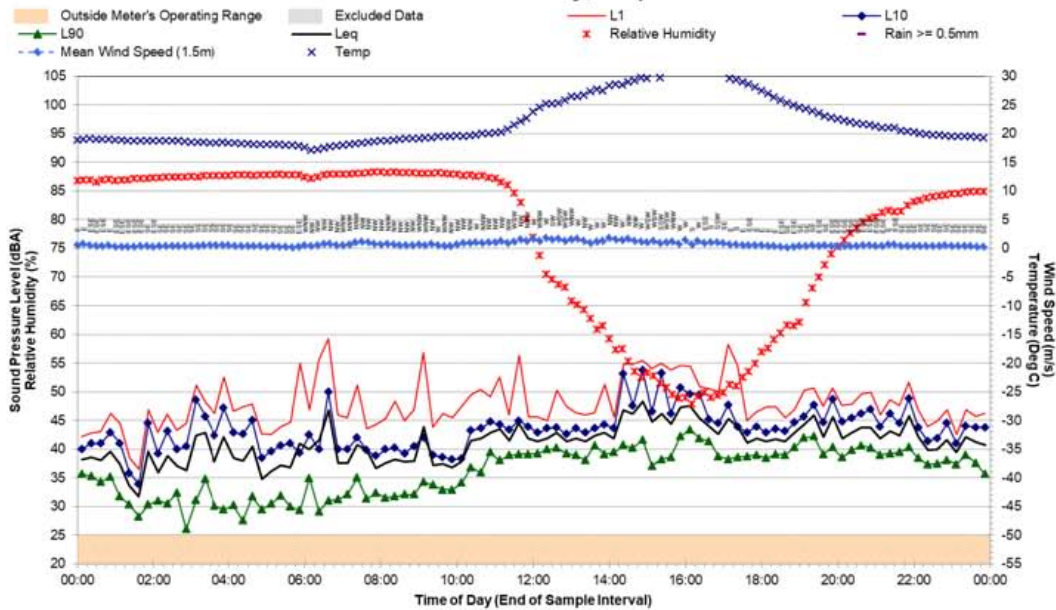
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**Statistical Ambient Noise Levels
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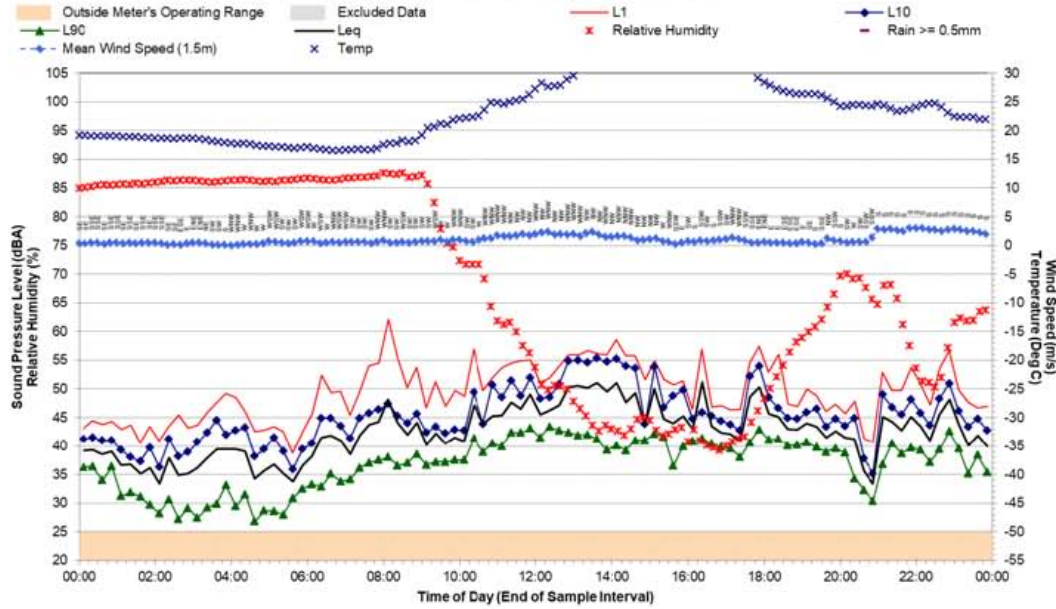
**Statistical Ambient Noise Levels
Location J - Sunday, 1 April 2018**



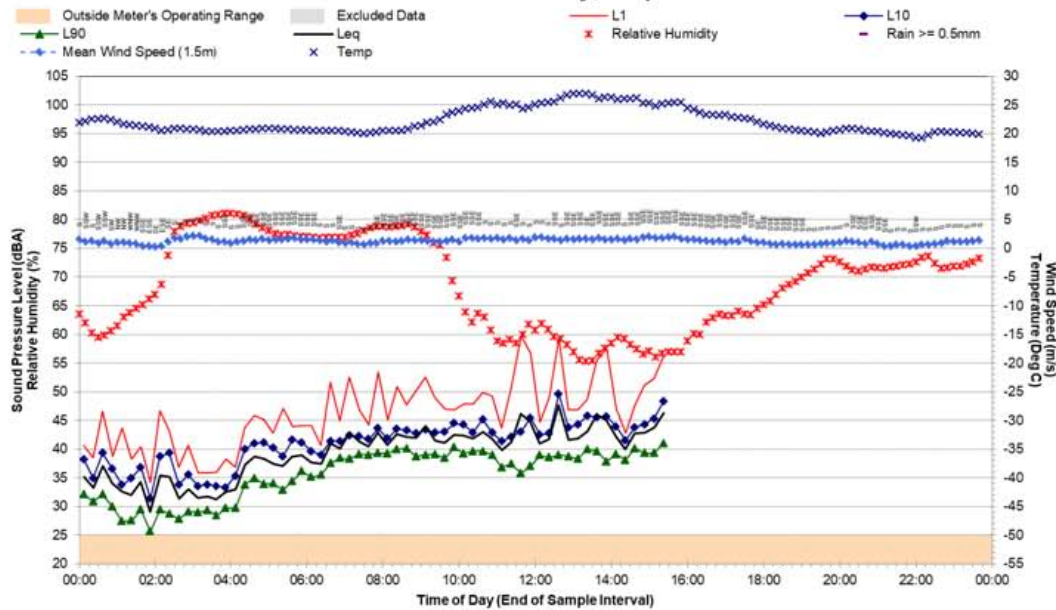
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**Statistical Ambient Noise Levels
Location J - Monday, 2 April 2018**



**Statistical Ambient Noise Levels
Location J - Tuesday, 3 April 2018**



DONALDSON AND ABEL COAL MINES

Quarterly Noise Monitoring
Quarter Ending June 2018

Prepared for:

Donaldson Coal Pty Ltd
PO Box 675
Green Hills 2320



Donaldson Coal Pty Ltd
Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending June 2018

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October 2018

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Donaldson Coal Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
Q70 630.01053-R01-v0.1	19 October 2018	Martin Davenport	Nicholas Vandenberg	
Q70 630.01053-R01-v0.1	18 October 2018	Martin Davenport	Nicholas Vandenberg	

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APPENDICES

Appendix A	Acoustic Terminology
Appendix B	Noise Monitoring Locations
Appendix C	Statistical Ambient Noise Levels

1 Introduction

1.1 Background

Donaldson Coal Pty Ltd has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct quarterly noise monitoring surveys for the Donaldson Coal Mine and Abel Coal Mine during the June 2018 quarter in accordance with the Abel Mine Project Noise Monitoring Program, dated 12 August 2014.

1.2 Objectives of this Report

The objectives of the noise monitoring survey for this operating quarter were as follows:

- Measure the ambient noise levels at six focus receptor locations (potentially worst affected) surrounding Donaldson Coal Mine and Abel Coal Mine.
- Qualify all sources of noise within each of the attended surveys, including estimated contribution or maximum level of individual noise sources.
- Assess the noise emissions of Donaldson Coal Mine and Abel Coal Mine with respect to the limits contained in the Development Consent.

1.3 Acoustic Terminology

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 Development Consent Project Approval

Development consent was obtained by Donaldson Coal Pty Ltd for the Donaldson Mine in October 1999 following a Commission of Inquiry. Development Consent number N97/00147 was issued by the Minister for Urban Affairs pursuant to Section 101 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Project Approval (Application No. 05_0136) granted by the Minister of Planning was obtained by Donaldson Coal Pty Ltd for Abel Coal Mine in 2007.

2.1 Donaldson Coal Mine Development Consent Conditions

The Development Consent nominates hours of operation and mine noise emission goals in the Sections entitled “*Operation of Development, Condition No. 3(1) and 3(2)*”, and “*Noise and Vibrational Noise Limits: Condition No. 15*” as follows:

3.(1) *Subject to (2) the approved hours of operation are as follows:*

Works	Period	Hours
Construction, including construction of any bunds	Monday to Friday Saturday	7 am to 6 pm 8 am to 1 pm
Mining operations, including mining, haulage of waste to dumps and coal processing	Monday to Friday Saturday, Sunday	24 hours per day 7 am to 6 pm
Road Transportation and stockpiling of coal	7 days per week	24 hours per day
Rail loading of coal	7 days per week	7 am to 10 pm
Maintenance of mobile and fixed plant	7 days per week	24 hours per day
Blasting, not involving closure of John Renshaw Drive	Monday to Saturday	7 am to 5 pm
Blasting, involving closure of John Renshaw Drive	Monday to Saturday	10 am to 2 pm

Notes: Restrictions on Public Holidays are the same as Sundays

- (2) *The Applicant shall submit a report to the Director-General’s satisfaction demonstrating the noise limits in Condition 15 can be met while rail loading of coal is occurring during the period from 6 pm to 10 pm. If that report does not demonstrate that the noise limits can be met to the Director-General’s satisfaction, then the hours of operation for rail loading of coal shall be restricted to 7 am to 6 pm.”*

15. Unless subject to a negotiated agreement in accordance with Condition 23, the Applicant shall ensure that the noise emission from construction or mining operations, when measured or computed at the boundary of any dwelling not owned by the applicant (or within 30 metres of the dwelling, if the boundary is more than 30 metres from the dwelling), shall not exceed the following noise limits:

Location	LA10(15minute) Noise Limits (dBA)	
	Daytime	Night-time
Beresfield area (residential)	45	35
Steggles Poultry Farm	50	40
Ebenezer Park Area	46	41
Black Hill Area	40	38
Buchanan and Louth Park Area	38	36
Ashtonfield Area	41	35
Thornton Area	48	40

Note: Daytime is 7 am to 10 pm Monday-Saturday, and 8 am to 10 pm Sundays and Public Holidays. Night-time is 10 pm to 7 am Monday-Saturday, and 10 pm to 8 am Sundays and Public Holidays.

The noise limits apply for prevailing meteorological conditions (winds up to 3 m/s), except under conditions of temperature inversions."

Other Conditions of Consent relevant to noise are as follows:

18. The applicant shall survey and investigate noise reduction measures from plant and equipment and set targets for noise reduction in each Annual Environmental Management Report (AEMR), taking into consideration valid noise complaints received in the previous year. The Report shall also include remedial measures.
19. The Applicant shall revise the Noise Management Plan as necessary and provide an updated Plan five years after commencement of mining to the Director-General, the independent noise expert (Condition 48), EPA, Councils and the Community Consultative Committee.

2.2 Abel Coal Mine – Project Approval

Approved Operations

The following operations are approved under the Abel Coal Mine Project Approval:

- Extraction of up to 6.1 Mtpa of Run of Mine (ROM) coal from the Abel Underground Coal Mine.
- Transport coal to the existing Bloomfield Coal Handling and Preparation Plant by private haul roads, or by coal conveyor, or by a combination of both methods.
- Operate the Bloomfield Coal Handling Processing Plant (CHPP) to process coal extracted from the Abel Coal Mine and the Bloomfield and Donaldson Coal Mines.
- Transportation of product coal from the Bloomfield site by rail via the Bloomfield rail loading facility.

The Project Approval was modified in June 2010 (05_0136 MOD 1) allowing construction and operation of a downcast ventilation fan. In May 2011 the Project Approval was modified again (05_0136 MOD 2) to allow the construction and operation of an upcast ventilation fan (and associated facilities). In December 2013 the Project Approval was further modified (05_0136 MOD3) to account for the increase in coal extracted including the upgrade of the Bloomfield CHPP.

Consent Conditions

The relevant conditions relating to noise from the Abel Coal Mine approval are reproduced below.

Schedule 4

NOISE

Operational Noise Criteria

1. The Proponent shall ensure that the noise generated by the Project does not exceed the criteria in Table 4 at any residence on privately-owned land.

Table 4: Operational Noise Criteria dB(A)

Location	Receiver Area	Day	Evening	Night	
		LAeq(15minute)	LAeq(15minute)	LAeq(15minute)	LA1(1minute)
Location I	Lord Howe Drive, Ashtonfield	36	36	36	45
Location K	Catholic Diocese Land	37	37	37	45
Location L	Kilshanny Avenue Ashtonfield	40	40	40	47
All other Locations	All other privately owned Residences	35	35	35	45

Notes:

- To interpret the locations referred to in Table 4, see plan in Appendix 3 (Appendix A).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

These noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Construction Noise Criteria

1. The proponent shall ensure that the noise generated during the construction of the downcast ventilation shaft as described in EA (MOD3) does not exceed the criteria in Table 5.

Table 5: Construction Noise Criteria dB(A)

Location	Receiver	Day
		L _{Aeq} (15minute)
Location R	281 Lings Road, Buttai	50
Location S	189 Lings Road, Buttai	43

Notes:

- The criteria in Table 5 apply only whilst the downcast ventilation shaft is being constructed, and for a maximum of 12 weeks from the commencement of construction.
- To interpret the locations referred to in Table 5, see plan in Appendix 3 (attached to this report as **Appendix A**).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

However, these noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Rail Noise Criteria

1. The proponent shall ensure that the noise from rail movements on the Bloomfield Rail Spur does not exceed the limits in Table 6 at any residence on privately owned land.

Table 6: Rail Spur noise criteria dB (A)

Location	Day	Evening	Night
	L _{Aeq} (period)		
All privately-owned land	55	45	40

Cumulative Noise Criteria

1. The proponent shall implement all reasonable and feasible measures to ensure that the noise generated by the project combined with noise generated by other mines does not exceed the criteria in Table 7 at any residence on privately-owned land.

Table 7: Cumulative noise criteria dB (A)

Location	Day	Evening	Night
	L _{Aeq} (period)		
All privately-owned land	55	45	40

Notes: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including meteorological conditions), of the NSW Industrial Noise Policy. Appendix 4 sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

Operating Conditions

1. *The proponent shall:*
 - a. *Implement best management practise to minimise the construction, operational, road and rail noise of the project;*
 - b. *Operate an on-site noise management system to ensure compliance with the relevant conditions of this approval;*
 - c. *Minimise the noise impacts of the project during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 4);*
 - d. *Only receive and/or dispatch locomotives and rolling stock either on or from the site that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142);*
 - e. *Carry out regular monitoring to determine whether the project is complying with the noise criteria and other relevant conditions of approval, to the satisfaction of the Director-General.*

Noise Management Plan

2. *The proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:*
 - a. *Be prepared in consultation with the EPA, and be submitted to the Director-General for approval within 6 months of the date of approval of MOD 3;*
 - b. *Describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval; Describe the proposed noise management system in detail; and*
 - c. *Include a monitoring program that:*
 - *Uses attended monitoring to evaluate the compliance of the project against the noise criteria in this approval;*
 - *Evaluates and reports on:*
 - *The effectiveness of the on-site noise management system; and*
 - *Compliance against the noise operating conditions; and*

Defines what constitutes a noise incident, and includes protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents. Appendix 4

Noise Compliance Assessment

Applicable Meteorological Conditions

1. *The noise criteria in Tables 4 and 7 are to apply under all metrological conditions except the following:*
 - a. *During periods of rain or hail.*
 - b. *Average wind speed at microphone height exceeds 5 m/s;*
 - c. *Wind speeds greater than 3 m/s measured at 10m above ground level; or*
 - d. *Temperature inversion conditions greater than 3°C/100m.*

Determination of metrological conditions

2. *Except for wind speed at microphone height, the data to be used for determining metrological conditions shall be that recorded by the meteorological station located on the site.*

Compliance monitoring

3. *Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.*
4. *Unless otherwise agreed with the director-general, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to:*
 - a. *Monitoring locations for the collection of representative noise data;*
 - b. *Metrological conditions during which collection of noise data is not appropriate;*
 - c. *Equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and*
 - d. *Modification to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.*

Appendix 5

Statement of Commitments

3. Noise

3.1 Construction Activities

The following noise control measures will be implemented prior to commencement of construction of the Abel Underground Mine or the upgrade of the Bloomfield CHPP.

1. *Maintain all machinery and equipment in working order;*
 - a. *No construction activities at the Abel pit top will take place on Sundays or Public Holidays;*
 - b. *Where possible locate noisy site equipment behind structures that act as barriers or at the greatest distance from noise sensitive areas; and*
 - c. *Orientate equipment so that noise emissions are directed away from noise sensitive areas.*

3.2 Noise Control Measures

- a. *The following noise control measures will be implemented prior to the mining of coal from the Abel underground Mine:*
 - i. *Orientation of the ventilation fans away from residential receivers and angle the output parallel to the ground.*
 - ii. *The sound power level of the front end loader to be used near the portal should not exceed 113 dBA and will be fitted with a noise sensitive reversing alarm.*
- b. *The following noise control measures will be implemented prior to the Bloomfield CHPP receiving any ROM coal from Able Underground Mine;*

- i. Noise mitigation works including partial enclosure and noise screening of drives and conveyors of the Bloomfield CHPP to screen residences to the north of the site.

3.2 Monitoring

The Company will implement a Noise Monitoring Program for the Abel Underground Mine and the Bloomfield CHPP, to the satisfaction of the Director-General. The Noise Monitoring Program shall include a combination of real-time and supplementary attended monitoring measures, and a noise monitoring protocol for evaluating compliance with the noise environmental assessment. This plan will be integrated with the monitoring plans for the Tasman, Donaldson and Bloomfield Mines to provide a single integrated Noise Monitoring Program for all 4 mines.

3.4 Continuous Improvement

The Company shall:

- a. Report on these investigations and implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director General.

The operator of the Bloomfield CHPP shall:

- b. Investigate ways to reduce the noise generated by the Bloomfield CHPP, including maximum noise levels which may result in sleep disturbance;
- c. Implement all reasonable and feasible best practice noise mitigation measures on the site; and
- d. Report on these investigations and the implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director-General.

3 Noise Monitoring Methodology

3.1 General Requirements

The operational noise monitoring program was conducted with reference to Development Consent N97/00147 (Donaldson Coal Mine), Project Approval 05_0136 (Abel Coal Mine), and in accordance with SLR's Report 630.01053.01300-R1 dated 12 August 2014 (*Noise Management Plan Abel Underground Mine*) and AS 1055-1997 *Acoustics - Description and Measurement of Environmental Noise*.

All acoustic instrumentation employed throughout the monitoring program has been designed to comply with the requirements of AS IEC 61672.1 – 2004 *Electroacoustics—Sound level meters – Specifications*, AS IEC 61672.2-2004, AS IEC 61672.3-2004 and carried current NATA or manufacturer calibration certificates.

Instrument calibration was conducted before and after each measurement, with the variation in calibrated levels not exceeding ± 0.5 dBA.

3.2 Monitoring Locations

Baseline and preceding operational quarterly surveys have been conducted at 11 locations surrounding the Donaldson Mine and Abel Coal Mine sites. With the experience of these previous surveys, it was decided to concentrate noise monitoring at six focus locations that represent the potentially most noise affected areas from Donaldson Mine and Abel Coal Mine. The details of the monitoring locations are contained within **Table 1**.

It is relevant to note that Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

Furthermore, Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite during the June noise monitoring period.

Table 1 Monitoring Locations

Noise Monitoring Location	Description
D	Black Hill School, Black Hill
F	Lot 684 Black Hill Road, Black Hill
G	156 Buchannan Road, Buchannan
I	Lord Howe Drive, Ashtonfield
J	Parish Drive, Thornton
L	Kilshanny Ave, Ashtonfield

A map giving the approximate location of the noise monitoring sites is contained within **Appendix B**.

3.3 Unattended Continuous Noise Monitoring

An environmental noise logger was deployed for a minimum of seven days between 24 June 2018 and 2 July 2018 at each of the nominated locations given in **Table 1**.

All unattended monitoring equipment was programmed to continuously record statistical noise level indices in 15 minute intervals including the L_{Amax} , $LA1$, $LA10$, $LA90$, $LA99$, L_{Amin} and L_{Aeq} . The statistical noise exceedance levels (L_{AN}) are the levels exceeded for N% of the 15 minute interval. The $LA90$ represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level. The $LA10$ is the level exceeded for 10% of the time and is usually referred to as the average maximum noise level. The L_{Aeq} is the equivalent continuous sound pressure level and represents the steady sound level which is equal in energy to the fluctuating level over the interval period. The L_{Amax} is the maximum noise level recorded over the interval.

3.4 Operator Attended Noise Monitoring

Operator attended surveys were conducted at each of the six monitoring locations during the daytime, evening and night-time periods, to verify the unattended logging results and to determine the character and contribution of ambient noise sources.

4 Operator Attended Noise Monitoring

4.1 Results of Operator Attended Noise Monitoring

Operator attended noise measurements were conducted commencing during the evening on Tuesday 26 June 2018 and completed during the day on Wednesday 27 June 2018. All operator attended noise surveys were conducted using a Brüel & Kjær 2250L integrating sound level meter (s/n: 3004636).

Results of the operator attended noise measurements are given in **Table 2** to **Table 7**.

Ambient noise levels given in the tables include all noise sources such as traffic, insects, birds, and mine operations as well as any other industrial operations.

The tables provide the following information:

- Monitoring location.
- Date and start time.
- Wind velocity (m/s) and Temperature ($^{\circ}$ C) at the measurement location.
- Typical maximum (L_{Amax}) and contributed noise levels.

Mine contributions listed in the tables are from the Abel Coal Mine and are stated only when a contribution could be quantified.

Table 2 Location D, Black Hill School, Black Hill

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	27/06/2018 14:15 17°C 0.5 m/s E	72	67	53	39	53	School 45-62 Road Traffic 46-72 Birdsong 56 Insects/frogs 35
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	26/06/2018 18:28 13°C Calm	80	71	53	37	57	Local traffic 77 - 80 Insects 36-39 Distant traffic 36-48
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	26/06/2018 22:34 8°C Calm 1/8 Cloud Cover	50	44	41	36	39	Road traffic 35-43 Insects 34-39 Birdsong 39-50
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 3 Location F, Lot 684 Black Hill Road, Black Hill

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	27/06/2018 14:57 17°C Calm	74	70	59	47	58	Road traffic 52-74 Insects 44 Birdsong 48
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	26/06/2018 18:51 11°C Calm	73	67	57	46	55	Road traffic 50-73 Insects 41-49
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	26/06/2018 22:57 10°C Calm 1/8 Cloud Cover	66	59	54	38	49	Road traffic 38-66 Insects 38-41
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 4 Location G, 156 Buchannan Road, Buchannan

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	27/06/2018 16:17 18°C 0.5 m/s SE	57	51	49	54	48	Road traffic 43-52 Birdsong 51-57
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	26/06/2018 19:57 12°C Calm	55	51	48	38	45	Aeroplane 46 Insects 30-34 Road traffic 39-51 Birdsong 45-55 Bloomfield Colliery 30-36
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	27/06/2018 00:05 9°C Calm 1/8 Cloud Cover	55	52	43	32	40	Road traffic 34-55 Insects 30-36 Bloomfield Colliery 28-36
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 5 Location I, 49 Magnetic Drive, Ashtonfield

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	27/06/2018 17:08 15°C Calm	73	64	51	46	52	Aeroplane 59 Residential noise 54 Road traffic 49-73 Insects 35-38
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	26/06/2018 20:50 12°C Calm	74	58	48	42	49	Insects 35-38 Traffic 41-74
		Estimated Abel Mine Noise Contribution <30 dBA L _{Aeq} (15minute)					Abel Mine barely audible CHPP area operations <30
Night	27/06/2018 00:56 9°C Calm 7/8 Cloud Cover	53	48	44	39	42	Train 44-53 Road traffic 49
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 6 Location J, Parish Drive, Thornton

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	27/06/2018 17:34 14°C Calm	48	46	45	42	44	Traffic 43-48
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	26/06/2018 21:48 11°C 0.5 m/s S	48	47	45	41	43	Traffic 42-48 Insects 30-32
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	26/06/2018 22:04 11°C 0.5 m/s S 1/8 Cloud Cover	52	49	46	41	44	Traffic 42-52 Insects 30-32
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 7 Location L, 17 Kilshanny Ave, Ashtonfield

Period	Date/ Start time/ Period/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (LAmax – dBA)
		LAmx	LA1	LA10	LA90	LAeq	
Day	27/06/2018 16:46 16°C 0.5 m/s SE	72	64	48	41	50	Pedestrians 53 Dog barking 39 Birdsong 42-52 Local traffic 52-72
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	26/06/2018 20:26 10°C Calm	73	64	42	35	50	Train 38-42 Insects 32-33 Dog barking 38 Residential noise 43 Traffic 36-73
		Estimated Abel Mine Noise Contribution 32 dBA LAeq(15minute)					Abel Mine Audible CHPP area operations 30-42
Night	27/06/2018 00:33 6°C Calm 4/8 Cloud Cover	47	40	37	33	35	Insects 20-25 Traffic 32-39 Dog barking 44-47
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

4.2 Operator Attended Noise Monitoring Summary

4.2.1 Donaldson Mine

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

4.2.2 Abel Coal Mine

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

The Bloomfield CHPP stockpile area was audible during the evening period at Location I and Location L. Noise generated by local and distant traffic was a significant contributor to ambient noise levels at all monitored locations as well as ‘natural’ noises such as birds, insects.

4.3 Compliance Assessment and Discussion of Results

4.3.1 Operations

Results of the operational compliance assessment are given in **Table 8**.

Table 8 Compliance Noise Assessment – Operations

Location	Estimated Abel LAeq(15minute) Contribution dBA			Consent Conditions			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
D – Black Hill School, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
F – Black Hill Road, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
I – Lord Howe Drive, Ashtonfield	Inaudible	<30	Inaudible	36	36	36	Yes	Yes	Yes
J – Parish Drive, Thornton	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	32	Inaudible	40	40	40	Yes	Yes	Yes

Results presented in **Table 8** indicate that compliance with the relevant consent conditions was achieved at all noise monitoring locations during all periods.

4.3.2 Sleep Disturbance

Results of the sleep disturbance compliance assessment are given in **Table 9**.

Table 9 Compliance Noise Assessment – Sleep Disturbance

Location	Estimated Bloomfield LA1(1minute) Contribution dBA	Consent Conditions LA1(1minute) dBA	Compliance
D – Black Hill School, Black Hill	Inaudible	45	Yes
F – Black Hill Road, Black Hill	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
I – Lord Howe Drive, Ashtonfield	Inaudible	45	Yes
J – Parish Drive, Thornton	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	47	Yes

Results presented in **Table 9** indicate that compliance with the sleep disturbance consent conditions was achieved at all noise monitoring locations during the night-time noise surveys.

5 Unattended Continuous Noise Monitoring

5.1 Results of Unattended Continuous Noise Monitoring

Unattended continuous noise monitoring was conducted between 24 June 2018 and 2 July 2018 at each of the six monitoring locations given in **Table 10**.

Table 10 Noise Logger and Noise Monitoring Locations

Location	Noise Logger Serial Number	Date of Logging
D – Black Hill School, Black Hill	ARL EL-316 16-203-528	24/06/2018 to 02/07/2018
F – Black Hill Road, Black Hill	ARL EL-316 16-203-505	24/06/2018 to 02/07/2018
G – Buchanan Road, Buchanan	ARL EL-316 16-306-039	24/06/2018 to 02/07/2018
I – Magnetic Drive, Ashtonfield	ARL EL-316 16-004-038	24/06/2018 to 02/07/2018
L – Kilshanny Ave, Kilshanny	ARL EL-316 16-203-525	24/06/2018 to 02/07/2018
J – Parish Drive, Thornton	SVAN 957 20665	24/06/2018 to 02/07/2018

The unattended ambient noise logger data from each monitoring location are presented graphically on a daily basis and are attached as **Appendix C**. A summary of the results of the unattended continuous noise monitoring is given in **Table 11**.

The ambient noise level data quantifies the overall noise level at a given location independent of its source or character.

The measured ambient noise levels were divided into three periods representing day, evening and night as designated in the NSW Noise Policy for Industry (NPfI).

Precautions were taken to minimise influences from extraneous noise sources (eg optimum placement of the loggers away from creeks, trees, houses, etc), however, not all these sources or their effects can be eliminated. This is particularly the case during the warmer times of year when noise from insects, frogs, birds and other animals can become quite prevalent.

Weather data for the subject area during the noise monitoring period was provided by Bloomfield Colliery. Noise data during periods of any rainfall and/or wind speeds in excess of 5 m/s were discarded in accordance with NPfI weather affected data exclusion methodology.

Table 11 Unattended Continuous Noise Monitoring Ambient Noise Levels (dBA)

Location	Period	Primary Noise Descriptor (dBA re 20 µPA)			
		LA1	LA10	LA90	LAeq
D Black Hill School, Black Hill	Day	67	54	35	55
	Evening	61	44	35	51
	Night	49	42	34	48
F Lot 684 Black Hill Road, Black Hill	Day	63	53	34	55
	Evening	59	46	34	50
	Night	44	38	29	44
G 156 Buchanan Road, Buchanan	Day	51	48	38	47
	Evening	49	47	36	44
	Night	48	44	30	43
I 49 Magnetic Drive, Ashtonfield	Day	65	55	39	56
	Evening	56	46	39	49
	Night	49	43	33	47
L 17 Kilshanny Ave, Ashtonfield	Day	72	59	46	59
	Evening	63	55	42	54
	Night	62	53	38	53
J 220 Parish Drive, Thornton	Day	51	47	38	48
	Evening	49	46	39	45
	Night	49	45	33	45

5.2 Long term Unattended Continuous Monitoring Summary for Donaldson Mine and Abel Coal Mine

5.2.1 Ambient LA90 Noise Levels

The long term ambient LA90 noise levels collected from each monitoring location are presented graphically in **Figure 1**, **Figure 2** and **Figure 3** for the daytime, evening and night-time periods respectively.

Figure 1 Long term Daytime LA90 Noise Levels

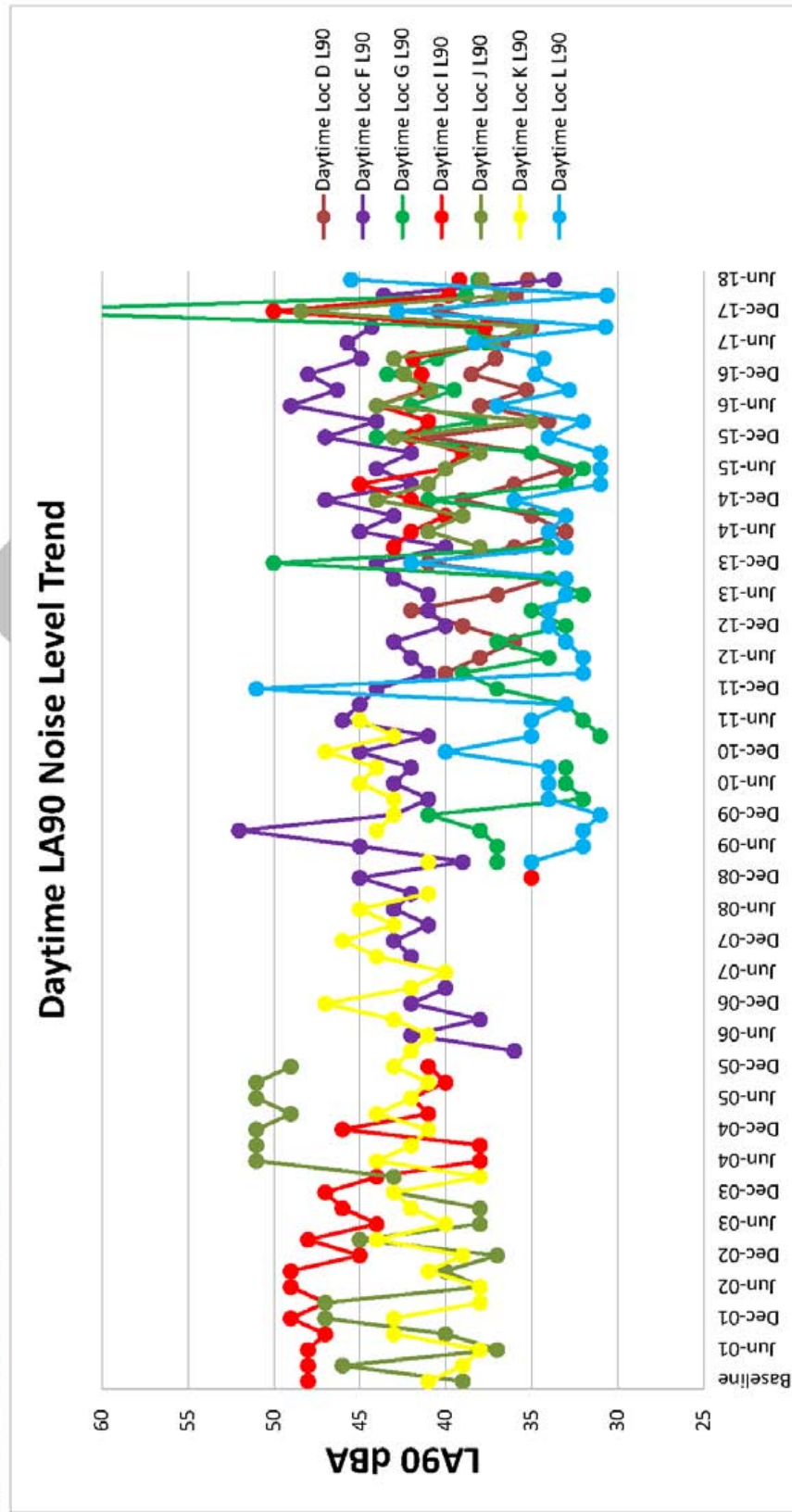
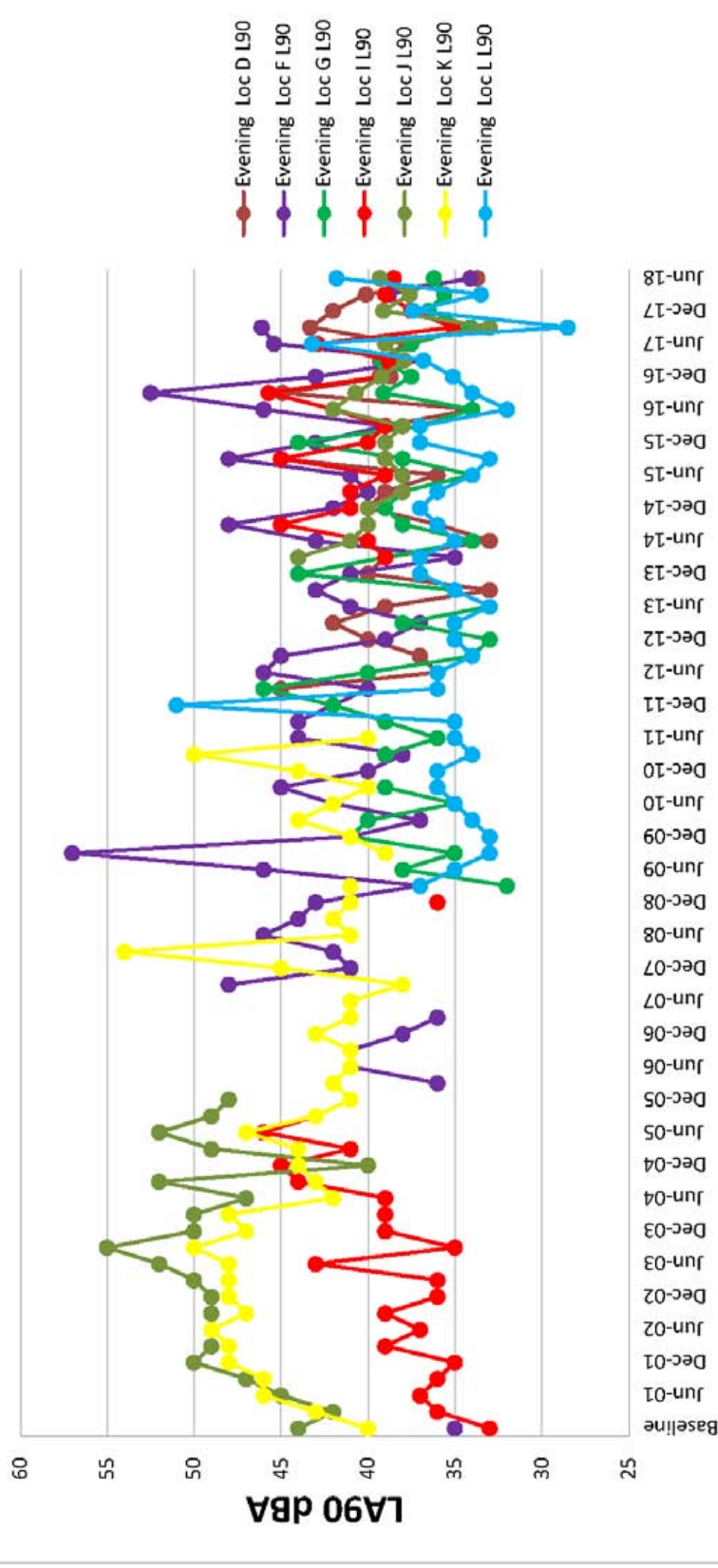


Figure 2 Long term Evening LA90 Noise Levels

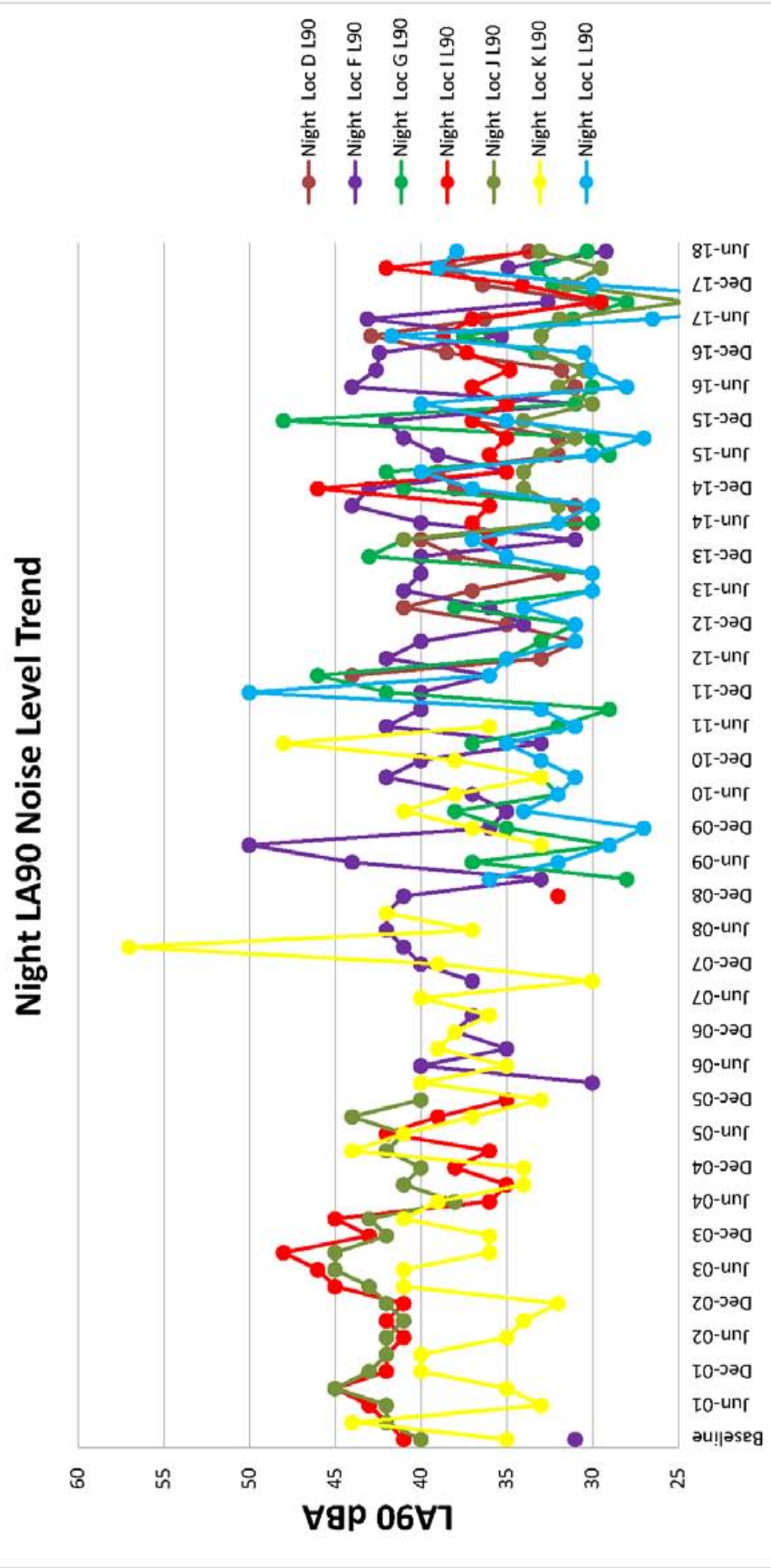
Evening LA90 Noise Level Trend



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Figure 3 Long term Night-time LA90 Noise Levels



5.2.1.1 Baseline

The summary of results in **Table 12** shows the ambient LA90 noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring process (ie. prior to commencement of mining operation at Donaldson).

Table 12 LA90 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ³
		Baseline	June 2018	
D Black Hill School, Black Hill	Day	N/A ²	35	N/A
	Evening	N/A ²	34	N/A
	Night	N/A ²	34	N/A
F Lot 684 Black Hill Road, Black Hill	Day	39	34	-5
	Evening	35	34	-1
	Night	31	29	-2
G 156 Buchanan Road, Buchanan	Day	N/A ²	38	N/A
	Evening	N/A ²	36	N/A
	Night	N/A ²	30	N/A
I 49 Magnetic Drive, Ashtonfield	Day	48	39	-9
	Evening	33	39	6
	Night	41	33	-8
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	46	N/A
	Evening	N/A ²	42	N/A
	Night	N/A ²	38	N/A
J 220 Parish Drive, Thornton	Day	39	38	-1
	Evening	44	39	-5
	Night	40	33	-7

Note 1: Periods are as detailed the NPfl and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB.

5.2.1.2 Previous Quarter

Table 13 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured in the previous monitoring period.

Table 13 LA90 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		March 2018	June 2018	
D Black Hill School, Black Hill	Day	36	35	-1
	Evening	40	34	-6
	Night	38	34	-4
F Lot 684 Black Hill Road, Black Hill	Day	44	34	-10
	Evening	39	34	-5
	Night	35	29	-6
G 156 Buchanan Road, Buchanan	Day	39	38	-1
	Evening	36	36	0
	Night	33	30	-3
I 49 Magnetic Drive, Ashtonfield	Day	40	39	-1
	Evening	39	39	0
	Night	42	33	-9
L 17 Kilshanny Ave, Ashtonfield	Day	31	46	15
	Evening	34	42	8
	Night	39	38	-1
J 220 Parish Drive, Thornton	Day	37	38	1
	Evening	38	39	1
	Night	30	33	3

Note 1: 1. Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: 2. Rounded to the nearest whole dB.

5.2.1.3 Coinciding Period Last Year

Table 14 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 14 LA90 Results Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		June 2017	June 2018	
D Black Hill School, Black Hill	Day	37	35	-2
	Evening	39	34	-5
	Night	43	34	-9
F Lot 684 Black Hill Road, Black Hill	Day	45	34	-11
	Evening	37	34	-3
	Night	35	29	-6
G 156 Buchanan Road, Buchanan	Day	41	38	-3
	Evening	39	36	-3
	Night	38	30	-8
I 49 Magnetic Drive, Ashtonfield	Day	42	39	-3
	Evening	39	39	0
	Night	39	33	-6
L 17 Kilshanny Ave, Ashtonfield	Day	34	46	12
	Evening	37	42	5
	Night	42	38	-4
J 220 Parish Drive, Thornton	Day	43	38	-5
	Evening	38	39	1
	Night	33	33	0

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

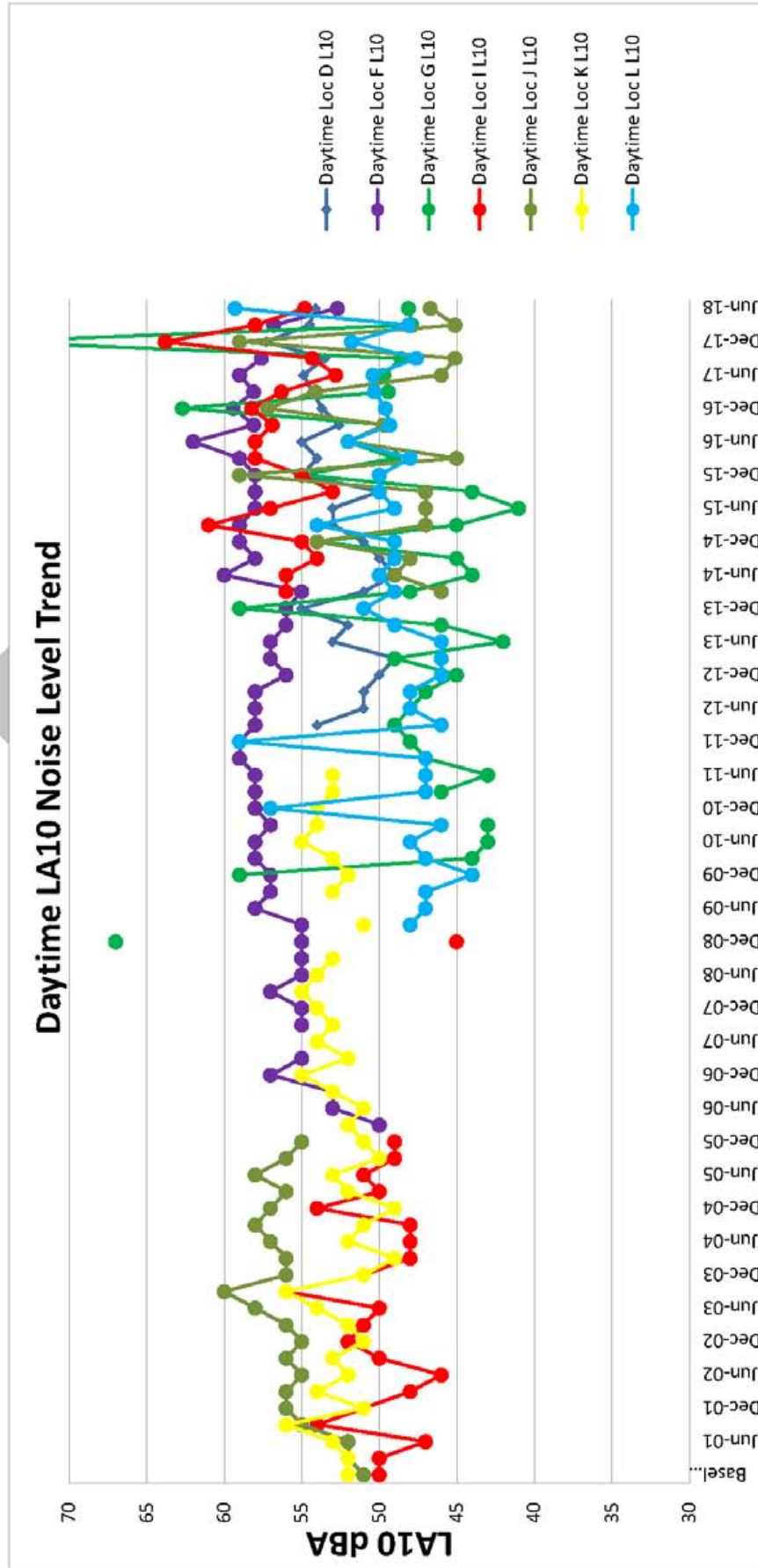
5.2.2 Ambient LA10 Noise Comparison

The long term ambient LA10 noise levels collected from each monitoring location are presented graphically in Figure 4, Figure 5 and Figure 6 for the daytime, evening and night-time respectively.

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Figure 4 Long term Daytime LA10 Noise Levels

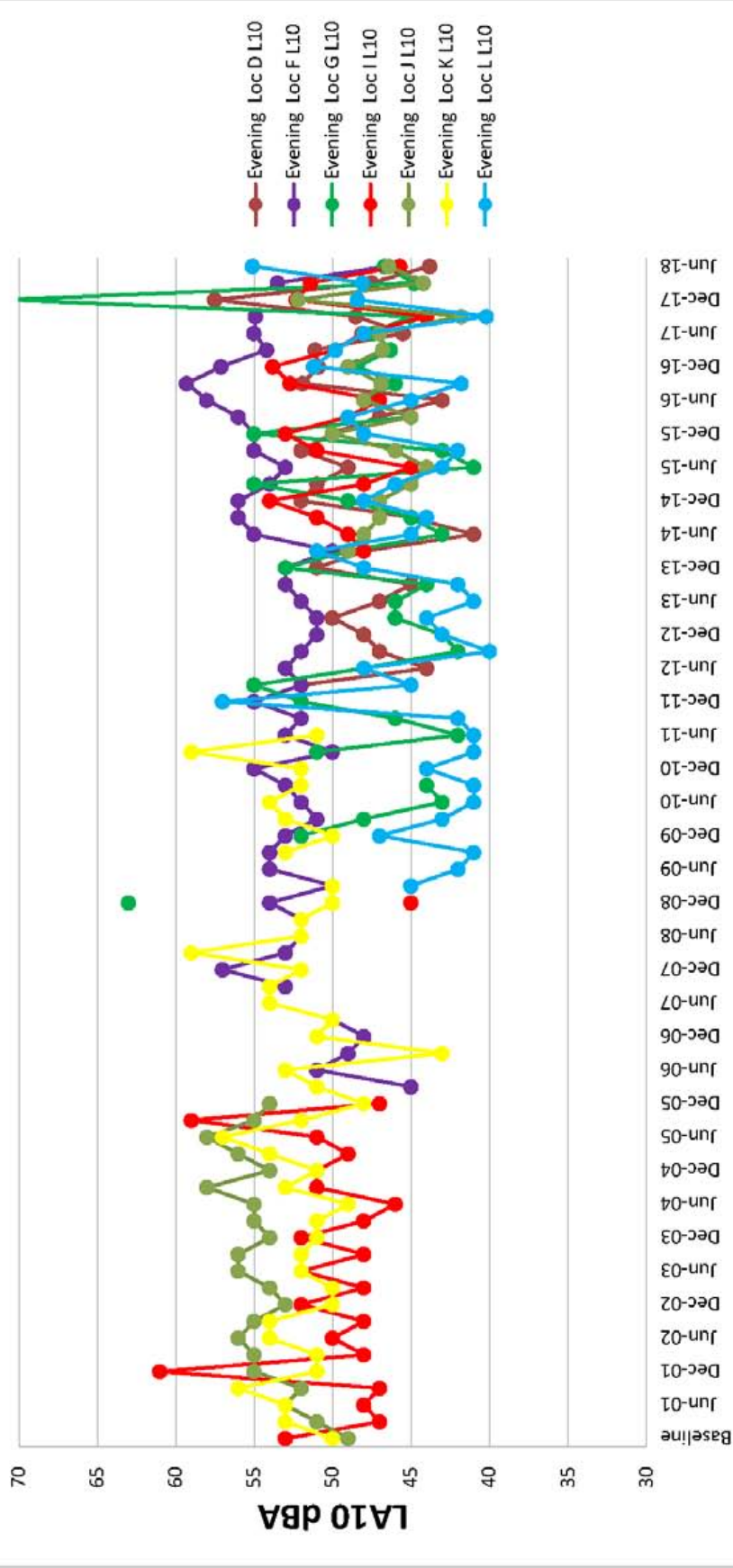


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Figure 5 Long term Evening LA10 Noise Levels

Evening LA10 Noise Level Trend



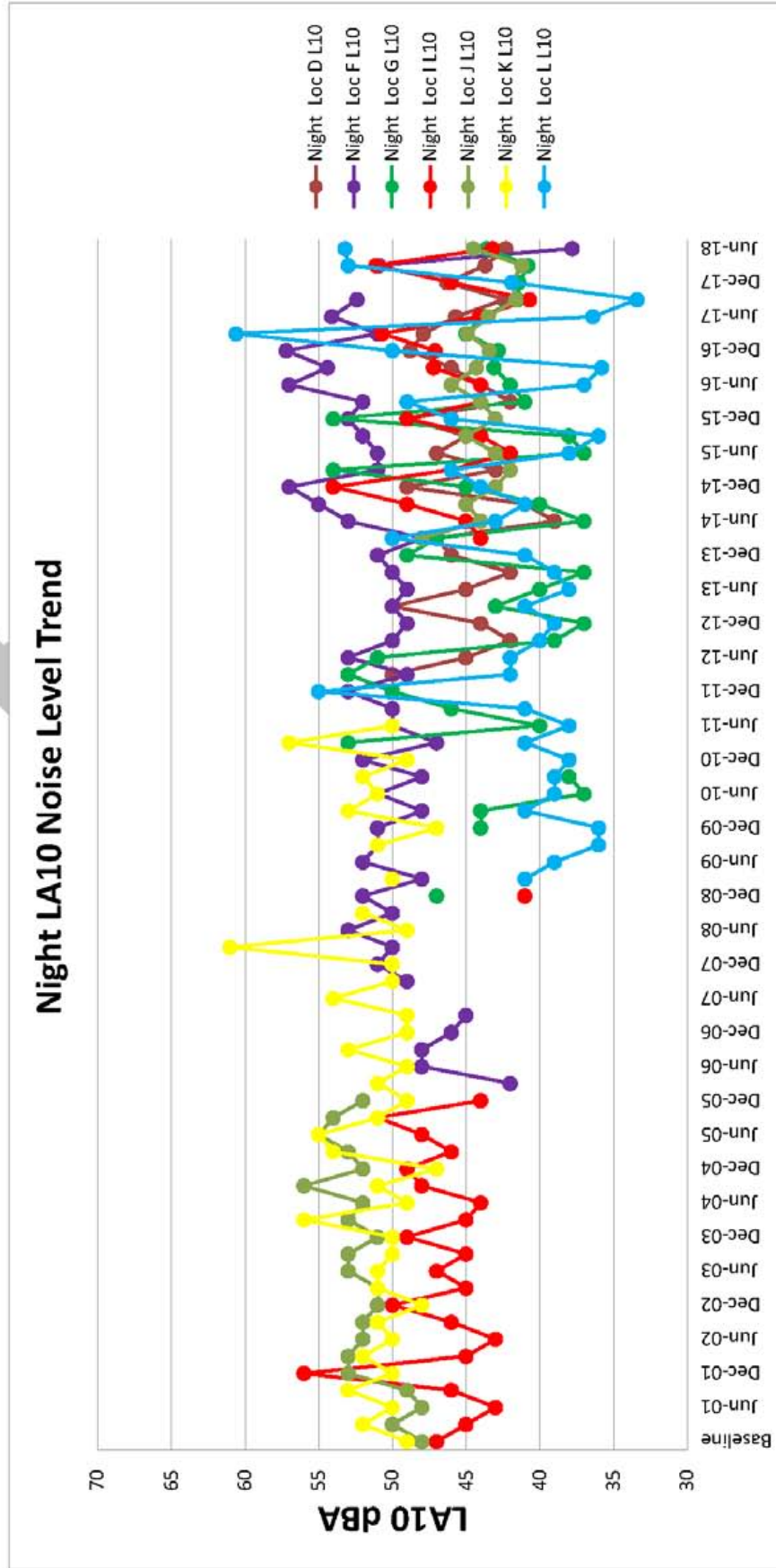
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Figure 6 Long term Night-time LA10 Noise Levels



5.2.2.1 Baseline

Table 15 presents the ambient LA10 noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring period.

Table 15 LA10 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ³
		Baseline	June 2018	
D Black Hill School, Black Hill	Day	N/A ²	54	N/A
	Evening	N/A ²	44	N/A
	Night	N/A ²	42	N/A
F Lot 684 Black Hill Road, Black Hill	Day	51	53	2
	Evening	49	46	-3
	Night	48	38	-10
G 156 Buchanan Road, Buchanan	Day	N/A ²	48	N/A
	Evening	N/A ²	47	N/A
	Night	N/A ²	44	N/A
I 49 Magnetic Drive, Ashtonfield	Day	50	55	5
	Evening	53	46	-7
	Night	47	43	-4
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	59	N/A
	Evening	N/A ²	55	N/A
	Night	N/A ²	53	N/A
J 220 Parish Drive, Thornton	Day	51	47	-4
	Evening	49	46	-3
	Night	48	45	-3

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB.

5.2.2.2 Previous Quarter

Table 16 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the previous monitoring period.

Table 16 LA10 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		March 2018	June 2018	
D Black Hill School, Black Hill	Day	55	54	-1
	Evening	48	44	-4
	Night	44	42	-2
F Lot 684 Black Hill Road, Black Hill	Day	57	53	-4
	Evening	54	46	-8
	Night	51	38	-13
G 156 Buchanan Road, Buchanan	Day	48	48	0
	Evening	45	47	2
	Night	41	44	3
I 49 Magnetic Drive, Ashtonfield	Day	58	55	-3
	Evening	51	46	-5
	Night	51	43	-8
L 17 Kilshanny Ave, Ashtonfield	Day	48	59	11
	Evening	48	55	7
	Night	53	53	0
J 220 Parish Drive, Thornton	Day	45	47	2
	Evening	44	46	2
	Night	41	45	4

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.2.2.3 Coinciding Period Last Year

Table 17 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 17 LA10 Result Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		June 2017	June 2018	
D Black Hill School, Black Hill	Day	55	54	-1
	Evening	46	44	-2
	Night	46	42	-4
F Lot 684 Black Hill Road, Black Hill	Day	59	53	-6
	Evening	55	46	-9
	Night	54	38	-16
G 156 Buchanan Road, Buchanan	Day	50	48	-2
	Evening	47	47	0
	Night	44	44	0
I 49 Magnetic Drive, Ashtonfield	Day	53	55	2
	Evening	48	46	-2
	Night	44	43	-1
L 17 Kilshanny Ave, Ashtonfield	Day	50	59	9
	Evening	48	55	7
	Night	36	53	17
J 220 Parish Drive, Thornton	Day	46	47	1
	Evening	47	46	-1
	Night	44	45	1

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.3 Rail Noise Impact

In order to determine compliance with the rail noise criteria, a noise logger was positioned at Location J. The train loading times during the noise monitoring period are presented in **Table 18**.

Table 18 Coal Train Loading Operations Log

Date	Coal Train Loading Time	Period
26/6/18	13:40-17:00	Day
27/6/18	15:17-18:44	Day/Evening
28/6/18	7:55-10:42 15:38-18:22	Day Day/Evening
29/6/18	12:35-15:29	Day
30/6/18	7:50-11:18 12:15-13:36	Day
1/7/18	10:00-12:50	Day
2/6/18	11:15-14:16	Day

The measured $L_{Aeq(Period)}$ noise level for each period from rail traffic at Location J are presented in **Table 19**.

Table 19 Rail Noise Impact Monitoring Results

Location	Date	Period	Measured $L_{Aeq(Period)}$	Criteria $L_{Aeq(Period)}$	Compliance
J	26/6/18	Day	37	55	Yes
	27/6/18	Day	36	55	Yes
		Evening	38	45	Yes
	28/6/18	Day	40	55	Yes
		Evening	37	45	Yes
	29/6/18	Day	39	55	Yes
	30/6/18	Day	43	55	Yes
	1/7/18	Day	37	55	Yes
	2/6/18	Day	35 ¹	55	Yes

1. Result includes rail entry movement only. Logger retrieved prior to the train leaving the spur.

Results presented in **Table 19** indicate that rail noise levels from the Bloomfield Rail Spur were in compliance with the Abel Mine Project Approval during the noise monitoring period.

6 Conclusion

SLR was engaged by Donaldson Coal Pty Ltd to conduct quarterly noise monitoring surveys for Donaldson Coal Mine and Abel Coal Mine in accordance with the Abel Coal Mine Noise Monitoring Program, dated 12 August 2014.

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

Operator-attended and unattended noise measurements were conducted for the June 2018 quarter at six focus locations surrounding the mine.

Abel portal operations were not observed to be audible at any locations during the monitoring period. Contributed noise levels from Abel Mine did not exceed noise emission goals (including night-time sleep arousal criteria) and compliance with the Abel Mine *Project Approval* was indicated at all locations.

A comparison of ambient LA_{10} and LA_{90} noise levels recorded during the current monitoring period (June 2018), the baseline monitoring period, the last monitoring period (March 2018), and the coinciding monitoring period from last year (June 2017) has been conducted.

Rail noise levels from the Bloomfield Rail Spur were in compliance with the Abel Mine Project Approval during the noise monitoring period.

Appendix A

Acoustic Terminology
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1 Sound Level or Noise Level

The terms "sound" and "noise" are almost interchangeable, except that in common usage "noise" is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or L_p are commonly used to represent Sound Pressure Level. The symbol L_A represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2E-5 Pa.

2 "A" Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an "A-weighting" filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120 110	Heavy rock concert Grinding on steel	Extremely noisy
100 90	Loud car horn at 3 m Construction site with pneumatic hammering	Very noisy
80 70	Kerbside of busy street Loud radio or television	Loud
60 50	Department store General Office	Moderate to quiet
40 30	Inside private office Inside bedroom	Quiet to very quiet
20	Unoccupied recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as "linear", and the units are expressed as dB(Z) or dB.

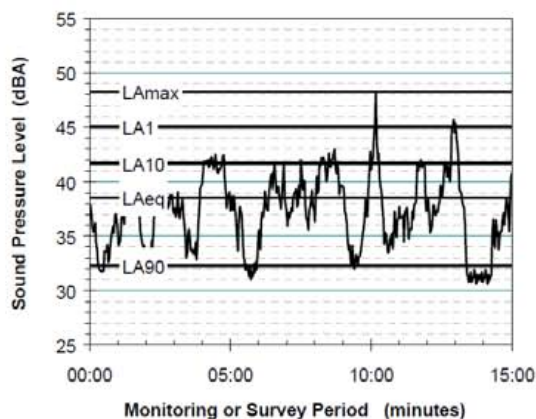
3 Sound Power Level

The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 1E-12 W. The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels L_{AN} , where L_{AN} is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the L_{A1} is the noise level exceeded for 1% of the time, L_{A10} the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

- L_{A1} The noise level exceeded for 1% of the 15 minute interval.
- L_{A10} The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- L_{A90} The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- L_{Aeq} The A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the "repeatable minimum" L_{A90} noise level over the daytime and night-time measurement periods, as required by the EPA. In addition the method produces mean or "average" levels representative of the other descriptors (L_{Aeq} , L_{A10} , etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than "broad band" noise.

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

Appendix A

Acoustic Terminology
Report 630.01053
Page 2 of 2

7 Frequency Analysis

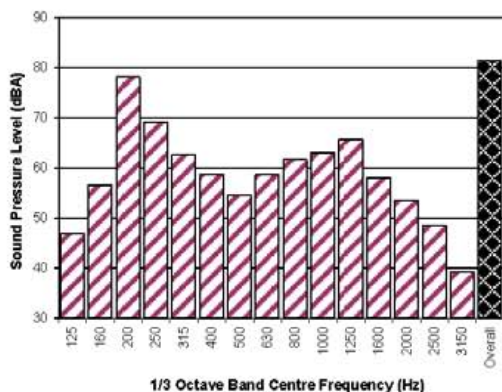
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of "peak" velocity or "rms" velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as "peak particle velocity", or PPV. The latter incorporates "root mean squared" averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (1E-6 mm/s). Care is required in this regard, as other reference levels are used by some organizations.

9 Human Perception of Vibration

People are able to "feel" vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as "normal" in a car, bus or train is considerably higher than what is perceived as "normal" in a shop, office or dwelling.

10 Over-Pressure

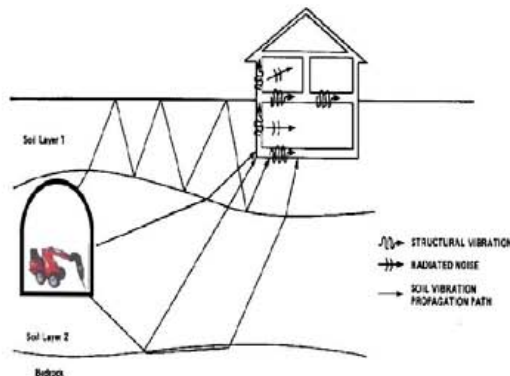
The term "over-pressure" is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

11 Regenerated Noise

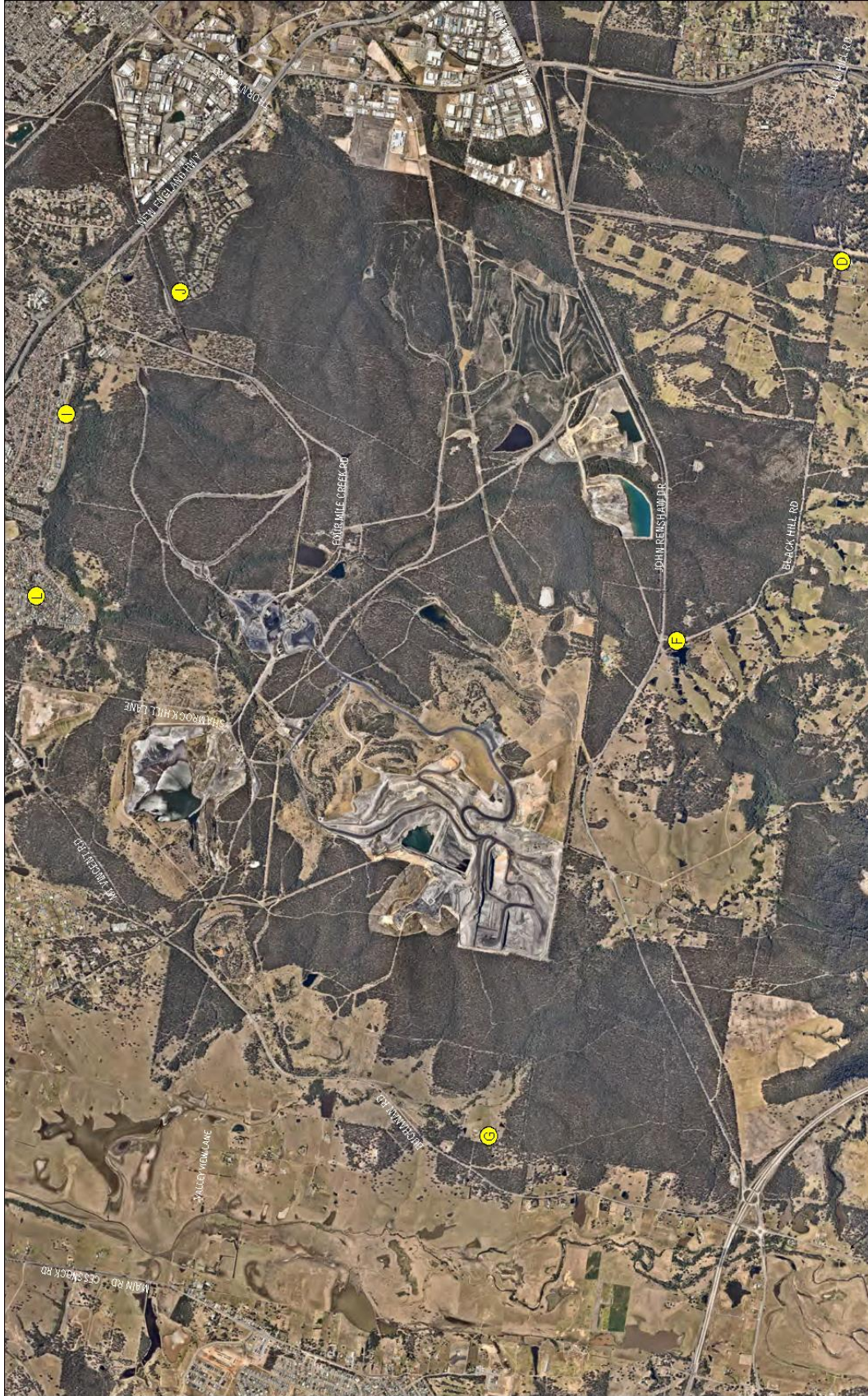
Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed "regenerated noise", "structure-borne noise", or sometimes "ground-borne noise". Regenerated noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of regenerated noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

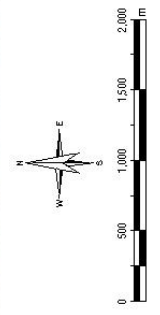
The following figure presents the various paths by which vibration and regenerated noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term "regenerated noise" is also used to describe other types of noise that are emitted from the primary source as a different form of energy. One example would be a fan with a silencer, where the fan is the energy source and primary noise source. The silencer may effectively reduce the fan noise, but some additional noise may be created by the aerodynamic effect of the silencer in the airstream. This "secondary" noise may be referred to as regenerated noise.



Donaldson Coal
Noise Monitoring
Noise Monitoring Locations
APPENDIX B



LEGEND
● Noise Monitoring Locations

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Date:	11/01/2018
Drawn by:	NT
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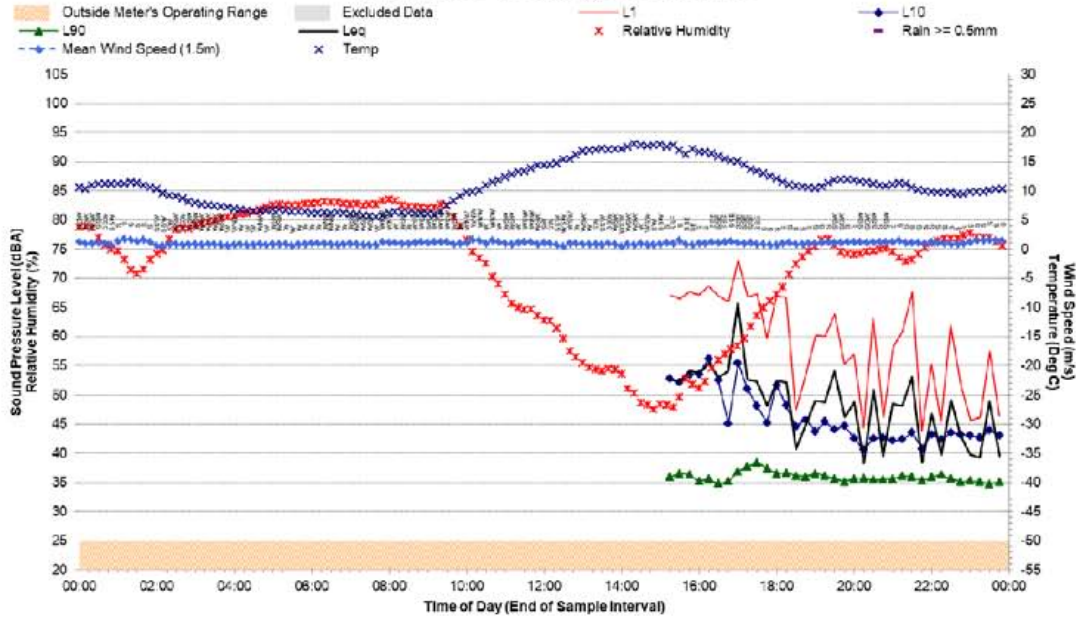
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APPENDIX C

Statistical Ambient Noise Levels

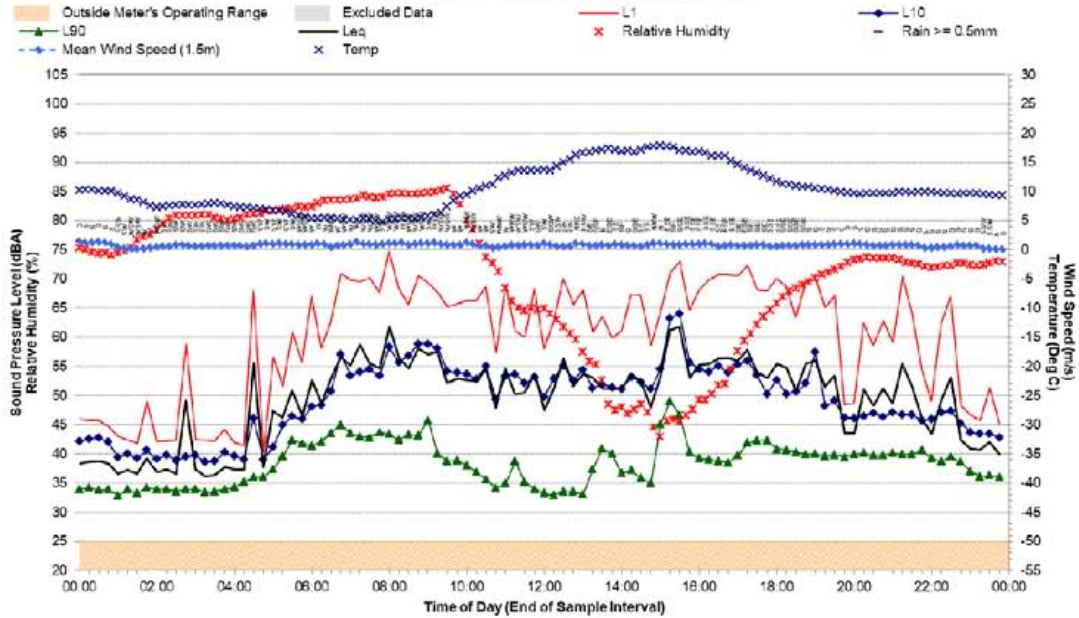
Statistical Ambient Noise Levels

Location D - Sunday, 24 June 2018

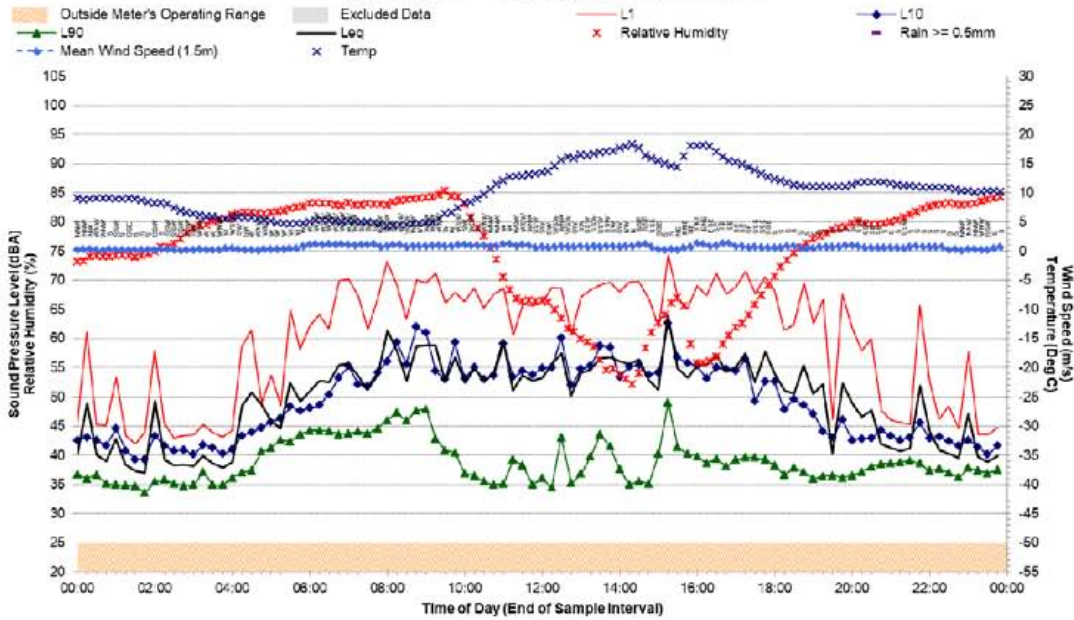


Statistical Ambient Noise Levels

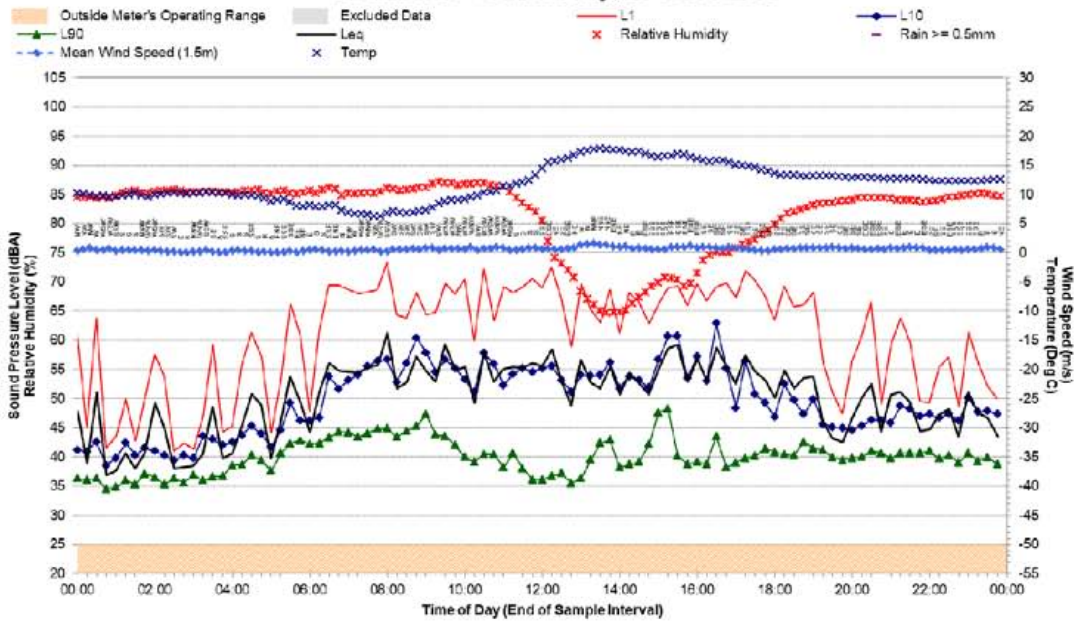
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Statistical Ambient Noise Levels Location D - Tuesday, 26 June 2018

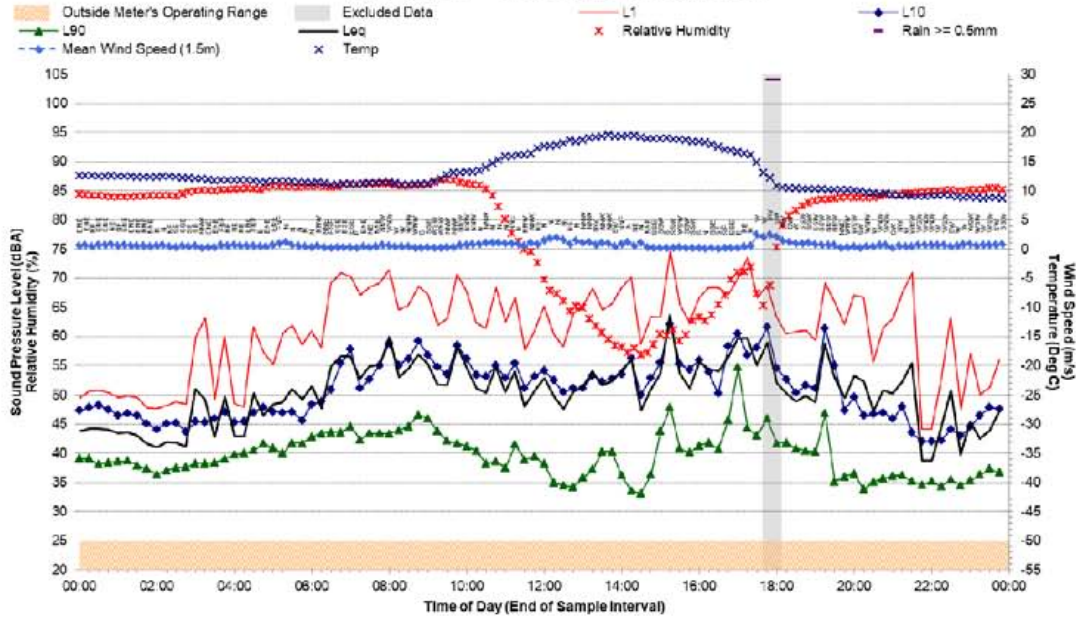


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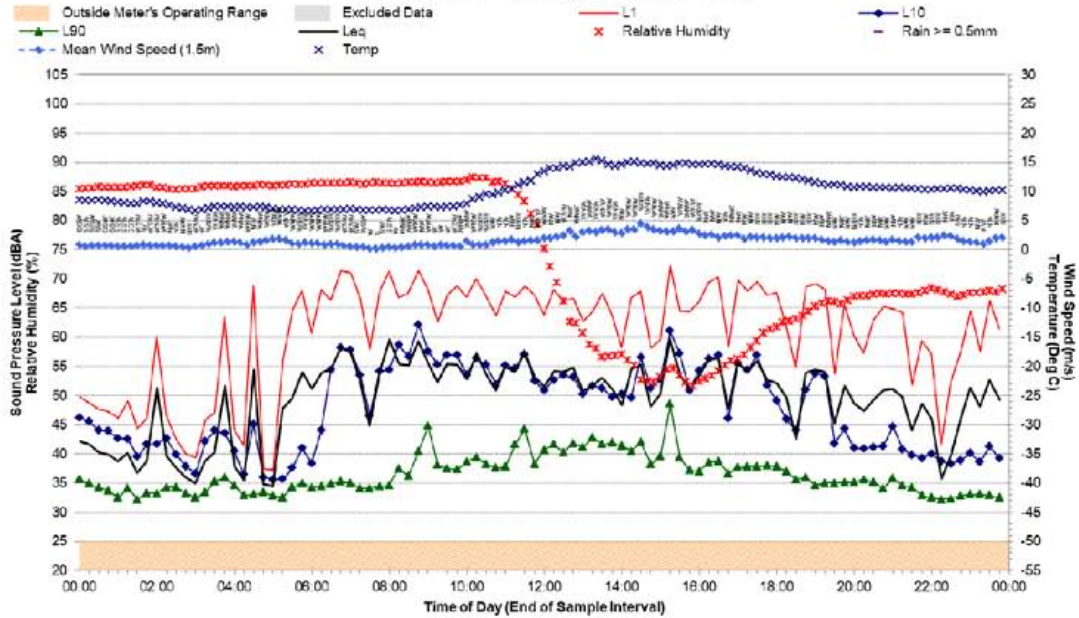
Statistical Ambient Noise Levels

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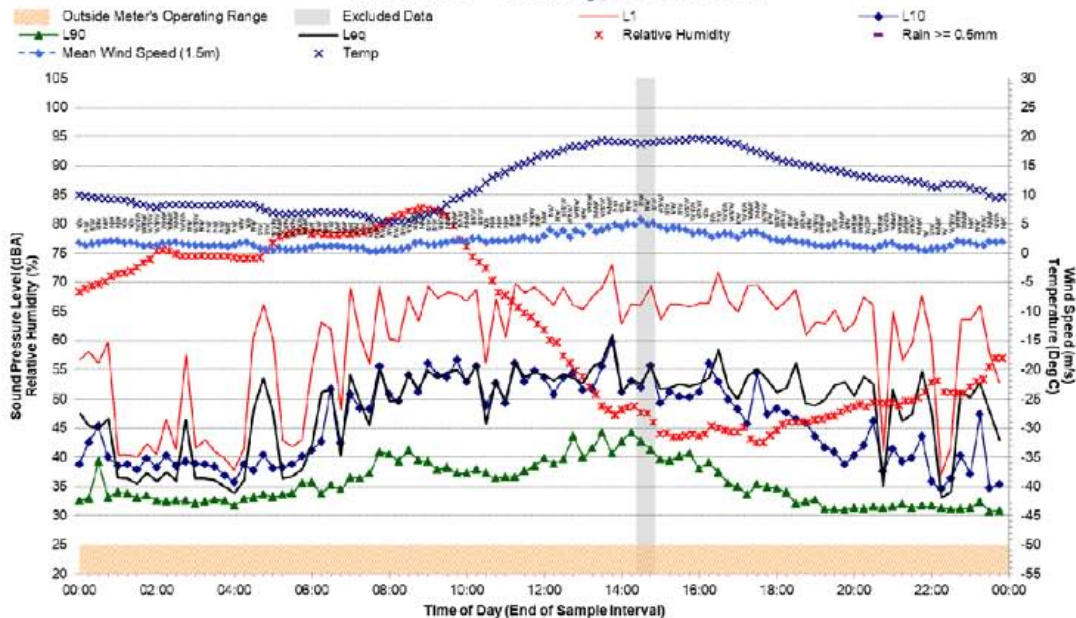


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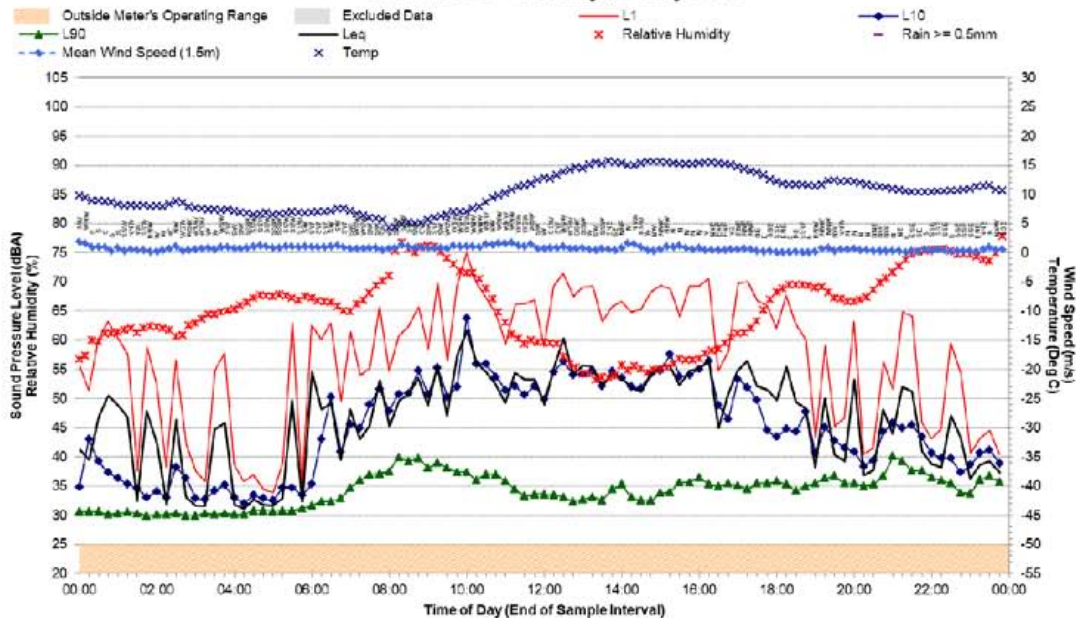
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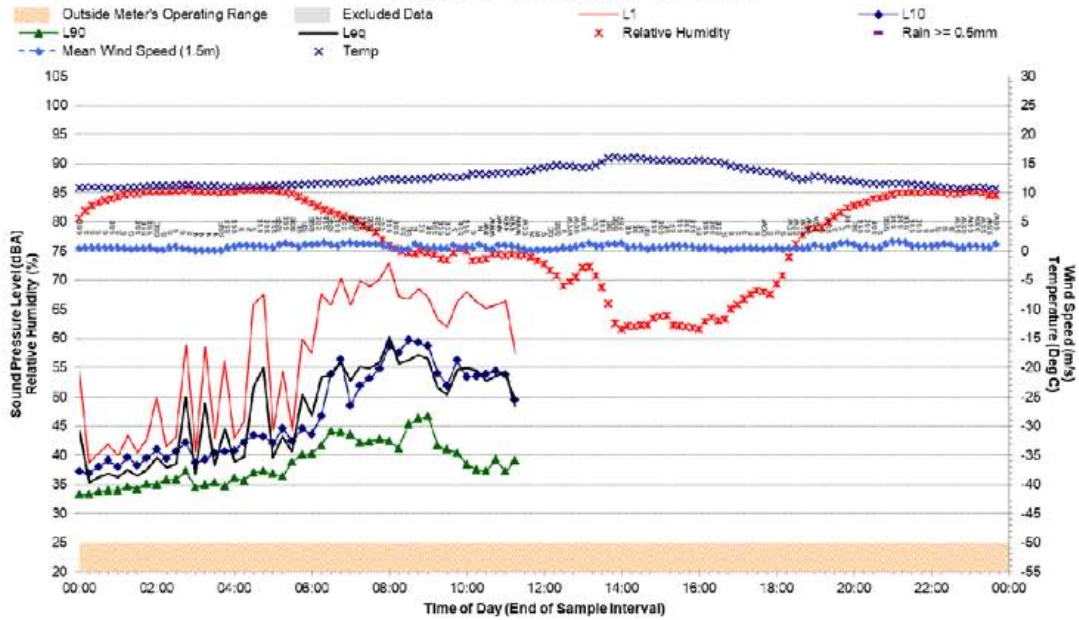
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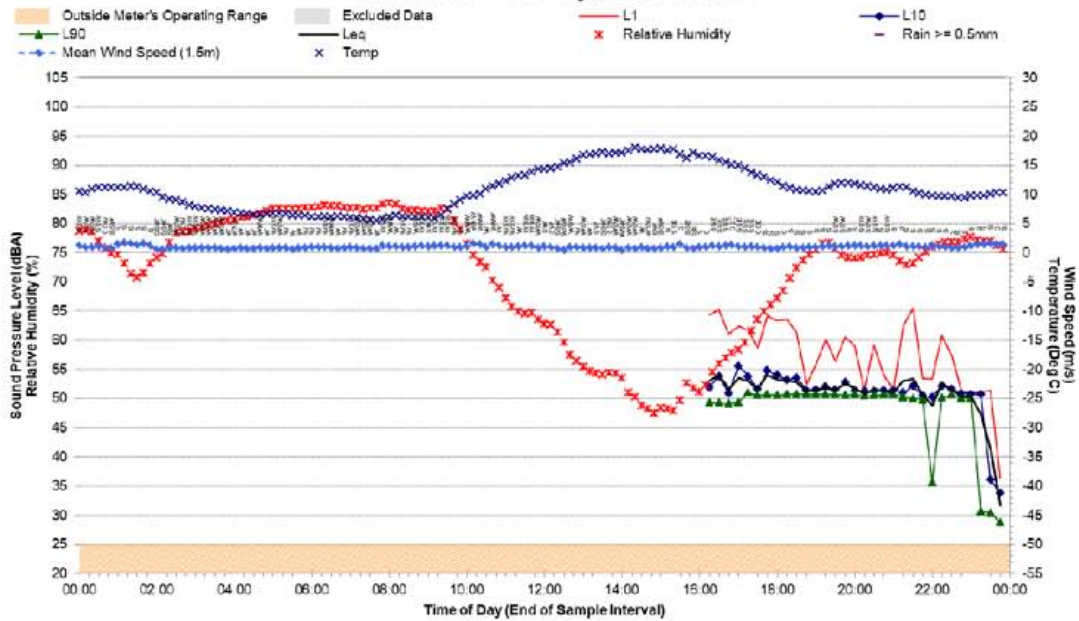
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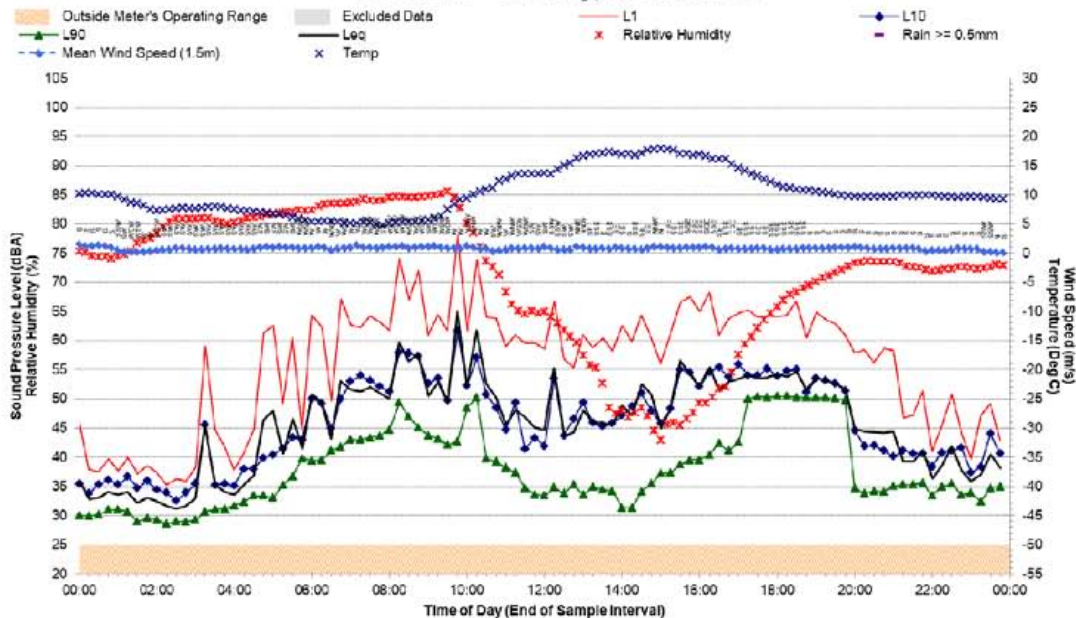
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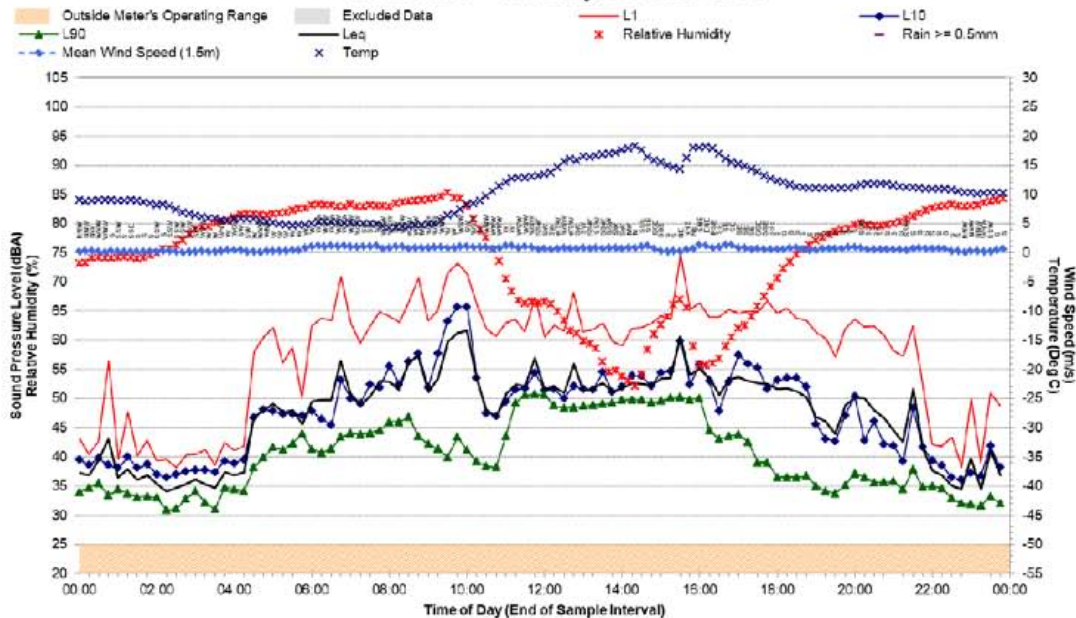
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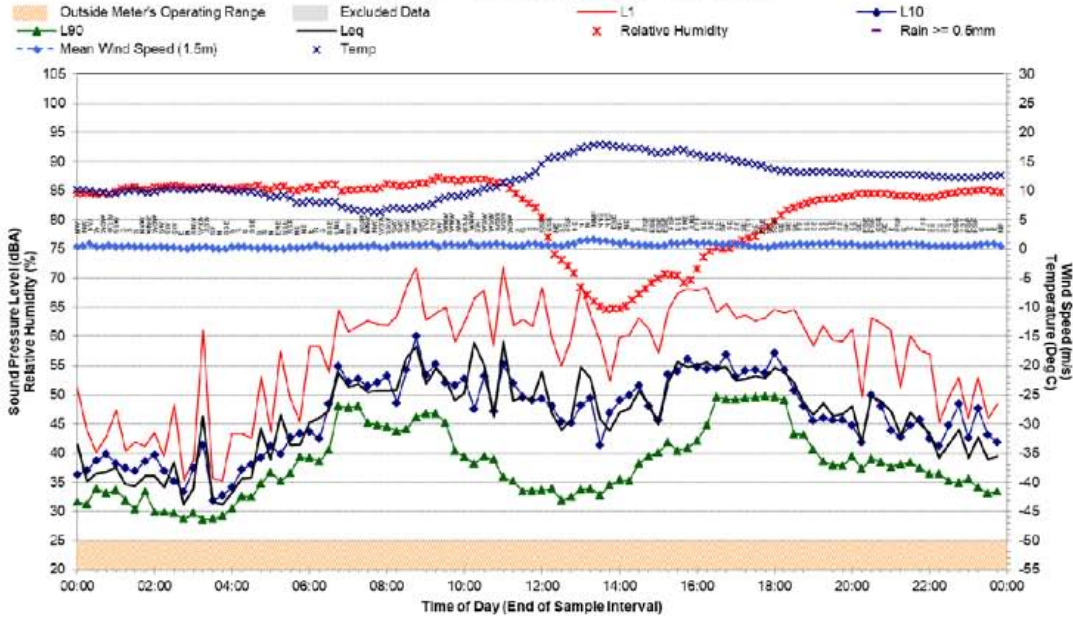
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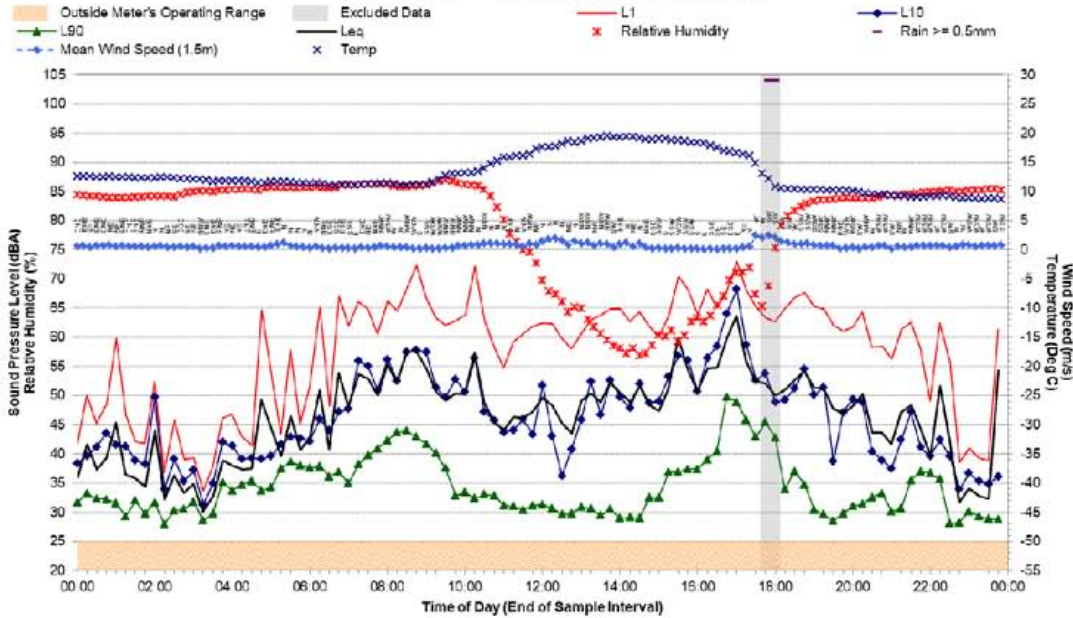
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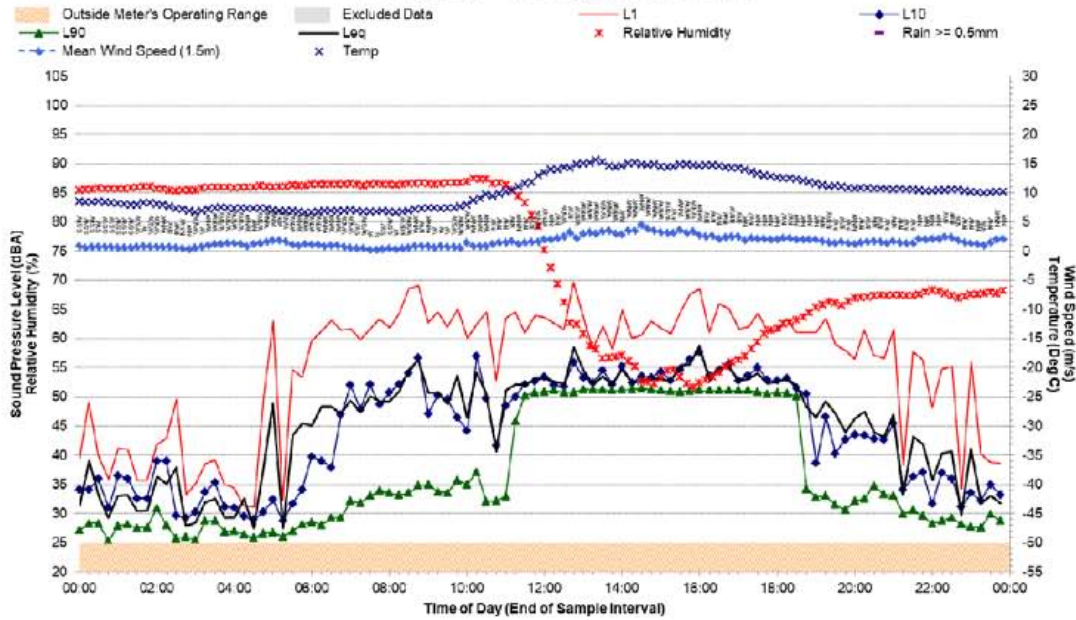
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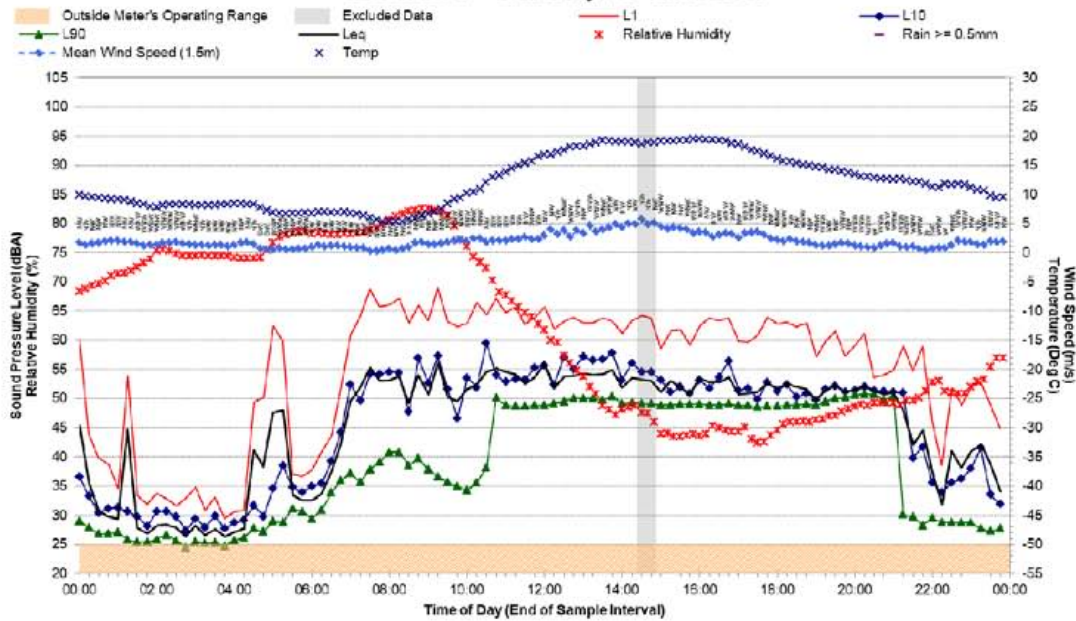
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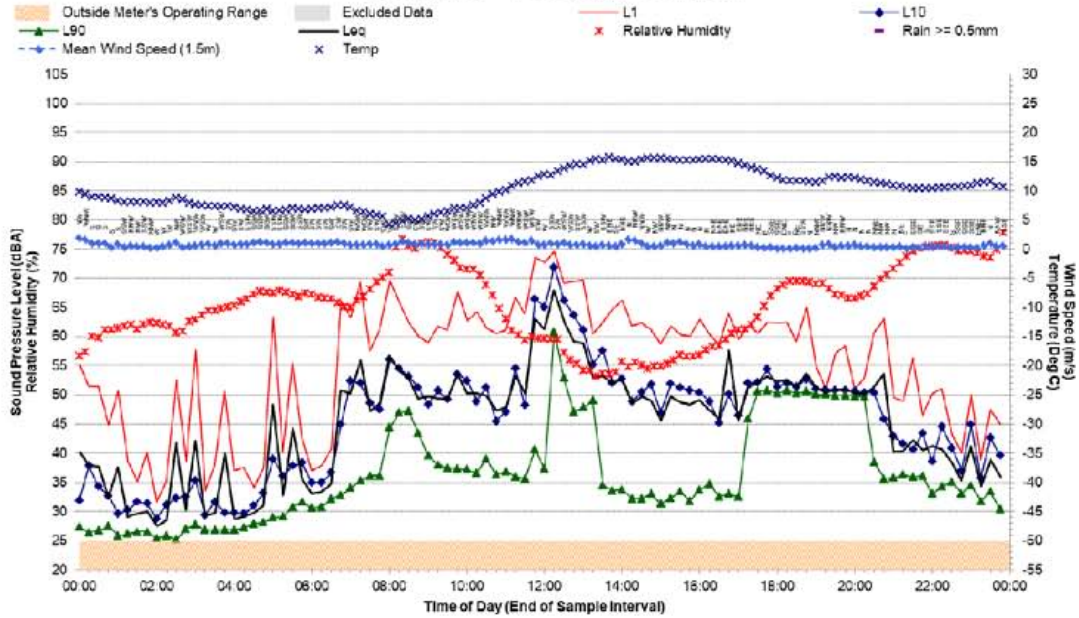
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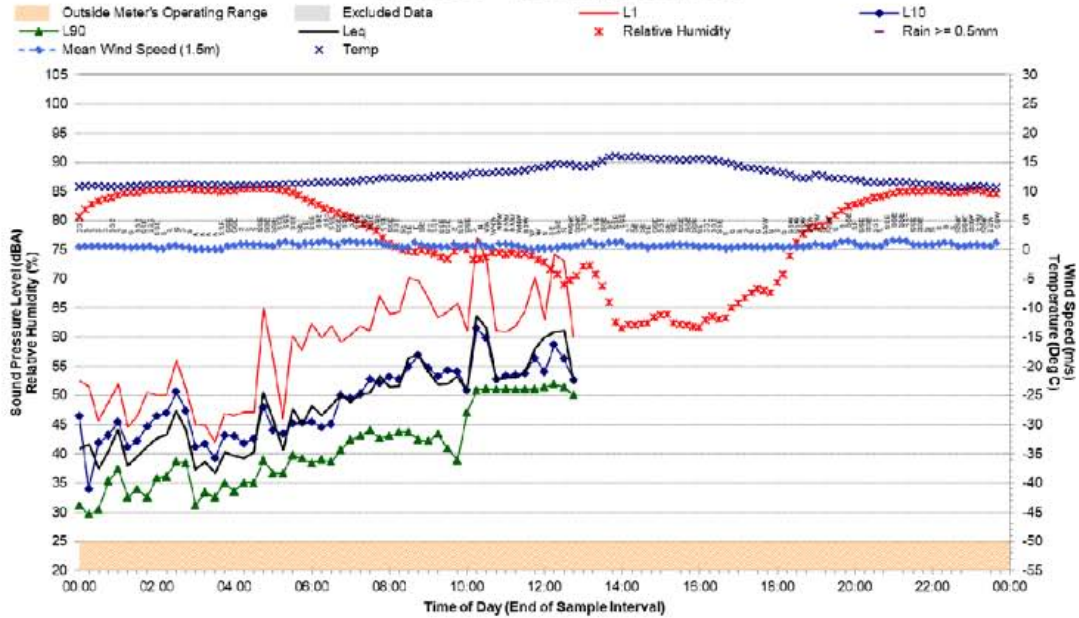
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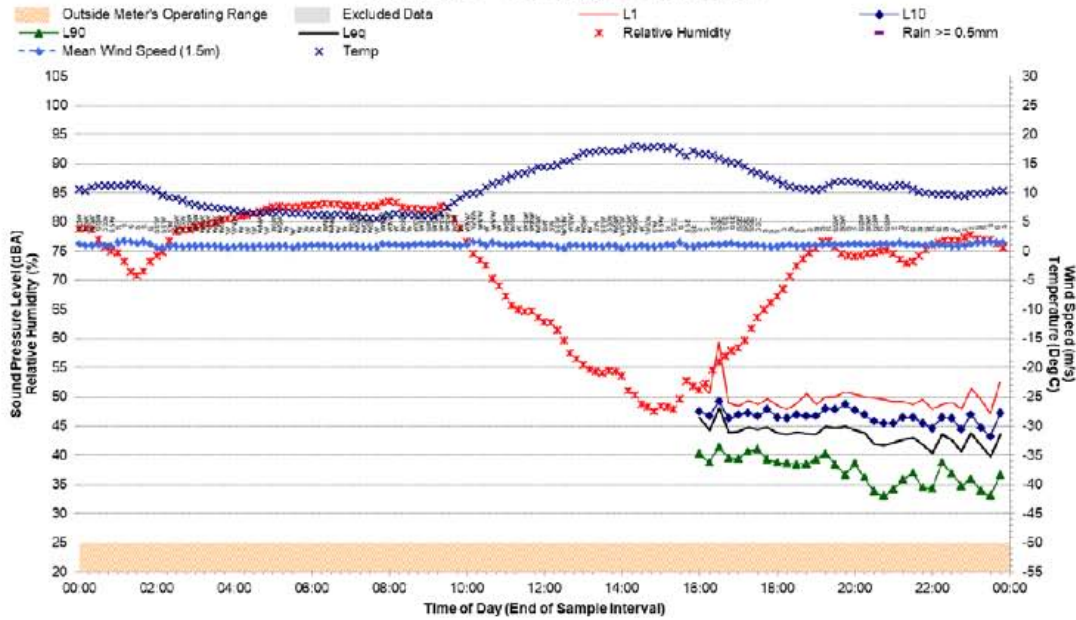
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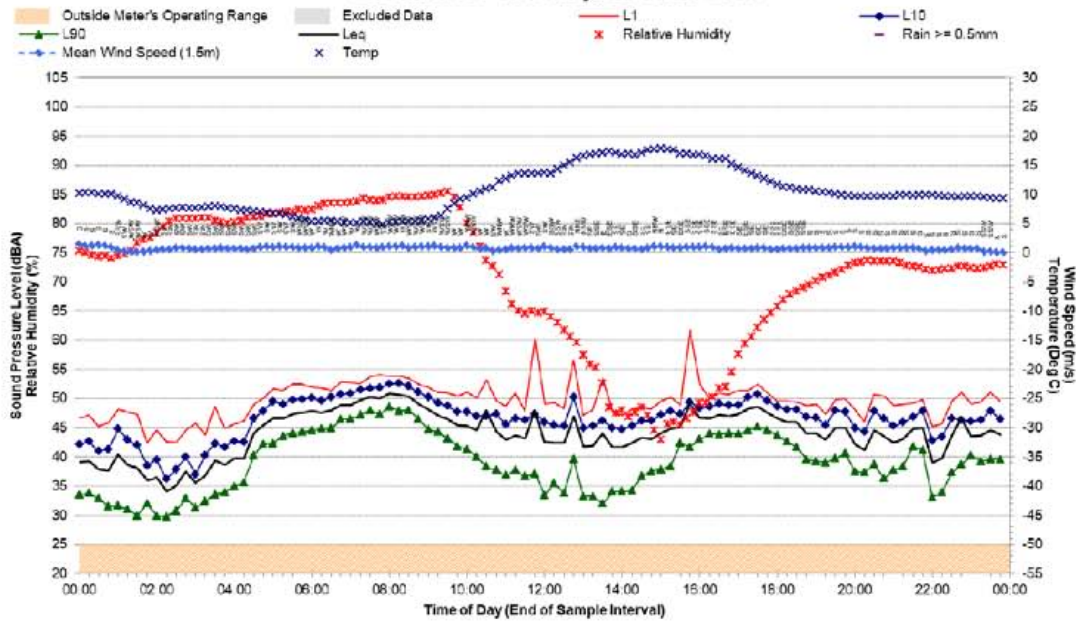
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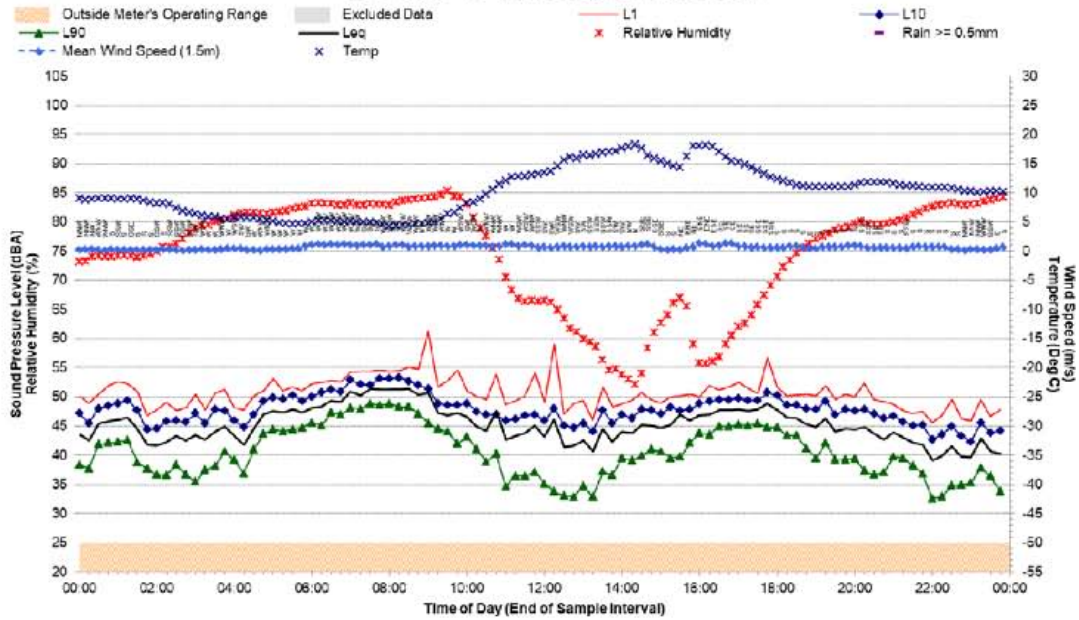
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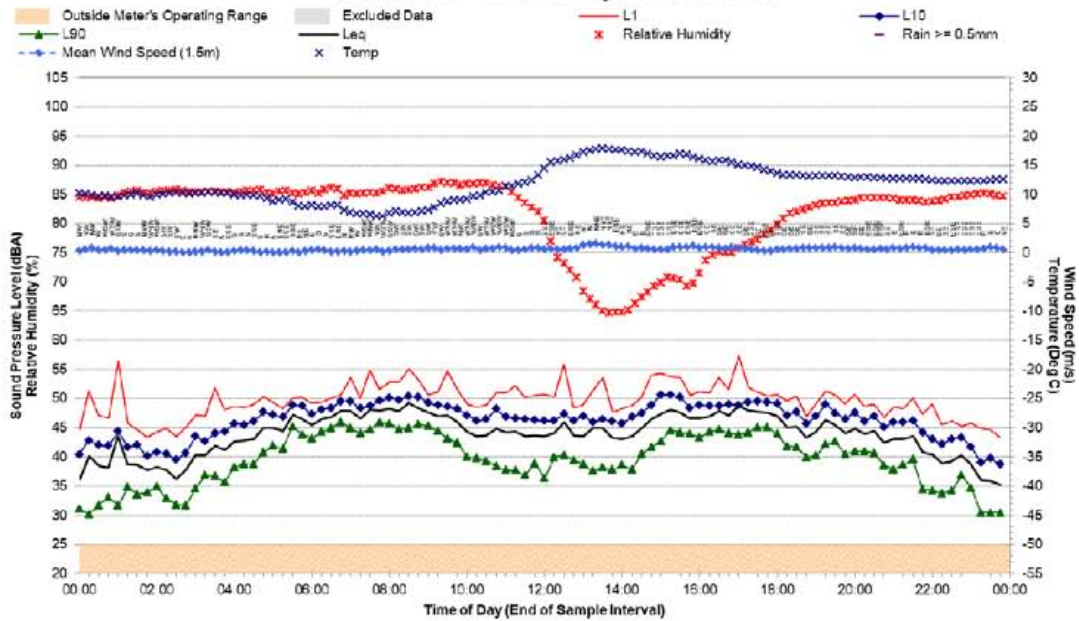
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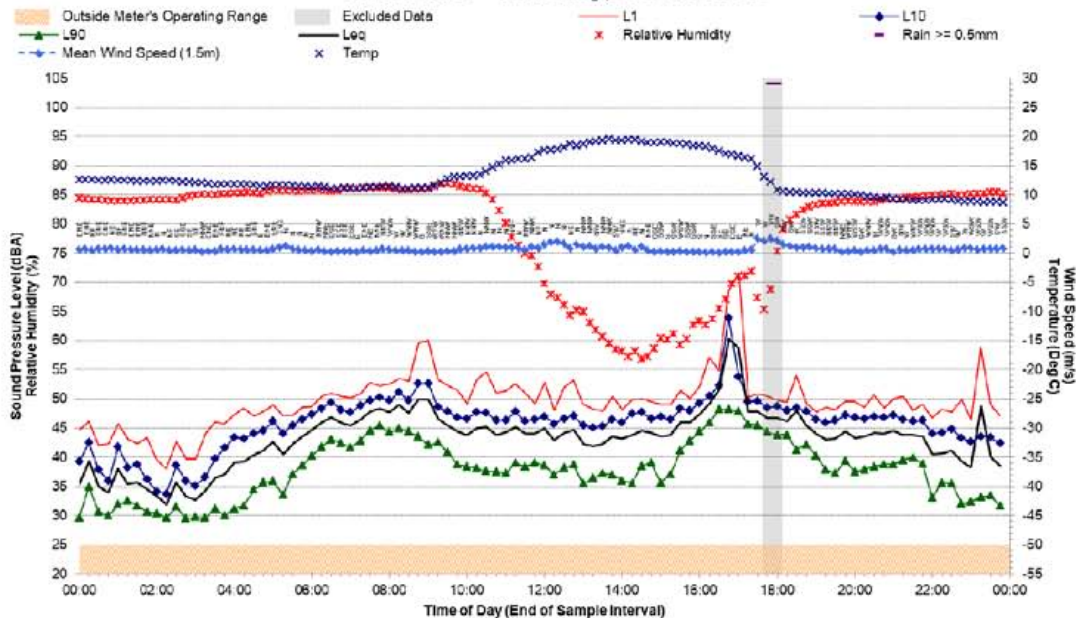
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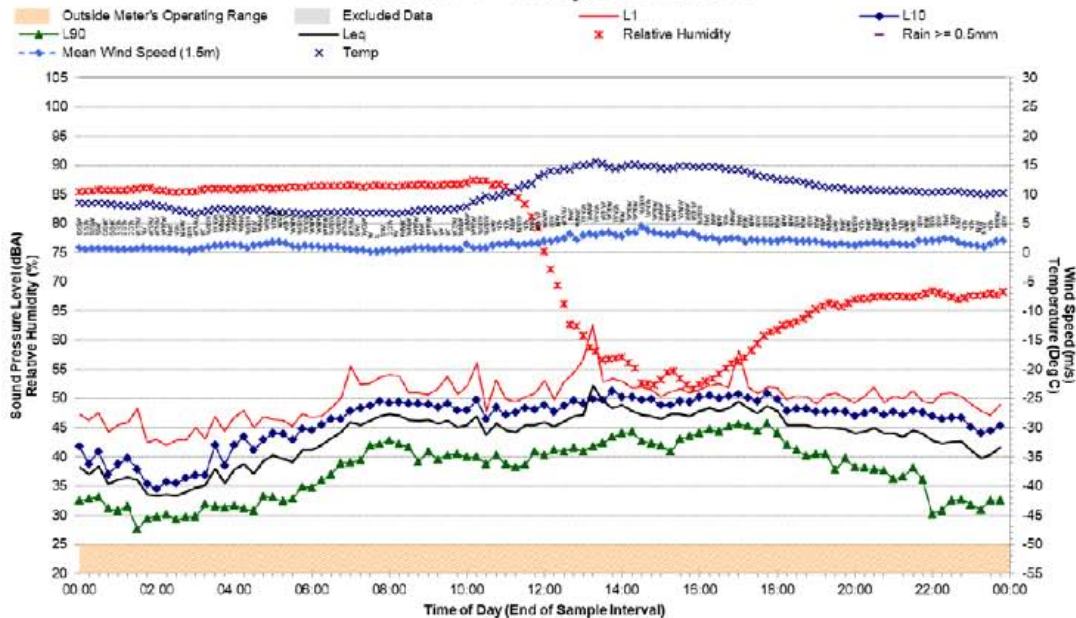
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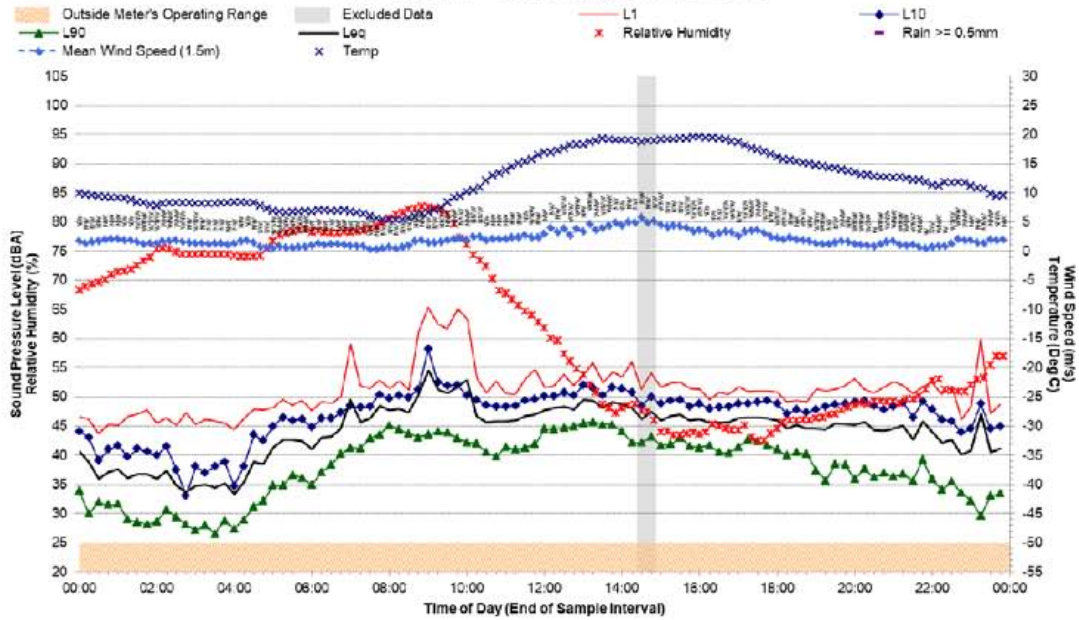
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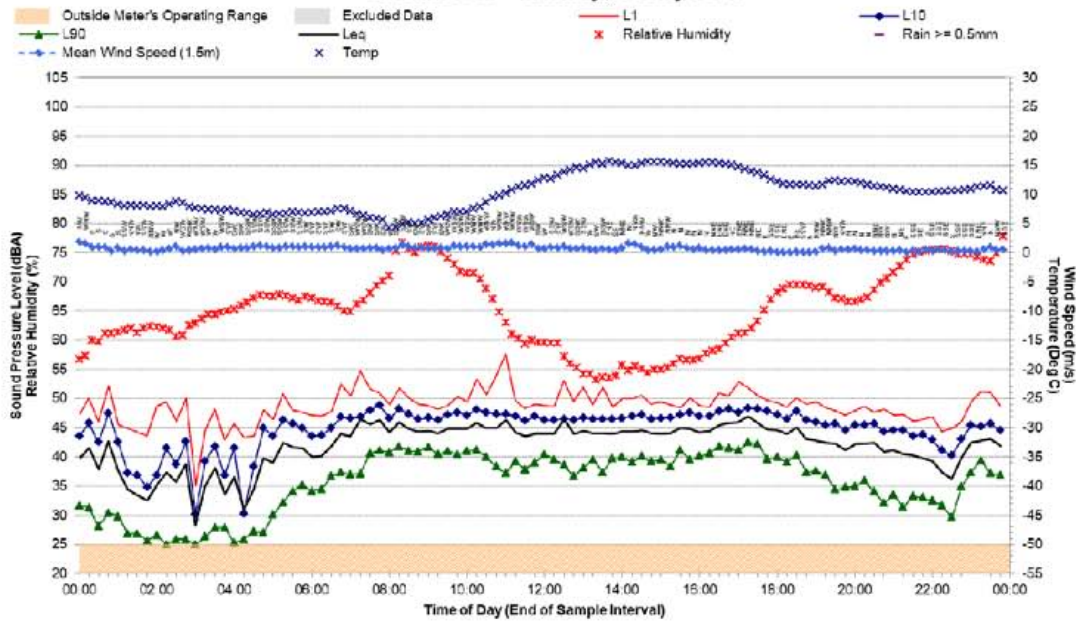
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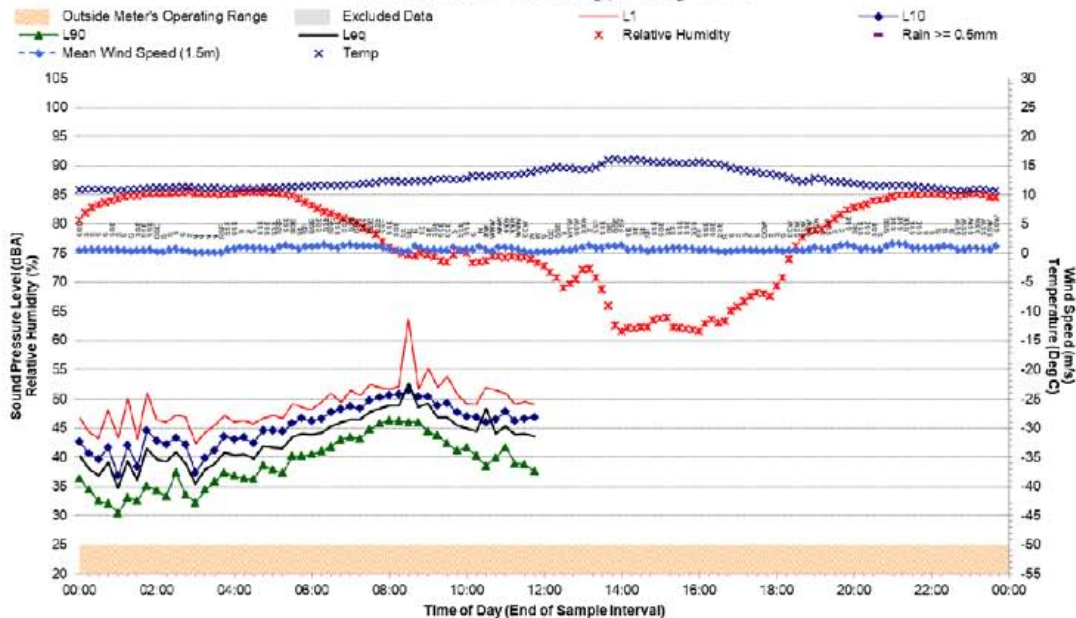
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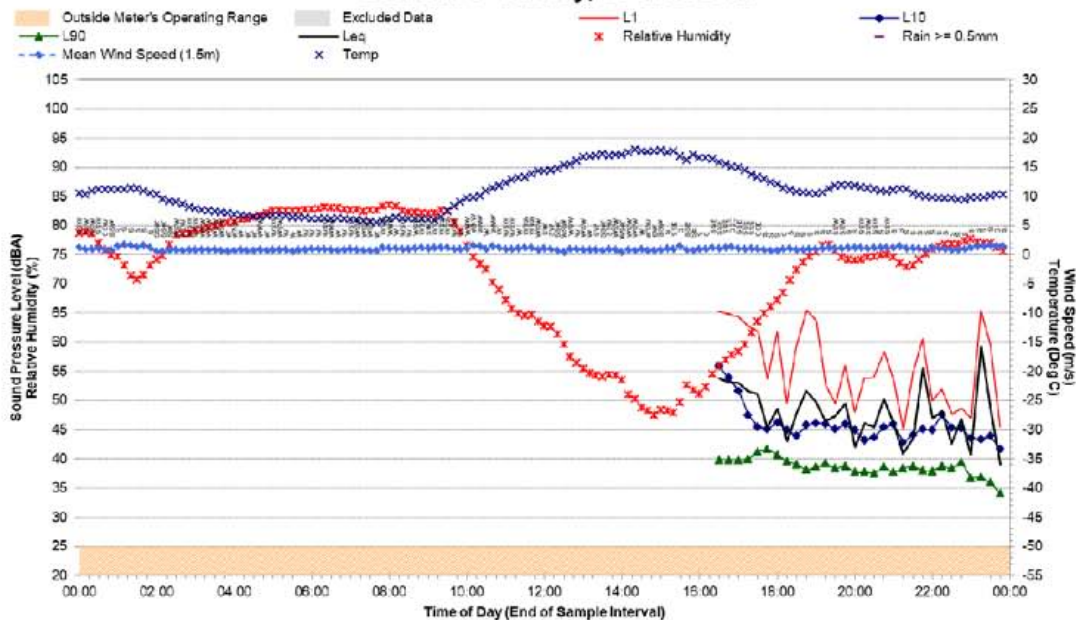
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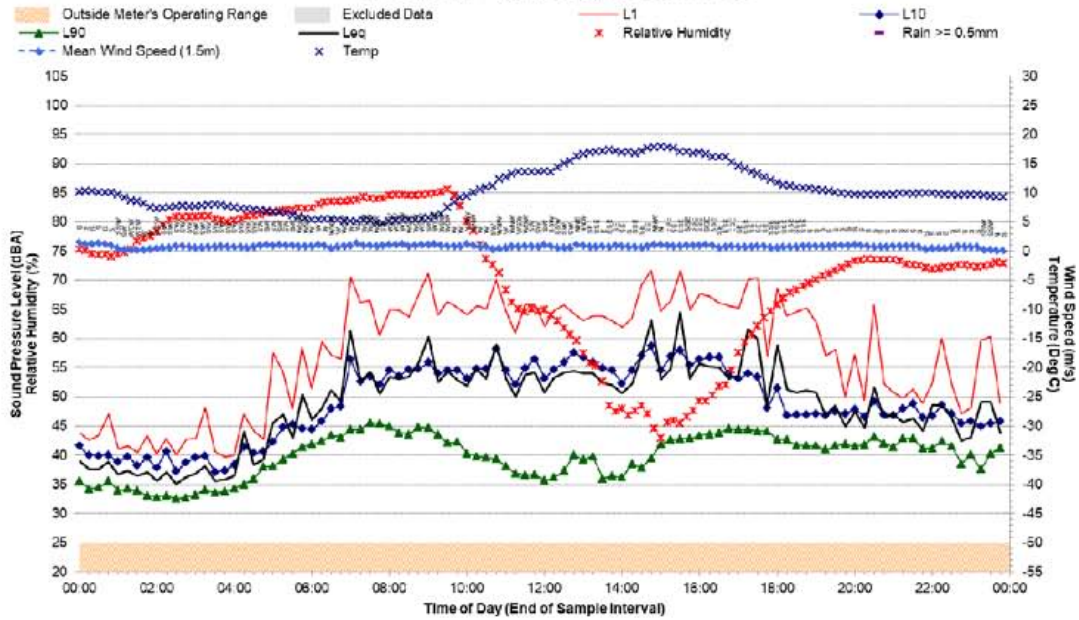


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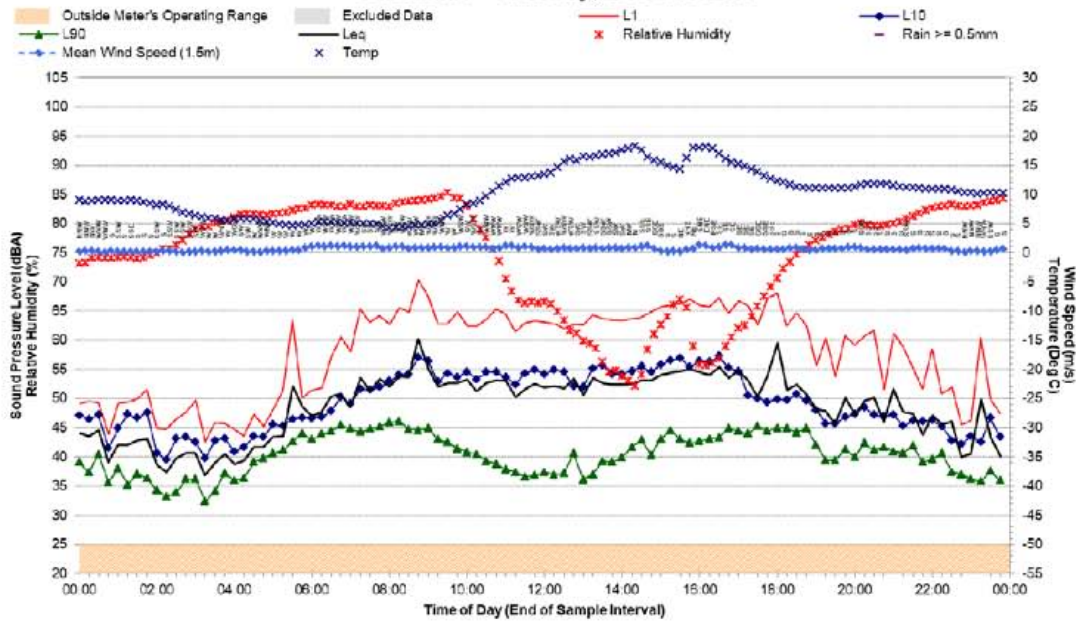
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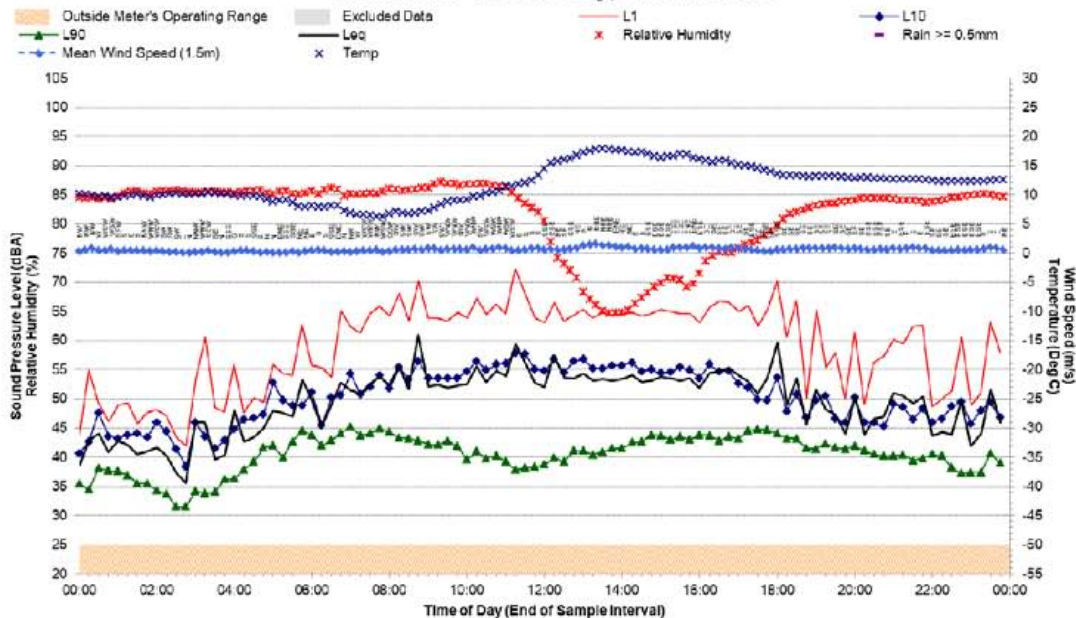


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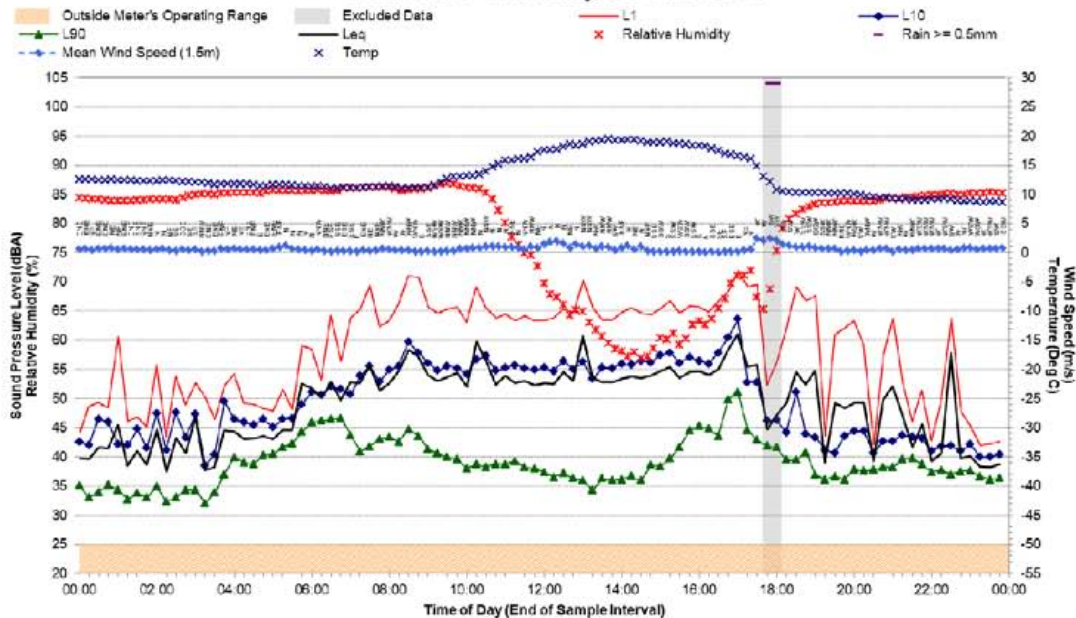
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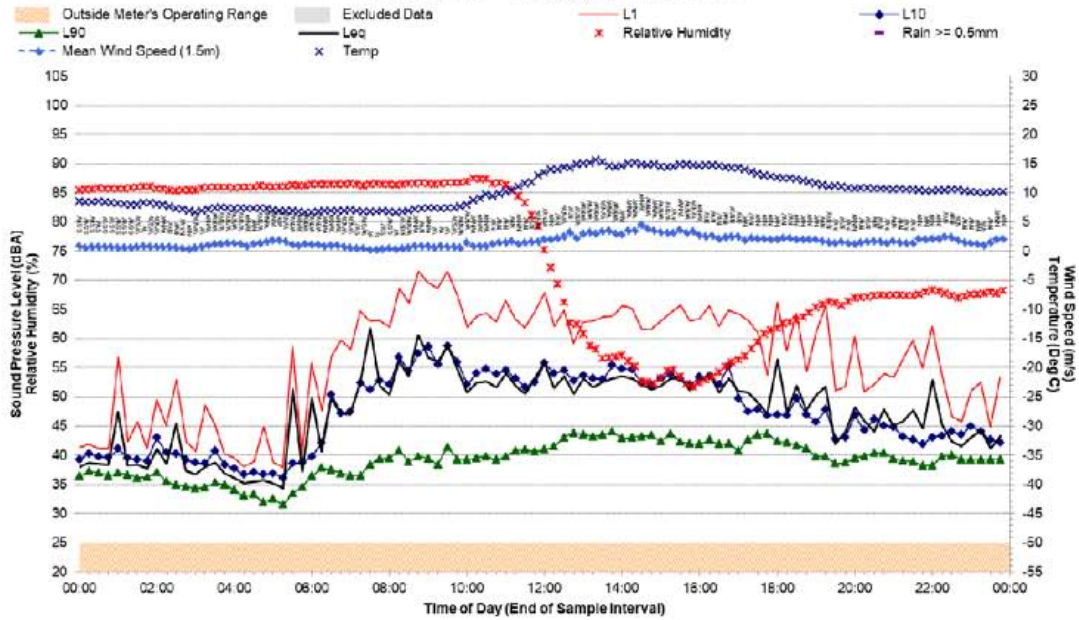


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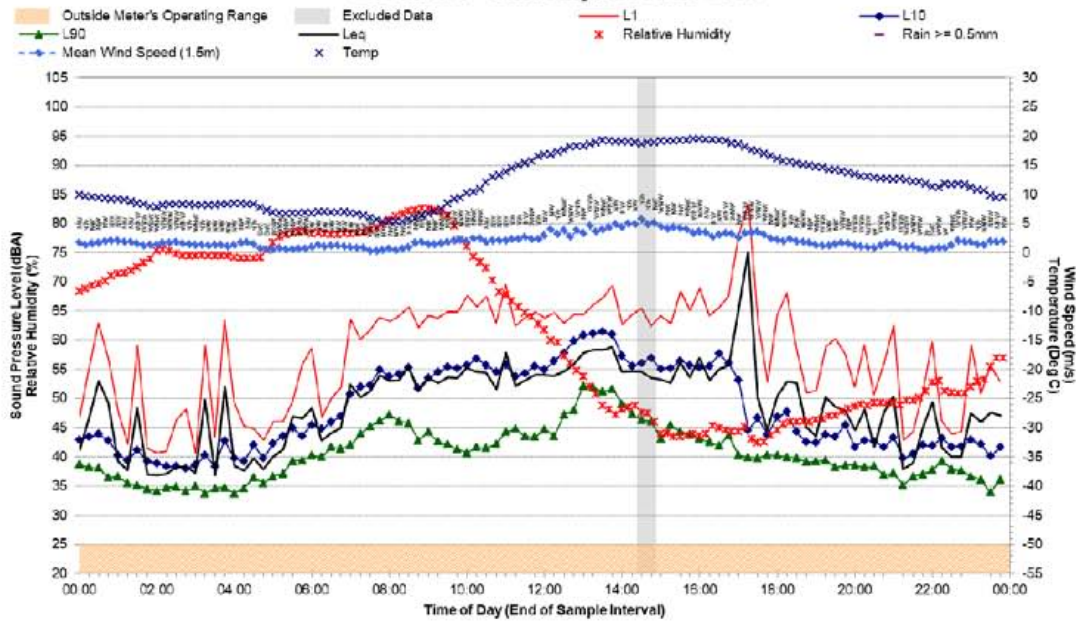
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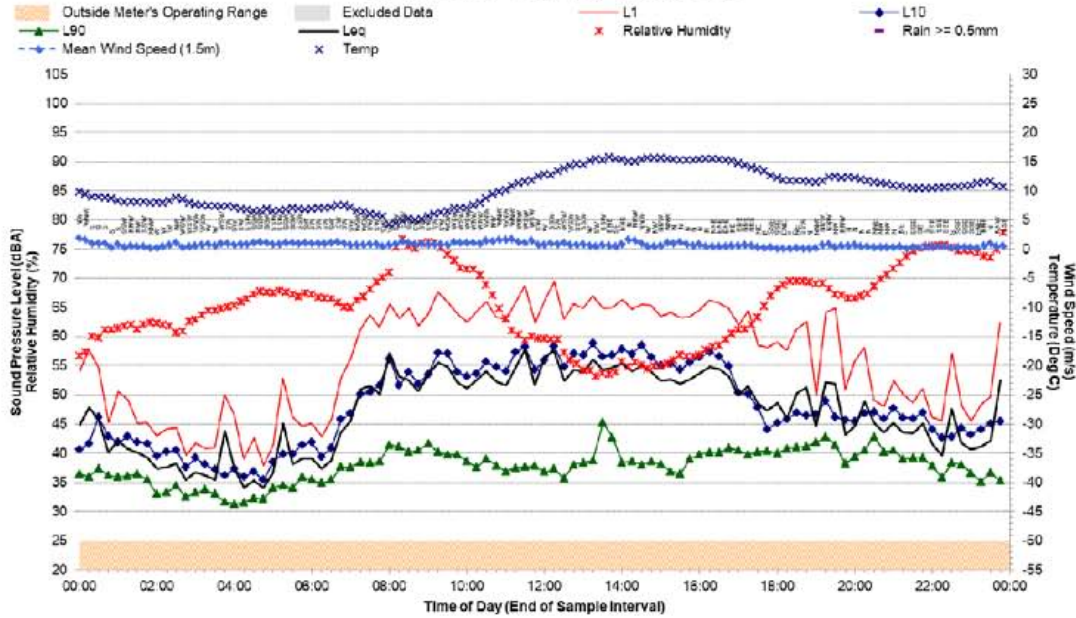


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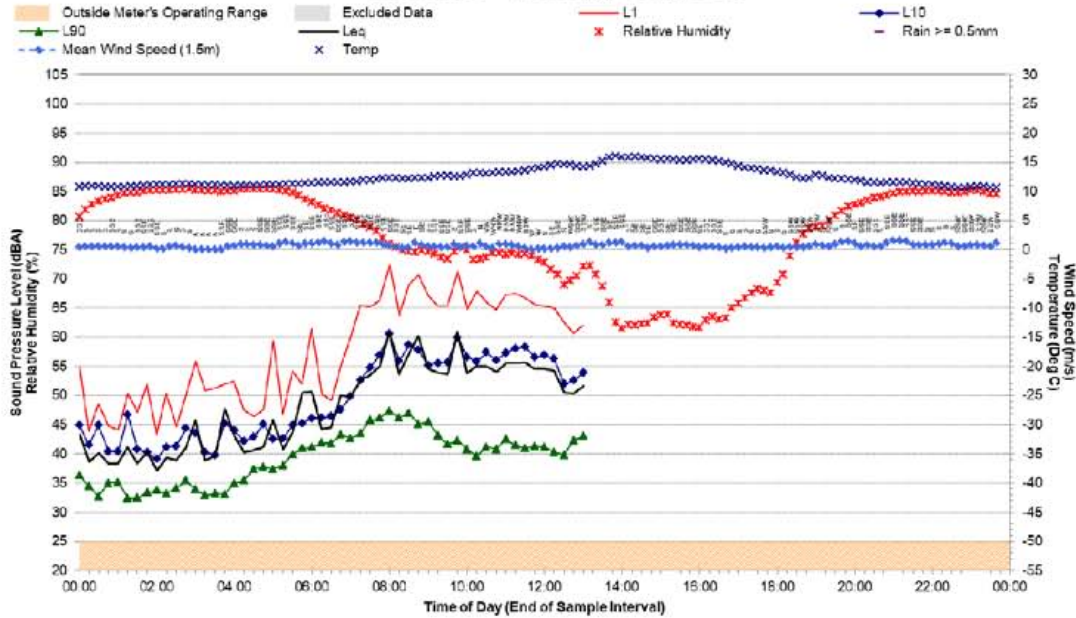
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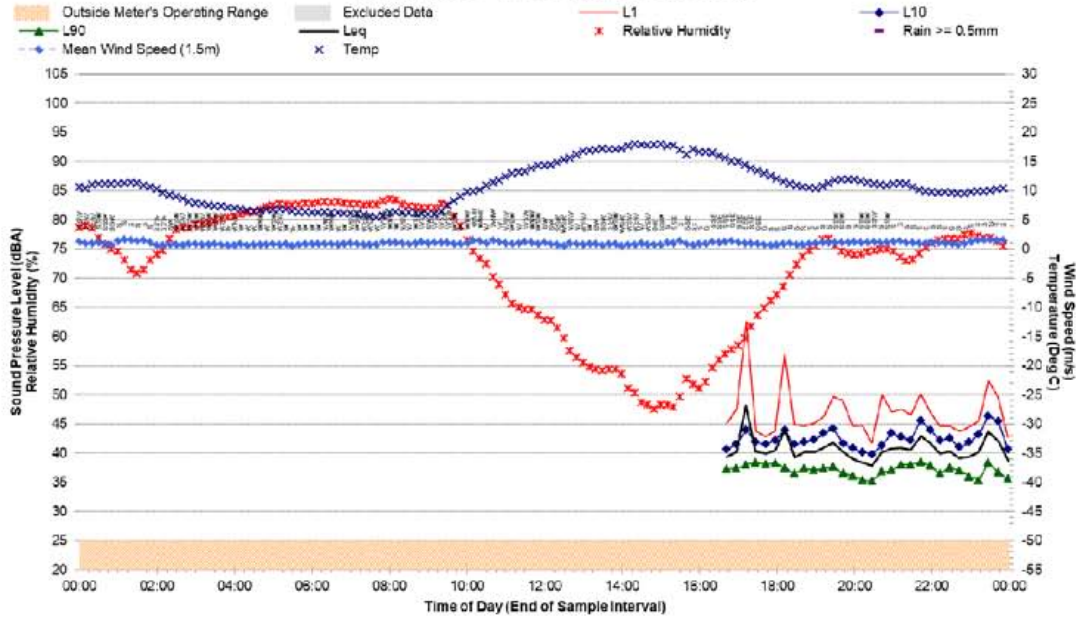


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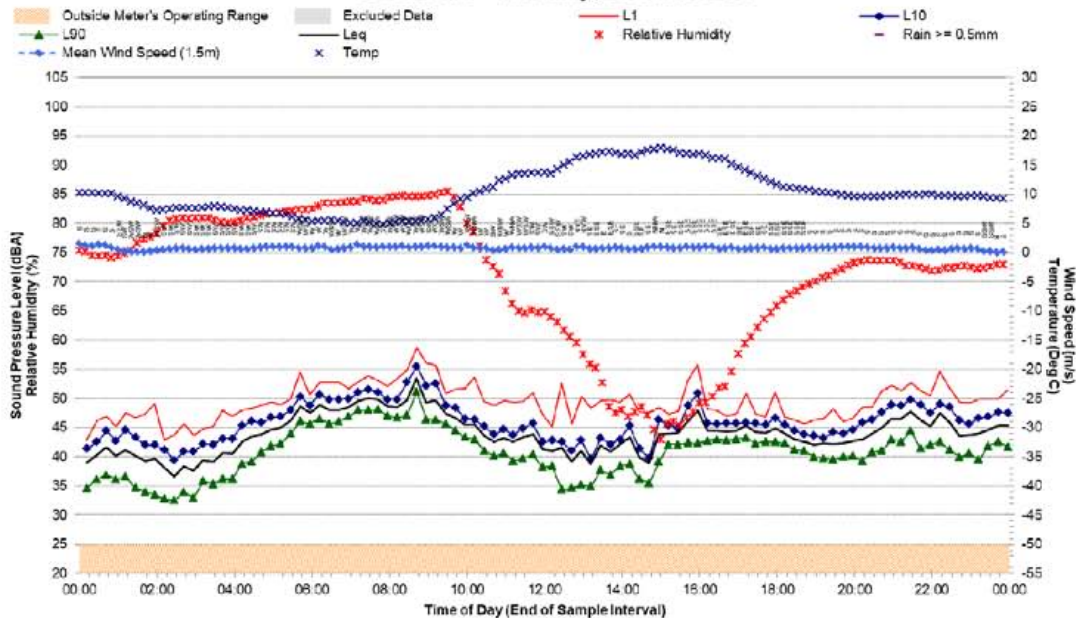
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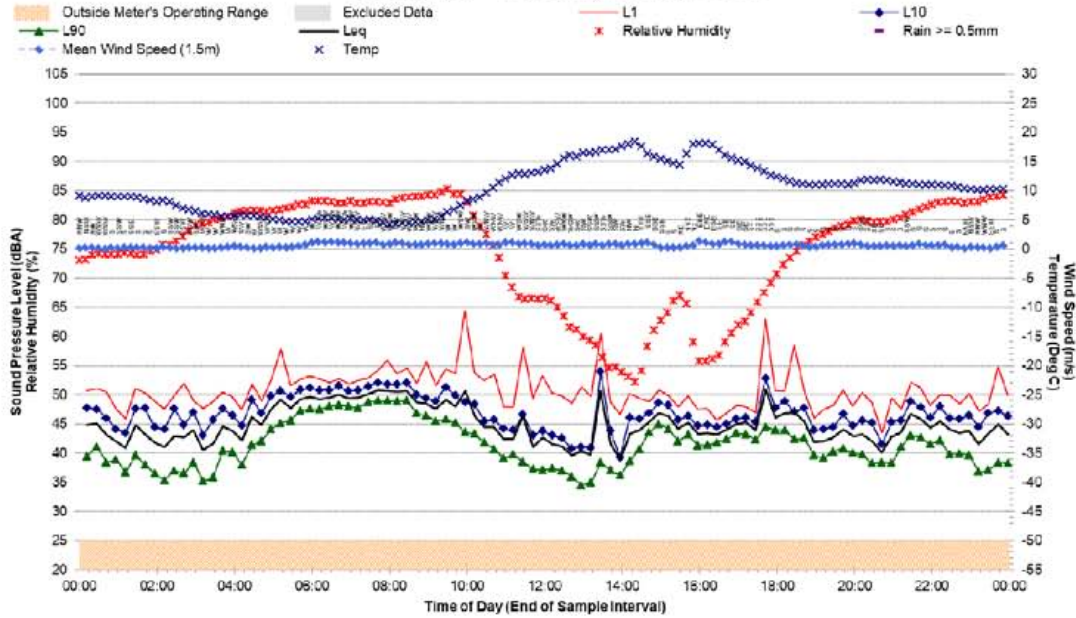
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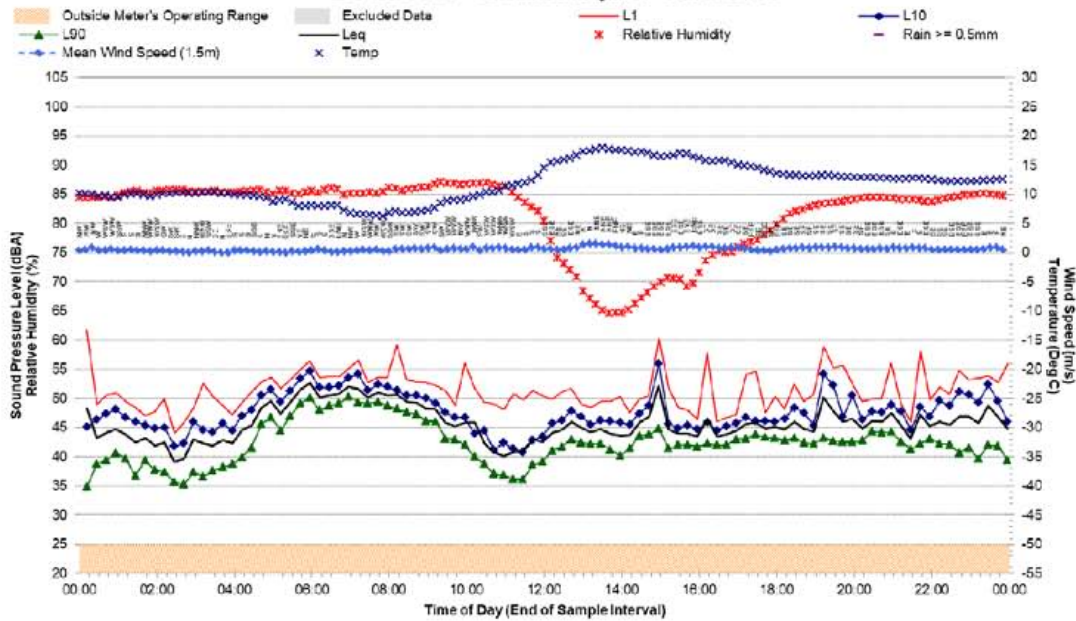
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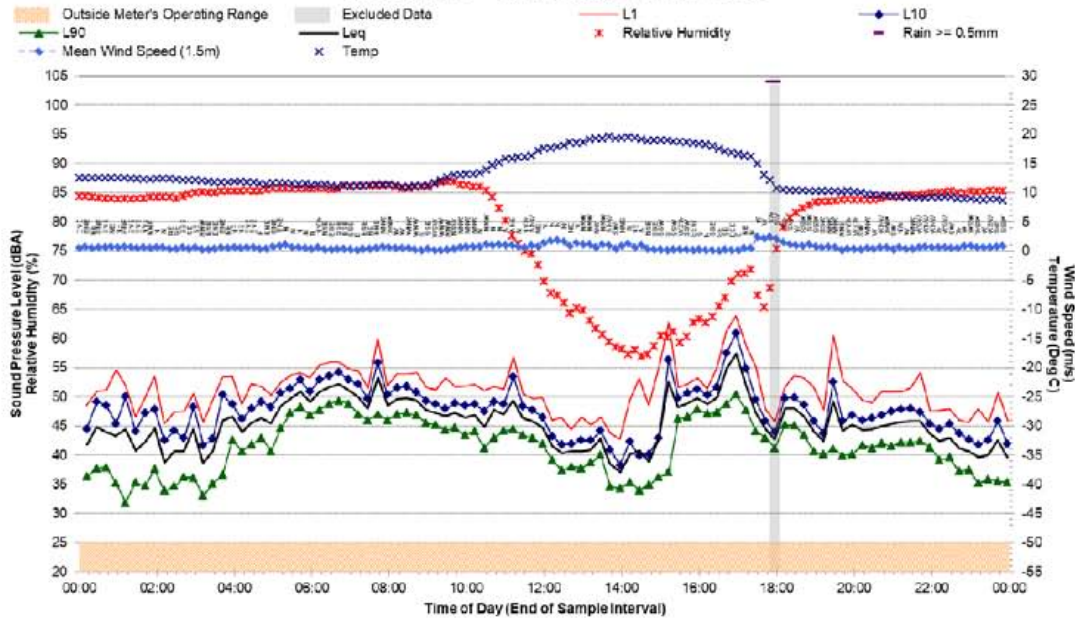


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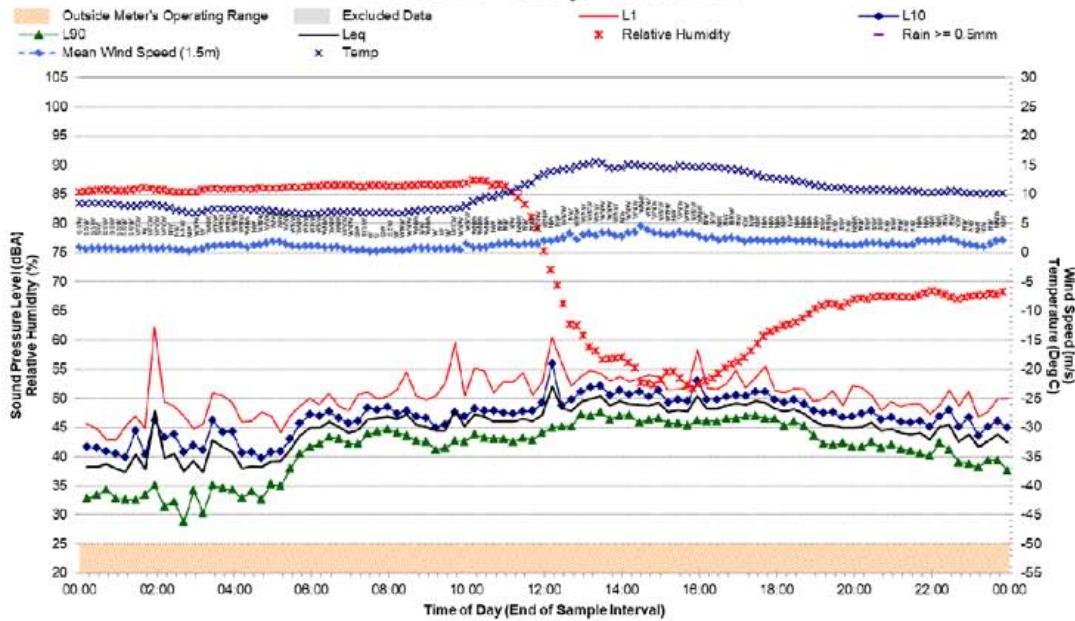
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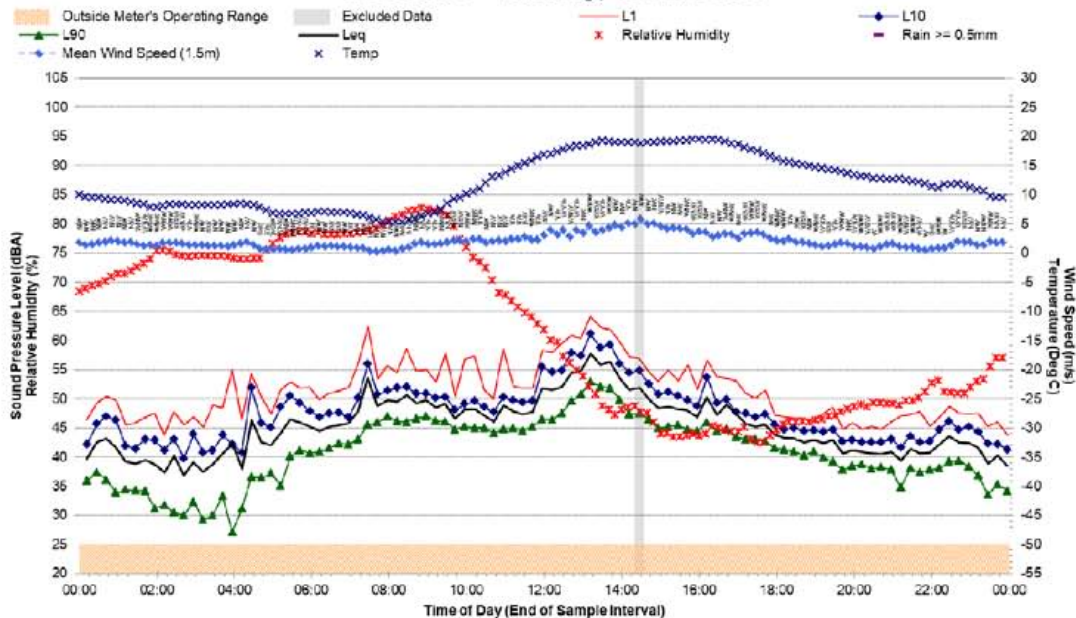
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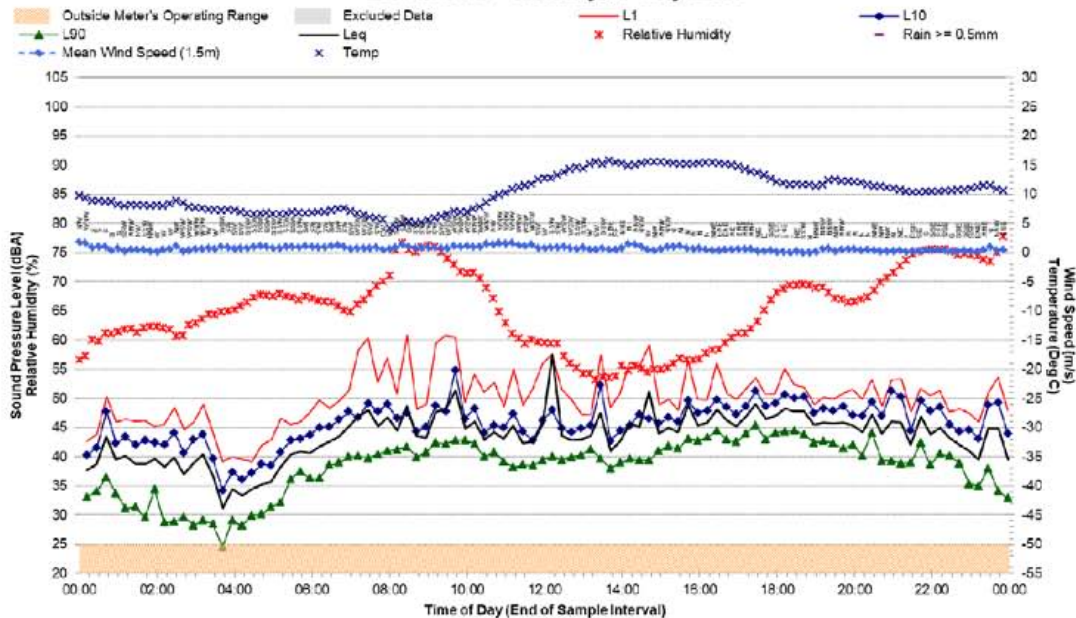
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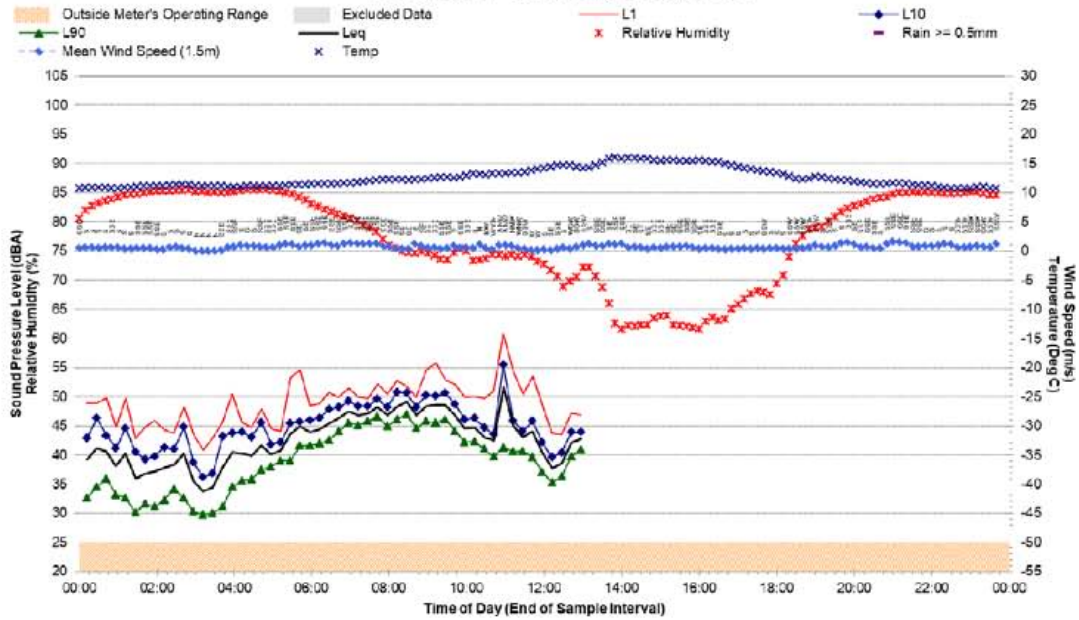
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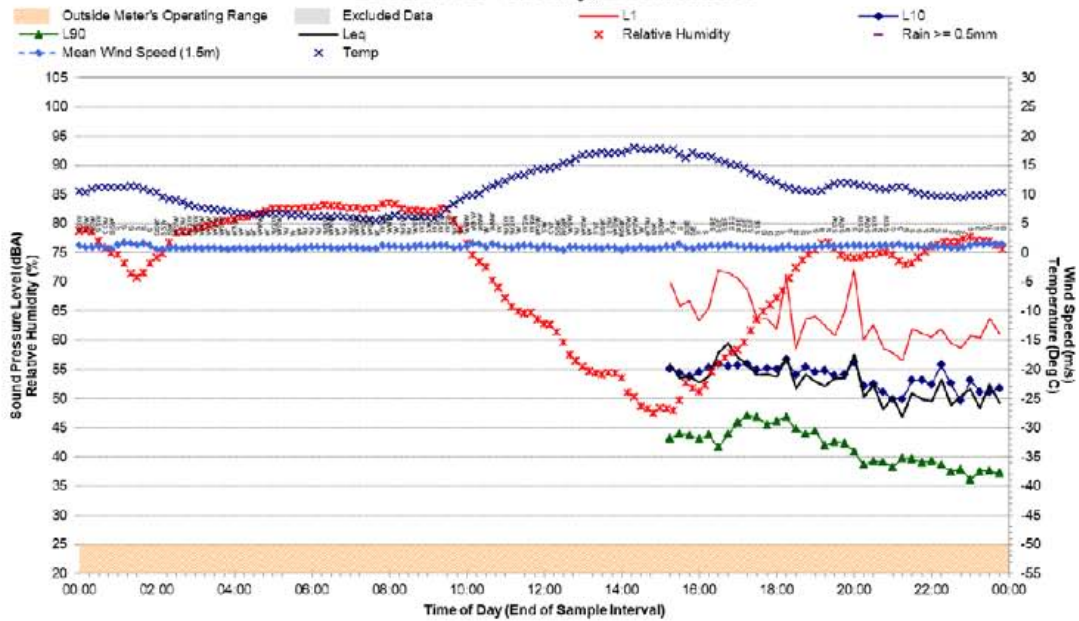
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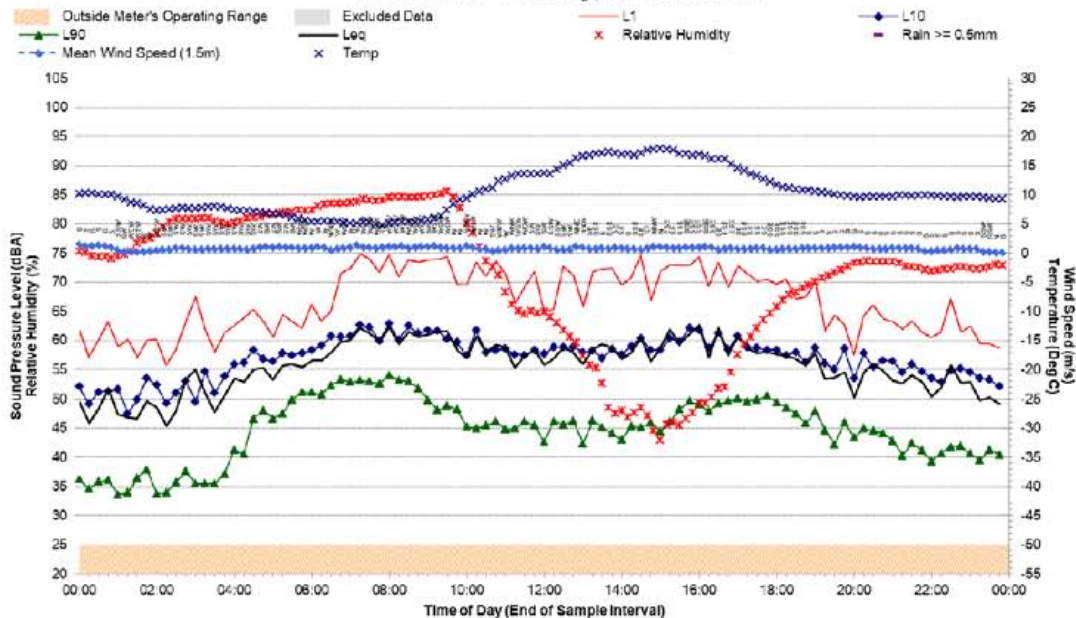
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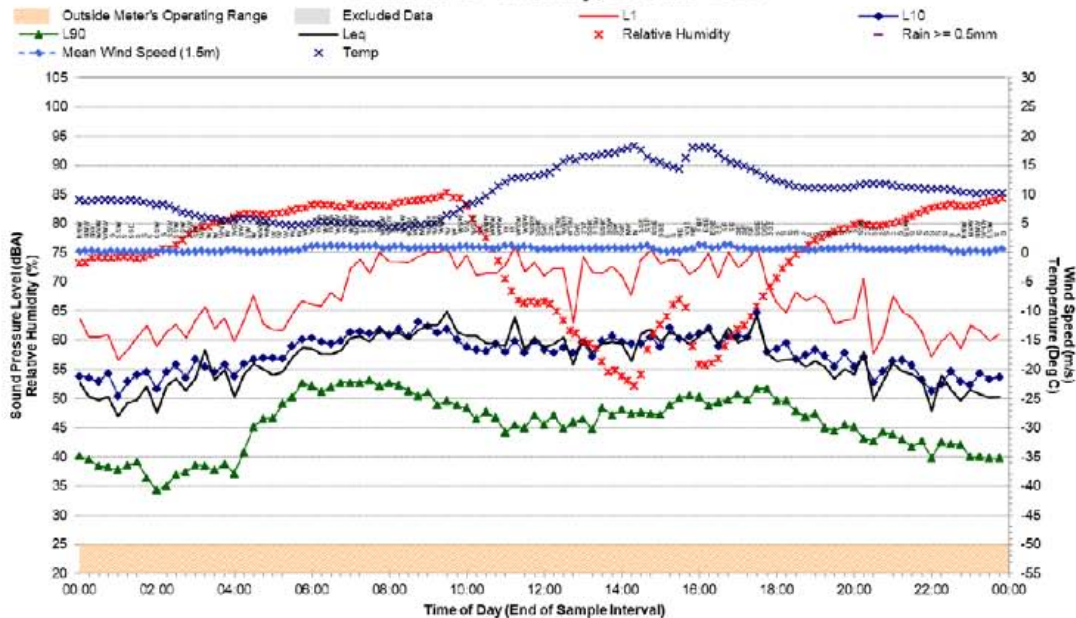
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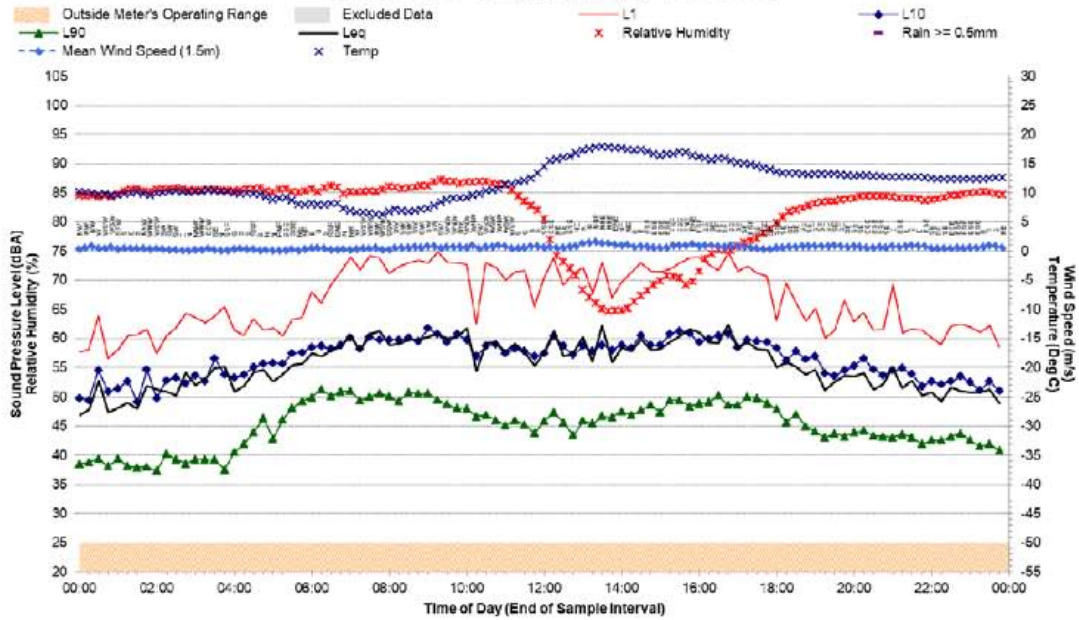
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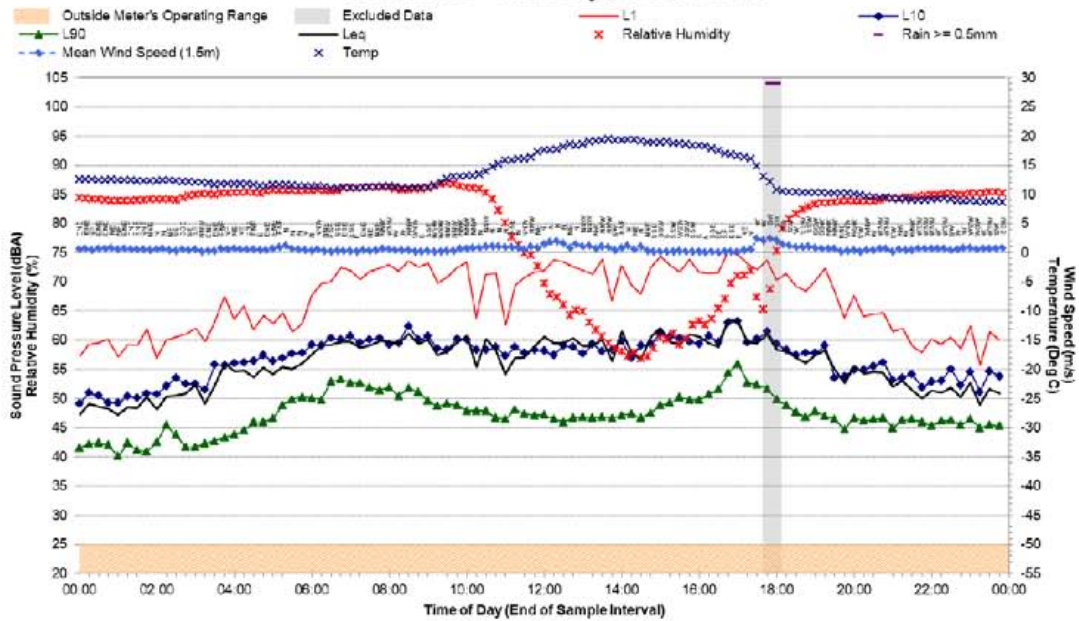
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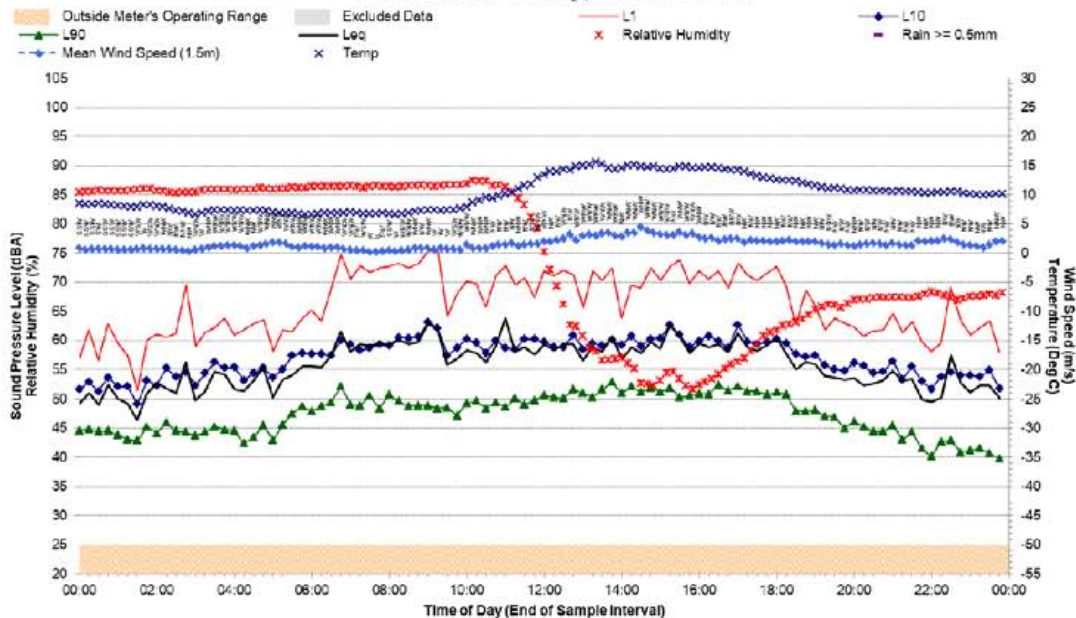
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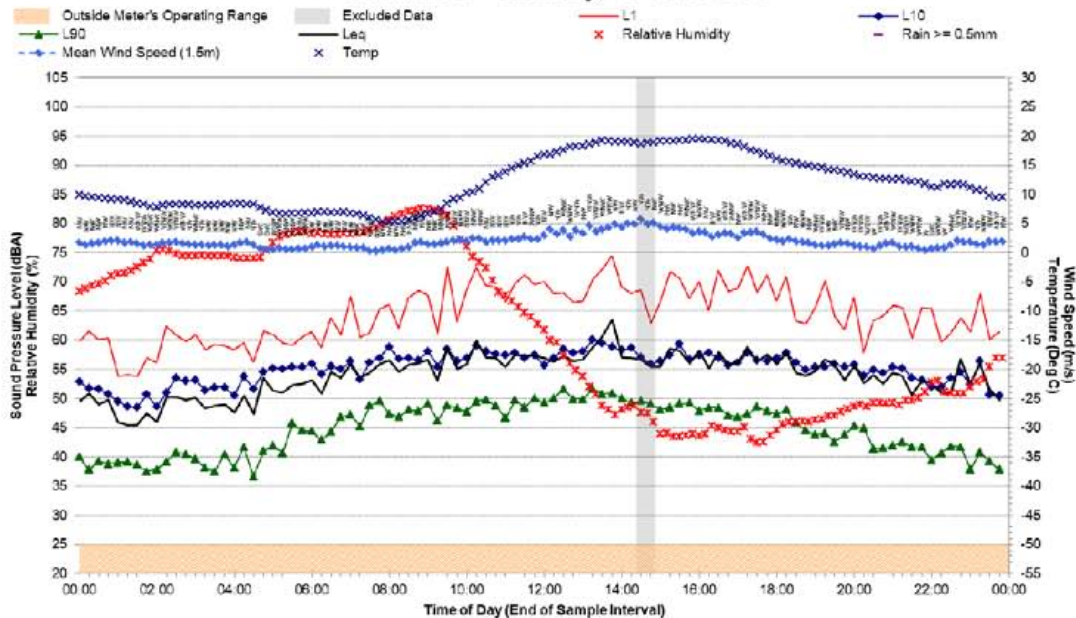
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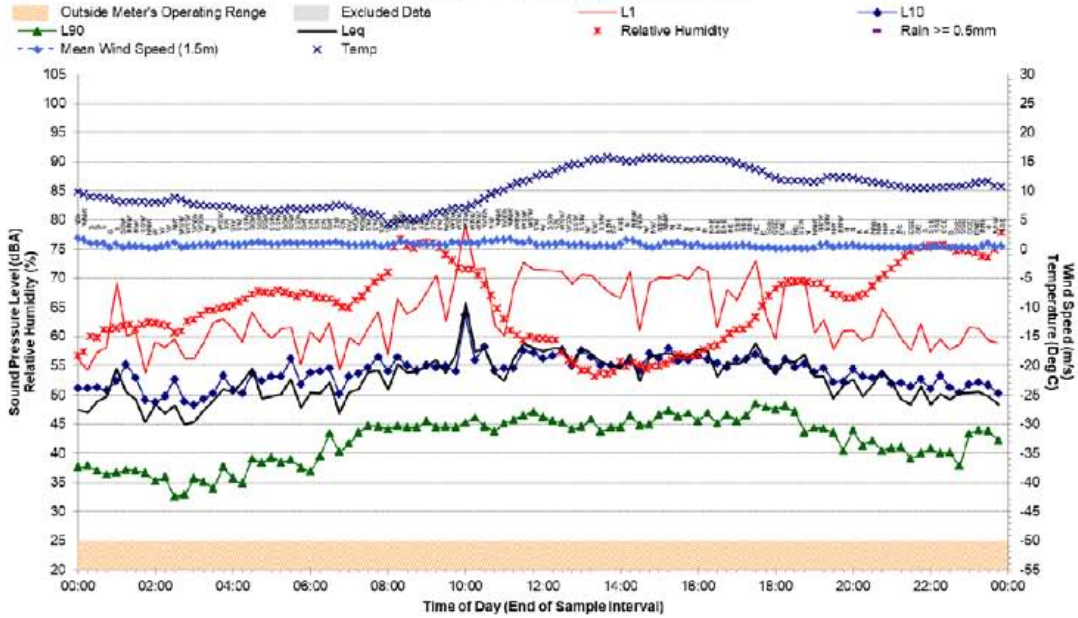


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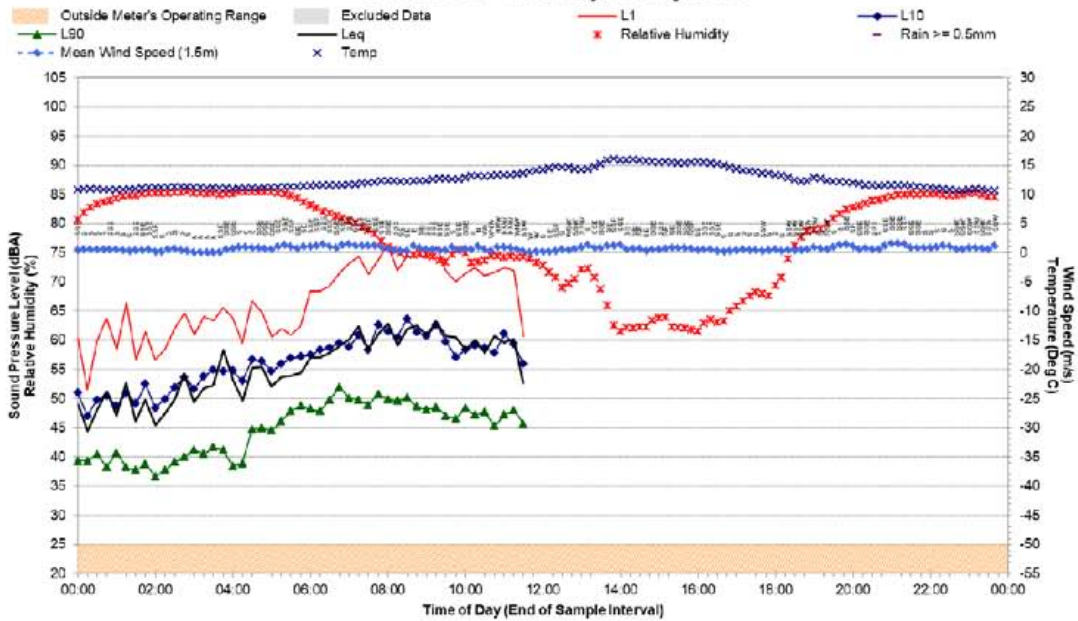
Statistical Ambient Noise Levels

Location L - Sunday, 1 July 2018



Statistical Ambient Noise Levels

Location L - Monday, 2 July 2018



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DONALDSON AND ABEL COAL MINES

Quarterly Noise Monitoring
Quarter Ending September 2018

Prepared for:

Donaldson Coal Pty Ltd
PO Box 675
Green Hills 2320



SLR Ref: Q71 630.01053-R01
Version No: -v1.0
January 2019



Donaldson Coal Pty Ltd
Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending September 2018

SLR Ref No: Q71 630.01053-R01-v1.0.docx
January 2019

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Donaldson Coal Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
Q71 630.01053-R01-v1.0	14 January 2019	Martin Davenport	Nicholas Vandenberg	Martin Davenport

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APPENDICES

- Appendix A Acoustic Terminology
- Appendix B Noise Monitoring Locations
- Appendix C Statistical Ambient Noise Levels

1 Introduction

1.1 Background

Donaldson Coal Pty Ltd has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct quarterly noise monitoring surveys for the Donaldson Coal Mine and Abel Coal Mine during the September 2018 quarter in accordance with the Abel Mine Project Noise Monitoring Program, dated 12 August 2014.

1.2 Objectives of this Report

The objectives of the noise monitoring survey for this operating quarter were as follows:

- Measure the ambient noise levels at six focus receptor locations (potentially worst affected) surrounding Donaldson Coal Mine and Abel Coal Mine.
- Qualify all sources of noise within each of the attended surveys, including estimated contribution or maximum level of individual noise sources.
- Assess the noise emissions of Donaldson Coal Mine and Abel Coal Mine with respect to the limits contained in the Development Consent.

1.3 Acoustic Terminology

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 Development Consent Project Approval

Development consent was obtained by Donaldson Coal Pty Ltd for the Donaldson Mine in October 1999 following a Commission of Inquiry. Development Consent number N97/00147 was issued by the Minister for Urban Affairs pursuant to Section 101 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Project Approval (Application No. 05_0136) granted by the Minister of Planning was obtained by Donaldson Coal Pty Ltd for Abel Coal Mine in 2007.

2.1 Donaldson Coal Mine Development Consent Conditions

The Development Consent nominates hours of operation and mine noise emission goals in the Sections entitled “*Operation of Development, Condition No. 3(1) and 3(2)*”, and “*Noise and Vibrational Noise Limits: Condition No. 15*” as follows:

3.(1) *Subject to (2) the approved hours of operation are as follows:*

<i>Works</i>	<i>Period</i>	<i>Hours</i>
<i>Construction, including construction of any bunds</i>	<i>Monday to Friday Saturday</i>	<i>7 am to 6 pm 8 am to 1 pm</i>
<i>Mining operations, including mining, haulage of waste to dumps and coal processing</i>	<i>Monday to Friday Saturday, Sunday</i>	<i>24 hours per day 7 am to 6 pm</i>
<i>Road Transportation and stockpiling of coal</i>	<i>7 days per week</i>	<i>24 hours per day</i>
<i>Rail loading of coal</i>	<i>7 days per week</i>	<i>7 am to 10 pm</i>
<i>Maintenance of mobile and fixed plant</i>	<i>7 days per week</i>	<i>24 hours per day</i>
<i>Blasting, not involving closure of John Renshaw Drive</i>	<i>Monday to Saturday</i>	<i>7 am to 5 pm</i>
<i>Blasting, involving closure of John Renshaw Drive</i>	<i>Monday to Saturday</i>	<i>10 am to 2 pm</i>

Notes: Restrictions on Public Holidays are the same as Sundays

(2) *The Applicant shall submit a report to the Director-General’s satisfaction demonstrating the noise limits in Condition 15 can be met while rail loading of coal is occurring during the period from 6 pm to 10 pm. If that report does not demonstrate that the noise limits can be met to the Director-General’s satisfaction, then the hours of operation for rail loading of coal shall be restricted to 7 am to 6 pm.”*

15. Unless subject to a negotiated agreement in accordance with Condition 23, the Applicant shall ensure that the noise emission from construction or mining operations, when measured or computed at the boundary of any dwelling not owned by the applicant (or within 30 metres of the dwelling, if the boundary is more than 30 metres from the dwelling), shall not exceed the following noise limits:

Location	LA10(15minute) Noise Limits (dBA)	
	Daytime	Night-time
Beresfield area (residential)	45	35
Steggles Poultry Farm	50	40
Ebenezer Park Area	46	41
Black Hill Area	40	38
Buchanan and Louth Park Area	38	36
Ashtonfield Area	41	35
Thornton Area	48	40

Note: Daytime is 7 am to 10 pm Monday-Saturday, and 8 am to 10 pm Sundays and Public Holidays. Night-time is 10 pm to 7 am Monday-Saturday, and 10 pm to 8 am Sundays and Public Holidays.

The noise limits apply for prevailing meteorological conditions (winds up to 3 m/s), except under conditions of temperature inversions."

Other Conditions of Consent relevant to noise are as follows:

18. The applicant shall survey and investigate noise reduction measures from plant and equipment and set targets for noise reduction in each Annual Environmental Management Report (AEMR), taking into consideration valid noise complaints received in the previous year. The Report shall also include remedial measures.
19. The Applicant shall revise the Noise Management Plan as necessary and provide an updated Plan five years after commencement of mining to the Director-General, the independent noise expert (Condition 48), EPA, Councils and the Community Consultative Committee.

2.2 Abel Coal Mine – Project Approval

Approved Operations

The following operations are approved under the Abel Coal Mine Project Approval:

- Extraction of up to 6.1 Mtpa of Run of Mine (ROM) coal from the Abel Underground Coal Mine.
- Transport coal to the existing Bloomfield Coal Handling and Preparation Plant by private haul roads, or by coal conveyor, or by a combination of both methods.
- Operate the Bloomfield Coal Handling Processing Plant (CHPP) to process coal extracted from the Abel Coal Mine and the Bloomfield and Donaldson Coal Mines.
- Transportation of product coal from the Bloomfield site by rail via the Bloomfield rail loading facility.

The Project Approval was modified in June 2010 (05_0136 MOD 1) allowing construction and operation of a downcast ventilation fan. In May 2011 the Project Approval was modified again (05_0136 MOD 2) to allow the construction and operation of an upcast ventilation fan (and associated facilities). In December 2013 the Project Approval was further modified (05_0136 MOD3) to account for the increase in coal extracted including the upgrade of the Bloomfield CHPP.

Consent Conditions

The relevant conditions relating to noise from the Abel Coal Mine approval are reproduced below.

Schedule 4

NOISE

Operational Noise Criteria

1. The Proponent shall ensure that the noise generated by the Project does not exceed the criteria in Table 4 at any residence on privately-owned land.

Table 4: Operational Noise Criteria dB(A)

Location	Receiver Area	Day	Evening	Night	
		LAeq(15minute)	LAeq(15minute)	LAeq(15minute)	LA1(1minute)
Location I	Lord Howe Drive, Ashtonfield	36	36	36	45
Location K	Catholic Diocese Land	37	37	37	45
Location L	Kilshanny Avenue Ashtonfield	40	40	40	47
All other Locations	All other privately owned Residences	35	35	35	45

Notes:

- To interpret the locations referred to in Table 4, see plan in Appendix 3 (Appendix A).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

These noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Construction Noise Criteria

1. The proponent shall ensure that the noise generated during the construction of the downcast ventilation shaft as described in EA (MOD3) does not exceed the criteria in Table 5.

Table 5: Construction Noise Criteria dB(A)

Location	Receiver	Day
		LAeq(15minute)
Location R	281 Lings Road, Buttai	50
Location S	189 Lings Road, Buttai	43

Notes:

- The criteria in Table 5 apply only whilst the downcast ventilation shaft is being constructed, and for a maximum of 12 weeks from the commencement of construction.
- To interpret the locations referred to in Table 5, see plan in Appendix 3 (attached to this report as **Appendix A**).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

However, these noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Rail Noise Criteria

1. The proponent shall ensure that the noise from rail movements on the Bloomfield Rail Spur does not exceed the limits in Table 6 at any residence on privately owned land.

Table 6: Rail Spur noise criteria dB (A)

Location	Day	Evening	Night
	LAeq(period)		
All privately-owned land	55	45	40

Cumulative Noise Criteria

1. The proponent shall implement all reasonable and feasible measures to ensure that the noise generated by the project combined with noise generated by other mines does not exceed the criteria in Table 7 at any residence on privately-owned land.

Table 7: Cumulative noise criteria dB (A)

Location	Day	Evening	Night
	LAeq(period)		
All privately-owned land	55	45	40

Notes: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including meteorological conditions), of the NSW Industrial Noise Policy. Appendix 4 sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

Operating Conditions

1. The proponent shall:
 - a. Implement best management practise to minimise the construction, operational, road and rail noise of the project;
 - b. Operate an on-site noise management system to ensure compliance with the relevant conditions of this approval;
 - c. Minimise the noise impacts of the project during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 4);
 - d. Only receive and/or dispatch locomotives and rolling stock either on or from the site that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142);
 - e. Carry out regular monitoring to determine whether the project is complying with the noise criteria and other relevant conditions of approval, to the satisfaction of the Director-General.

Noise Management Plan

2. The proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:
 - a. Be prepared in consultation with the EPA, and be submitted to the Director-General for approval within 6 months of the date of approval of MOD 3;
 - b. Describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval; Describe the proposed noise management system in detail; and
 - c. Include a monitoring program that:
 - Uses attended monitoring to evaluate the compliance of the project against the noise criteria in this approval;
 - Evaluates and reports on:
 - The effectiveness of the on-site noise management system; and
 - Compliance against the noise operating conditions; and

Defines what constitutes a noise incident, and includes protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents. Appendix 4

Noise Compliance Assessment

Applicable Meteorological Conditions

1. The noise criteria in Tables 4 and 7 are to apply under all metrological conditions except the following:
 - a. During periods of rain or hail.
 - b. Average wind speed at microphone height exceeds 5 m/s;
 - c. Wind speeds greater than 3 m/s measured at 10m above ground level; or
 - d. Temperature inversion conditions greater than 3°C/100m.

Determination of metrological conditions

2. *Except for wind speed at microphone height, the data to be used for determining metrological conditions shall be that recorded by the meteorological station located on the site.*

Compliance monitoring

3. *Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.*
4. *Unless otherwise agreed with the director-general, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to:*
 - a. *Monitoring locations for the collection of representative noise data;*
 - b. *Metrological conditions during which collection of noise data is not appropriate;*
 - c. *Equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and*
 - d. *Modification to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.*

Appendix 5

Statement of Commitments

3. Noise

3.1 Construction Activities

The following noise control measures will be implemented prior to commencement of construction of the Abel Underground Mine or the upgrade of the Bloomfield CHPP.

1. *Maintain all machinery and equipment in working order;*
 - a. *No construction activities at the Abel pit top will take place on Sundays or Public Holidays;*
 - b. *Where possible locate noisy site equipment behind structures that act as barriers or at the greatest distance from noise sensitive areas; and*
 - c. *Orientate equipment so that noise emissions are directed away from noise sensitive areas.*

3.2 Noise Control Measures

- a. *The following noise control measures will be implemented prior to the mining of coal from the Abel underground Mine:*
 - i. *Orientation of the ventilation fans away from residential receivers and angle the output parallel to the ground.*
 - ii. *The sound power level of the front end loader to be used near the portal should not exceed 113 dBA and will be fitted with a noise sensitive reversing alarm.*
- b. *The following noise control measures will be implemented prior to the Bloomfield CHPP receiving any ROM coal from Able Underground Mine;*

-
- i. *Noise mitigation works including partial enclosure and noise screening of drives and conveyors of the Bloomfield CHPP to screen residences to the north of the site.*

3.2 Monitoring

The Company will implement a Noise Monitoring Program for the Abel Underground Mine and the Bloomfield CHPP, to the satisfaction of the Director-General. The Noise Monitoring Program shall include a combination of real-time and supplementary attended monitoring measures, and a noise monitoring protocol for evaluating compliance with the noise environmental assessment. This plan will be integrated with the monitoring plans for the Tasman, Donaldson and Bloomfield Mines to provide a single integrated Noise Monitoring Program for all 4 mines.

3.4 Continuous Improvement

The Company shall:

- a. *Report on these investigations and implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director General.*

The operator of the Bloomfield CHPP shall:

- b. *Investigate ways to reduce the noise generated by the Bloomfield CHPP, including maximum noise levels which may result in sleep disturbance;*
- c. *Implement all reasonable and feasible best practice noise mitigation measures on the site; and*
- d. *Report on these investigations and the implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director-General.*

3 Noise Monitoring Methodology

3.1 General Requirements

The operational noise monitoring program was conducted with reference to Development Consent N97/00147 (Donaldson Coal Mine), Project Approval 05_0136 (Abel Coal Mine), and in accordance with SLR's Report 630.01053.01300-R1 dated 12 August 2014 (*Noise Management Plan Abel Underground Mine*) and AS 1055-1997 *Acoustics - Description and Measurement of Environmental Noise*.

All acoustic instrumentation employed throughout the monitoring program has been designed to comply with the requirements of AS IEC 61672.1 – 2004 *Electroacoustics—Sound level meters – Specifications*, AS IEC 61672.2-2004, AS IEC 61672.3-2004 and carried current NATA or manufacturer calibration certificates.

Instrument calibration was conducted before and after each measurement, with the variation in calibrated levels not exceeding ± 0.5 dBA.

3.2 Monitoring Locations

Baseline and preceding operational quarterly surveys have been conducted at 11 locations surrounding the Donaldson Mine and Abel Coal Mine sites. With the experience of these previous surveys, it was decided to concentrate noise monitoring at six focus locations that represent the potentially most noise affected areas from Donaldson Mine and Abel Coal Mine. The details of the monitoring locations are contained within **Table 1**.

It is relevant to note that Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

Furthermore, Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite during the September 2018 noise monitoring period.

Table 1 Monitoring Locations

Noise Monitoring Location	Description
D	Black Hill School, Black Hill
F	Lot 684 Black Hill Road, Black Hill
G	156 Buchannan Road, Buchannan
I	Magnetic Drive, Ashtonfield
J	Parish Drive, Thornton
L	Kilshanny Ave, Ashtonfield

A map giving the approximate location of the noise monitoring sites is contained within **Appendix B**.

3.3 Unattended Continuous Noise Monitoring

An environmental noise logger was deployed for a minimum of seven days between 20 September 2018 and 30 September 2018 at each of the nominated locations given in **Table 1**.

All unattended monitoring equipment was programmed to continuously record statistical noise level indices in 15 minute intervals including the L_{Amax} , L_{A1} , L_{A10} , L_{A90} , L_{A99} , L_{Amin} and L_{Aeq} . The statistical noise exceedance levels (L_{AN}) are the levels exceeded for N% of the 15 minute interval. The L_{A90} represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level. The L_{A10} is the level exceeded for 10% of the time and is usually referred to as the average maximum noise level. The L_{Aeq} is the equivalent continuous sound pressure level and represents the steady sound level which is equal in energy to the fluctuating level over the interval period. The L_{Amax} is the maximum noise level recorded over the interval.

3.4 Operator Attended Noise Monitoring

Operator attended surveys were conducted at each of the six monitoring locations during the daytime, evening and night-time periods, to verify the unattended logging results and to determine the character and contribution of ambient noise sources.

4 Operator Attended Noise Monitoring

4.1 Results of Operator Attended Noise Monitoring

Operator attended noise measurements were conducted during the evening and night-time period on Tuesday 25 September 2018 and Wednesday 26 September 2018. Operator attended noise measurements were conducted during the daytime period on Wednesday 26 September 2018 and Sunday 30 September 2018. All operator attended noise surveys were conducted using a Brüel & Kjær 2270 integrating sound level meter (s/n: 2679354).

Results of the operator attended noise measurements are given in **Table 2** to **Table 7**.

Ambient noise levels given in the tables include all noise sources such as traffic, insects, birds, and mine operations as well as any other industrial operations.

The tables provide the following information:

- Monitoring location.
- Date and start time.
- Wind velocity (m/s) and Temperature (°C) at the measurement location.
- Typical maximum (L_{Amax}) and contributed noise levels.

Mine contributions listed in the tables are from the Abel Coal Mine and are stated only when a contribution could be quantified.

Table 2 Location D, Black Hill School, Black Hill

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	26/09/2018 09:53 17°C 2 m/s ESE	84	70	57	39	58	Aeroplane 49-63 Road Traffic 38-84 Birdsong 48-54 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	25/09/2018 18:28 14°C 1 m/s SE	77	67	50	43	54	Local traffic 77 Insects 36-39 Distant traffic 36-48 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	25/09/2018 22:36 10°C 0.5 m/s SE 0/8 Cloud Cover	58	51	48	40	45	Road traffic 43-58 Insects/frogs 34-37 Bat 39-50 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Table 3 Location F, Lot 684 Black Hill Road, Black Hill

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	26/09/2018 10:14 17°C Calm	77	68	58	45	56	Road traffic 39-77 Aeroplane 46-55 Birdsong 48
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	25/09/2018 19:04 11°C Calm	73	63	55	45	52	Road traffic 50-73 Insects 41-49
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	25/09/2018 22:59 10°C 0.5 m/s SE 0/8 Cloud Cover	62	58	52	41	48	Road traffic 40-62 Insects 33-40
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 4 Location G, 156 Buchanan Road, Buchanan

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	26/09/2018 11:17 17°C 1 m/s S	60	53	50	43	48	Road traffic 41-52 Birdsong 51-60 Wind in trees 33-51
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	25/09/2018 19:59 12°C 1 m/s ESE	53	50	47	41	44	Insects 30-38 Road traffic 38-53 Wind in trees 39 Bloomfield Colliery 32-47
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	26/09/2018 00:05 11°C 0.5 m/s SE 0/8 Cloud Cover	45	43	36	31	34	Road traffic 32-45 Insects 28-31 Livestock 37 Bloomfield Colliery 28-37
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 5 Location I, Magnetic Drive, Ashtonfield

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	30/09/2018 09:33 17°C 2 m/s S	73	67	58	41	55	Residential noise 50 Road traffic 45-73 Insects 35-40 Birdsong 45-60 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	25/09/2018 20:55 11°C 1 m/s ESE	71	54	48	42	48	Insects 33-37 Traffic 41-71 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	26/09/2018 00:58 12°C 0.5 m/s ESE 0/8 Cloud Cover	53	48	44	39	42	Insects 33-40 Traffic 41-47 Dog barking 51-53 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Table 6 Location J, Parish Drive, Thornton

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	30/09/2018 09:54 14°C 2 m/s SSE	62	51	42	33	41	Traffic 33-43 Birdsong 44-62 Insects 30 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	25/09/2018 21:47 10°C 0.5 m/s SE	54	49	47	41	44	Train 44-46 Road traffic 38-48 Insects/frogs 42-54 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	25/09/2018 22:03 10°C 0.5 m/s SE 0/8 Cloud Cover	49	45	42	38	40	Road traffic 38-49 Insects/frogs 42-48 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

Table 7 Location L, Kilshanny Ave, Ashtonfield

Period	Date/ Start time/ Period/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	26/09/2018 11:46 17°C 1 m/s SSE	71	62	50	42	50	Birdsong 42-63 Local traffic 62-71 Distant traffic 42-44 Wind in trees 42-51 Bloomfield Colliery <35 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	25/09/2018 20:29 12°C 1 m/s E	78	63	40	37	51	Insects 32-33 Residential noise 36-41 Traffic 36-78 Bloomfield Colliery <30 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	26/09/2018 00:34 11°C 0.5 m/s SE 0/8 Cloud Cover	51	46	44	33	40	Insects 30-32 Traffic 32-41 Train 41-48 Dog barking 45-51 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

4.2 Operator Attended Noise Monitoring Summary

4.2.1 Donaldson Mine

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

4.2.2 Abel Coal Mine

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

The Bloomfield CHPP stockpile area was not audible during all operator attended noise surveys. Noise generated by local and distant traffic was a significant contributor to ambient noise levels at all monitored locations as well as 'natural' noises such as birds, insects.

4.3 Compliance Assessment and Discussion of Results

4.3.1 Operations

Results of the operational compliance assessment are given in **Table 8**.

Table 8 Compliance Noise Assessment – Operations

Location	Estimated Abel LAeq(15minute) Contribution dBA			Consent Conditions			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
D – Black Hill School, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
F – Black Hill Road, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
I – Magnetic Drive, Ashtonfield	Inaudible	Inaudible	Inaudible	36	36	36	Yes	Yes	Yes
J – Parish Drive, Thornton	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	Inaudible	Inaudible	40	40	40	Yes	Yes	Yes

Results presented in **Table 8** indicate that compliance with the relevant consent conditions was achieved at all noise monitoring locations during all periods.

4.3.2 Sleep Disturbance

Results of the sleep disturbance compliance assessment are given in **Table 9**.

Table 9 Compliance Noise Assessment – Sleep Disturbance

Location	Estimated Bloomfield LA1(1minute) Contribution dBA	Consent Conditions LA1(1minute) dBA	Compliance
D – Black Hill School, Black Hill	Inaudible	45	Yes
F – Black Hill Road, Black Hill	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
I – Lord Howe Drive, Ashtonfield	Inaudible	45	Yes
J – Parish Drive, Thornton	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	47	Yes

Results presented in **Table 9** indicate that compliance with the sleep disturbance consent conditions was achieved at all noise monitoring locations during the night-time noise surveys.

5 Unattended Continuous Noise Monitoring

5.1 Results of Unattended Continuous Noise Monitoring

Unattended continuous noise monitoring was conducted between 20 September 2018 and 28 September 2018 at each of the six monitoring locations given in **Table 10**.

Table 10 Noise Logger and Noise Monitoring Locations

Location	Noise Logger Serial Number	Date of Logging
D – Black Hill School, Black Hill	ARL EL-316 16-203-528	20 September 2018 - 30 September 2018
F – Black Hill Road, Black Hill	ARL EL-316 16-207-050	20 September 2018 - 30 September 2018
G – Buchanan Road, Buchanan	ARL EL-316 16-306-041	20 September 2018 - 30 September 2018
I – Magnetic Drive, Ashtonfield	ARL EL-316 16-004-038	20 September 2018 - 30 September 2018
L – Kilshanny Ave, Kilshanny	ARL EL-316 16-203-525	20 September 2018 - 30 September 2018
J – Parish Drive, Thornton	SVAN 957 20665	20 September 2018 - 30 September 2018

The unattended ambient noise logger data from each monitoring location are presented graphically on a daily basis and are attached as **Appendix C**. A summary of the results of the unattended continuous noise monitoring is given in **Table 11**.

The ambient noise level data quantifies the overall noise level at a given location independent of its source or character.

The measured ambient noise levels were divided into three periods representing day, evening and night as designated in the NSW Noise Policy for Industry (NPfI).

Precautions were taken to minimise influences from extraneous noise sources (eg optimum placement of the loggers away from creeks, trees, houses, etc), however, not all these sources or their effects can be eliminated. This is particularly the case during the warmer times of year when noise from insects, frogs, birds and other animals can become quite prevalent.

Weather data for the subject area during the noise monitoring period was provided by Bloomfield Colliery. Noise data during periods of any rainfall and/or wind speeds in excess of 5 m/s were discarded in accordance with NPfI weather affected data exclusion methodology.

Table 11 Unattended Continuous Noise Monitoring Ambient Noise Levels (dBA)

Location	Period	Primary Noise Descriptor (dBA re 20 µPA)			
		LA1	LA10	LA90	LAeq
D Black Hill School, Black Hill	Day	67	54	37	54
	Evening	61	46	40	51
	Night	53	43	33	49
F Lot 684 Black Hill Road, Black Hill	Day	71	57	45	59
	Evening	63	55	47	55
	Night	59	53	39	53
G 156 Buchanan Road, Buchanan	Day	54	49	39	48
	Evening	49	46	36	44
	Night	47	43	29	43
I 49 Magnetic Drive, Ashtonfield	Day	66	57	40	56
	Evening	58	47	41	50
	Night	49	44	34	48
L 17 Kilshanny Ave, Ashtonfield	Day	62	51	31	52
	Evening	58	44	36	48
	Night	47	37	26	46
J 220 Parish Drive, Thornton	Day	51	47	38	48
	Evening	49	46	39	44
	Night	49	44	31	43

5.2 Long term Unattended Continuous Monitoring Summary for Donaldson Mine and Abel Coal Mine

5.2.1 Ambient LA90 Noise Levels

The long term ambient LA90 noise levels collected from each monitoring location are presented graphically in **Figure 1**, **Figure 2** and **Figure 3** for the daytime, evening and night-time periods respectively.

Figure 1 Long term Daytime LA90 Noise Levels

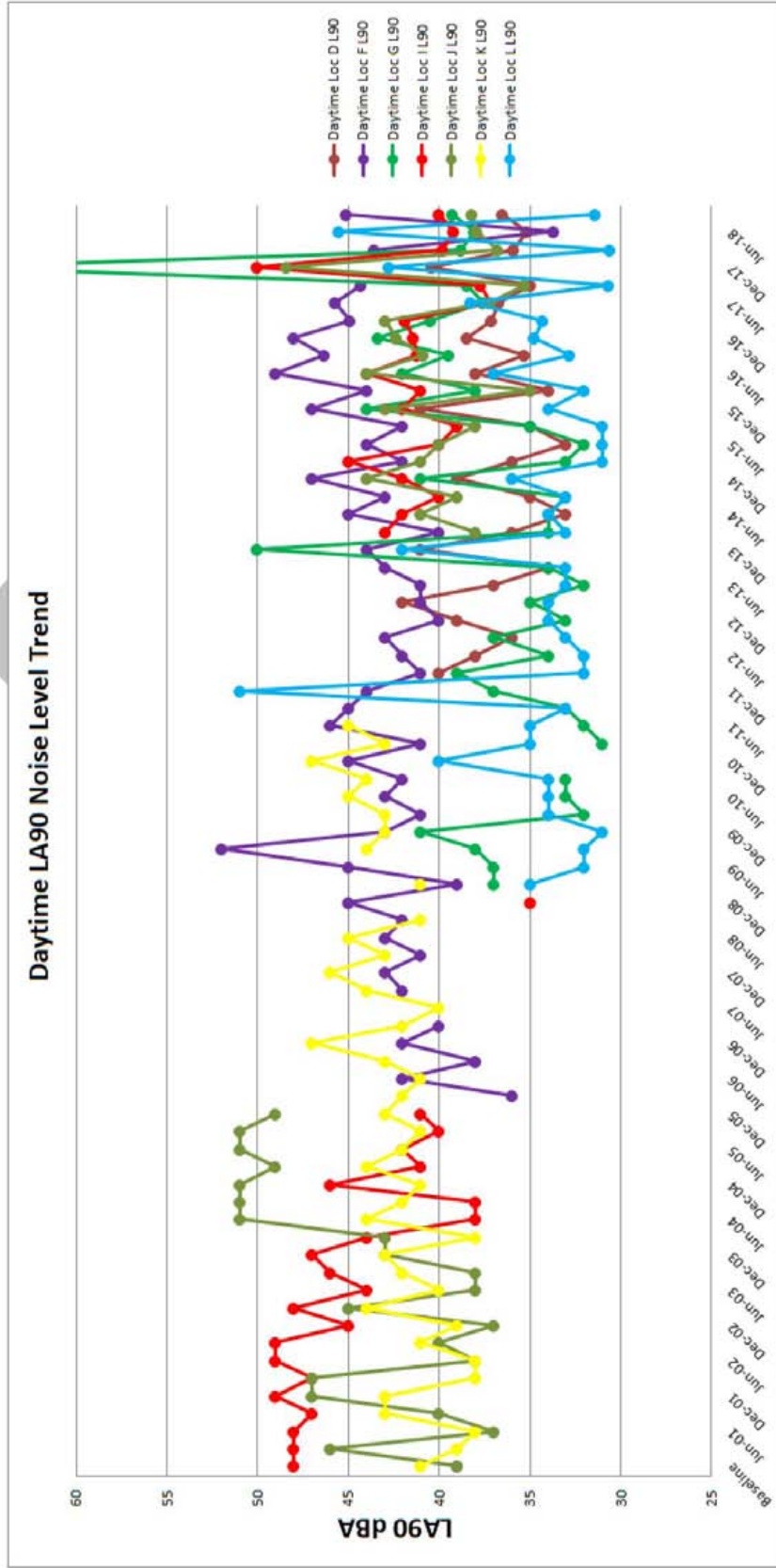
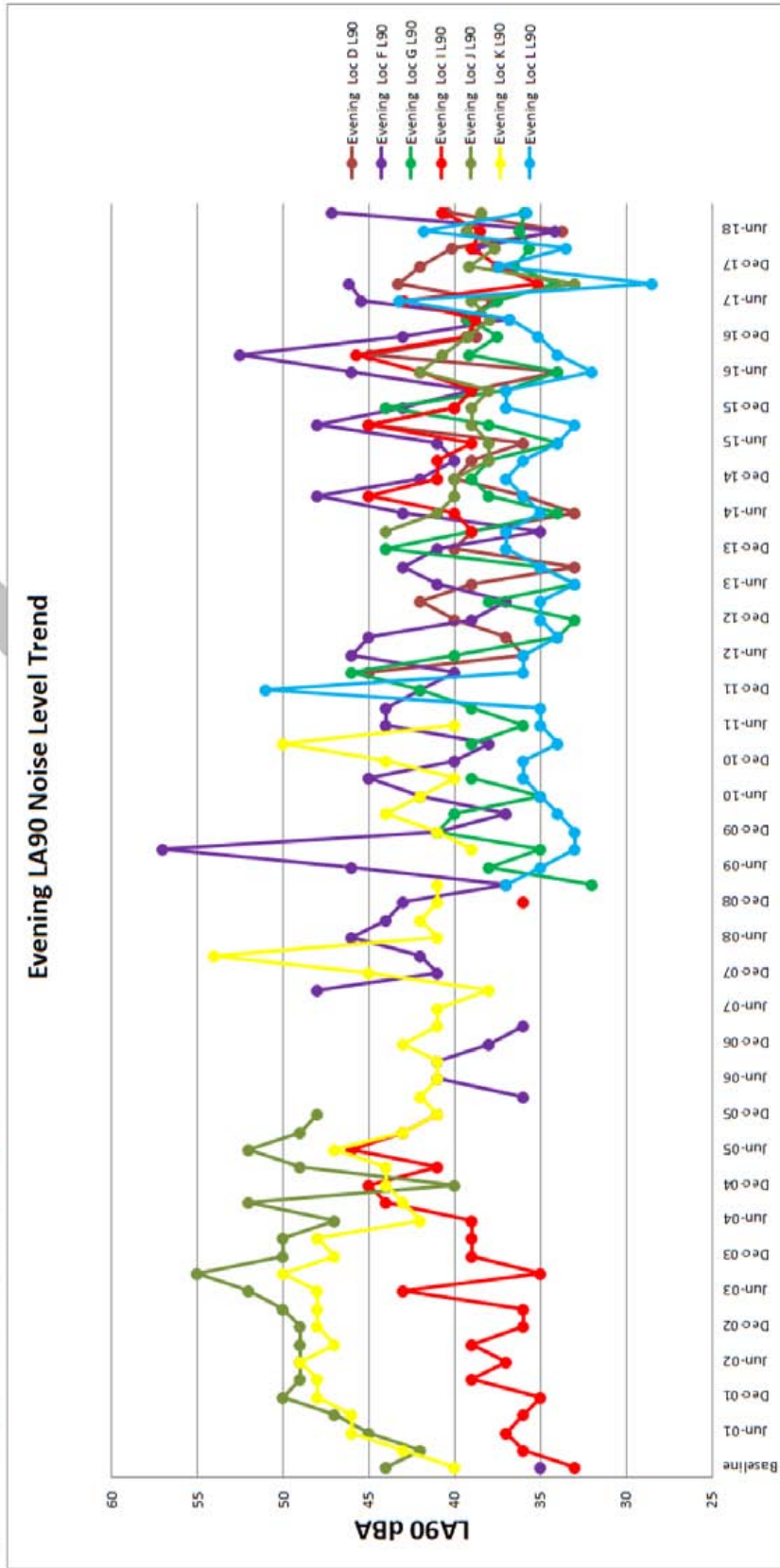


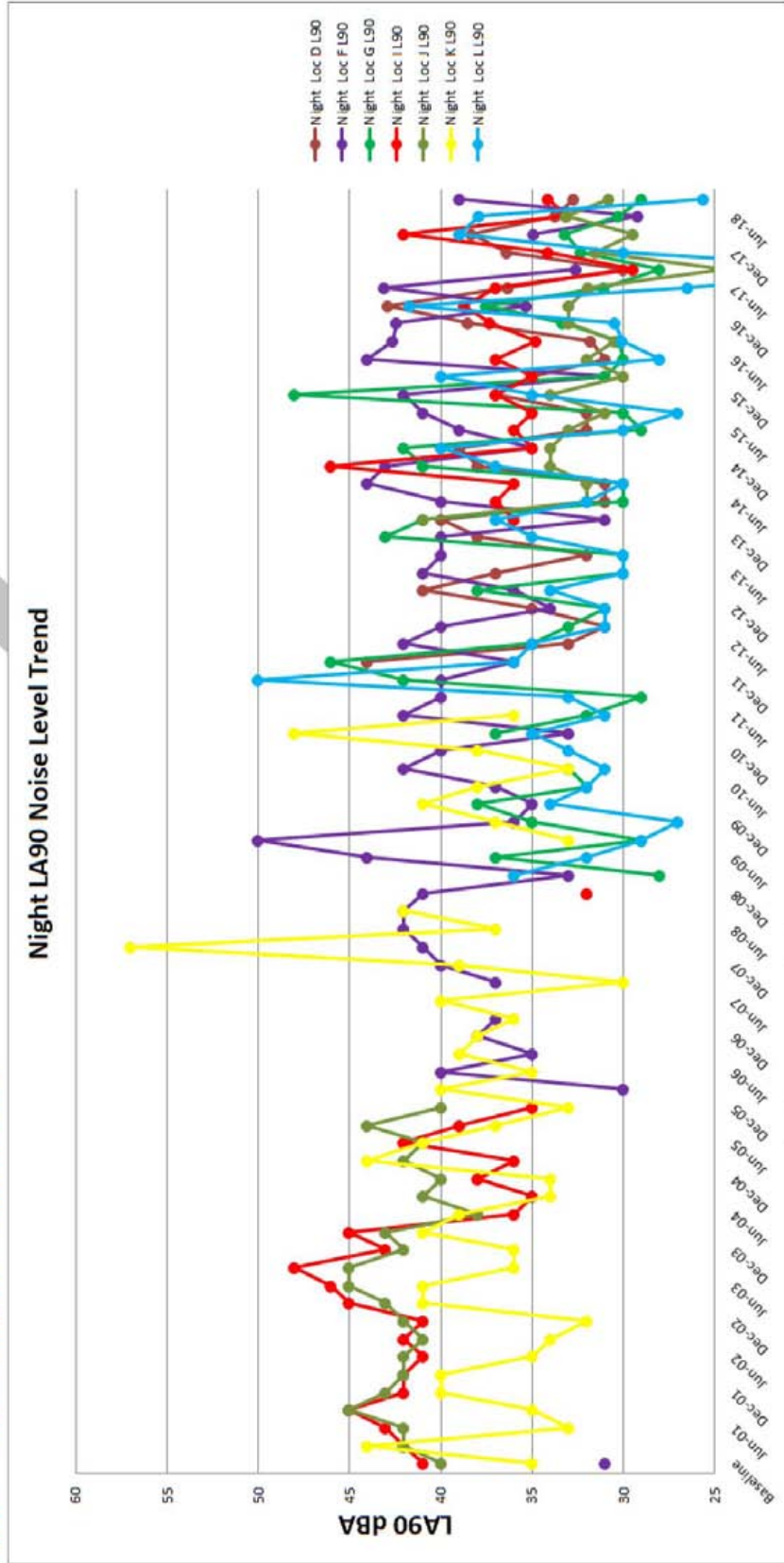
Figure 2 Long term Evening LA90 Noise Levels



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Figure 3 Long term Night-time LA90 Noise Levels



5.2.1.1 Baseline

The summary of results in **Table 12** shows the ambient LA90 noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring process (ie. prior to commencement of mining operation at Donaldson).

Table 12 LA90 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ³
		Baseline	September 2018	
D Black Hill School, Black Hill	Day	N/A ²	37	N/A
	Evening	N/A ²	40	N/A
	Night	N/A ²	33	N/A
F Lot 684 Black Hill Road, Black Hill	Day	39	45	6
	Evening	35	47	12
	Night	31	39	8
G 156 Buchanan Road, Buchanan	Day	N/A ²	39	N/A
	Evening	N/A ²	36	N/A
	Night	N/A ²	29	N/A
I 49 Magnetic Drive, Ashtonfield	Day	48	40	-8
	Evening	33	41	8
	Night	41	34	-7
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	31	N/A
	Evening	N/A ²	36	N/A
	Night	N/A ²	26	N/A
J 220 Parish Drive, Thornton	Day	39	38	-1
	Evening	44	38	-6
	Night	40	31	-9

Note 1: Periods are as detailed the NPfl and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB.

5.2.1.2 Previous Quarter

Table 13 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured in the previous monitoring period.

Table 13 LA90 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		June 2018	September 2018	
D Black Hill School, Black Hill	Day	35	37	1
	Evening	34	40	7
	Night	34	33	-1
F Lot 684 Black Hill Road, Black Hill	Day	34	45	11
	Evening	34	47	13
	Night	29	39	10
G 156 Buchanan Road, Buchanan	Day	38	39	1
	Evening	36	36	0
	Night	30	29	-1
I 49 Magnetic Drive, Ashtonfield	Day	39	40	1
	Evening	39	41	2
	Night	33	34	1
L 17 Kilshanny Ave, Ashtonfield	Day	46	31	-14
	Evening	42	36	-6
	Night	38	26	-12
J 220 Parish Drive, Thornton	Day	38	38	0
	Evening	39	38	-1
	Night	33	31	-2

Note 1: 1. Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.2.1.3 Coinciding Period Last Year

Table 14 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 14 LA90 Results Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		September 2017	September 2018	
D Black Hill School, Black Hill	Day	35	37	2
	Evening	43	40	-3
	Night	30	33	3
F Lot 684 Black Hill Road, Black Hill	Day	44	45	1
	Evening	46	47	1
	Night	33	39	6
G 156 Buchanan Road, Buchanan	Day	39	39	1
	Evening	34	36	2
	Night	28	29	1
I 49 Magnetic Drive, Ashtonfield	Day	38	40	2
	Evening	35	41	6
	Night	30	34	5
L 17 Kilshanny Ave, Ashtonfield	Day	31	31	1
	Evening	29	36	7
	Night	15	26	10
J 220 Parish Drive, Thornton	Day	35	38	3
	Evening	33	38	5
	Night	25	31	6

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

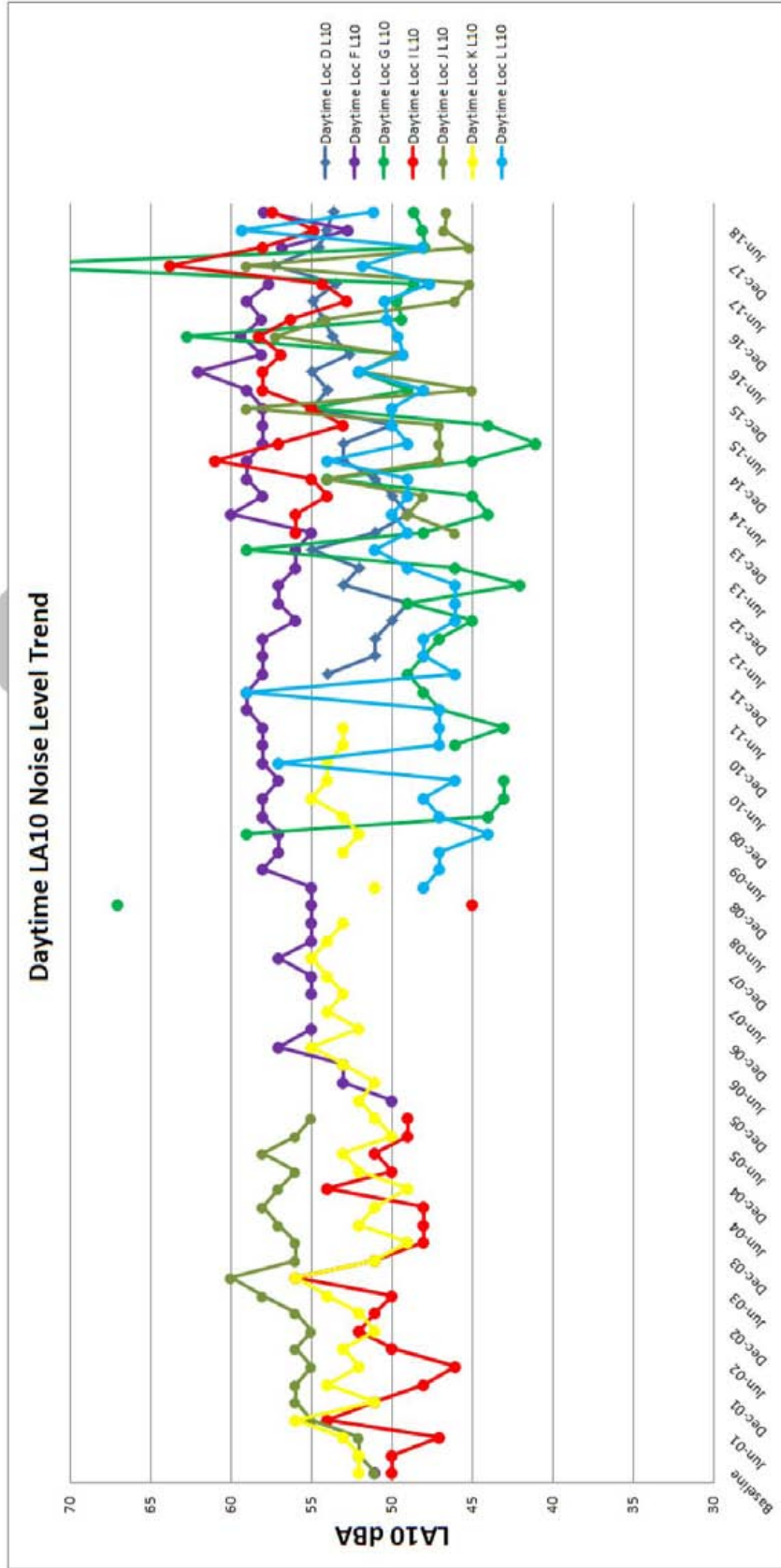
5.2.2 Ambient LA10 Noise Comparison

The long term ambient LA10 noise levels collected from each monitoring location are presented graphically in **Figure 4**, **Figure 5** and **Figure 6** for the daytime, evening and night-time respectively.

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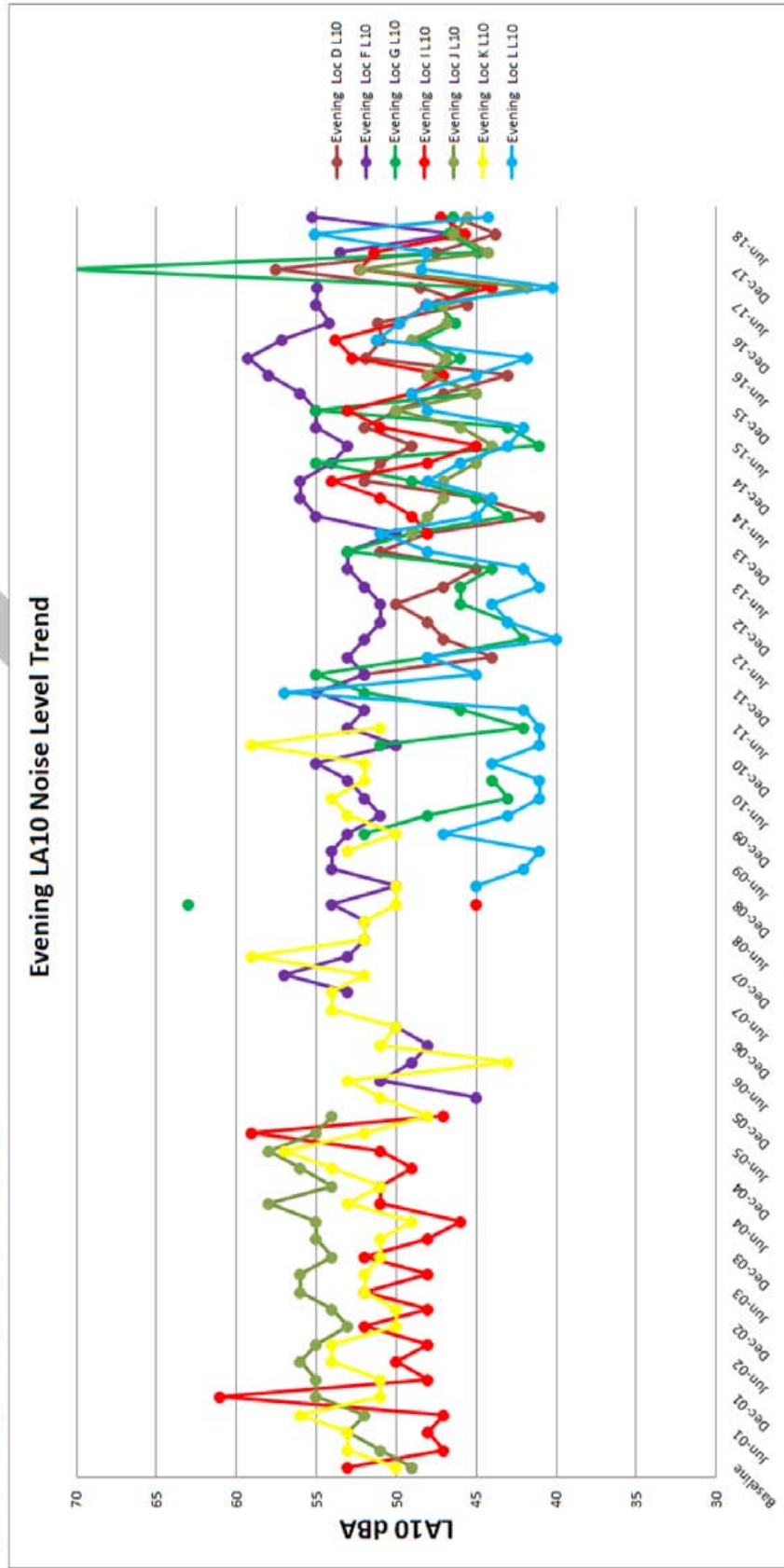
Figure 4 Long term Daytime LA10 Noise Levels



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Donaldson and Abel Coal Mines
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Quarter Ending September 2018

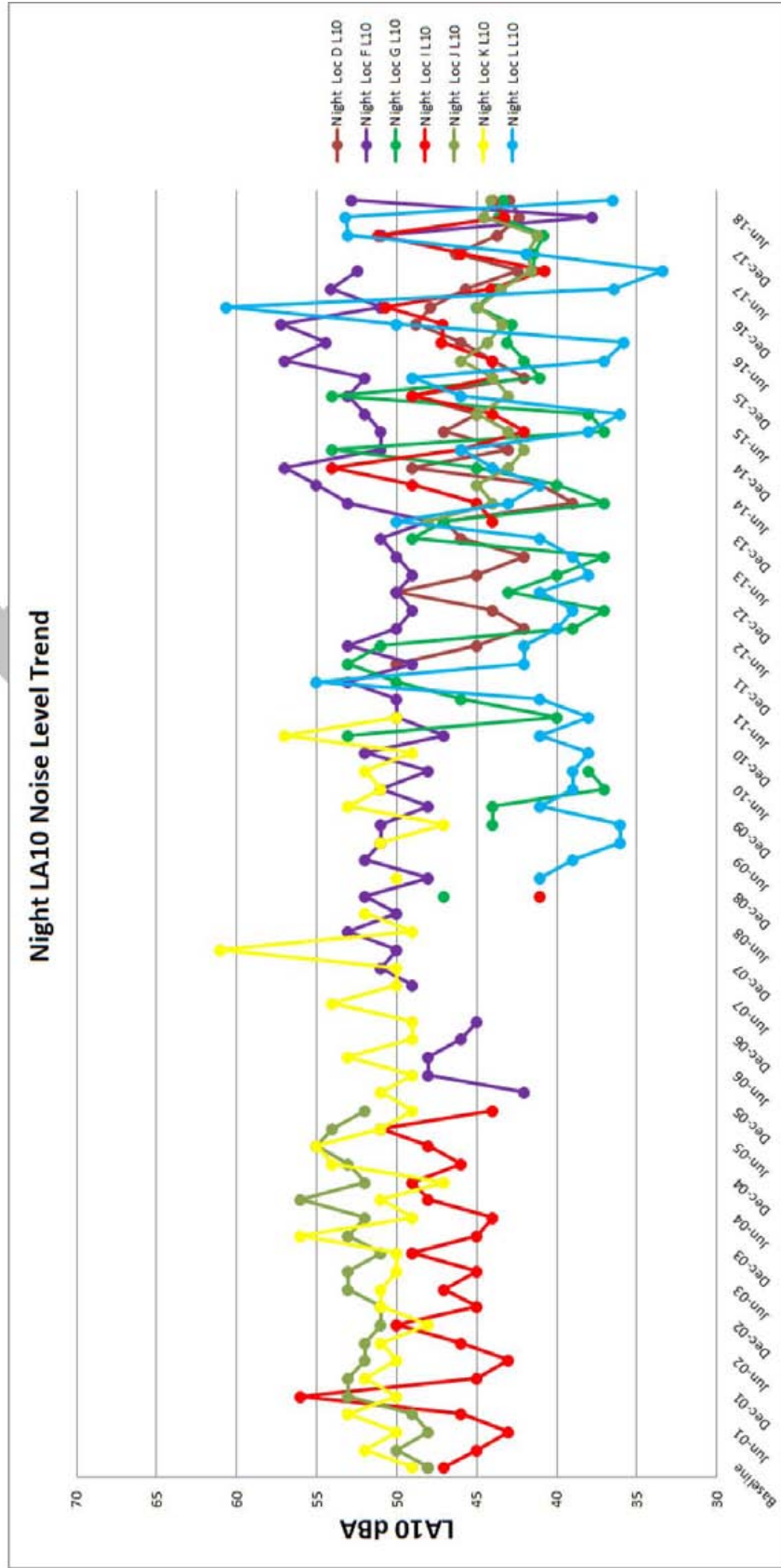
Figure 5 Long term Evening LA10 Noise Levels



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Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending September 2018

Figure 6 Long term Night-time LA10 Noise Levels



5.2.2.1 Baseline

Table 15 presents the ambient LA10 noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring period.

Table 15 LA10 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ³
		Baseline	September 2018	
D Black Hill School, Black Hill	Day	N/A ²	54	N/A
	Evening	N/A ²	46	N/A
	Night	N/A ²	43	N/A
F Lot 684 Black Hill Road, Black Hill	Day	51	58	7
	Evening	49	55	6
	Night	48	53	5
G 156 Buchanan Road, Buchanan	Day	N/A ²	49	N/A
	Evening	N/A ²	46	N/A
	Night	N/A ²	43	N/A
I 49 Magnetic Drive, Ashtonfield	Day	50	57	7
	Evening	53	47	-6
	Night	47	44	-3
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	51	N/A
	Evening	N/A ²	44	N/A
	Night	N/A ²	37	N/A
J 220 Parish Drive, Thornton	Day	51	47	-4
	Evening	49	46	-4
	Night	48	44	-4

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB.

5.2.2.2 Previous Quarter

Table 16 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the previous monitoring period.

Table 16 LA10 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		June 2018	September 2018	
D Black Hill School, Black Hill	Day	54	54	-1
	Evening	44	46	3
	Night	42	43	1
F Lot 684 Black Hill Road, Black Hill	Day	53	58	5
	Evening	46	55	9
	Night	38	53	15
G 156 Buchanan Road, Buchanan	Day	48	49	1
	Evening	47	46	0
	Night	44	43	0
I 49 Magnetic Drive, Ashtonfield	Day	55	57	3
	Evening	46	47	2
	Night	43	44	1
L 17 Kilshanny Ave, Ashtonfield	Day	59	51	-8
	Evening	55	44	-11
	Night	53	37	-17
J 220 Parish Drive, Thornton	Day	47	47	0
	Evening	46	46	-1
	Night	45	44	0

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.2.2.3 Coinciding Period Last Year

Table 17 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 17 LA10 Result Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		September 2017	September 2018	
D Black Hill School, Black Hill	Day	54	54	0
	Evening	49	46	-2
	Night	42	43	1
F Lot 684 Black Hill Road, Black Hill	Day	58	58	0
	Evening	55	55	0
	Night	52	53	0
G 156 Buchanan Road, Buchanan	Day	49	49	0
	Evening	45	46	1
	Night	42	43	2
I 49 Magnetic Drive, Ashtonfield	Day	54	57	3
	Evening	44	47	3
	Night	41	44	3
L 17 Kilshanny Ave, Ashtonfield	Day	48	51	4
	Evening	40	44	4
	Night	33	37	3
J 220 Parish Drive, Thornton	Day	45	47	2
	Evening	42	46	4
	Night	42	44	3

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.3 Rail Noise Impact

In order to determine compliance with the rail noise criteria, a noise logger was positioned at Location J. No trains were recorded over the monitoring period. As such rail noise levels from the Bloomfield Rail Spur were considered to be in compliance with the Abel Mine Project Approval during the noise monitoring period.

6 Conclusion

SLR was engaged by Donaldson Coal Pty Ltd to conduct quarterly noise monitoring surveys for Donaldson Coal Mine and Abel Coal Mine in accordance with the Abel Coal Mine Noise Monitoring Program, dated 12 August 2014.

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

Operator-attended and unattended noise measurements were conducted for the September 2018 quarter at six focus locations surrounding the mine.

Abel portal operations were not observed to be audible at any locations during the monitoring period. Contributed noise levels from Abel Mine did not exceed noise emission goals (including night-time sleep arousal criteria) and compliance with the Abel Mine *Project Approval* was indicated at all locations.

A comparison of ambient LA_{10} and LA_{90} noise levels recorded during the current monitoring period (September 2018), the baseline monitoring period, the last monitoring period (June 2018), and the coinciding monitoring period from last year (September 2017) has been conducted.

Rail noise levels from the Bloomfield Rail Spur were considered to be in compliance with the Abel Mine Project Approval during the noise monitoring period.

Appendix A

Acoustic Terminology
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1 Sound Level or Noise Level

The terms "sound" and "noise" are almost interchangeable, except that in common usage "noise" is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or L_p are commonly used to represent Sound Pressure Level. The symbol L_A represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2E-5 Pa.

2 "A" Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an "A-weighting" filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120 110	Heavy rock concert Grinding on steel	Extremely noisy
100 90	Loud car horn at 3 m Construction site with pneumatic hammering	Very noisy
80 70	Kerbside of busy street Loud radio or television	Loud
60 50	Department store General Office	Moderate to quiet
40 30	Inside private office Inside bedroom	Quiet to very quiet
20	Unoccupied recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as "linear", and the units are expressed as dB(Z) or dB.

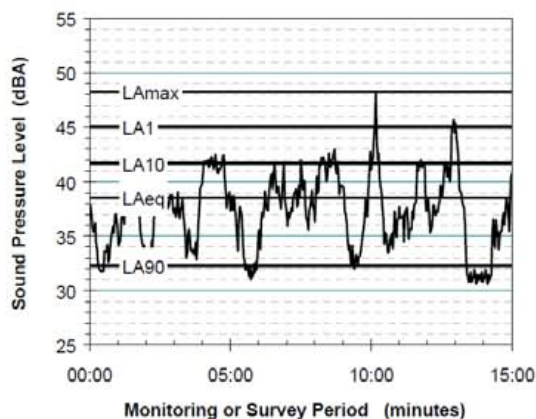
3 Sound Power Level

The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 1E-12 W. The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels L_{AN} , where L_{AN} is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the L_{A1} is the noise level exceeded for 1% of the time, L_{A10} the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

- L_{A1} The noise level exceeded for 1% of the 15 minute interval.
- L_{A10} The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- L_{A90} The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- L_{Aeq} The A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the "repeatable minimum" L_{A90} noise level over the daytime and night-time measurement periods, as required by the EPA. In addition the method produces mean or "average" levels representative of the other descriptors (L_{Aeq} , L_{A10} , etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than "broad band" noise.

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

Appendix A

Acoustic Terminology
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7 Frequency Analysis

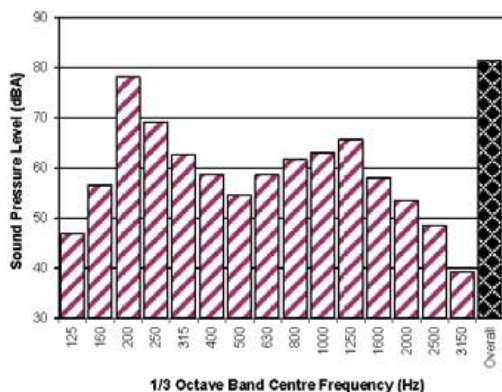
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of "peak" velocity or "rms" velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as "peak particle velocity", or PPV. The latter incorporates "root mean squared" averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (1E-6 mm/s). Care is required in this regard, as other reference levels are used by some organizations.

9 Human Perception of Vibration

People are able to "feel" vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as "normal" in a car, bus or train is considerably higher than what is perceived as "normal" in a shop, office or dwelling.

10 Over-Pressure

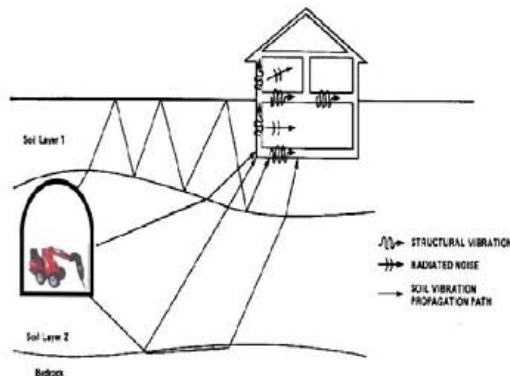
The term "over-pressure" is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

11 Regenerated Noise

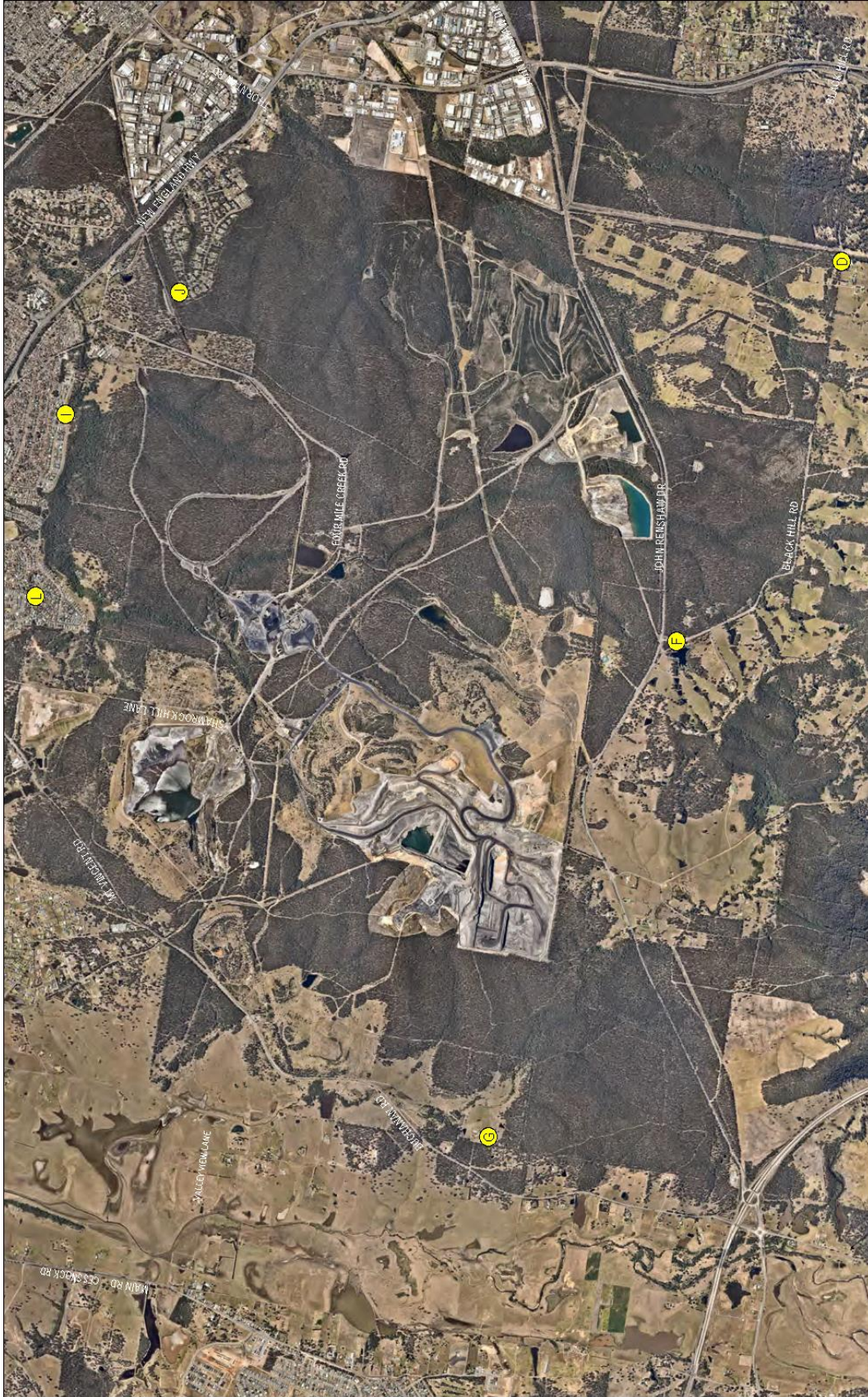
Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed "regenerated noise", "structure-borne noise", or sometimes "ground-borne noise". Regenerated noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of regenerated noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

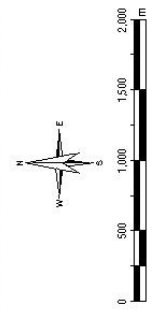
The following figure presents the various paths by which vibration and regenerated noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term "regenerated noise" is also used to describe other types of noise that are emitted from the primary source as a different form of energy. One example would be a fan with a silencer, where the fan is the energy source and primary noise source. The silencer may effectively reduce the fan noise, but some additional noise may be created by the aerodynamic effect of the silencer in the airstream. This "secondary" noise may be referred to as regenerated noise.



Donaldson Coal
Noise Monitoring
Noise Monitoring Locations
APPENDIX B



LEGEND
● Noise Monitoring Locations

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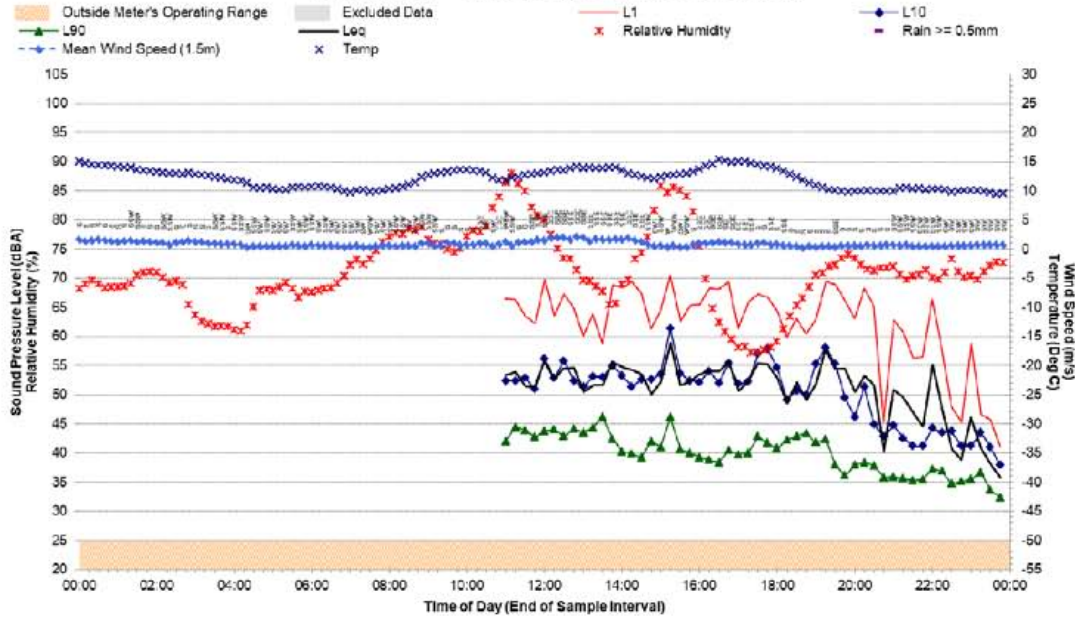
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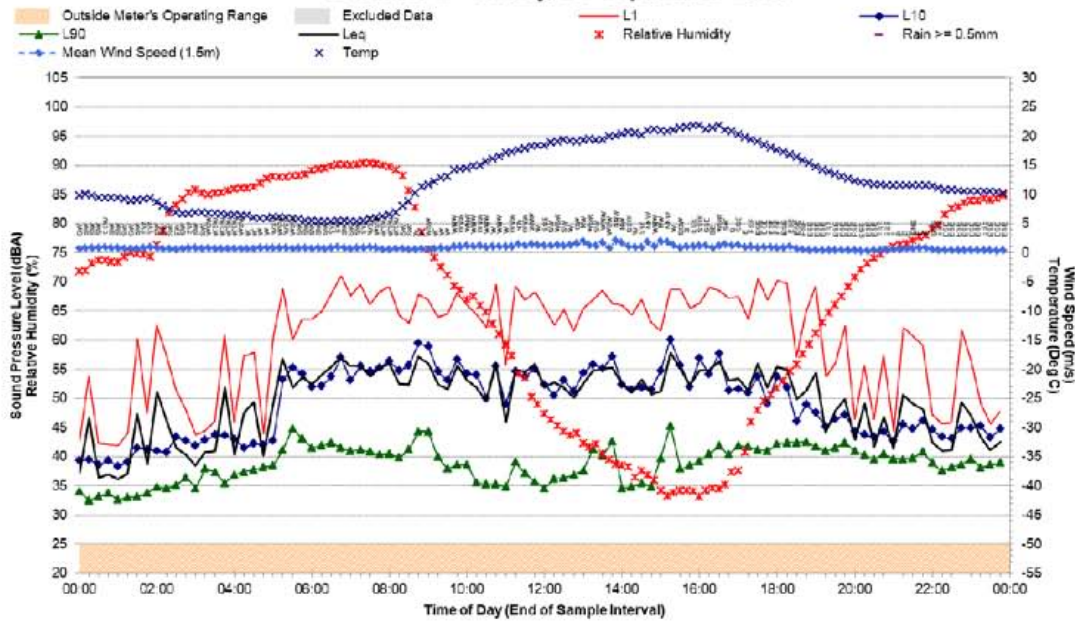
APPENDIX C

Statistical Ambient Noise Levels

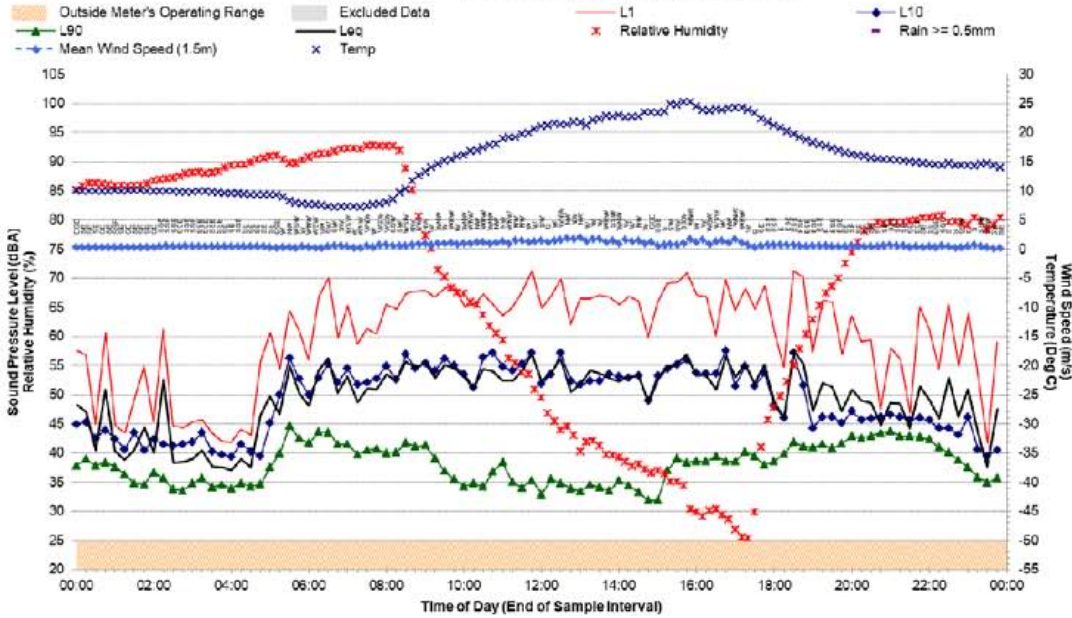
Statistical Ambient Noise Levels Location D - Thursday, 20 September 2018



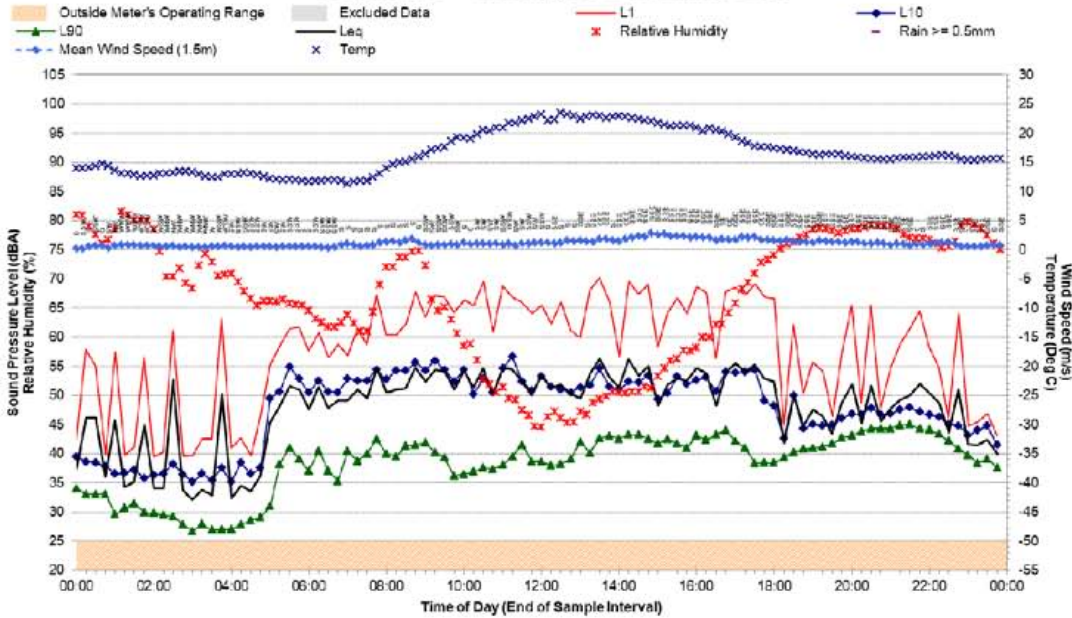
Statistical Ambient Noise Levels Location D - Friday, 21 September 2018



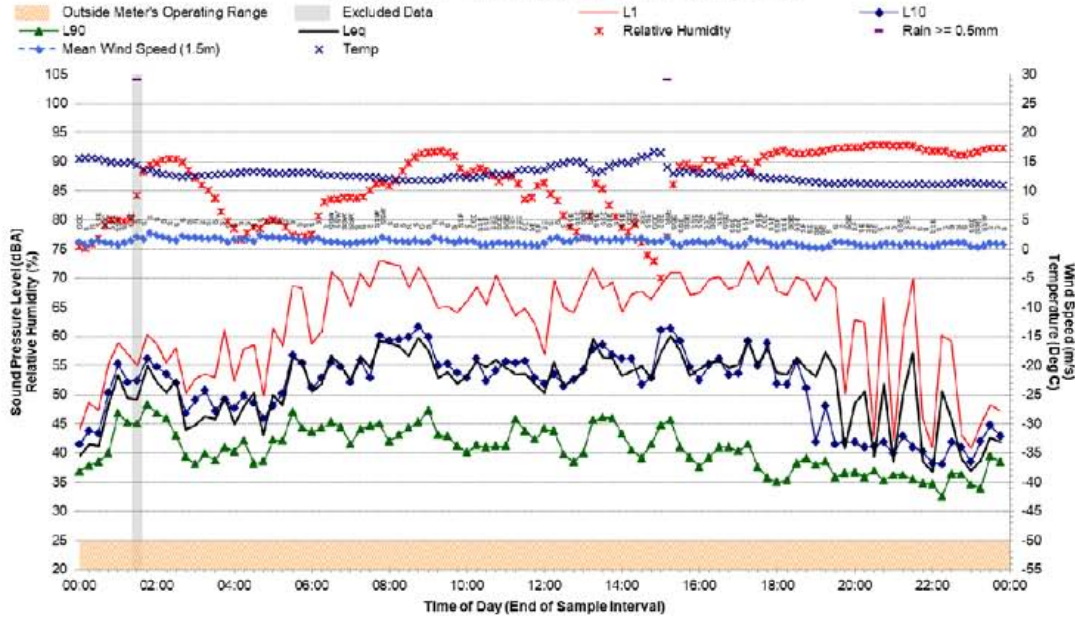
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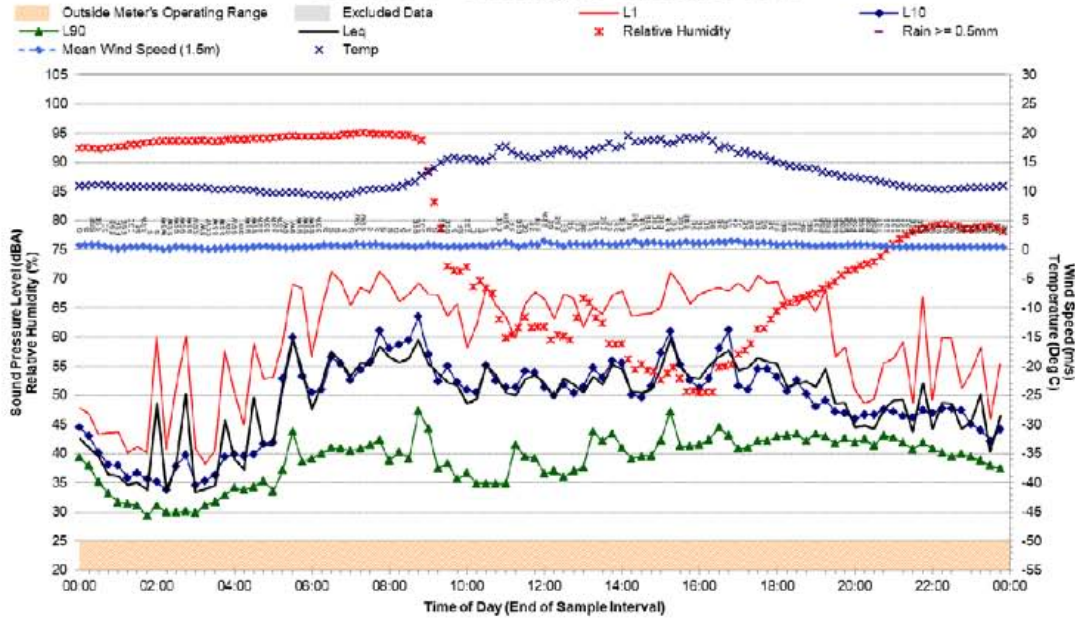
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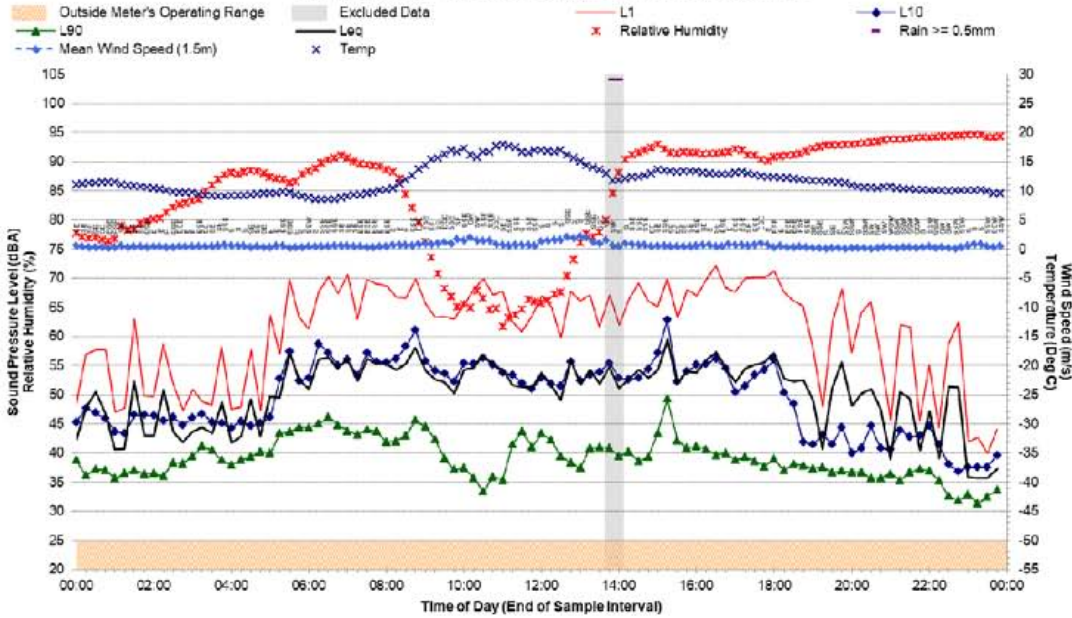
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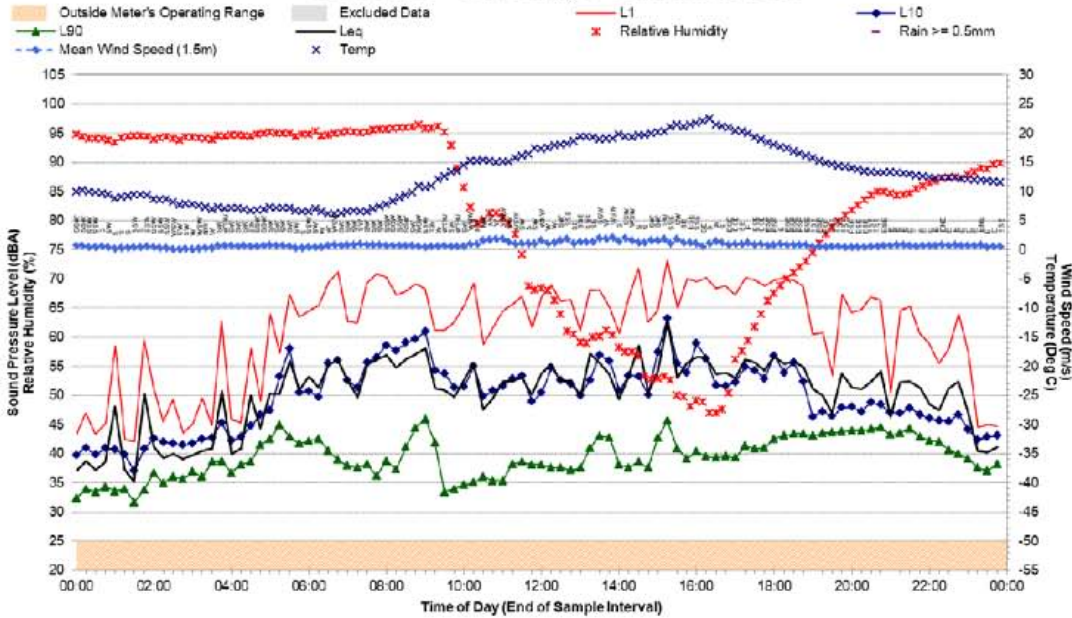
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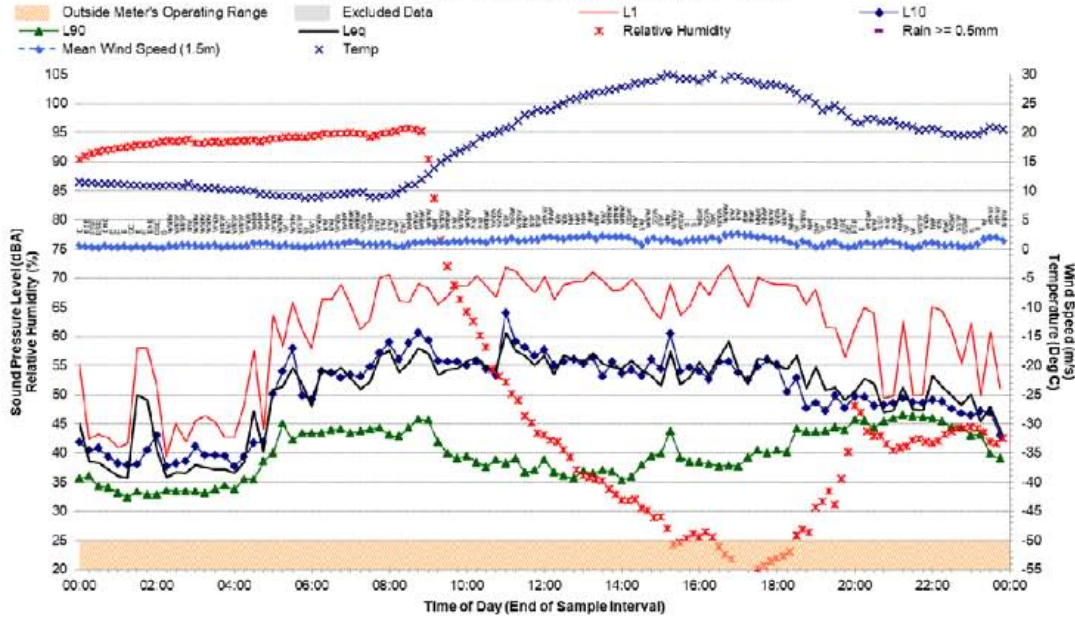
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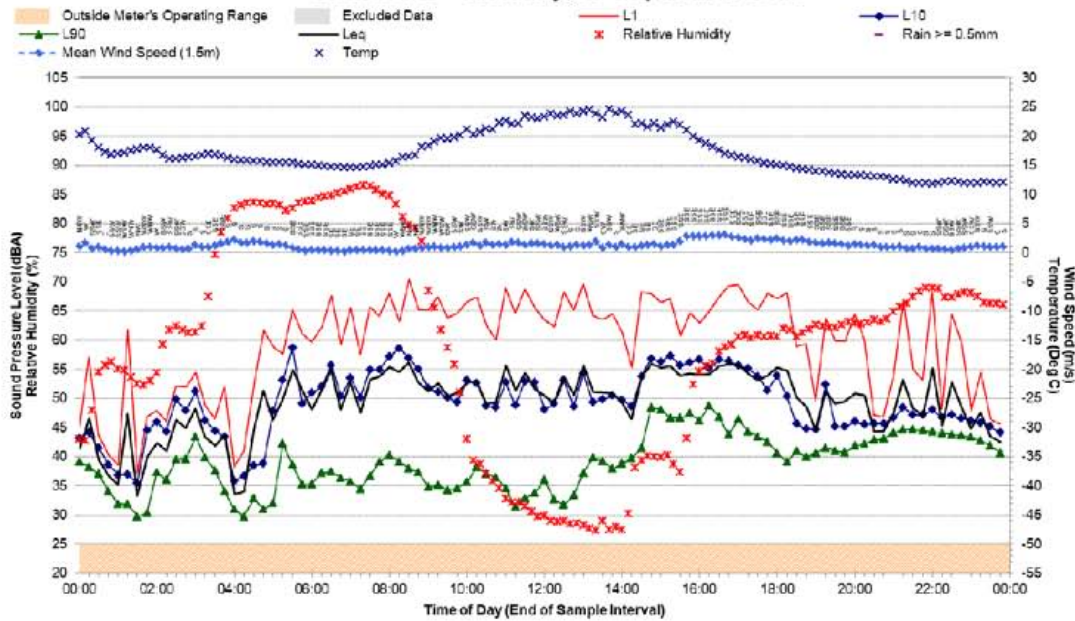
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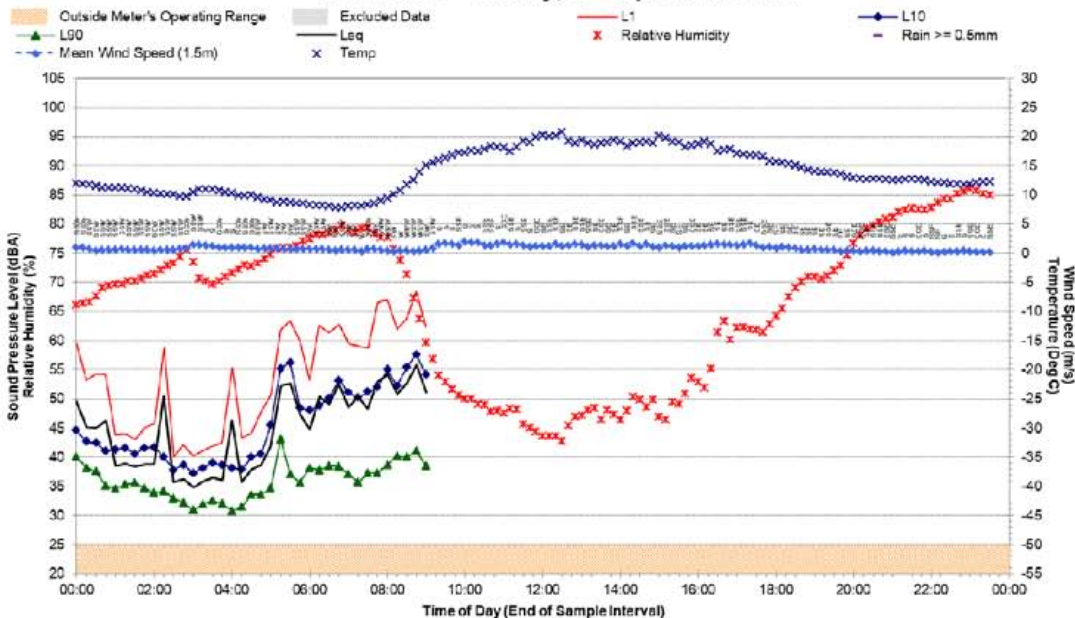
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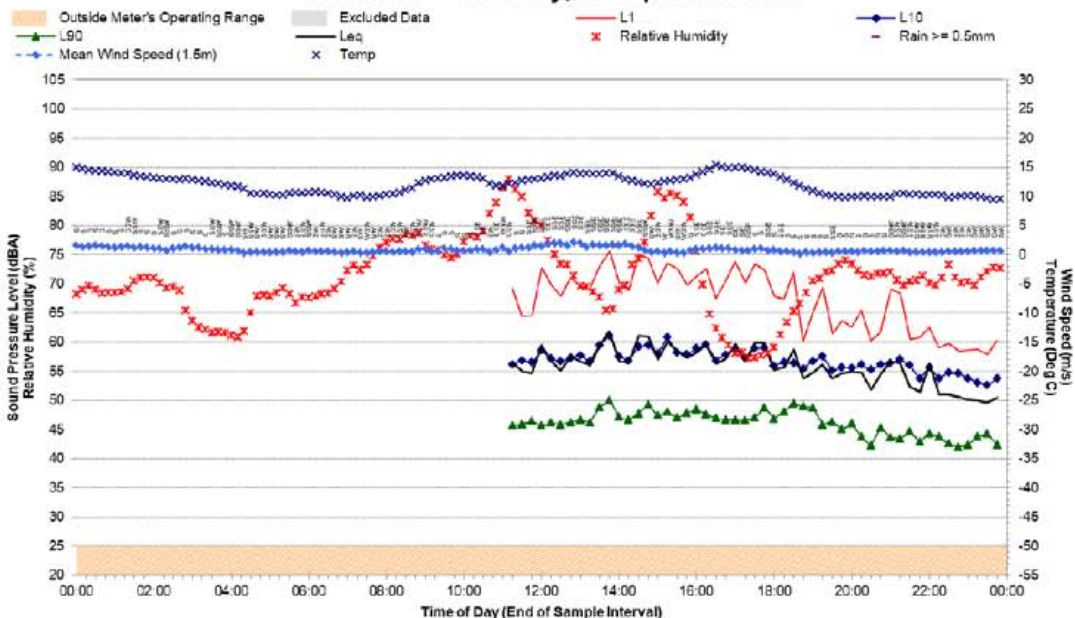
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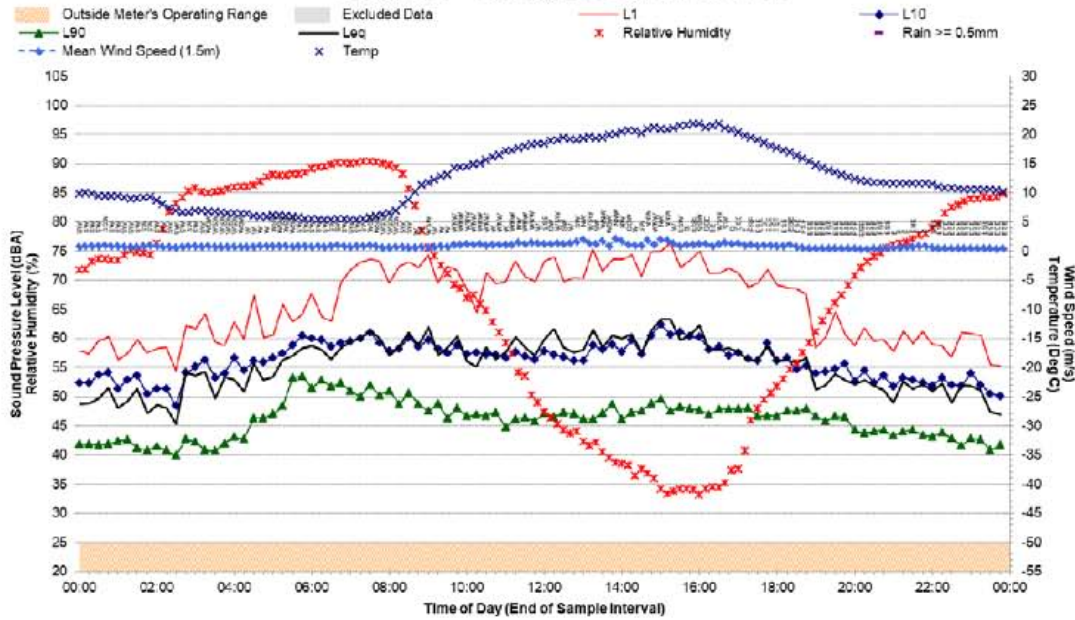
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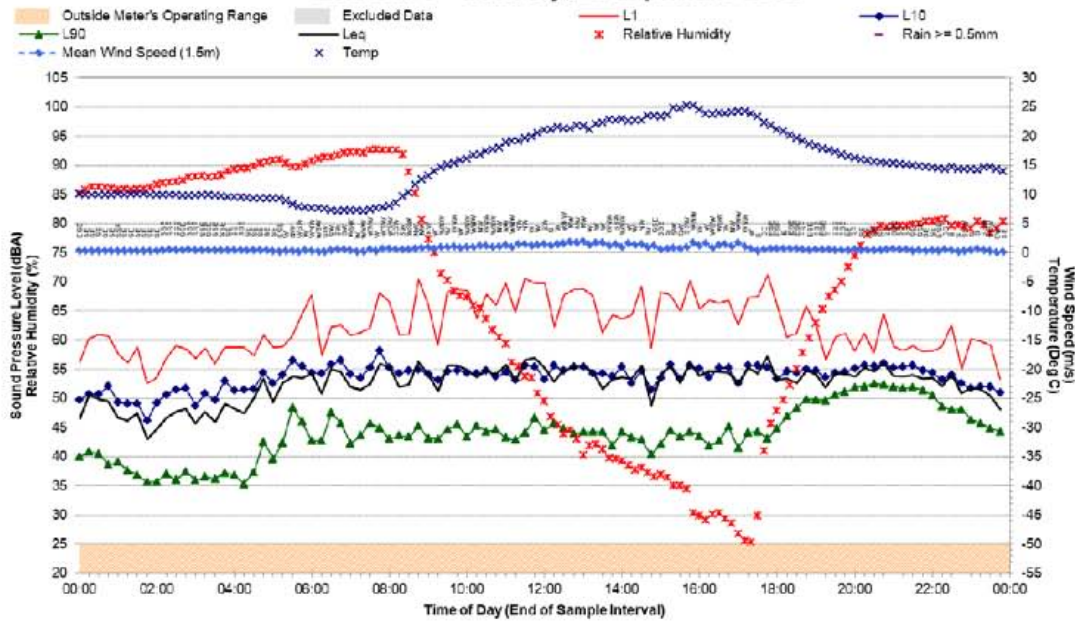
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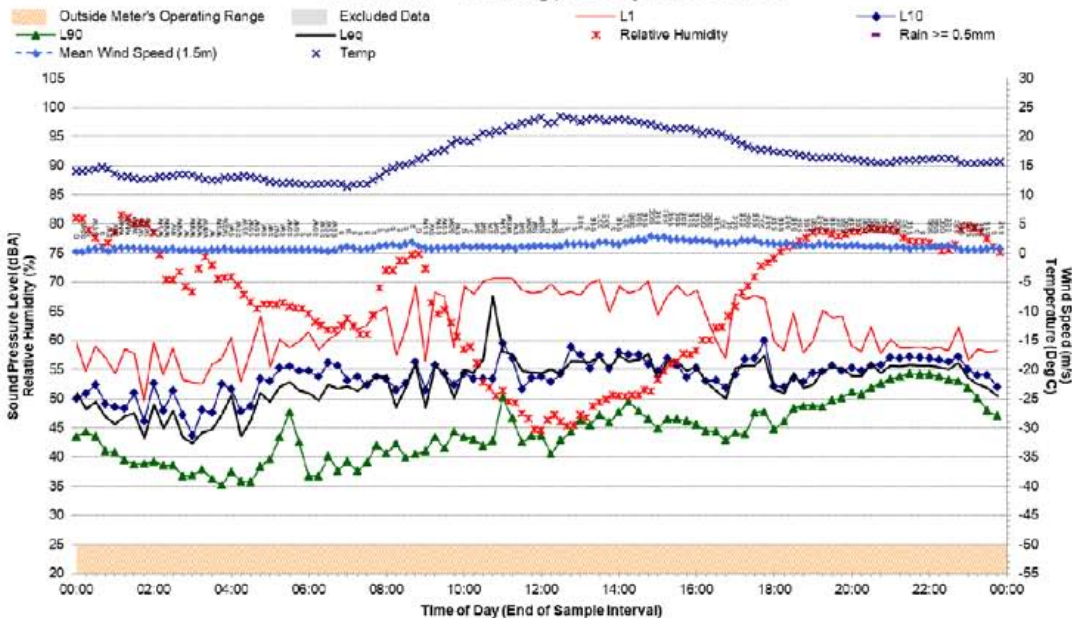
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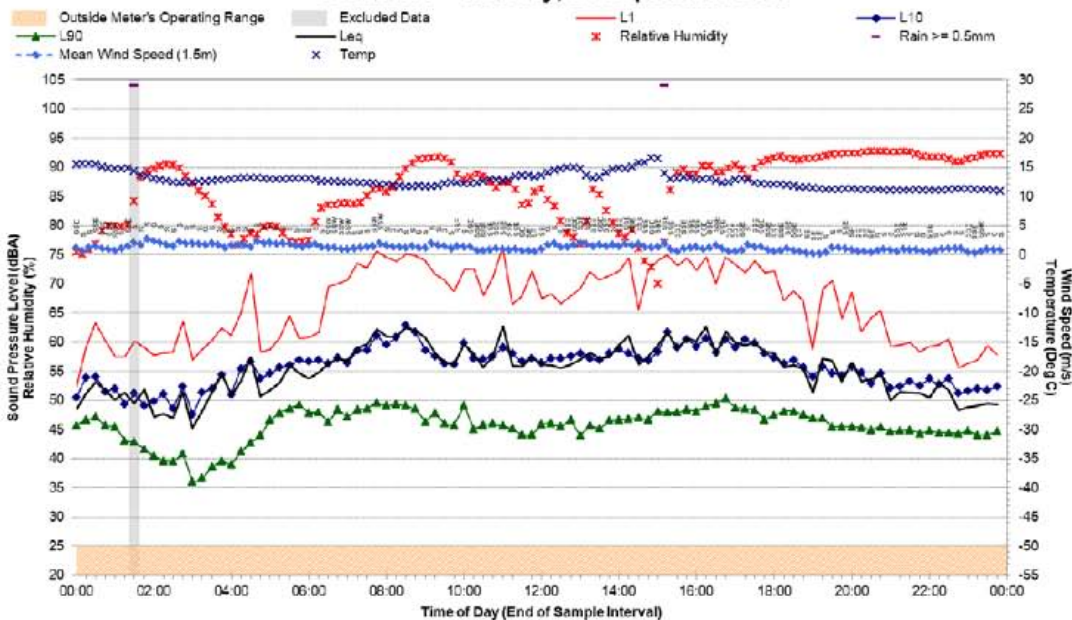
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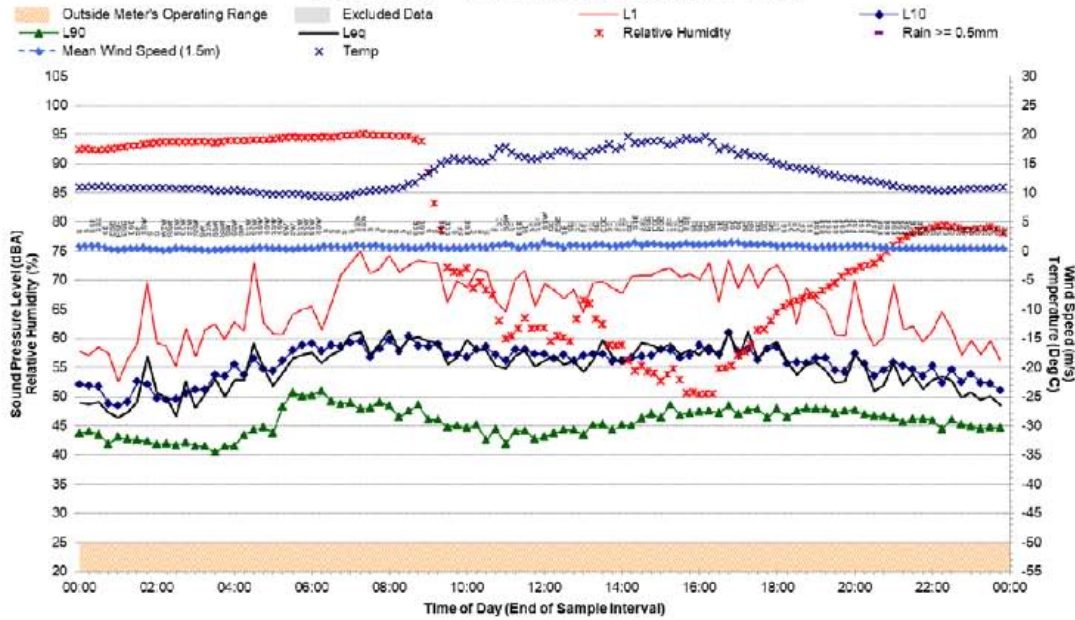
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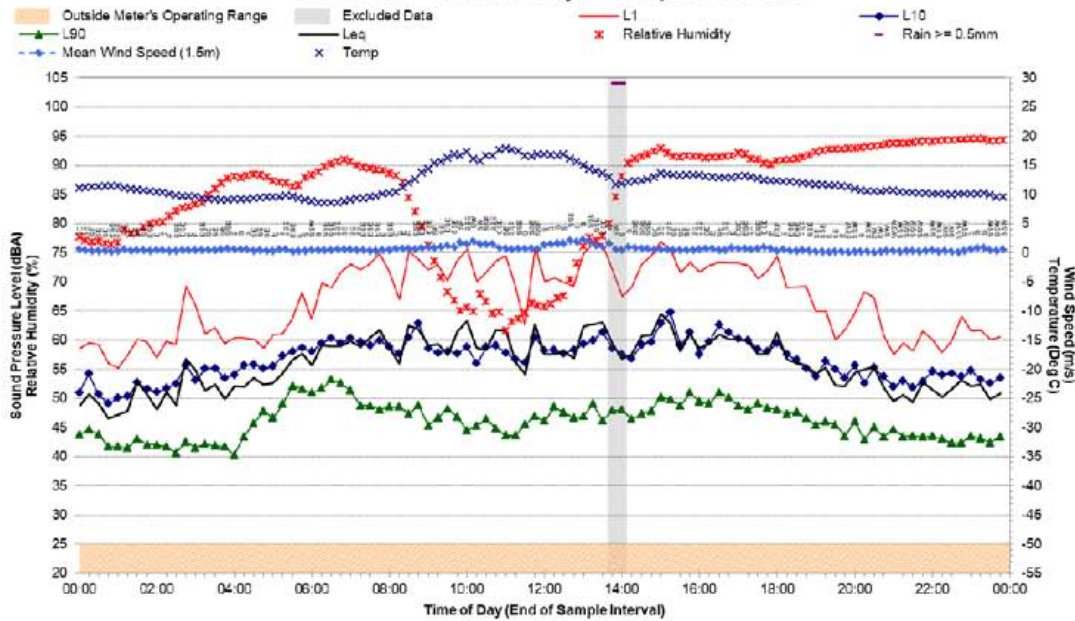
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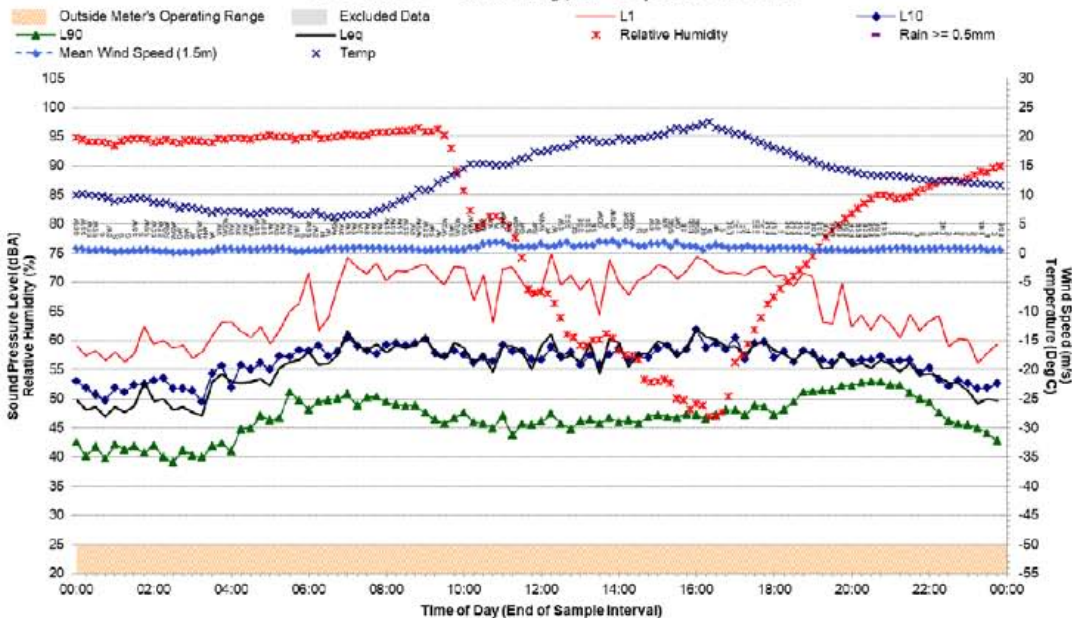
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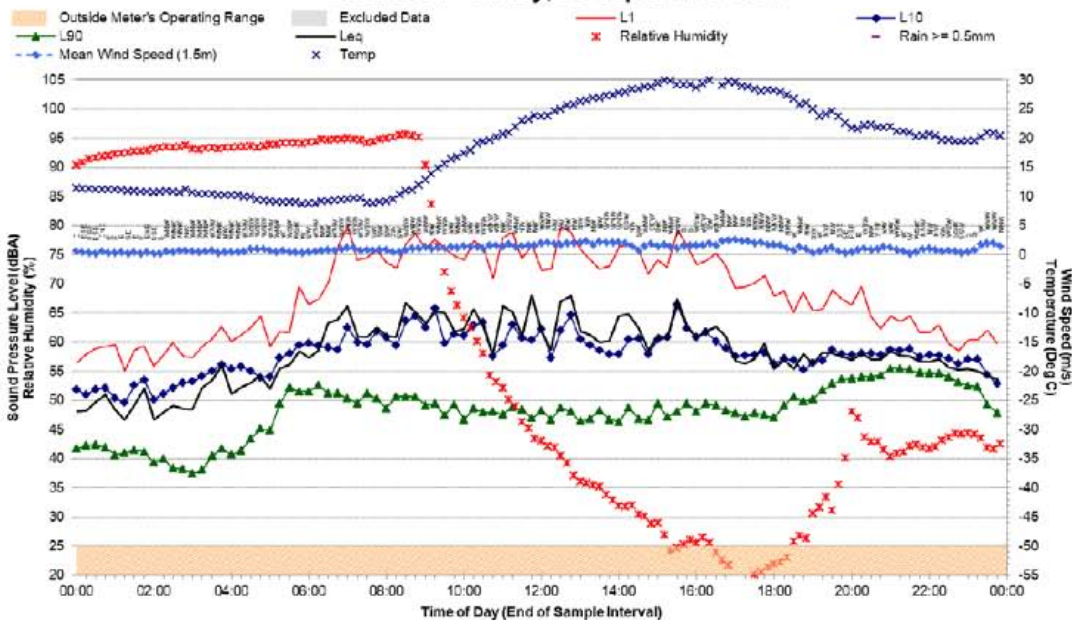
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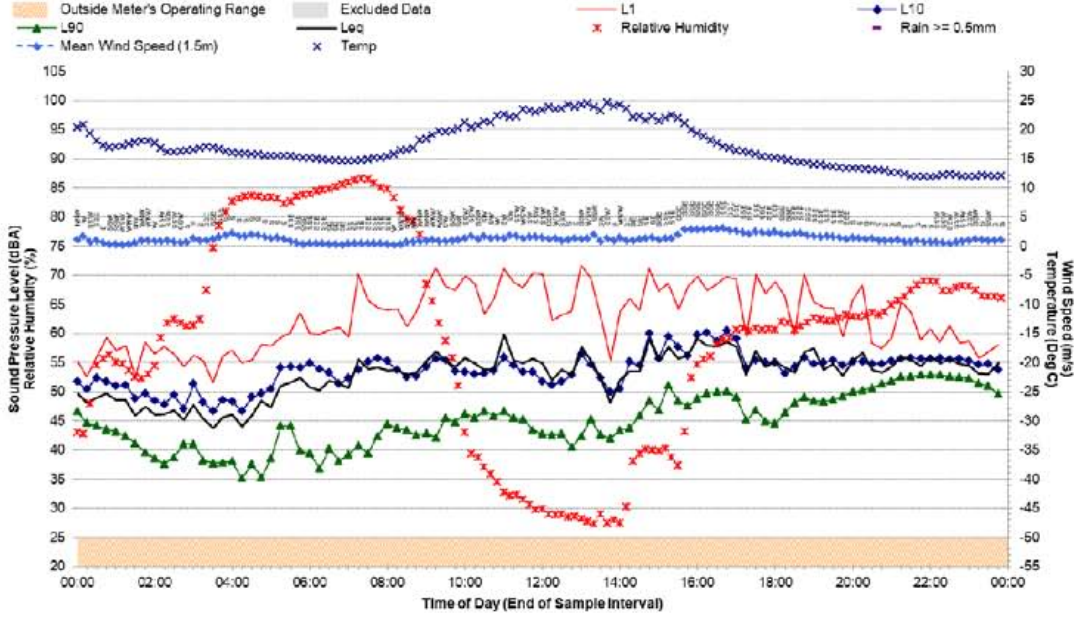
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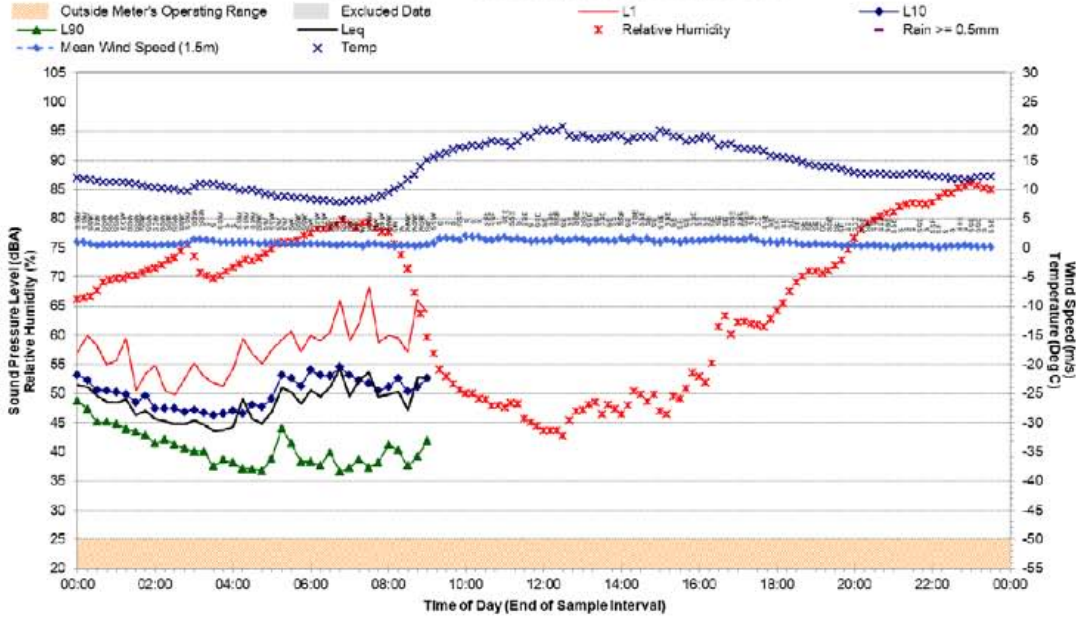
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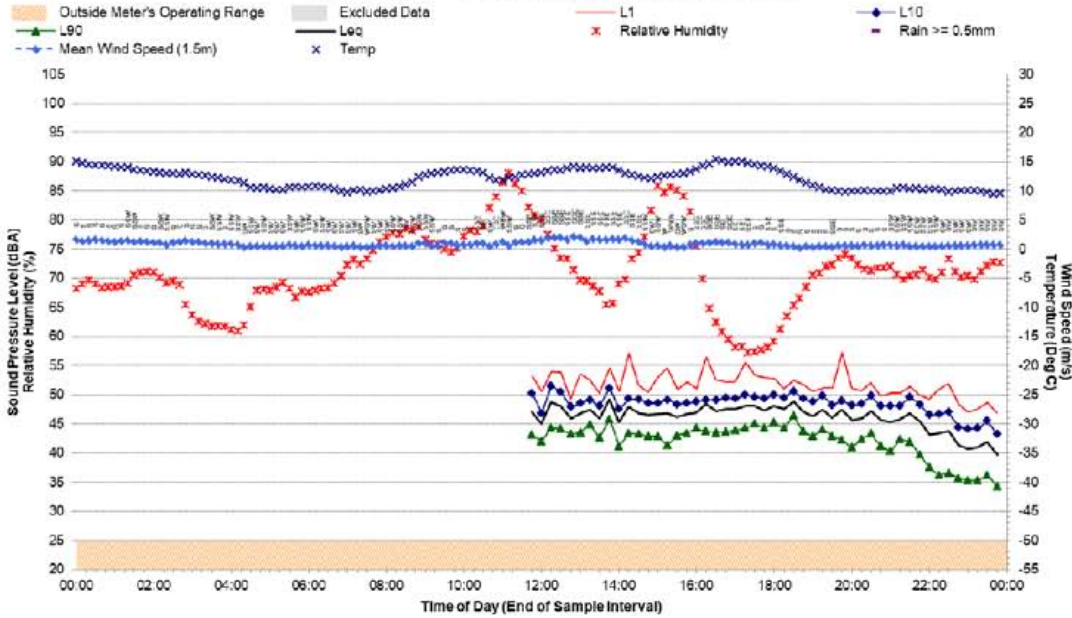
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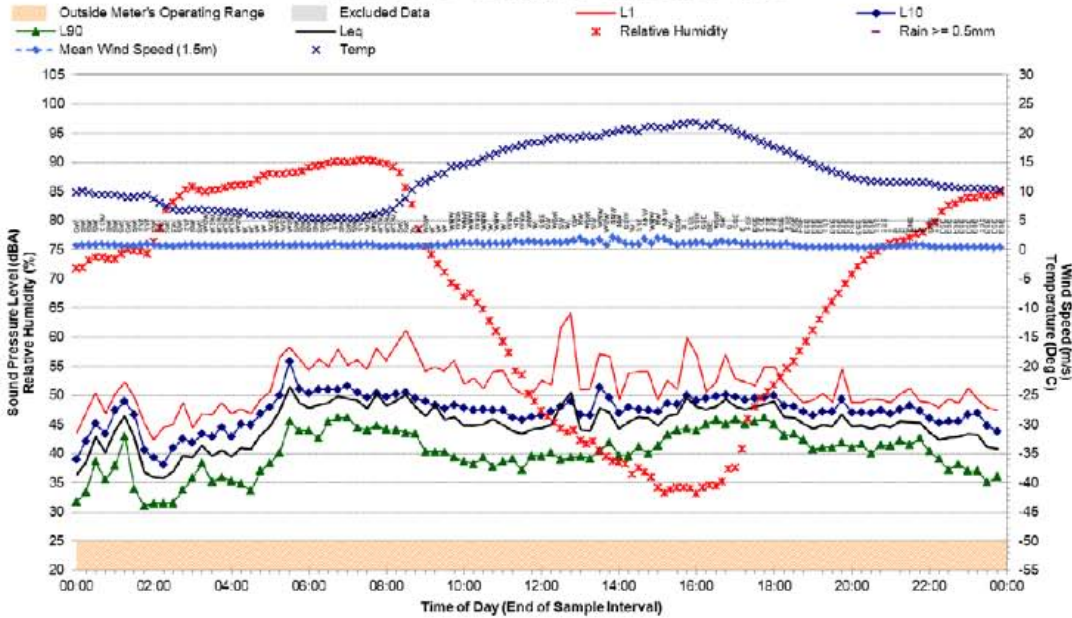
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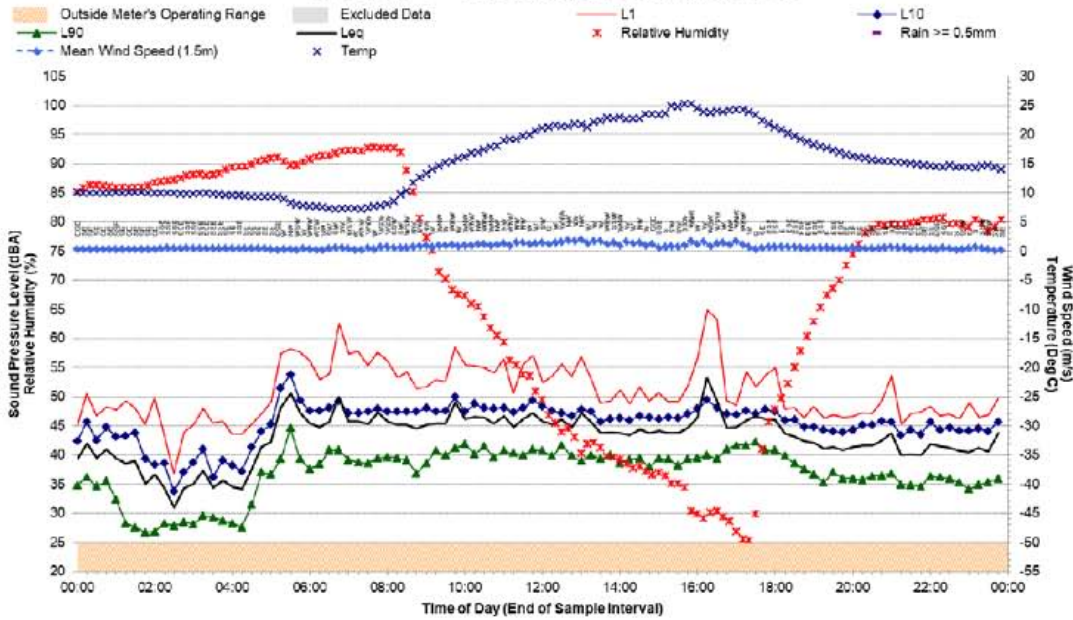
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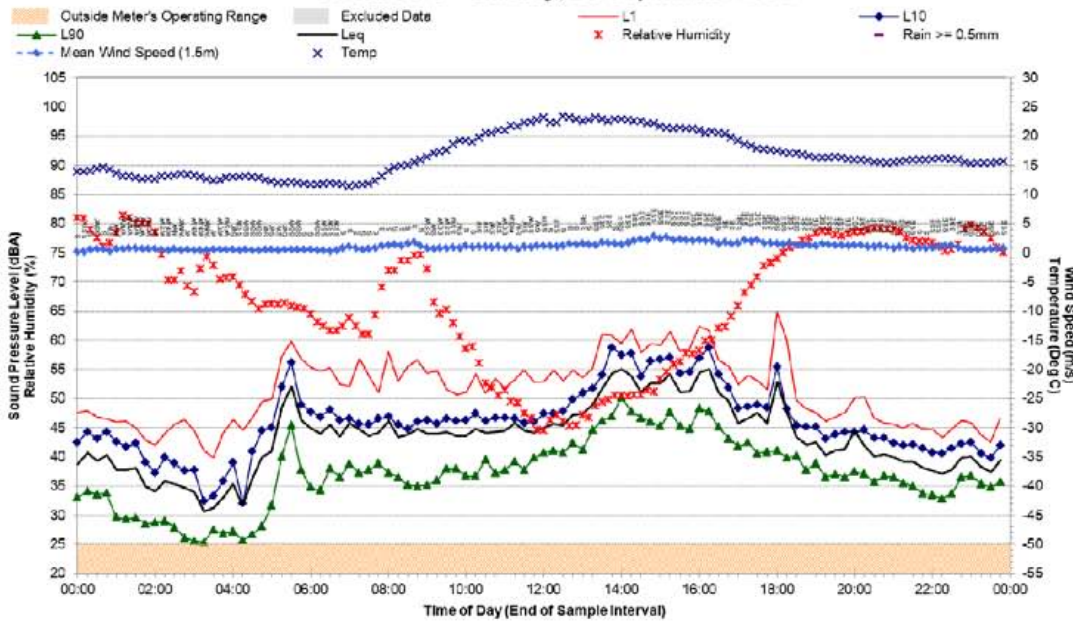
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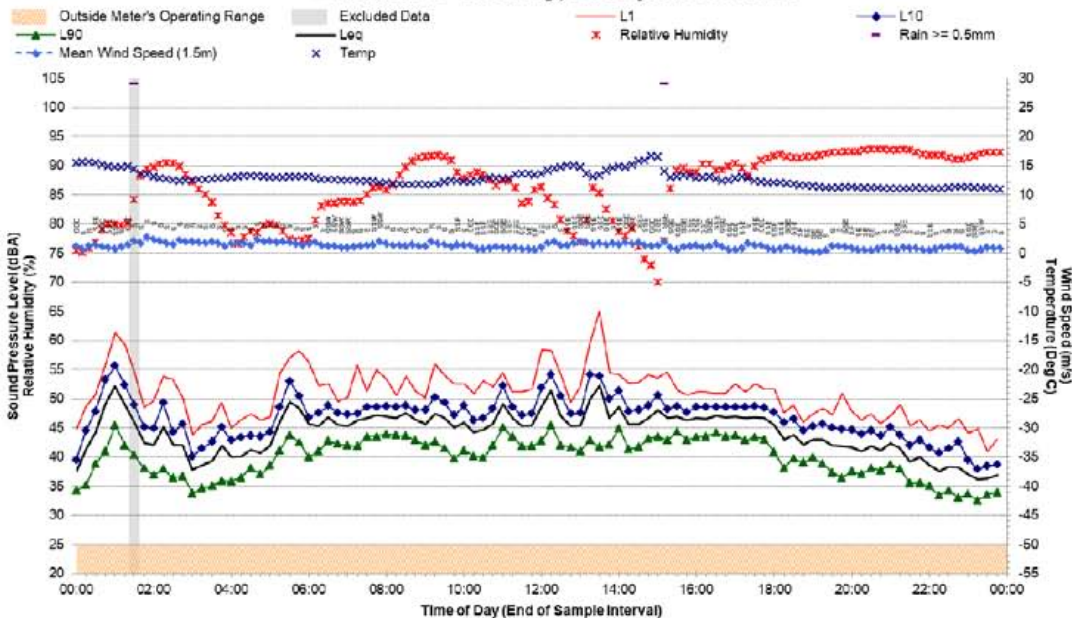
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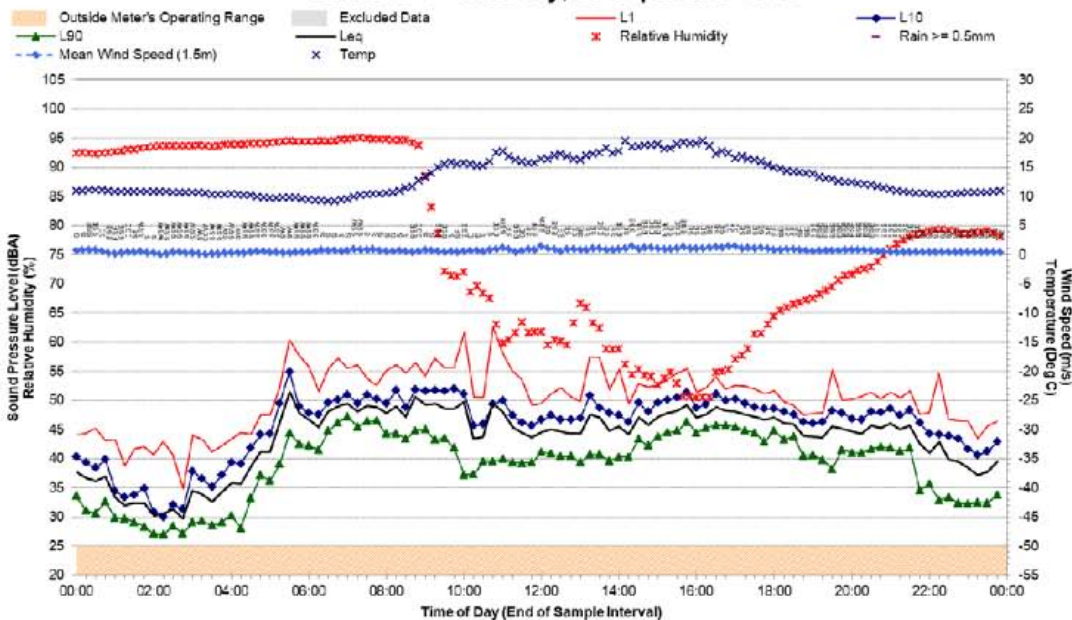
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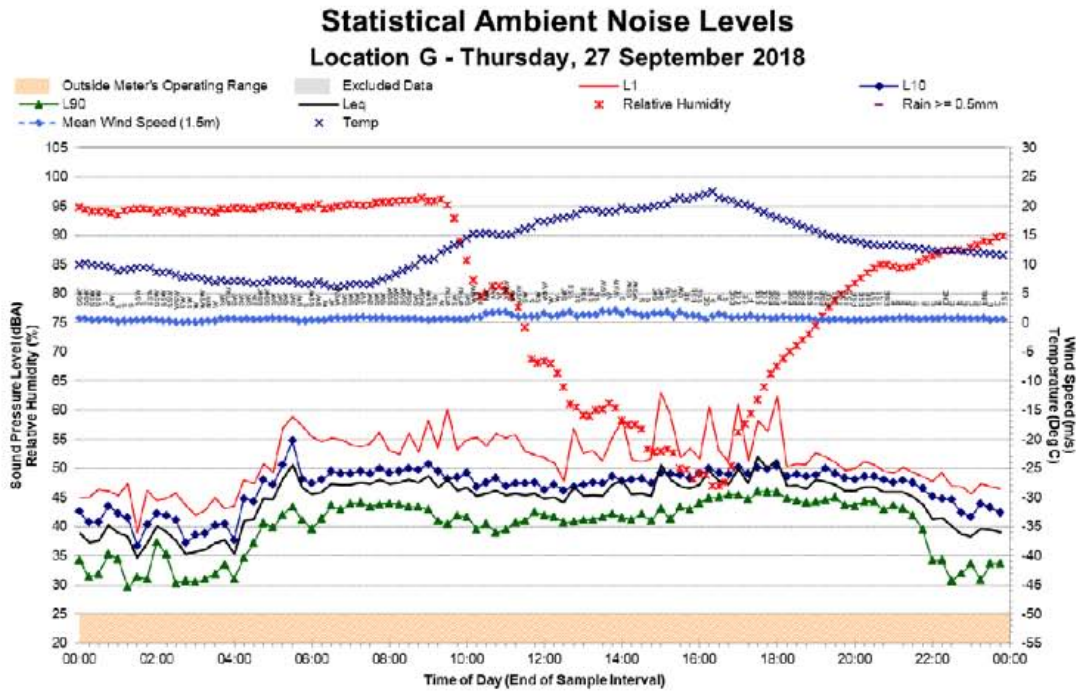
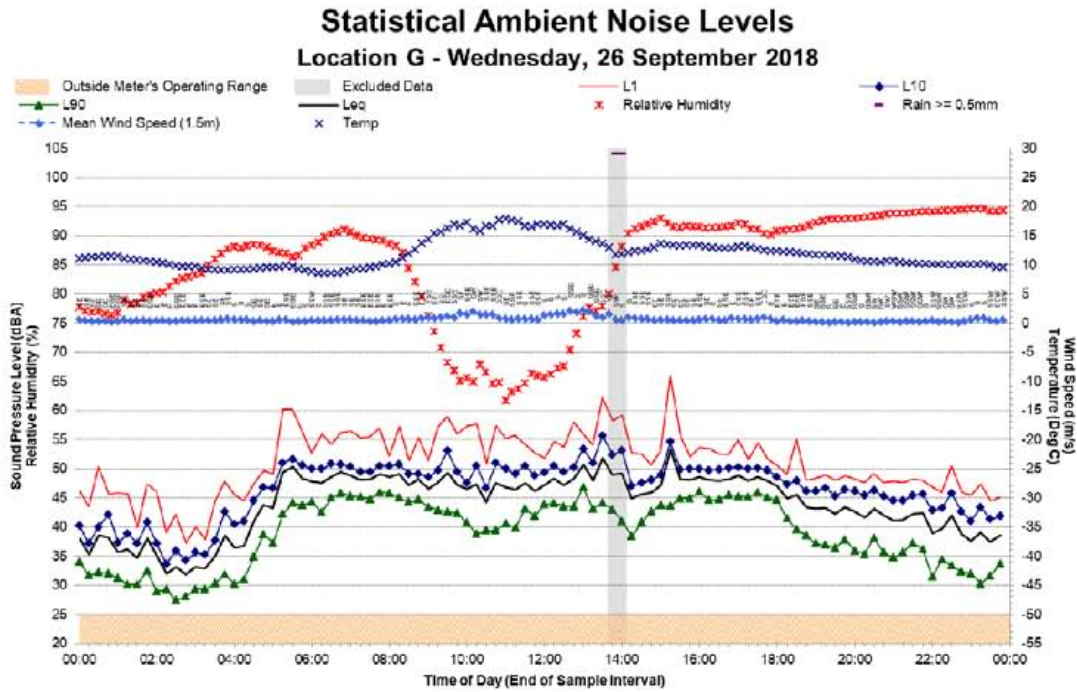


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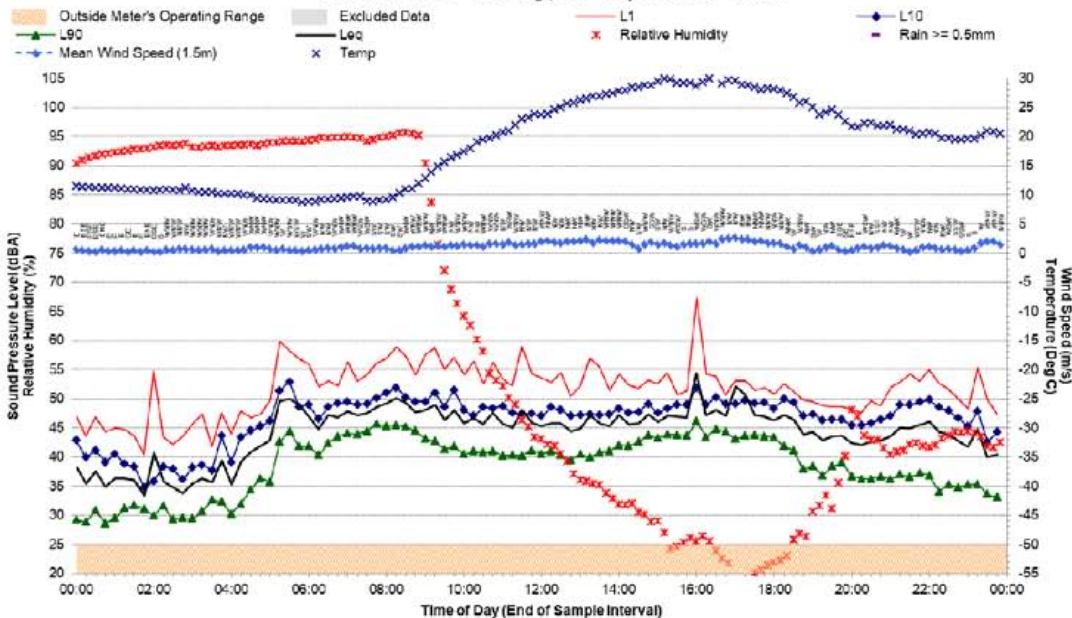


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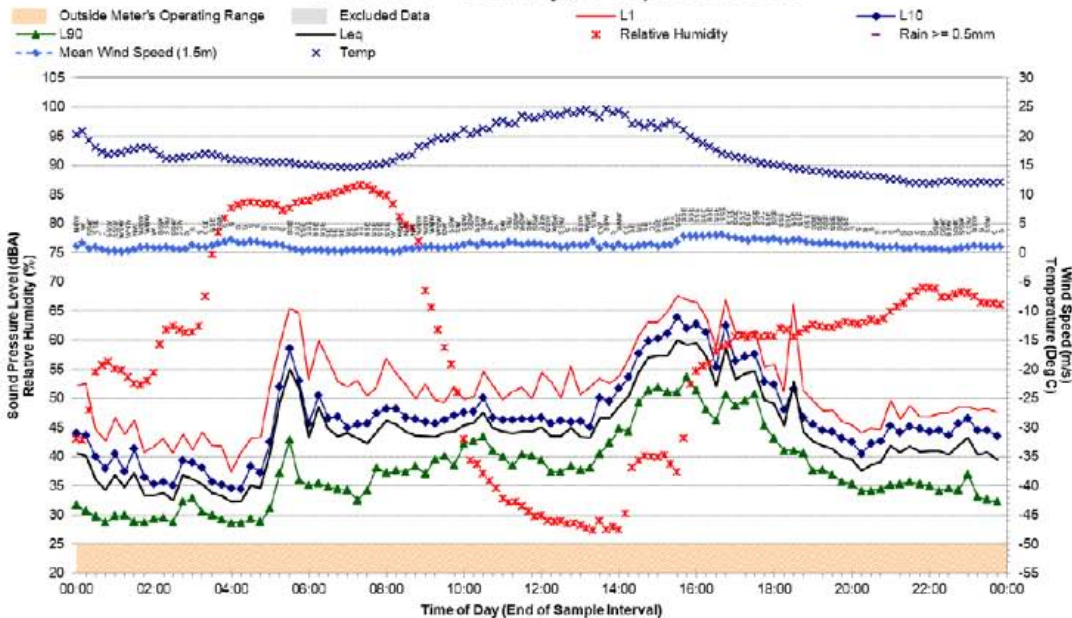




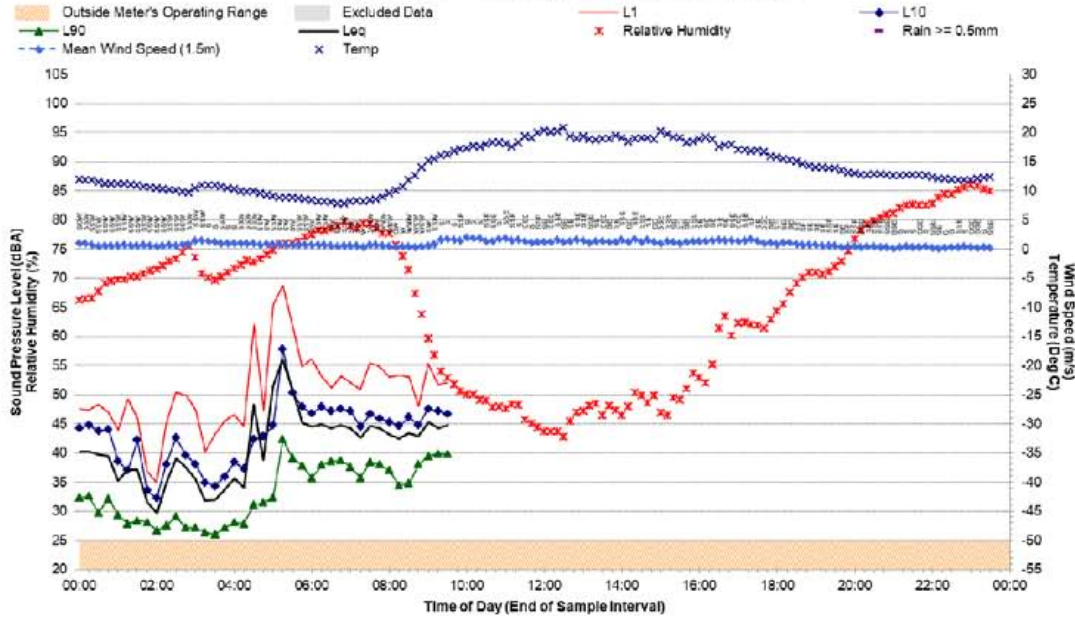
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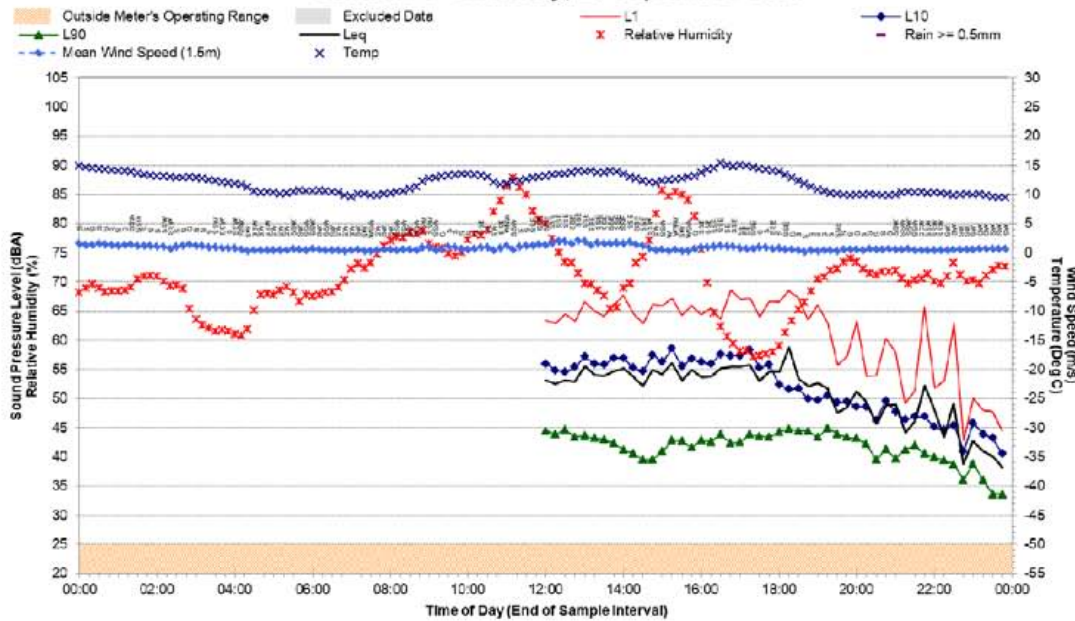
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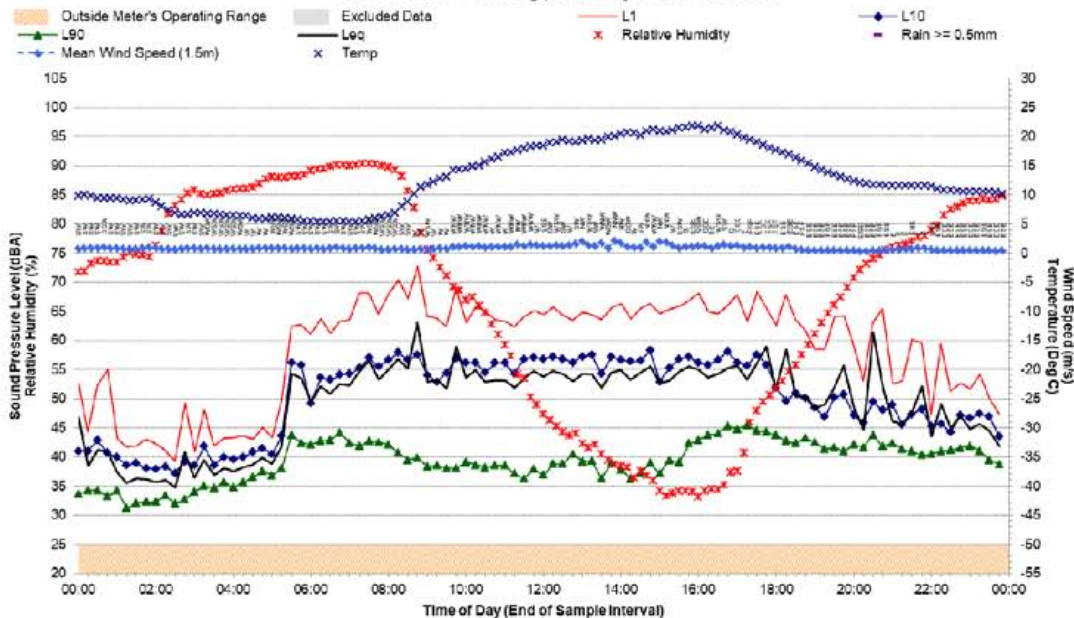
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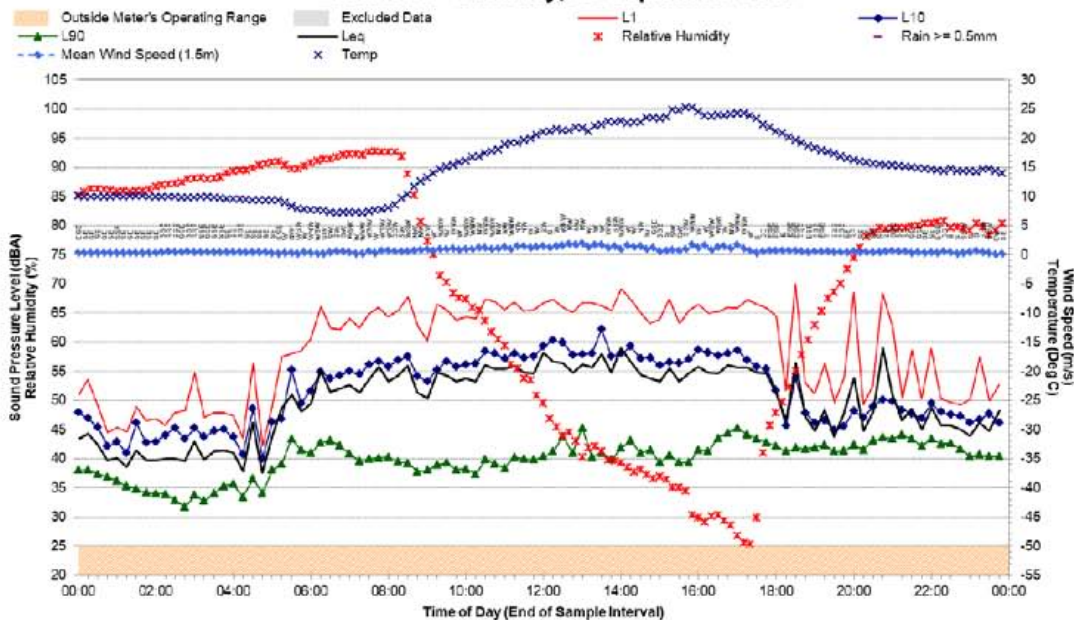
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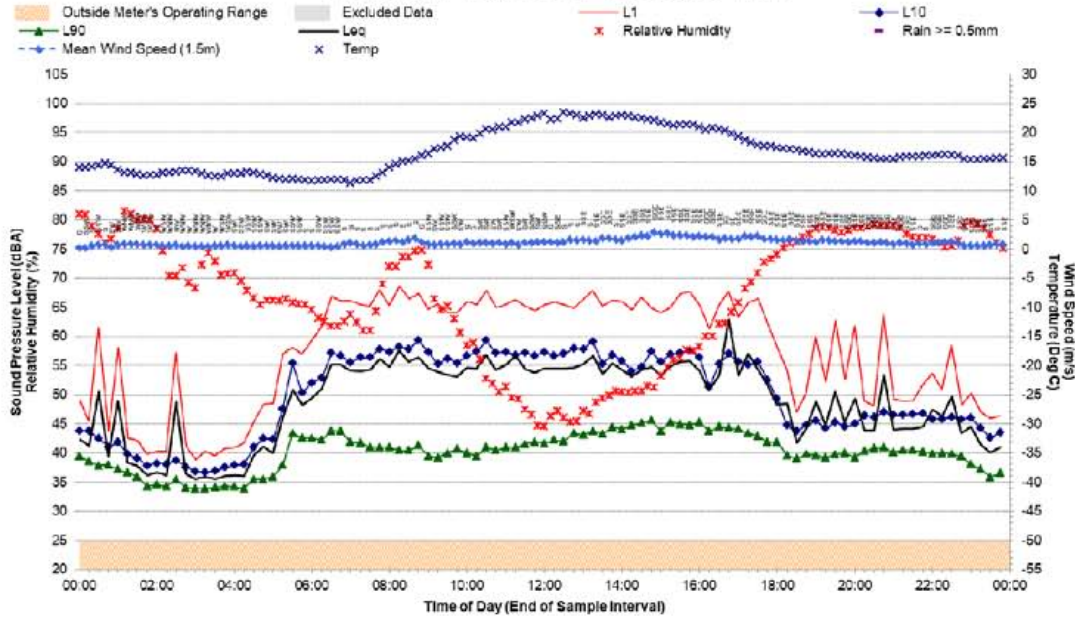
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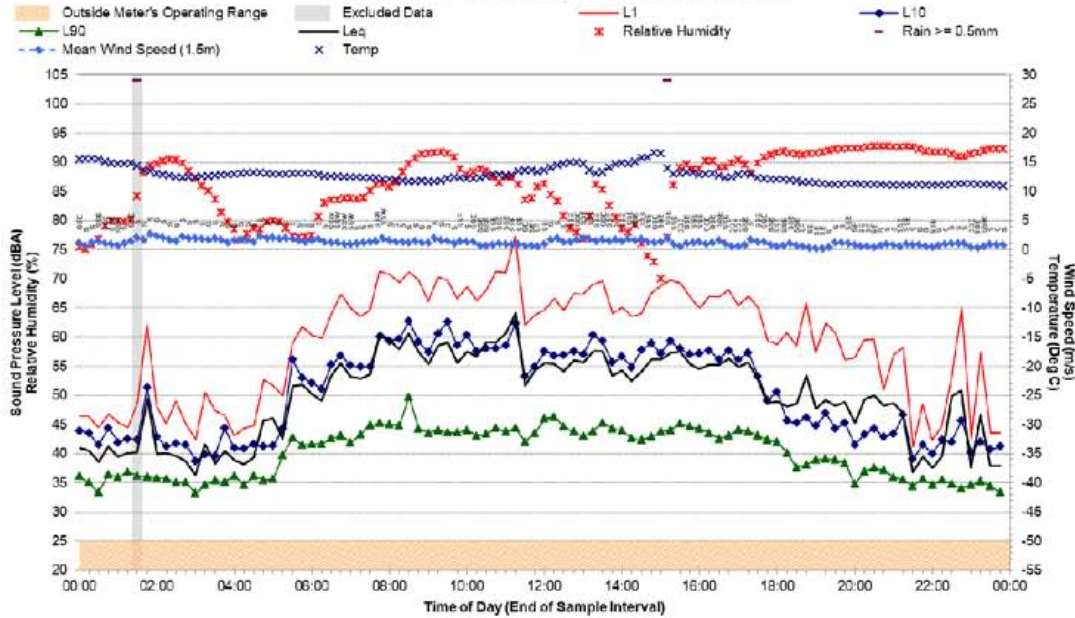
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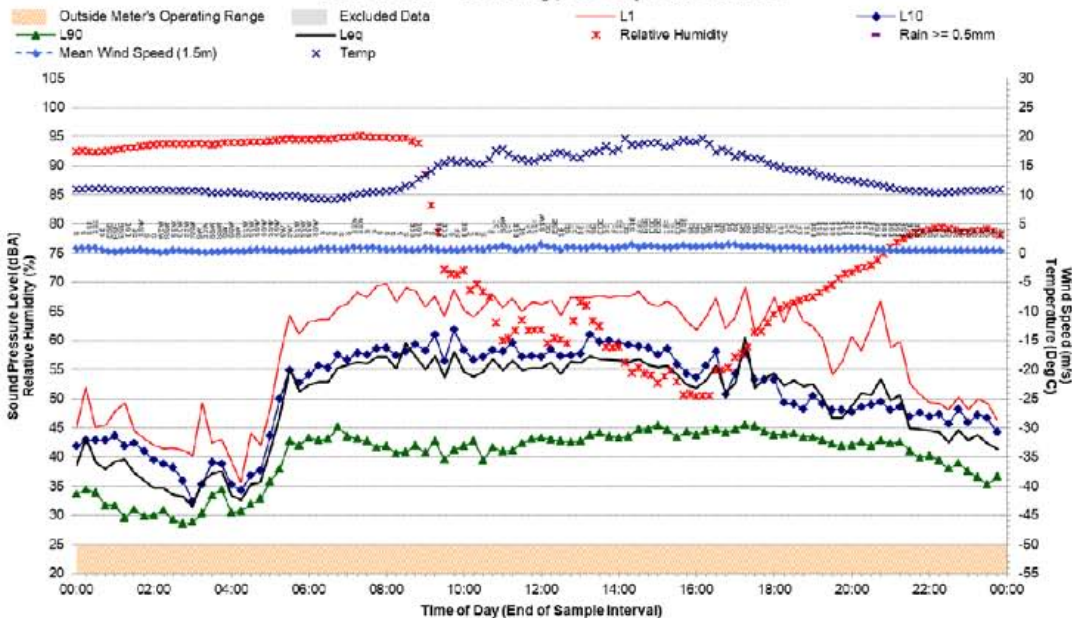
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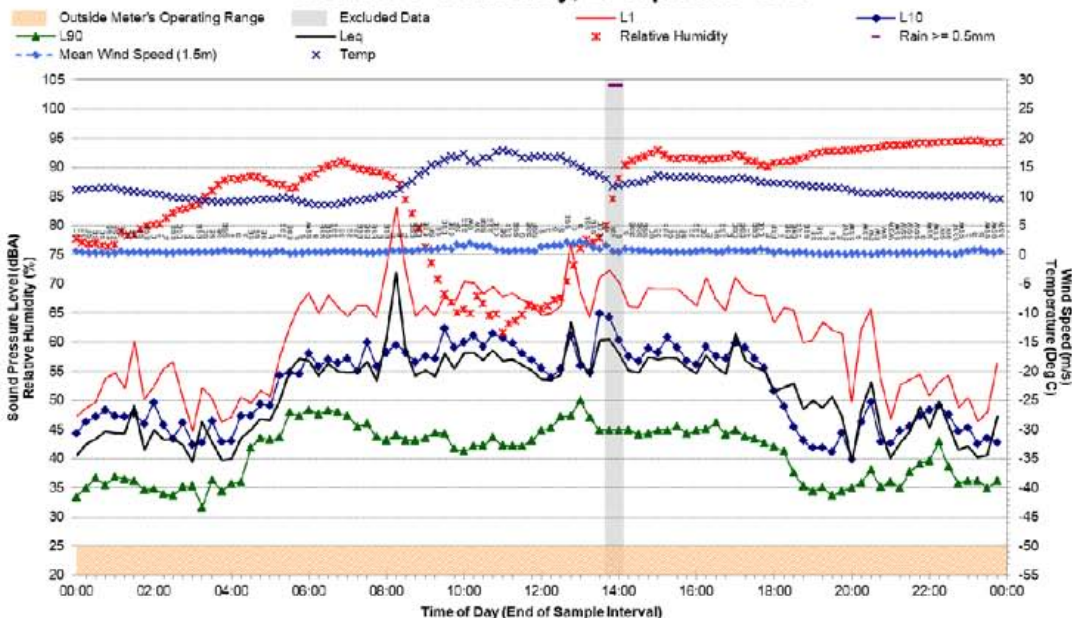
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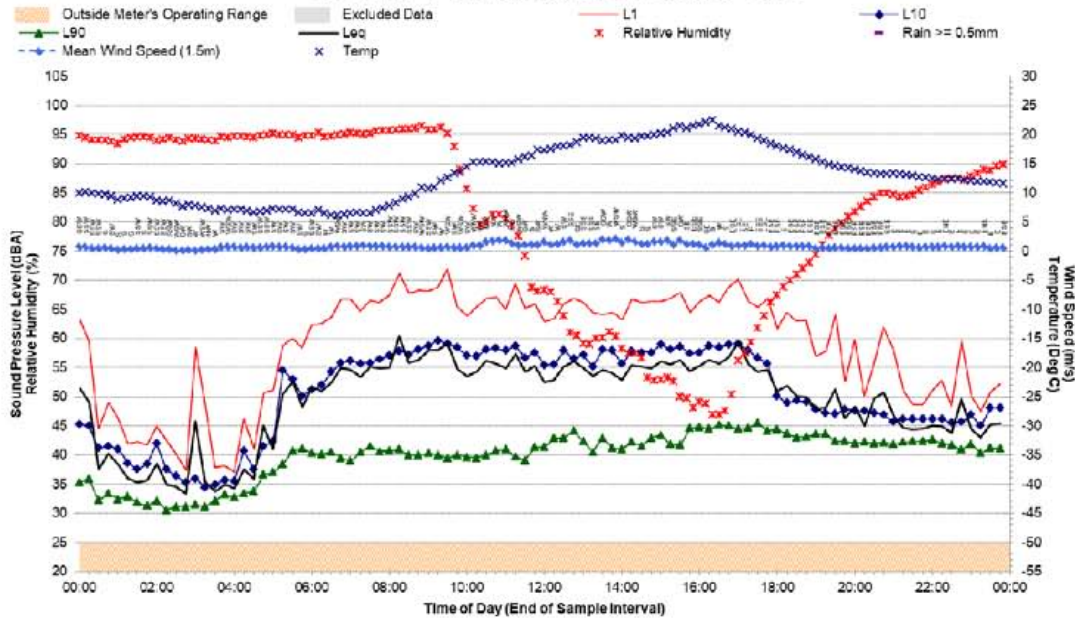
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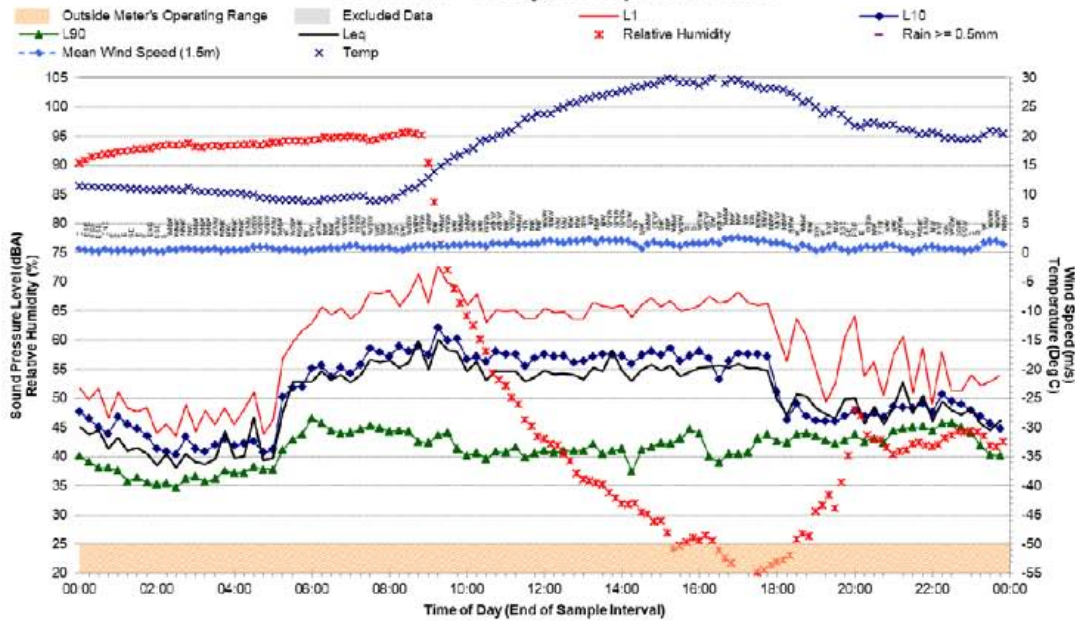
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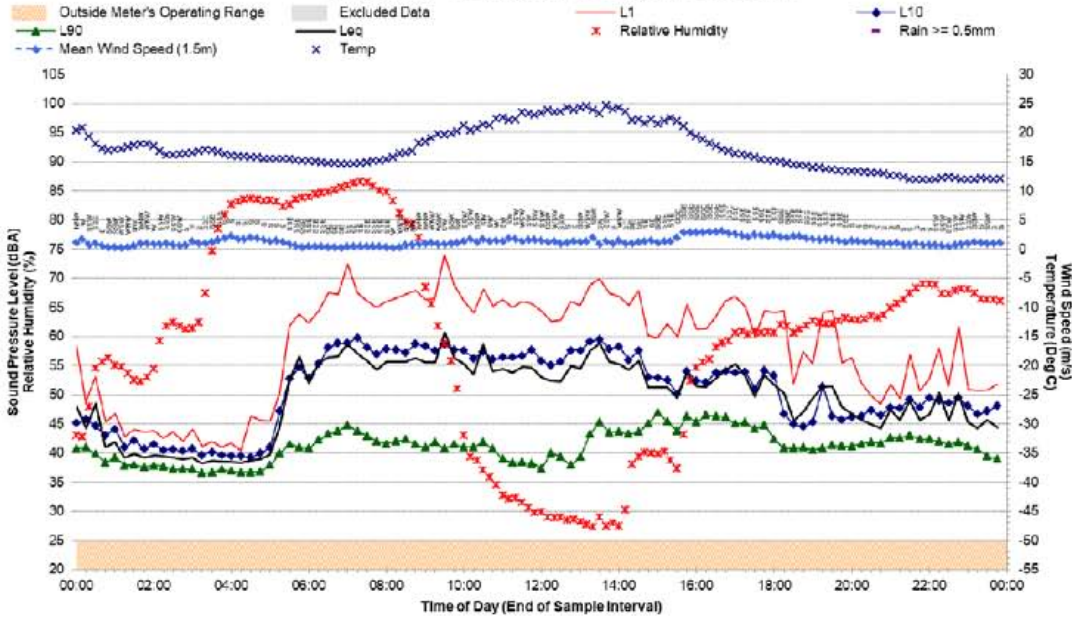
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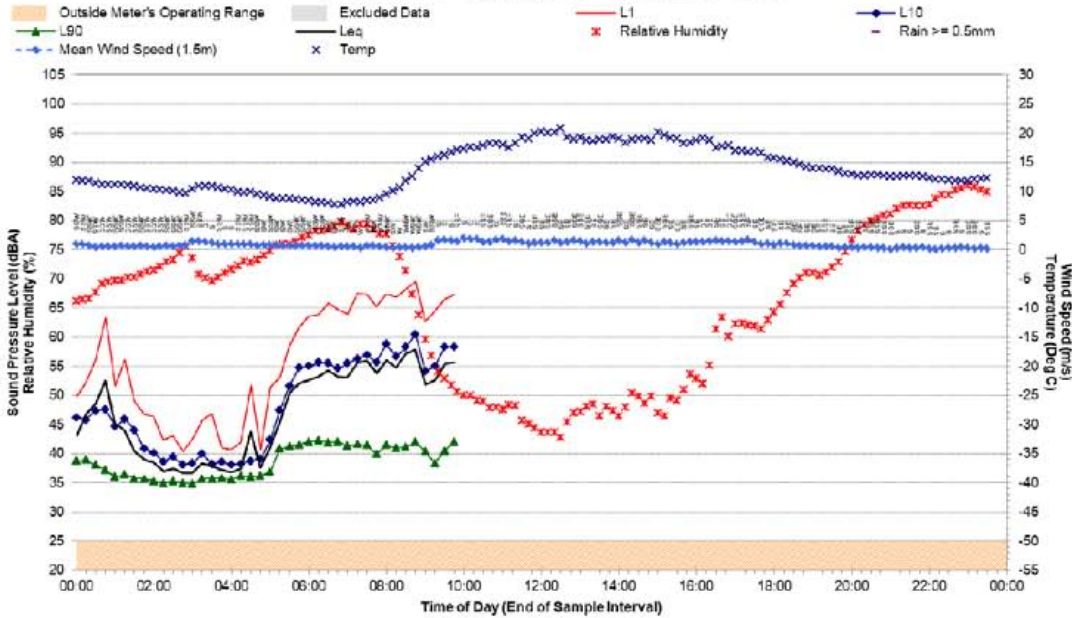
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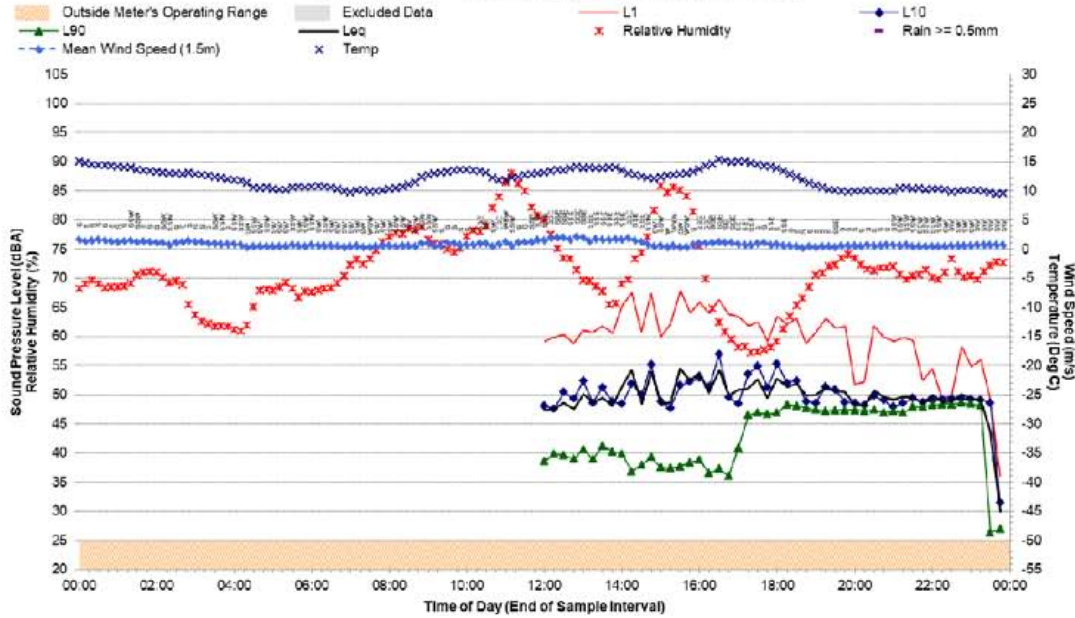
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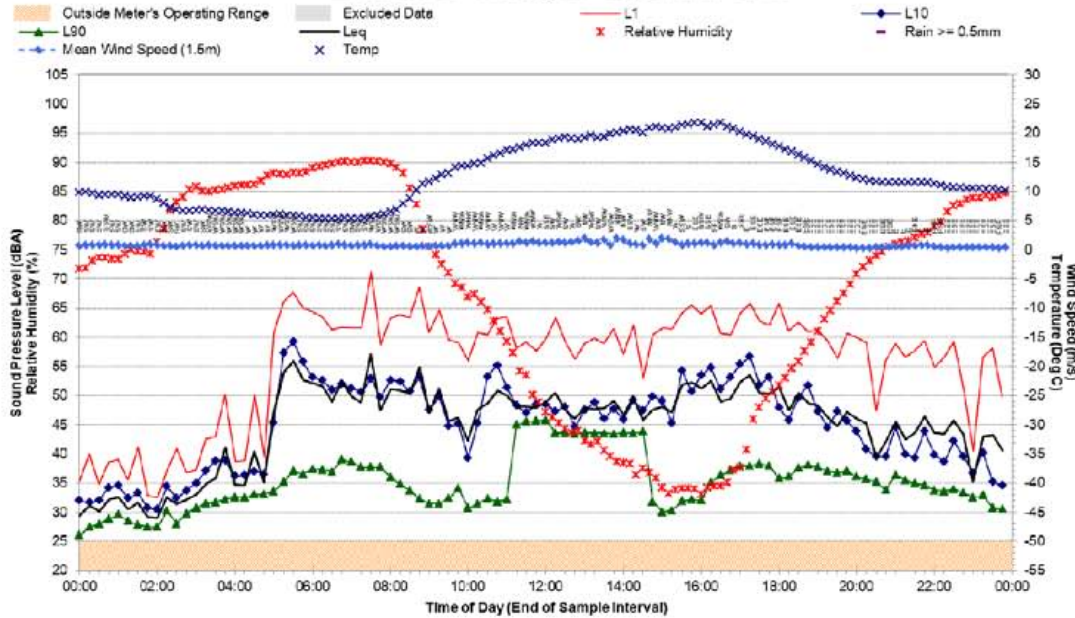
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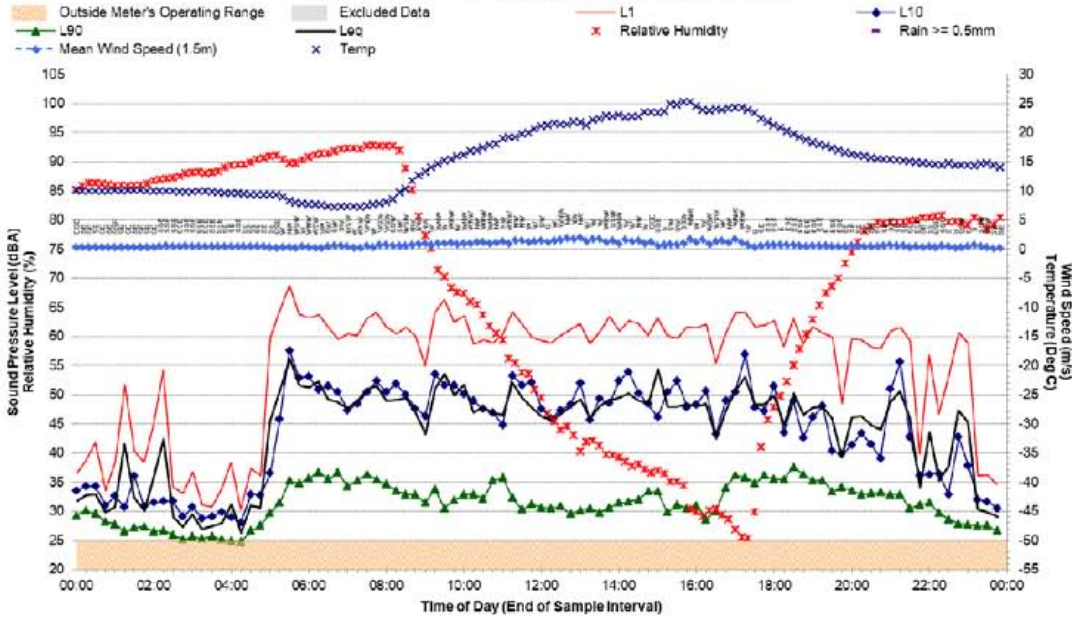
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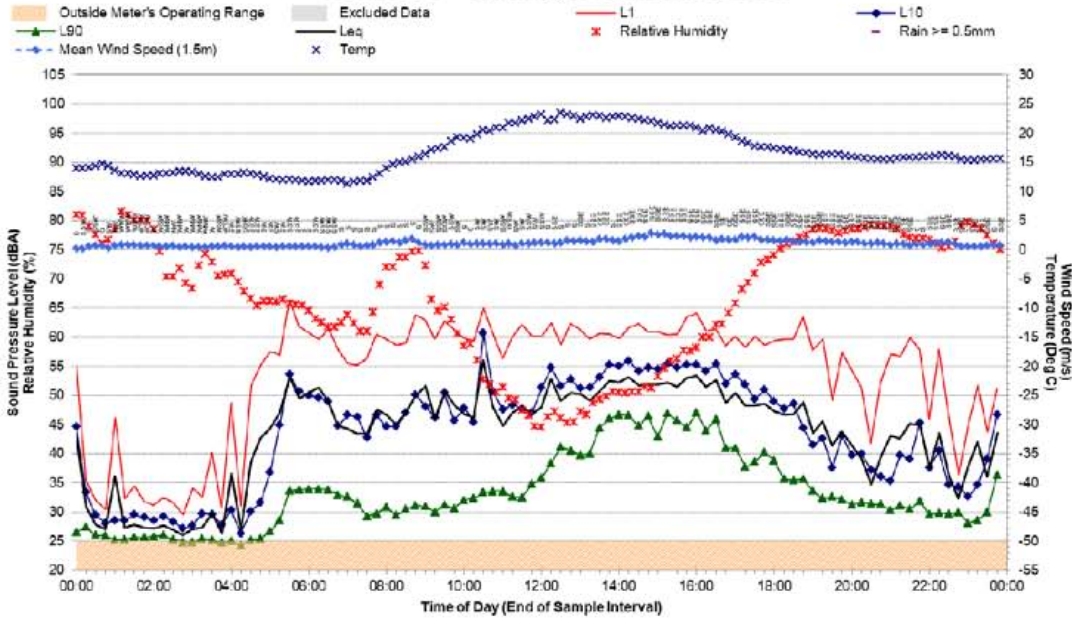
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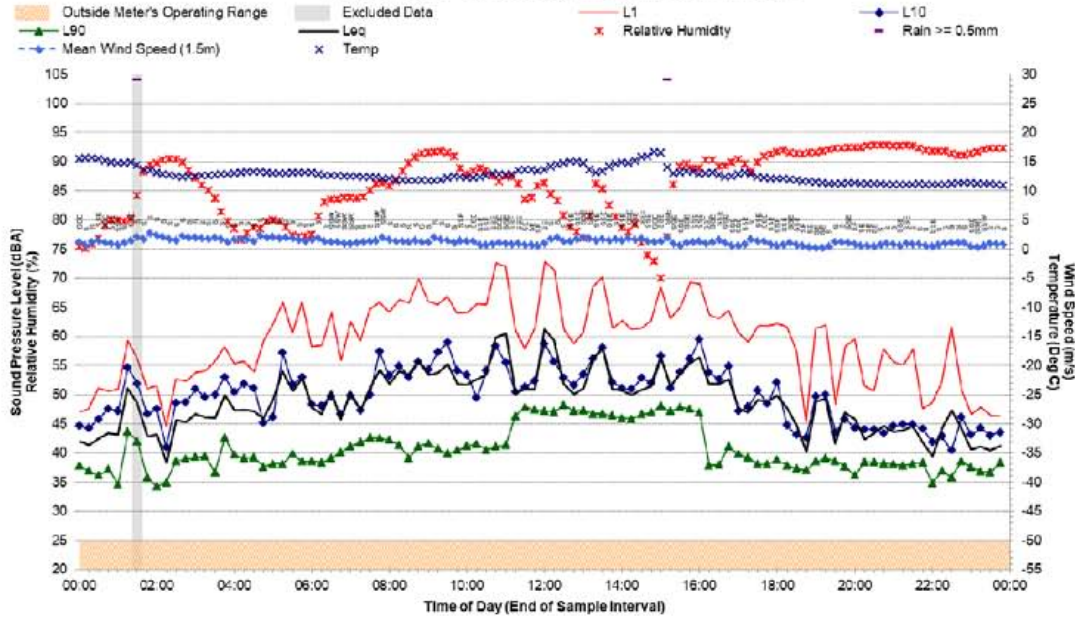
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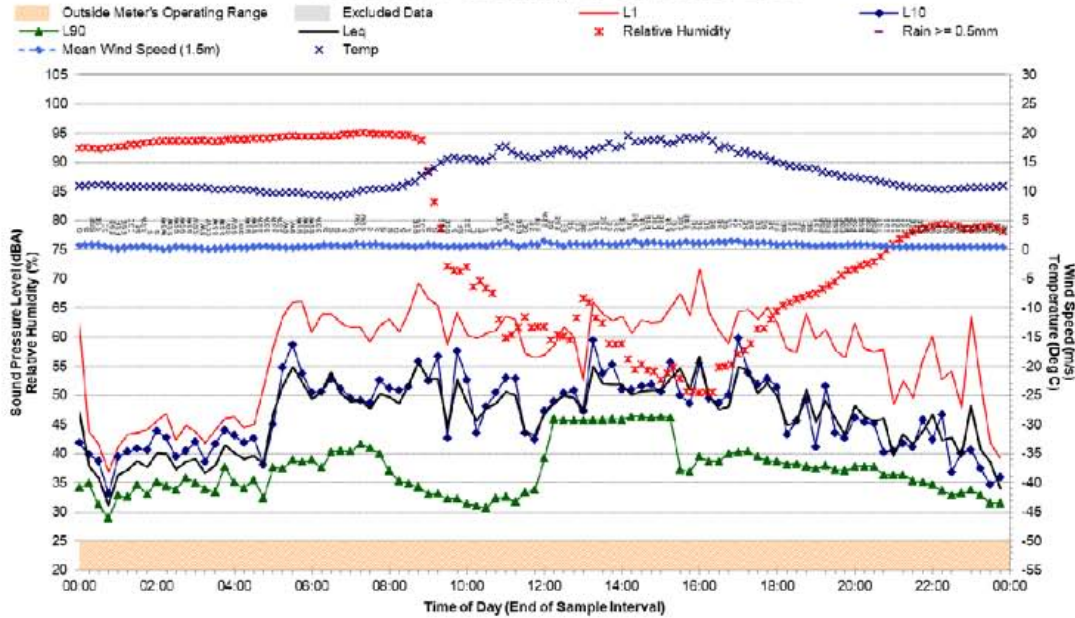
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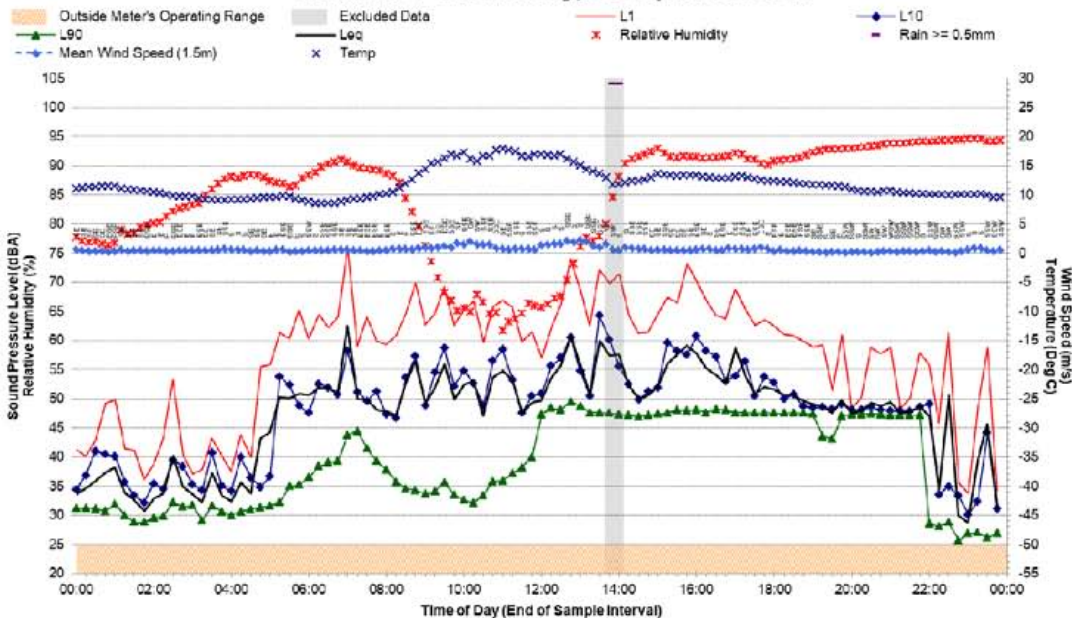
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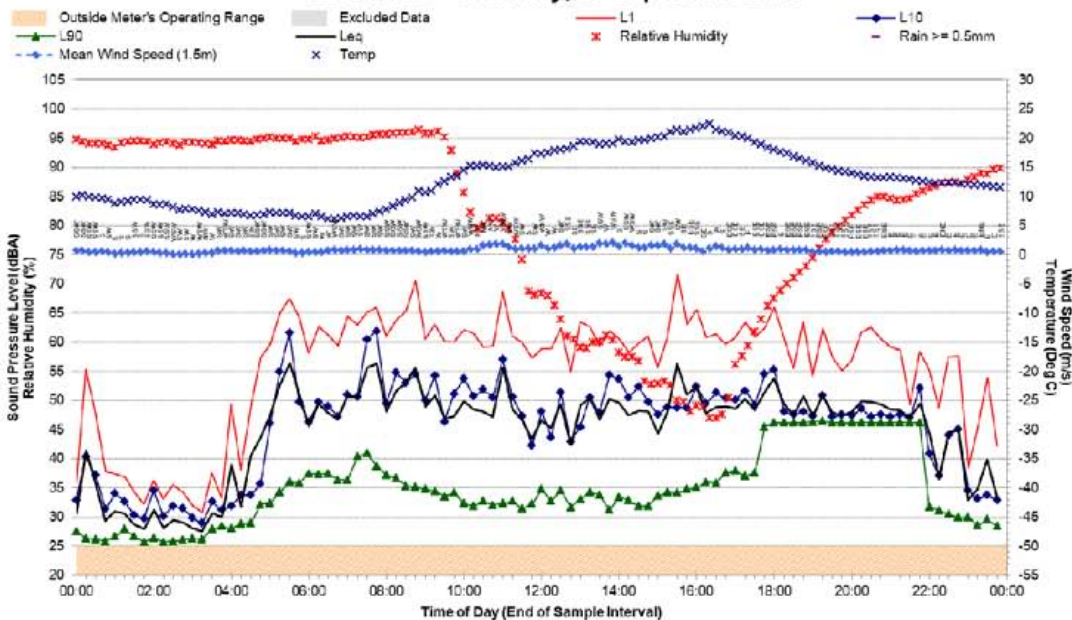
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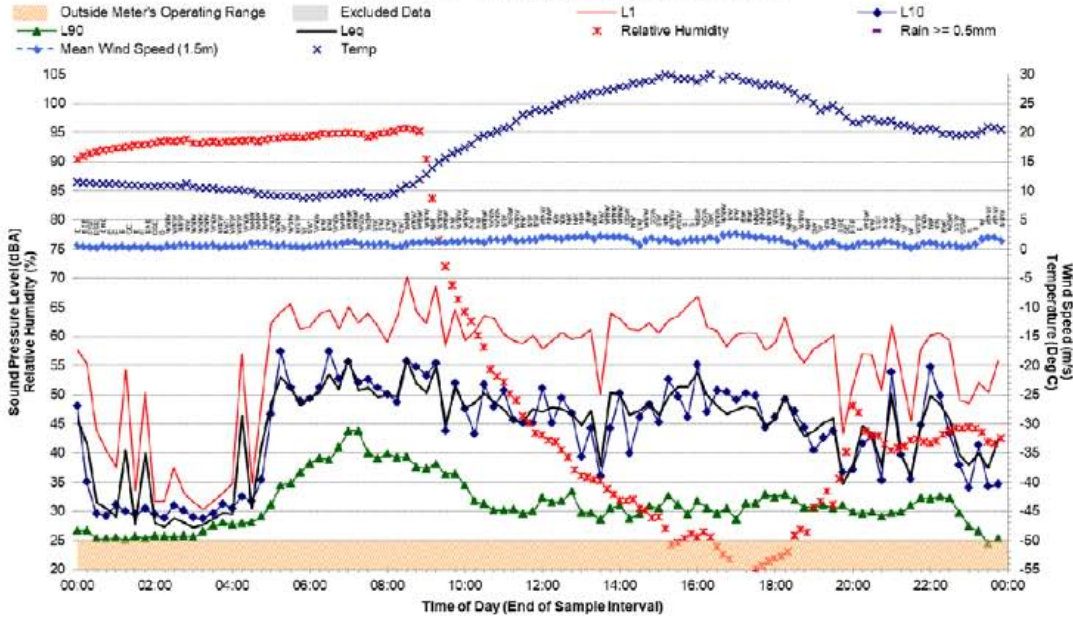
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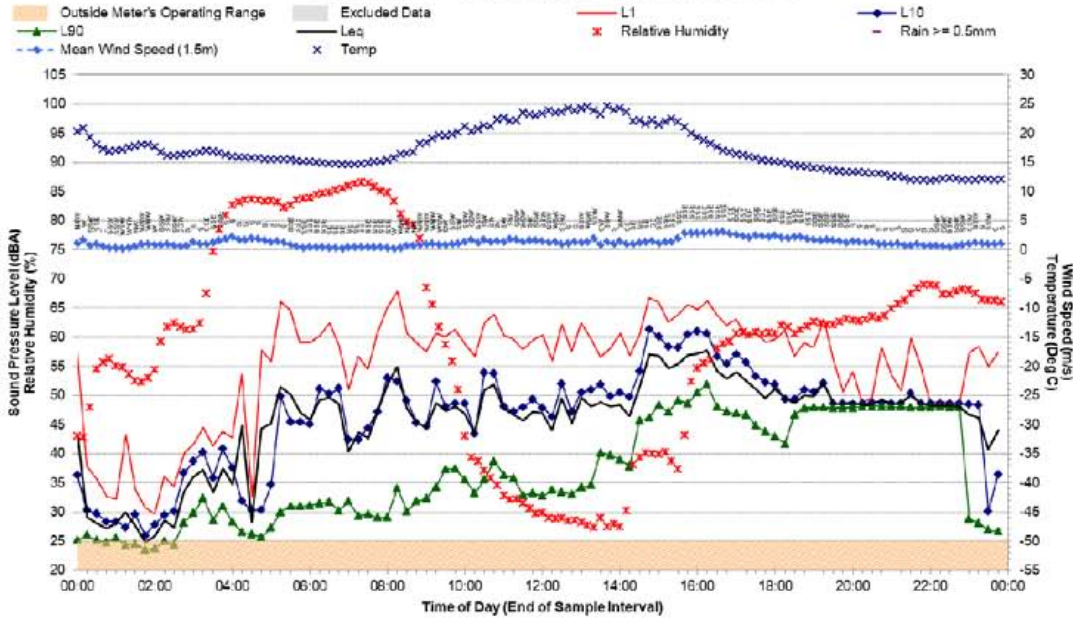
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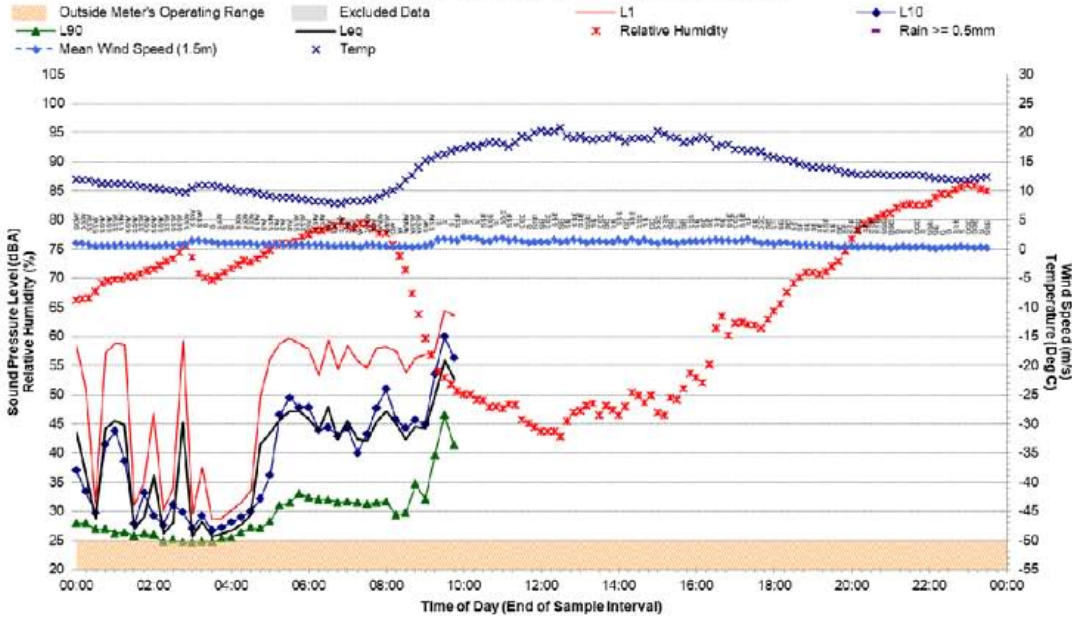
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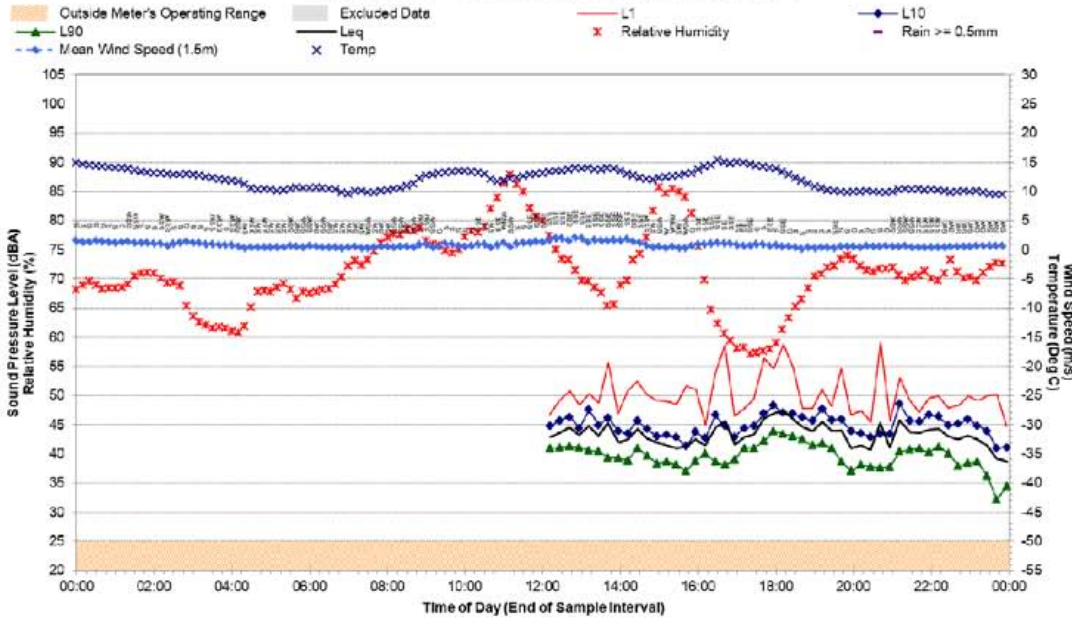
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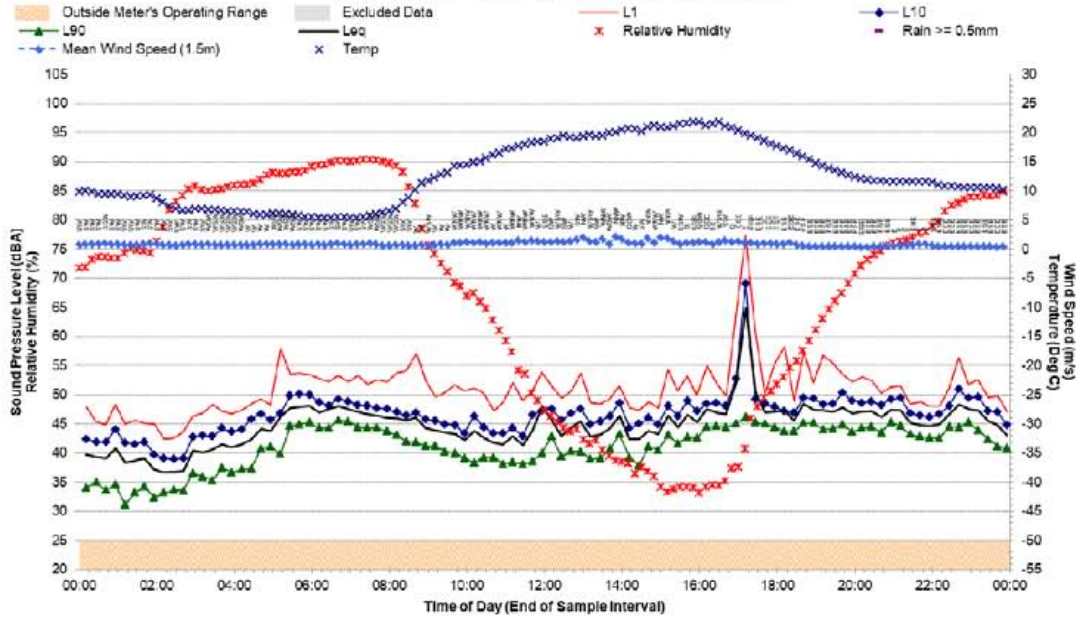
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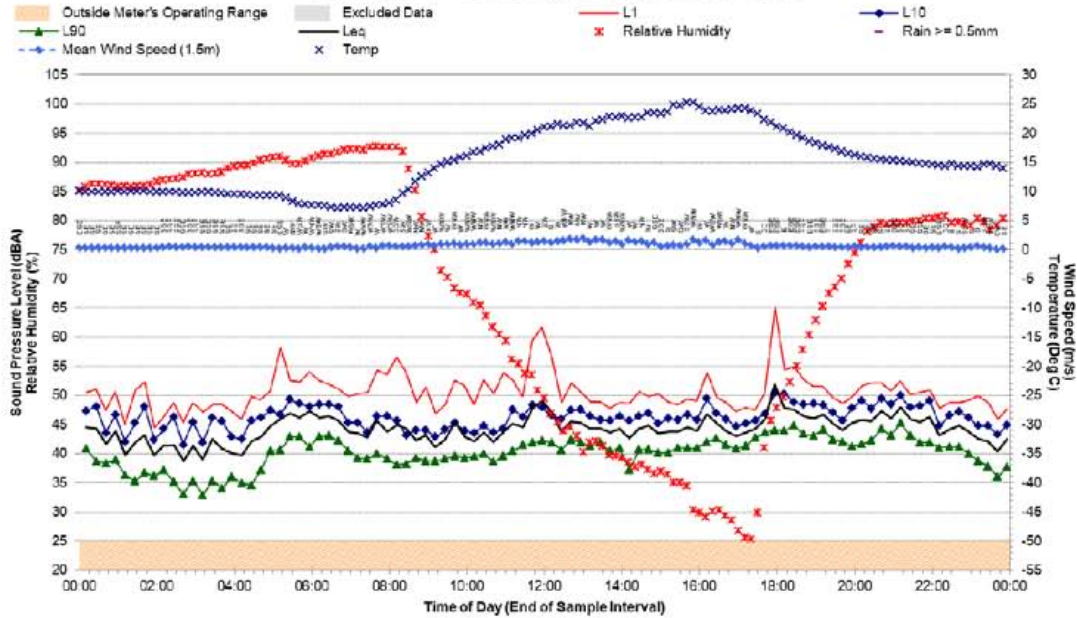
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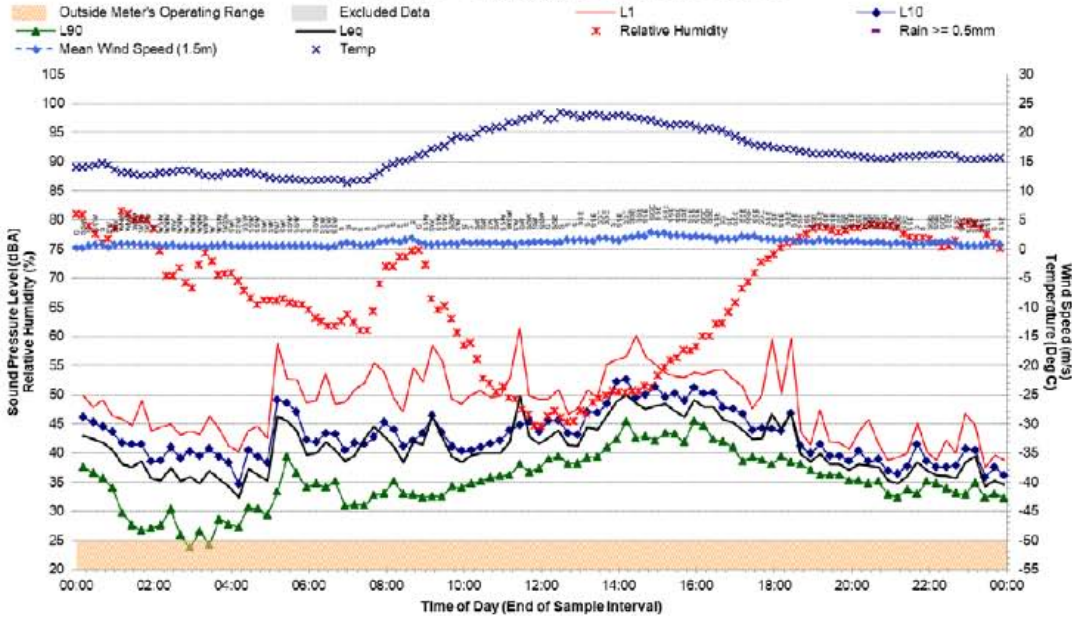
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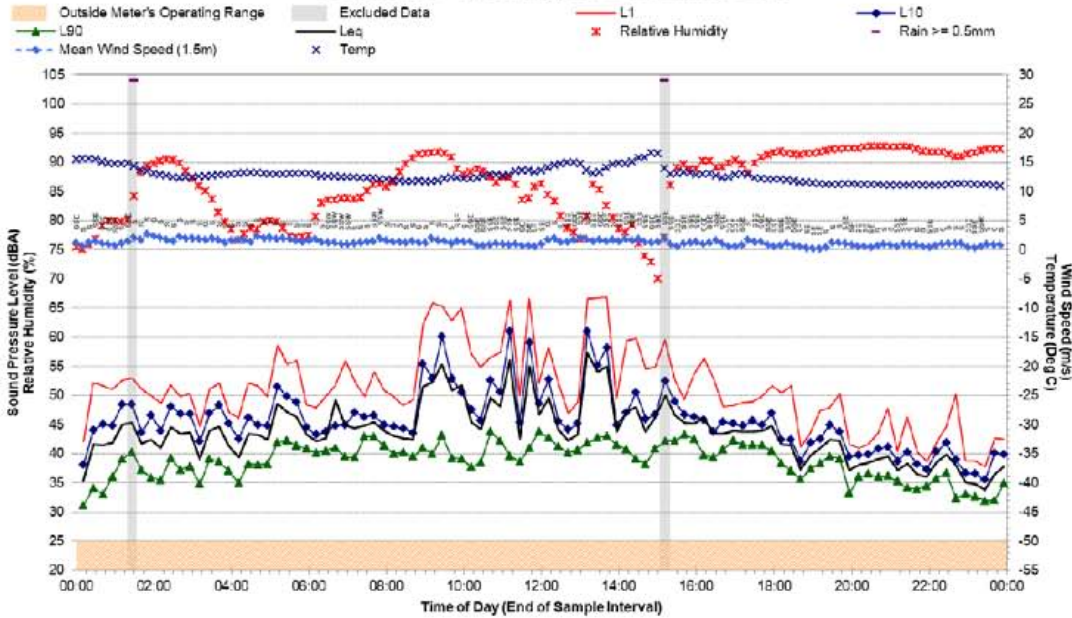
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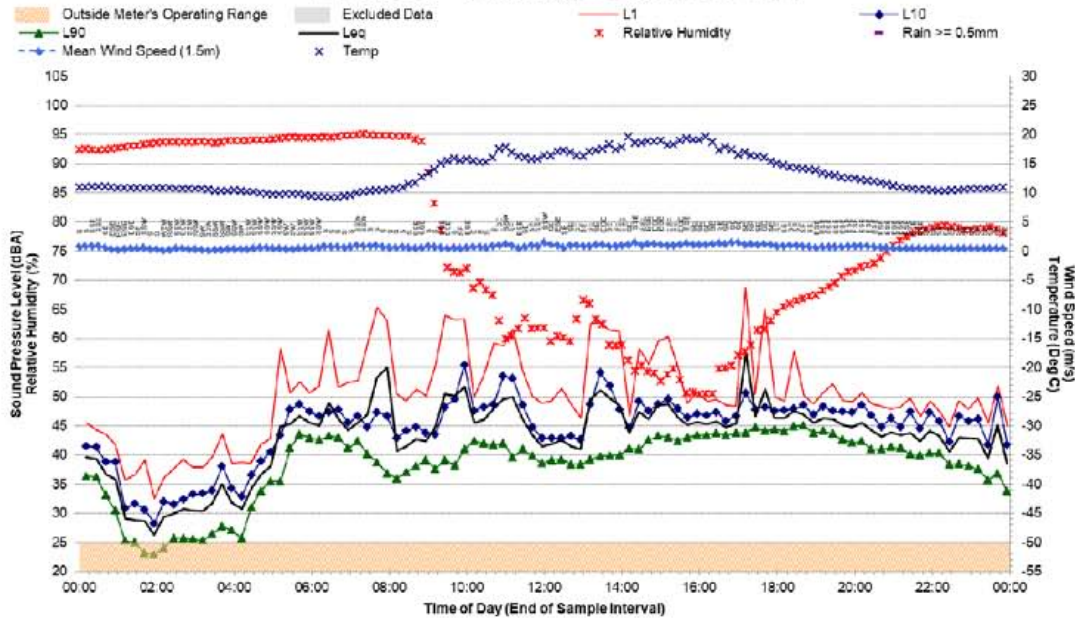
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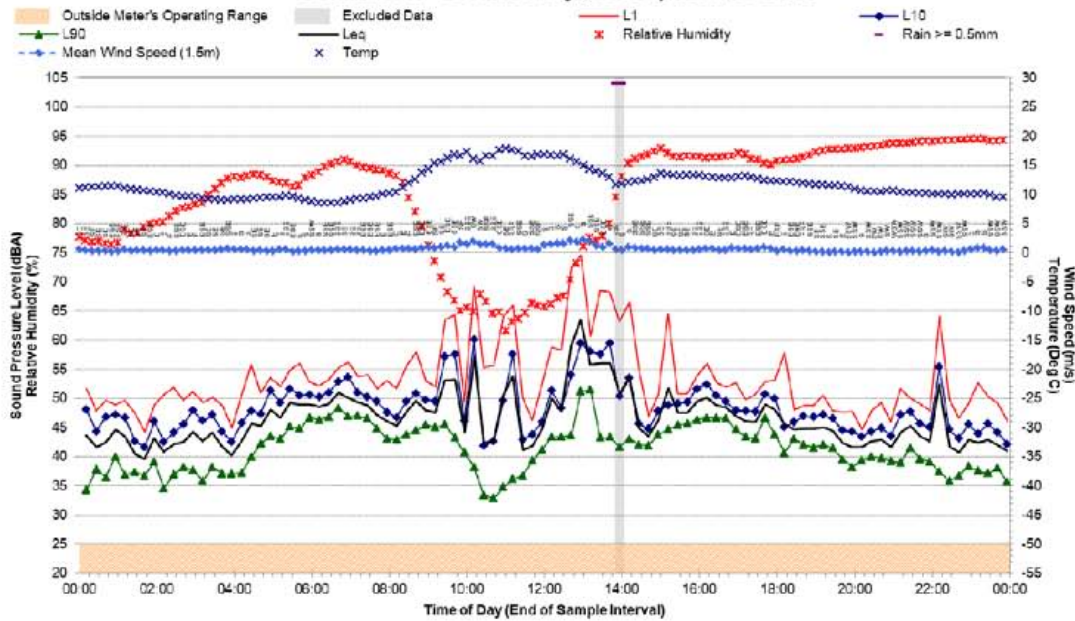
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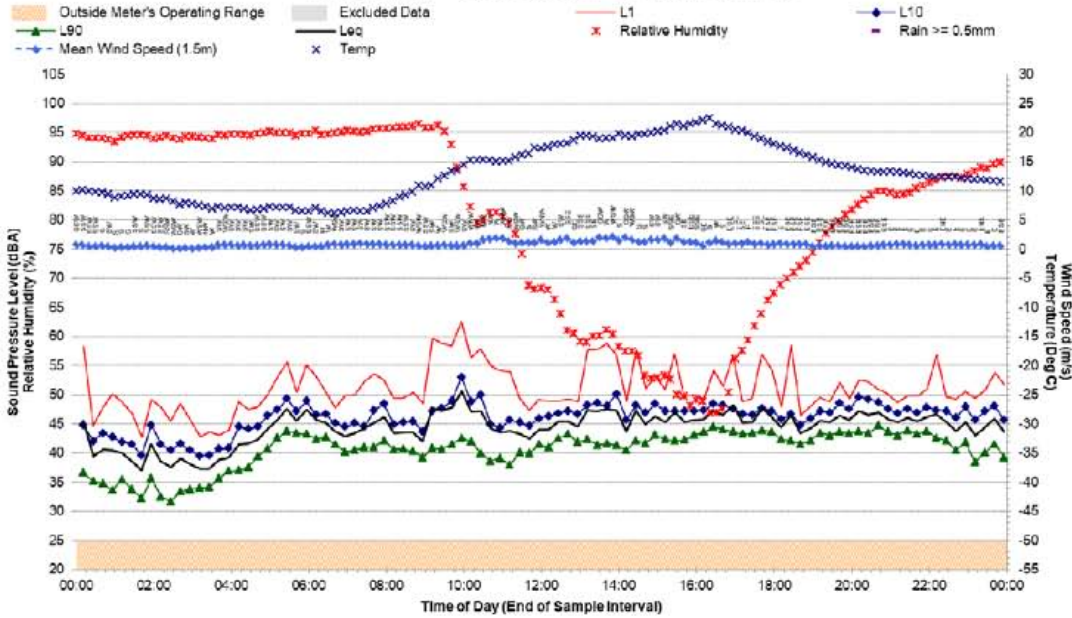
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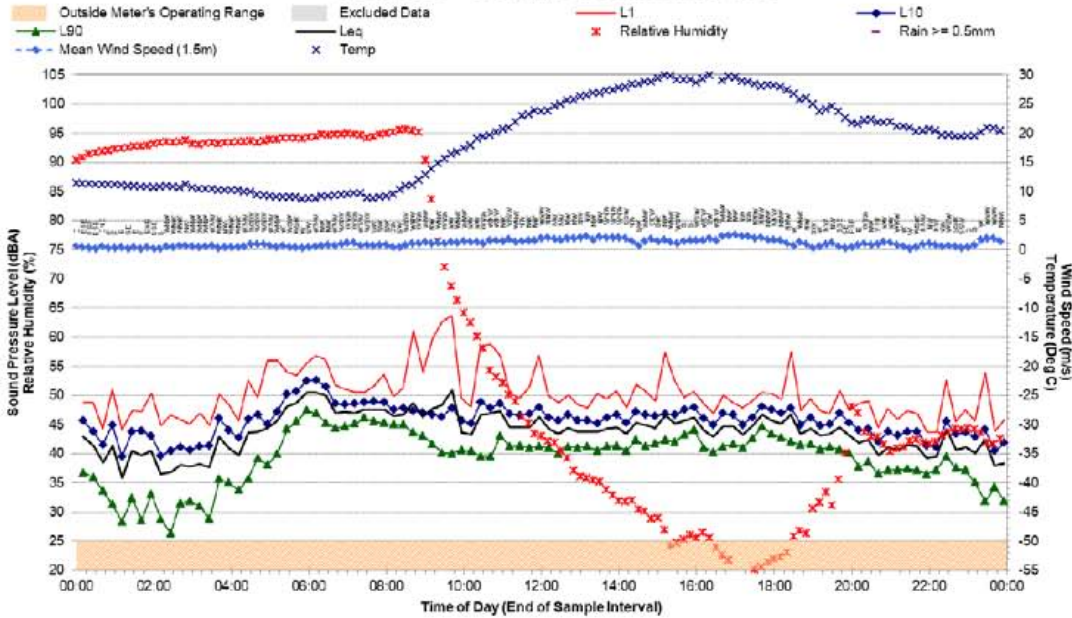
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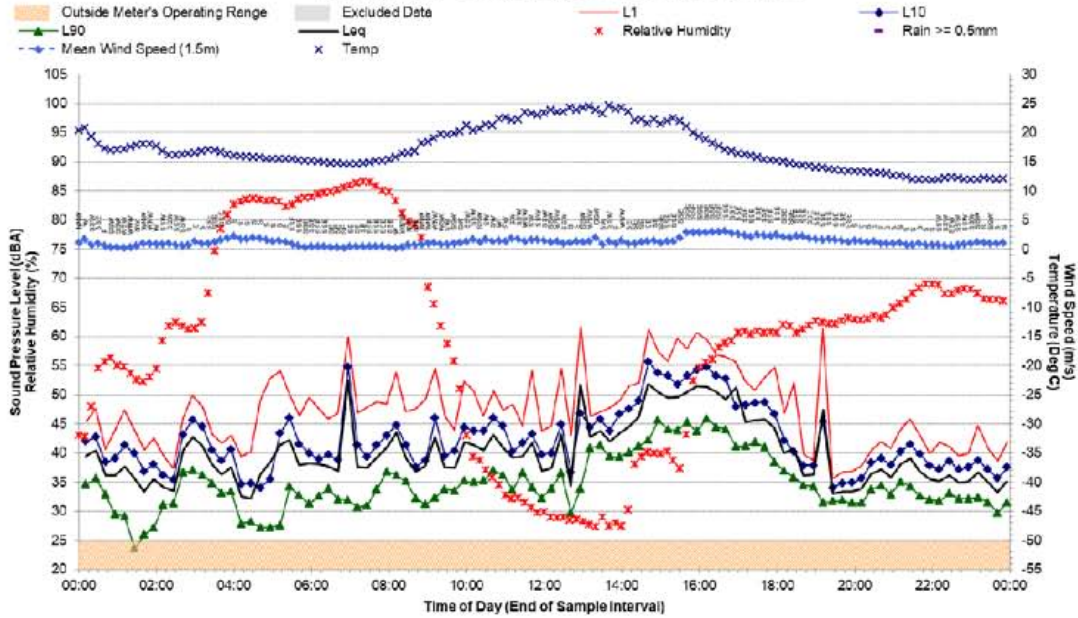
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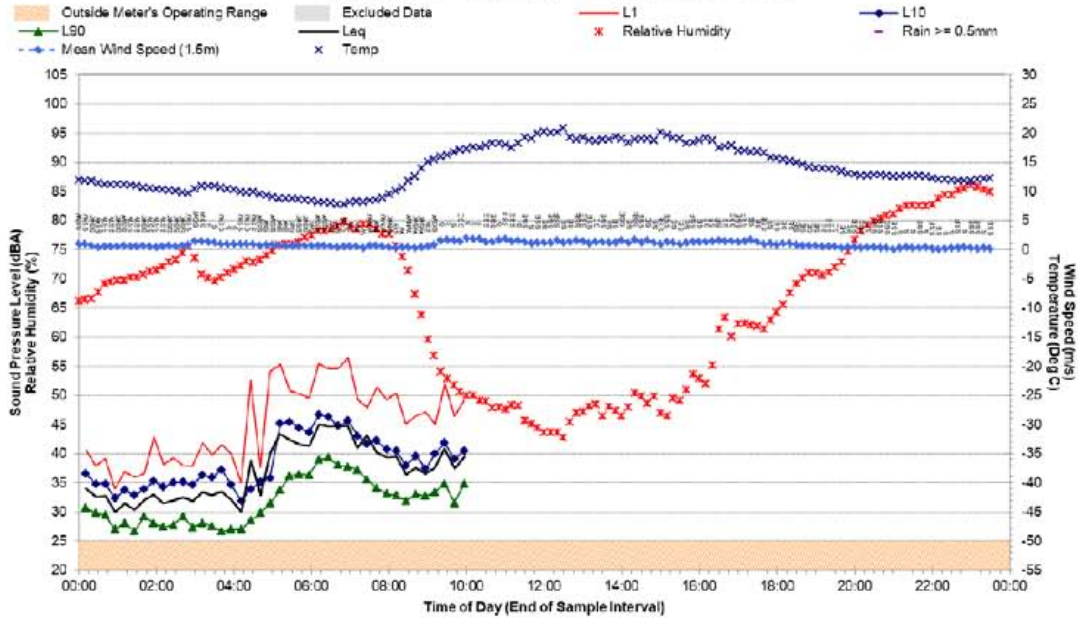
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DONALDSON AND ABEL COAL MINES

Quarterly Noise Monitoring
Quarter Ending December 2018

Prepared for:

Donaldson Coal Pty Ltd
PO Box 675
Green Hills 2320



Donaldson Coal Pty Ltd
Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending December 2018

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February 2019

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Donaldson Coal Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
Q72 630.01053-R01-v0.1	26 February 2019	Martin Davenport	Nicholas Vandenberg	

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1 Introduction

1.1 Background

Donaldson Coal Pty Ltd has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct quarterly noise monitoring surveys for the Donaldson Coal Mine and Abel Coal Mine during the December 2018 quarter in accordance with the Abel Mine Project Noise Monitoring Program, dated 12 August 2014.

1.2 Objectives of this Report

The objectives of the noise monitoring survey for this operating quarter were as follows:

- Measure the ambient noise levels at six focus receptor locations (potentially worst affected) surrounding Donaldson Coal Mine and Abel Coal Mine.
- Qualify all sources of noise within each of the attended surveys, including estimated contribution or maximum level of individual noise sources.
- Assess the noise emissions of Donaldson Coal Mine and Abel Coal Mine with respect to the limits contained in the Development Consent.

1.3 Acoustic Terminology

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 Development Consent Project Approval

Development consent was obtained by Donaldson Coal Pty Ltd for the Donaldson Mine in October 1999 following a Commission of Inquiry. Development Consent number N97/00147 was issued by the Minister for Urban Affairs pursuant to Section 101 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Project Approval (Application No. 05_0136) granted by the Minister of Planning was obtained by Donaldson Coal Pty Ltd for Abel Coal Mine in 2007.

2.1 Donaldson Coal Mine Development Consent Conditions

The Development Consent nominates hours of operation and mine noise emission goals in the Sections entitled “Operation of Development, Condition No. 3(1) and 3(2)”, and “Noise and Vibrational Noise Limits: Condition No. 15” as follows:

3.(1) Subject to (2) the approved hours of operation are as follows:

Works	Period	Hours
Construction, including construction of any bunds	Monday to Friday Saturday	7 am to 6 pm 8 am to 1 pm
Mining operations, including mining, haulage of waste to dumps and coal processing	Monday to Friday Saturday, Sunday	24 hours per day 7 am to 6 pm
Road Transportation and stockpiling of coal	7 days per week	24 hours per day
Rail loading of coal	7 days per week	7 am to 10 pm
Maintenance of mobile and fixed plant	7 days per week	24 hours per day
Blasting, not involving closure of John Renshaw Drive	Monday to Saturday	7 am to 5 pm
Blasting, involving closure of John Renshaw Drive	Monday to Saturday	10 am to 2 pm

Notes: Restrictions on Public Holidays are the same as Sundays

(2) The Applicant shall submit a report to the Director-General’s satisfaction demonstrating the noise limits in Condition 15 can be met while rail loading of coal is occurring during the period from 6 pm to 10 pm. If that report does not demonstrate that the noise limits can be met to the Director-General’s satisfaction, then the hours of operation for rail loading of coal shall be restricted to 7 am to 6 pm.”

15. Unless subject to a negotiated agreement in accordance with Condition 23, the Applicant shall ensure that the noise emission from construction or mining operations, when measured or computed at the boundary of any dwelling not owned by the applicant (or within 30 metres of the dwelling, if the boundary is more than 30 metres from the dwelling), shall not exceed the following noise limits:

Location	LA10(15minute) Noise Limits (dBA)	
	Daytime	Night-time
Beresfield area (residential)	45	35
Steggles Poultry Farm	50	40
Ebenezer Park Area	46	41
Black Hill Area	40	38
Buchanan and Louth Park Area	38	36
Ashtonfield Area	41	35
Thornton Area	48	40

Note: Daytime is 7 am to 10 pm Monday-Saturday, and 8 am to 10 pm Sundays and Public Holidays. Night-time is 10 pm to 7 am Monday-Saturday, and 10 pm to 8 am Sundays and Public Holidays.

The noise limits apply for prevailing meteorological conditions (winds up to 3 m/s), except under conditions of temperature inversions."

Other Conditions of Consent relevant to noise are as follows:

18. The applicant shall survey and investigate noise reduction measures from plant and equipment and set targets for noise reduction in each Annual Environmental Management Report (AEMR), taking into consideration valid noise complaints received in the previous year. The Report shall also include remedial measures.
19. The Applicant shall revise the Noise Management Plan as necessary and provide an updated Plan five years after commencement of mining to the Director-General, the independent noise expert (Condition 48), EPA, Councils and the Community Consultative Committee.

2.2 Abel Coal Mine – Project Approval

Approved Operations

The following operations are approved under the Abel Coal Mine Project Approval:

- Extraction of up to 6.1 Mtpa of Run of Mine (ROM) coal from the Abel Underground Coal Mine.
- Transport coal to the existing Bloomfield Coal Handling and Preparation Plant by private haul roads, or by coal conveyor, or by a combination of both methods.
- Operate the Bloomfield Coal Handling Processing Plant (CHPP) to process coal extracted from the Abel Coal Mine and the Bloomfield and Donaldson Coal Mines.
- Transportation of product coal from the Bloomfield site by rail via the Bloomfield rail loading facility.

The Project Approval was modified in June 2010 (05_0136 MOD 1) allowing construction and operation of a downcast ventilation fan. In May 2011 the Project Approval was modified again (05_0136 MOD 2) to allow the construction and operation of an upcast ventilation fan (and associated facilities). In December 2013 the Project Approval was further modified (05_0136 MOD3) to account for the increase in coal extracted including the upgrade of the Bloomfield CHPP.

Consent Conditions

The relevant conditions relating to noise from the Abel Coal Mine approval are reproduced below.

Schedule 4

NOISE

Operational Noise Criteria

1. The Proponent shall ensure that the noise generated by the Project does not exceed the criteria in Table 4 at any residence on privately-owned land.

Table 4: Operational Noise Criteria dB(A)

Location	Receiver Area	Day	Evening	Night	
		LAeq(15minute)	LAeq(15minute)	LAeq(15minute)	LA1(1minute)
Location I	Lord Howe Drive, Ashtonfield	36	36	36	45
Location K	Catholic Diocese Land	37	37	37	45
Location L	Kilshanny Avenue Ashtonfield	40	40	40	47
All other Locations	All other privately owned Residences	35	35	35	45

Notes:

- To interpret the locations referred to in Table 4, see plan in Appendix 3 (Appendix A).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

These noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Construction Noise Criteria

- The proponent shall ensure that the noise generated during the construction of the downcast ventilation shaft as described in EA (MOD3) does not exceed the criteria in Table 5.

Table 5: Construction Noise Criteria dB(A)

Location	Receiver	Day
		LAeq(15minute)
Location R	281 Lings Road, Buttai	50
Location S	189 Lings Road, Buttai	43

Notes:

- The criteria in Table 5 apply only whilst the downcast ventilation shaft is being constructed, and for a maximum of 12 weeks from the commencement of construction.
- To interpret the locations referred to in Table 5, see plan in Appendix 3 (attached to this report as **Appendix A**).
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.

However, these noise criteria do not apply if the Proponent has an Agreement with the relevant landowner to generate higher noise levels, and the proponent has advised the Department in writing of the terms of this agreement.

Rail Noise Criteria

- The proponent shall ensure that the noise from rail movements on the Bloomfield Rail Spur does not exceed the limits in Table 6 at any residence on privately owned land.

Table 6: Rail Spur noise criteria dB (A)

Location	Day	Evening	Night
	LAeq(period)		
All privately-owned land	55	45	40

Cumulative Noise Criteria

- The proponent shall implement all reasonable and feasible measures to ensure that the noise generated by the project combined with noise generated by other mines does not exceed the criteria in Table 7 at any residence on privately-owned land.

Table 7: Cumulative noise criteria dB (A)

Location	Day	Evening	Night
	LAeq(period)		
All privately-owned land	55	45	40

Notes: Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including meteorological conditions), of the NSW Industrial Noise Policy. Appendix 4 sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

Operating Conditions

1. The proponent shall:
 - a. Implement best management practise to minimise the construction, operational, road and rail noise of the project;
 - b. Operate an on-site noise management system to ensure compliance with the relevant conditions of this approval;
 - c. Minimise the noise impacts of the project during meteorological conditions under which the noise limits in this consent do not apply (see Appendix 4);
 - d. Only receive and/or dispatch locomotives and rolling stock either on or from the site that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142);
 - e. Carry out regular monitoring to determine whether the project is complying with the noise criteria and other relevant conditions of approval, to the satisfaction of the Director-General.

Noise Management Plan

2. The proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:
 - a. Be prepared in consultation with the EPA, and be submitted to the Director-General for approval within 6 months of the date of approval of MOD 3;
 - b. Describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval; Describe the proposed noise management system in detail; and
 - c. Include a monitoring program that:
 - Uses attended monitoring to evaluate the compliance of the project against the noise criteria in this approval;
 - Evaluates and reports on:
 - The effectiveness of the on-site noise management system; and
 - Compliance against the noise operating conditions; and

Defines what constitutes a noise incident, and includes protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents. Appendix 4

Noise Compliance Assessment

Applicable Meteorological Conditions

1. The noise criteria in Tables 4 and 7 are to apply under all metrological conditions except the following:
 - a. During periods of rain or hail.
 - b. Average wind speed at microphone height exceeds 5 m/s;
 - c. Wind speeds greater than 3 m/s measured at 10m above ground level; or
 - d. Temperature inversion conditions greater than 3°C/100m.

Determination of metrological conditions

2. *Except for wind speed at microphone height, the data to be used for determining metrological conditions shall be that recorded by the meteorological station located on the site.*

Compliance monitoring

3. *Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.*
4. *Unless otherwise agreed with the director-general, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to:*
 - a. *Monitoring locations for the collection of representative noise data;*
 - b. *Metrological conditions during which collection of noise data is not appropriate;*
 - c. *Equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and*
 - d. *Modification to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.*

Appendix 5

Statement of Commitments

3. Noise

3.1 Construction Activities

The following noise control measures will be implemented prior to commencement of construction of the Abel Underground Mine or the upgrade of the Bloomfield CHPP.

1. *Maintain all machinery and equipment in working order;*
 - a. *No construction activities at the Abel pit top will take place on Sundays or Public Holidays;*
 - b. *Where possible locate noisy site equipment behind structures that act as barriers or at the greatest distance from noise sensitive areas; and*
 - c. *Orientate equipment so that noise emissions are directed away from noise sensitive areas.*

3.2 Noise Control Measures

- a. *The following noise control measures will be implemented prior to the mining of coal from the Abel underground Mine:*
 - i. *Orientation of the ventilation fans away from residential receivers and angle the output parallel to the ground.*
 - ii. *The sound power level of the front end loader to be used near the portal should not exceed 113 dBA and will be fitted with a noise sensitive reversing alarm.*
- b. *The following noise control measures will be implemented prior to the Bloomfield CHPP receiving any ROM coal from Able Underground Mine;*

- i. *Noise mitigation works including partial enclosure and noise screening of drives and conveyors of the Bloomfield CHPP to screen residences to the north of the site.*

3.2 Monitoring

The Company will implement a Noise Monitoring Program for the Abel Underground Mine and the Bloomfield CHPP, to the satisfaction of the Director-General. The Noise Monitoring Program shall include a combination of real-time and supplementary attended monitoring measures, and a noise monitoring protocol for evaluating compliance with the noise environmental assessment. This plan will be integrated with the monitoring plans for the Tasman, Donaldson and Bloomfield Mines to provide a single integrated Noise Monitoring Program for all 4 mines.

3.4 Continuous Improvement

The Company shall:

- a. *Report on these investigations and implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director General.*

The operator of the Bloomfield CHPP shall:

- b. *Investigate ways to reduce the noise generated by the Bloomfield CHPP, including maximum noise levels which may result in sleep disturbance;*
- c. *Implement all reasonable and feasible best practice noise mitigation measures on the site; and*
- d. *Report on these investigations and the implementation of any new noise mitigation measures on site in the AEMR, to the satisfaction of the Director-General.*

3 Noise Monitoring Methodology

3.1 General Requirements

The operational noise monitoring program was conducted with reference to Development Consent N97/00147 (Donaldson Coal Mine), Project Approval 05_0136 (Abel Coal Mine), and in accordance with SLR's Report 630.01053.01300-R1 dated 12 August 2014 (*Noise Management Plan Abel Underground Mine*) and AS 1055-1997 *Acoustics - Description and Measurement of Environmental Noise*.

All acoustic instrumentation employed throughout the monitoring program has been designed to comply with the requirements of AS IEC 61672.1 – 2004 *Electroacoustics—Sound level meters – Specifications*, AS IEC 61672.2-2004, AS IEC 61672.3-2004 and carried current NATA or manufacturer calibration certificates. Certificates for acoustic instrumentation used during the December 2018 quarter is provided in **Appendix B**.

Instrument calibration was conducted before and after each measurement, with the variation in calibrated levels not exceeding ± 0.5 dBA.

3.2 Monitoring Locations

Baseline and preceding operational quarterly surveys have been conducted at 11 locations surrounding the Donaldson Mine and Abel Coal Mine sites. With the experience of these previous surveys, it was decided to concentrate noise monitoring at six focus locations that represent the potentially most noise affected areas from Donaldson Mine and Abel Coal Mine. The details of the monitoring locations are contained within **Table 1**.

It is relevant to note that Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

Furthermore, Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite during the December 2018 noise monitoring period.

Table 1 Monitoring Locations

Noise Monitoring Location	Description
D	Black Hill School, Black Hill
F	Lot 684 Black Hill Road, Black Hill
G	156 Buchannan Road, Buchannan
I	Magnetic Drive, Ashtonfield
J	Parish Drive, Thornton
L	Kilshanny Ave, Ashtonfield

A map giving the approximate location of the noise monitoring sites is contained within **Appendix C**.

3.3 Unattended Continuous Noise Monitoring

An environmental noise logger was deployed for a minimum of seven days between 23 November 2018 and Monday 7 January 2019 at each of the nominated locations given in **Table 1**.

All unattended monitoring equipment was programmed to continuously record statistical noise level indices in 15 minute intervals including the L_{Amax} , L_{A1} , L_{A10} , L_{A90} , L_{A99} , L_{Amin} and L_{Aeq} . The statistical noise exceedance levels (L_{AN}) are the levels exceeded for N% of the 15 minute interval. The L_{A90} represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level. The L_{A10} is the level exceeded for 10% of the time and is usually referred to as the average maximum noise level. The L_{Aeq} is the equivalent continuous sound pressure level and represents the steady sound level which is equal in energy to the fluctuating level over the interval period. The L_{Amax} is the maximum noise level recorded over the interval.

3.4 Operator Attended Noise Monitoring

Operator attended surveys were conducted at each of the six monitoring locations during the daytime, evening and night-time periods, to verify the unattended logging results and to determine the character and contribution of ambient noise sources.

4 Operator Attended Noise Monitoring

4.1 Results of Operator Attended Noise Monitoring

Operator attended noise measurements were conducted during the evening and night-time period on Thursday 20 December 2018 and Friday 21 December 2018. Operator attended noise measurements were conducted during the daytime period on Tuesday 4 December 2018 and Tuesday 18 December 2018. All operator attended noise surveys were conducted using a Brüel & Kjær 2270 integrating sound level meter (s/n: 2679354).

Results of the operator attended noise measurements are given in **Table 2** to **Table 7**.

Ambient noise levels given in the tables include all noise sources such as traffic, insects, birds, and mine operations as well as any other industrial operations.

The tables provide the following information:

- Monitoring location.
- Date and start time.
- Wind velocity (m/s) and Temperature (°C) at the measurement location.
- Typical maximum (L_{Amax}) and contributed noise levels.

Mine contributions listed in the tables are from the Abel Coal Mine and are stated only when a contribution could be quantified.

Table 2 Location D, Black Hill School, Black Hill

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	4/12/2018 16:15 24°C 2.2 m/s SE	74	67	56	44	55	Road Traffic 42-74 Birdsong 48-54 Wind in trees 38-42 Insects 41-44
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	20/12/2018 18:18 30°C 1.1 m/s E	84	75	74	47	69	Insects 48-74 Birdsong 54 Road traffic 39-84
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	20/12/2018 22:27 10°C 3 m/s NNE 6/8 Cloud Cover	76	67	46	41	53	Road traffic 40-76 Insects/frogs 41-45 Wind in trees 43
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

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Table 3 Location F, Lot 684 Black Hill Road, Black Hill

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	18/12/2018 15:10 28°C 1.8 m/s SSE	78	70	58	49	58	Road traffic 54-78 Insects 46-49
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	20/12/2018 18:39 30°C 1.6 m/s S	70	66	63	45	58	Road traffic 43-70 Insects 45-67
		Estimated Abel Mine Noise Contribution Inaudible					Weather 53 Abel Mine Inaudible
Night	20/12/2018 22:47 23°C 3 m/s S 7/8 Cloud Cover	68	61	53	43	51	Road traffic 40-68 Insects 40-51
		Estimated Abel Mine Noise Contribution Inaudible					Bats 55 Abel Mine Inaudible

Table 4 Location G, 156 Buchanan Road, Buchanan

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	18/12/2018 16:47 28°C 1.8 m/s S	85	72	67	58	64	Insects 60-72 Road traffic 47-52 Branch 85 Wind in trees 45 Other Industry 34-36 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	20/12/2018 19:53 26°C 4.2 m/s S	76	75	67	53	64	Insects 45-76 Wind in trees 43-58 Road traffic 45-52 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	20/12/2018 23:50 23°C 3.7 m/s S 6/8 Cloud Cover	49	47	43	36	40	Road traffic 41-47 Insects 40-43 Birdsong 49 Wind in trees 32-35 Other Industry 29-39 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

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Table 5 Location 1, Magnetic Drive, Ashtonfield

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	4/12/2018 15:32 26°C 2.9 m/s SE	74	68	59	47	56	Road traffic 44-74 Birdsong 55-68
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Evening	20/12/2018 20:45 24°C 1.7 m/s ESE	77	58	47	45	50	Aeroplane 53 Road traffic 42-77 Insects 34-41
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible
Night	21/12/2018 00:37 22°C 3.6 m/s S 7/8 Cloud Cover	53	47	44	41	42	Insects 40-46 Wind gust 53 Distant traffic 35-38
		Estimated Abel Mine Noise Contribution Inaudible					Abel Mine Inaudible

Table 6 Location J, Parish Drive, Thornton

Period	Date/ Start time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	4/12/2018 15:53 25°C 2.1 m/s SE	64	55	51	46	49	Road Traffic 46-53 Birdsong 52-64 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	20/12/2018 21:24 23°C 1.1 m/s SE	61	48	45	39	42	Insects 39-53 Impact (rain drop) 61 Road traffic 43-49 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	20/12/2018 22:00 23°C 2.4 m/s S 8/8 Cloud Cover	59	46	42	37	40	Insects 37-59 Road traffic 41-52 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

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Table 7 Location L, Kilshanny Ave, Ashtonfield

Period	Date/ Start time/ Period/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission, Typical Maximum Noise Levels (L _{Amax} – dBA)
		L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	
Day	18/12/2018 17:20 27°C 2.2 m/s SE	70	65	50	40	51	Wind in trees 43-46 Road traffic 39-70 Birdsong 54-62 Residents 47 Dirt bike 45-57 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Evening	20/12/2018 20:21 24°C 1.6 m/s ESE	78	64	54	48	55	Road traffic 55-78 Wind in trees 44 Insects 45-49 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					
Night	21/12/2018 00:16 22°C 4.3 m/s S 8/8 Cloud Cover	62	53	45	37	43	Birdsong 58-62 Wind in trees 40-45 Road traffic 59 Abel Mine Inaudible
		Estimated Abel Mine Noise Contribution Inaudible					

4.2 Operator Attended Noise Monitoring Summary

4.2.1 Donaldson Mine

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

4.2.2 Abel Coal Mine

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

The Bloomfield CHPP stockpile area was not audible during all operator attended noise surveys. Noise generated by local and distant traffic was a significant contributor to ambient noise levels at all monitored locations as well as 'natural' noises such as birds, insects.

4.3 Compliance Assessment and Discussion of Results

4.3.1 Operations

Results of the operational compliance assessment are given in **Table 8**.

Table 8 Compliance Noise Assessment – Operations

Location	Estimated Abel LAeq(15minute) Contribution dBA			Consent Conditions			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
D – Black Hill School, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
F – Black Hill Road, Black Hill	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
G – Buchanan Road, Buchanan	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
I – Magnetic Drive, Ashtonfield	Inaudible	Inaudible	Inaudible	36	36	36	Yes	Yes	Yes
J – Parish Drive, Thornton	Inaudible	Inaudible	Inaudible	35	35	35	Yes	Yes	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	Inaudible	Inaudible	40	40	40	Yes	Yes	Yes

Results presented in **Table 8** indicate that compliance with the relevant consent conditions was achieved at all noise monitoring locations during all periods.

4.3.2 Sleep Disturbance

Results of the sleep disturbance compliance assessment are given in **Table 9**.

Table 9 Compliance Noise Assessment – Sleep Disturbance

Location	Estimated Bloomfield LA1(1minute) Contribution dBA	Consent Conditions LA1(1minute) dBA	Compliance
D – Black Hill School, Black Hill	Inaudible	45	Yes
F – Black Hill Road, Black Hill	Inaudible	45	Yes
G – Buchanan Road, Buchanan	Inaudible	45	Yes
I – Lord Howe Drive, Ashtonfield	Inaudible	45	Yes
J – Parish Drive, Thornton	Inaudible	45	Yes
L – Kilshanny Ave, Ashtonfield	Inaudible	47	Yes

Results presented in **Table 9** indicate that compliance with the sleep disturbance consent conditions was achieved at all noise monitoring locations during the night-time noise surveys.

5 Unattended Continuous Noise Monitoring

5.1 Results of Unattended Continuous Noise Monitoring

Unattended continuous noise monitoring was conducted between 23 November 2018 and Monday 7 January 2019 at each of the six monitoring locations given in **Table 10**.

Table 10 Noise Logger and Noise Monitoring Locations

Location	Noise Logger Serial Number	Date of Logging
D – Black Hill School, Black Hill	ARL EL-316 16-203-525	23 November 2018 - 4 December 2018
F – Black Hill Road, Black Hill	ARL EL-316 16-203-528	18 December 2018 - 7 January 2019
G – Buchanan Road, Buchanan	SVAN 957 20665	18 December 2018 - 4 January 2019
I – Magnetic Drive, Ashtonfield	ARL EL-316 16-203-505	23 November 2018 - 4 December 2018
L – Kilshanny Ave, Kilshanny	ARL EL-316 16-203-525	18 December 2018 - 7 January 2019
J – Parish Drive, Thornton	SVAN 957 20665	23 November 2018 - 4 December 2018

The unattended ambient noise logger data from each monitoring location are presented graphically on a daily basis and are attached as **Appendix C**. A summary of the results of the unattended continuous noise monitoring is given in **Table 11**.

The ambient noise level data quantifies the overall noise level at a given location independent of its source or character.

The measured ambient noise levels were divided into three periods representing day, evening and night as designated in the NSW Noise Policy for Industry (NPfI).

Precautions were taken to minimise influences from extraneous noise sources (eg optimum placement of the loggers away from creeks, trees, houses, etc), however, not all these sources or their effects can be eliminated. This is particularly the case during the warmer times of year when noise from insects, frogs, birds and other animals can become quite prevalent.

Weather data for the subject area during the noise monitoring period was provided by Bloomfield Colliery. Noise data during periods of any rainfall and/or wind speeds in excess of 5 m/s were discarded in accordance with NPfI weather affected data exclusion methodology.

Table 11 Unattended Continuous Noise Monitoring Ambient Noise Levels (dBA)

Location	Period	Primary Noise Descriptor (dBA re 20 µPA)			
		LA1	LA10	LA90	LAeq
D Black Hill School, Black Hill	Day	66	54	39	56
	Evening	62	52	39	53
	Night	56	47	36	53
F Lot 684 Black Hill Road, Black Hill	Day	72	58	46	64
	Evening	68	56	42	66
	Night	57	50	38	59
G 156 Buchanan Road, Buchanan	Day	76	74	66	74
	Evening	76	73	38	70
	Night	45	41	31	63
I 49 Magnetic Drive, Ashtonfield	Day	67	58	41	57
	Evening	64	55	42	56
	Night	53	49	36	51
L 17 Kilshanny Ave, Ashtonfield	Day	59	50	36	59
	Evening	59	49	38	55
	Night	49	43	31	46
J 220 Parish Drive, Thornton	Day	56	51	40	50
	Evening	50	45	38	49
	Night	47	43	32	44

5.2 Long term Unattended Continuous Monitoring Summary for Donaldson Mine and Abel Coal Mine

5.2.1 Ambient LA90 Noise Levels

The long term ambient LA90 noise levels collected from each monitoring location are presented graphically in **Figure 1**, **Figure 2** and **Figure 3** for the daytime, evening and night-time periods respectively.

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Donaldson Coal Pty Ltd
Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending December 2018

Figure 1 Long term Daytime LA90 Noise Levels

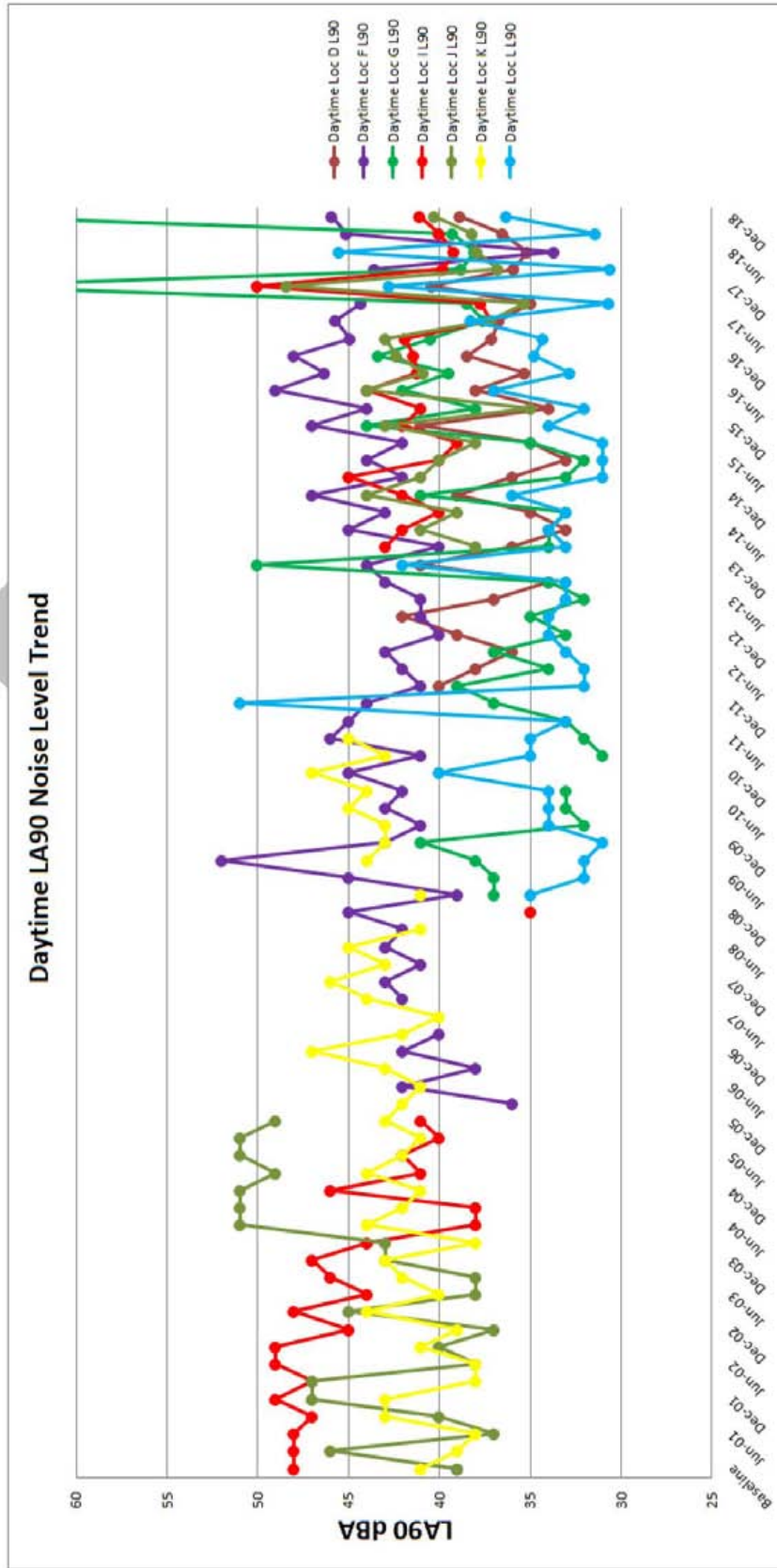


Figure 2 Long term Evening LA90 Noise Levels

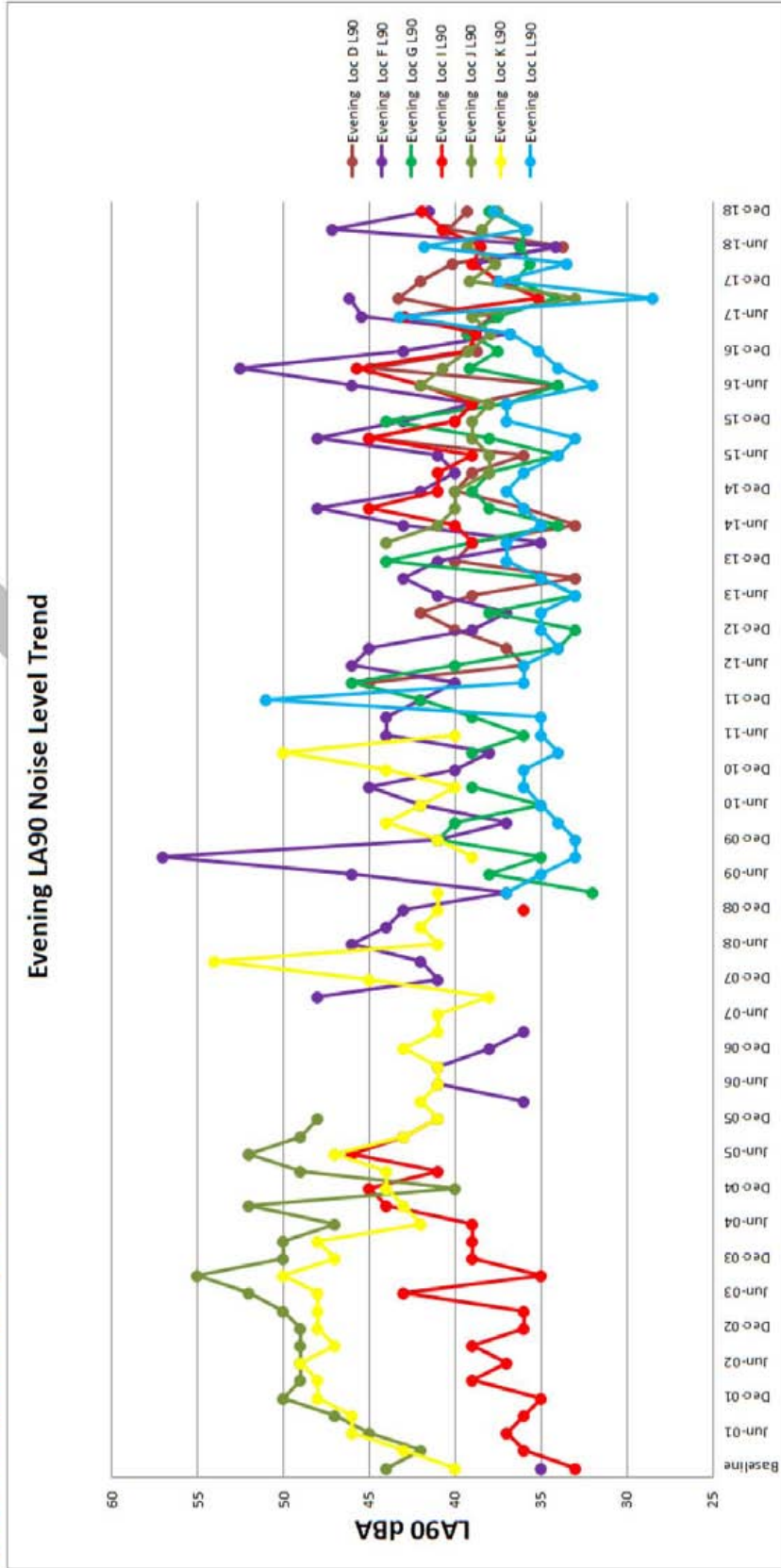
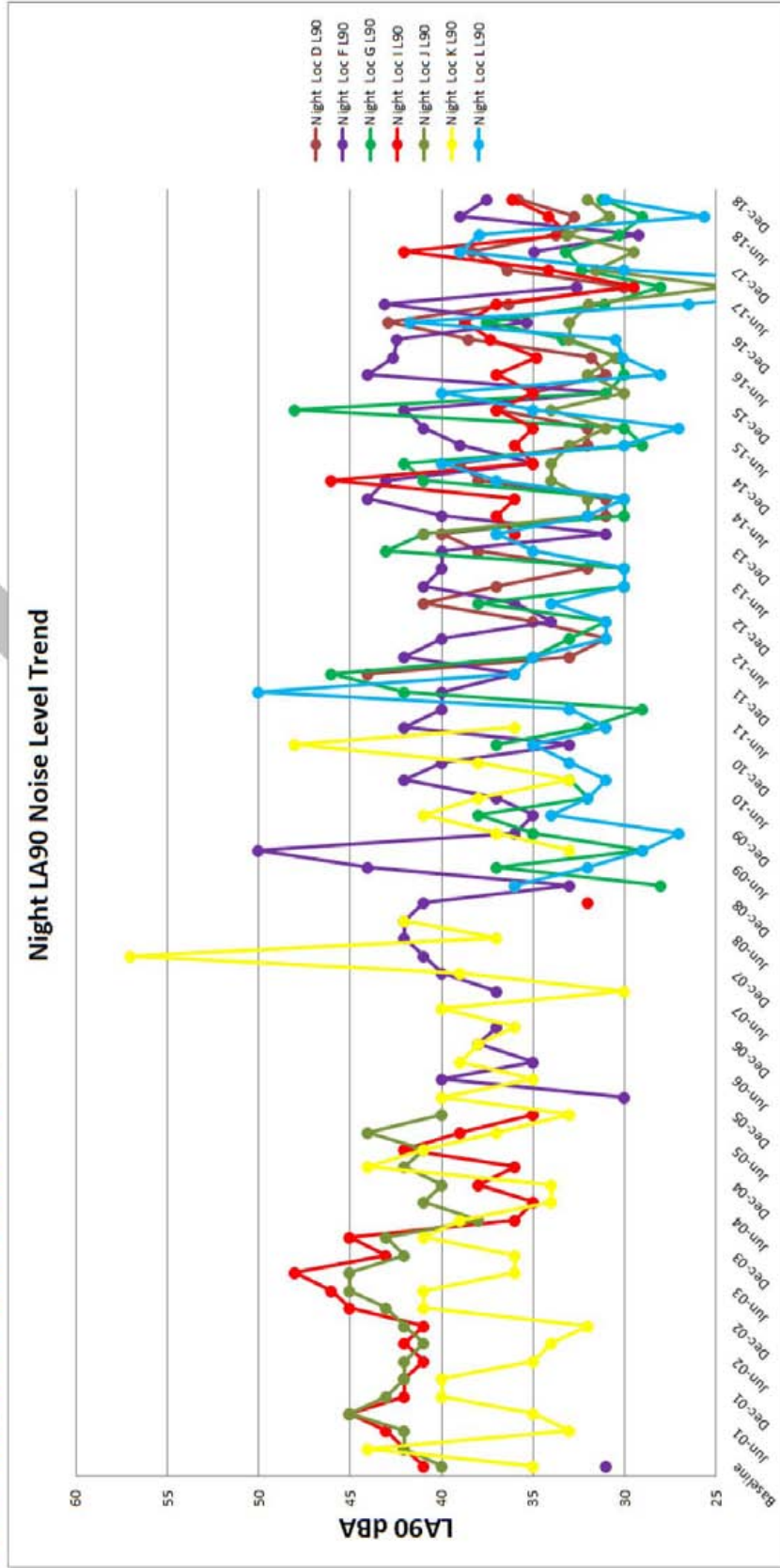


Figure 3 Long term Night-time LA90 Noise Levels



5.2.1.1 Baseline

The summary of results in **Table 12** shows the ambient LA90 noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring process (ie. prior to commencement of mining operation at Donaldson).

Table 12 LA90 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ³
		Baseline	December 2018	
D Black Hill School, Black Hill	Day	N/A ²	39	N/A
	Evening	N/A ²	39	N/A
	Night	N/A ²	36	N/A
F Lot 684 Black Hill Road, Black Hill	Day	39	46	7
	Evening	35	42	7
	Night	31	38	7
G 156 Buchanan Road, Buchanan	Day	N/A ²	66	N/A
	Evening	N/A ²	38	N/A
	Night	N/A ²	31	N/A
I 49 Magnetic Drive, Ashtonfield	Day	48	41	-7
	Evening	33	42	9
	Night	41	36	-5
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	36	N/A
	Evening	N/A ²	38	N/A
	Night	N/A ²	31	N/A
J 220 Parish Drive, Thornton	Day	39	40	1
	Evening	44	38	-6
	Night	40	32	-8

Note 1: Periods are as detailed the NPfl and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB.

5.2.1.2 Previous Quarter

Table 13 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured in the previous monitoring period.

Table 13 LA90 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		September 2018	December 2018	
D Black Hill School, Black Hill	Day	37	39	2
	Evening	40	39	-1
	Night	33	36	-3
F Lot 684 Black Hill Road, Black Hill	Day	45	46	1
	Evening	47	42	-5
	Night	39	38	-1
G 156 Buchanan Road, Buchanan	Day	39	66	27
	Evening	36	38	2
	Night	29	31	2
I 49 Magnetic Drive, Ashtonfield	Day	40	41	1
	Evening	41	42	1
	Night	34	36	2
L 17 Kilshanny Ave, Ashtonfield	Day	31	36	5
	Evening	36	38	2
	Night	26	31	5
J 220 Parish Drive, Thornton	Day	38	40	2
	Evening	38	38	0
	Night	31	32	1

Note 1: 1. Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.2.1.3 Coinciding Period Last Year

Table 14 presents the ambient LA90 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 14 LA90 Results Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA90 Noise Levels		Difference dB ²
		December 2017	December 2018	
D Black Hill School, Black Hill	Day	40	39	-1
	Evening	42	39	-3
	Night	36	36	0
F Lot 684 Black Hill Road, Black Hill	Day	- ³	46	- ³
	Evening	- ³	42	- ³
	Night	- ³	38	- ³
G 156 Buchanan Road, Buchanan	Day	67	66	-1
	Evening	37	38	1
	Night	32	31	-1
I 49 Magnetic Drive, Ashtonfield	Day	50	41	-9
	Evening	38	42	4
	Night	34	36	2
L 17 Kilshanny Ave, Ashtonfield	Day	43	36	-7
	Evening	37	38	1
	Night	30	31	1
J 220 Parish Drive, Thornton	Day	48	40	-8
	Evening	39	38	-1
	Night	32	32	0

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

Note 3: Due to a logger error no results are available at location F for the December 2017 quarter, as such a comparison can not be made.

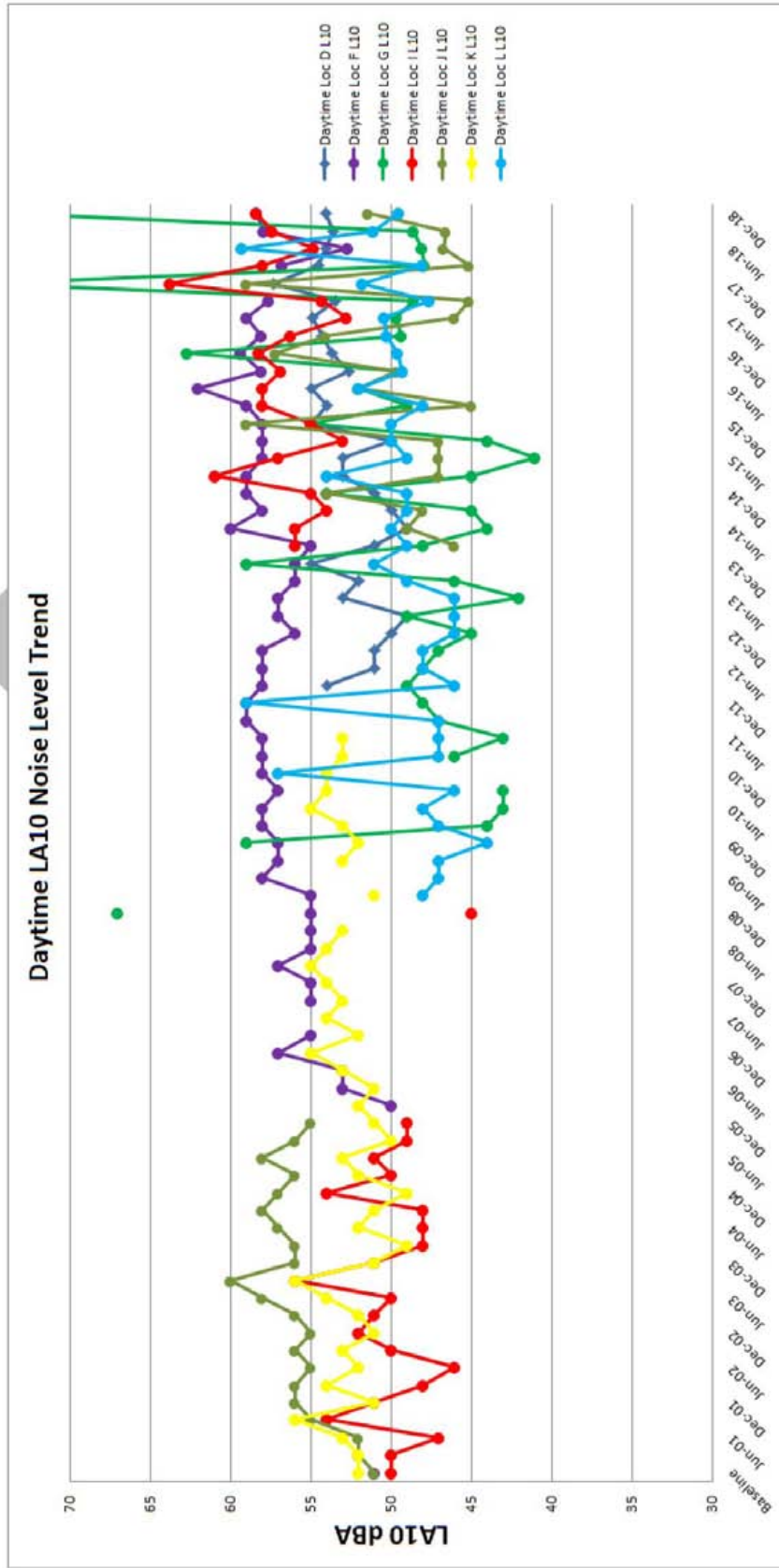
5.2.2 Ambient LA10 Noise Comparison

The long term ambient LA10 noise levels collected from each monitoring location are presented graphically in **Figure 4**, **Figure 5** and **Figure 6** for the daytime, evening and night-time respectively.

SLR Ref No: Q72 630.01053-R1D1.docx
February 2019

Donaldson Coal Pty Ltd
Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending December 2018

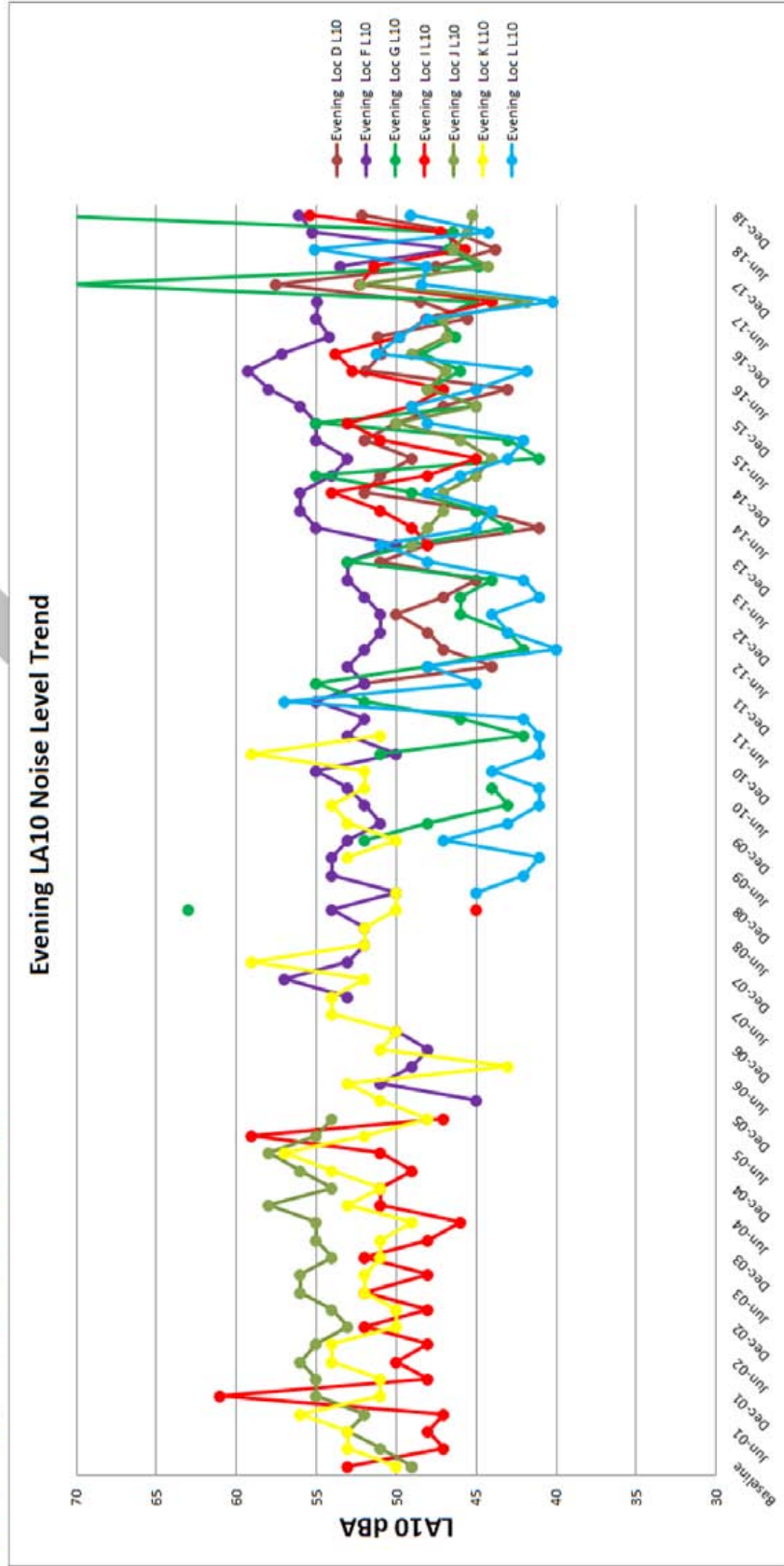
Figure 4 Long term Daytime LA10 Noise Levels



SLR Ref No: Q72 630.01053-R1D1.docx
February 2019

Donaldson Coal Pty Ltd
Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending December 2018

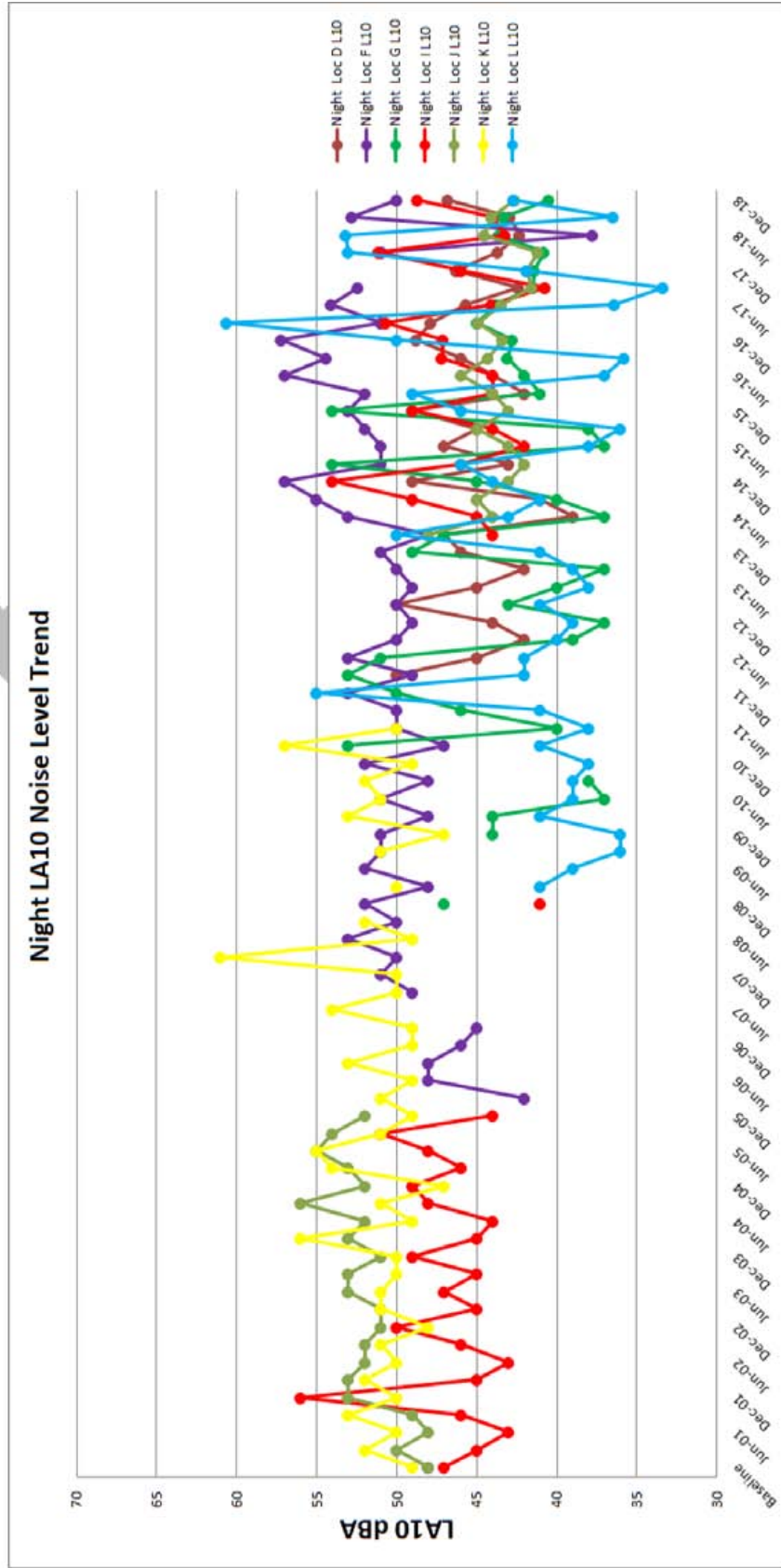
Figure 5 Long term Evening LA10 Noise Levels



SLR Ref No: Q72 630.01053-R1D1.docx
February 2019

Donaldson Coal Pty Ltd
Donaldson and Abel Coal Mines
Quarterly Noise Monitoring
Quarter Ending December 2018

Figure 6 Long term Night-time LA10 Noise Levels



5.2.2.1 Baseline

Table 15 presents the ambient LA10 noise levels recorded for the current monitoring period compared to the levels recorded during the baseline monitoring period.

Table 15 LA10 Results Comparison – Baseline

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ³
		Baseline	December 2018	
D Black Hill School, Black Hill	Day	N/A ²	54	N/A
	Evening	N/A ²	52	N/A
	Night	N/A ²	47	N/A
F Lot 684 Black Hill Road, Black Hill	Day	51	58	7
	Evening	49	56	7
	Night	48	50	2
G 156 Buchanan Road, Buchanan	Day	N/A ²	74	N/A
	Evening	N/A ²	73	N/A
	Night	N/A ²	41	N/A
I 49 Magnetic Drive, Ashtonfield	Day	50	58	8
	Evening	53	55	2
	Night	47	49	2
L 17 Kilshanny Ave, Ashtonfield	Day	N/A ²	50	N/A
	Evening	N/A ²	49	N/A
	Night	N/A ²	43	N/A
J 220 Parish Drive, Thornton	Day	51	51	0
	Evening	49	45	-4
	Night	48	43	-5

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: No data was available during baseline measurements, no comparisons can be made.

Note 3: Rounded to the nearest whole dB.

5.2.2.2 Previous Quarter

Table 16 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the previous monitoring period.

Table 16 LA10 Results Comparison – Previous Quarter

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		September 2018	December 2018	
D Black Hill School, Black Hill	Day	54	54	0
	Evening	46	52	6
	Night	43	47	4
F Lot 684 Black Hill Road, Black Hill	Day	58	58	0
	Evening	55	56	1
	Night	53	50	-3
G 156 Buchanan Road, Buchanan	Day	49	74	26
	Evening	46	73	27
	Night	43	41	-3
I 49 Magnetic Drive, Ashtonfield	Day	57	58	1
	Evening	47	55	8
	Night	44	49	5
L 17 Kilshanny Ave, Ashtonfield	Day	51	50	-1
	Evening	44	49	5
	Night	37	43	6
J 220 Parish Drive, Thornton	Day	47	51	4
	Evening	46	45	-1
	Night	44	43	-1

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

5.2.2.3 Coinciding Period Last Year

Table 17 presents the ambient LA10 noise levels recorded for the current monitoring period compared to those measured during the coinciding monitoring period last year.

Table 17 LA10 Result Comparison – Coinciding Period Last Year

Monitoring Location	Period ¹	Long term Night-time LA10 Noise Levels		Difference dB ²
		December 2017	December 2018	
D Black Hill School, Black Hill	Day	57	54	-3
	Evening	58	52	-6
	Night	46	47	1
F Lot 684 Black Hill Road, Black Hill	Day	- ³	58	- ³
	Evening	- ³	56	- ³
	Night	- ³	50	- ³
G 156 Buchanan Road, Buchanan	Day	76	74	-2
	Evening	71	73	2
	Night	41	41	0
I 49 Magnetic Drive, Ashtonfield	Day	64	58	-6
	Evening	52	55	3
	Night	46	49	3
L 17 Kilshanny Ave, Ashtonfield	Day	52	50	-2
	Evening	48	49	1
	Night	42	43	1
J 220 Parish Drive, Thornton	Day	59	51	-8
	Evening	52	45	-7
	Night	42	43	1

Note 1: Periods are as detailed in the Industrial Noise Policy (INP) and are Daytime - 7.00 am to 6.00 pm Monday to Saturday, 8.00 am to 6.00 pm Sunday; Evening - 6.00 pm to 10.00 pm; Night - 10.00 pm to 7.00 am Monday to Saturday, 10.00 pm to 8.00 am Sunday.

Note 2: Rounded to the nearest whole dB.

Note 3: Due to a logger error no results are available at location F for the December 2017 quarter, as such a comparison can not be made.

5.3 Rail Noise Monitoring

In order to determine compliance with the rail noise criteria, a noise logger was positioned at Location J. The train loading times during the noise monitoring period are presented in **Table 18**.

Table 18 Coal Train Loading Operations Log

Date	Coal Train Loading Time	Period
23/11/18	12:06-15:25	Day
28/11/18	10:04-13:01 16:00-18:55	Day Day
29/11/18	10:15-13:14	Day
30/11/18	13:26-17:05	Day

The measured $L_{Aeq(period)}$ noise level for each period from rail traffic at Location J are presented in **Table 19**.

Table 19 Rail Noise Impact Monitoring Results

Location	Date	Period	Measured $L_{Aeq(period)}$	Criteria $L_{Aeq(period)}$	Compliance
J	23/11/18	Day	52 ¹	55	Yes
	28/11/18	Day	49 ¹	55	Yes
	29/11/18	Day	38	55	Yes
	30/11/18	Day	34	55	Yes

1. Train movements occurred during weather affected data.

Results presented in **Table 19** indicate that rail noise levels from the Bloomfield Rail Spur were in compliance with the Abel Mine Project Approval during the noise monitoring period.

6 Conclusion

SLR was engaged by Donaldson Coal Pty Ltd to conduct quarterly noise monitoring surveys for Donaldson Coal Mine and Abel Coal Mine in accordance with the Abel Coal Mine Noise Monitoring Program, dated 12 August 2014.

Donaldson Open Cut Mine has ceased production and all major earthworks on the site have been finalised. Therefore, compliance noise monitoring for the Donaldson Open Cut Mine is no longer required.

Abel mine was placed in Care & Maintenance on 28th April 2016 and there was no operations onsite, excluding that from the Bloomfield CHPP which operates under the Abel Coal Mine project consent conditions.

Operator-attended and unattended noise measurements were conducted for the December 2018 quarter at six focus locations surrounding the mine.

Abel portal operations were not observed to be audible at any locations during the monitoring period. Contributed noise levels from Abel Mine did not exceed noise emission goals (including night-time sleep arousal criteria) and compliance with the Abel Mine *Project Approval* was indicated at all locations.

A comparison of ambient LA_{10} and LA_{90} noise levels recorded during the current monitoring period (December 2018), the baseline monitoring period, the last monitoring period (September 2018), and the coinciding monitoring period from last year (December 2017) has been conducted.

Rail noise levels from the Bloomfield Rail Spur were considered to be in compliance with the Abel Mine Project Approval during the noise monitoring period.

DRAFT

Appendix A

Acoustic Terminology
Report 630.01053
Page 1 of 2

1 Sound Level or Noise Level

The terms “sound” and “noise” are almost interchangeable, except that in common usage “noise” is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or L_p are commonly used to represent Sound Pressure Level. The symbol L_A represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2E-5 Pa.

2 “A” Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an “A-weighting” filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People’s hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120 110	Heavy rock concert Grinding on steel	Extremely noisy
100 90	Loud car horn at 3 m Construction site with pneumatic hammering	Very noisy
80 70	Kerbside of busy street Loud radio or television	Loud
60 50	Department store General Office	Moderate to quiet
40 30	Inside private office Inside bedroom	Quiet to very quiet
20	Unoccupied recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as “linear”, and the units are expressed as dB(Z) or dB.

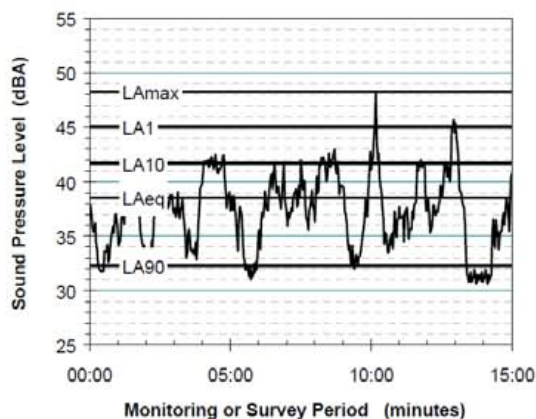
3 Sound Power Level

The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 1E-12 W. The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels L_{AN}, where L_{AN} is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the L_{A1} is the noise level exceeded for 1% of the time, L_{A10} the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

- L_{A1} The noise level exceeded for 1% of the 15 minute interval.
- L_{A10} The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- L_{A90} The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- L_{Aeq} The A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the “repeatable minimum” L_{A90} noise level over the daytime and night-time measurement periods, as required by the EPA. In addition the method produces mean or “average” levels representative of the other descriptors (L_{Aeq}, L_{A10}, etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than “broad band” noise.

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

Appendix A

Acoustic Terminology

Report 630.01053

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7 Frequency Analysis

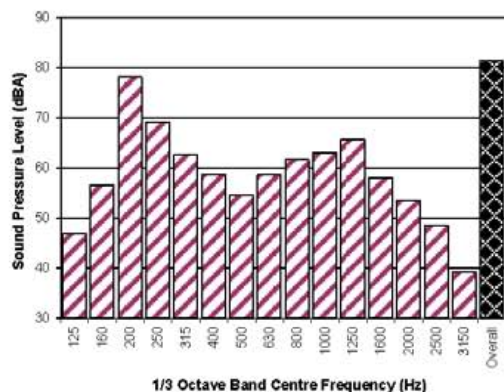
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of "peak" velocity or "rms" velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as "peak particle velocity", or PPV. The latter incorporates "root mean squared" averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (1E-6 mm/s). Care is required in this regard, as other reference levels are used by some organizations.

9 Human Perception of Vibration

People are able to "feel" vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as "normal" in a car, bus or train is considerably higher than what is perceived as "normal" in a shop, office or dwelling.

10 Over-Pressure

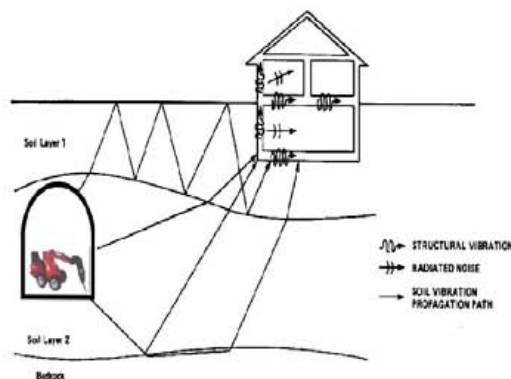
The term "over-pressure" is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

11 Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed "regenerated noise", "structure-borne noise", or sometimes "ground-borne noise". Regenerated noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of regenerated noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents the various paths by which vibration and regenerated noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term "regenerated noise" is also used to describe other types of noise that are emitted from the primary source as a different form of energy. One example would be a fan with a silencer, where the fan is the energy source and primary noise source. The silencer may effectively reduce the fan noise, but some additional noise may be created by the aerodynamic effect of the silencer in the airstream. This "secondary" noise may be referred to as regenerated noise.

APPENDIX B

Calibration Certificates



**Acoustic
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Labs Pty Ltd**

Level 7 Building 2 423 Pennant Hills Rd
Pennant Hills NSW AUSTRALIA 2120
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
AS 1259.1:1990 - AS 1259.2:1990
Calibration Certificate

Calibration Number C17277

Client Details SLR Consulting
Suite 2, 2 Domville Avenue
Hawthorn VIC 3122

Equipment Tested/ Model Number : ARL EL-316
Instrument Serial Number : 16-203-505
Microphone Serial Number : 318370
Pre-amplifier Serial Number : 26962

Atmospheric Conditions

Ambient Temperature : 24.9°C
Relative Humidity : 44.3%
Barometric Pressure : 100.78kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 14/06/2017
Secondary Check: Riley Cooper
Report Issue Date : 15/06/2017

Approved Signatory :  Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10.2.2: Absolute sensitivity	Pass	10.3.4: Inherent system noise level	Pass
10.2.3: Frequency weighting	Pass	10.4.2: Time weighting characteristic F and S	Pass
10.3.2: Overload indications	Pass	10.4.3: Time weighting characteristic I	Pass
10.3.3: Accuracy of level range control	Pass	10.4.5: R.M.S performance	Pass
8.9: Detector-indicator linearity	Pass	9.3.2: Time averaging	Pass
8.10: Differential level linearity	Pass	9.3.5: Overload indication	Pass

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	±0.16dB	Temperature	±0.05°C
12.5kHz	±0.2dB	Relative Humidity	±0.46%
16kHz	±0.29dB	Barometric Pressure	±0.017Pa
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.

The sound level meter under test has been shown to conform to the type 1 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.

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.

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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Sound Level Meter
AS 1259.1:1990 - AS 1259.2:1990
Calibration Certificate

Calibration Number C17217

Client Details SLR Consulting Australia Pty Ltd
2 Lincoln Street
Lane Cove NSW 2066

Equipment Tested/ Model Number : ARL EL-316
Instrument Serial Number : 16-203-525
Microphone Serial Number : 322080
Pre-amplifier Serial Number : 27089

Atmospheric Conditions

Ambient Temperature : 24.9°C
Relative Humidity : 46.4%
Barometric Pressure : 100.27kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 09/06/2017
Secondary Check: Riley Cooper
Report Issue Date : 13/06/2017

Approved Signatory :  PP Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
10.2.2: Absolute sensitivity	Pass	10.3.4: Inherent system noise level	Pass
10.2.3: Frequency weighting	Pass	10.4.2: Time weighting characteristic F and S	Pass
10.3.2: Overload indications	Pass	10.4.3: Time weighting characteristic I	Pass
10.3.3: Accuracy of level range control	Pass	10.4.5: R.M.S performance	Pass
8.9: Detector-indicator linearity	Pass	9.3.2: Time averaging	Pass
8.10: Differential level linearity	Pass	9.3.5: Overload indication	Pass

Least Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	±0.16dB	Temperature	±0.05°C
12.5kHz	±0.2dB	Relative Humidity	±0.46%
16kHz	±0.29dB	Barometric Pressure	±0.017Pa
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.

The sound level meter under test has been shown to conform to the type 1 requirements for periodic testing as described in AS 1259.1:1990 and AS 1259.2:1990 for the tests stated above.



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.
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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.

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: SLM 41926

Equipment Description: Noise Logger

Manufacturer: ARL
Model No: EL-316 Serial No: 16-203-528
Microphone Type: UC-53A Serial No: 305019
Pre-amplifier Type: NH17 Serial No: 26964

Comments: All tests passed for type 1.
(See over for details)

Owner: SLR Consulting Australia Pty Ltd
Level 2, 2 Lincoln Street
Lane Cove, NSW 2066

Ambient Pressure: 997 hPa ± 1.5 hPa
Temperature: 23 °C $\pm 2^\circ$ C Relative Humidity: 28 % $\pm 5\%$
Date of Calibration: 07/08/2018 Issue Date: 07/08/2018
Acu-Vib Test Procedure: AVP05 (SLM)
CHECKED BY: *[Signature]* AUTHORISED SIGNATURE: *[Signature]*

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the
Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Accredited Lab. No. 5262
Acoustic and Vibration
Measurements



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Tel: (02) 95893133 Fax: (02) 95892533
Mobile: 0413 809809
web site: www.acu-vib.com.au

Page 1 of 2
AVCERT05b Rev. 1.3 16.05.18

CERTIFICATE NO.: **SLM 41926**

The performance characteristics listed below were tested. The tests are based on the relevant clauses of A.S. 1259.1 and A.S. 1259.2 - 1990

- 1. RMS Performance clause 10.4.5
- 2. Time Weighting Responses, F&S clause 10.4.2
- 3. Time Weighting L clause 10.4.3
- 4. Time Weighting P clause 10.4.4
- 5. Input Attenuator Accuracy clause 10.3.3
- 6. Detector & Differential Linearity clause 10.4.1
- 7. Weighting Networks & Linearity clause 10.2.3
- 8. Overload Indication clause 10.3.2
- 9. AC Output & Weighted Noise Level clause 11. (c), (f), (i) 10.3.4
- 10. Time Averaging clause 9.3.2
- 11. Absolute Sensitivity clause 10.2.2

Note: Absolute Sensitivity as found was 95.1 dB and adjusted to 94.1 dB
Uncertainty: ± 0.13 dB (at 95% c.l.) $k=2$

Date of Calibration: 07/08/2018 Issue Date: 07/08/2018

Checked by: *A.A.*

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
the International System of Units (SI) through the use of national standards.
The uncertainties quoted are calculated in accordance with the Guide of the IEC. Guide to the Uncertainty of
Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



Accredited Lab. No. 0262
Acoustic and Vibration
Measurements



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Page 2 of 2 End of Calibration Certificate
AVCERT026

CERTIFICATE OF CALIBRATION

CERTIFICATE No.: **SLM 22623 & FILT 4618**

Equipment Description: Sound & Vibration Analyser

Manufacturer: Svantek

Model No: Svan-957 **Serial No:** 20665

Microphone Type: 7052E **Serial No:** 46882

Filter Type: 1/1 Octave **Serial No:** 20665

Comments: All tests passed for class 1.
(See over for details)

Owner: SLR Consulting Australia Pty Ltd
Level 2, 2 Lincoln Street
Lane Cove, NSW 2066

Ambient Pressure: 1009 hPa ± 1.5 hPa

Temperature: 24 °C $\pm 2^\circ$ C **Relative Humidity:** 45% $\pm 5\%$

Date of Calibration: 27/04/2018 **Issue Date:** 27/04/2018

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *[Signature]* **AUTHORISED SIGNATURE:** *[Signature]*
Jack Kieft

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to
Australian/national standards.



Accredited Lab. No. 9262
Acoustic and Vibration
Measurements



HEAD OFFICE
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Page 1 of 2
AVCERT10 Rev. 1.3 05.02.18

CERTIFICATE NO.: SLM 22623 & FILT 4618

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	Clause	Result
Absolute Calibration	10	Pass
Acoustical Frequency Weighting	12	Pass
Self Generated Noise	11.1	Entered
Electrical Noise	11.2	Entered
Long Term Stability	15	Pass
Electrical Frequency Weightings	13	Pass
Frequency and Time Weightings	14	Pass
Reference Level Linearity	16	Pass
Range Level Linearity	17	Pass
Toneburst	18	Pass
Peak C Sound Level	19	Pass
Overload Indicator	20	Pass
High Level Stability	21	Pass

Statement of Compliance: 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. As public evidence was available, from an independent organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.
A full technical report is available if required.


This Sound Level Meter included an Octave Filter Set. Tests were based on IEC 1260: 1995 and AS/NZS 4476 - 1997 and were conducted to test the following performance characteristics:

1. Relative attenuation clause 5.3

Least uncertainty for relative attenuation (at 95% c.l.) k=2:

- ±0.1 dB for attenuation equal to or less than 6 dB
- ±0.3 dB for RA from above 6 dB to 18 dB
- ±0.6 dB for RA from above 18 dB to 80 dB

Date of Calibration: 27/04/2018 **Issue Date:** 27/04/2018

Checked by: 

Accredited for compliance with ISO/IEC 17025 - Calibration
The results of the tests, calibration and/or measurements included in this document are traceable to Australian/national standards.



Accredited Lab. No. 9262
Acoustic and Vibration
Measurements



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web site: www.acu-vib.com.au

Brüel & Kjær 

The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

**CERTIFICATE OF TRACEABLE
CALIBRATION**

No.: CDK1706457

Page 1 of 3

CALIBRATION OF:

Manufacturer:	Brüel & Kjær		
Hand-held Analyzer Type:	Type: 2270	Serial No.:	2679354
Application:	Type: BZ-7233	Version No.:	4.6.3
Intensity Probe Type:	Type: 3654	Serial No.:	2783762
Customer identification:	-		

CUSTOMER:

SLR Consulting Australia Pty Ltd
PO Box 176
2066 Lane Cove
New South Wales
Australia

CALIBRATION CONDITIONS:

Preconditioning:	4 hours at 23° C ± 3° C		
Environment conditions:	Air Temperature:	23 °C ± 3 °C	
	Air Pressure:	101,3 kPa ± 5 kPa	
	Relative Humidity:	50% RH ± 25% RH	

PROCEDURE:

The pressure residual intensity index for the complete system is then calibrated in accordance with the demands in IEC 1043 class 1 using the Brüel & Kjær calibration procedure P_3654_A05.

RESULTS:

Calibration after repair or adjustment

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA-4/02

Date of Calibration: 2017-09-01

Certificate Issued: 2017-09-01


Nicki Eriksen

Calibration Technician

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CERTIFICATE OF CALIBRATION

No.: CDK1706457

Page 2 of 3

RESULTS:

List of performed (sub)tests with status:

"OK" Means the result of the test is within tolerances.

"-" Means the result of the test is outside these tolerances.

Visual inspection:

	Result accepted?
Visual inspection	OK

Status of System Elements:

	Calibration Date	Result accepted?
Calibration of microphones	2017-09-01	OK ²

¹⁾ Accredited calibration, Environmental conditions 23°C ± 3°C, 1013 hPa ± 5 hPa

²⁾ Factory calibration, Environmental conditions 23°C ± 2°C, > 960 hPa

Sound Pressure Calibration:

Measured Value Channel A [dB re 1V/Pa]	Measured Value Channel B [dB re 1V/Pa]	Deviation [dB]	Maximum Deviation [±dB]	Calibration Uncertainty [dB]
-38,75	-38,39	0,35	1,00	0,24

3654 Gain Diviation	Open-circuit Sensitivity [dB re 1V/Pa]	Measured Value [dB re 1V/Pa]	Deviation [dB]	Calibration Uncertainty [dB]
Mic. Part 1	-38,40	-38,75	-0,35	0,24
Mic. Part 2	-38,20	-38,39	-0,19	0,24

CERTIFICATE OF CALIBRATION



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No.: CDK1706457

Page 3 of 3

Measurement of the P-I index for the system:

Minimum levels are in accordance with IEC 1043 class 1 limits, with a 12 spacer

Frequency [Hz]	Min. Level [dB]	Direction	Measured P-I index [dB]	Calibration Uncertainty [dB]
50	9		23,6	< 1
63	10		25,1	< 1
80	11		25,6	< 1
100	12		27,2	< 1
125	13		29,6	< 1
160	14		33,2	< 1
200	15		37,7	< 1
250	16		40,7	< 1
315	16	-	36,8	< 1
400	16	-	45,6	< 1
500	16		40,5	< 1
630	16		27,7	< 1
800	16	-	27,2	< 1
1000	16	-	27,1	< 1
1250	16	-	35,9	< 1
1600	16	-	26,8	< 1
2000	16	-	33,5	< 1
2500	16		34,6	< 1
3150	16		32,6	< 1
4000	16		29,1	< 1
5000	16		27,8	< 1

System configuration:

Part 1 to channel: A

Part 2 to channel: B

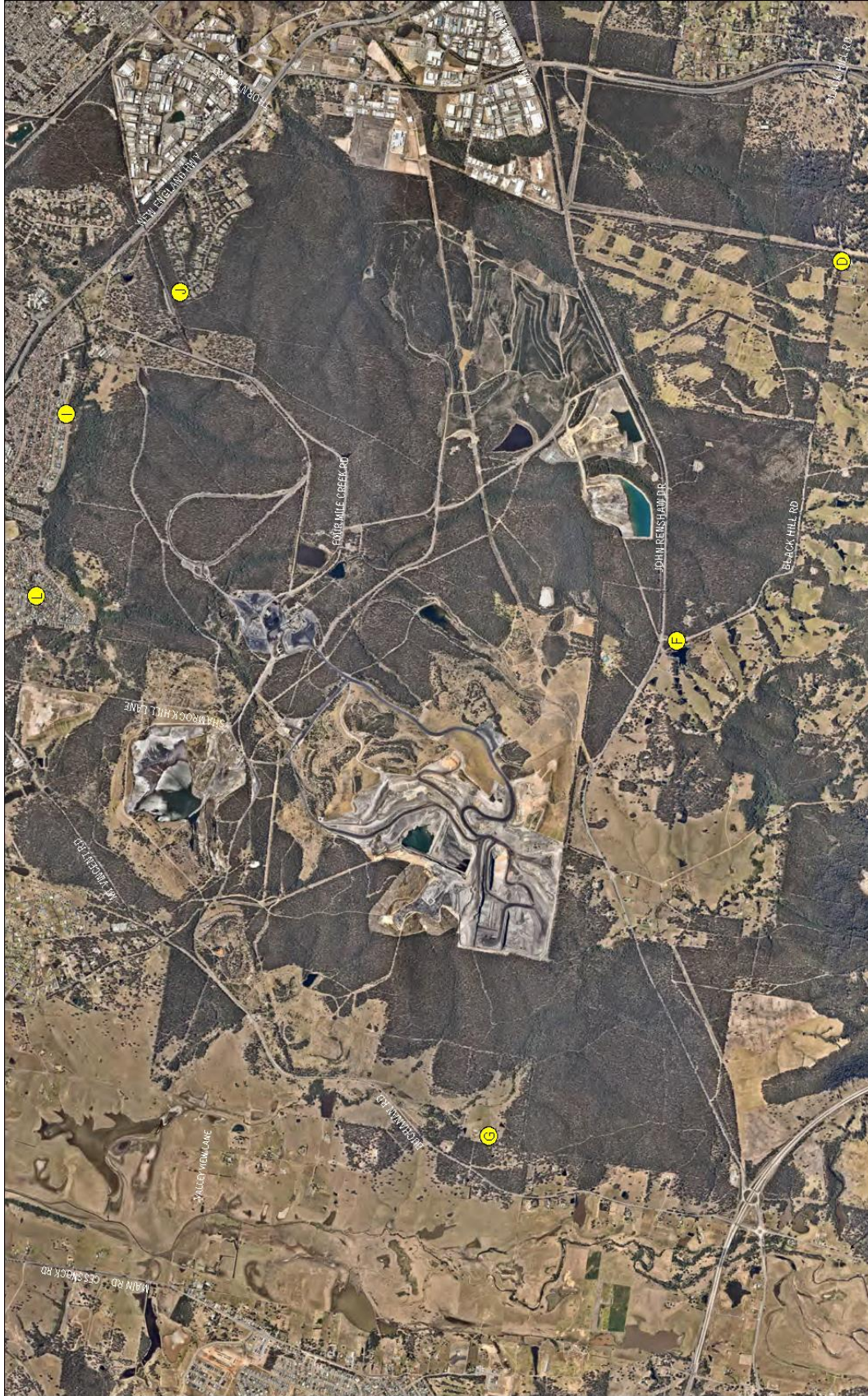
Notes:

CALIBRATION EQUIPMENT:

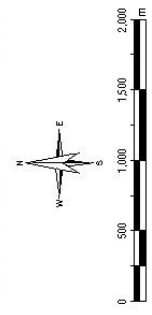
Description	Type	Serial No.
Pistonphone	4228	1908475
Intensity Coupler	UA-0914	1913431
Sound Source	ZI-0055	-
Vaisala Barometer	PTB100A	U2450020
Vaisala Thermometer	HMT331	C1750032

APPENDIX C

Noise Monitoring Locations



Donaldson Coal
Noise Monitoring
Noise Monitoring Locations
APPENDIX C



LEGEND
● Noise Monitoring Locations

Project No.: 6300.01.063.01.200
Date: 11/01/2018
Drawn by: NT
Scale: 1:45,000
Sheet Size: A4
Projection: GDA 1994 MGA Zone 56

SLR
10 KINGS ROAD
NEW LAMBTON
NEW SOUTH WALES 2305
AUSTRALIA
T: 61 2 4037 3201
F: 61 2 4037 3201
www.slronline.com
www.slroffice.com

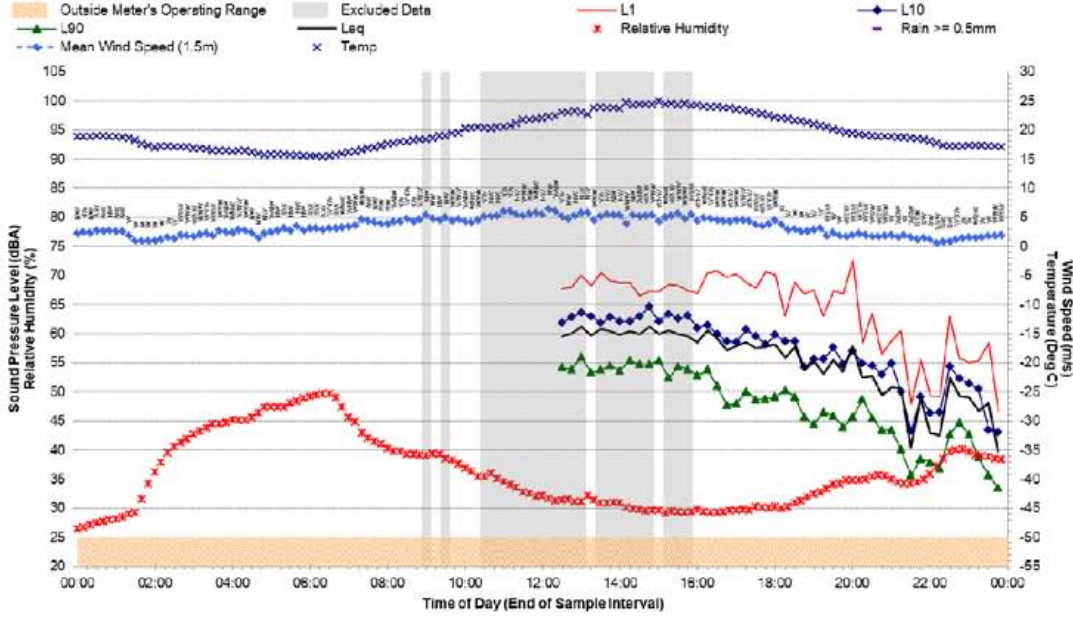
The content contained within this document may be based on information provided by the client. SLR does not guarantee the accuracy of such information.

APPENDIX D

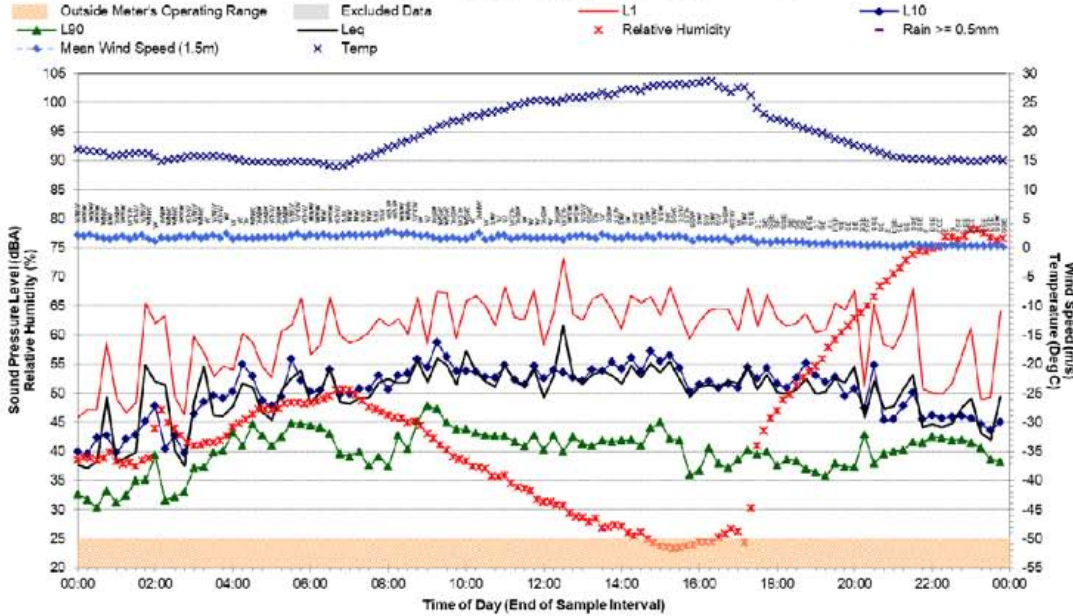
Statistical Ambient Noise Levels

DRAFT

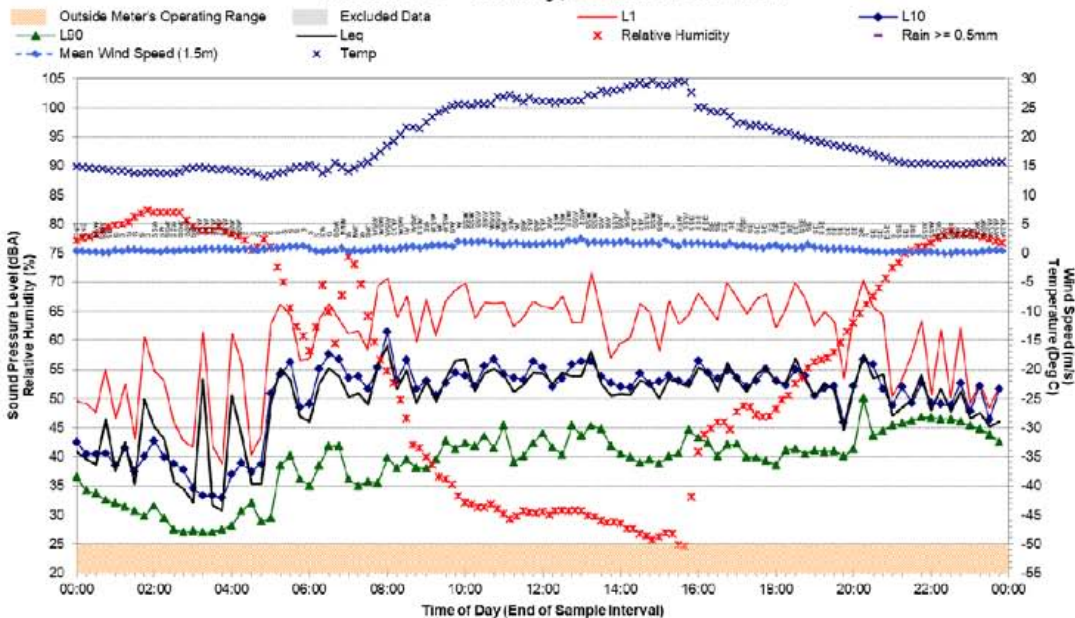
Statistical Ambient Noise Levels Location D - Friday, 23 November 2018



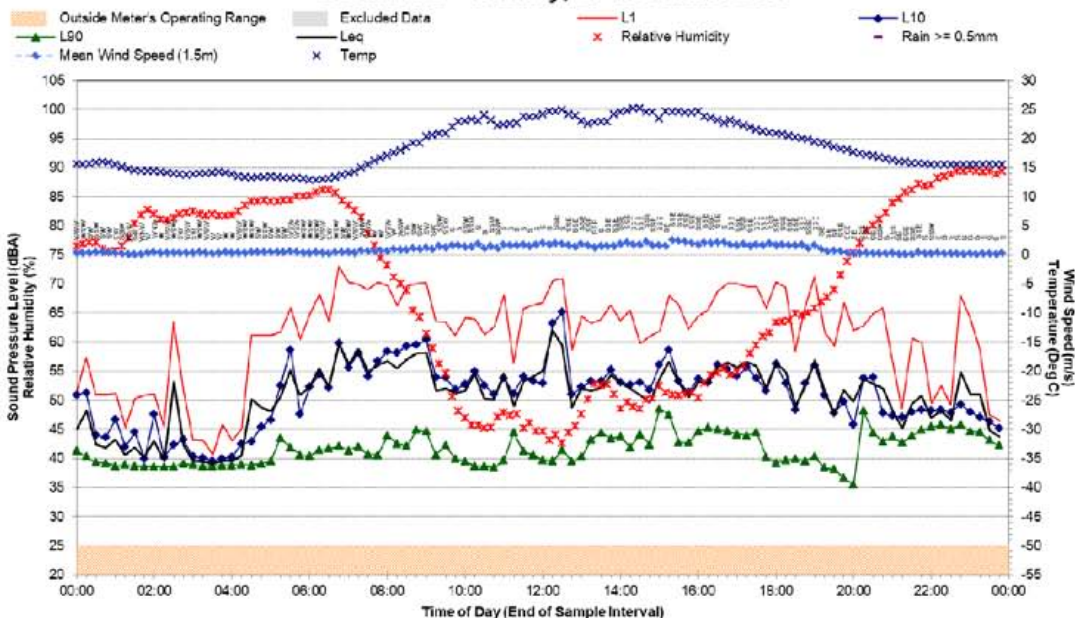
Statistical Ambient Noise Levels Location D - Saturday, 24 November 2018



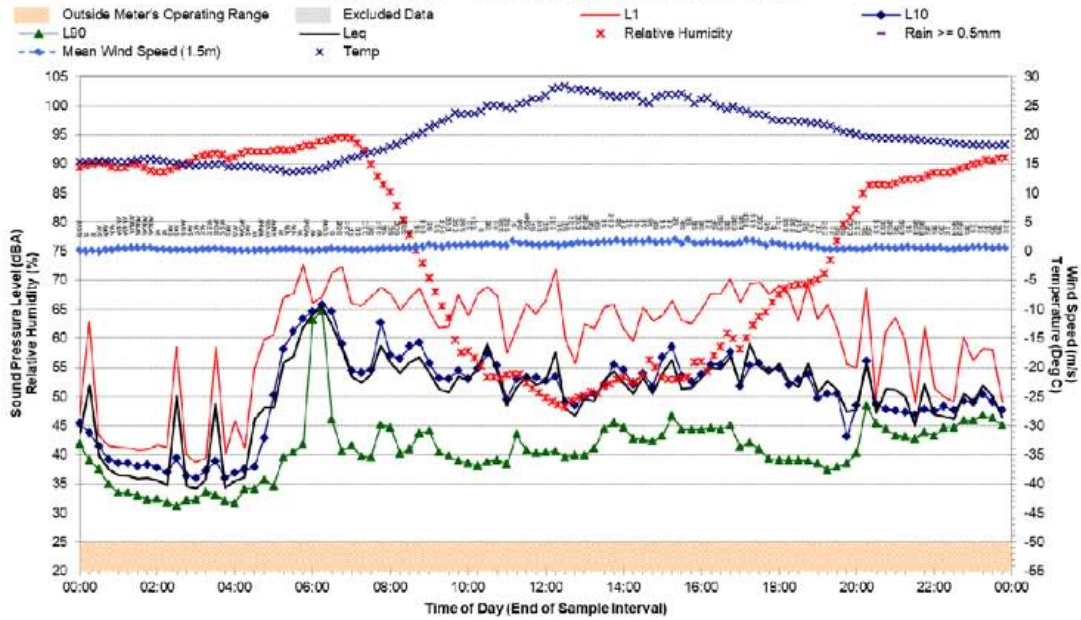
Statistical Ambient Noise Levels Location D - Sunday, 25 November 2018



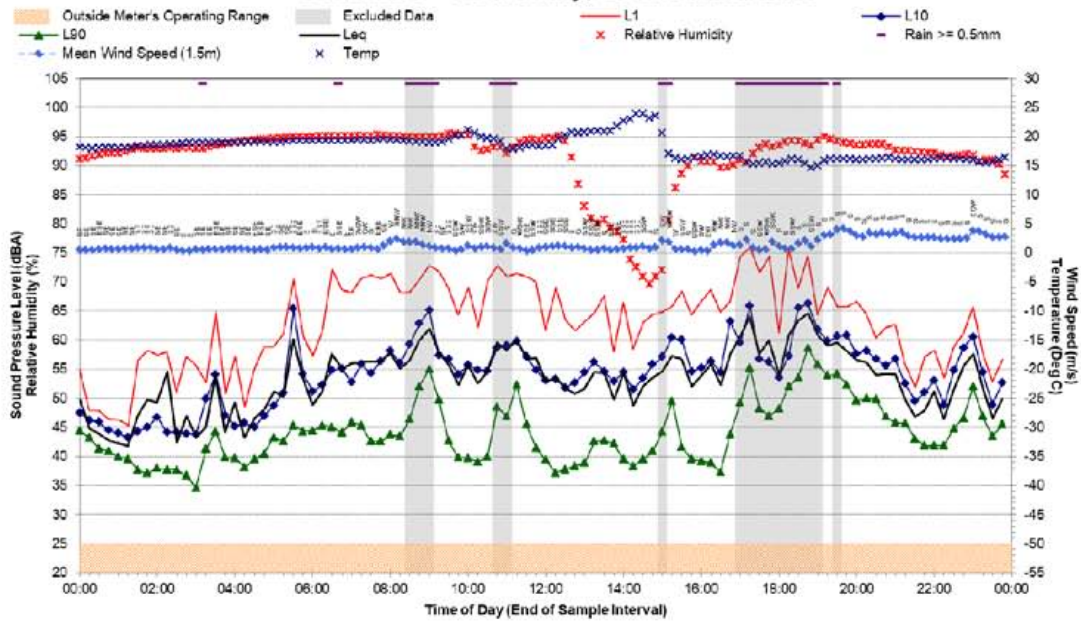
Statistical Ambient Noise Levels Location D - Monday, 26 November 2018



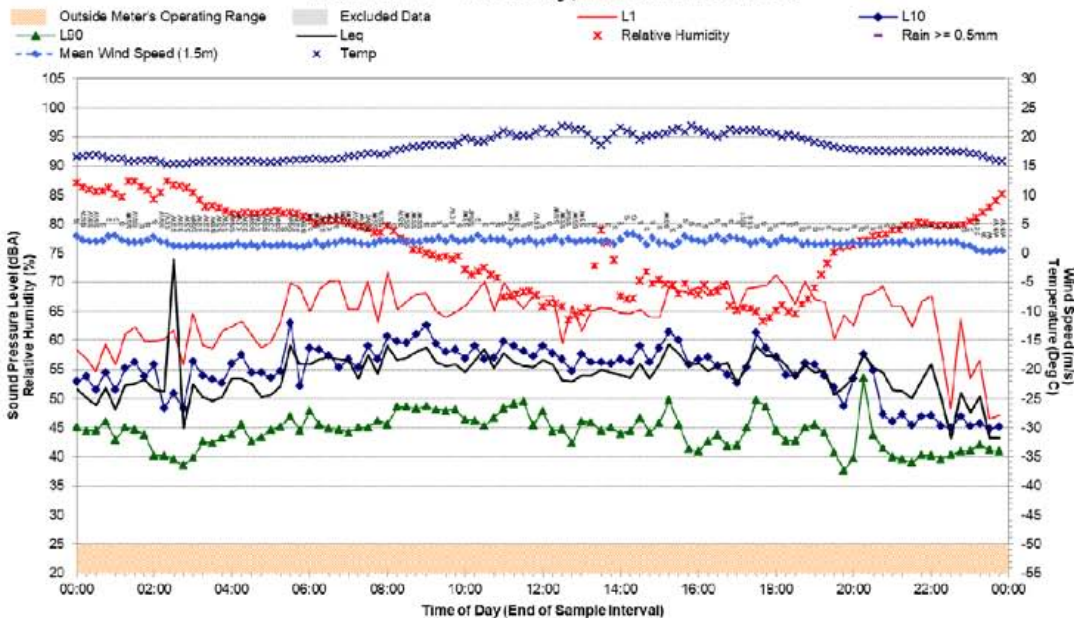
Statistical Ambient Noise Levels Location D - Tuesday, 27 November 2018



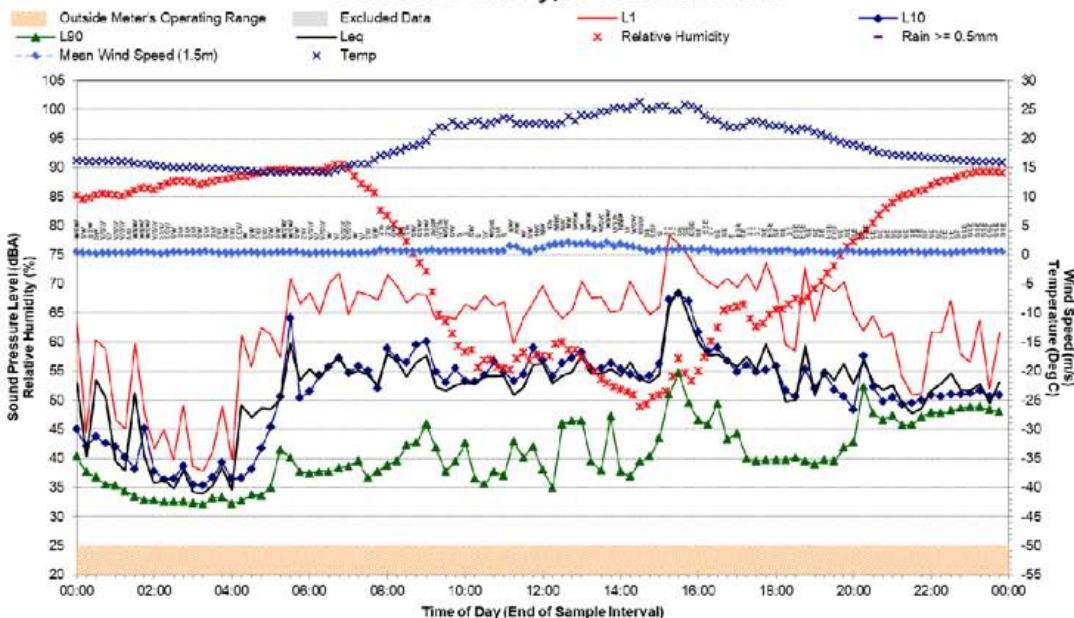
Statistical Ambient Noise Levels Location D - Wednesday, 28 November 2018



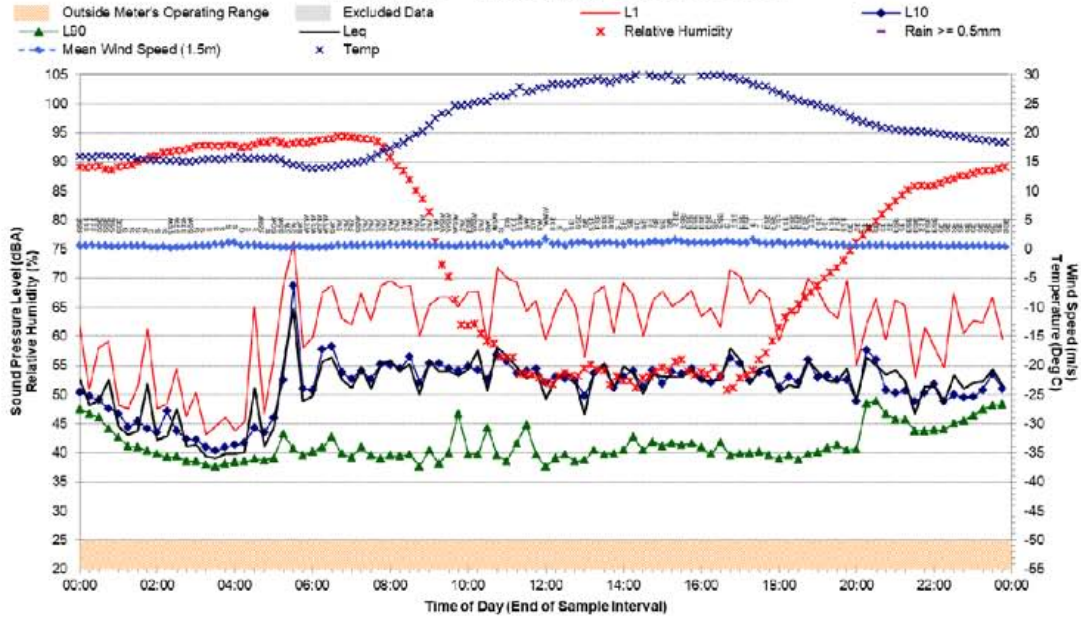
Statistical Ambient Noise Levels Location D - Thursday, 29 November 2018



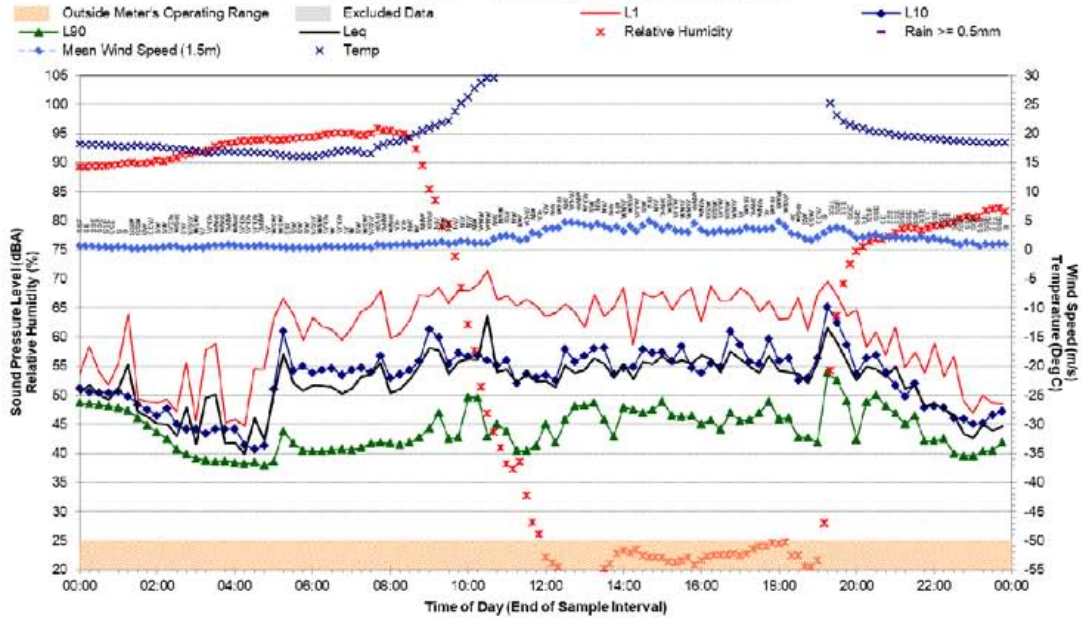
Statistical Ambient Noise Levels Location D - Friday, 30 November 2018



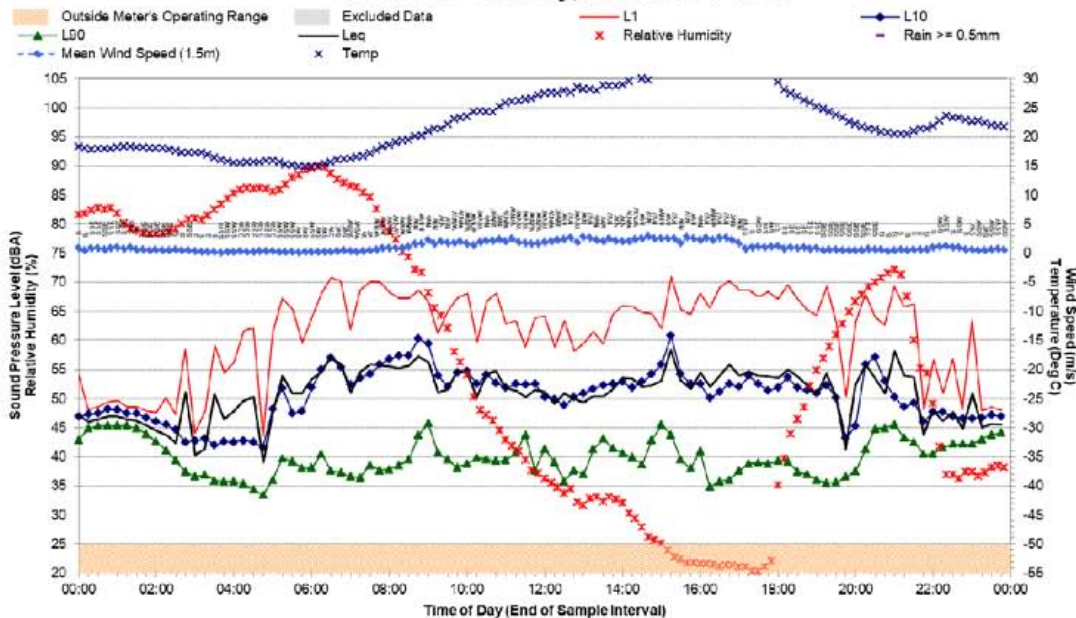
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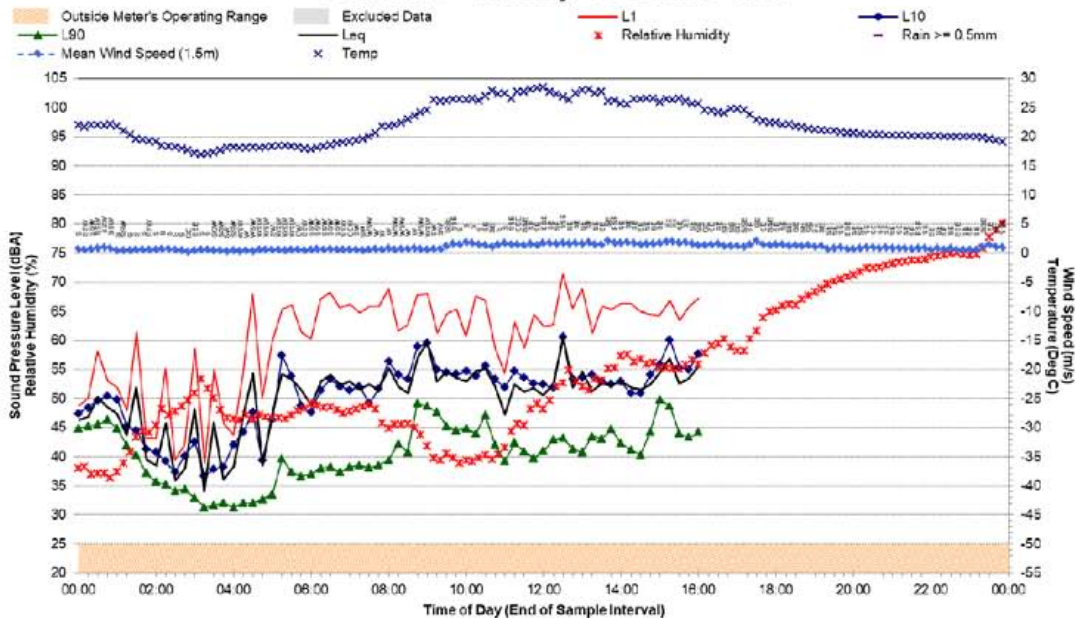
Statistical Ambient Noise Levels Location D - Sunday, 2 December 2018



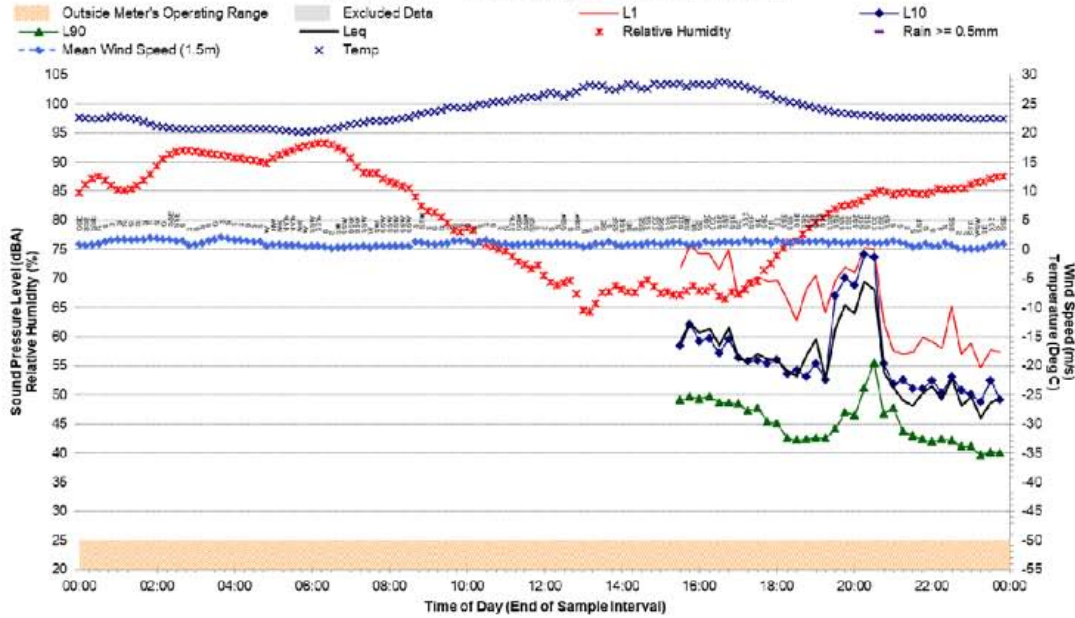
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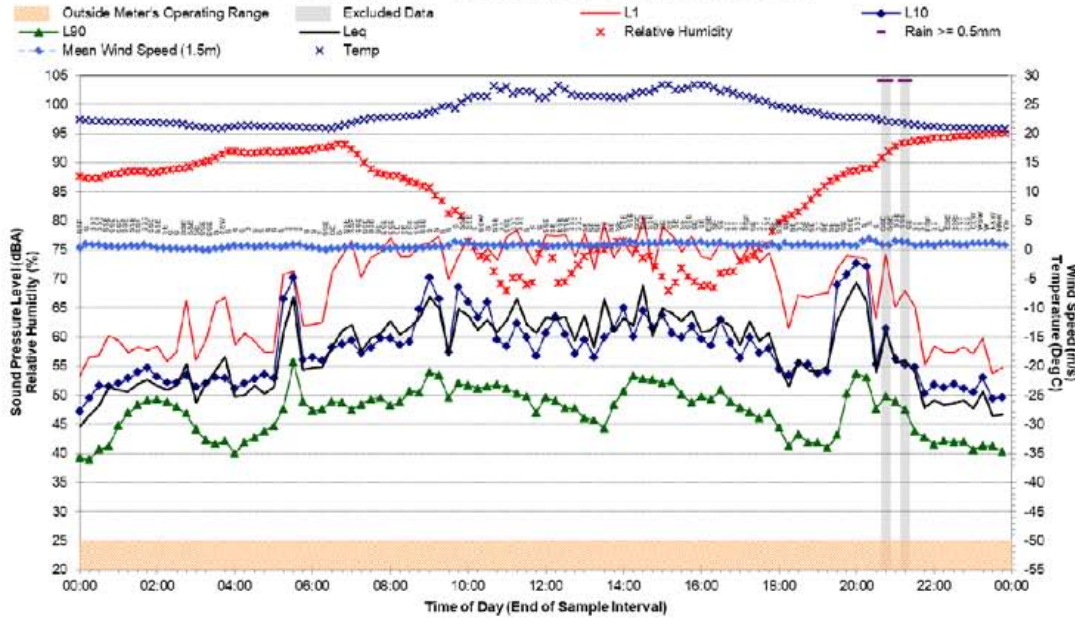
Statistical Ambient Noise Levels Location D - Tuesday, 4 December 2018



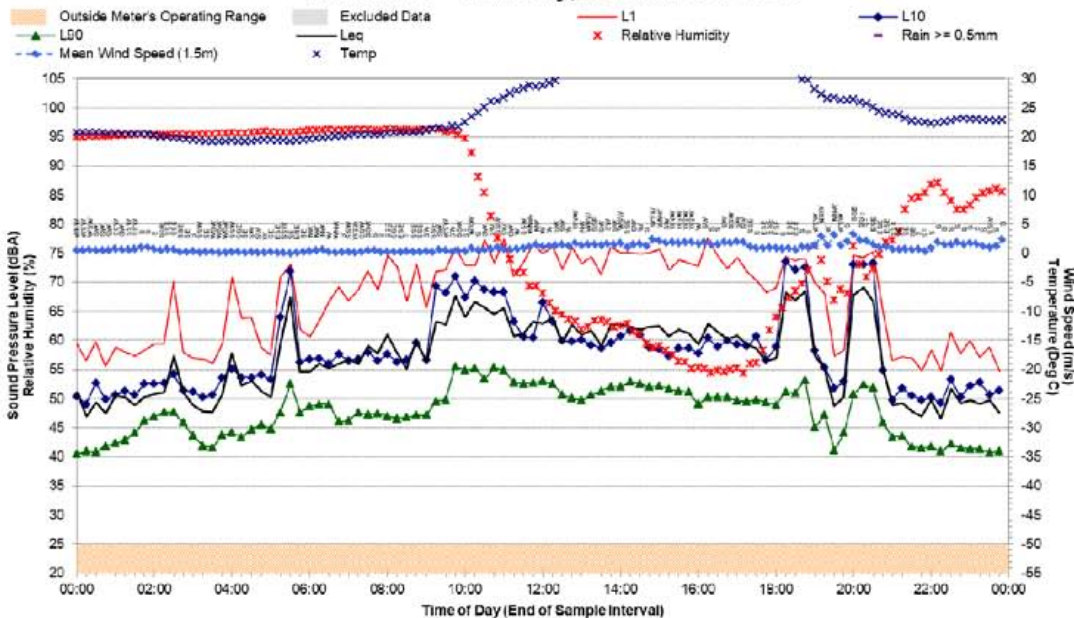
Statistical Ambient Noise Levels Location F - Tuesday, 18 December 2018



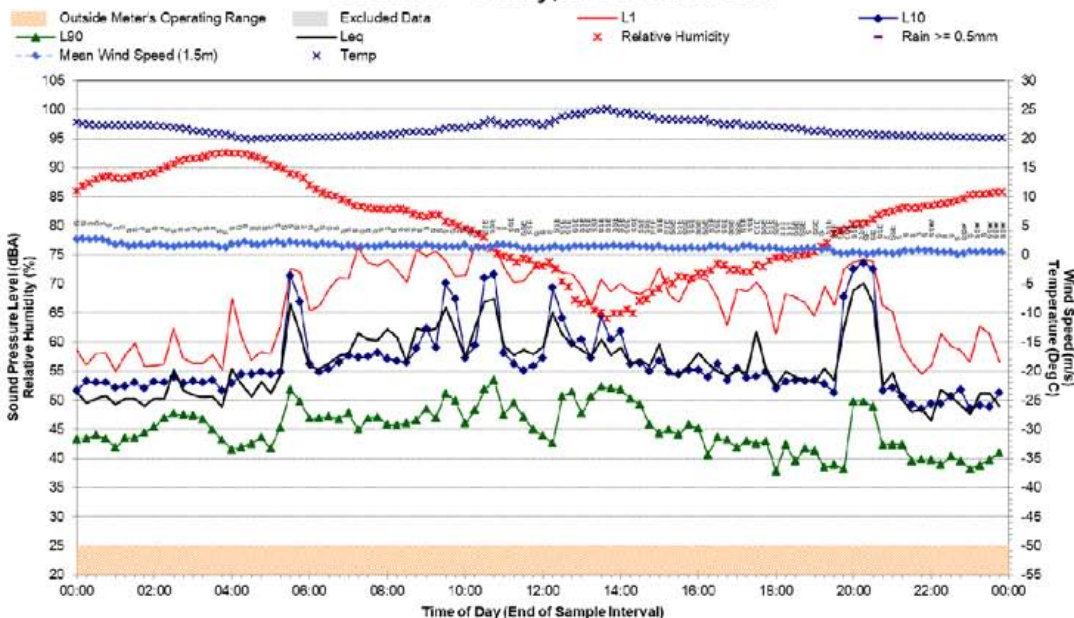
Statistical Ambient Noise Levels Location F - Wednesday, 19 December 2018



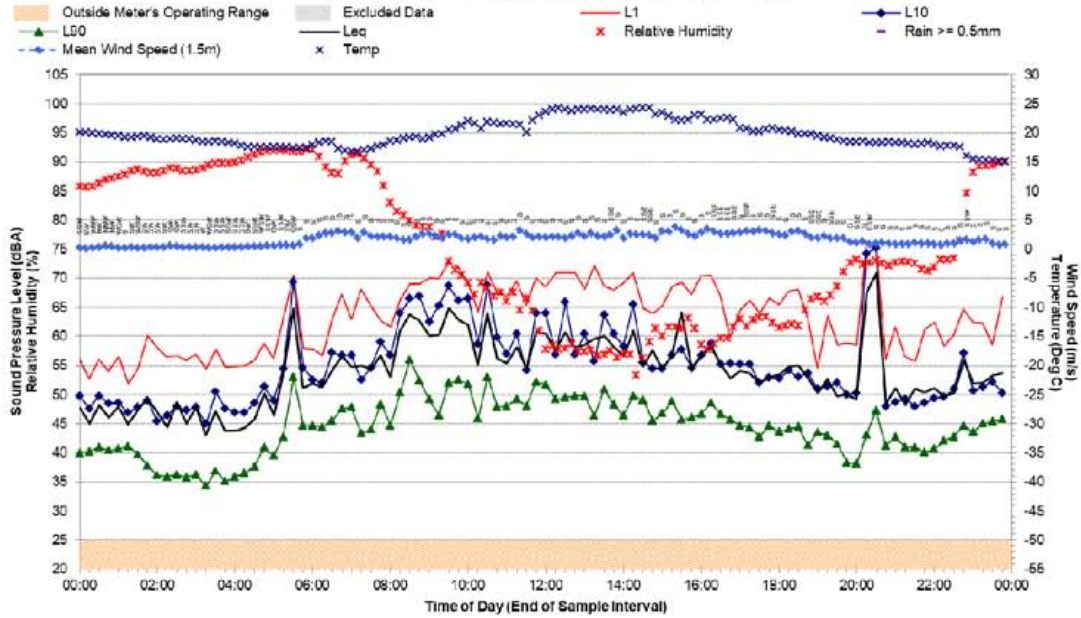
Statistical Ambient Noise Levels Location F - Thursday, 20 December 2018



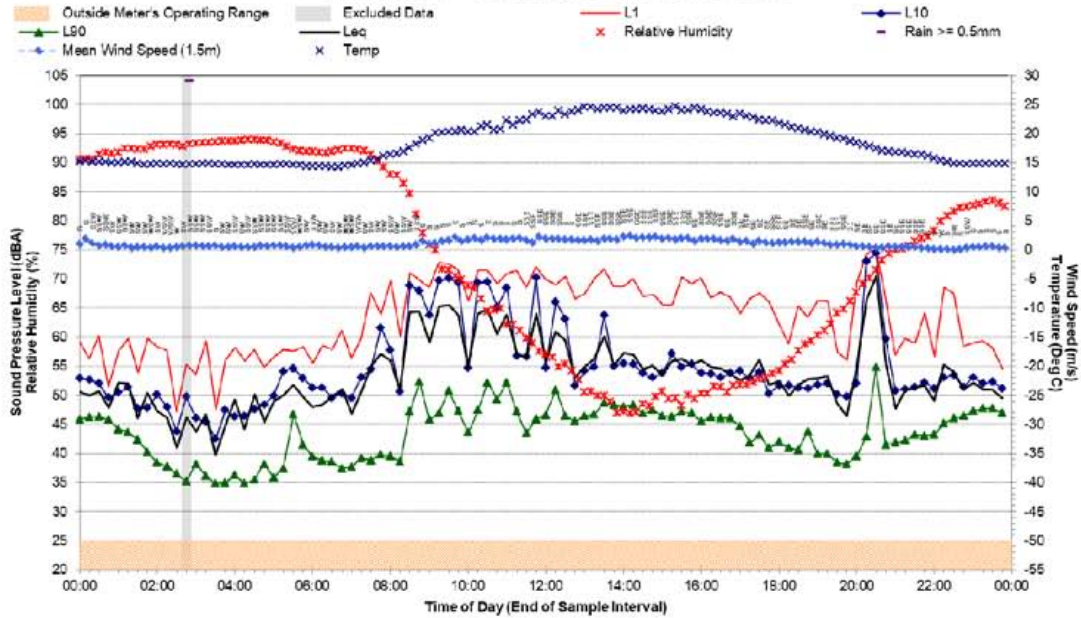
Statistical Ambient Noise Levels Location F - Friday, 21 December 2018



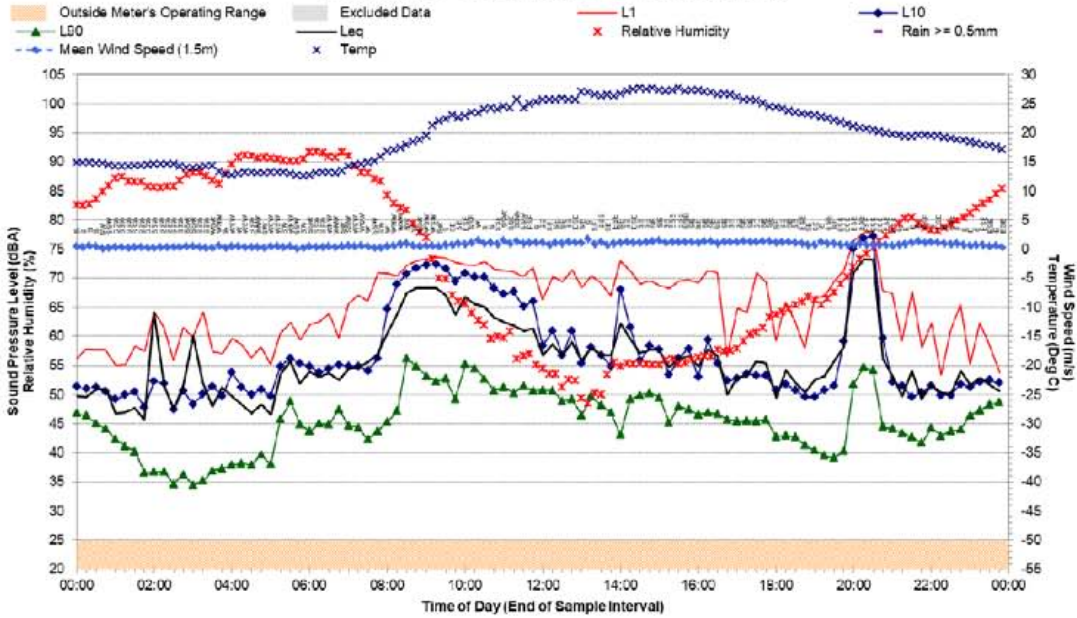
Statistical Ambient Noise Levels Location F - Saturday, 22 December 2018



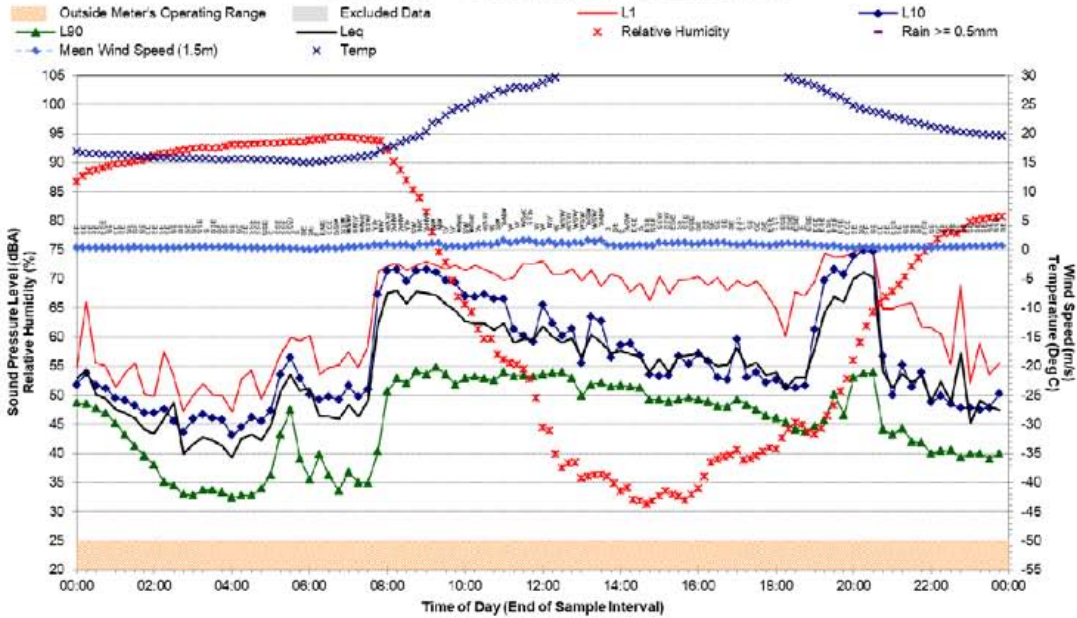
Statistical Ambient Noise Levels Location F - Sunday, 23 December 2018



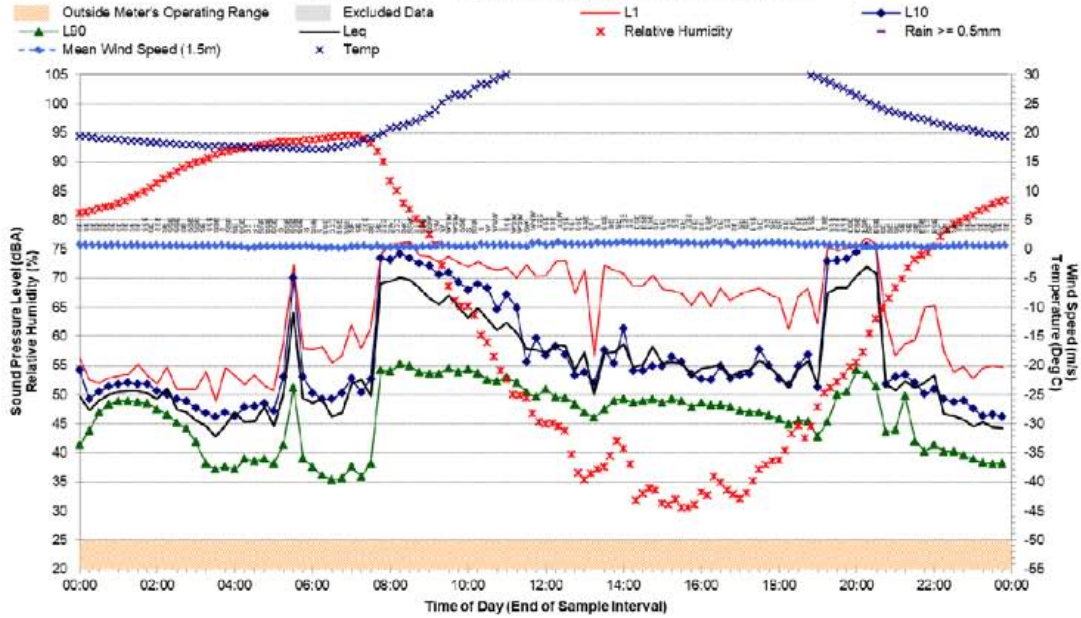
Statistical Ambient Noise Levels Location F - Monday, 24 December 2018



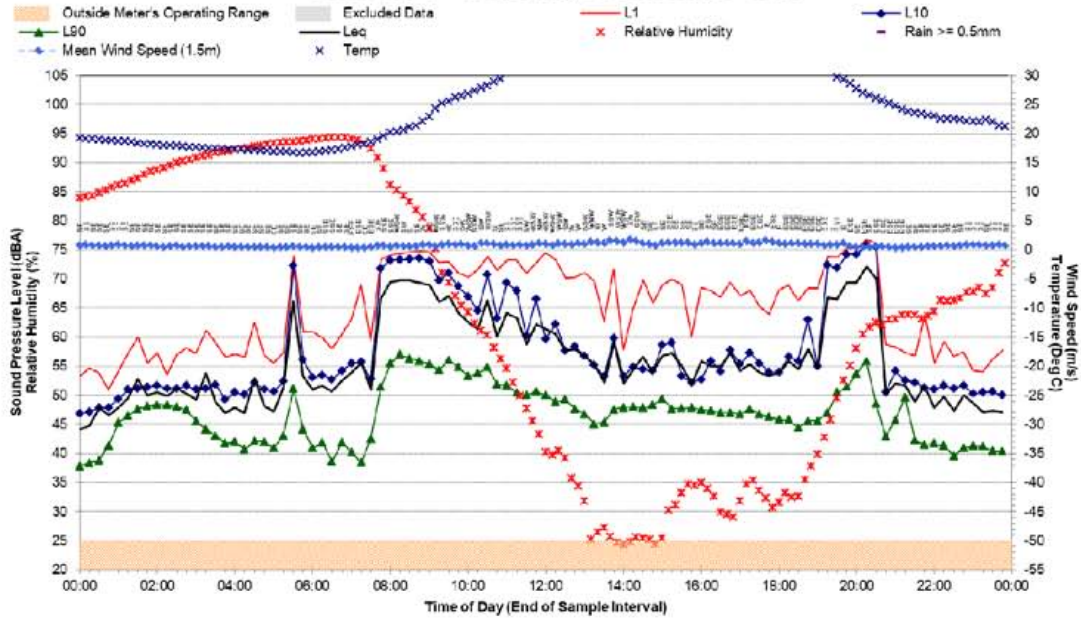
Statistical Ambient Noise Levels Location F - Tuesday, 25 December 2018



Statistical Ambient Noise Levels Location F - Wednesday, 26 December 2018

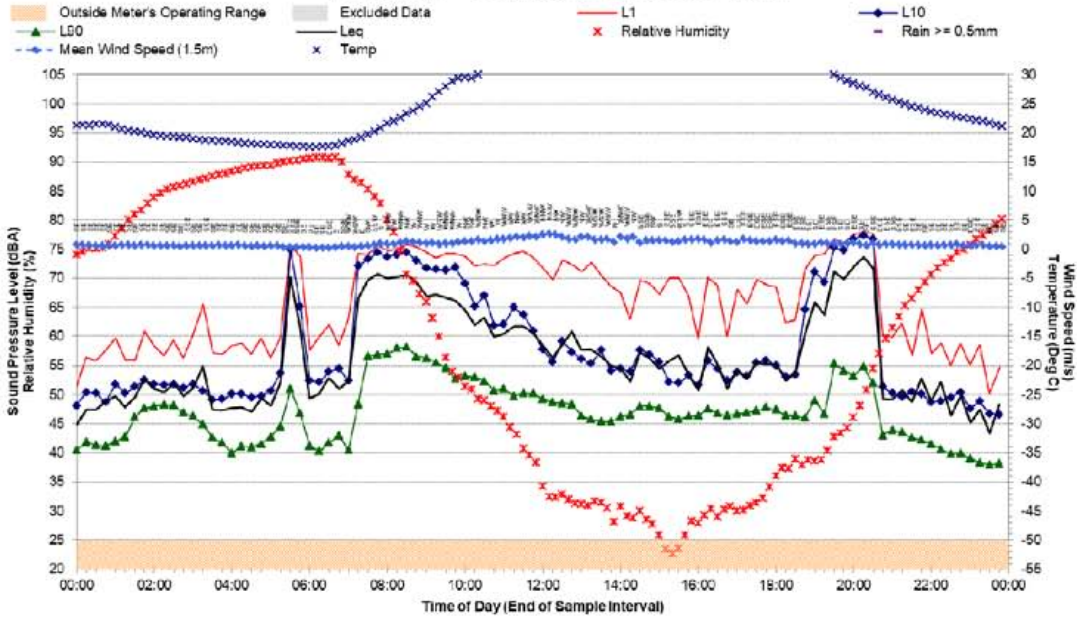


Statistical Ambient Noise Levels Location F - Thursday, 27 December 2018



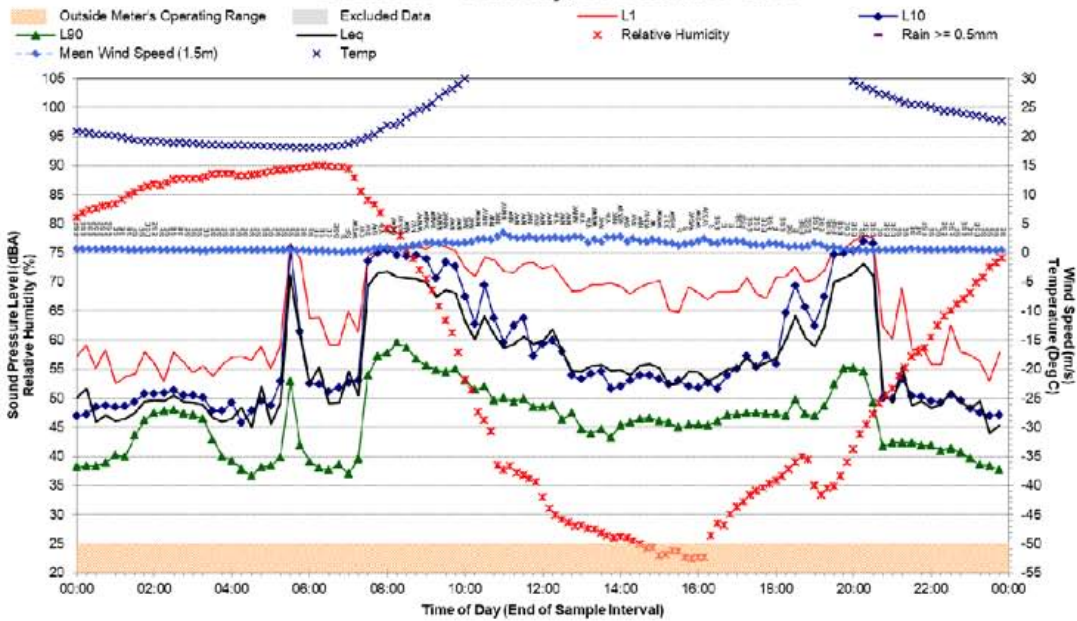
Statistical Ambient Noise Levels

Location F - Friday, 28 December 2018

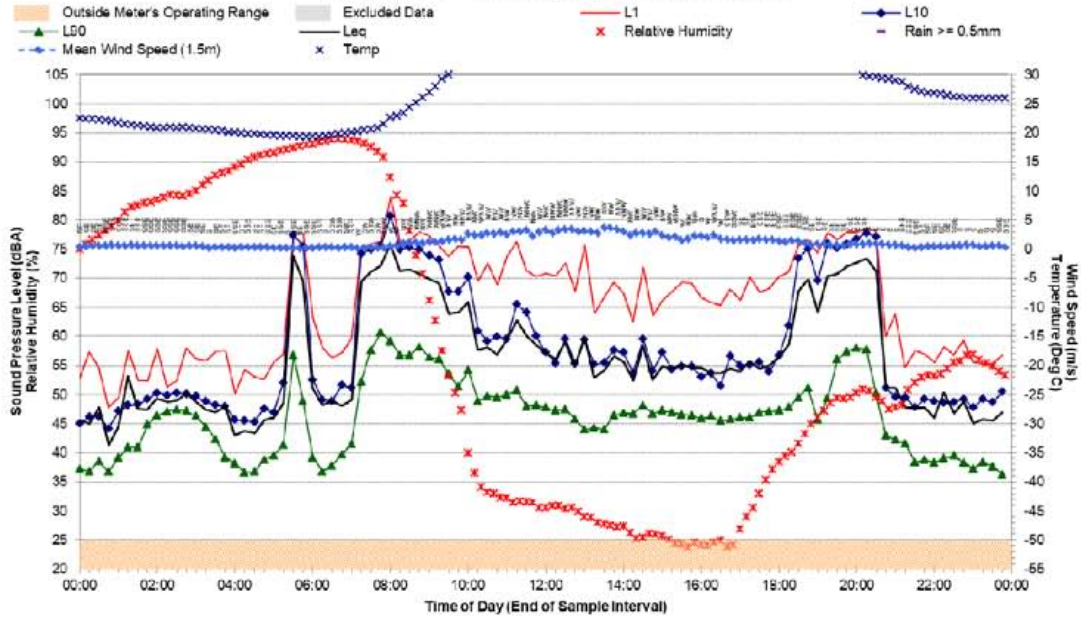


Statistical Ambient Noise Levels

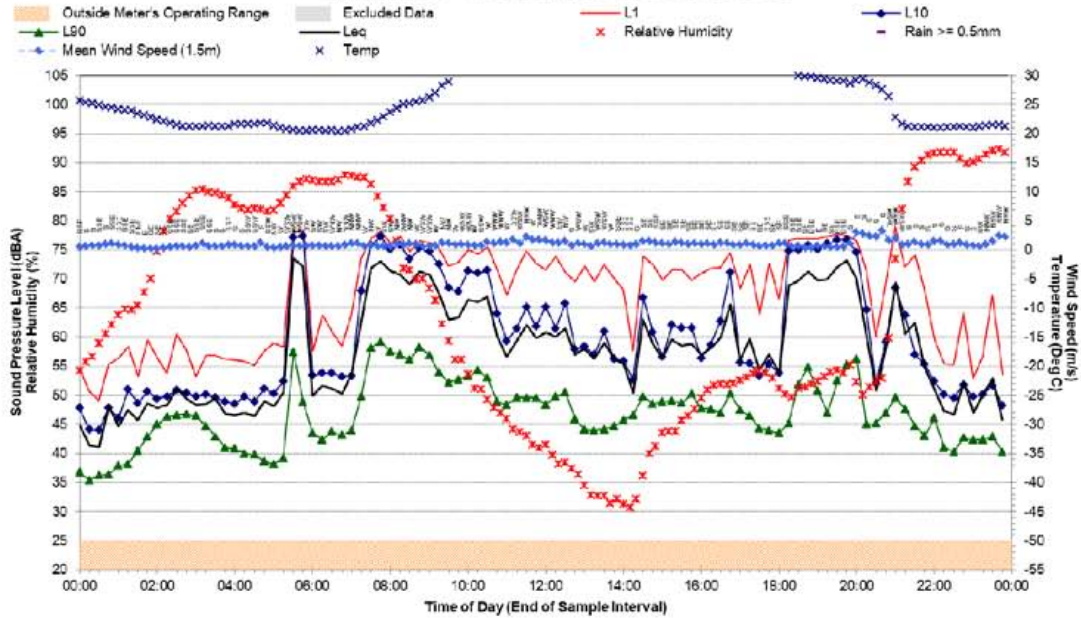
Location F - Saturday, 29 December 2018



Statistical Ambient Noise Levels Location F - Sunday, 30 December 2018

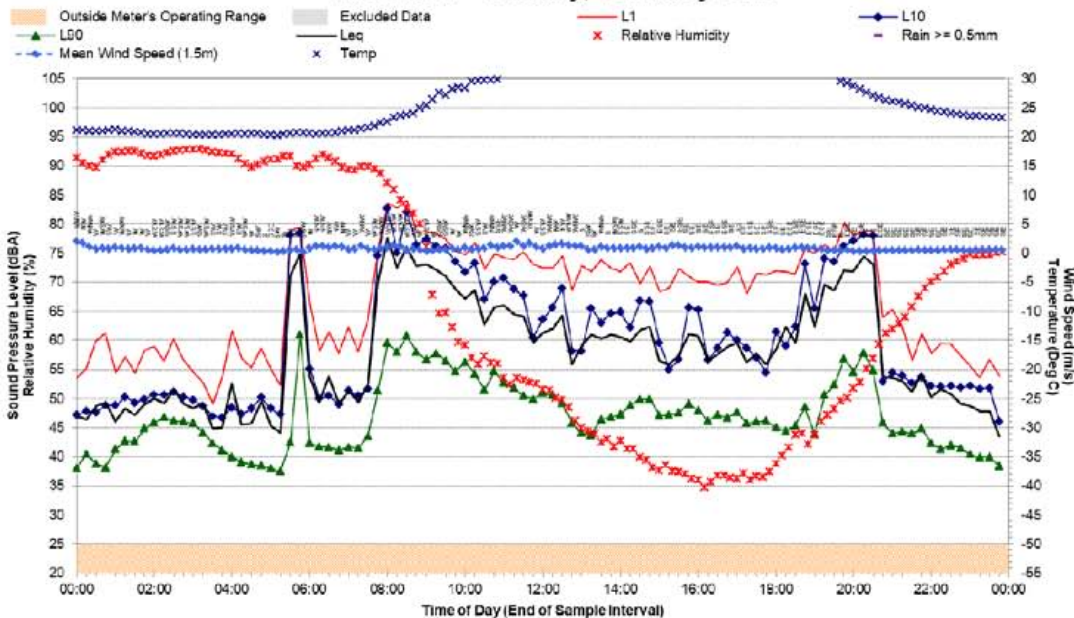


Statistical Ambient Noise Levels Location F - Monday, 31 December 2018



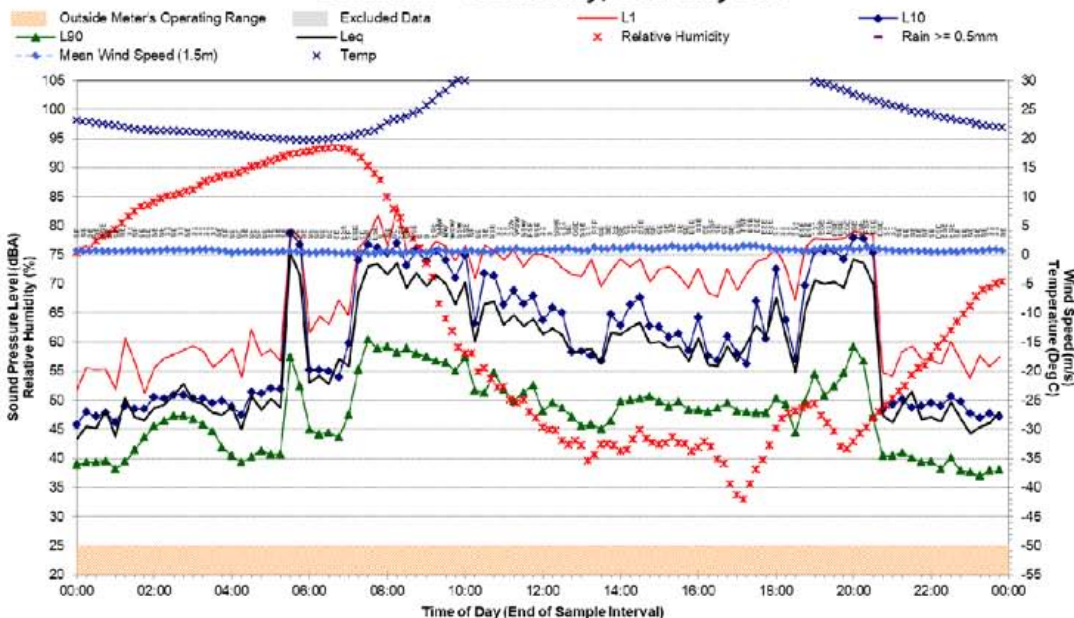
Statistical Ambient Noise Levels

Location F - Tuesday, 1 January 2019

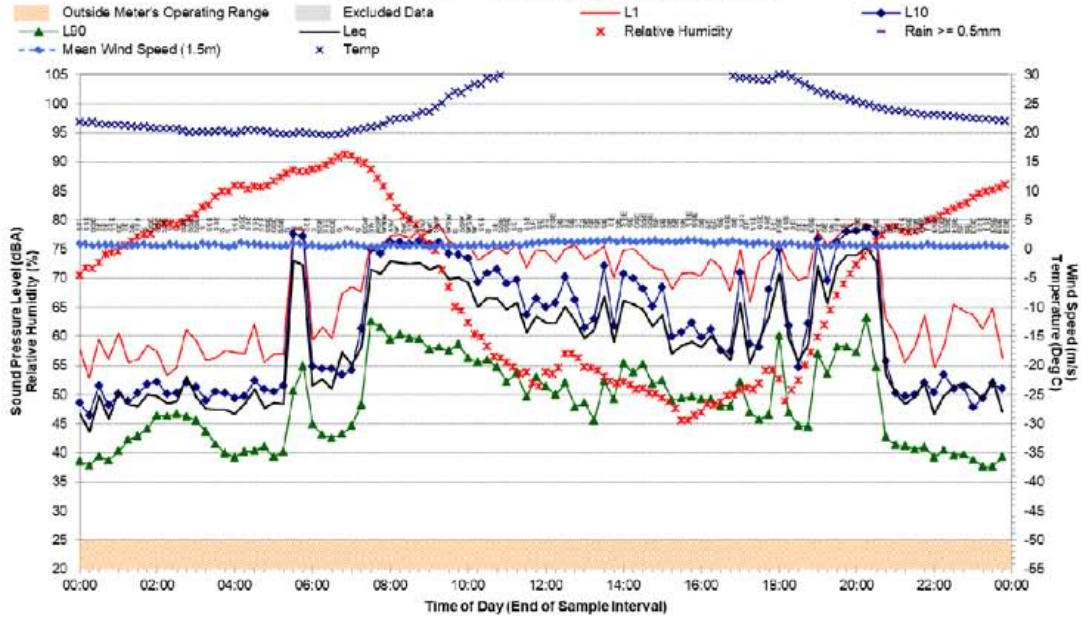


Statistical Ambient Noise Levels

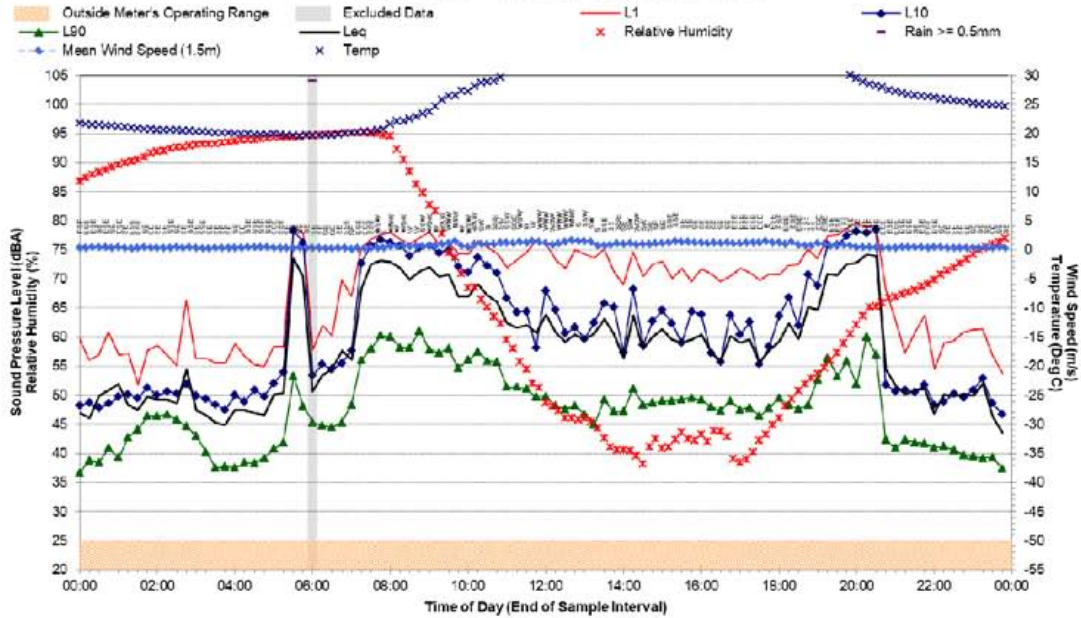
Location F - Wednesday, 2 January 2019



Statistical Ambient Noise Levels Location F - Thursday, 3 January 2019

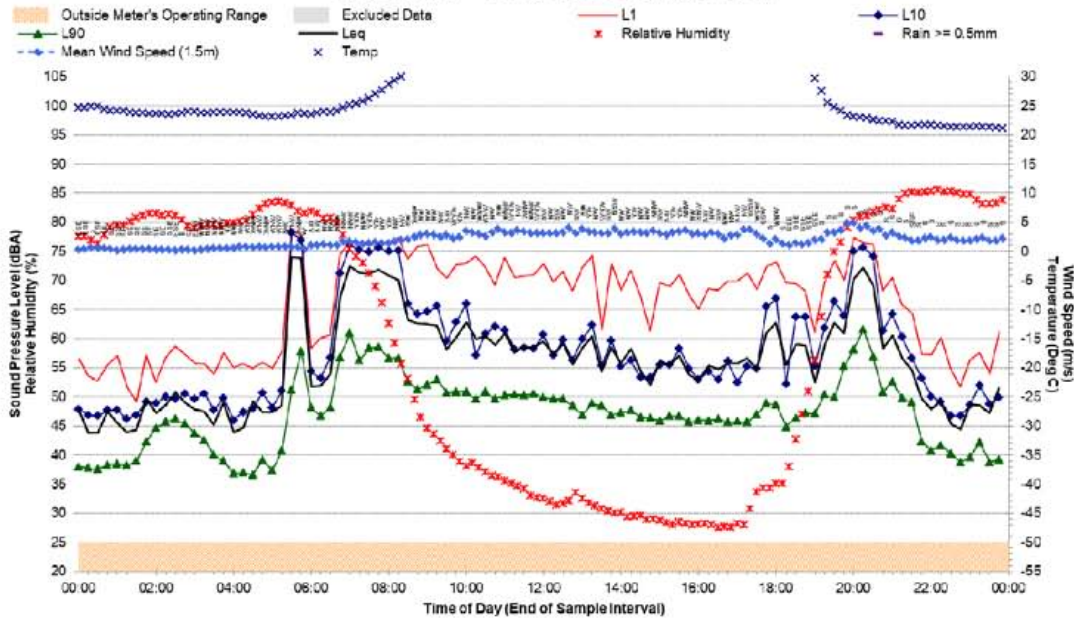


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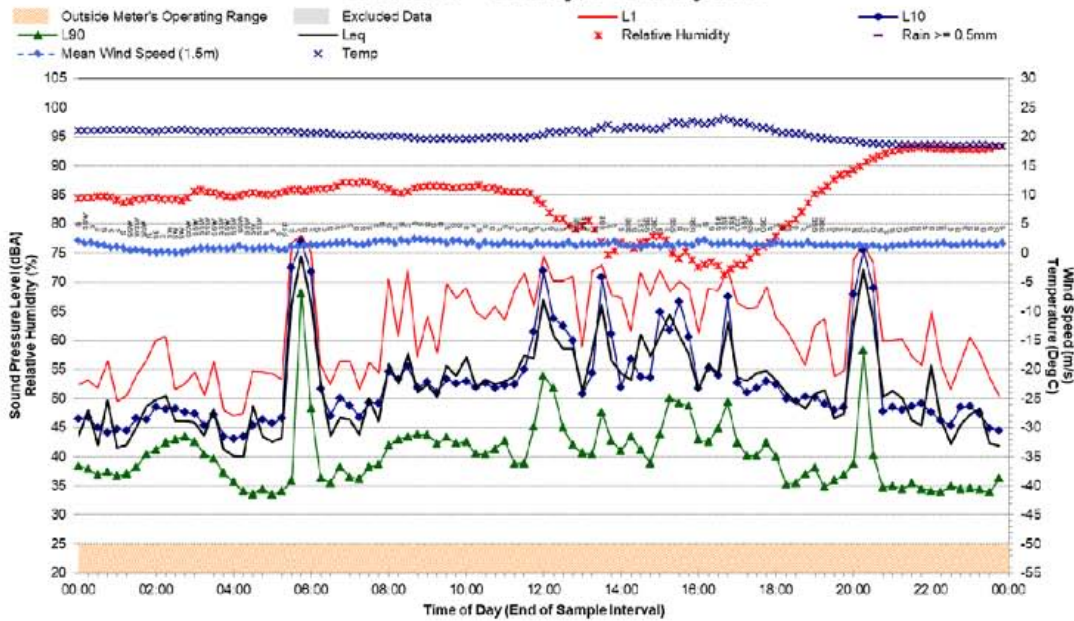
Statistical Ambient Noise Levels

Location F - Saturday, 5 January 2019



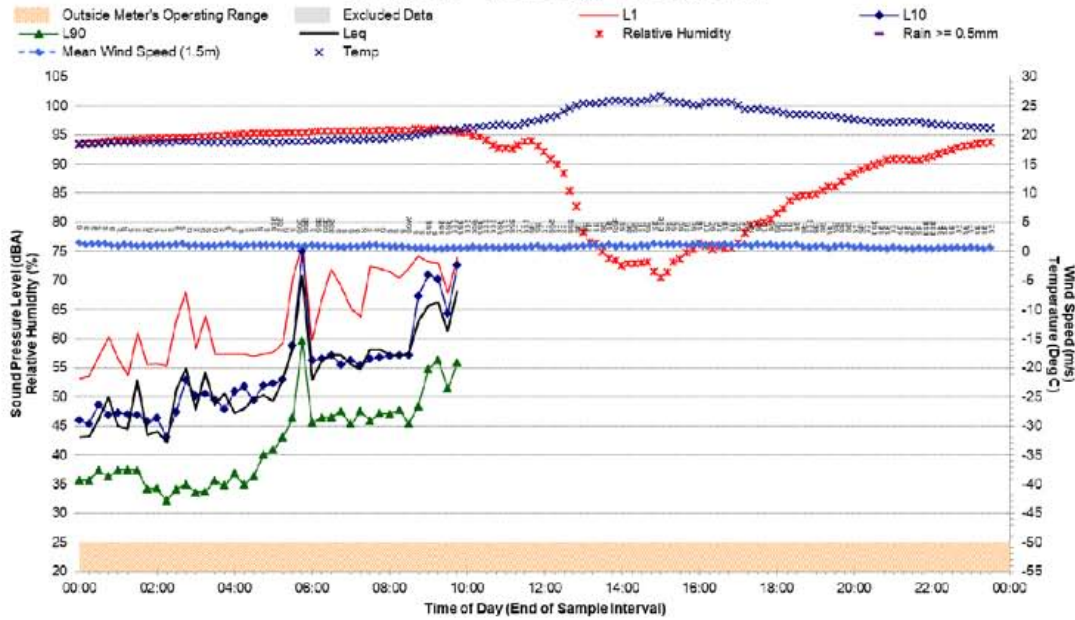
Statistical Ambient Noise Levels

Location F - Sunday, 6 January 2019



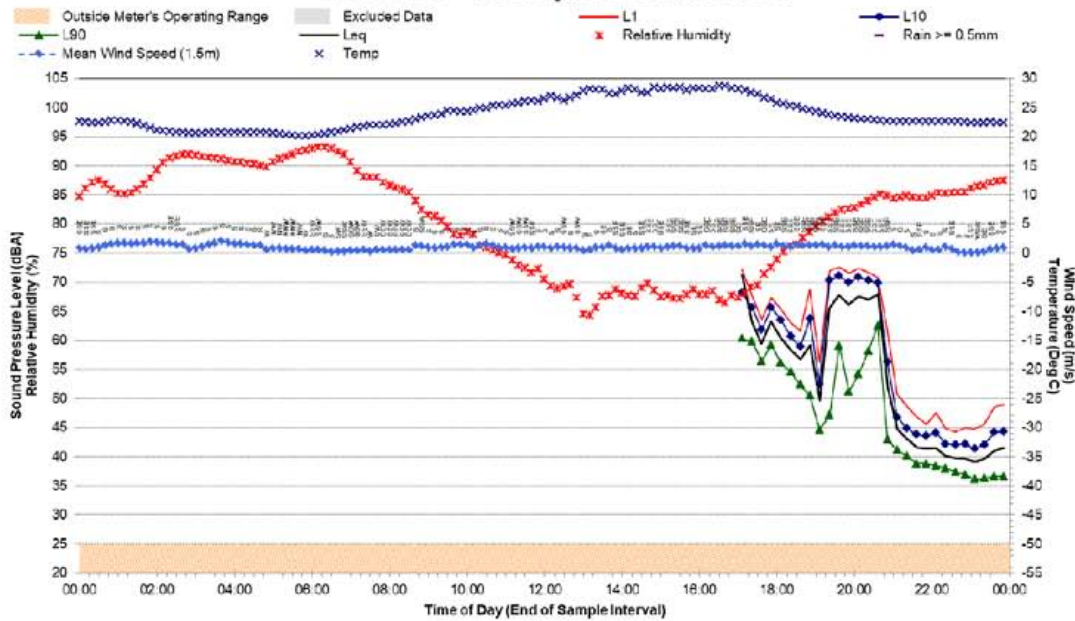
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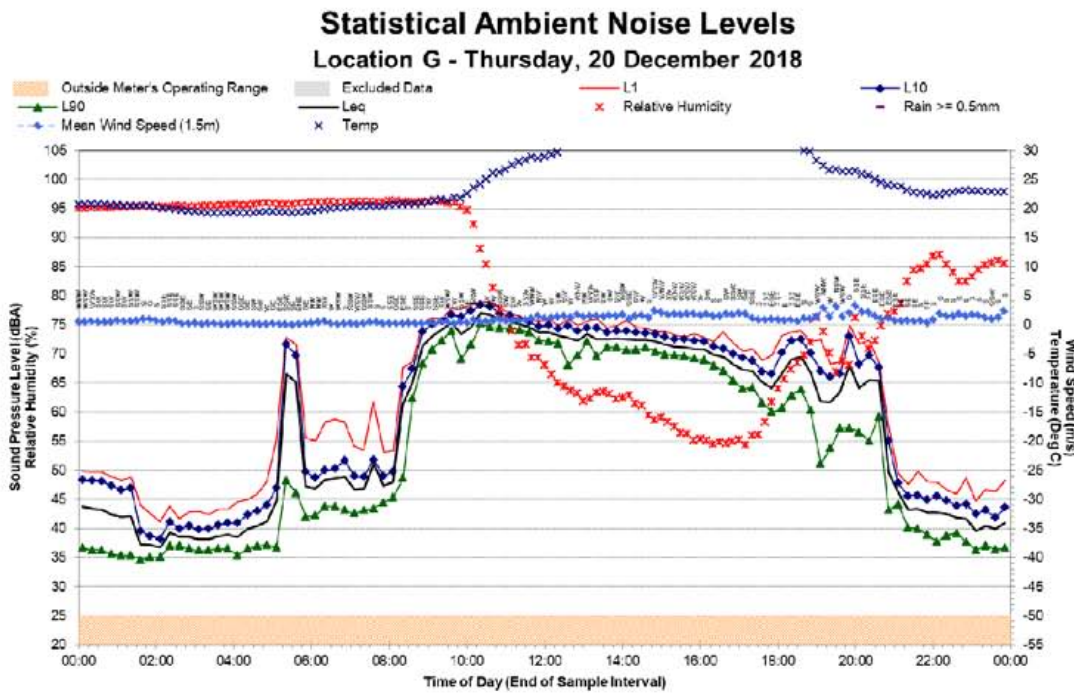
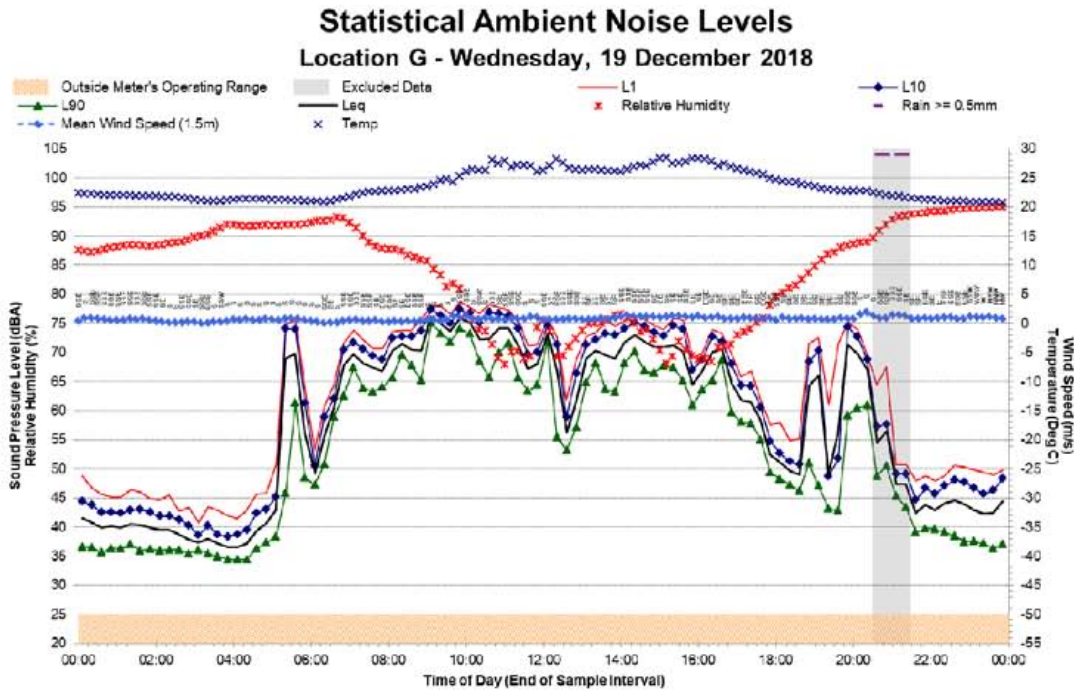
Location F - Monday, 7 January 2019



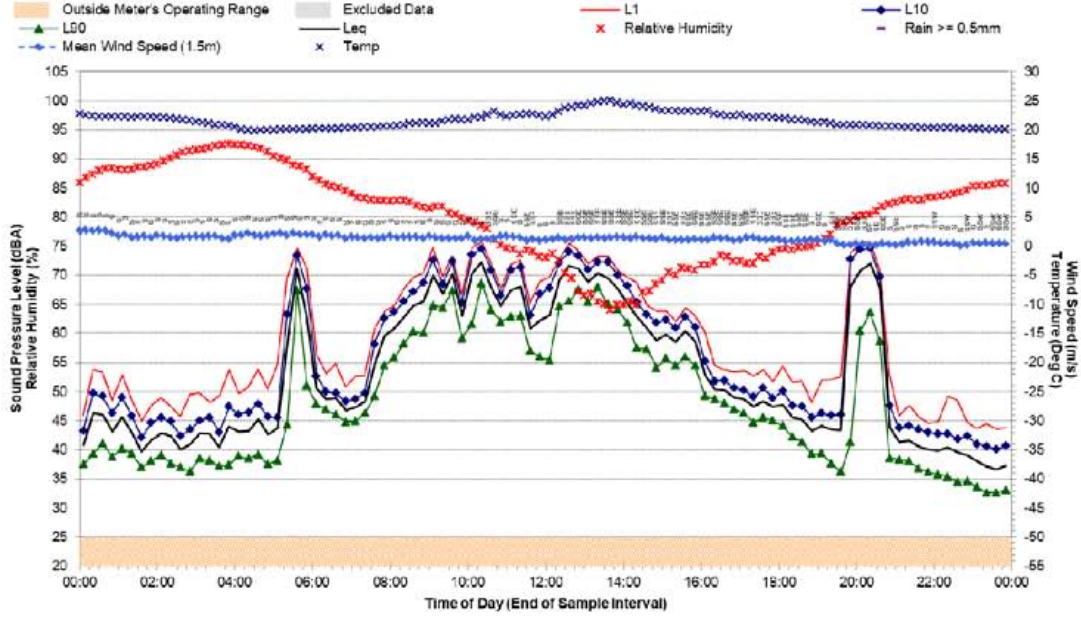
Statistical Ambient Noise Levels

Location G - Tuesday, 18 December 2018

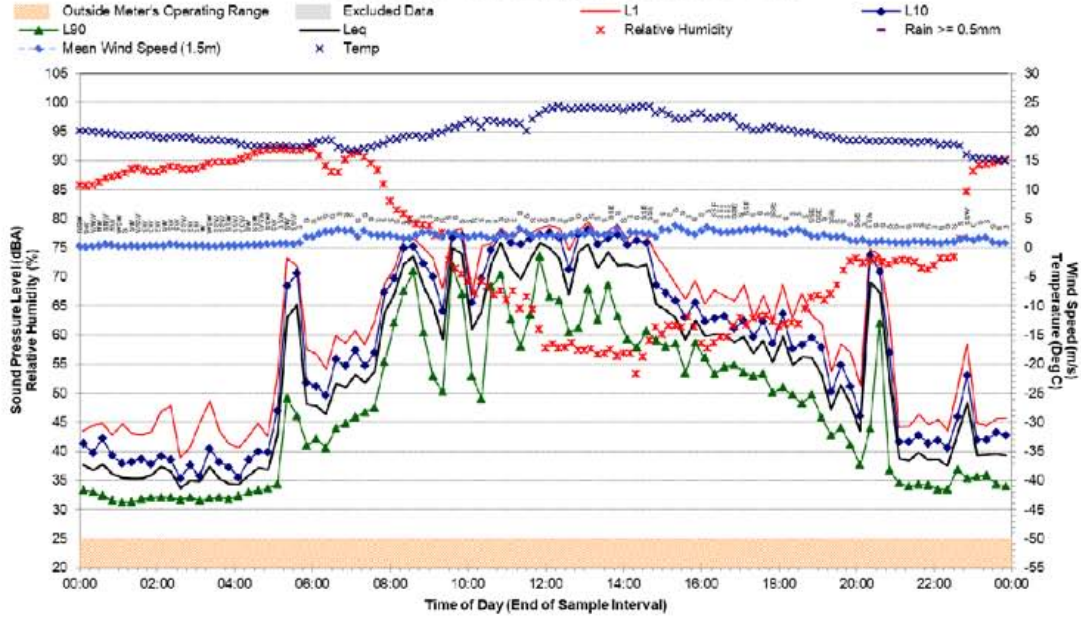




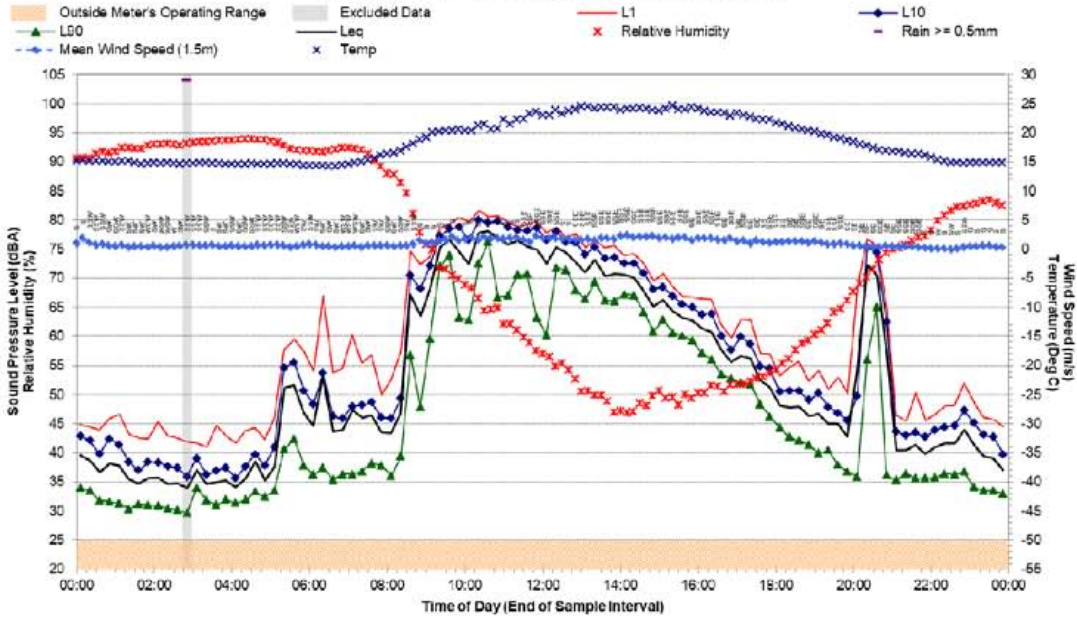
Statistical Ambient Noise Levels Location G - Friday, 21 December 2018



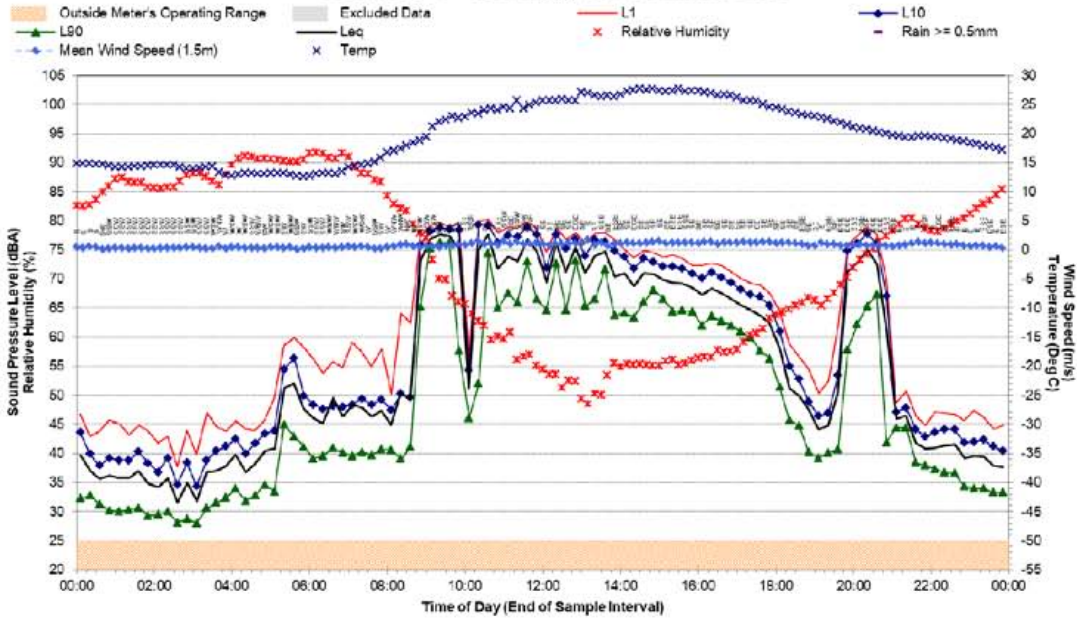
Statistical Ambient Noise Levels Location G - Saturday, 22 December 2018



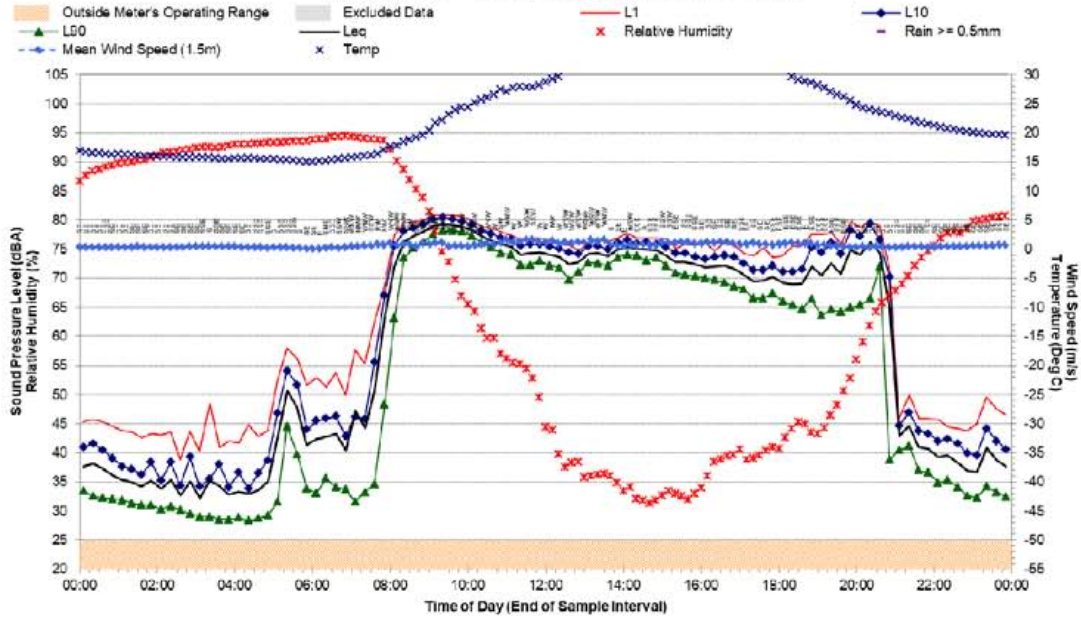
Statistical Ambient Noise Levels Location G - Sunday, 23 December 2018



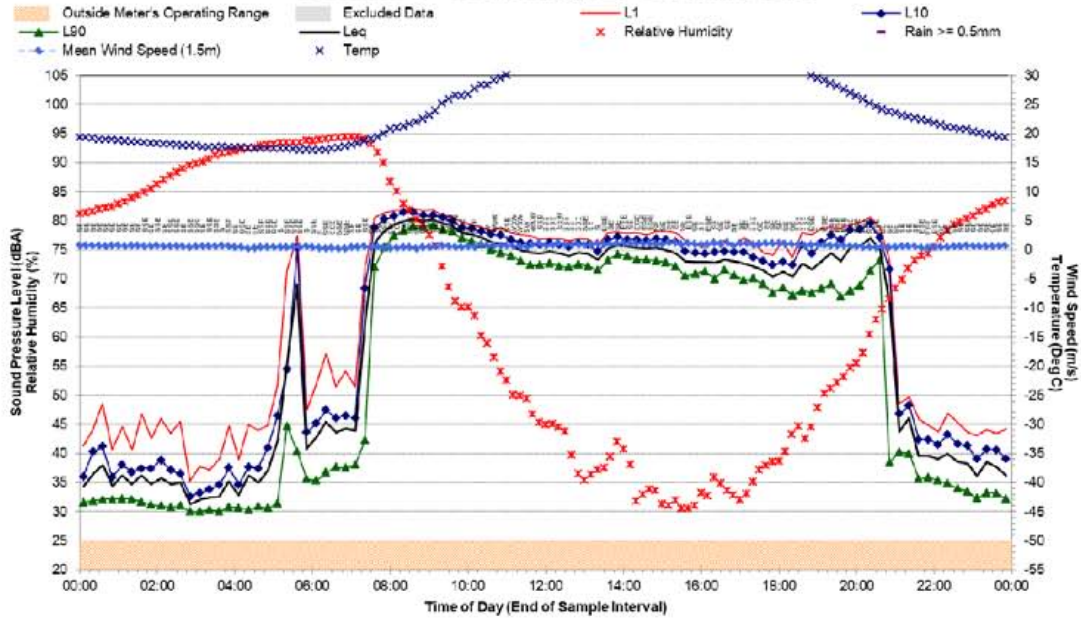
Statistical Ambient Noise Levels Location G - Monday, 24 December 2018



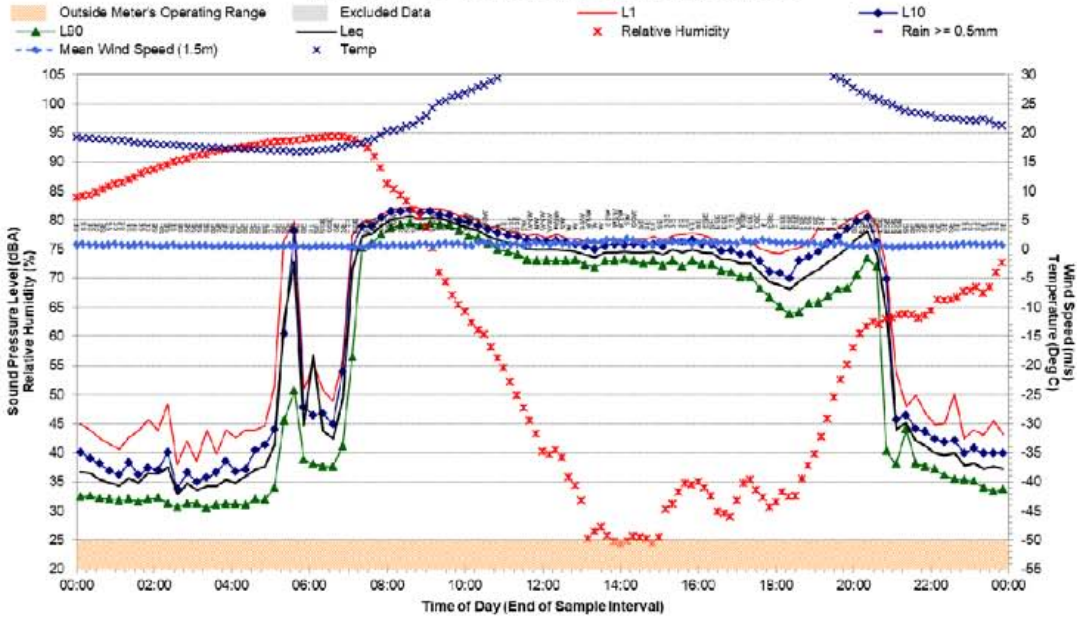
Statistical Ambient Noise Levels Location G - Tuesday, 25 December 2018



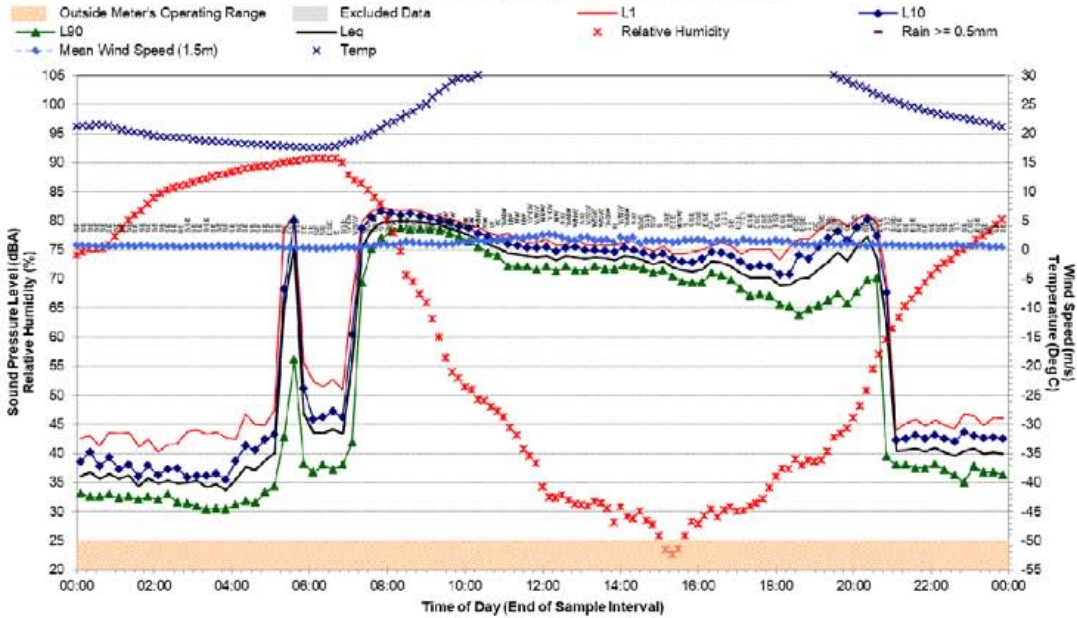
Statistical Ambient Noise Levels Location G - Wednesday, 26 December 2018



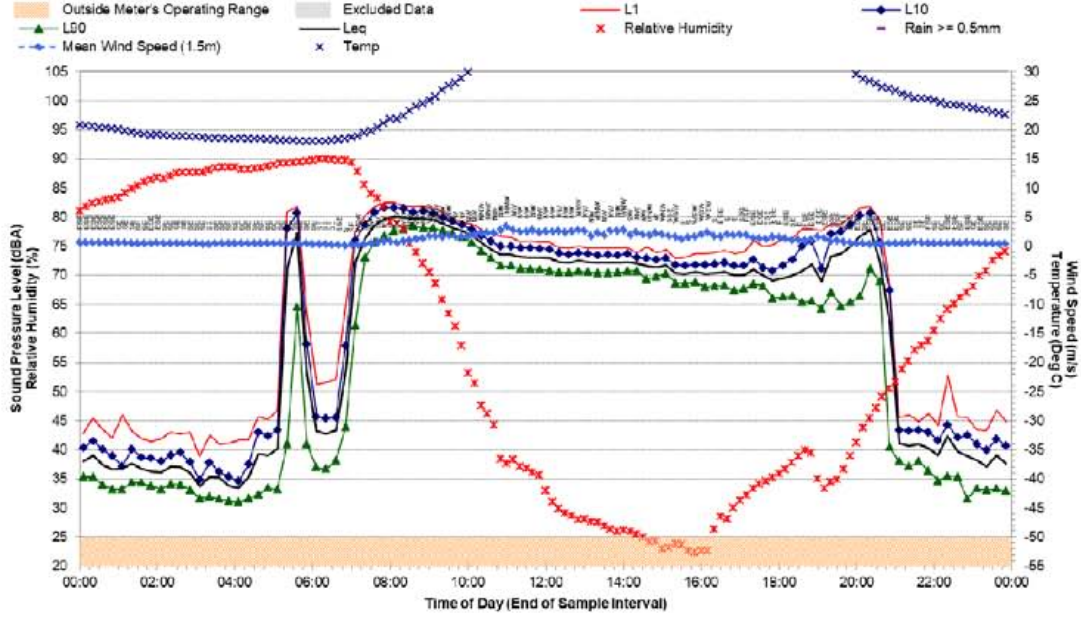
Statistical Ambient Noise Levels Location G - Thursday, 27 December 2018



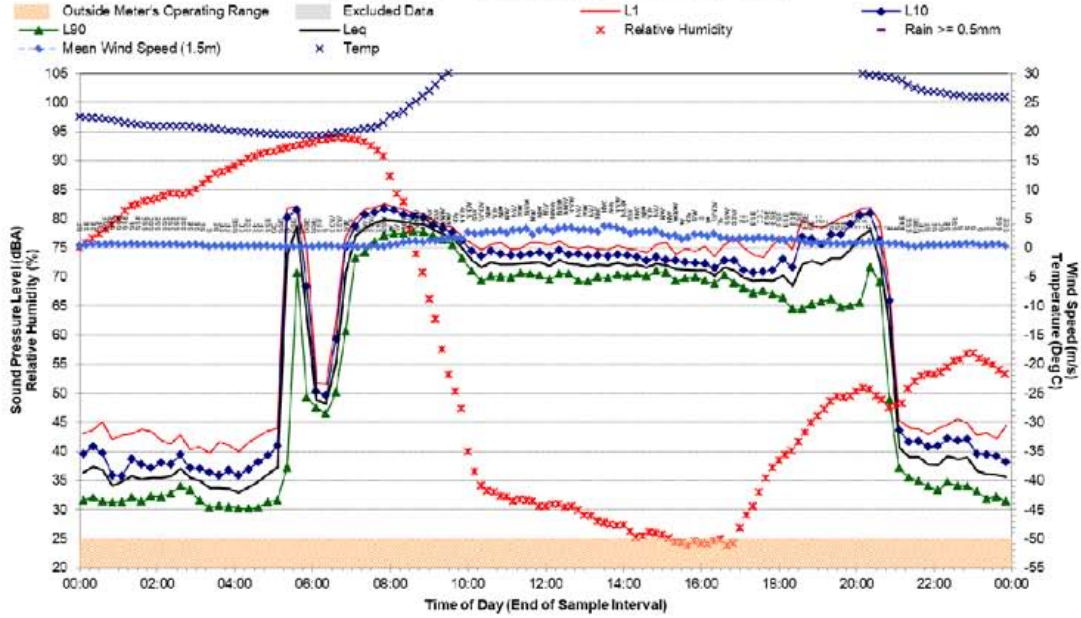
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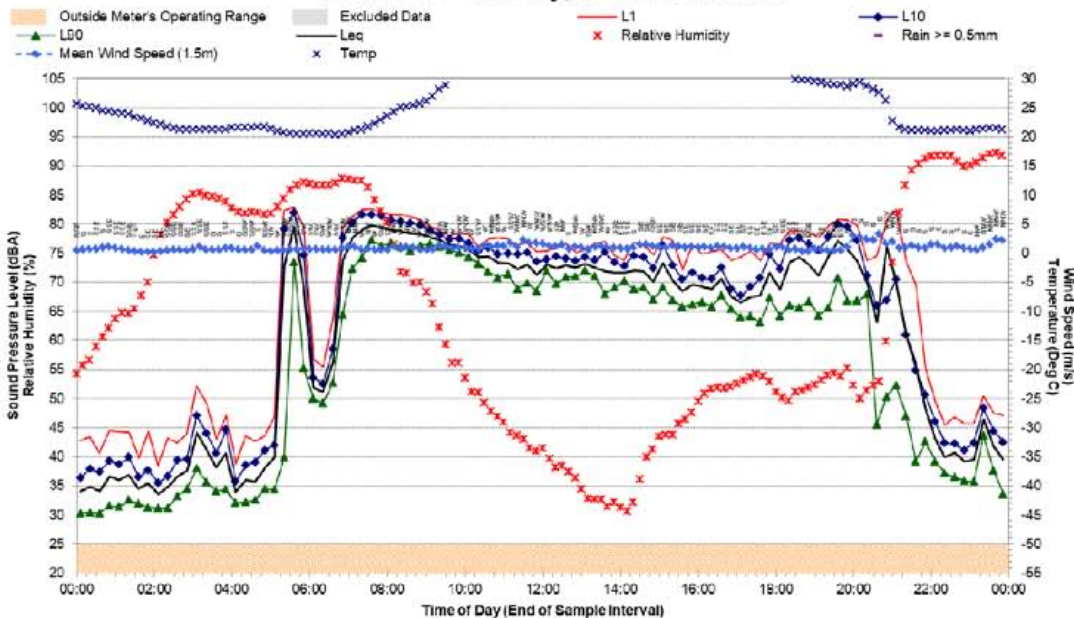
Statistical Ambient Noise Levels Location G - Saturday, 29 December 2018



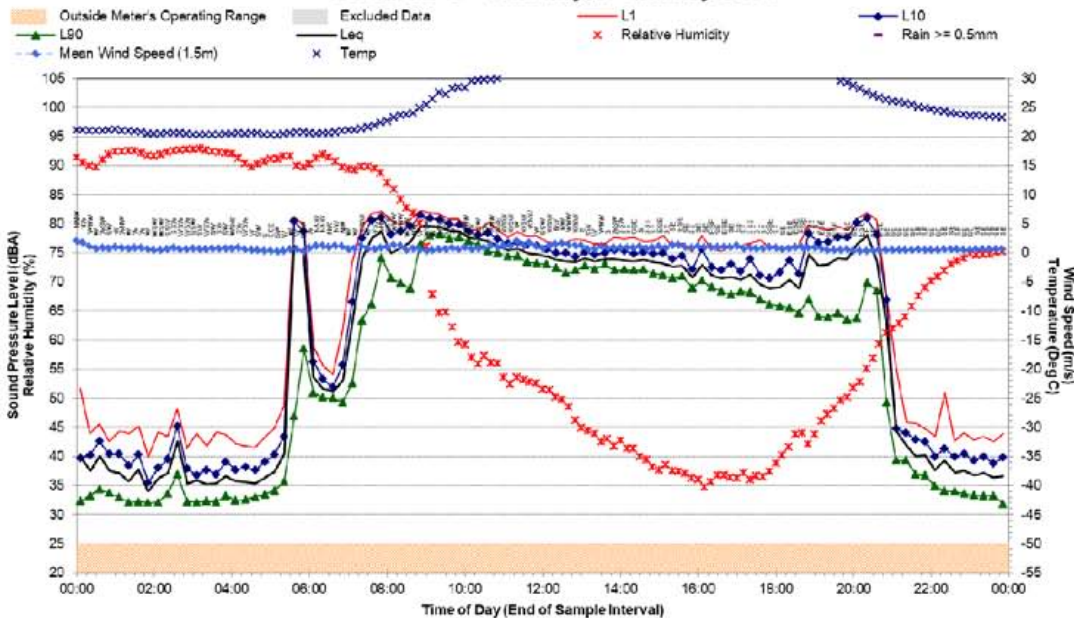
Statistical Ambient Noise Levels Location G - Sunday, 30 December 2018



Statistical Ambient Noise Levels Location G - Monday, 31 December 2018

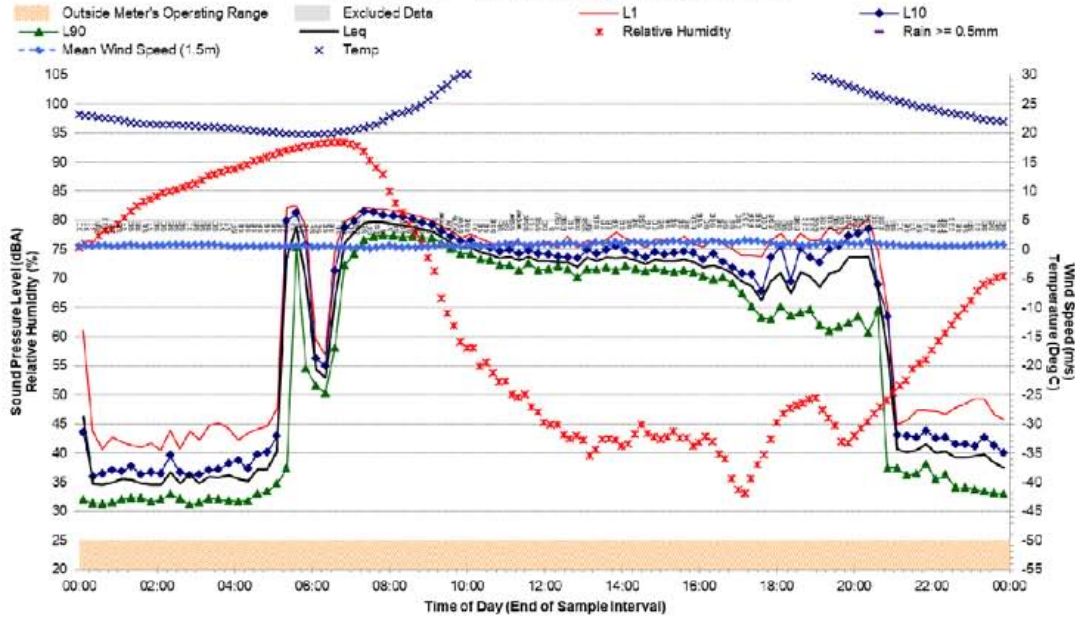


Statistical Ambient Noise Levels Location G - Tuesday, 1 January 2019



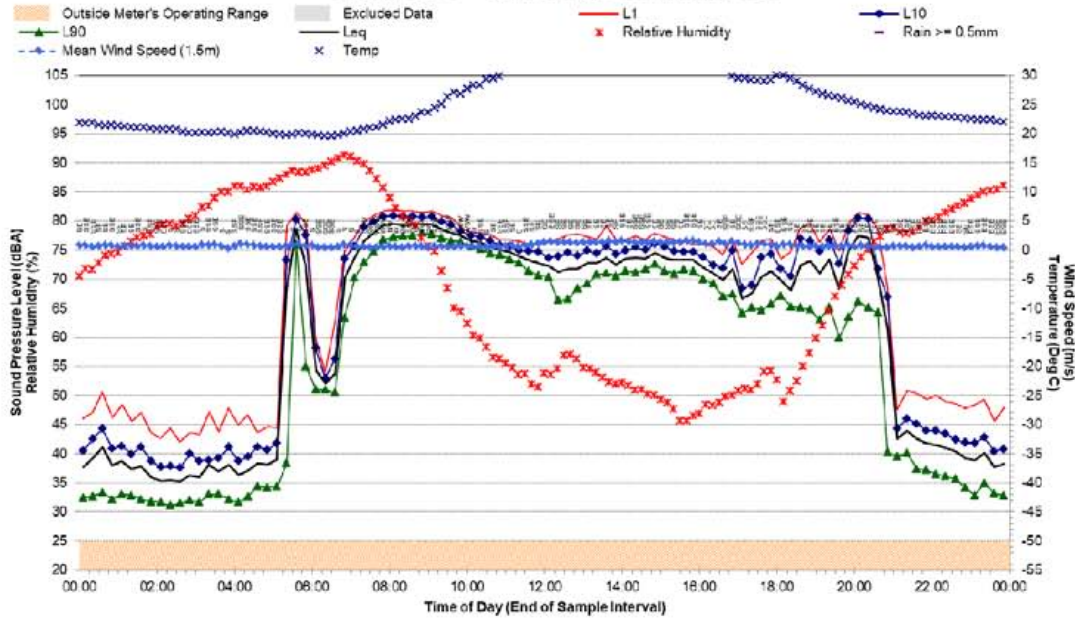
Statistical Ambient Noise Levels

Location G - Wednesday, 2 January 2019

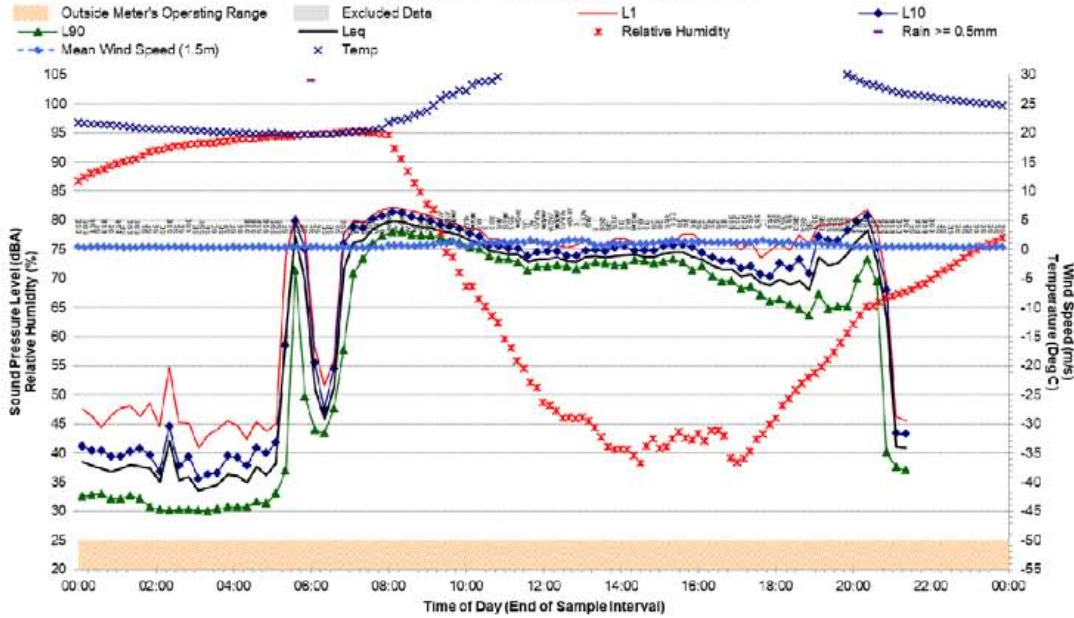


Statistical Ambient Noise Levels

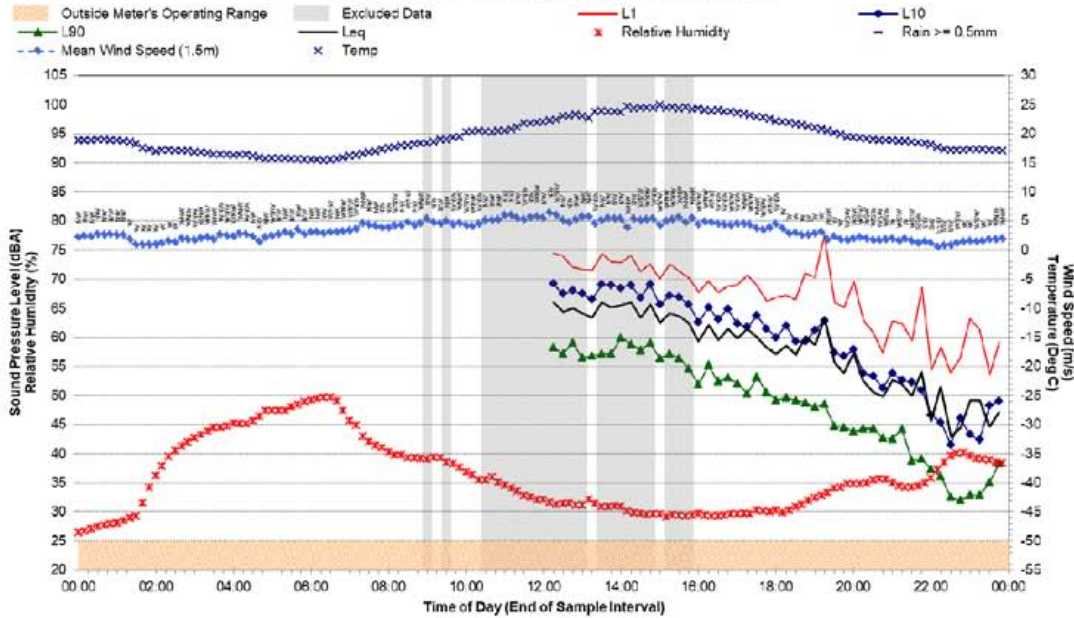
Location G - Thursday, 3 January 2019



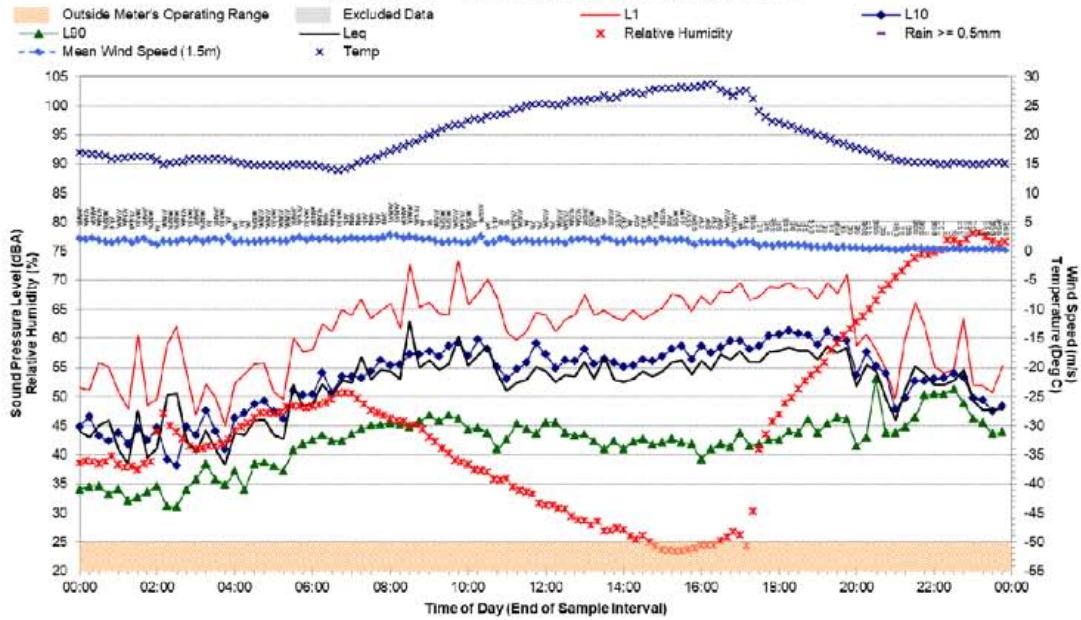
Statistical Ambient Noise Levels Location G - Friday, 4 January 2019



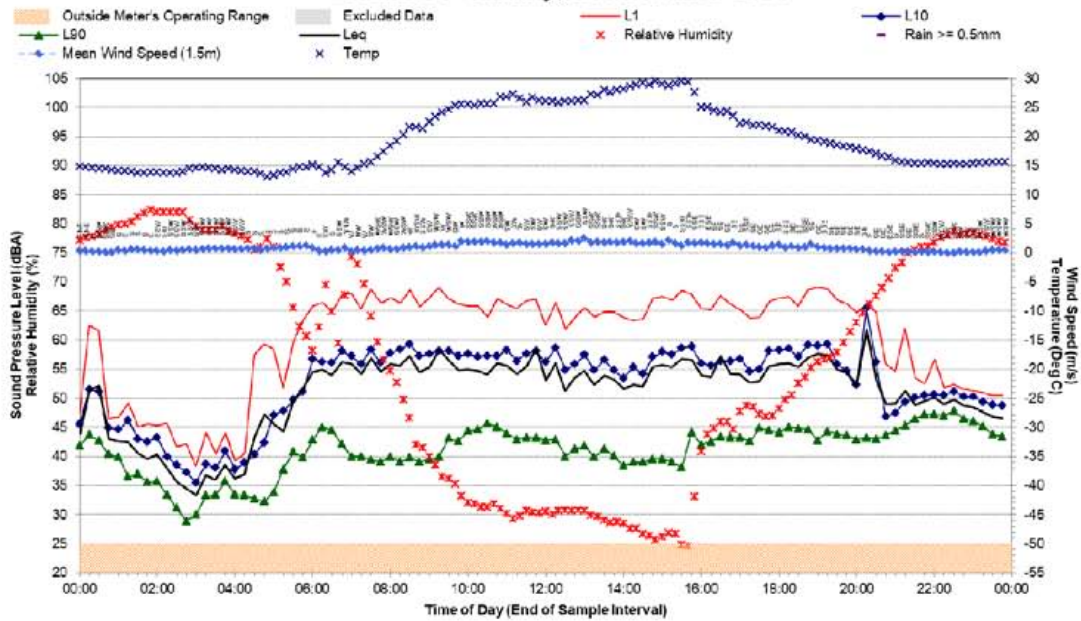
Statistical Ambient Noise Levels Location I - Friday, 23 November 2018



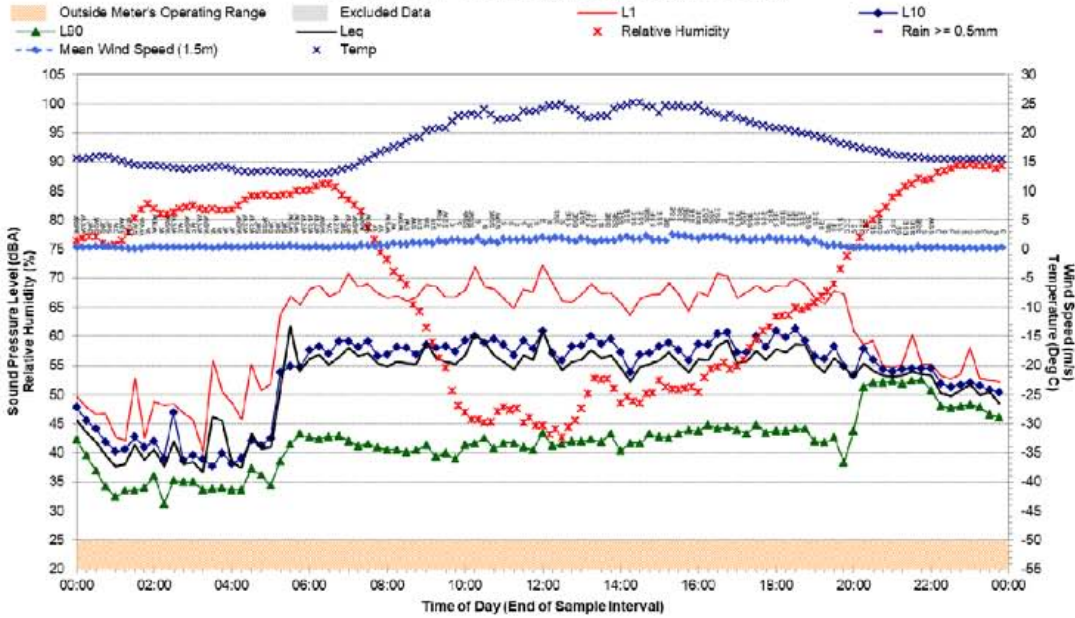
Statistical Ambient Noise Levels Location I - Saturday, 24 November 2018



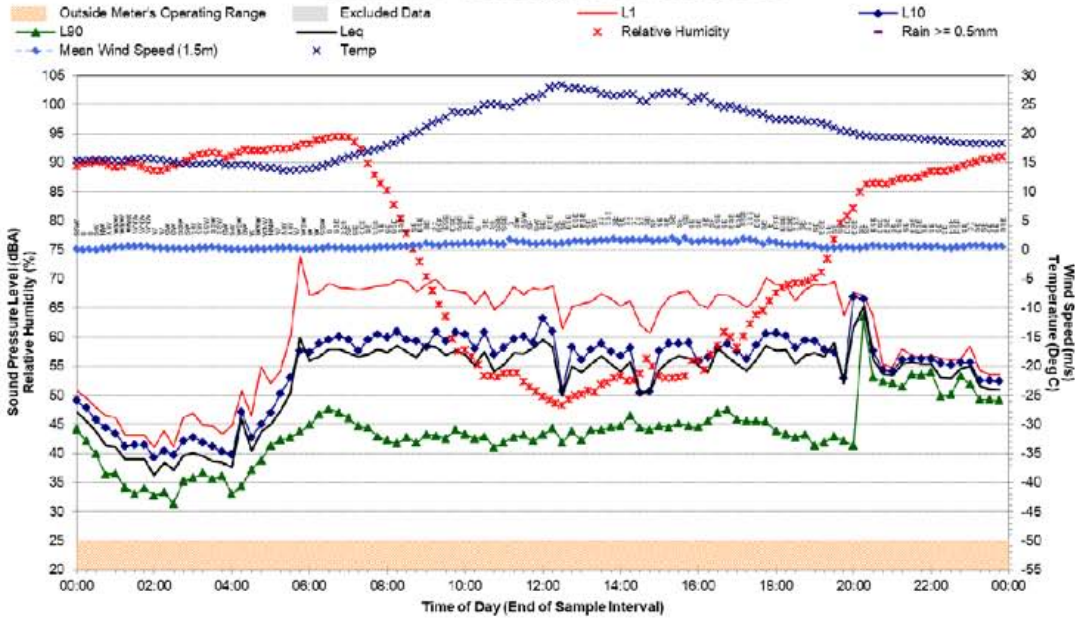
Statistical Ambient Noise Levels Location I - Sunday, 25 November 2018



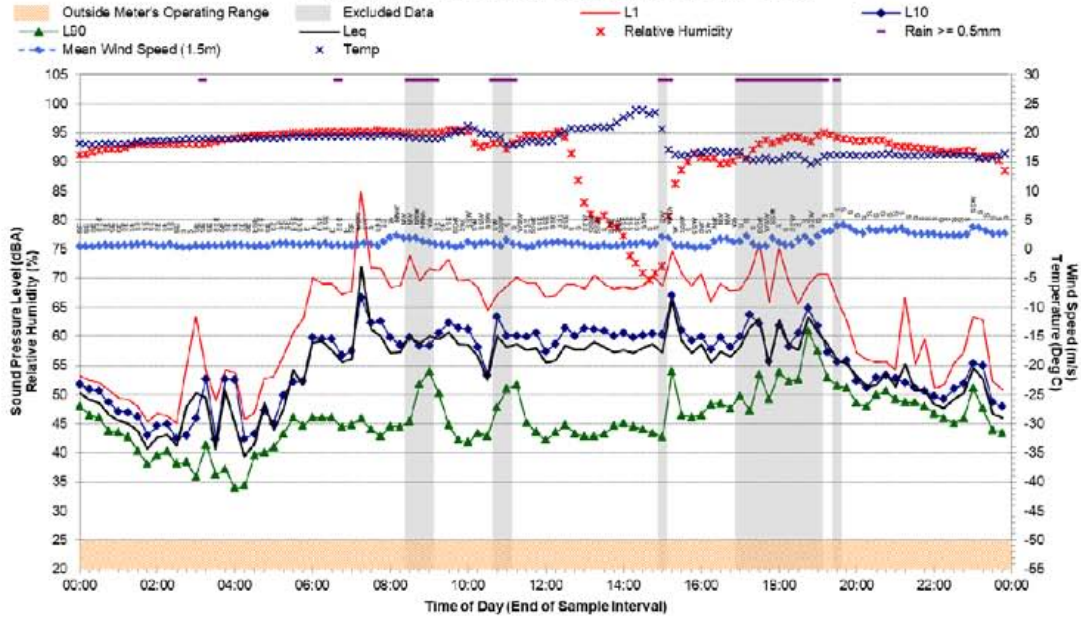
Statistical Ambient Noise Levels Location I - Monday, 26 November 2018



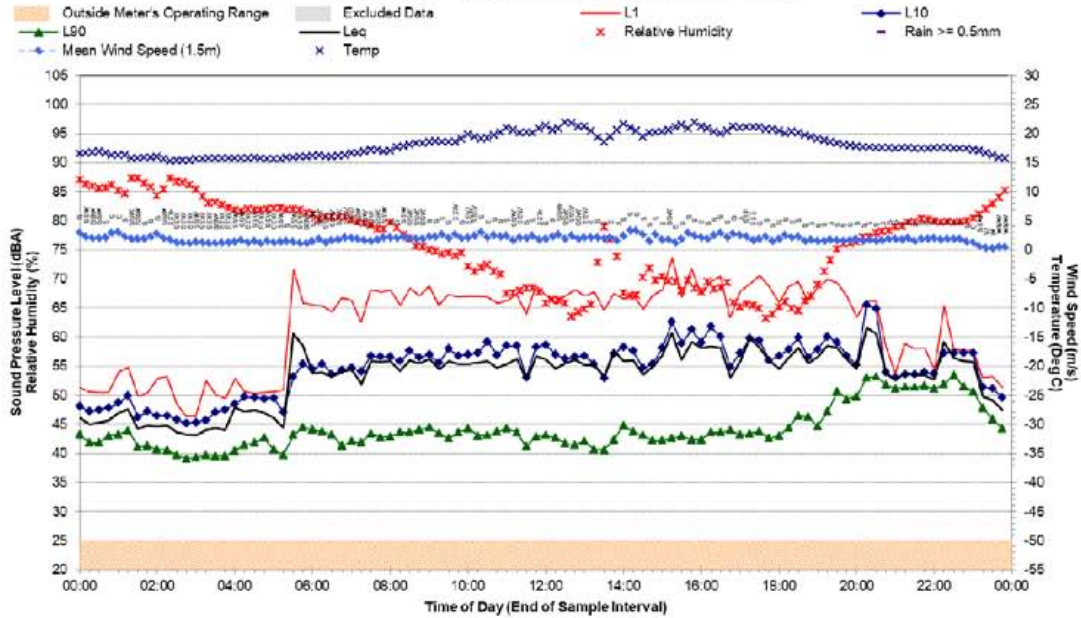
Statistical Ambient Noise Levels Location I - Tuesday, 27 November 2018



Statistical Ambient Noise Levels Location I - Wednesday, 28 November 2018

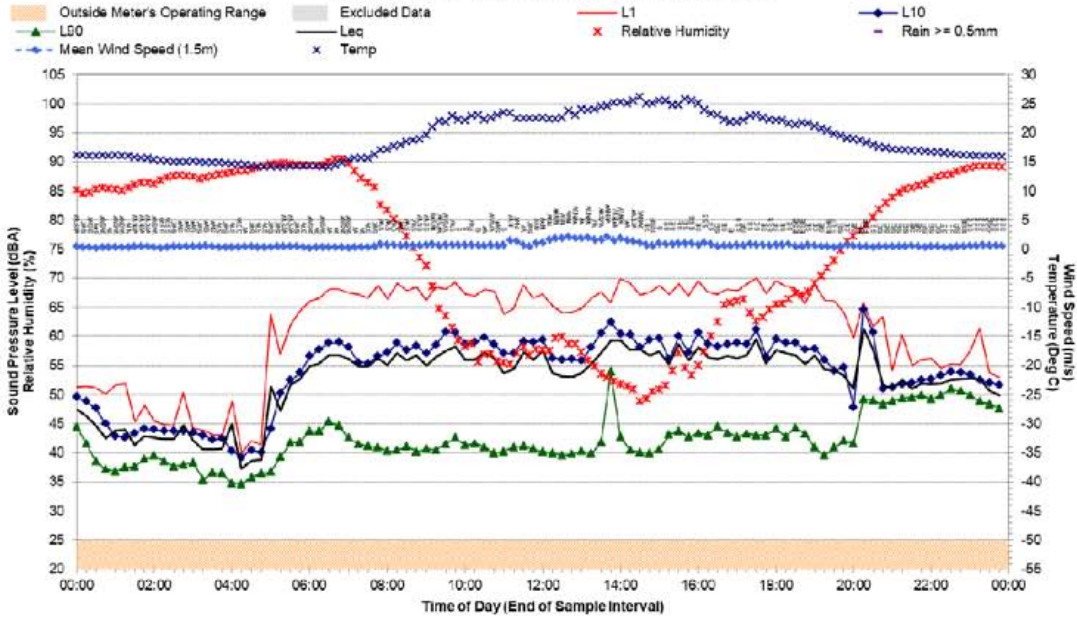


Statistical Ambient Noise Levels Location I - Thursday, 29 November 2018



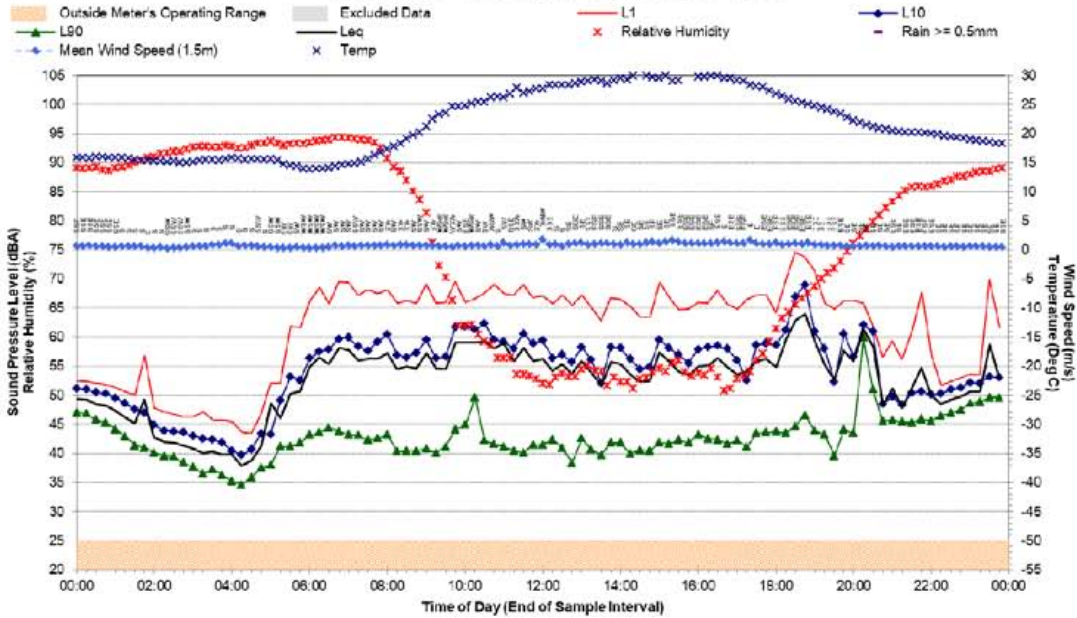
Statistical Ambient Noise Levels

Location I - Friday, 30 November 2018



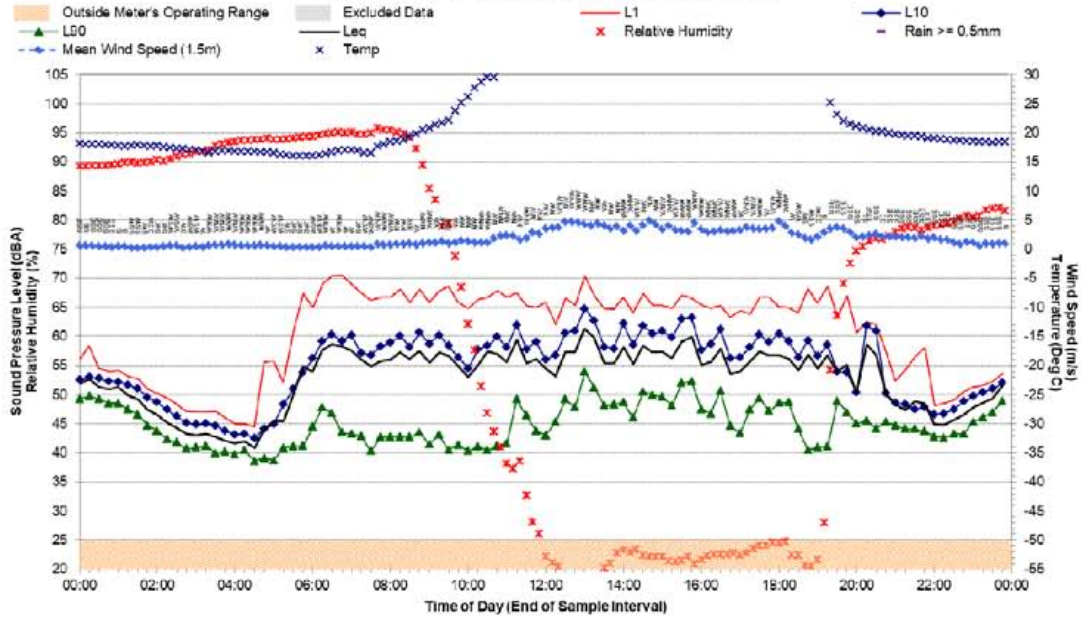
Statistical Ambient Noise Levels

Location I - Saturday, 1 December 2018



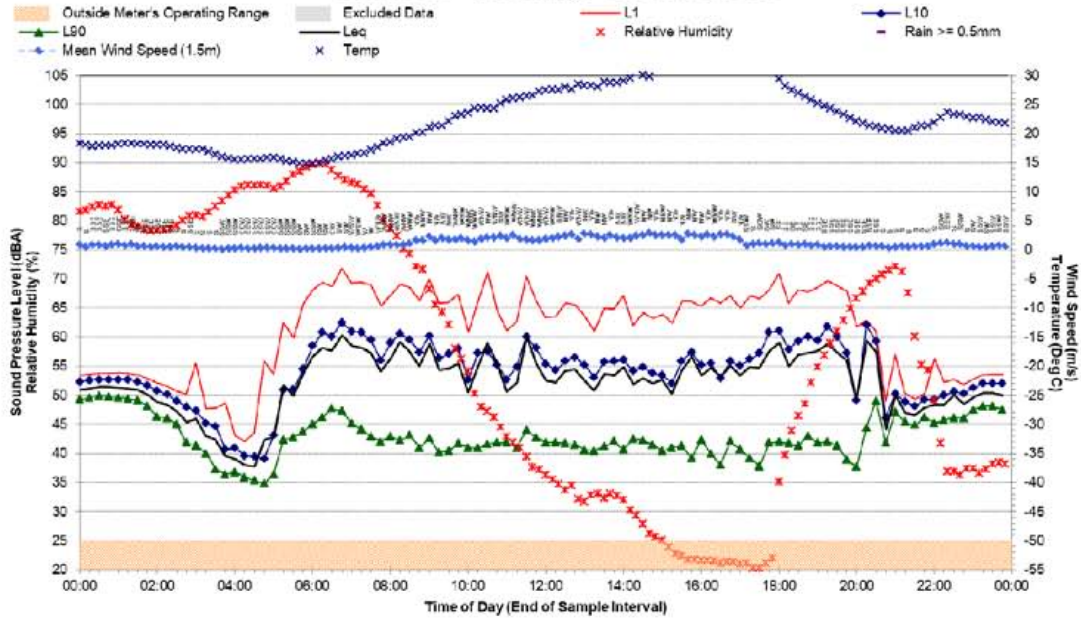
Statistical Ambient Noise Levels

Location 1 - Sunday, 2 December 2018

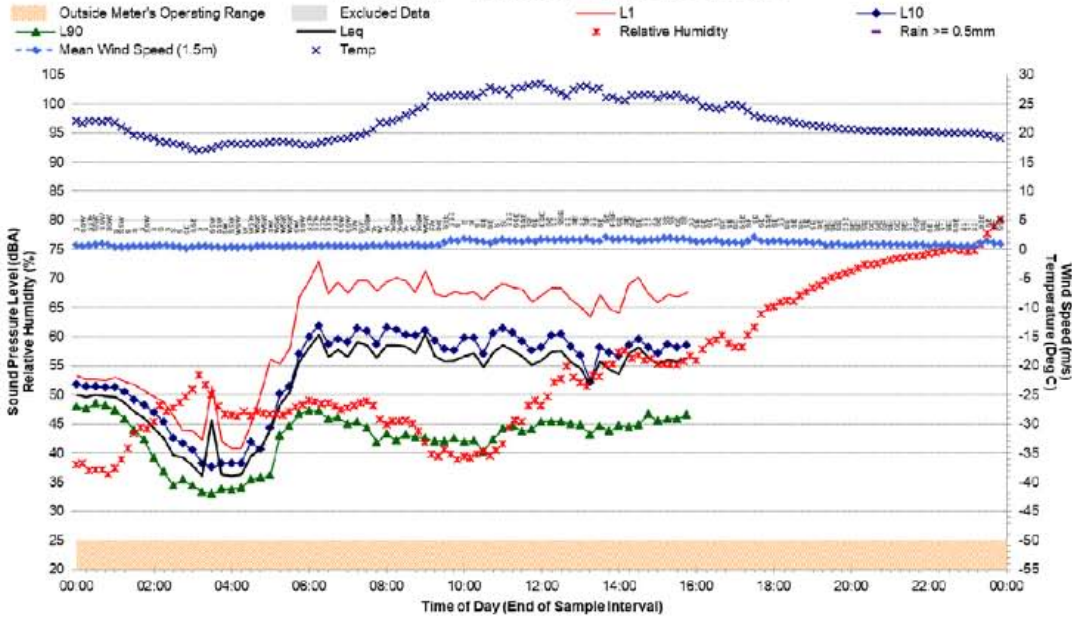


Statistical Ambient Noise Levels

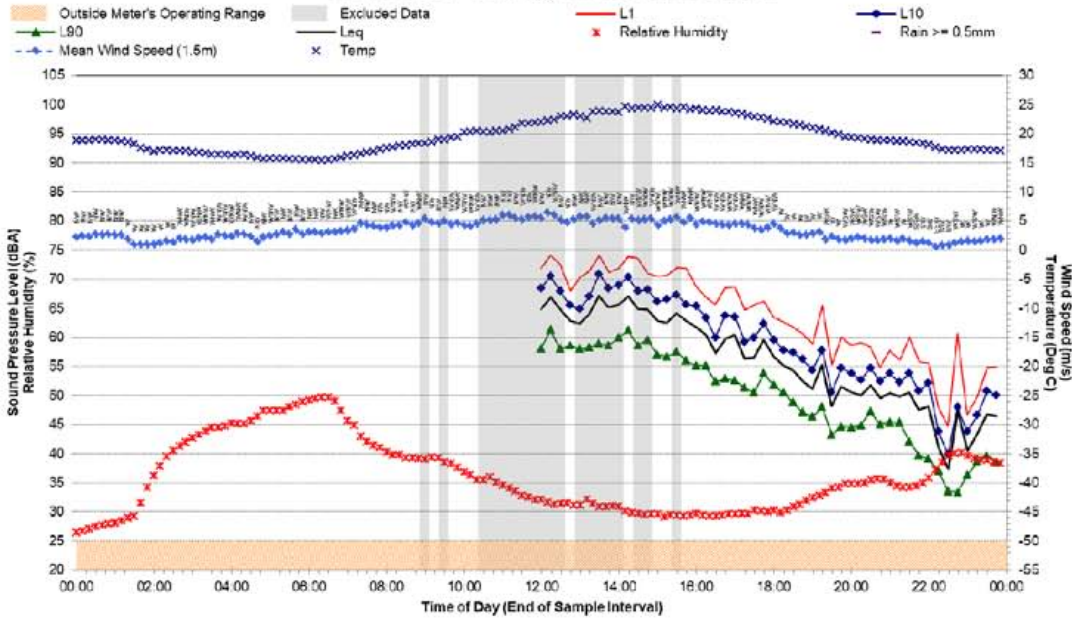
Location 1 - Monday, 3 December 2018



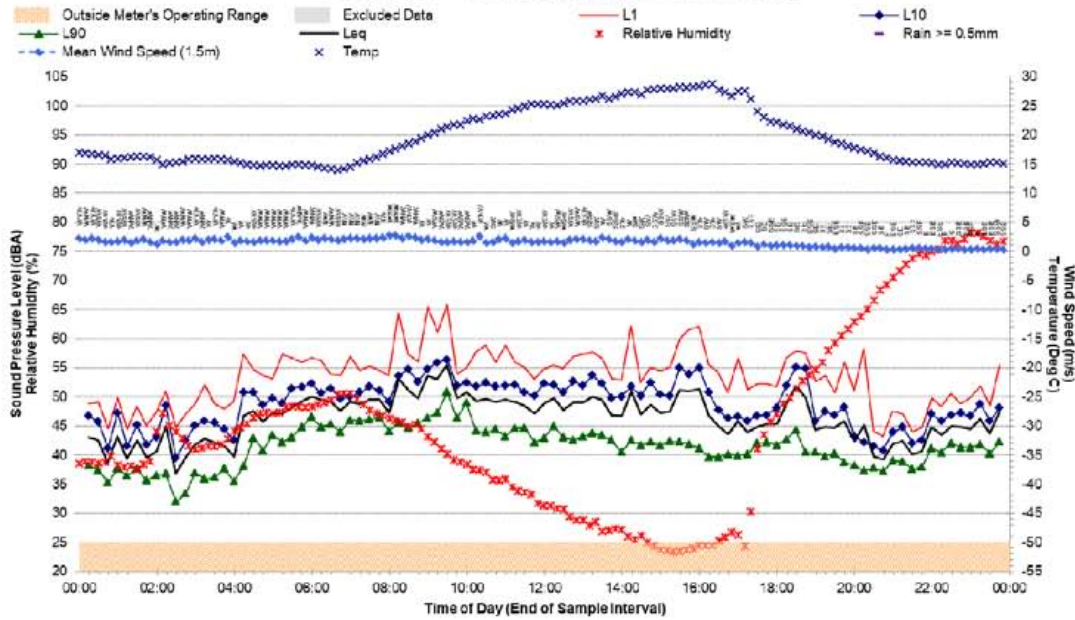
Statistical Ambient Noise Levels Location I - Tuesday, 4 December 2018



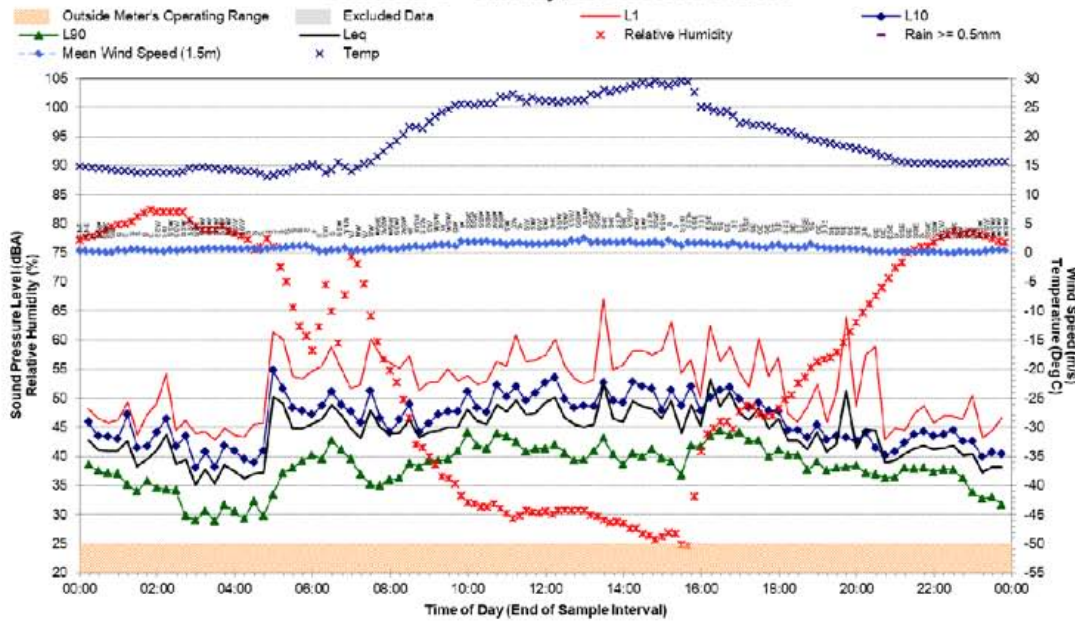
Statistical Ambient Noise Levels Location J - Friday, 23 November 2018



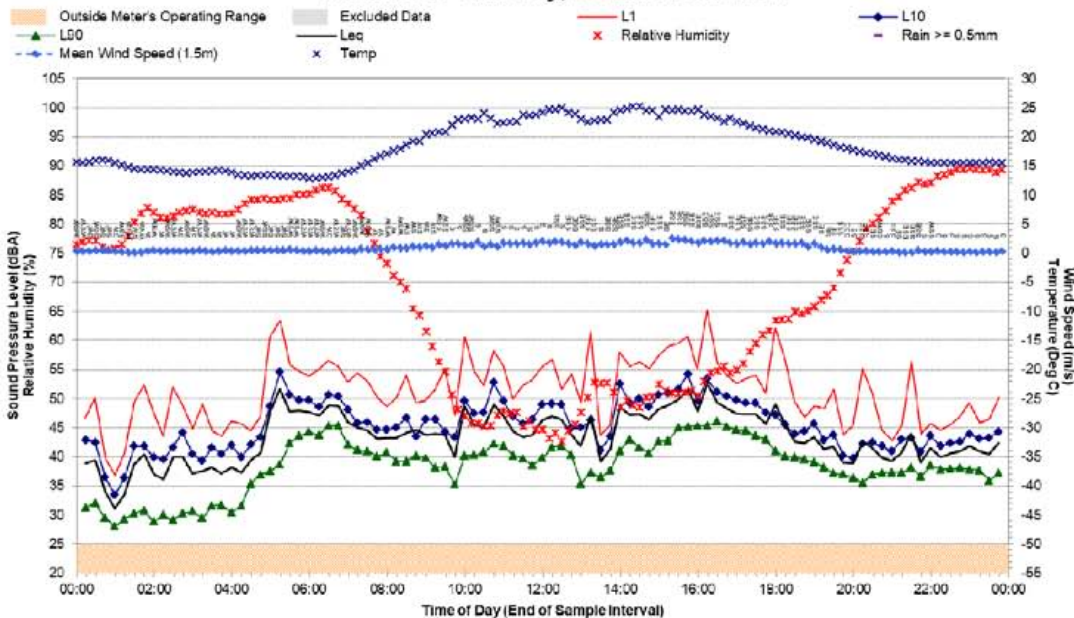
Statistical Ambient Noise Levels Location J - Saturday, 24 November 2018



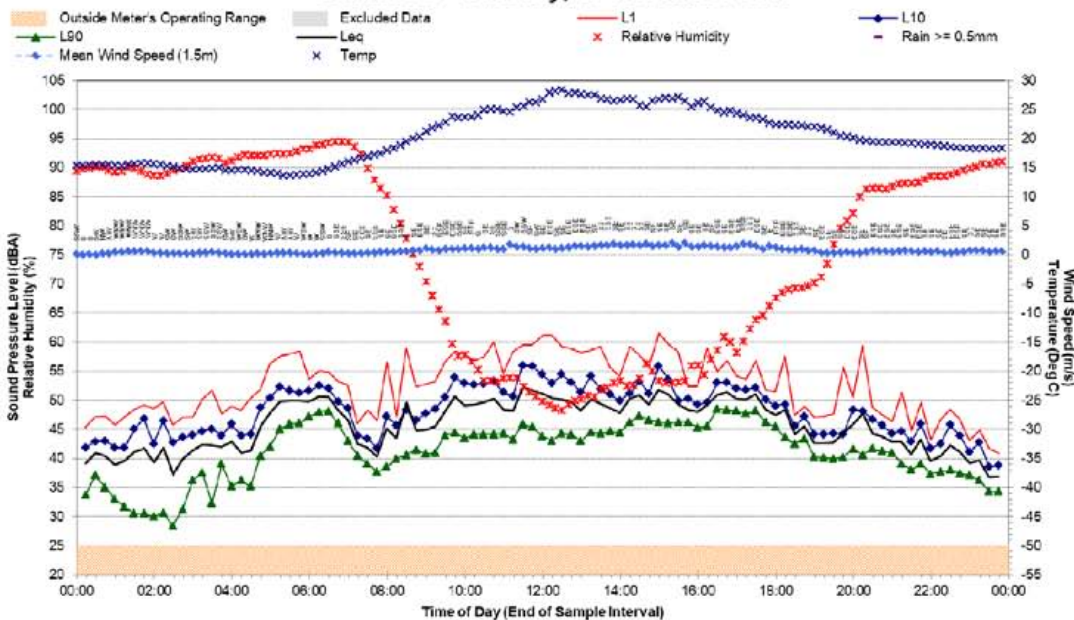
Statistical Ambient Noise Levels Location J - Sunday, 25 November 2018



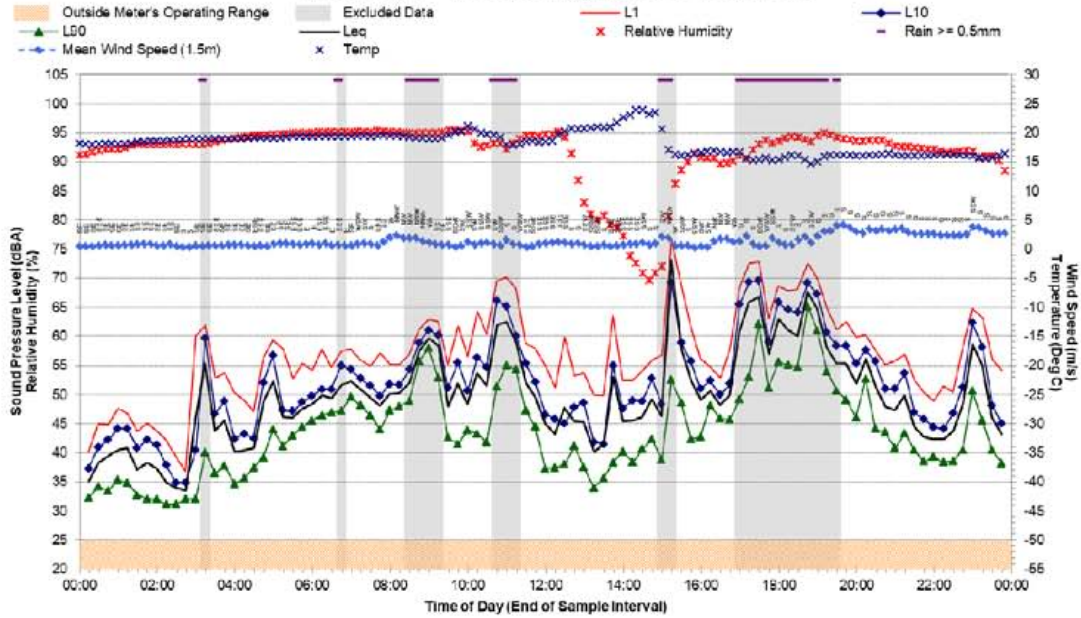
Statistical Ambient Noise Levels Location J - Monday, 26 November 2018



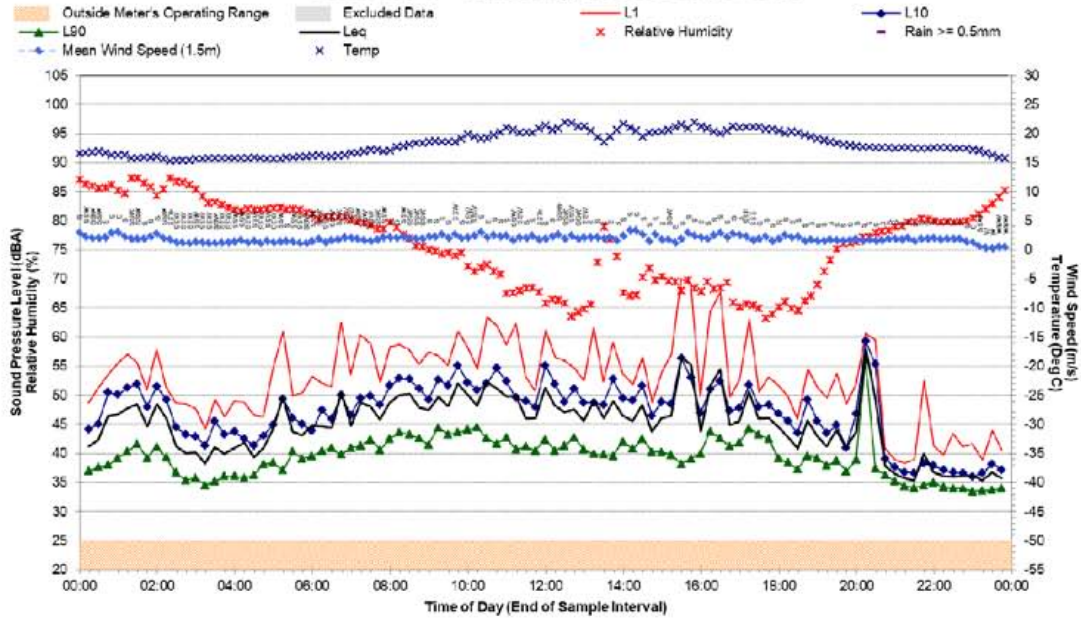
Statistical Ambient Noise Levels Location J - Tuesday, 27 November 2018



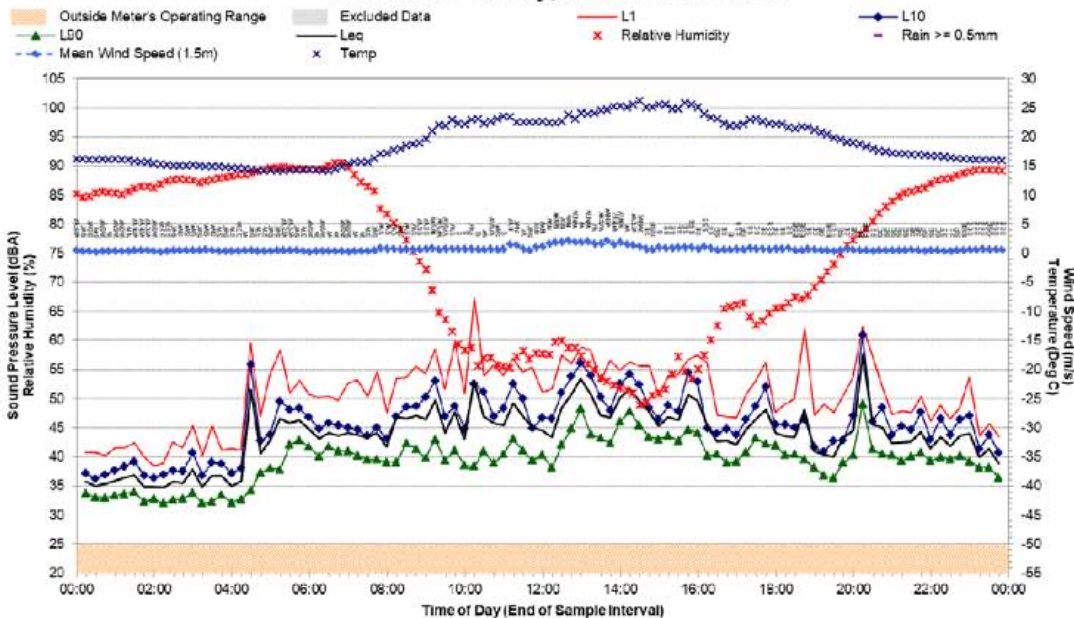
Statistical Ambient Noise Levels Location J - Wednesday, 28 November 2018



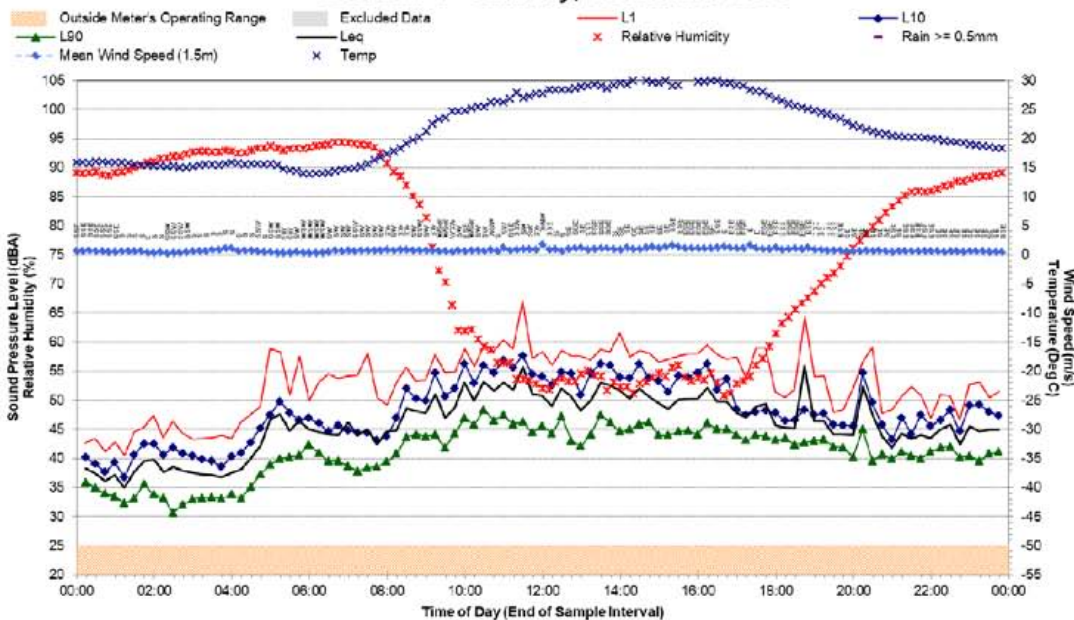
Statistical Ambient Noise Levels Location J - Thursday, 29 November 2018



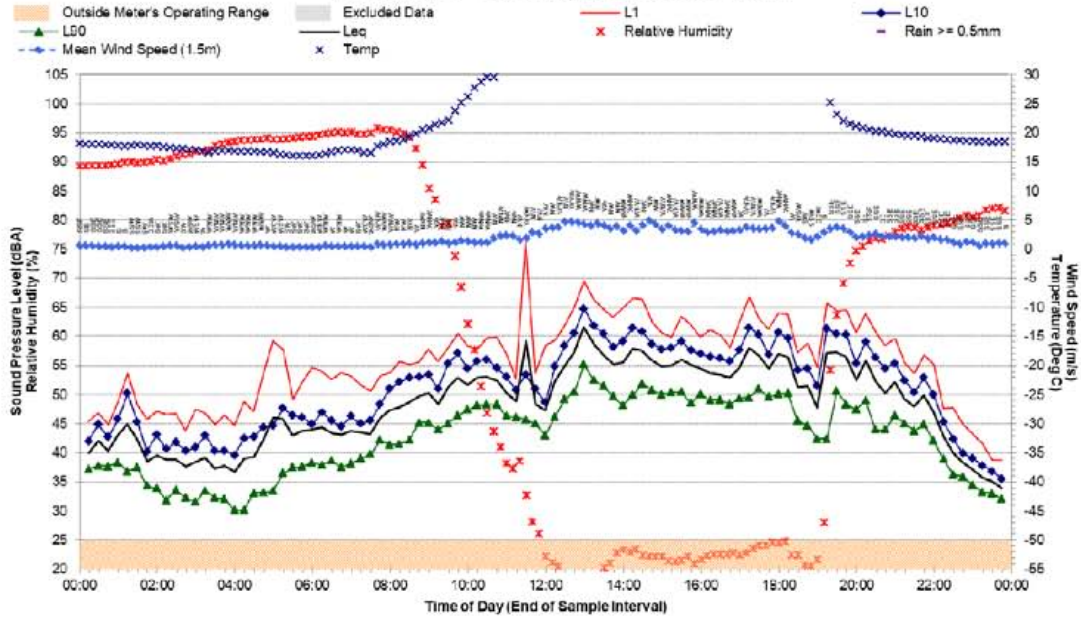
Statistical Ambient Noise Levels Location J - Friday, 30 November 2018



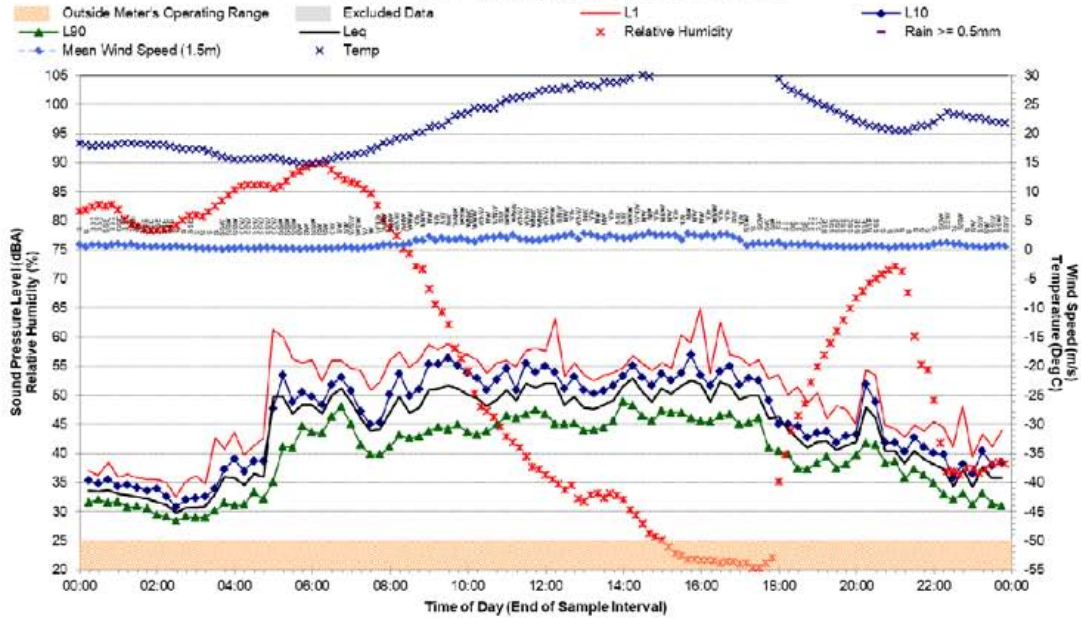
Statistical Ambient Noise Levels Location J - Saturday, 1 December 2018



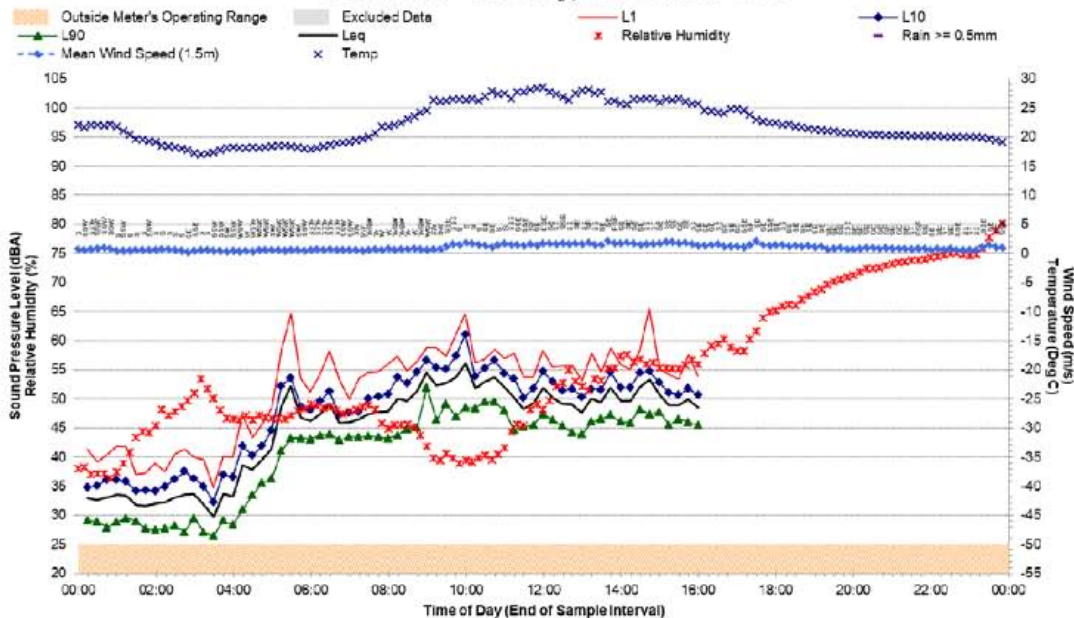
Statistical Ambient Noise Levels Location J - Sunday, 2 December 2018



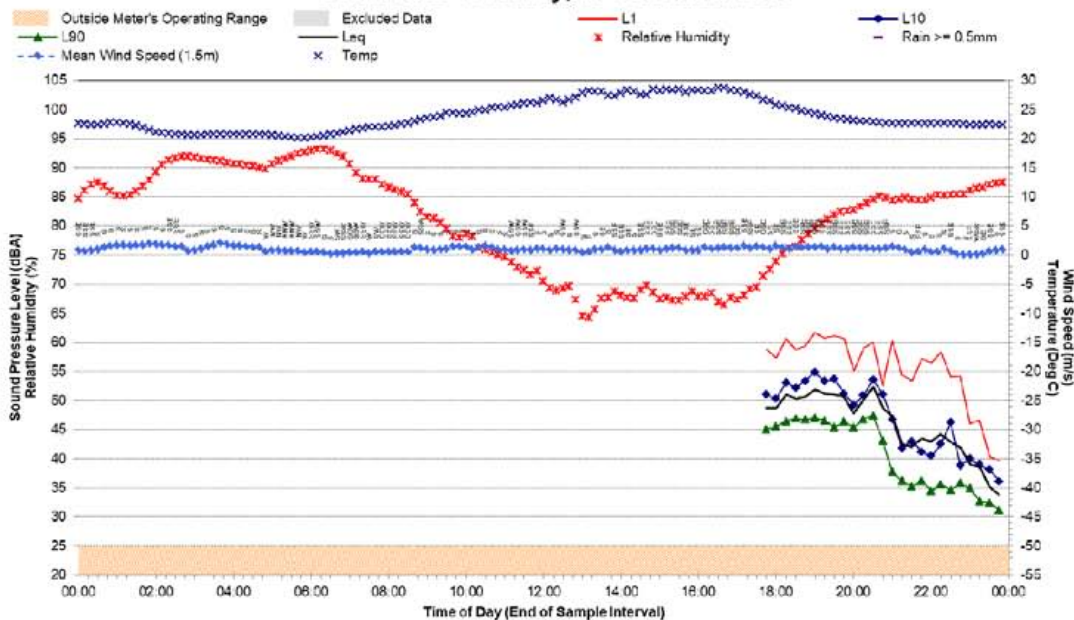
Statistical Ambient Noise Levels Location J - Monday, 3 December 2018



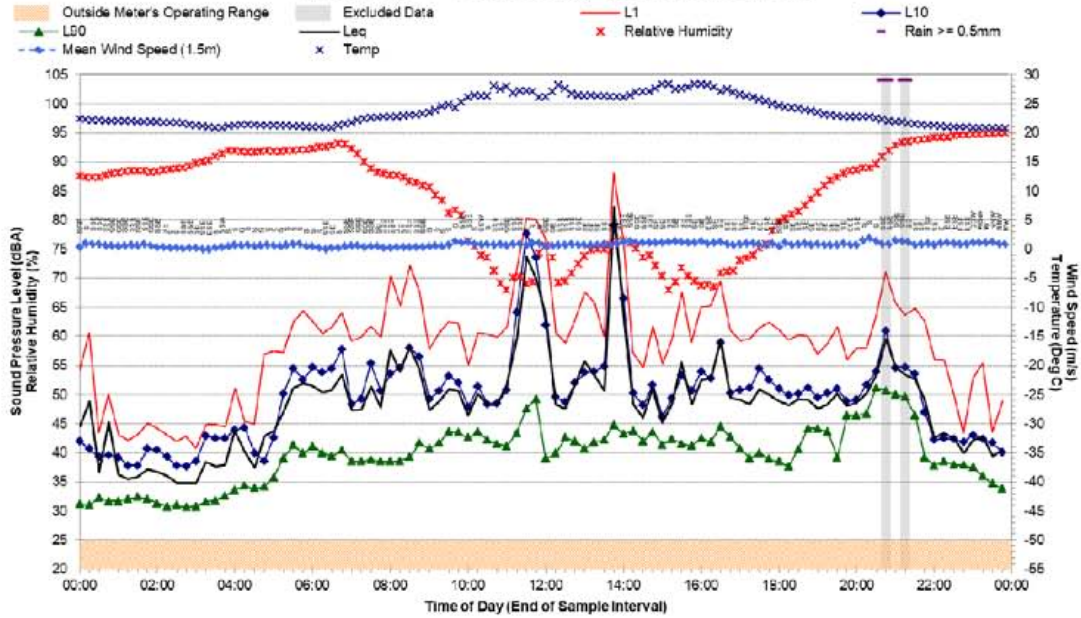
Statistical Ambient Noise Levels Location J - Tuesday, 4 December 2018



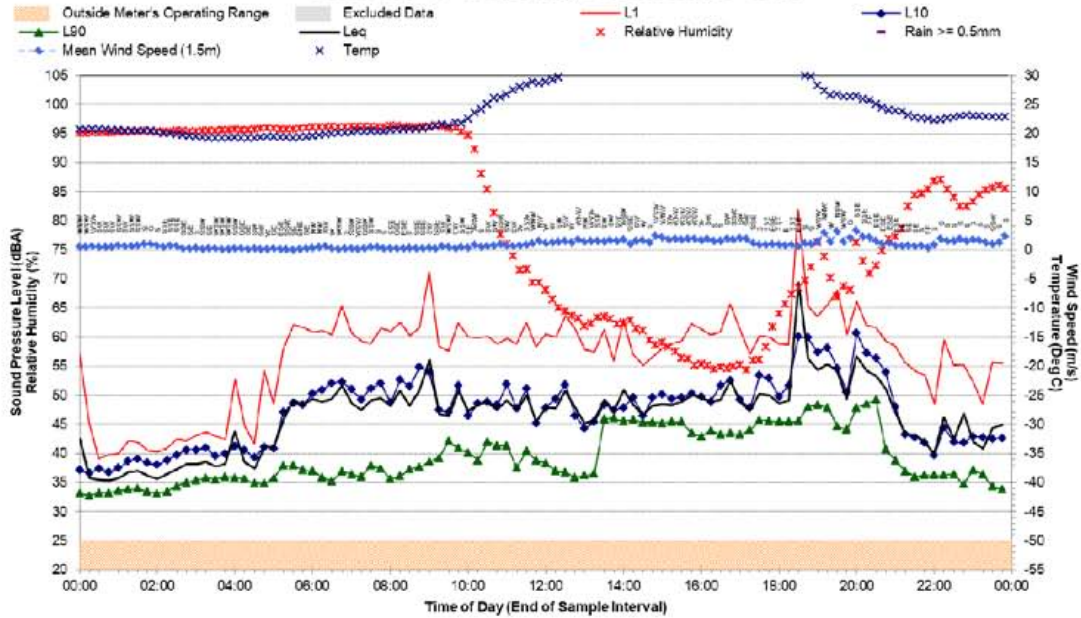
Statistical Ambient Noise Levels Location L - Tuesday, 18 December 2018



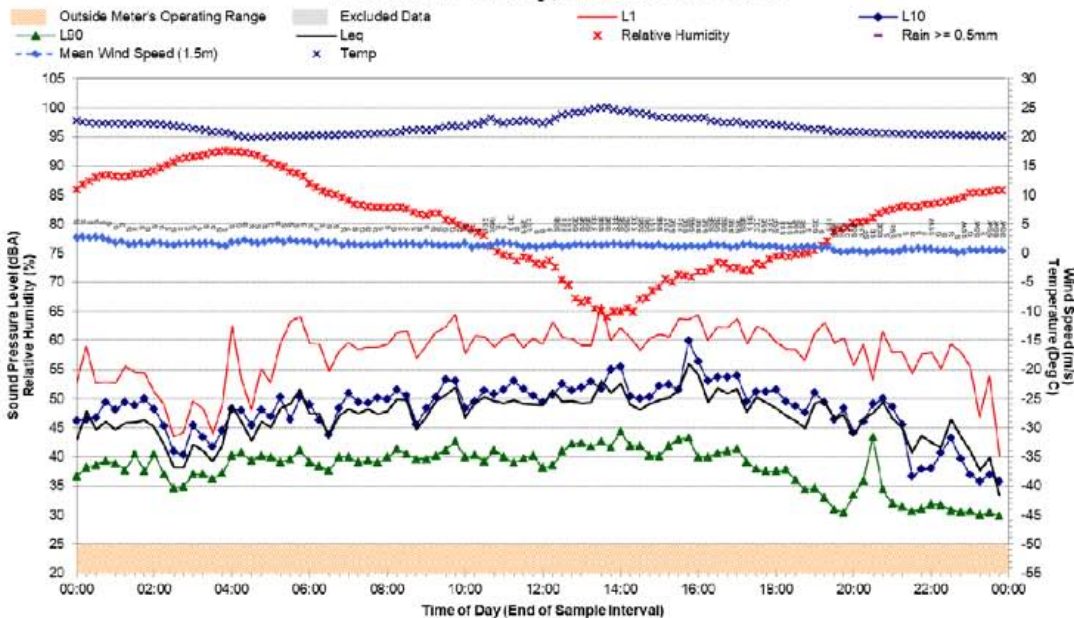
Statistical Ambient Noise Levels Location L - Wednesday, 19 December 2018



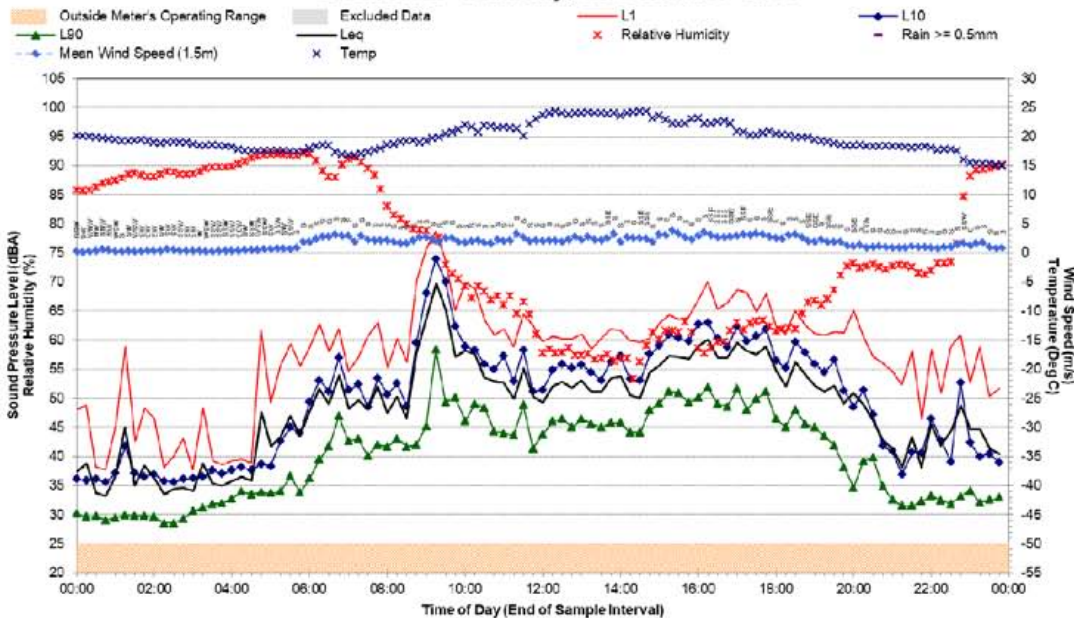
Statistical Ambient Noise Levels Location L - Thursday, 20 December 2018



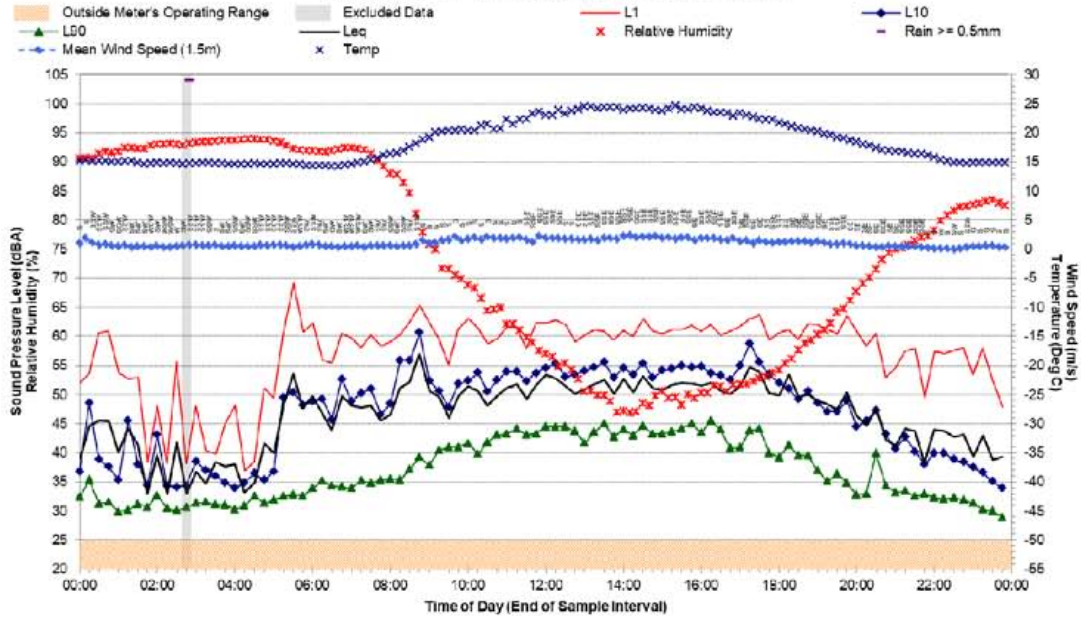
Statistical Ambient Noise Levels Location L - Friday, 21 December 2018



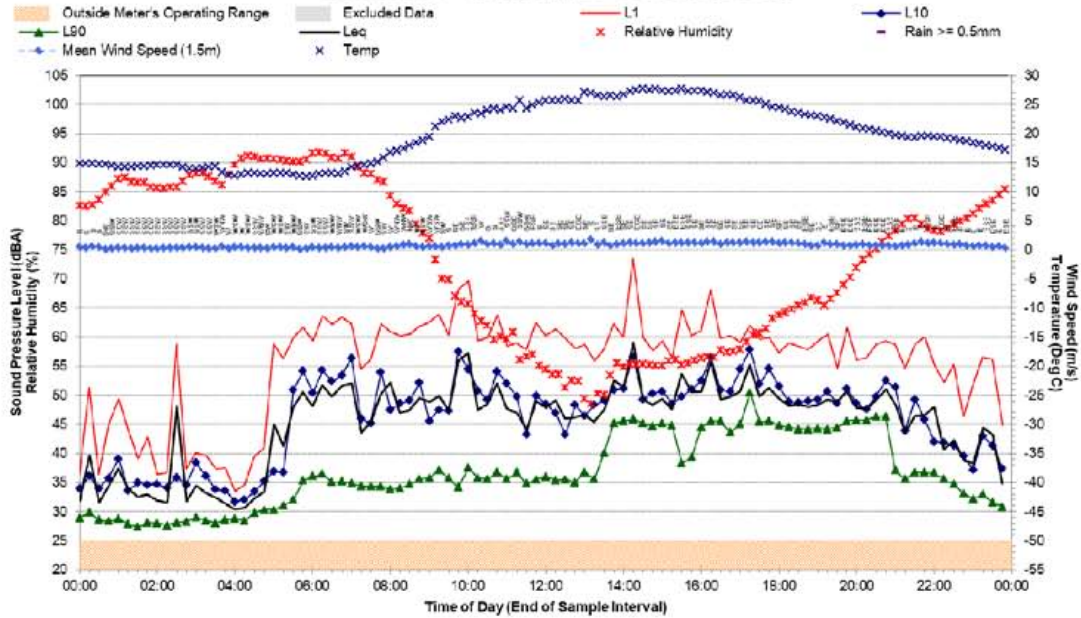
Statistical Ambient Noise Levels Location L - Saturday, 22 December 2018



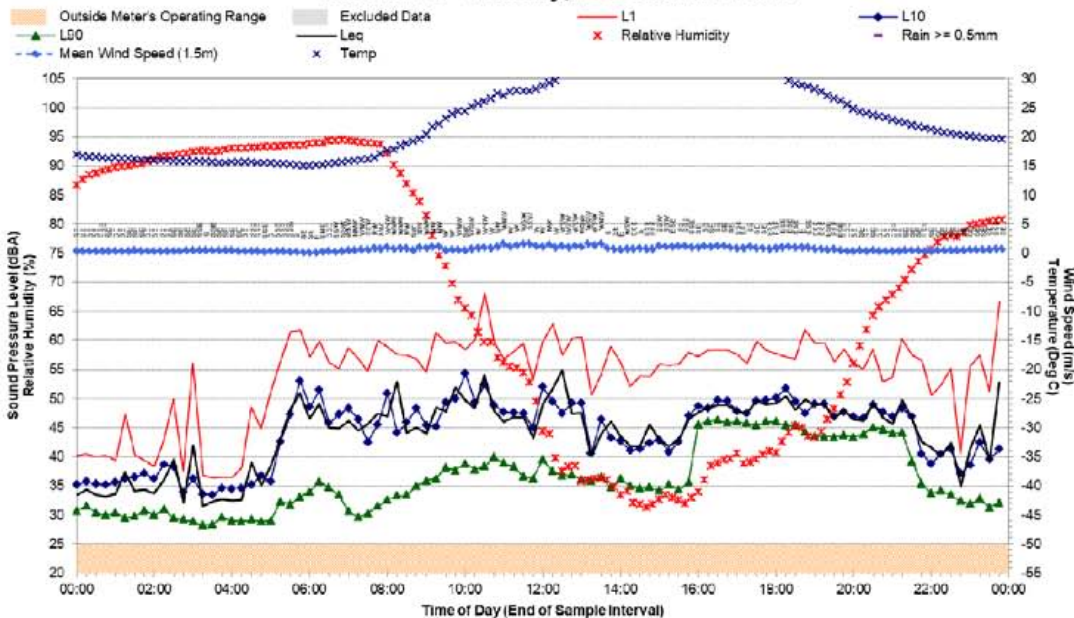
Statistical Ambient Noise Levels Location L - Sunday, 23 December 2018



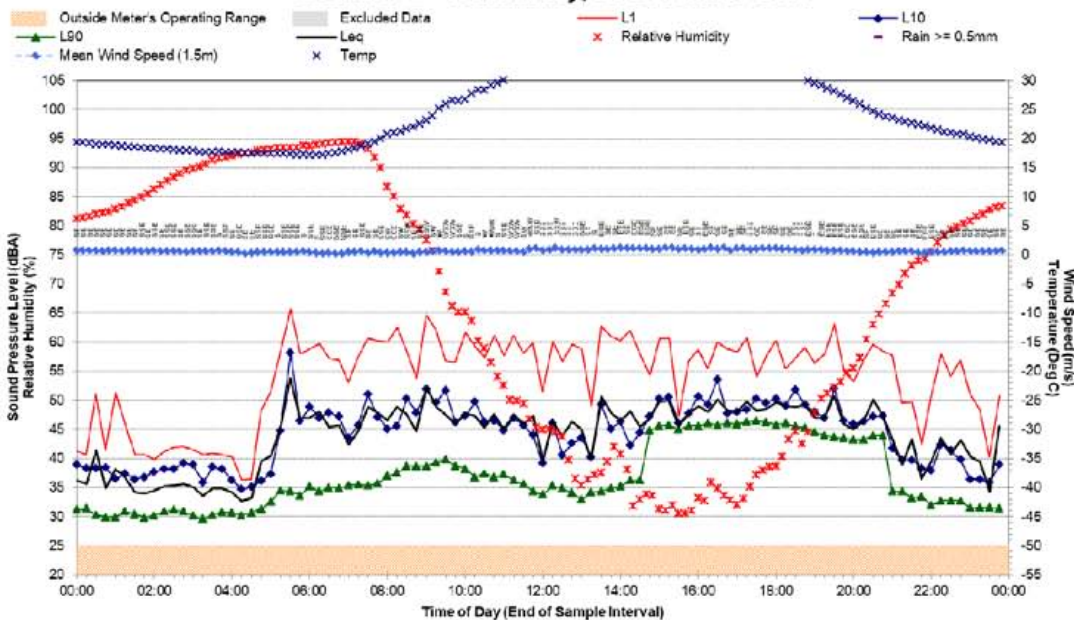
Statistical Ambient Noise Levels Location L - Monday, 24 December 2018



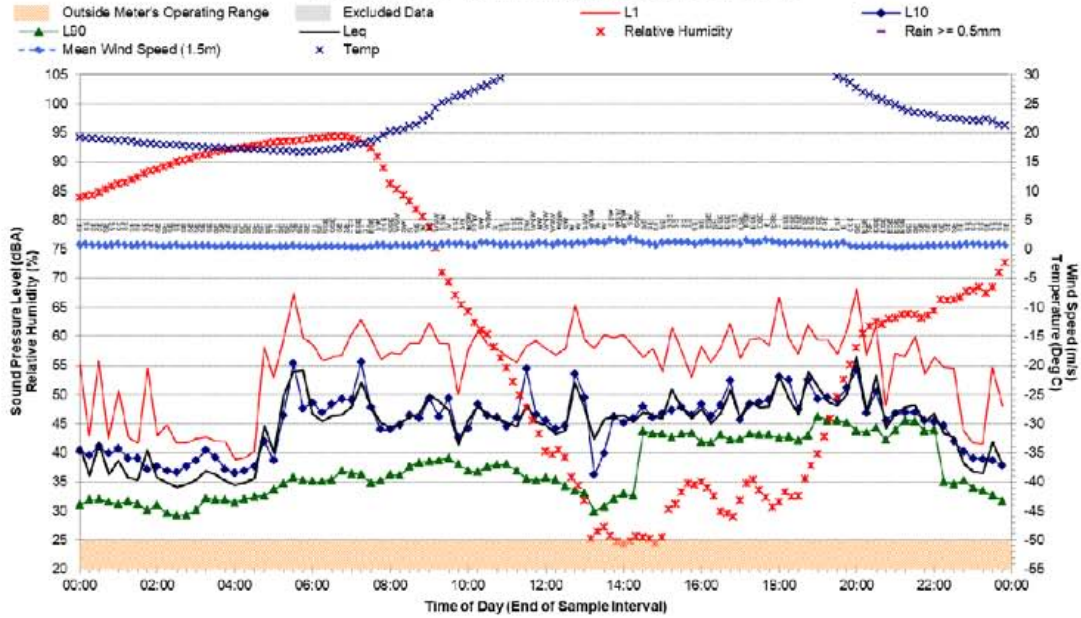
Statistical Ambient Noise Levels Location L - Tuesday, 25 December 2018



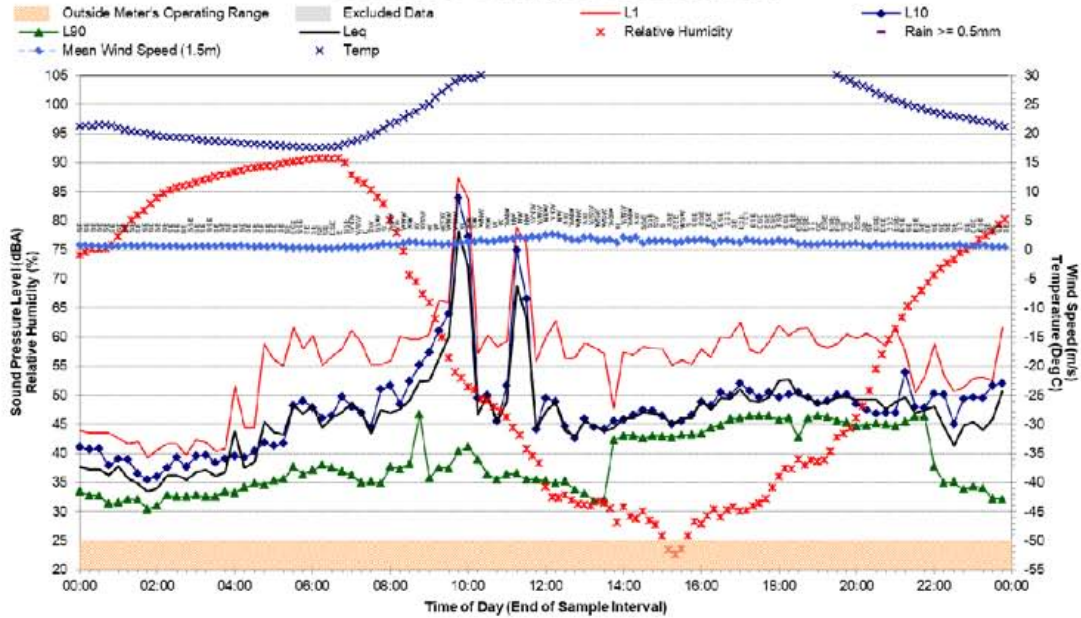
Statistical Ambient Noise Levels Location L - Wednesday, 26 December 2018



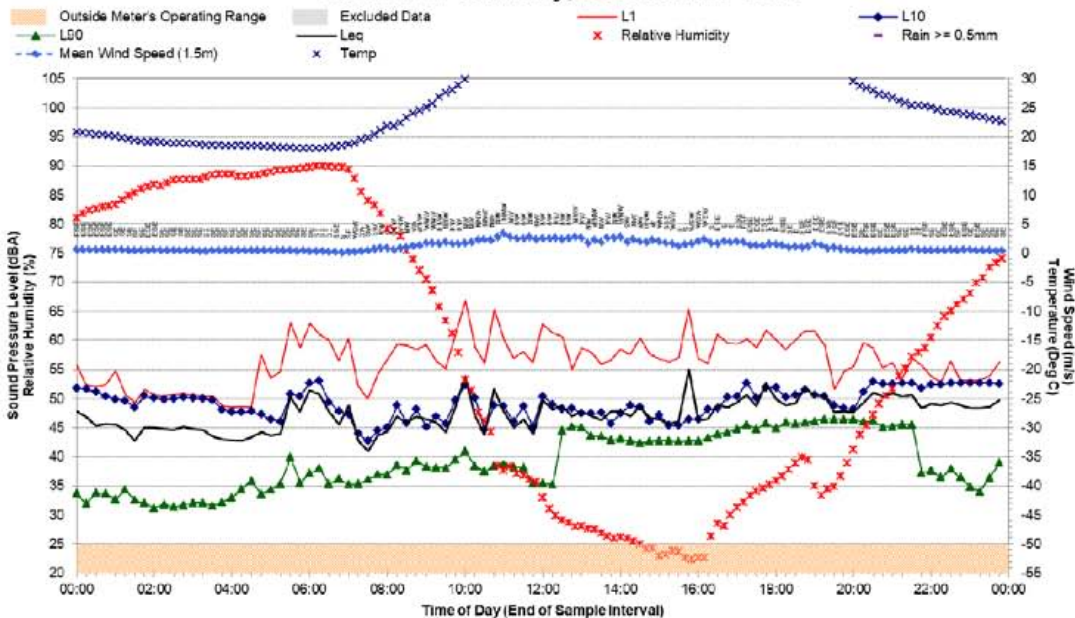
Statistical Ambient Noise Levels Location L - Thursday, 27 December 2018



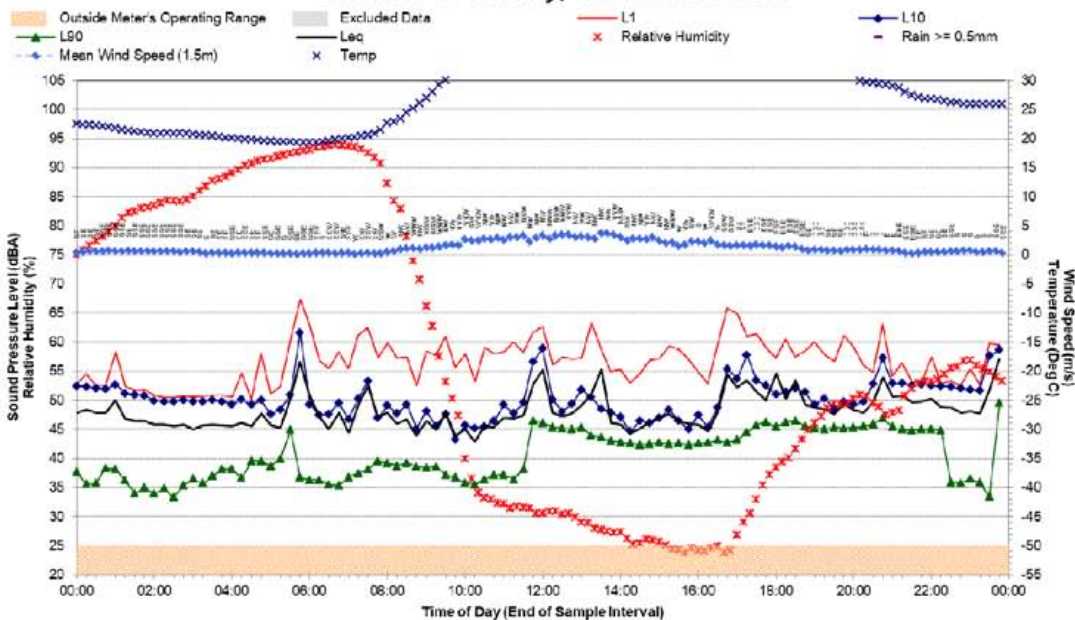
Statistical Ambient Noise Levels Location L - Friday, 28 December 2018



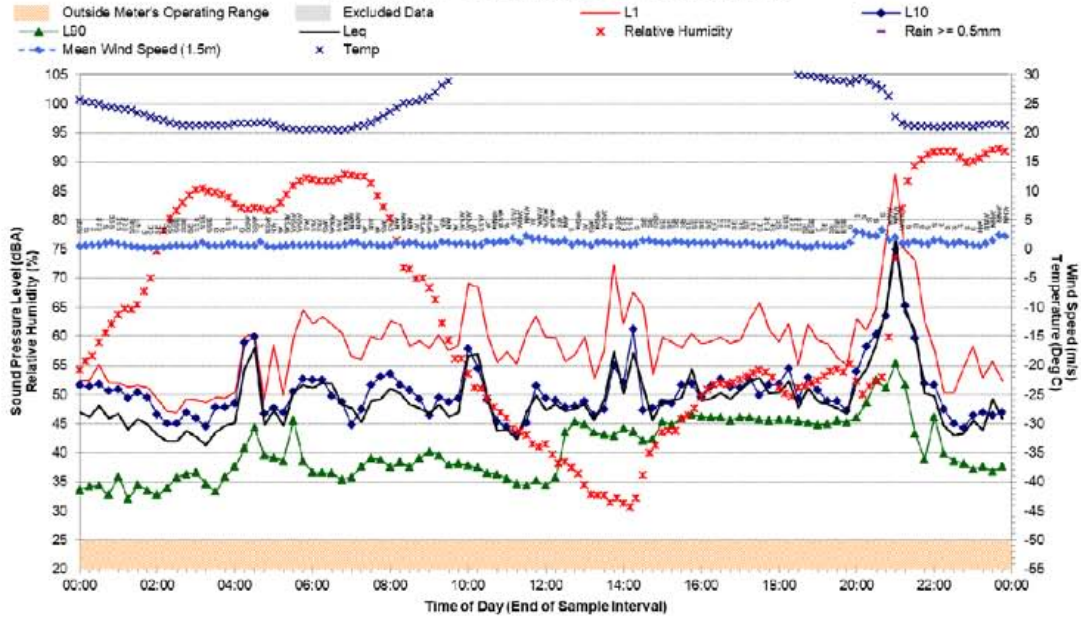
Statistical Ambient Noise Levels Location L - Saturday, 29 December 2018



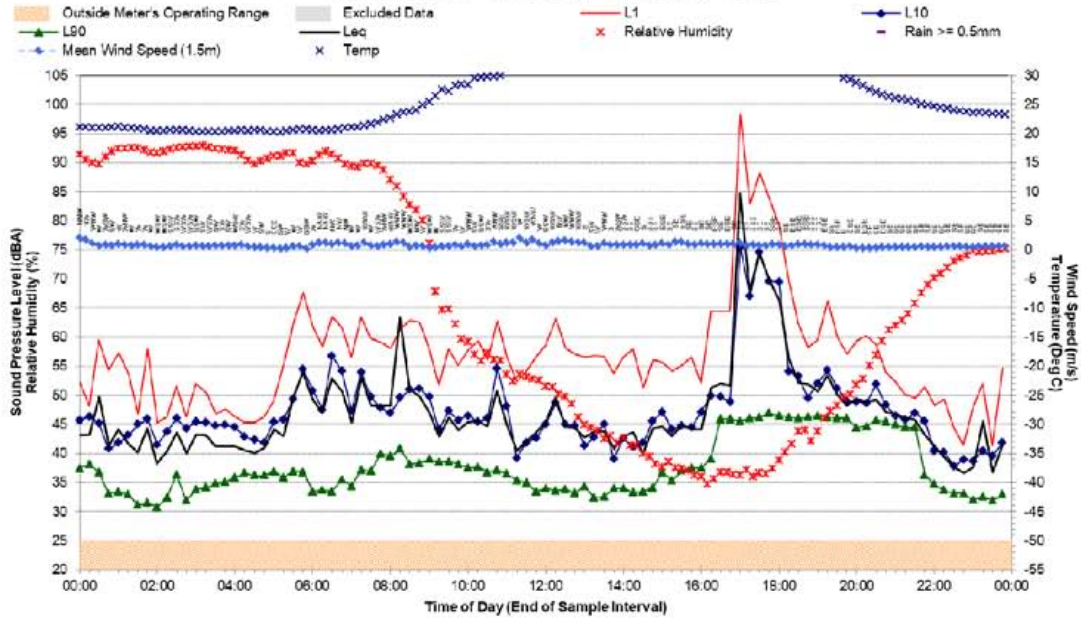
Statistical Ambient Noise Levels Location L - Sunday, 30 December 2018



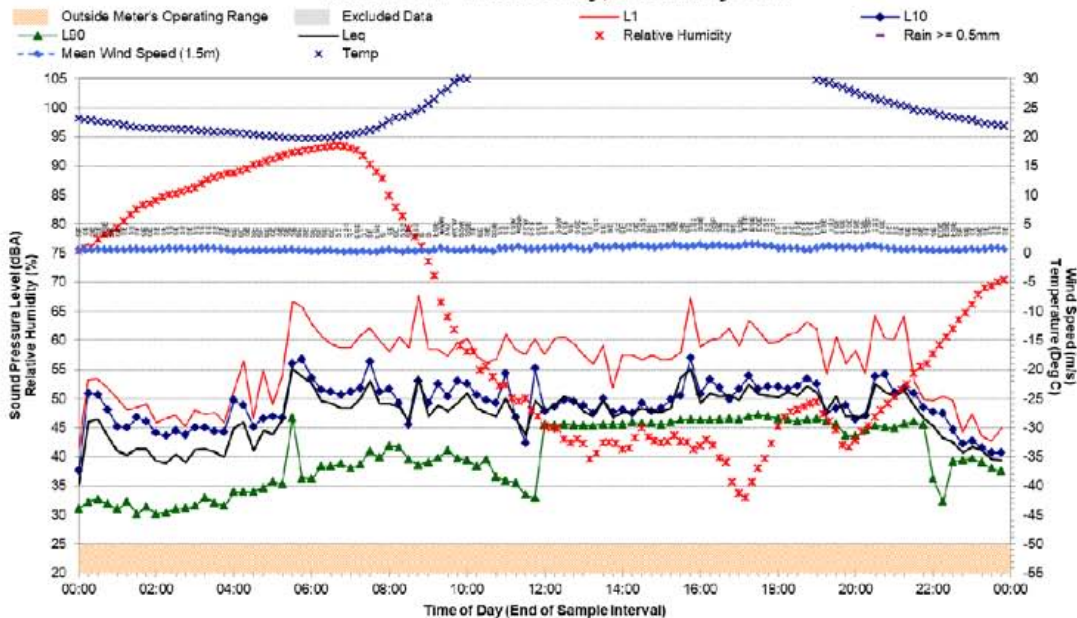
Statistical Ambient Noise Levels Location L - Monday, 31 December 2018



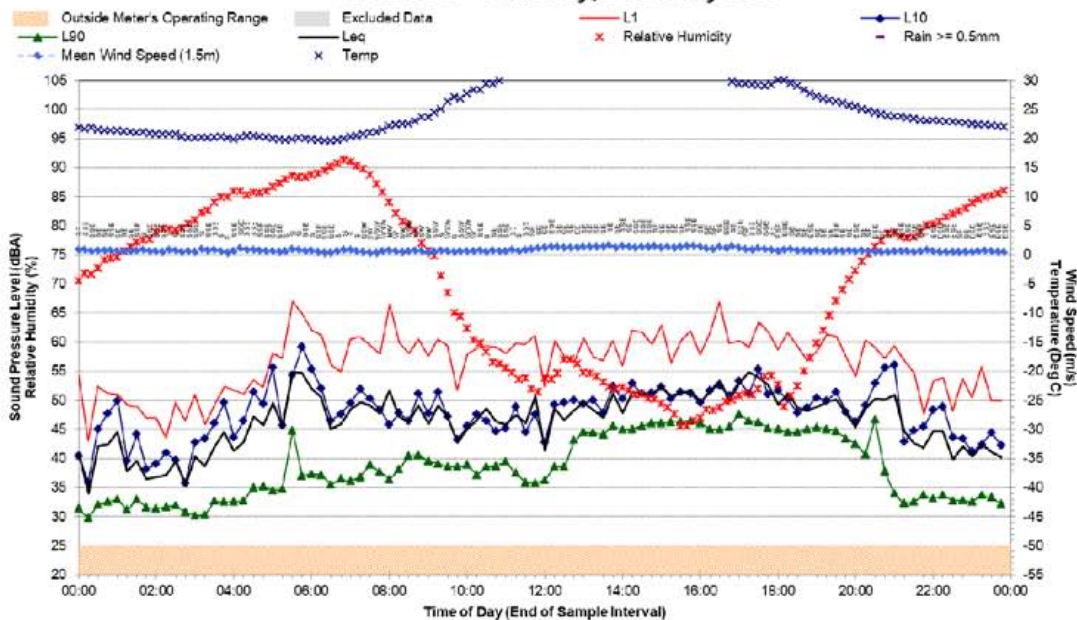
Statistical Ambient Noise Levels Location L - Tuesday, 1 January 2019



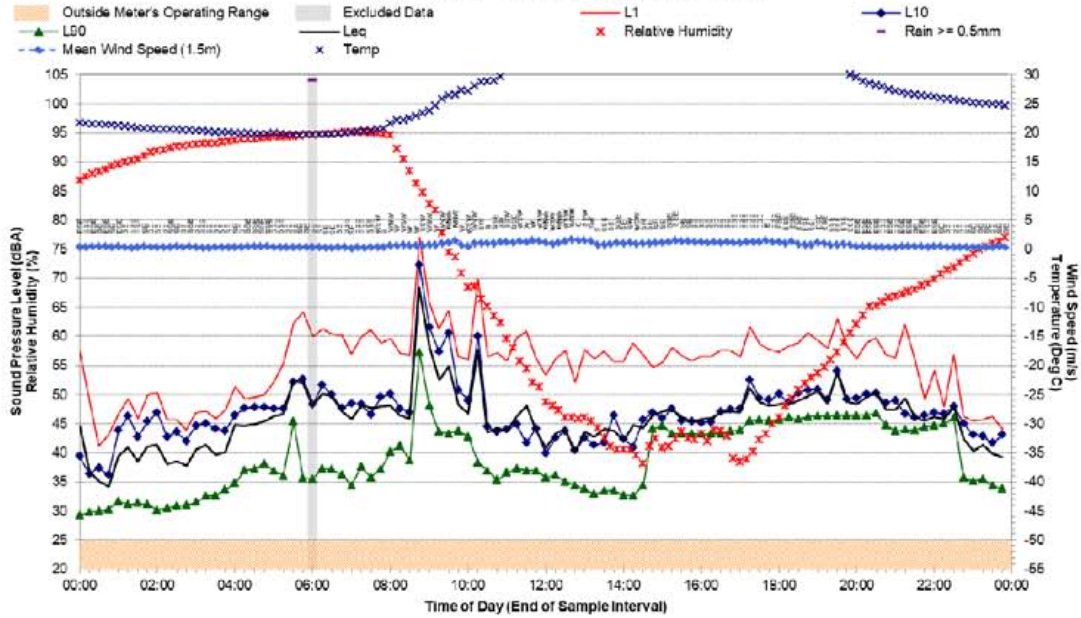
Statistical Ambient Noise Levels Location L - Wednesday, 2 January 2019



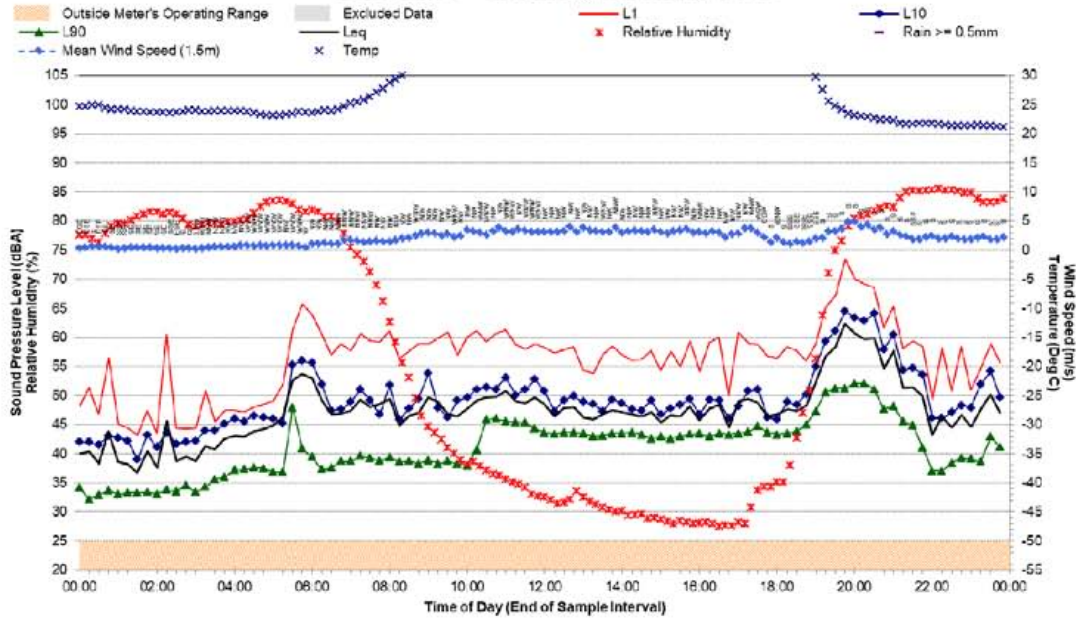
Statistical Ambient Noise Levels Location L - Thursday, 3 January 2019



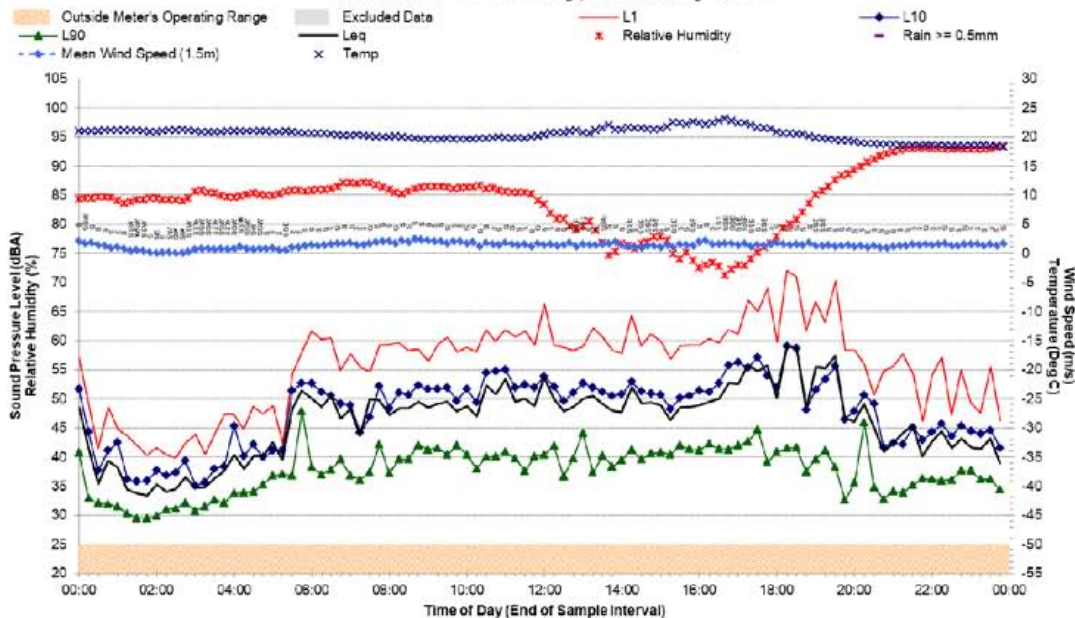
Statistical Ambient Noise Levels Location L - Friday, 4 January 2019



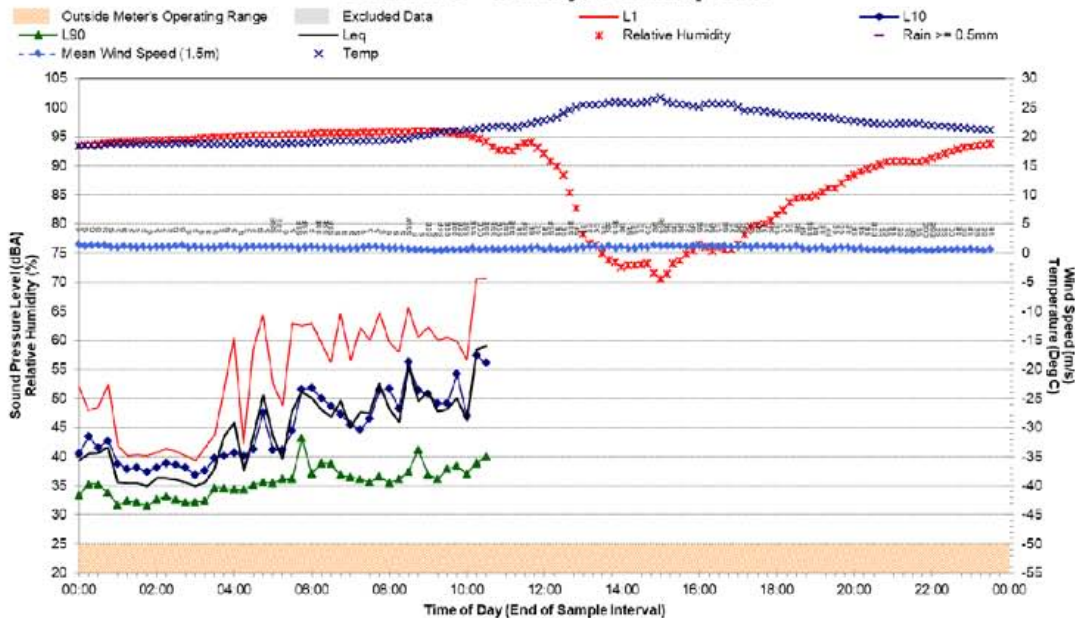
Statistical Ambient Noise Levels Location L - Saturday, 5 January 2019



Statistical Ambient Noise Levels Location L - Sunday, 6 January 2019



Statistical Ambient Noise Levels Location L - Monday, 7 January 2019



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