Acoustic Terminology

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 2×10^{-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	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	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(lin) or dB.

3 Sound Power Level

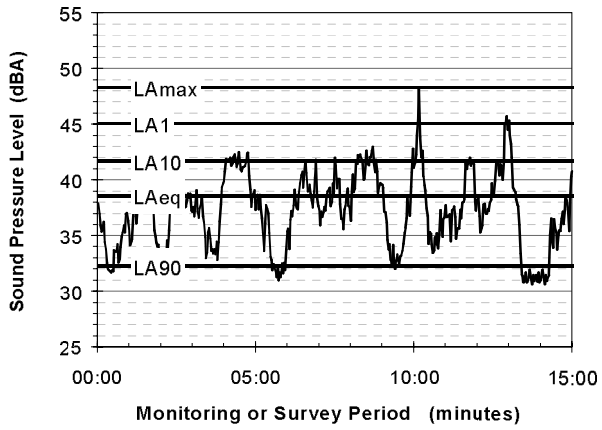
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or L_W, or by the reference unit 10^{-12} W.

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 exceed 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.

7 Frequency Analysis

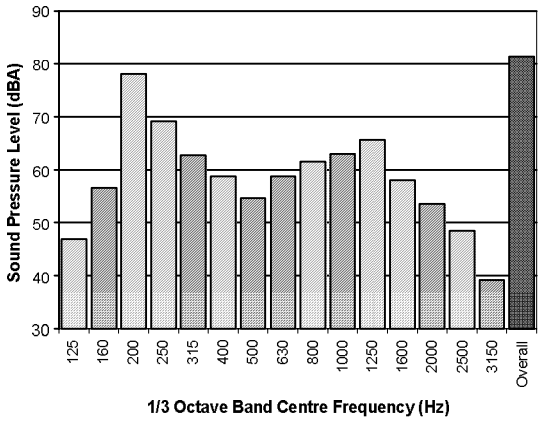
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

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_o), where V_o is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be 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

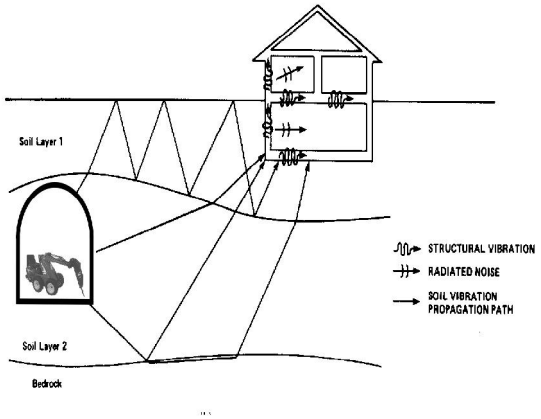
The term 'over-pressure' is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

11 Ground-borne Noise, Structure-borne Noise and Regenerated Noise

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

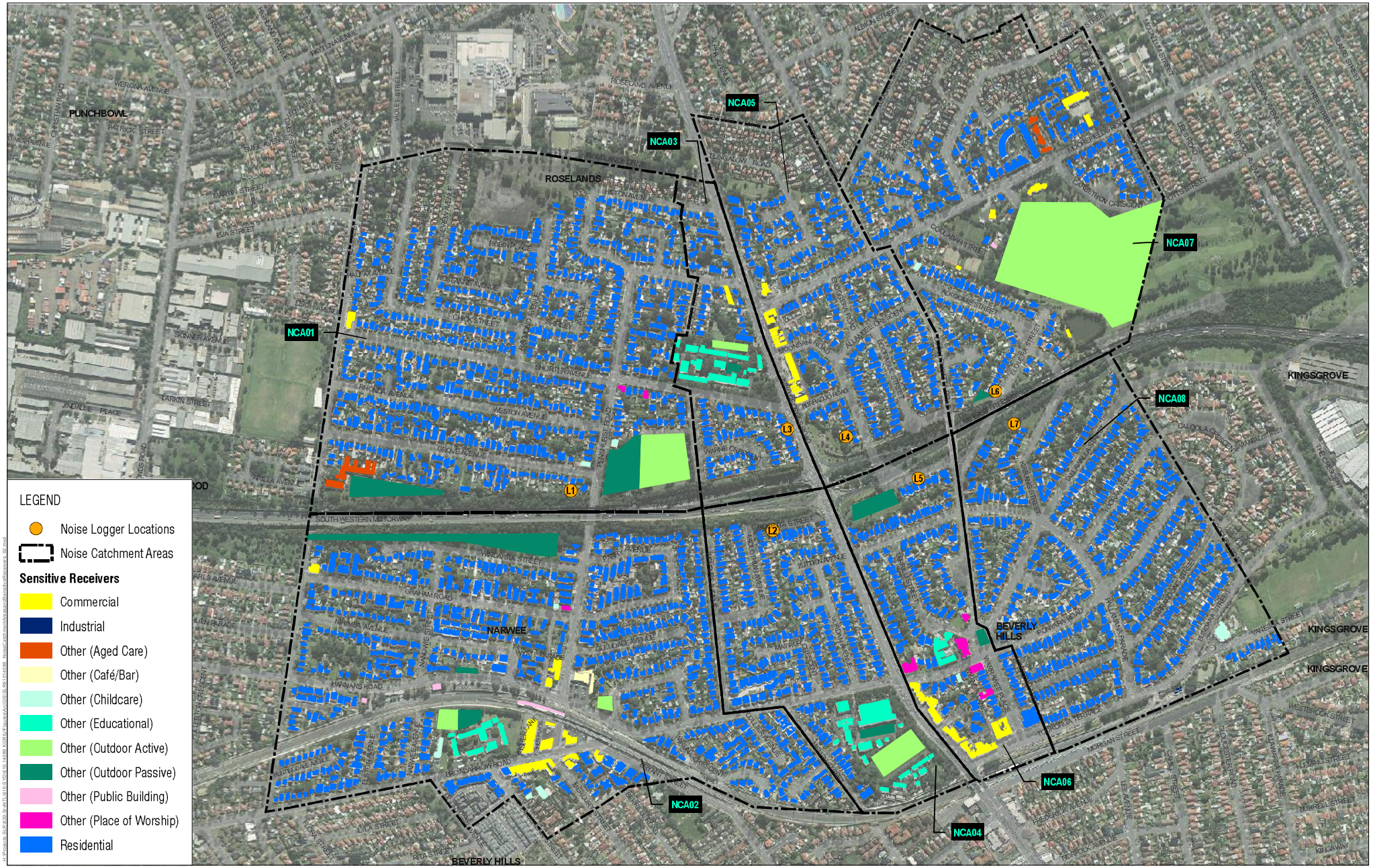
Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

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



The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise

Noise Catchment Areas and Sensitive Receivers



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West Connex Delivery Authority

King Georges Road Interchange Upgrade
Noise and Vibration Impact Assessment

Noise Catchment Areas and Sensitive Receivers

Ambient Noise Monitoring Results

Noise Monitoring Location:	**L1**
Noise Monitoring Address:	**6 Grove Avenue, Narwee**

Logger Device Type: SVAN957
Logger Serial No: 20670

Ambient noise logger deployed outside residential address 6 Grove Avenue, Narwee. Logger located in back yard on southern side of property.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the M5, with a steady flow of traffic throughout the measurement.

Recorded Noise Levels (LAmax):
M5 Light-vehicle road traffic: typically ~54-59 dBA, M5 Heavy-vehicle road traffic: 60-66 dBA, Neighbour activity: 55-58 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	52	58	60	63
Evening	51	56	58	61
Night-time	39	53	55	60

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	**Noise Level (dBA)**		
	Weekday LAeq(Period)	**Weekend LAeq**(Period)	**Weekly LAeq**(Period)
Number of Valid Days	6	4	N/A
Daytime (7am-10pm)	57	57	57
Night-time (10pm-7am)	53	53	53

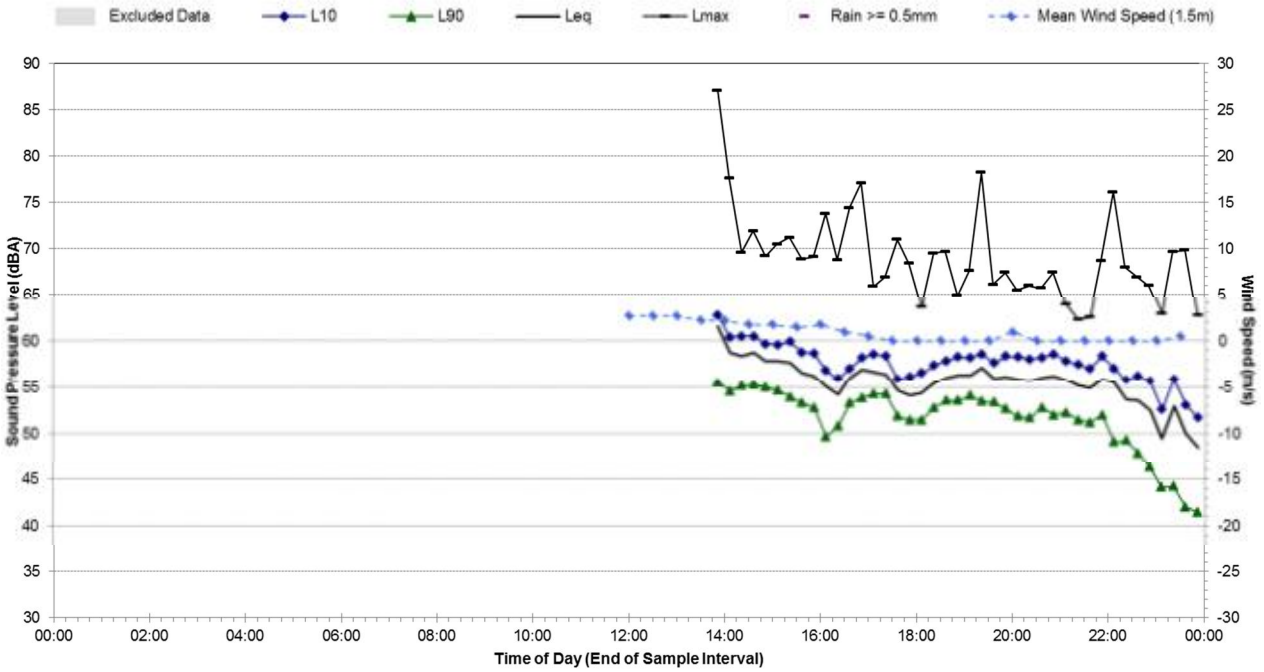
Attended Noise Measurement Results

Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
22/05/2014	13:25	54	58	69

Photo of Noise Monitoring Location

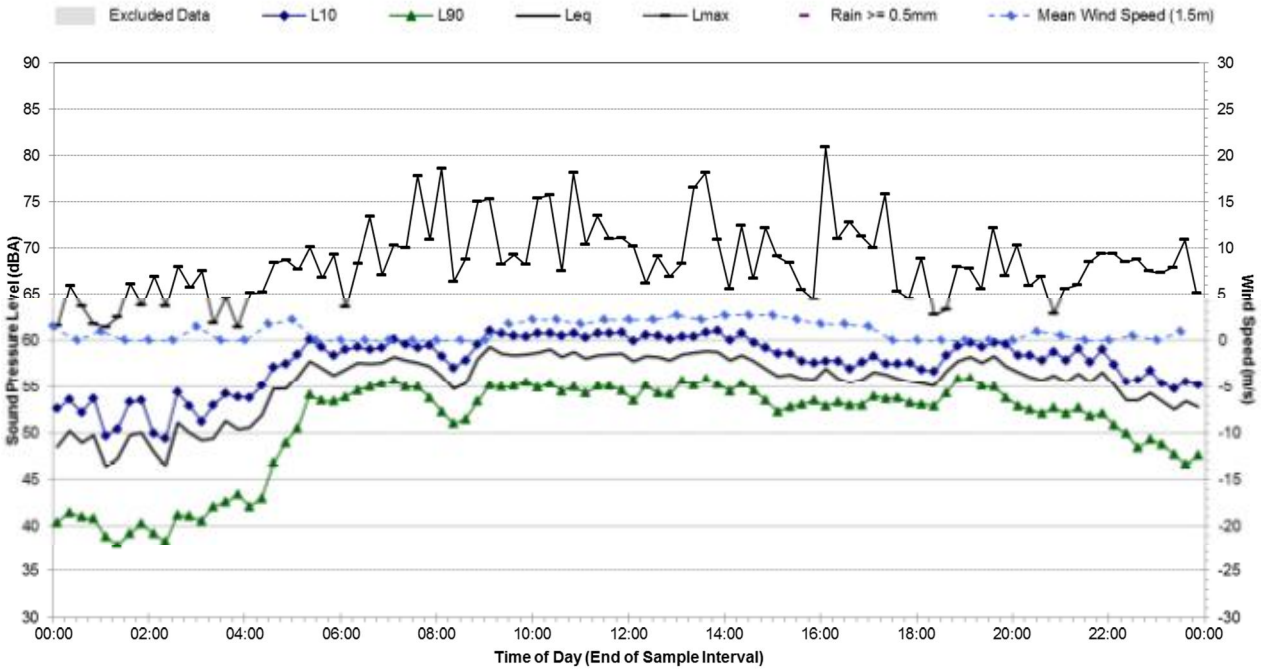
Statistical Ambient Noise Levels

L1 - Thursday, 22 May 2014



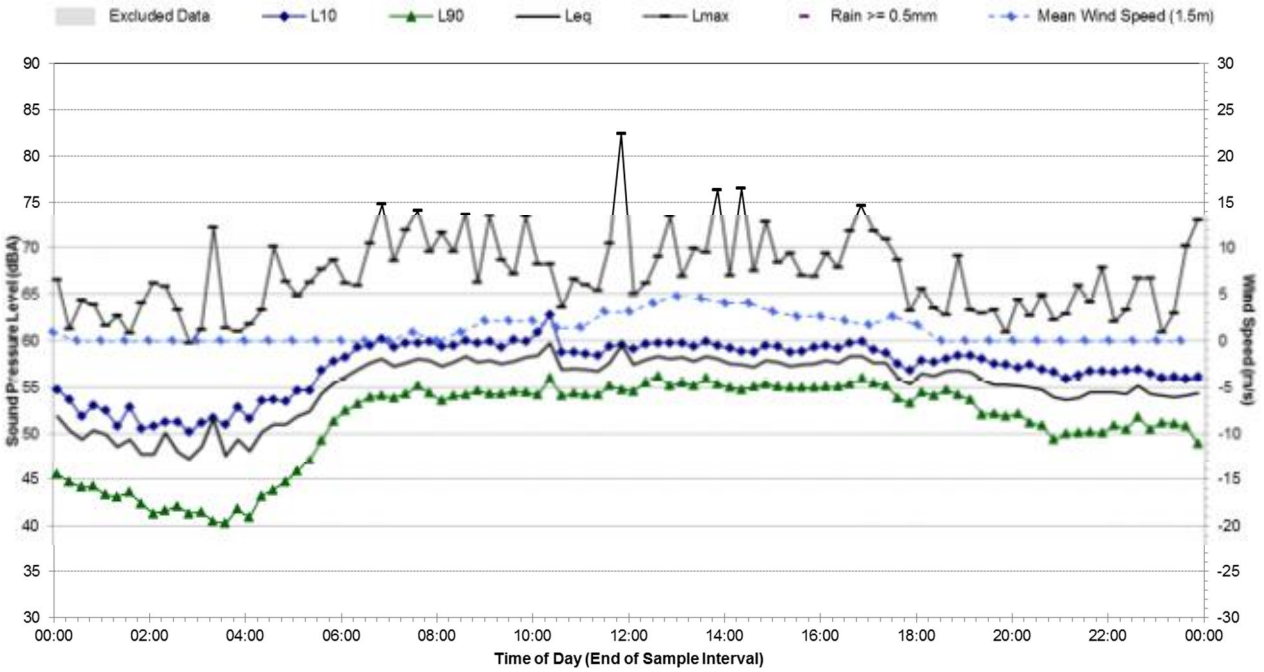
Statistical Ambient Noise Levels

L1 - Friday, 23 May 2014



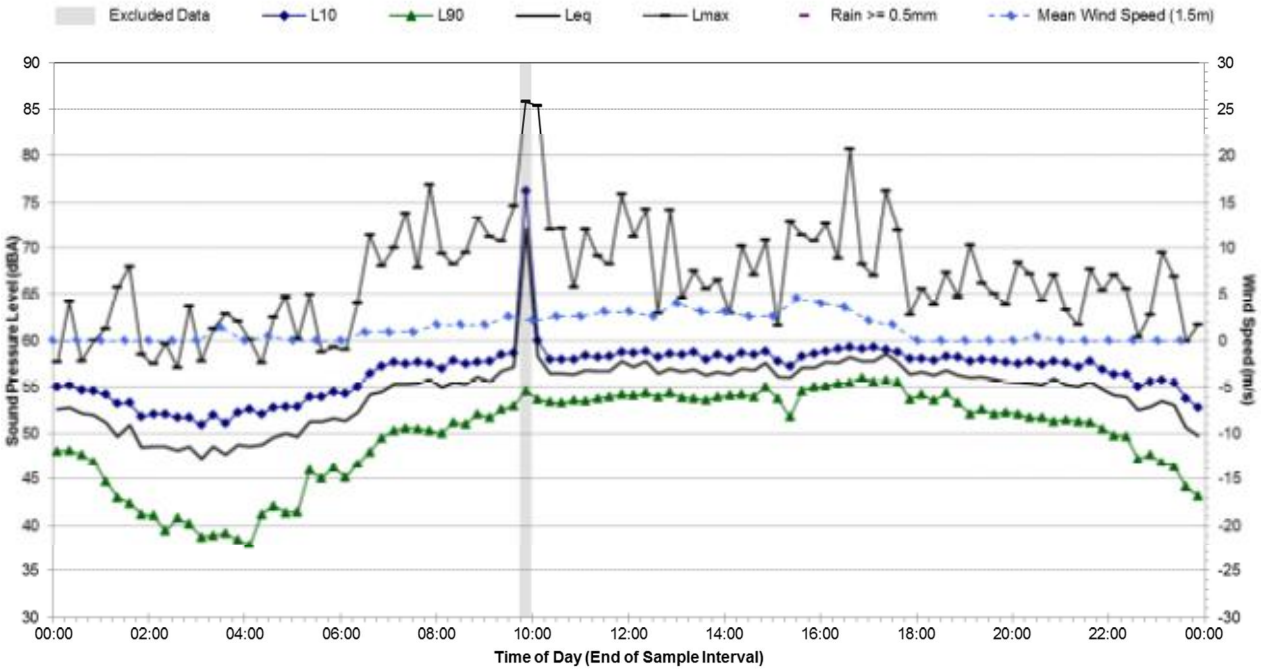
Statistical Ambient Noise Levels

L1 - Saturday, 24 May 2014



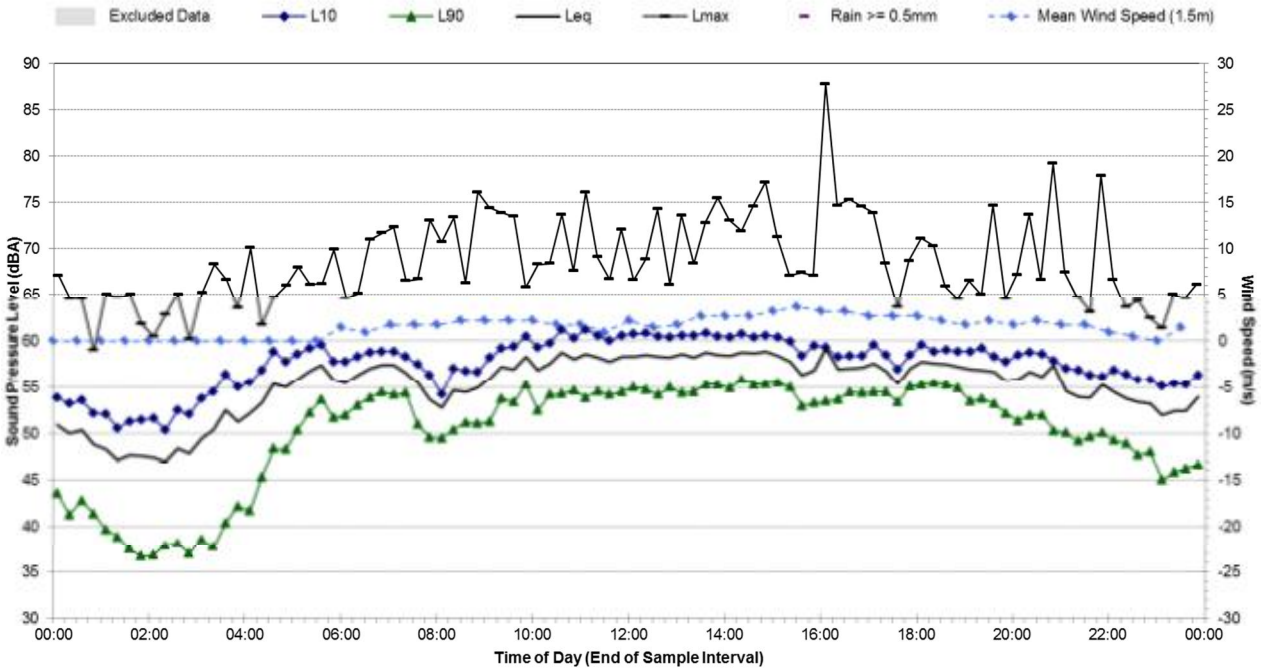
Statistical Ambient Noise Levels

L1 - Sunday, 25 May 2014



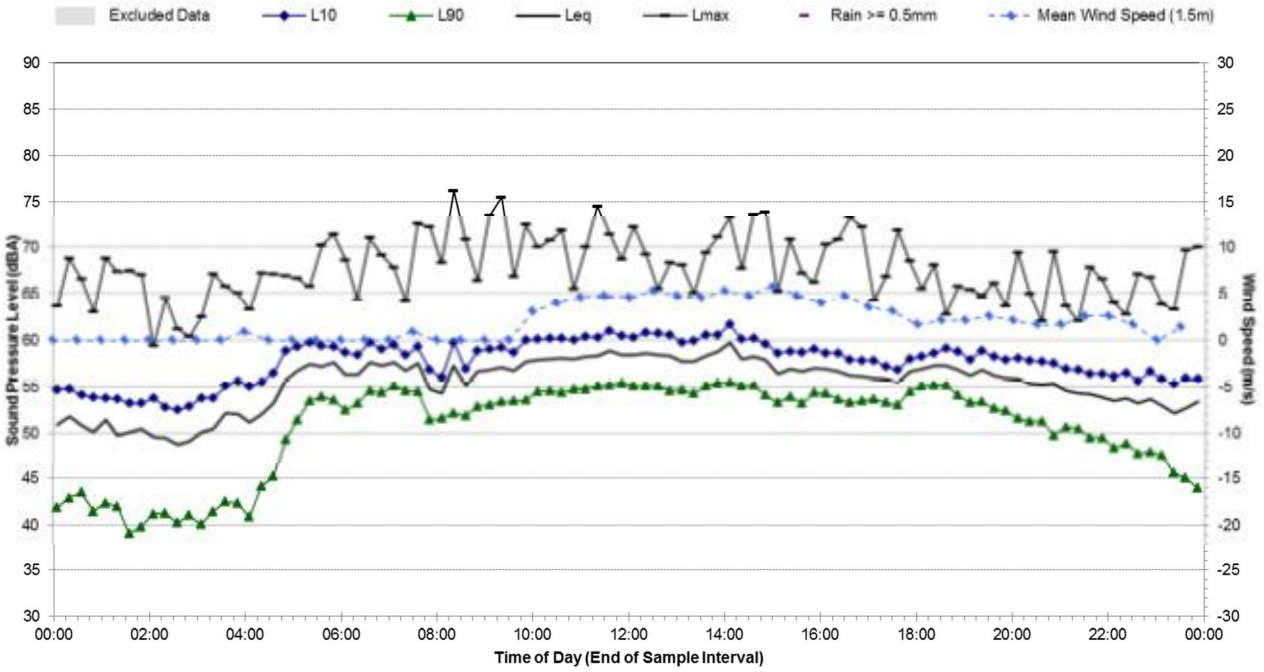
Statistical Ambient Noise Levels

L1 - Monday, 26 May 2014



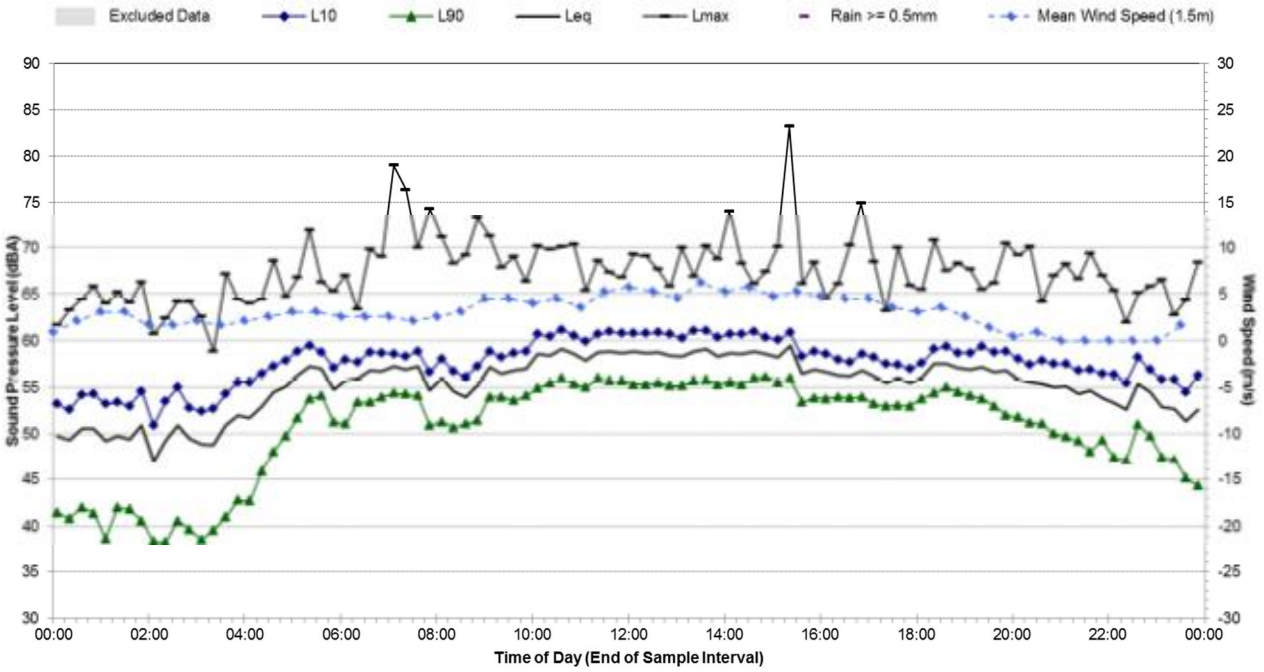
Statistical Ambient Noise Levels

L1 - Tuesday, 27 May 2014



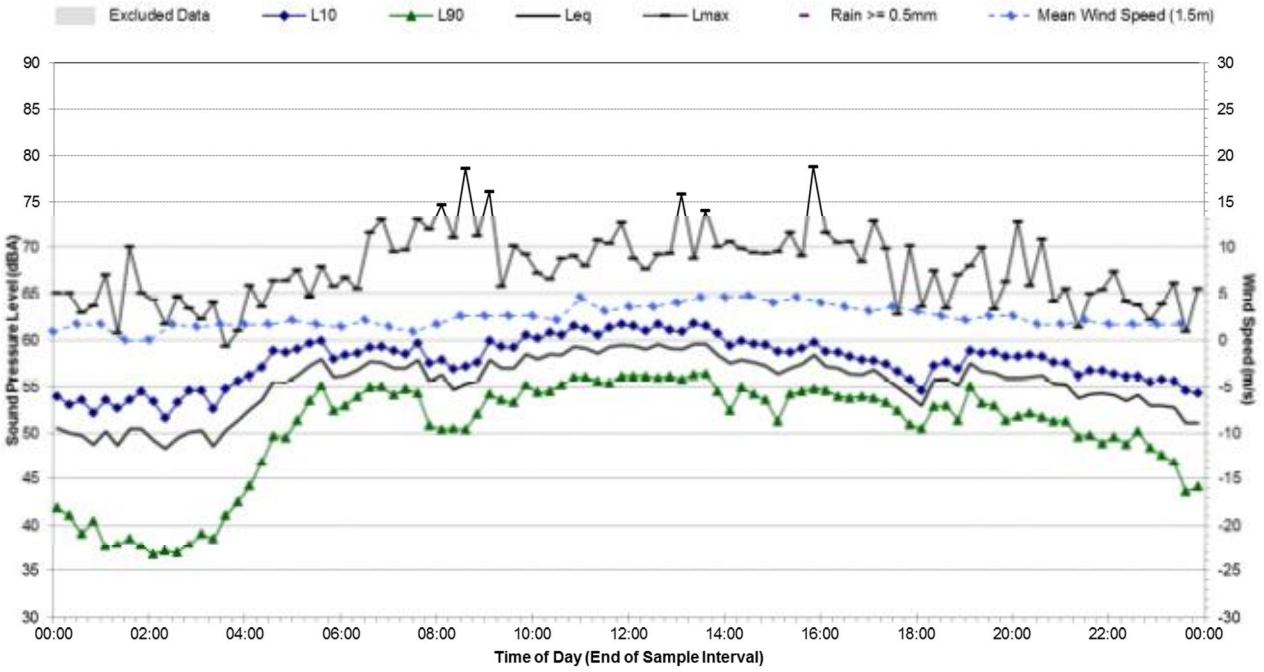
Statistical Ambient Noise Levels

L1 - Wednesday, 28 May 2014



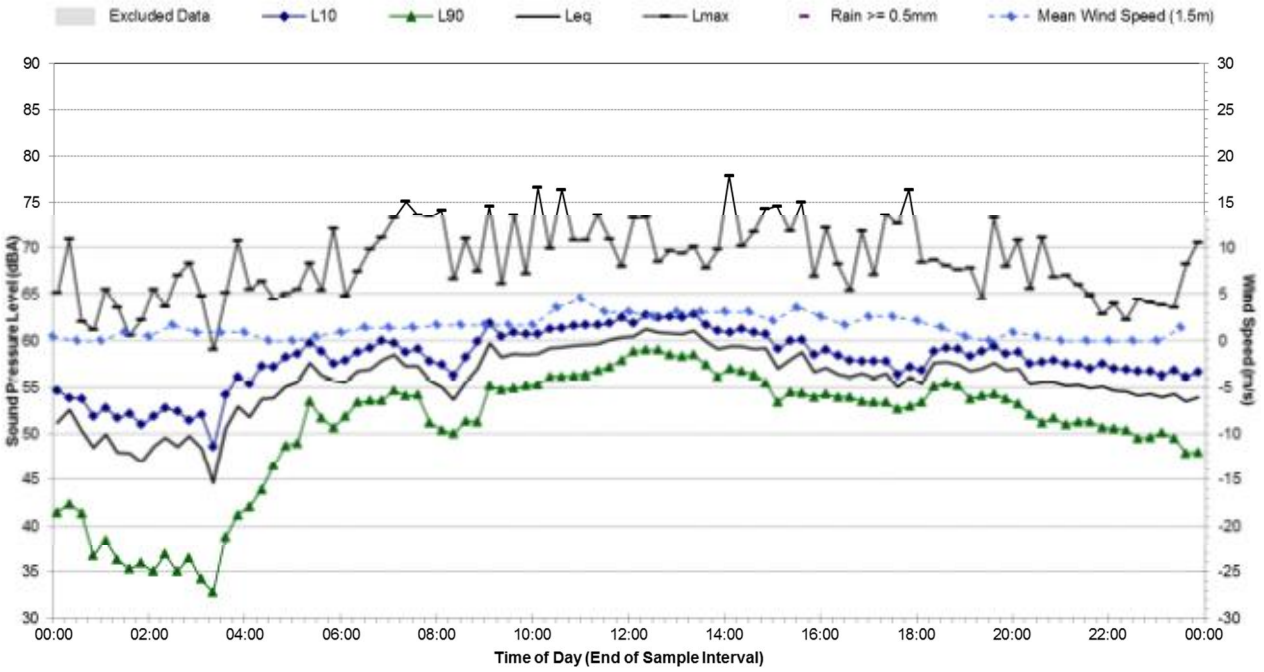
Statistical Ambient Noise Levels

L1 - Thursday, 29 May 2014



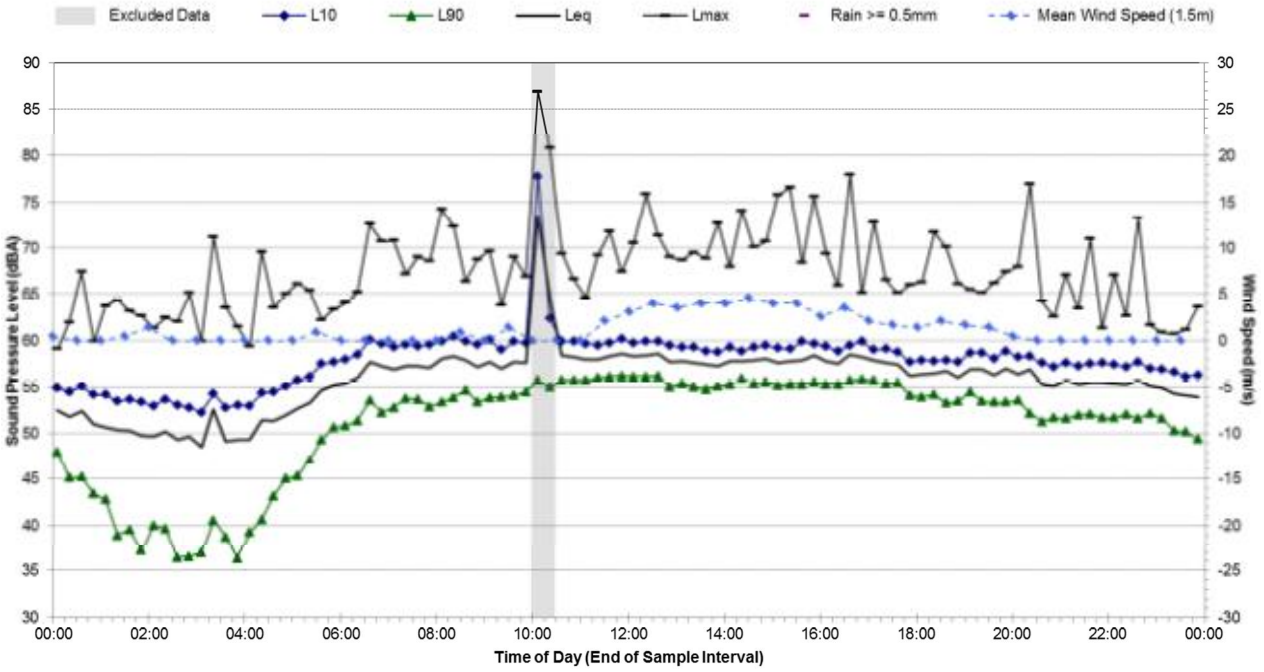
Statistical Ambient Noise Levels

L1 - Friday, 30 May 2014



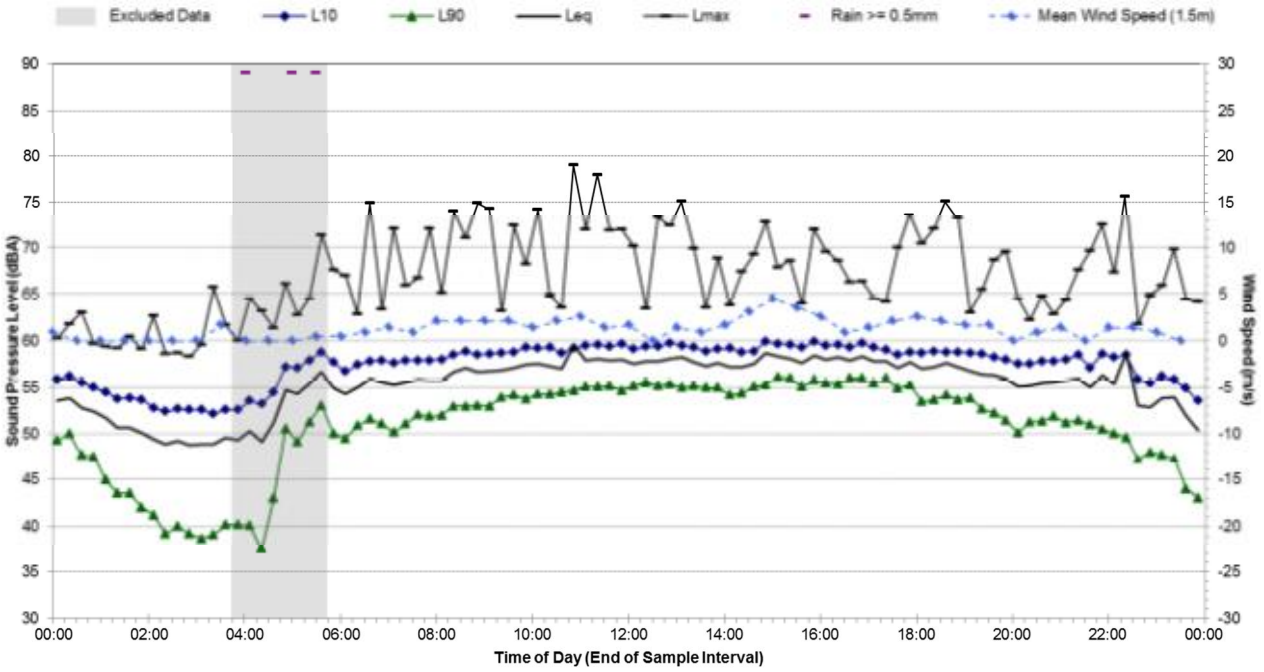
Statistical Ambient Noise Levels

L1 - Saturday, 31 May 2014



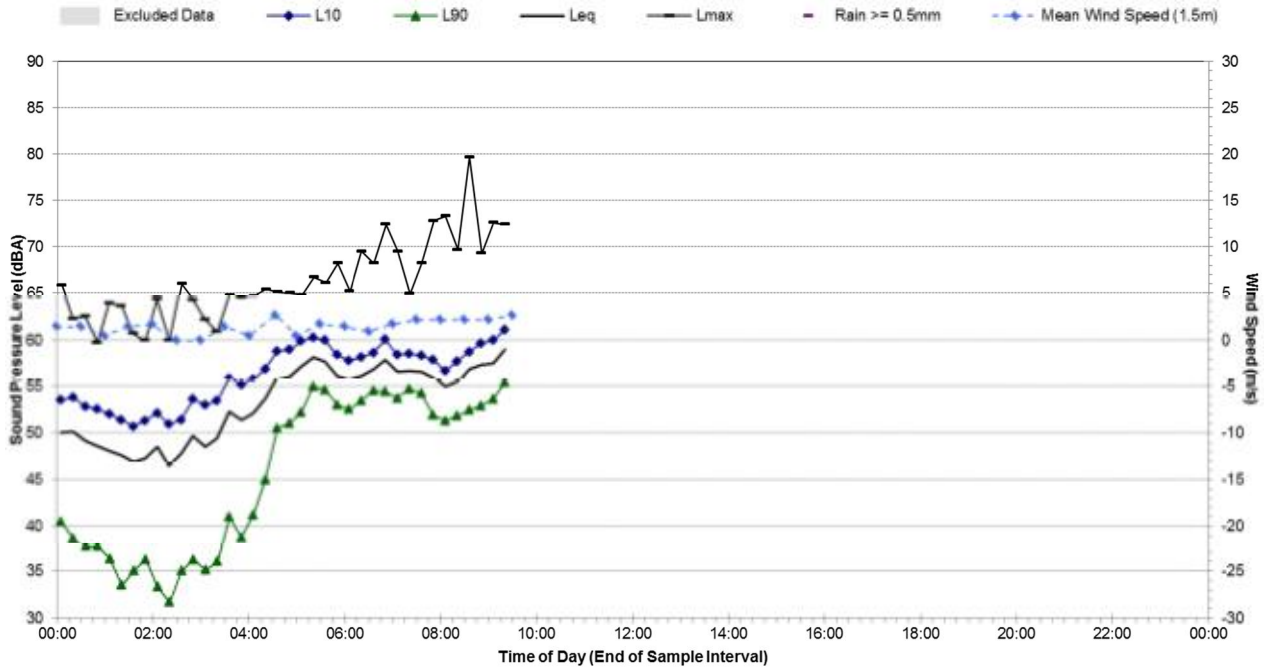
Statistical Ambient Noise Levels

L1 - Sunday, 1 June 2014



Statistical Ambient Noise Levels

L1 - Monday, 2 June 2014



Ambient Noise Monitoring Results

Noise Monitoring Location:	**L2**
Noise Monitoring Address:	**15 Rosetta Lane, Beverly Hills**

Logger Device Type: SVAN957
Logger Serial No: 20669

Ambient noise logger deployed outside residential address 15 Rosetta Lane, Beverly Hills. Logger located in front yard on northern side of property.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the M5, with a steady flow of traffic throughout the measurement. Noise from fauna including insects was also present at the time of the attended measurement.

Recorded Noise Levels (LAmax):
M5 Light-vehicle road traffic: typically ~56-58 dBA, M5 Heavy-vehicle road traffic: 58-61 dBA, Pedestrian activity: 55-69 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	53	58	59	63
Evening	52	56	58	61
Night-time	44	54	55	58

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	**Noise Level (dBA)**		
	Weekday LAeq(Period)	**Weekend LAeq**(Period)	**Weekly LAeq**(Period)
Number of Valid Days	6	4	N/A
Daytime (7am-10pm)	58	57	57
Night-time (10pm-7am)	54	54	54

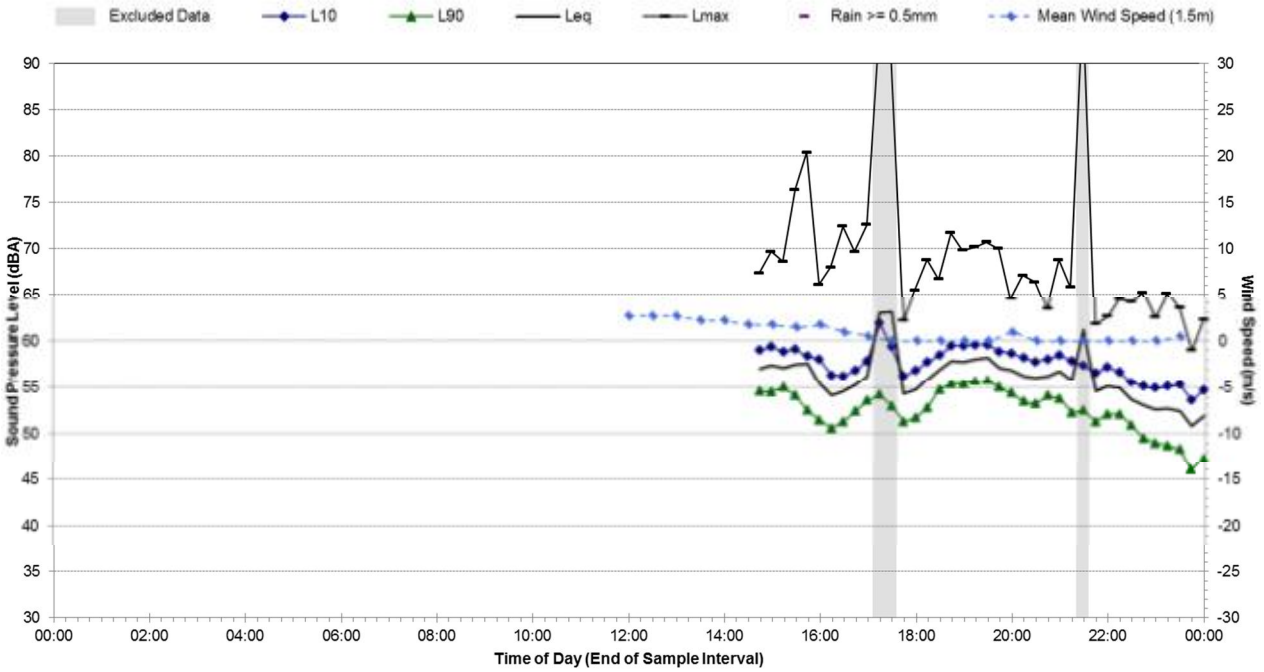
Attended Noise Measurement Results

Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
22/05/2014	18:40	55	57	69

Photo of Noise Monitoring Location

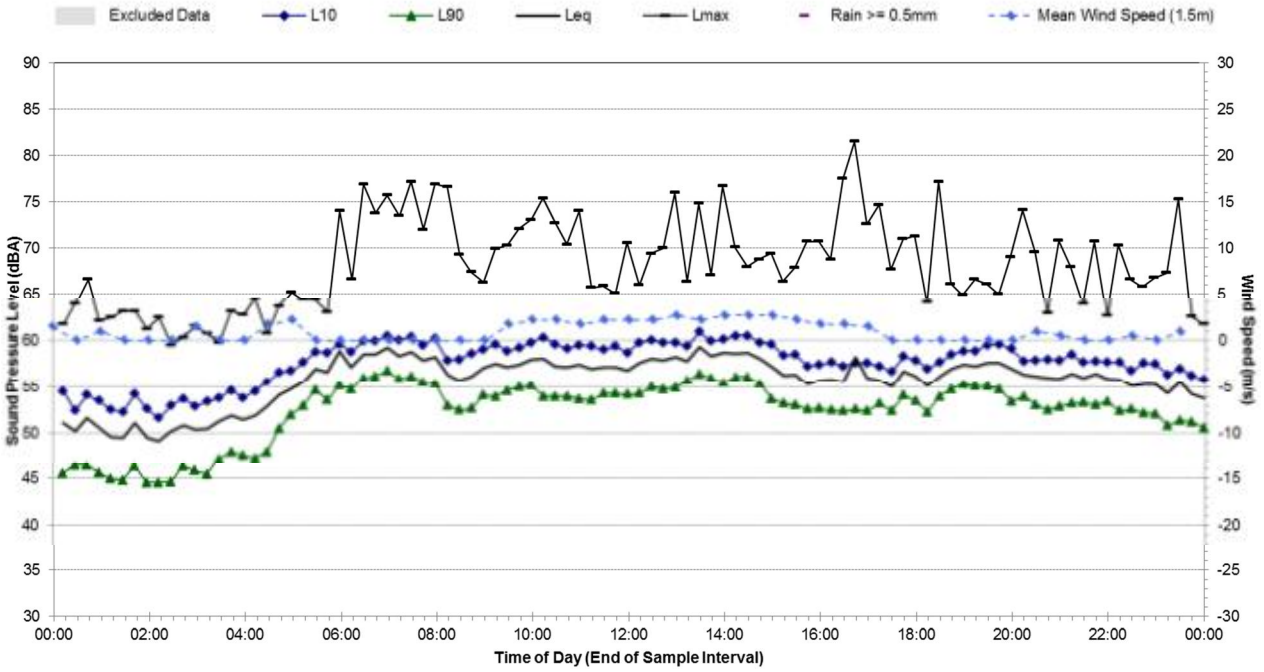
Statistical Ambient Noise Levels

L2 - Thursday, 22 May 2014



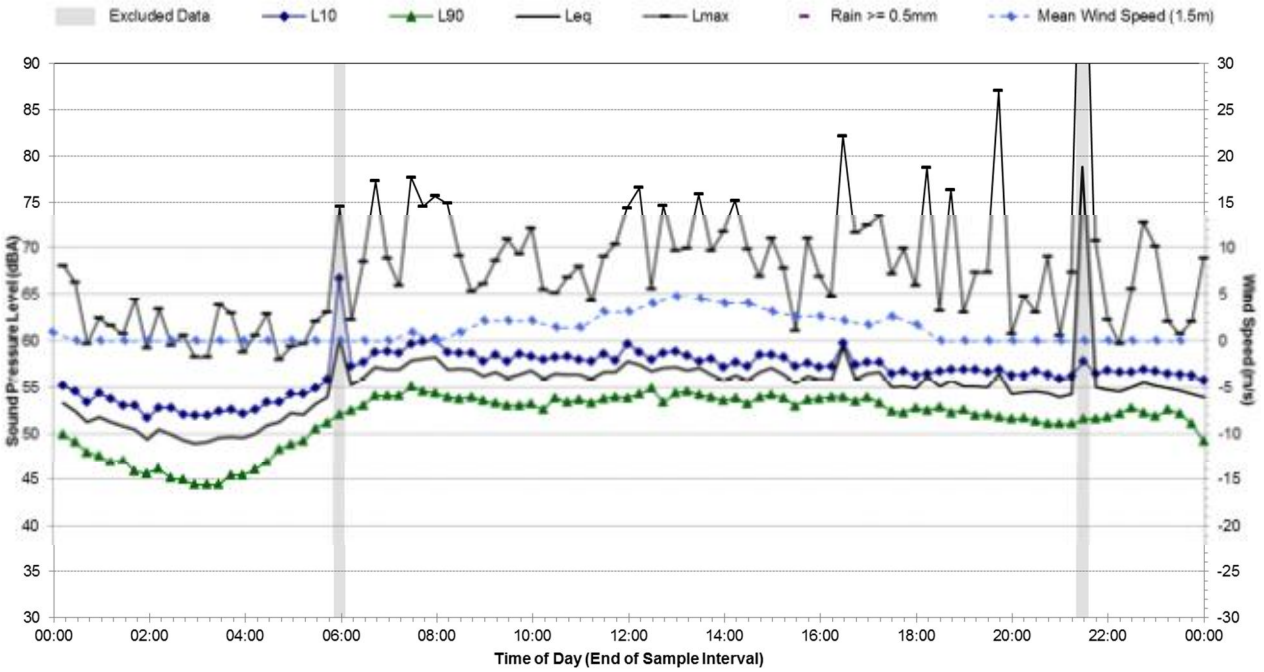
Statistical Ambient Noise Levels

L2 - Friday, 23 May 2014



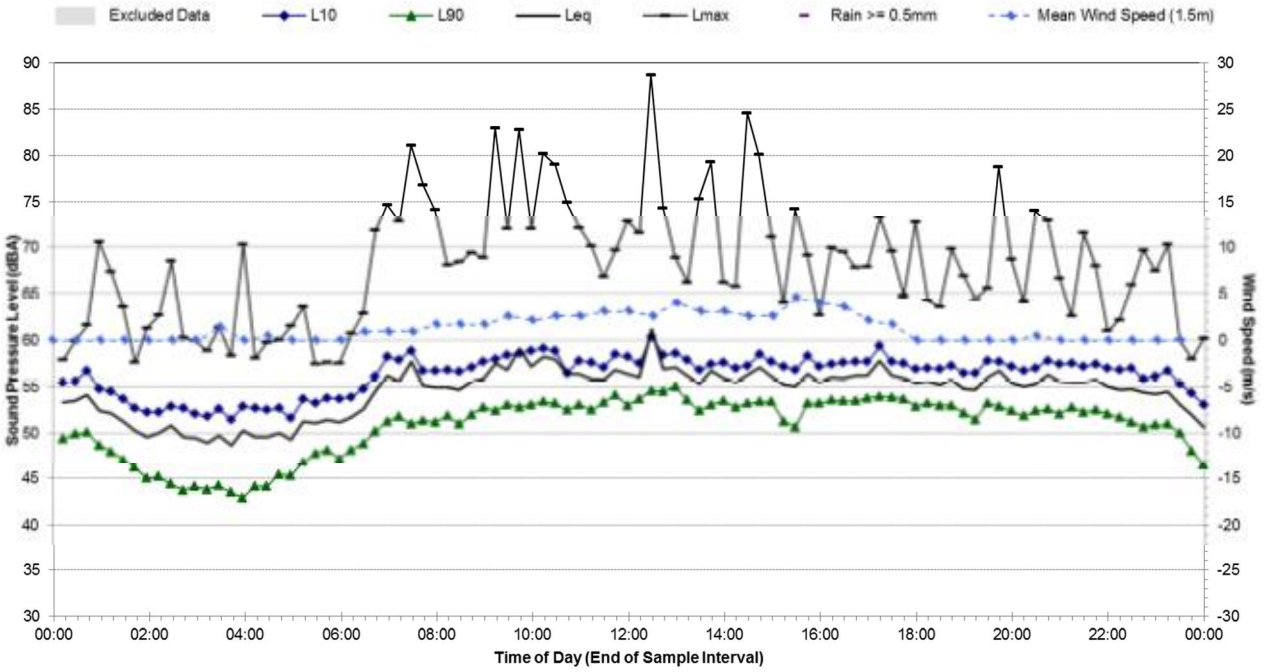
Statistical Ambient Noise Levels

L2 - Saturday, 24 May 2014



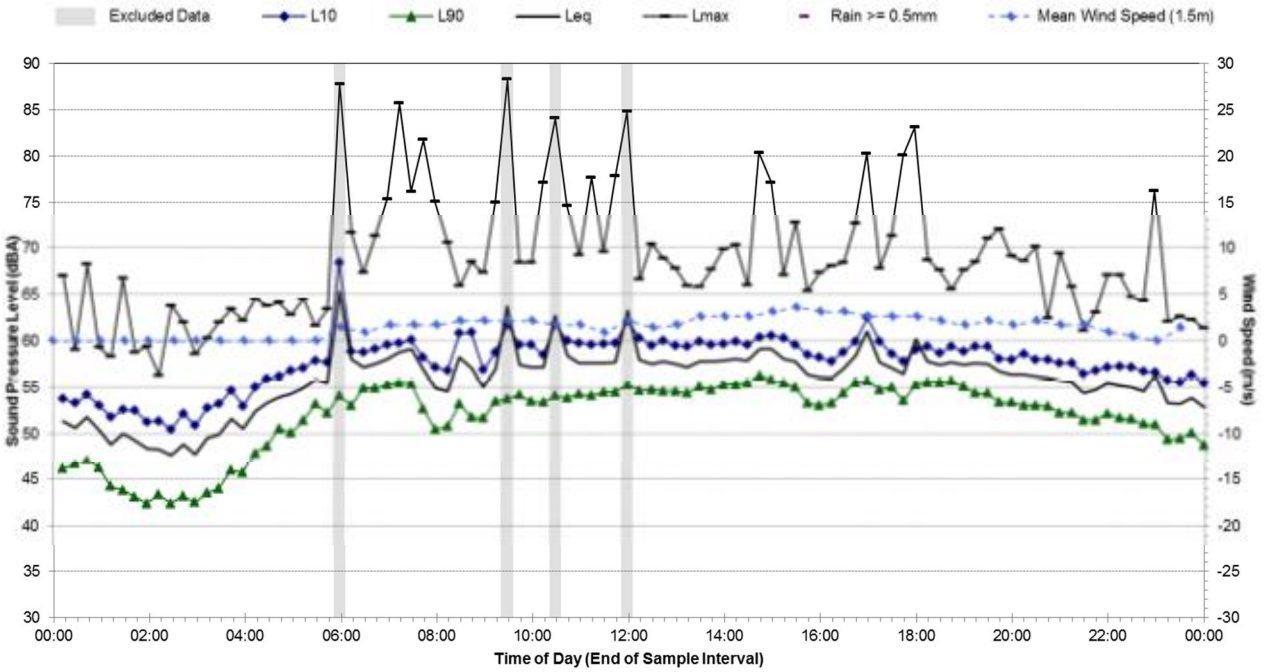
Statistical Ambient Noise Levels

L2 - Sunday, 25 May 2014



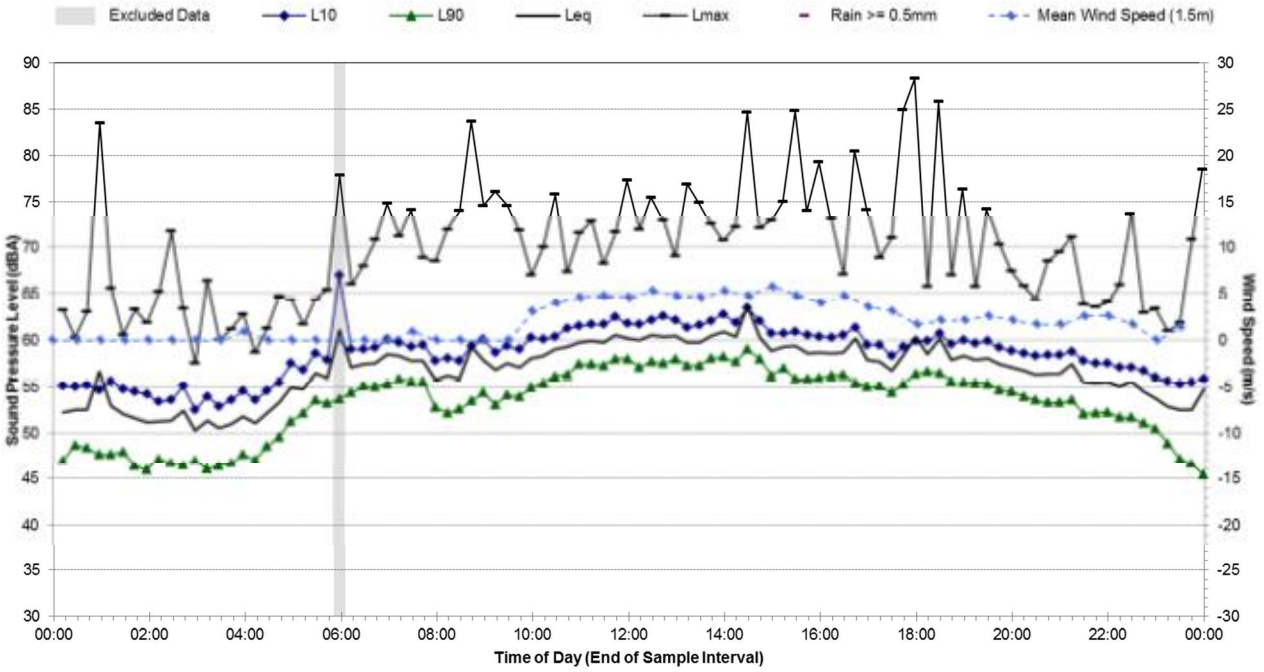
Statistical Ambient Noise Levels

L2 - Monday, 26 May 2014



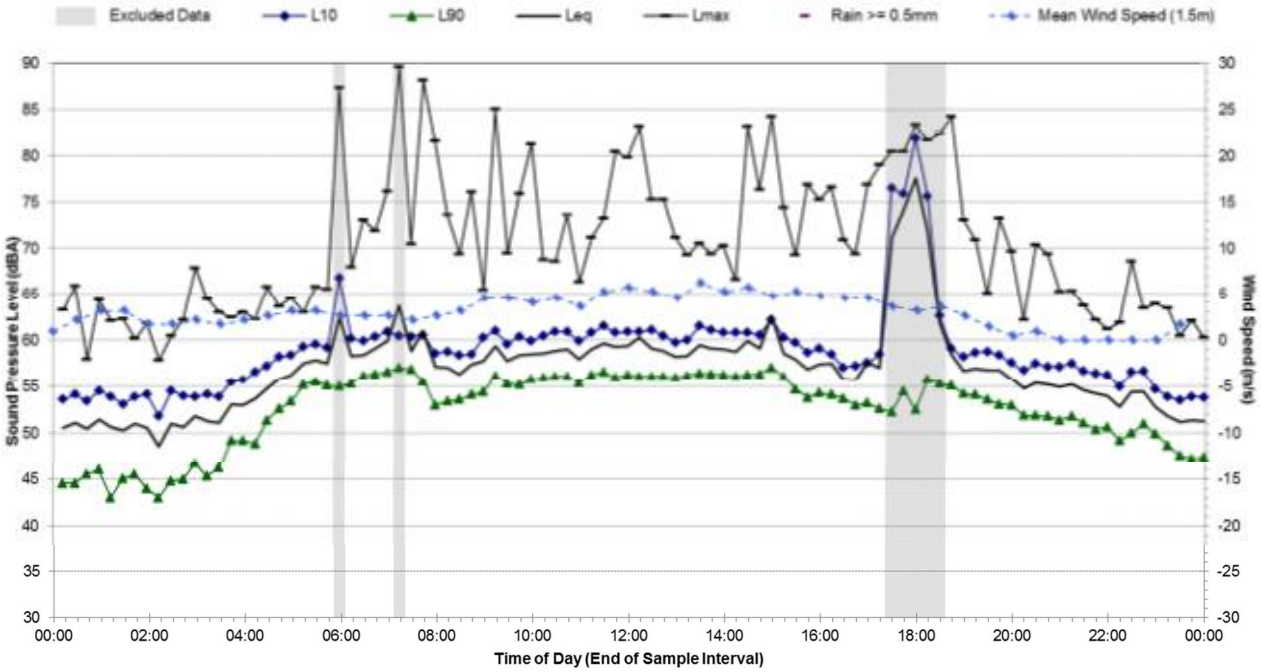
Statistical Ambient Noise Levels

L2 - Tuesday, 27 May 2014



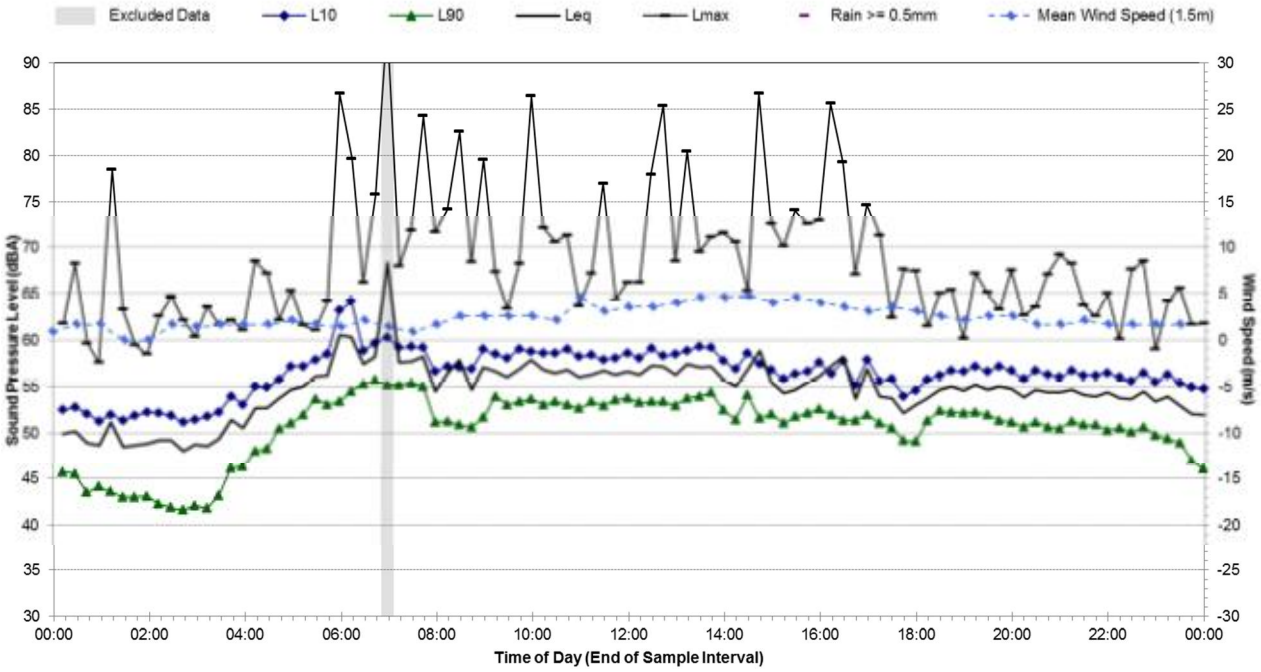
Statistical Ambient Noise Levels

L2 - Wednesday, 28 May 2014



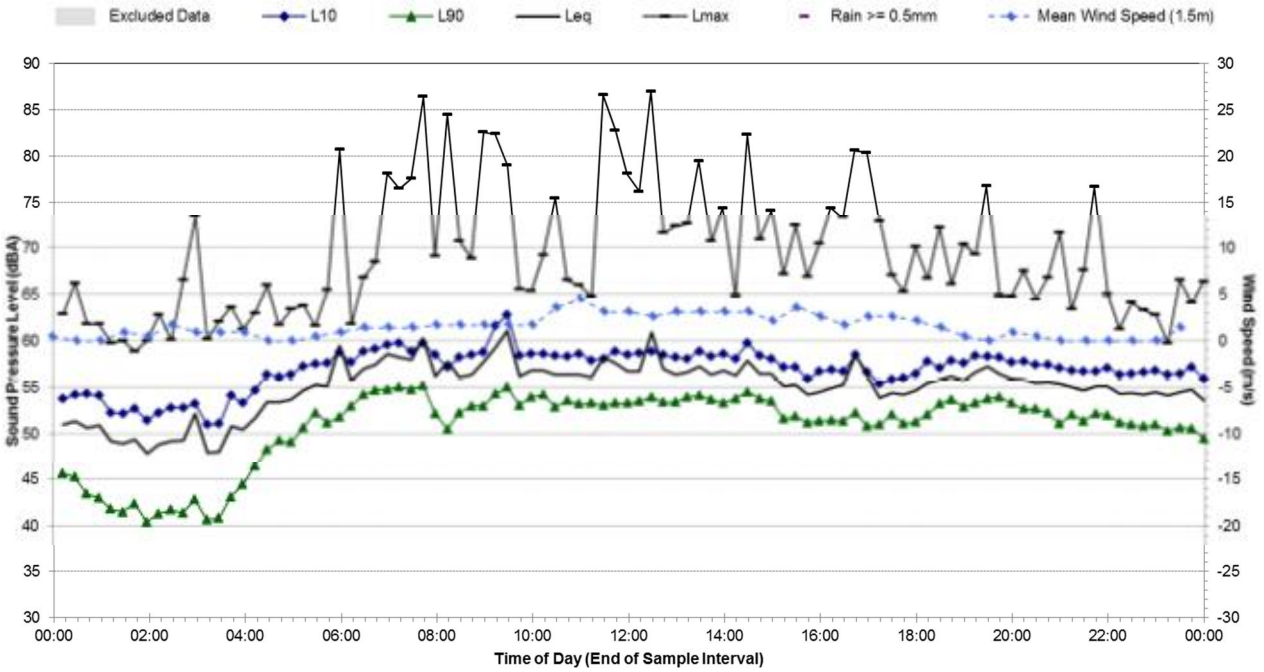
Statistical Ambient Noise Levels

L2 - Thursday, 29 May 2014



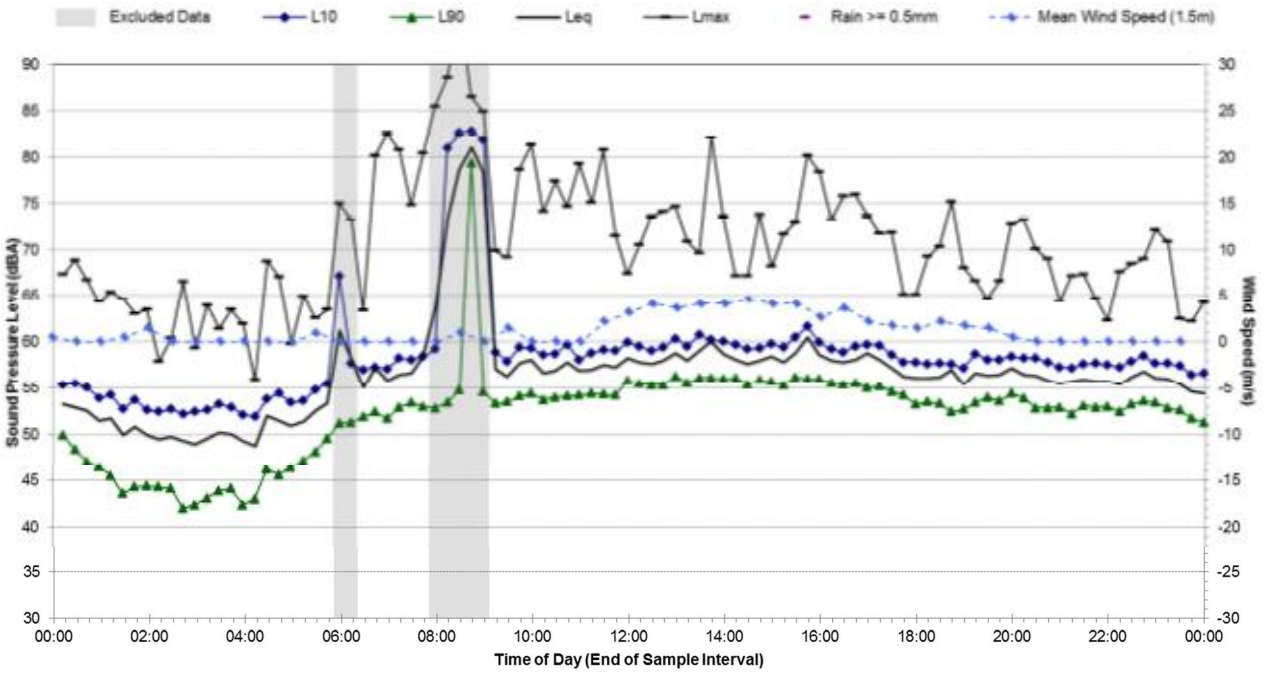
Statistical Ambient Noise Levels

L2 - Friday, 30 May 2014



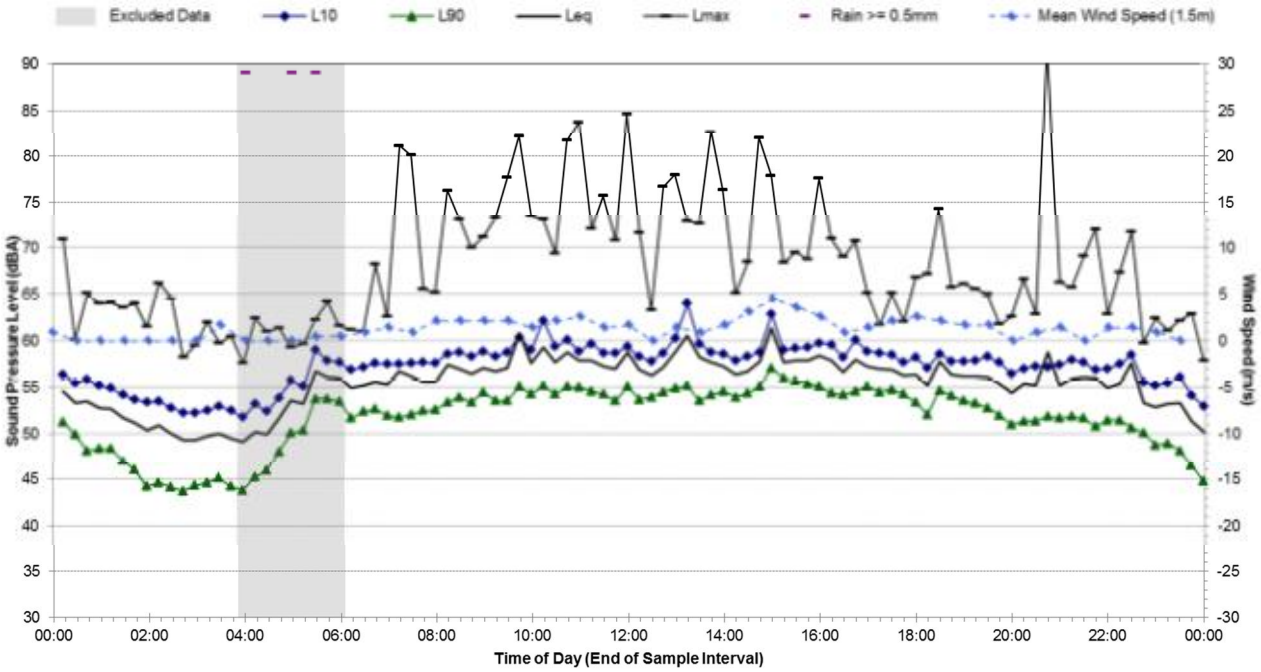
Statistical Ambient Noise Levels

L2 - Saturday, 31 May 2014



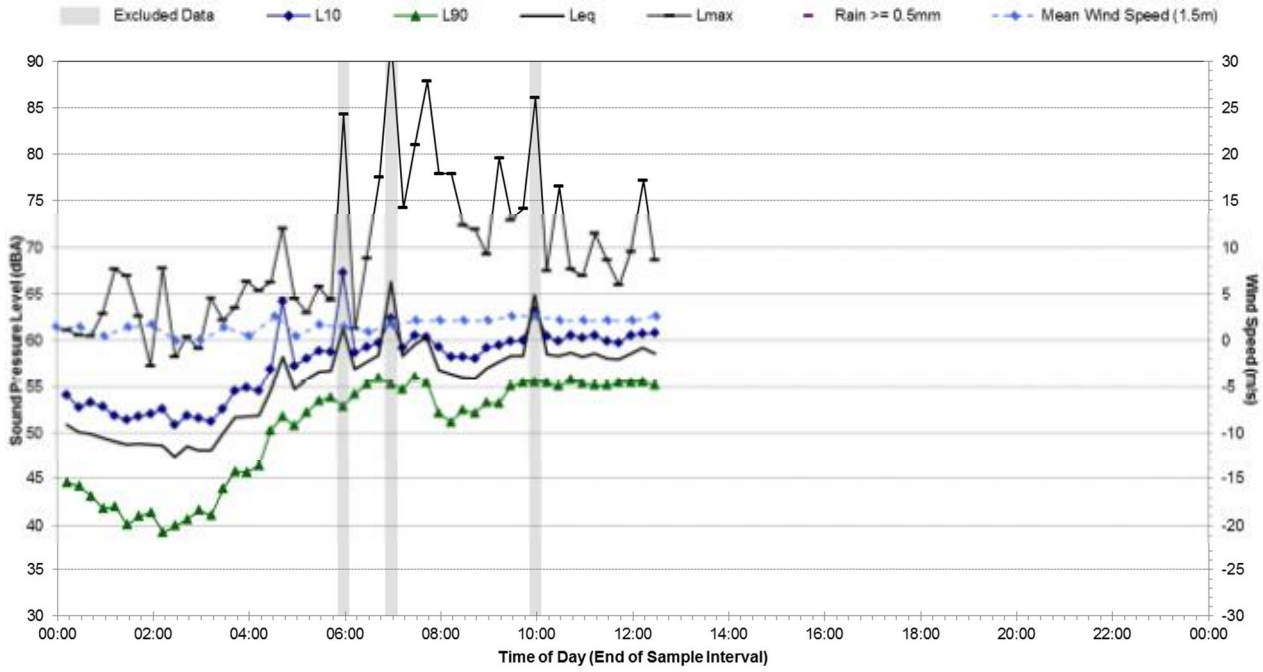
Statistical Ambient Noise Levels

L2 - Sunday, 1 June 2014



Statistical Ambient Noise Levels

L2 - Monday, 2 June 2014



Ambient Noise Monitoring Results

Noise Monitoring Location:	**L3**
Noise Monitoring Address:	**311 King Georges Road, Beverly Hills**

Logger Device Type: SVAN957
Logger Serial No: 23293

Ambient noise logger deployed outside residential address 311 King Georges Road, Beverly Hills. Logger located in front yard on eastern side of property.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from King Georges Road, with a steady flow of traffic throughout the measurement.

Recorded Noise Levels (LAmax):
King Georges Rd Light-vehicle road traffic: typically ~65-79 dBA, King Georges Rd Heavy-vehicle road traffic: 70-85 dBA, Heavy vehicle pneumatic release: 75-89 dBA, Motorbikes and sports cars: ~89-92

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	60	72	75	80
Evening	58	70	73	78
Night-time	46	69	71	78

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	**Noise Level (dBA)**		
	Weekday LAeq(Period)	**Weekend LAeq**(Period)	**Weekly LAeq**(Period)
Number of Valid Days	6	4	N/A
Daytime (7am-10pm)	72	71	71
Night-time (10pm-7am)	69	68	69

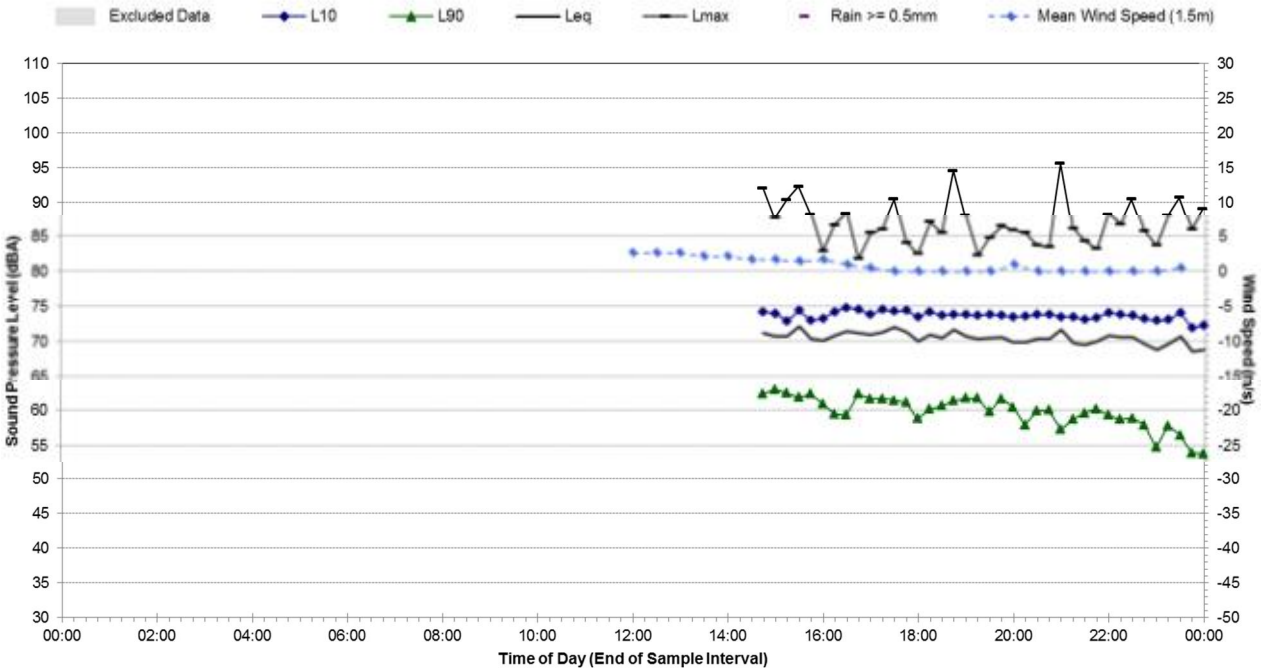
Attended Noise Measurement Results

Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
02/06/2014	10:00	65	73	92

Photo of Noise Monitoring Location

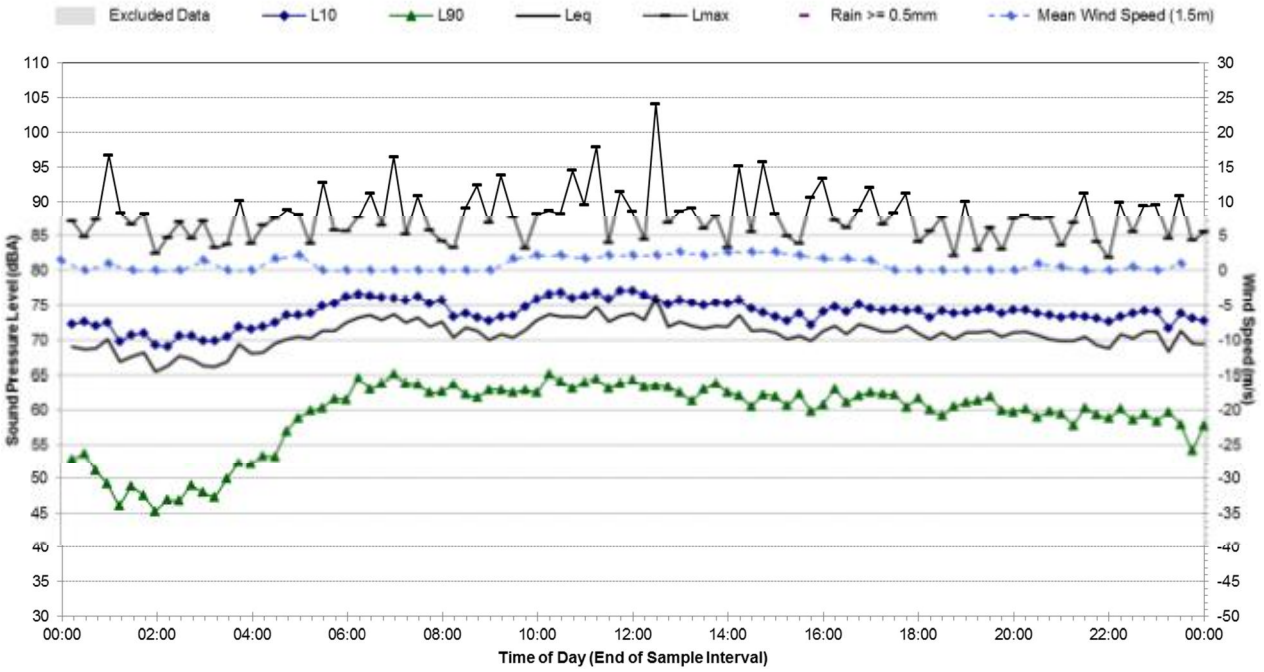
Statistical Ambient Noise Levels

L3 - Thursday, 22 May 2014



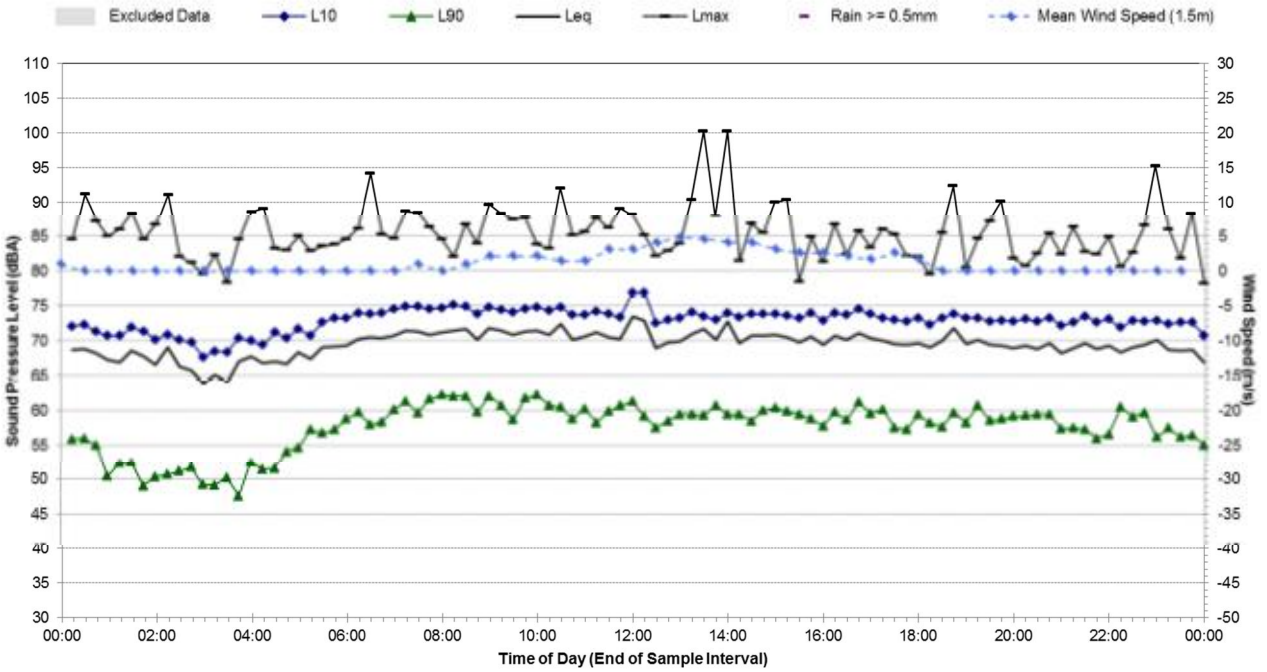
Statistical Ambient Noise Levels

L3 - Friday, 23 May 2014



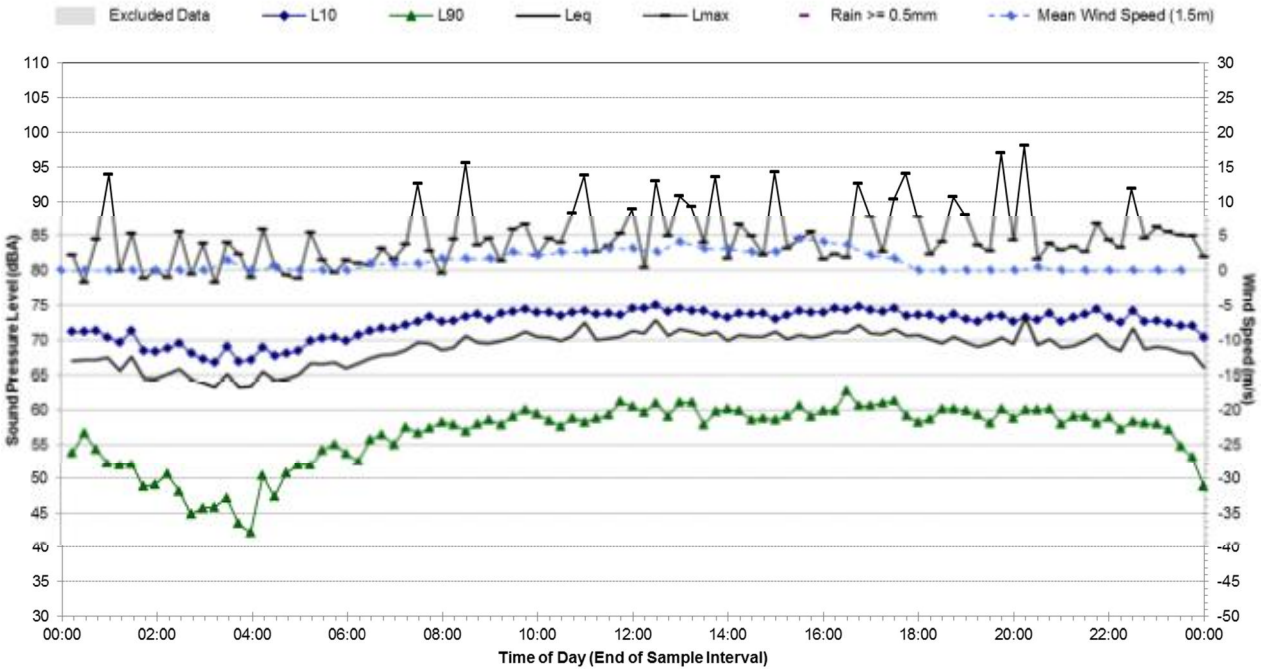
Statistical Ambient Noise Levels

L3 - Saturday, 24 May 2014



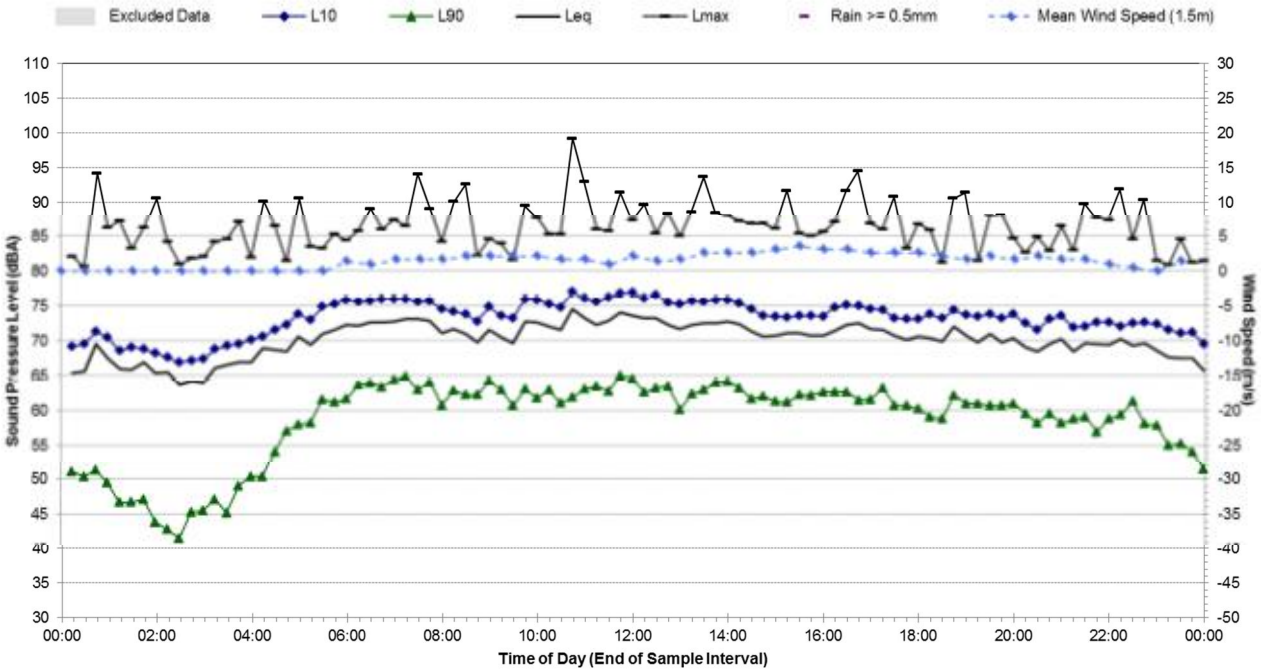
Statistical Ambient Noise Levels

L3 - Sunday, 25 May 2014



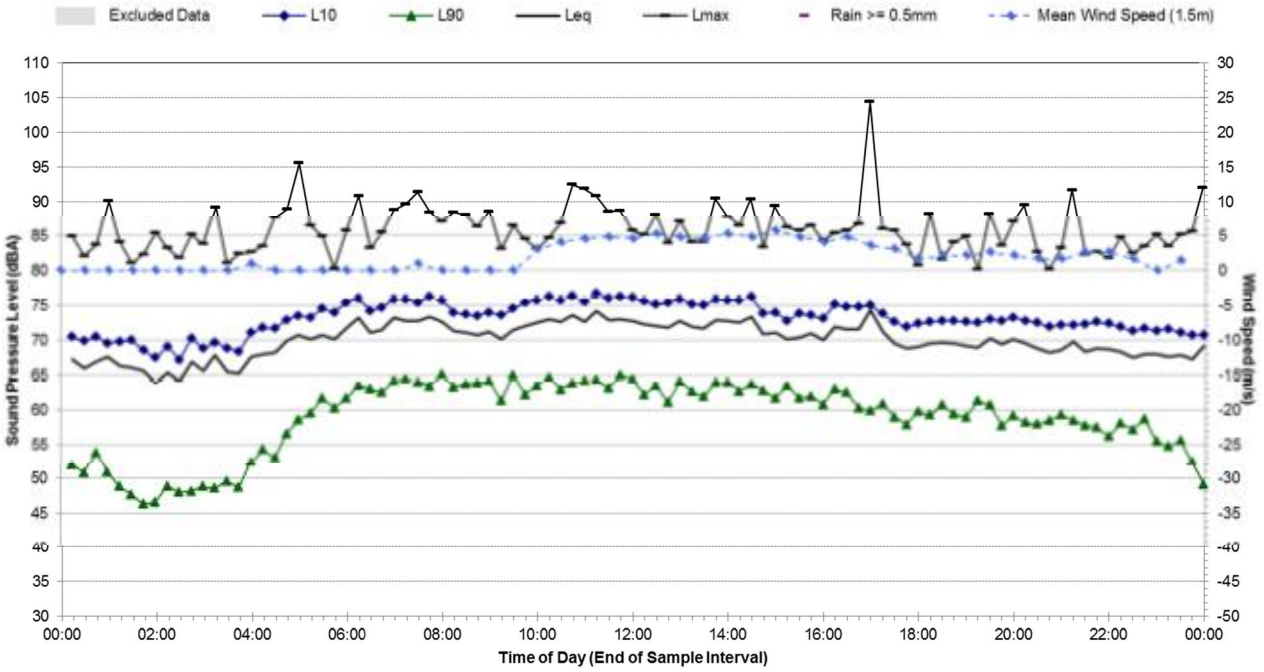
Statistical Ambient Noise Levels

L3 - Monday, 26 May 2014



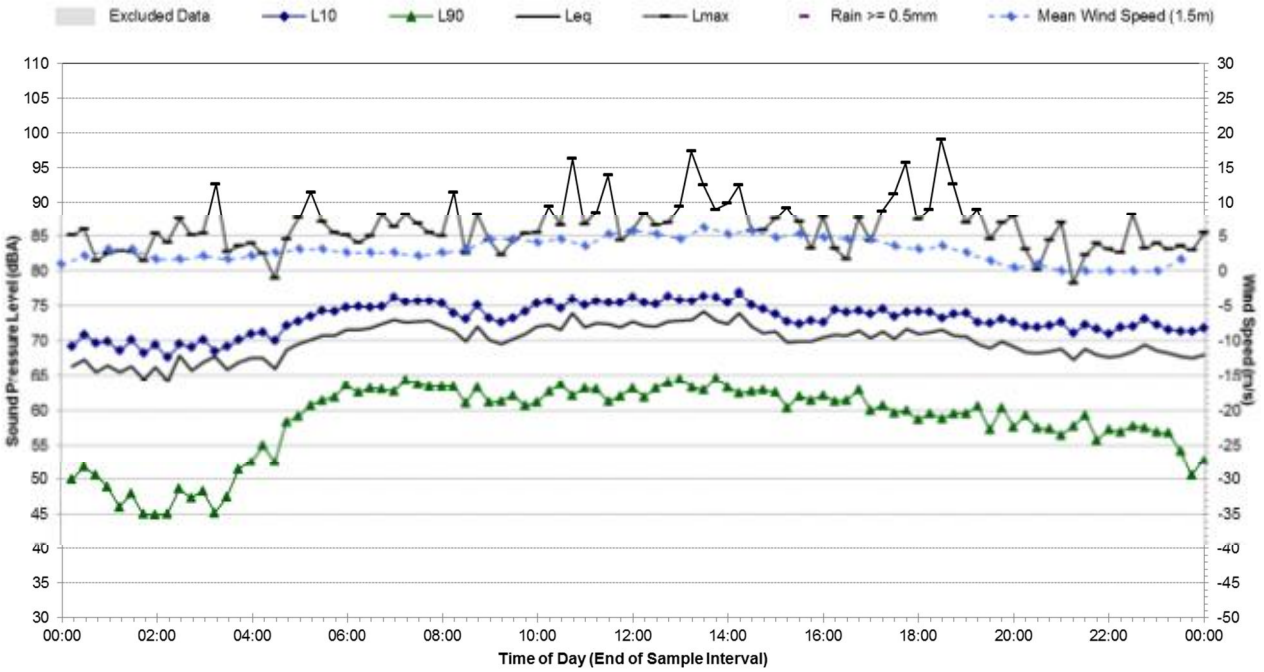
Statistical Ambient Noise Levels

L3 - Tuesday, 27 May 2014



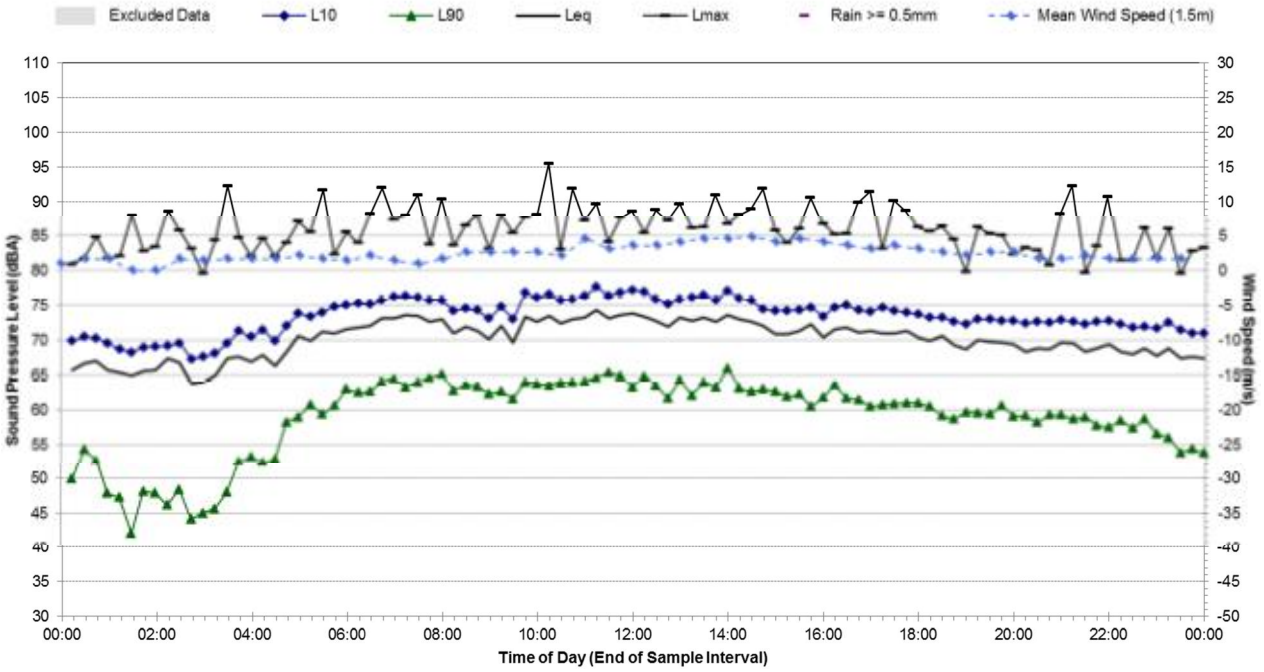
Statistical Ambient Noise Levels

L3 - Wednesday, 28 May 2014



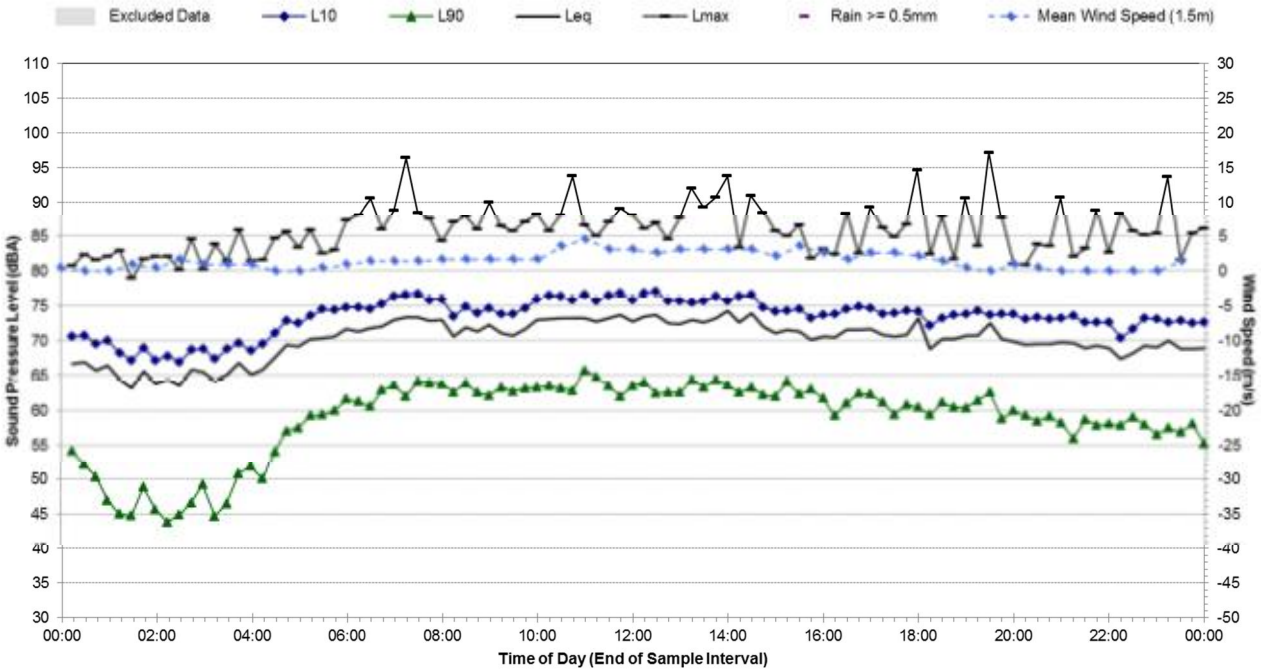
Statistical Ambient Noise Levels

L3 - Thursday, 29 May 2014



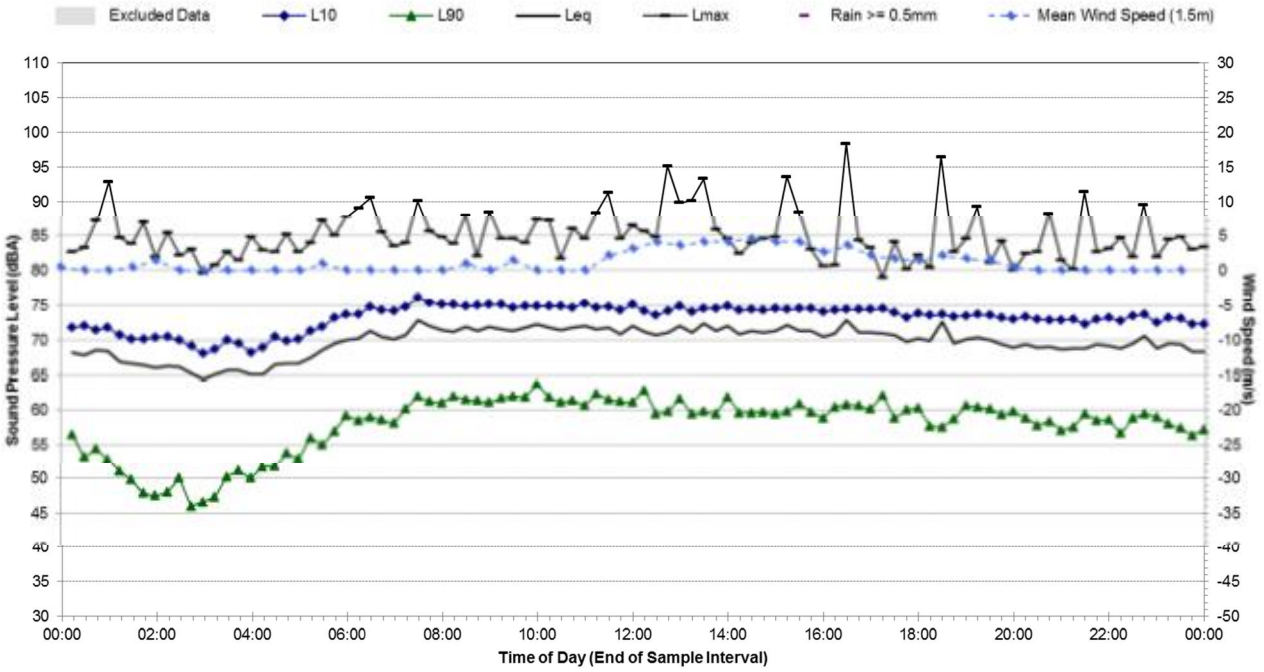
Statistical Ambient Noise Levels

L3 - Friday, 30 May 2014



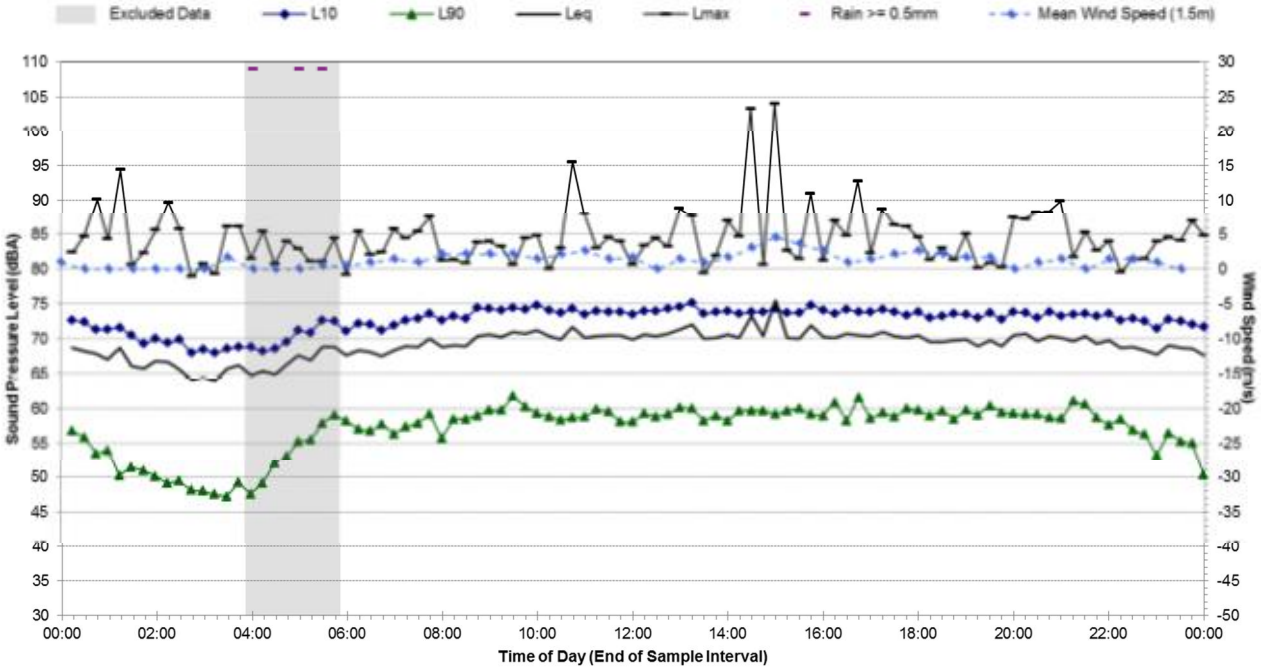
Statistical Ambient Noise Levels

L3 - Saturday, 31 May 2014



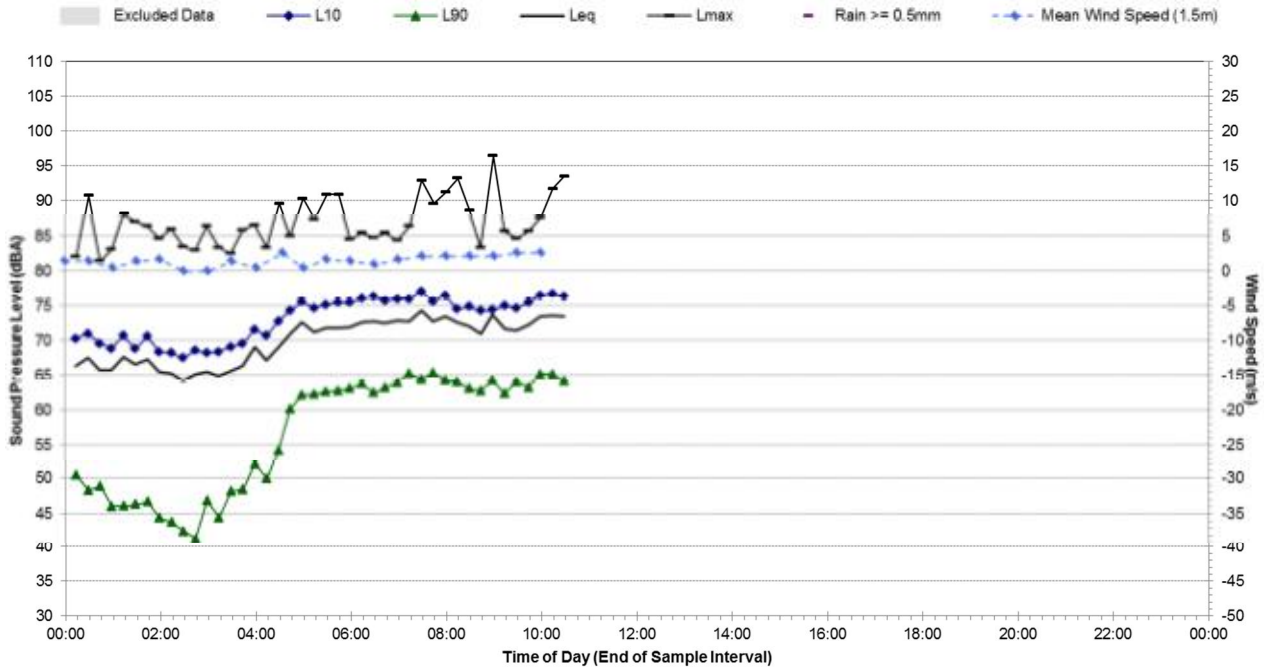
Statistical Ambient Noise Levels

L3 - Sunday, 1 June 2014



Statistical Ambient Noise Levels

L3 - Monday, 2 June 2014



Ambient Noise Monitoring Results

Noise Monitoring Location:	**L4**
Noise Monitoring Address:	**36 Allambee Crescent, Beverly Hills**

Logger Device Type: SVAN957
Logger Serial No: 27523

Ambient noise logger deployed outside residential address 36 Allambee Crescent, Beverly Hills. Logger located in back yard on western side of property.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the King Georges Road and M5, with a steady flow of traffic throughout the measurement. Noise from nearby birds and dogs were also audible during the attended measurements.

Recorded Noise Levels (LAmax):
King Georges Rd and M5 road traffic: 50-60 dBA, Birds: 55-72 dBA , Dog barks: 70-84

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	47	57	59	66
Evening	46	53	54	59
Night-time	40	52	52	58

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	**Noise Level (dBA)**		
	Weekday LAeq(Period)	**Weekend LAeq**(Period)	**Weekly LAeq**(Period)
Number of Valid Days	7	4	N/A
Daytime (7am-10pm)	56	56	56
Night-time (10pm-7am)	52	50	52

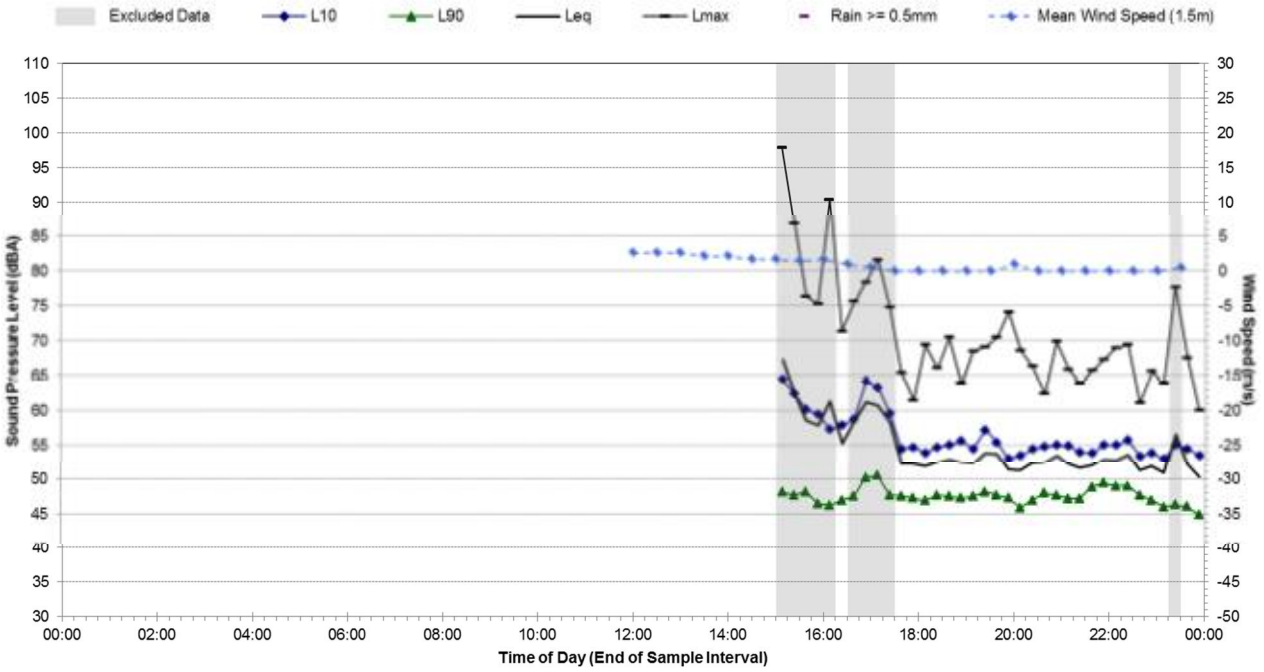
Attended Noise Measurement Results

Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
22/05/2014	15:00	46	59	84

Photo of Noise Monitoring Location

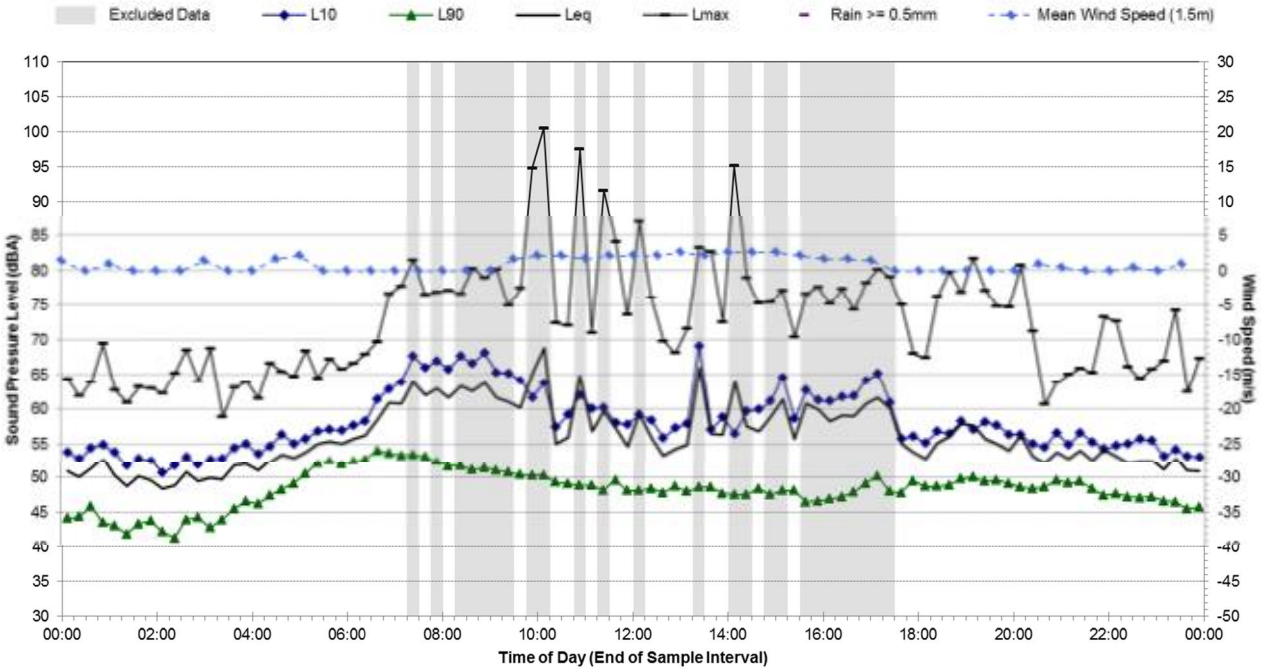
Statistical Ambient Noise Levels

L4 - Thursday, 22 May 2014



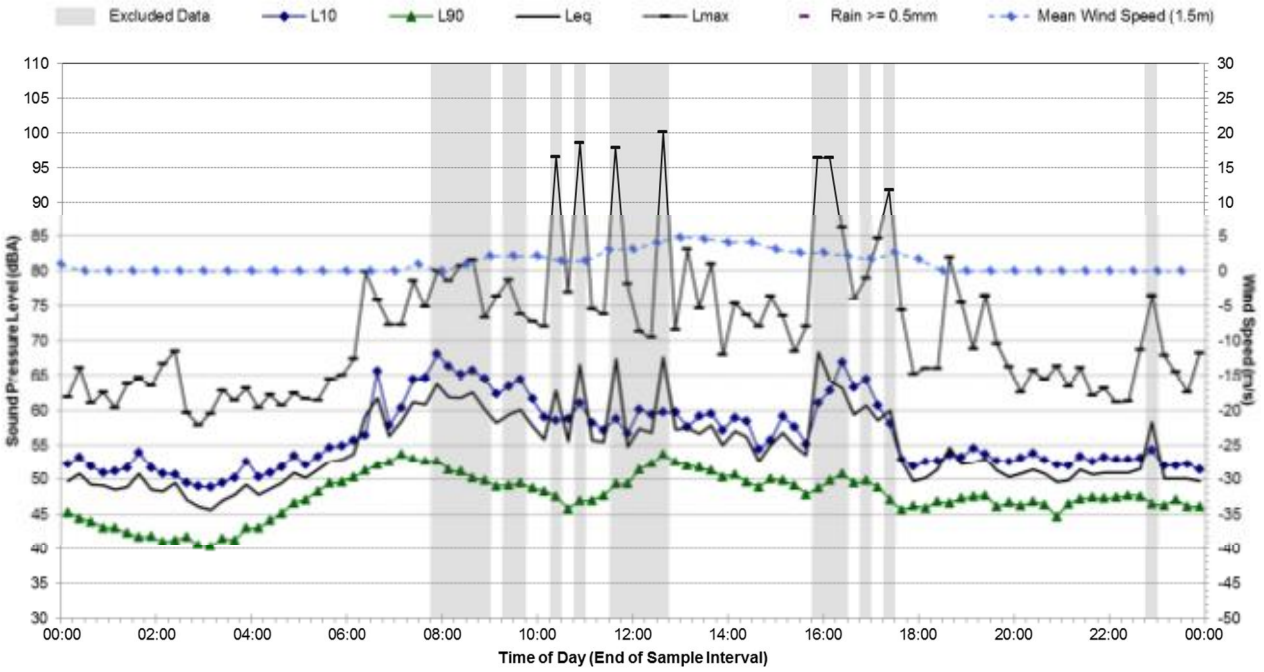
Statistical Ambient Noise Levels

L4 - Friday, 23 May 2014



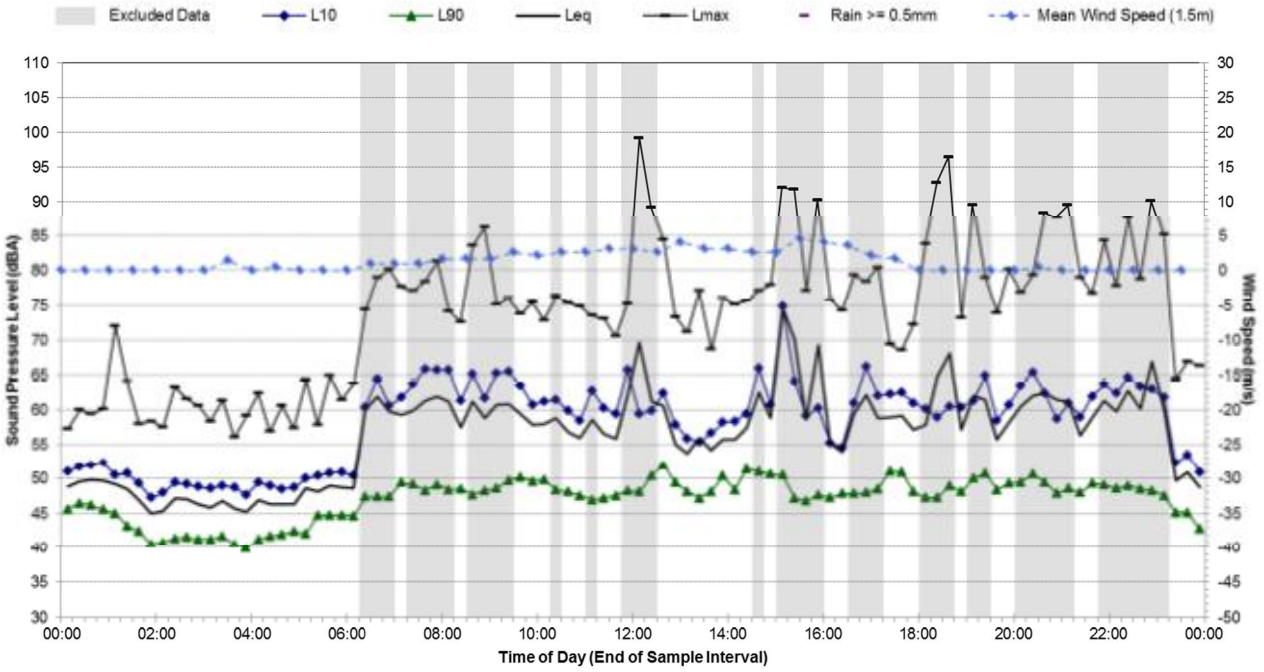
Statistical Ambient Noise Levels

L4 - Saturday, 24 May 2014



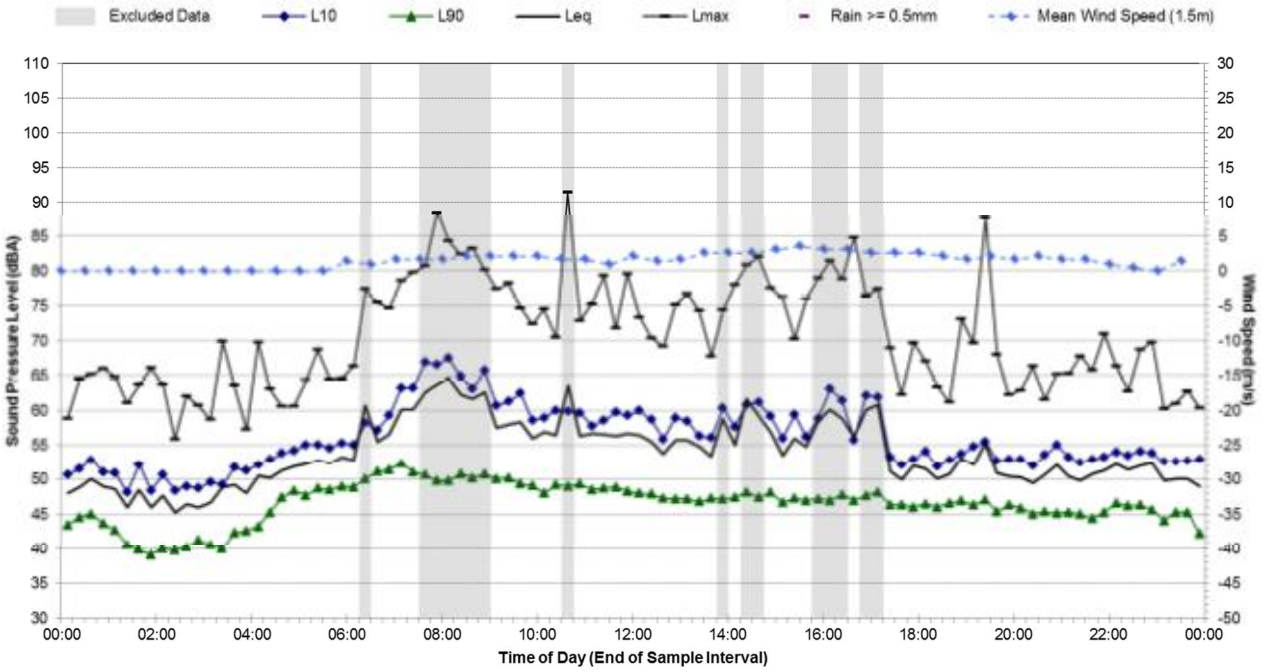
Statistical Ambient Noise Levels

L4 - Sunday, 25 May 2014



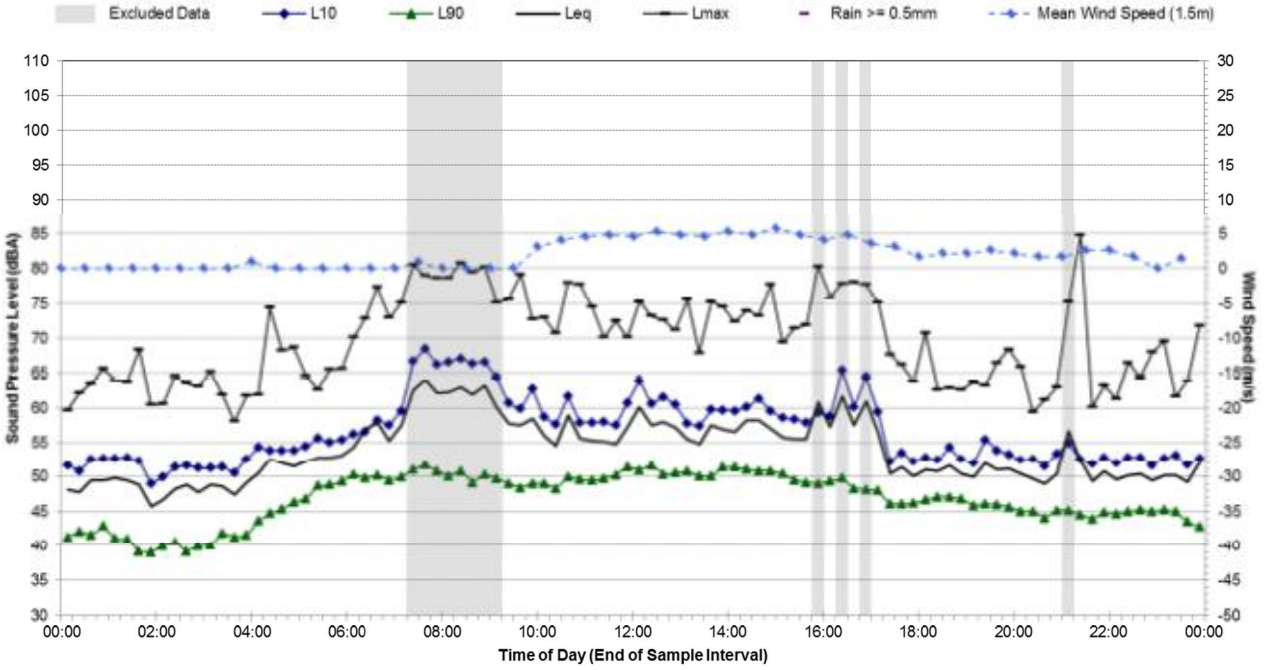
Statistical Ambient Noise Levels

L4 - Monday, 26 May 2014



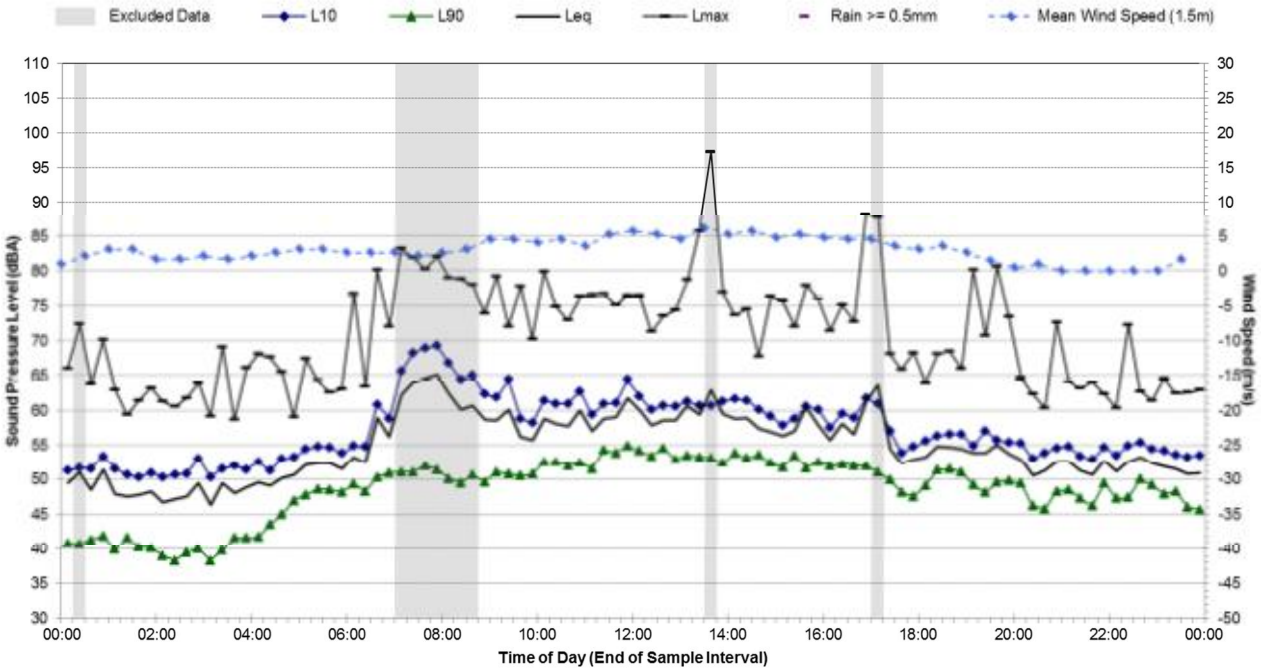
Statistical Ambient Noise Levels

L4 - Tuesday, 27 May 2014



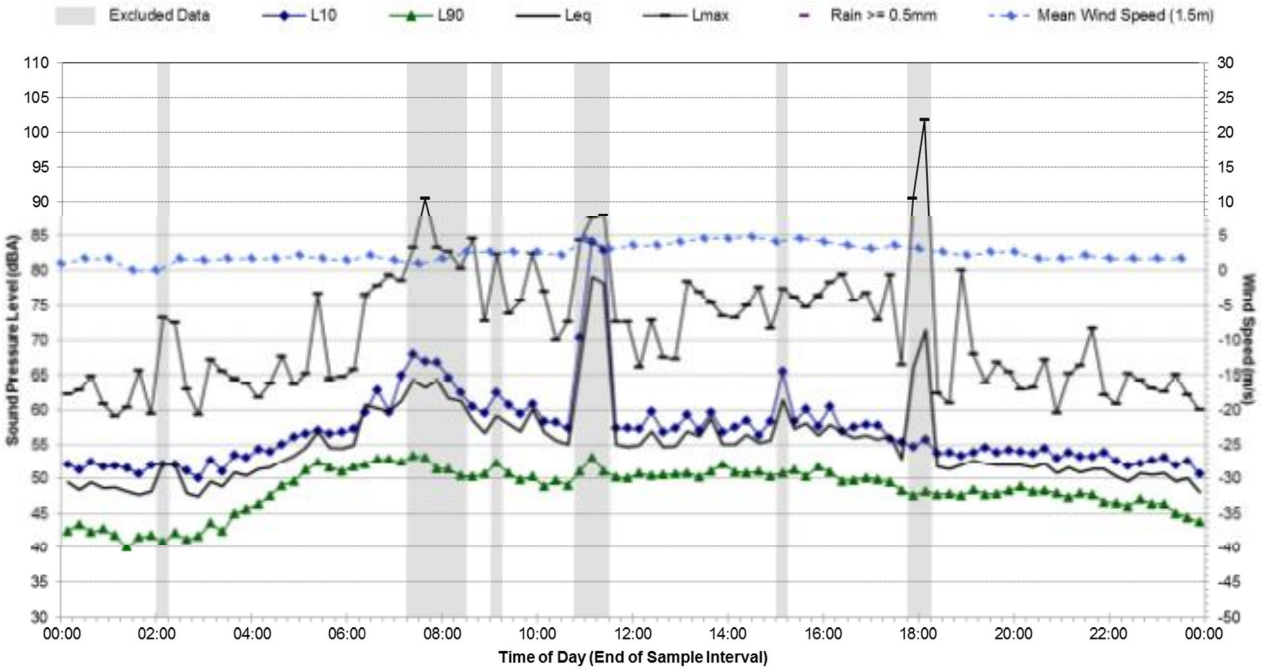
Statistical Ambient Noise Levels

L4 - Wednesday, 28 May 2014



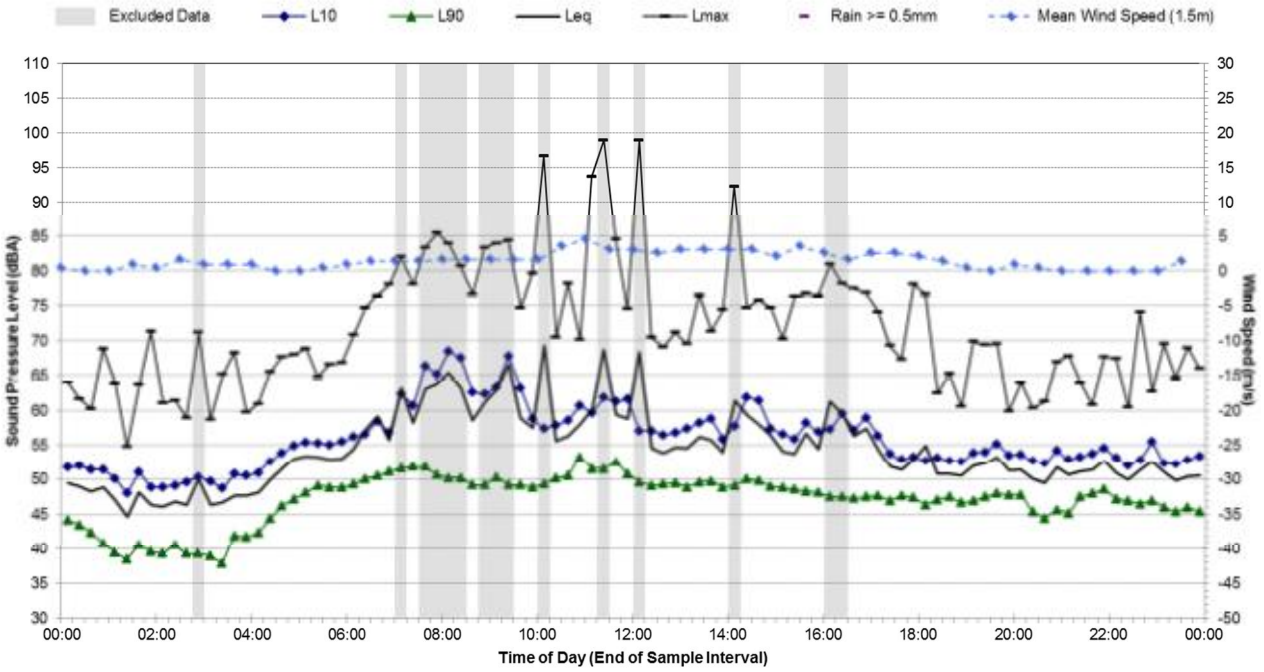
Statistical Ambient Noise Levels

L4 - Thursday, 29 May 2014



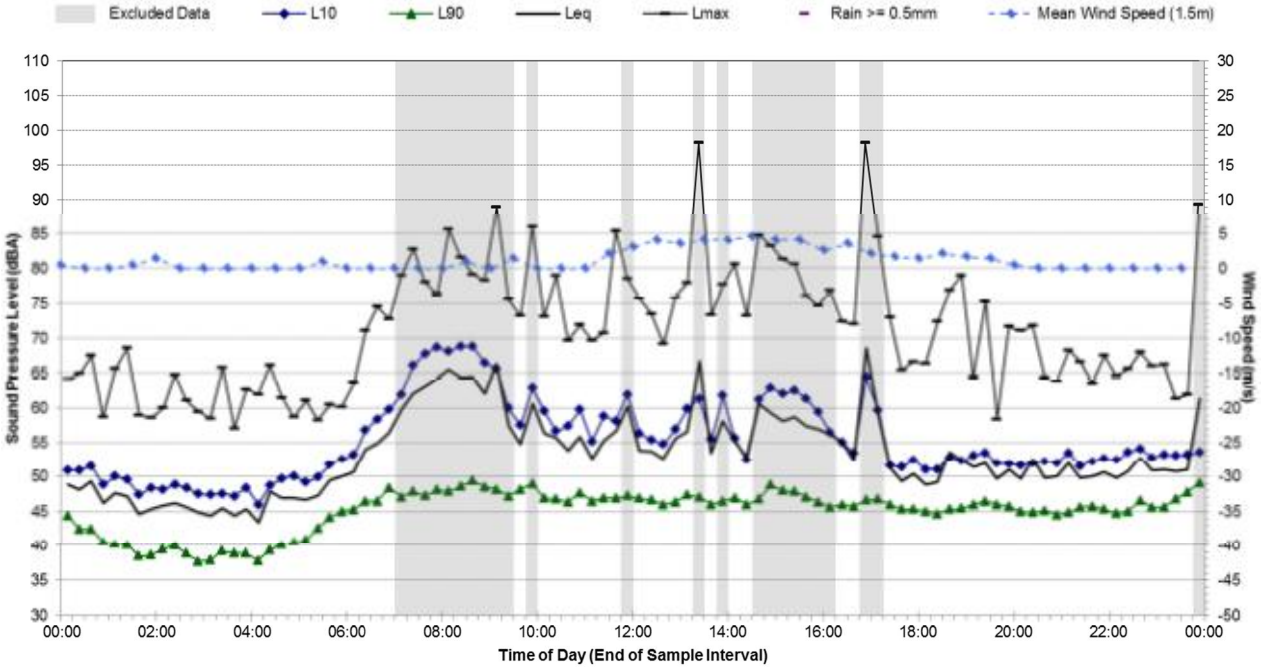
Statistical Ambient Noise Levels

L4 - Friday, 30 May 2014



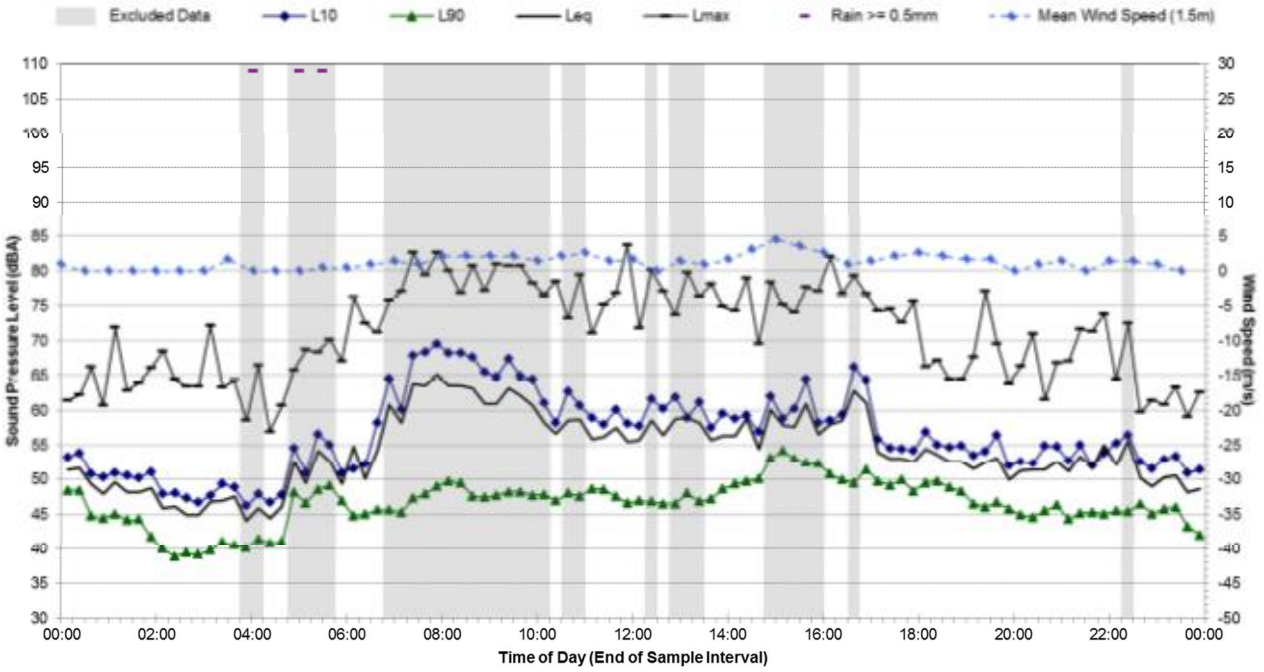
Statistical Ambient Noise Levels

L4 - Saturday, 31 May 2014



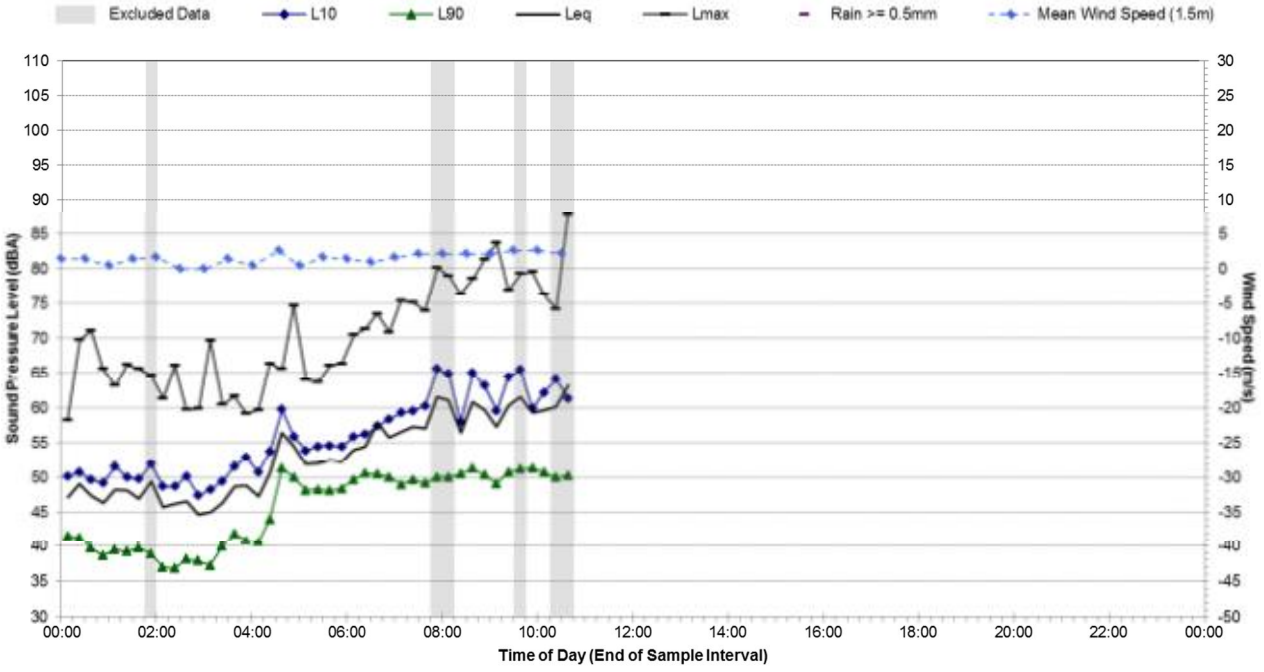
Statistical Ambient Noise Levels

L4 - Sunday, 1 June 2014



Statistical Ambient Noise Levels

L4 - Monday, 2 June 2014



Noise Monitoring Location:	**L5**
Noise Monitoring Address:	**6 Allambee Crescent, Beverly Hills**

Logger Device Type: SVAN957
Logger Serial No: 21857

Ambient noise logger deployed outside residential address 6 Allambee Crescent, Beverly Hills. Logger located in front yard on northern side of property.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the M5, King Georges Rd, and Cooloongatta Rd, with a steady flow of traffic throughout the measurement. Insect noise was also audible during the attended measurements.

Recorded Noise Levels (LAmax):
M5 road traffic: ~55-63 dBA, Cooloongatta road traffic: 55-62 dBA, King Georges road traffic: ~50-55 dBA, Insects: 50-53 dBA, Air traffic: ~59 dBA.

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	51	56	57	61
Evening	50	54	55	60
Night-time	44	52	54	57

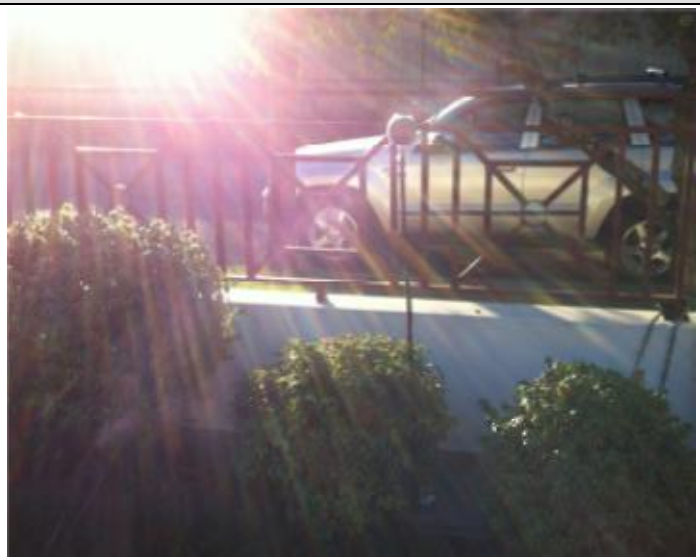
Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	**Noise Level (dBA)**		
	Weekday LAeq(Period)	**Weekend LAeq**(Period)	**Weekly LAeq**(Period)
Number of Valid Days	6	4	N/A
Daytime (7am-10pm)	56	54	55
Night-time (10pm-7am)	53	52	52

Attended Noise Measurement Results

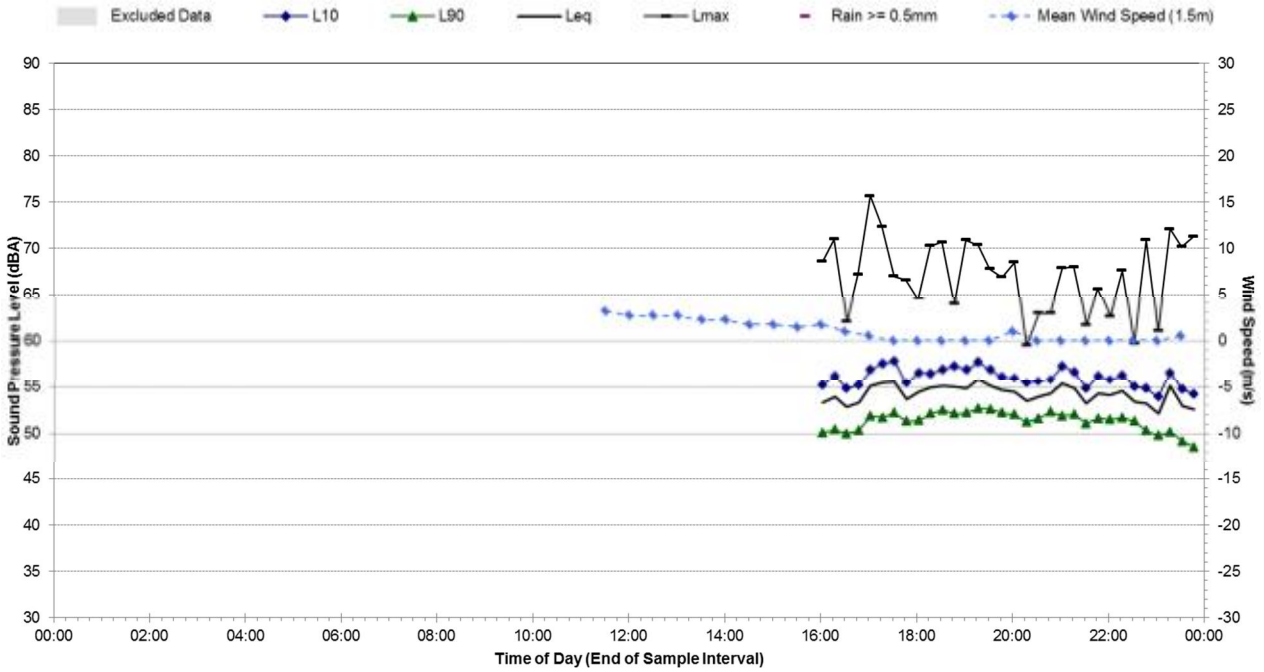
Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
22/05/2014	17:40	52	56	69

Photo of Noise Monitoring Location



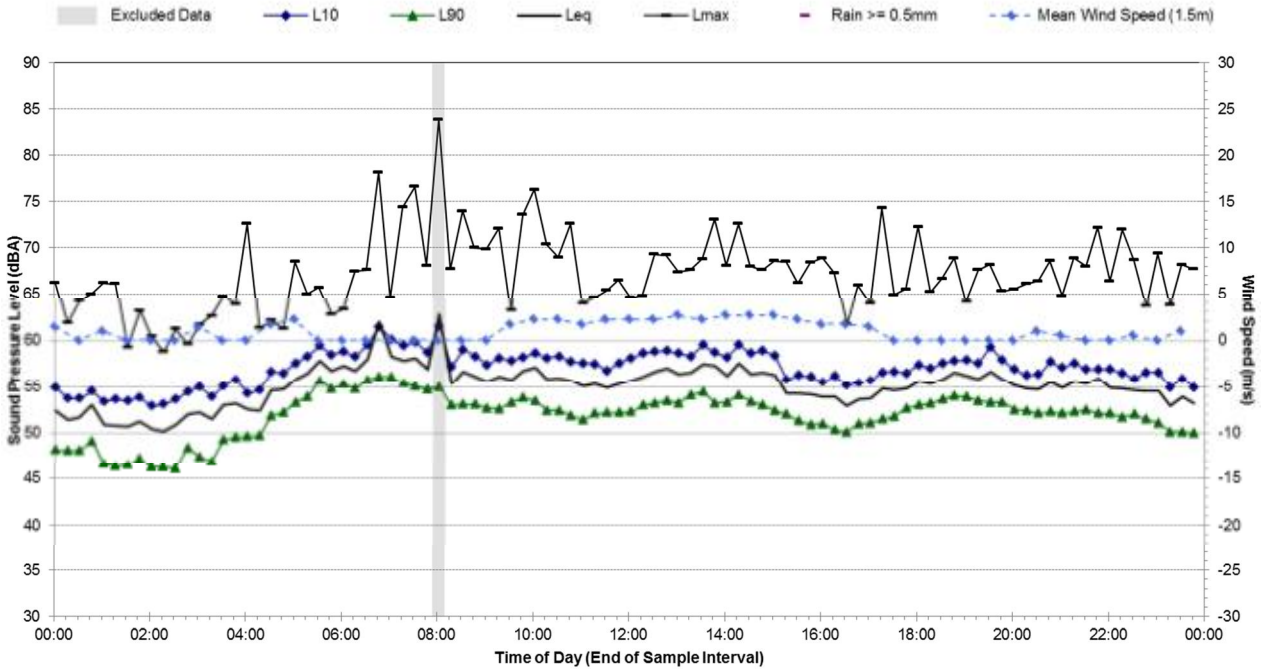
Statistical Ambient Noise Levels

L5 - Thursday, 22 May 2014



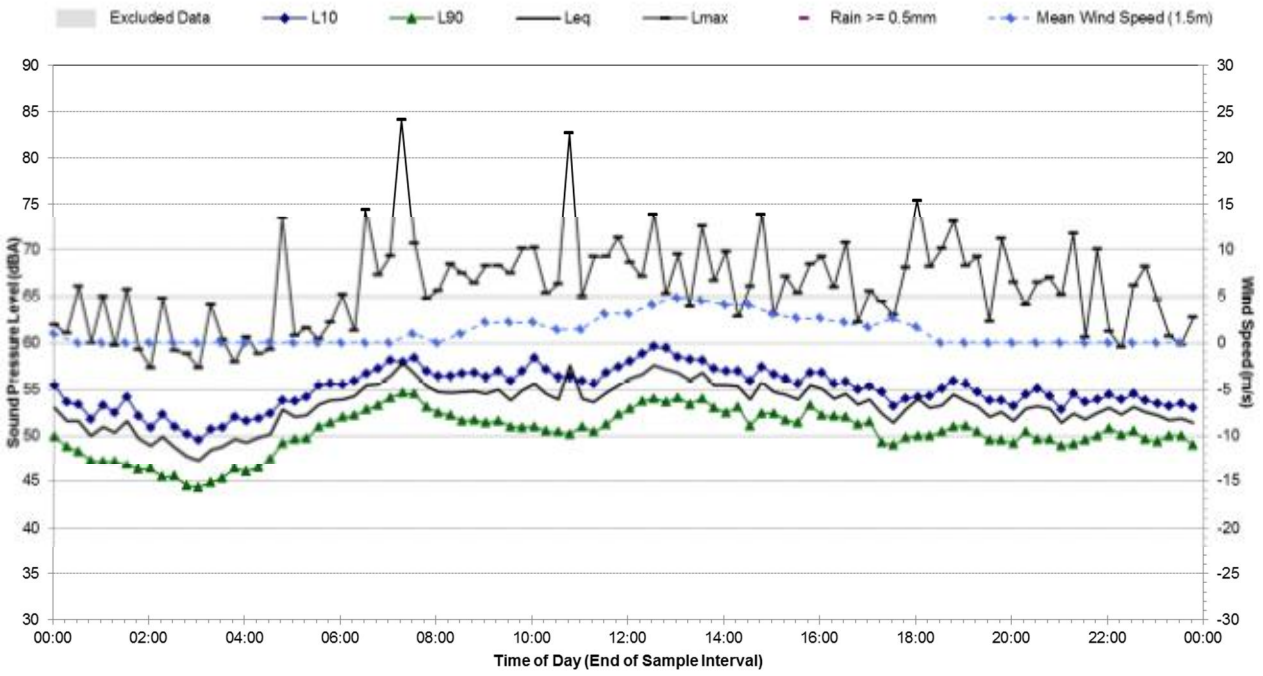
Statistical Ambient Noise Levels

L5 - Friday, 23 May 2014



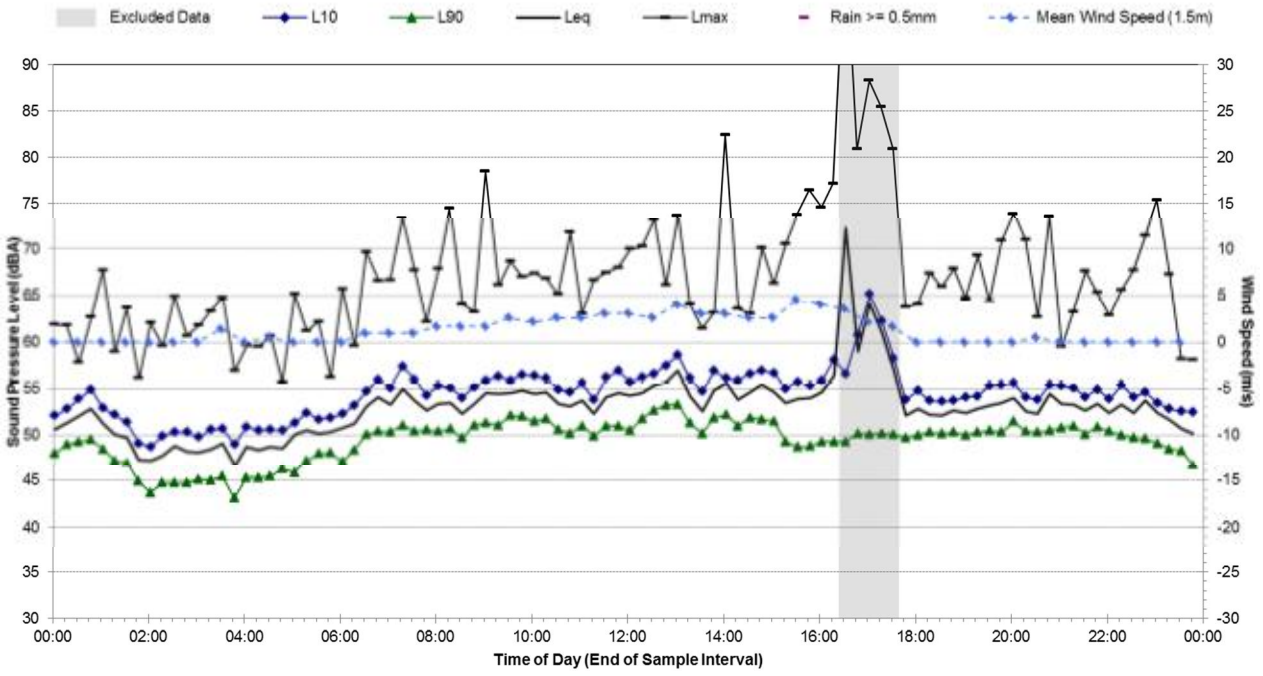
Statistical Ambient Noise Levels

L5 - Saturday, 24 May 2014



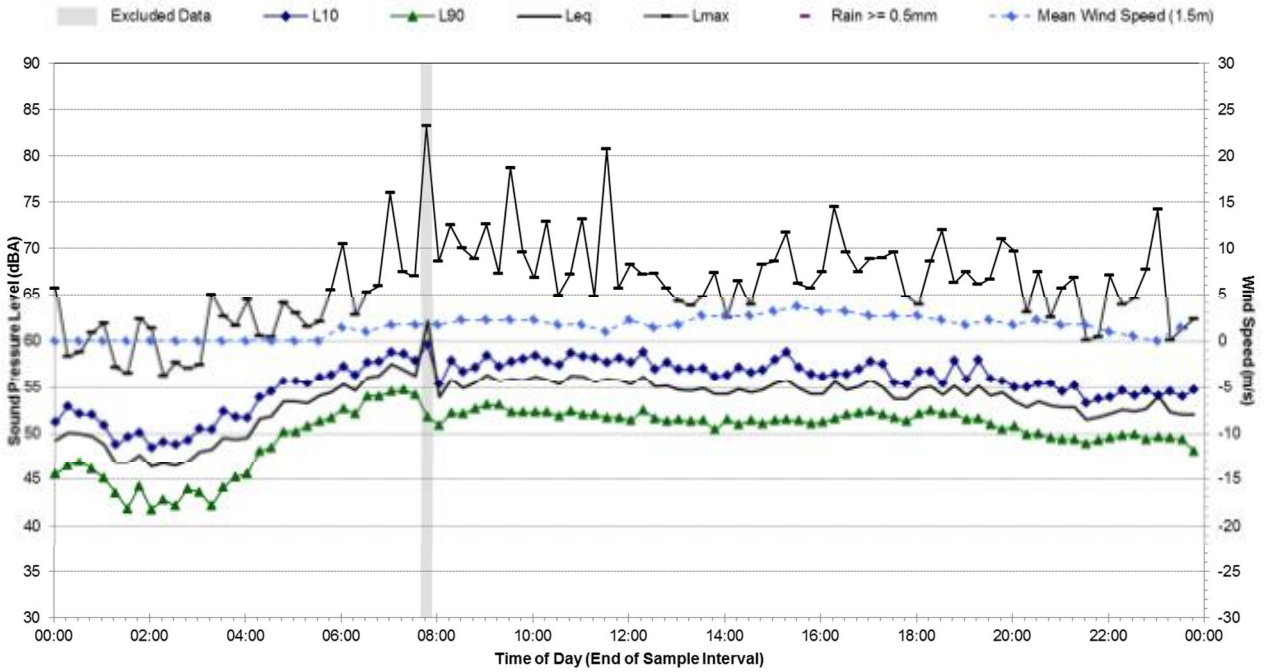
Statistical Ambient Noise Levels

L5 - Sunday, 25 May 2014



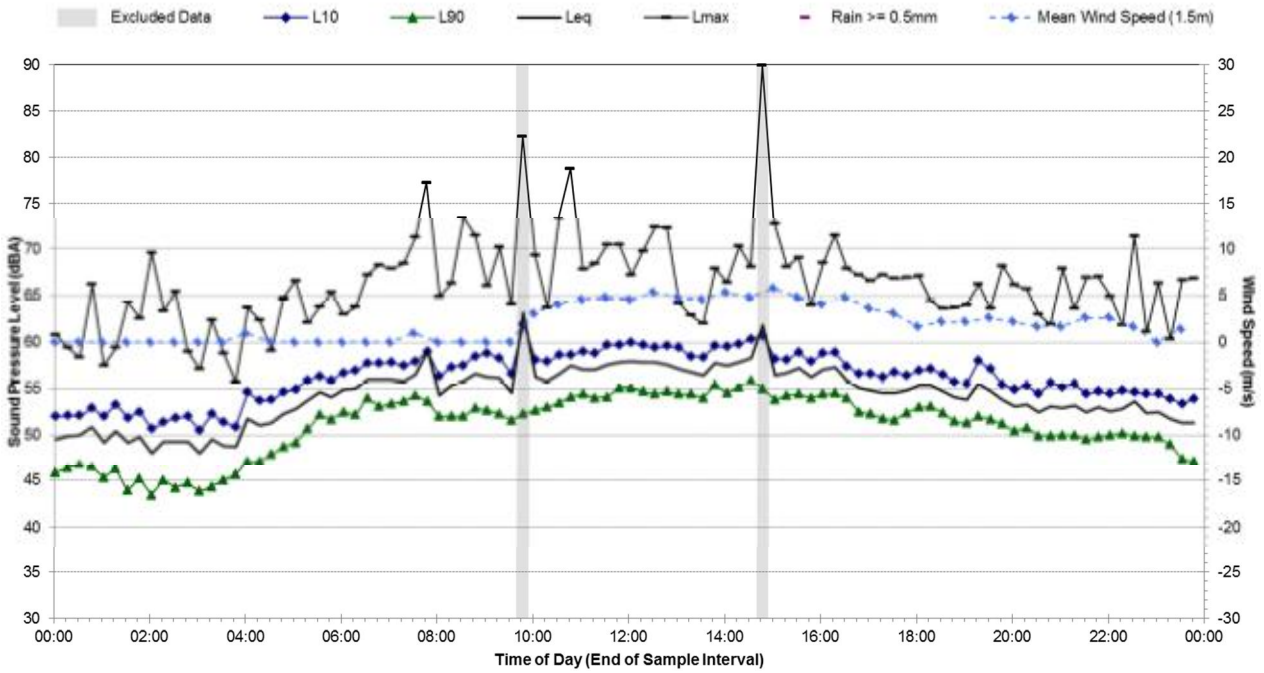
Statistical Ambient Noise Levels

L5 - Monday, 26 May 2014



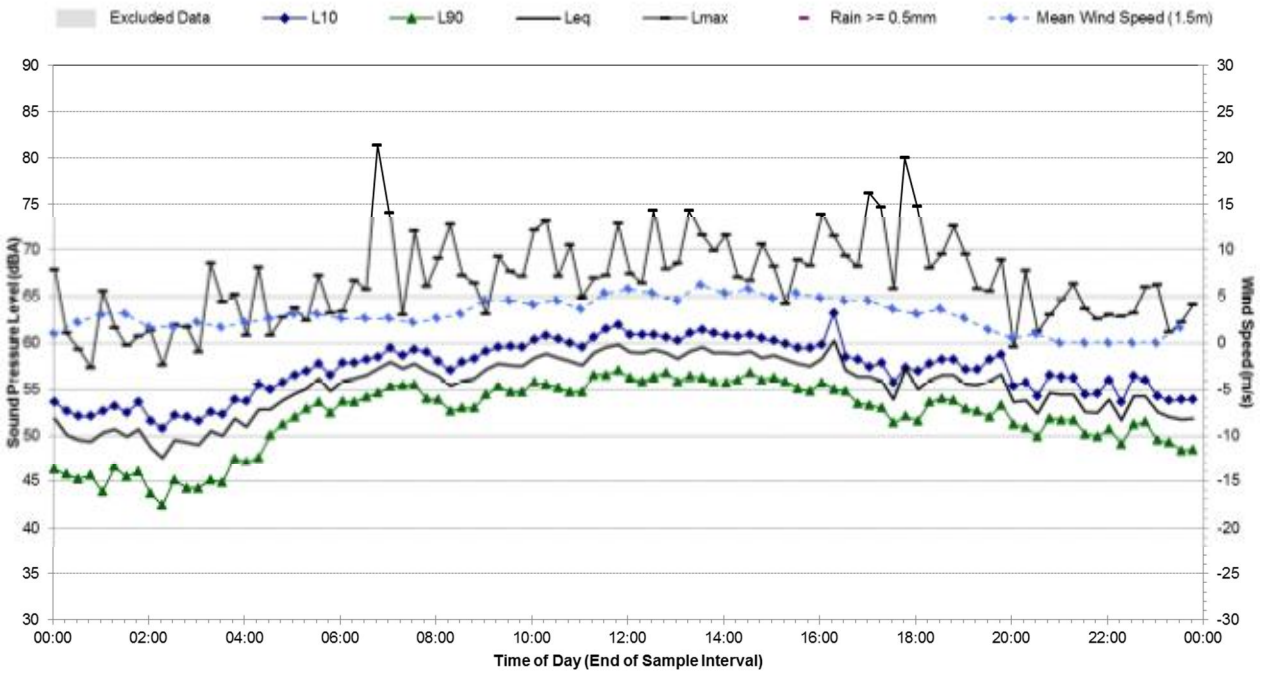
Statistical Ambient Noise Levels

L5 - Tuesday, 27 May 2014



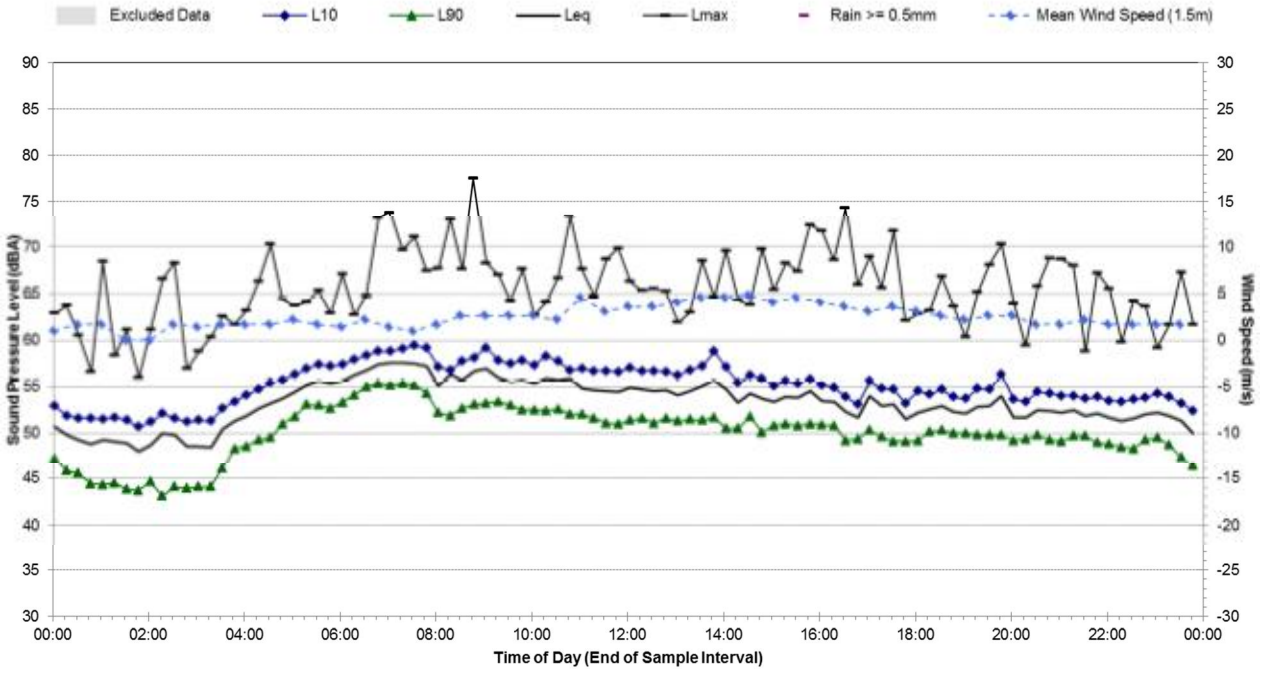
Statistical Ambient Noise Levels

L5 - Wednesday, 28 May 2014



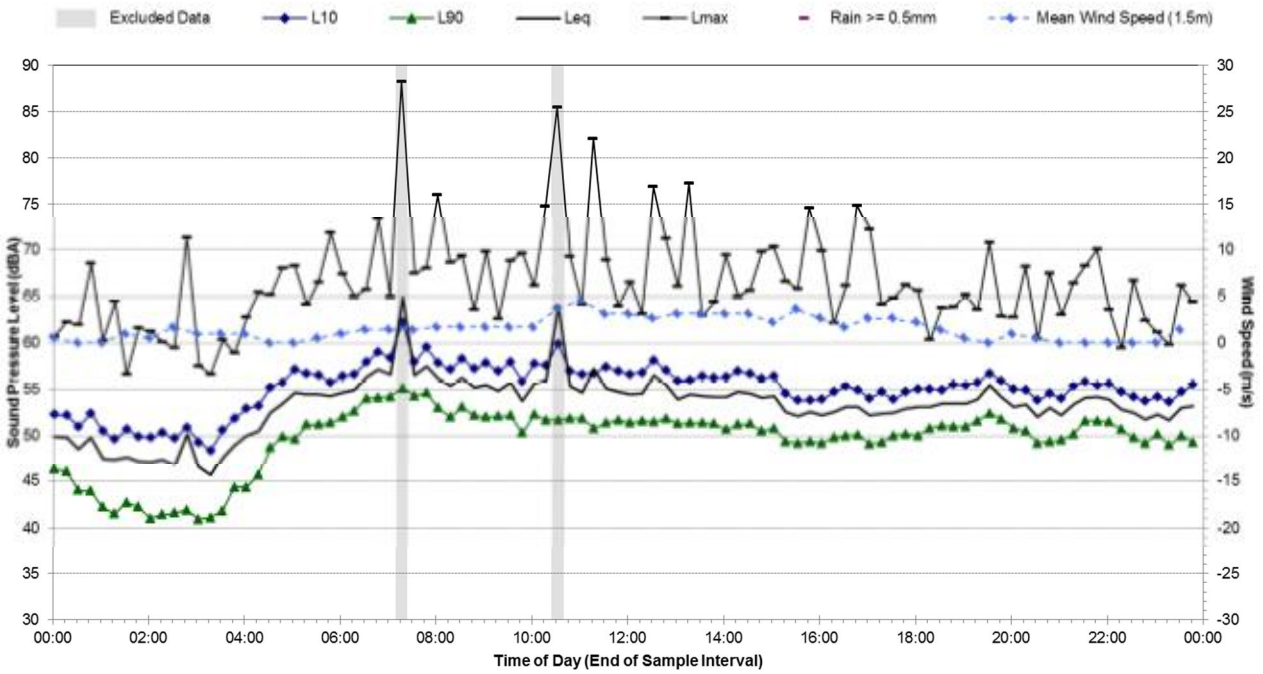
Statistical Ambient Noise Levels

L5 - Thursday, 29 May 2014



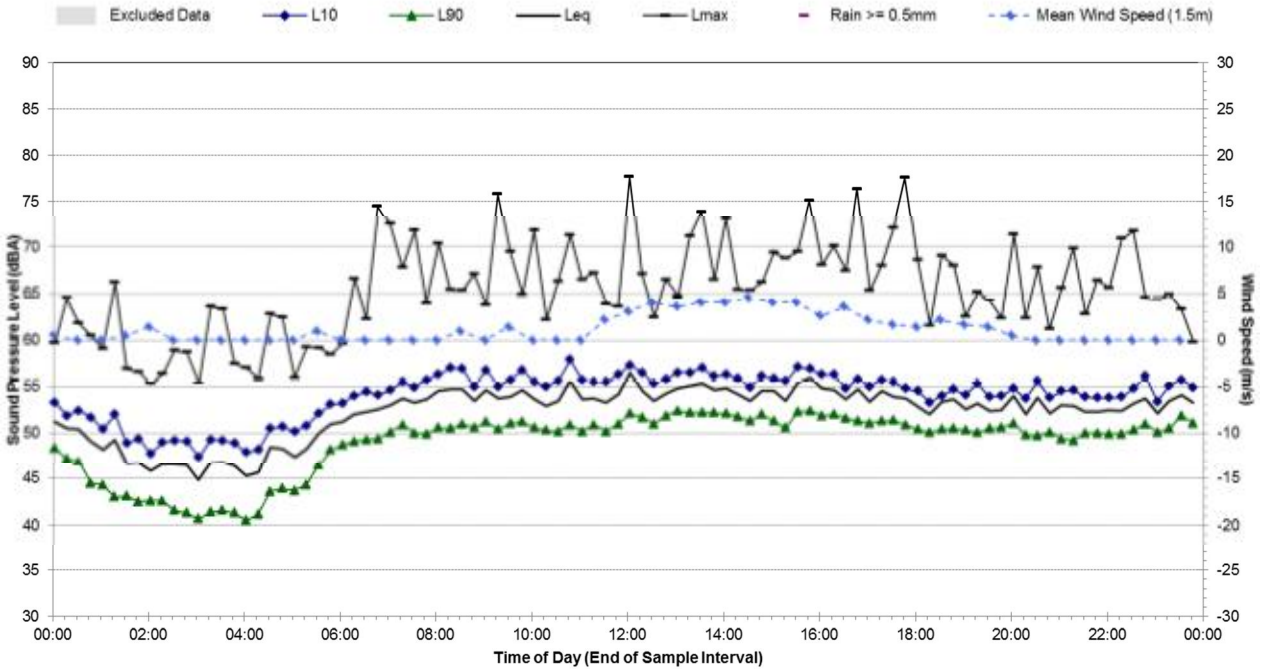
Statistical Ambient Noise Levels

L5 - Friday, 30 May 2014



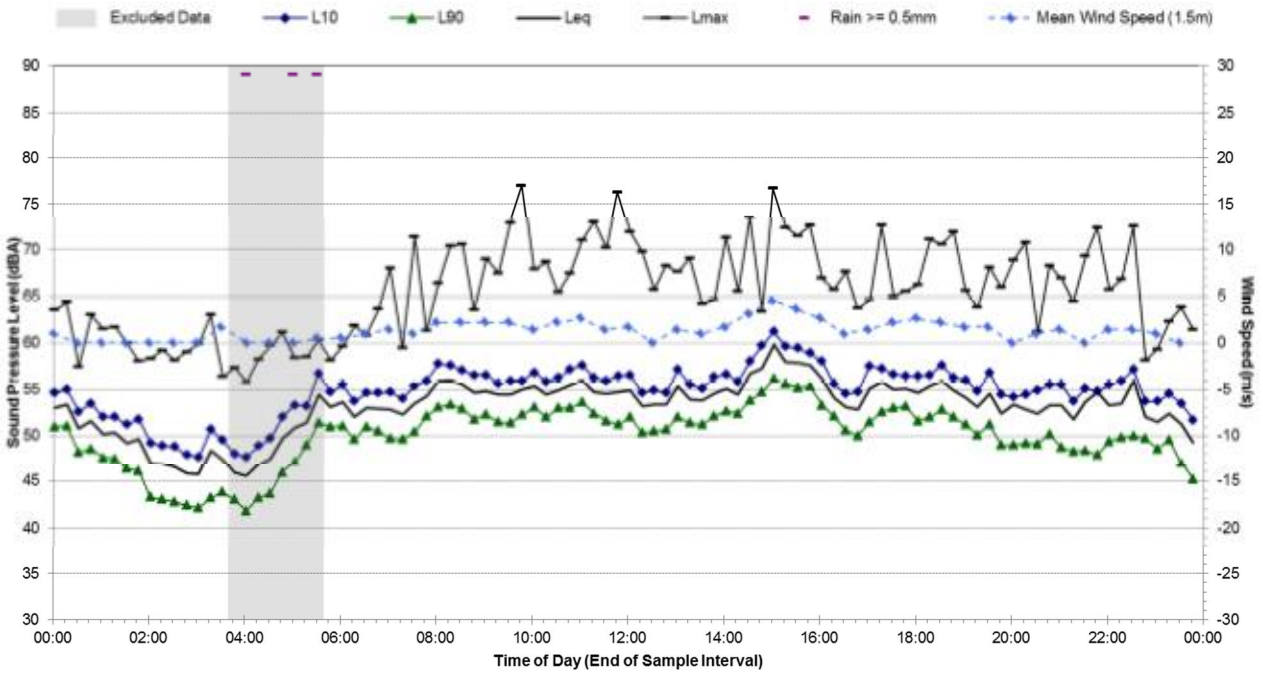
Statistical Ambient Noise Levels

L5 - Saturday, 31 May 2014



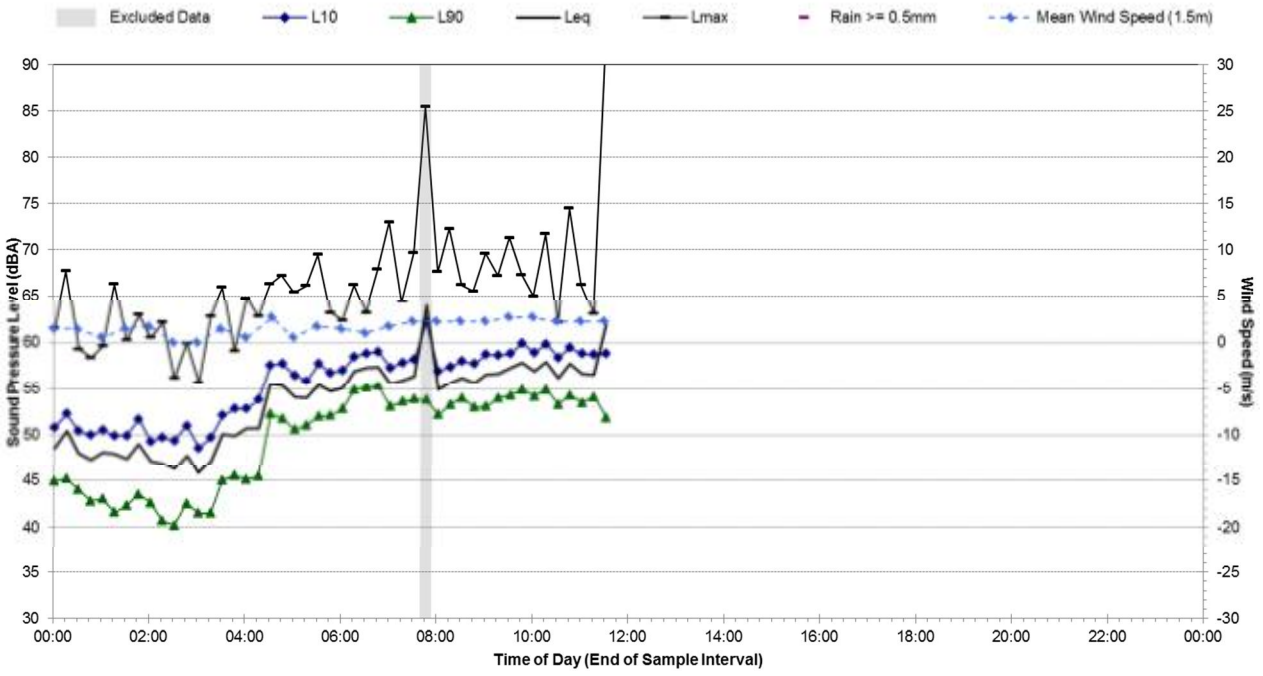
Statistical Ambient Noise Levels

L5 - Sunday, 1 June 2014



Statistical Ambient Noise Levels

L5 - Monday, 2 June 2014



Ambient Noise Monitoring Results

Noise Monitoring Location:	**L6**
Noise Monitoring Address:	**19 Elouera Street, Beverly Hills**

Logger Device Type: SVAN957
Logger Serial No: 20668

Ambient noise logger deployed outside residential address 19 Elouera Street, Beverly Hills. Logger located in front yard on eastern side of property.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the M5, with a steady flow of traffic throughout the measurement.

Recorded Noise Levels (LAmax):
M5 Light-vehicle road traffic: typically ~50-53 dBA, M5 Heavy-vehicle road traffic: 55-59 dBA, Local Road Traffic: 52-62 dBA, Birds and Insects: 50-57 dBA, Dog barking: 54-72 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	50	55	57	61
Evening	49	54	55	60
Night-time	40	51	53	57

Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	**Noise Level (dBA)**		
	Weekday LAeq(Period)	**Weekend LAeq**(Period)	**Weekly LAeq**(Period)
Number of Valid Days	6	4	N/A
Daytime (7am-10pm)	55	54	55
Night-time (10pm-7am)	51	51	51

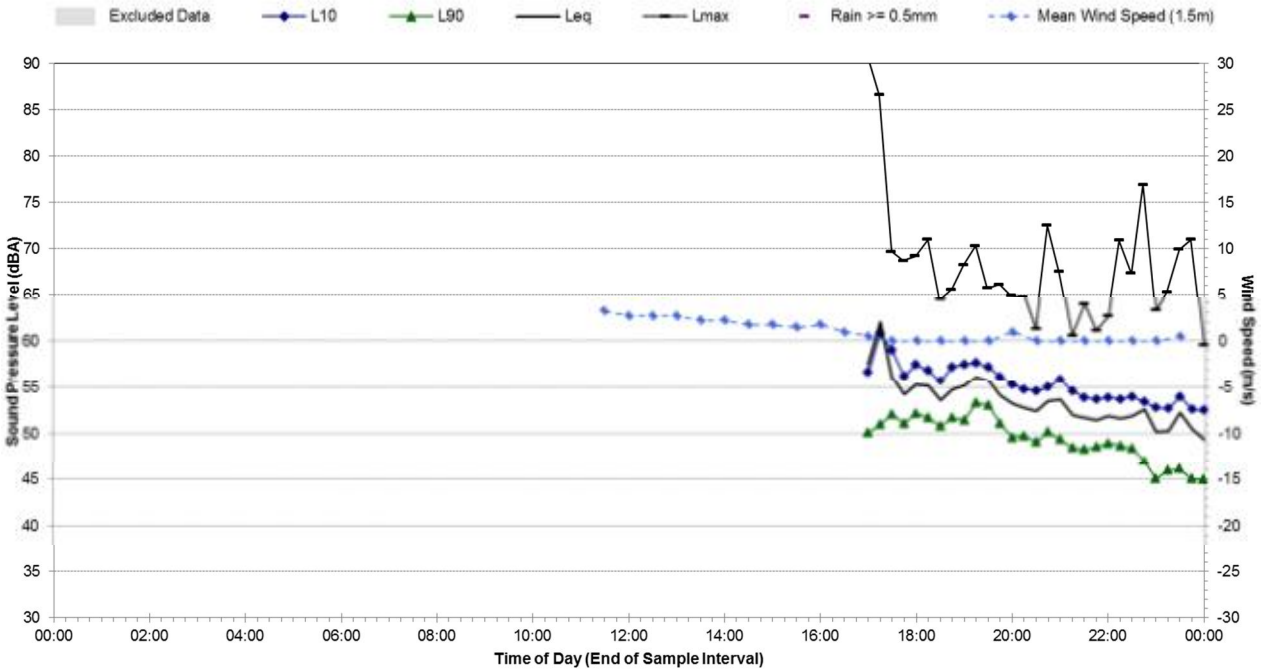
Attended Noise Measurement Results

Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
22/05/2014	16:40	50	54	72

Photo of Noise Monitoring Location

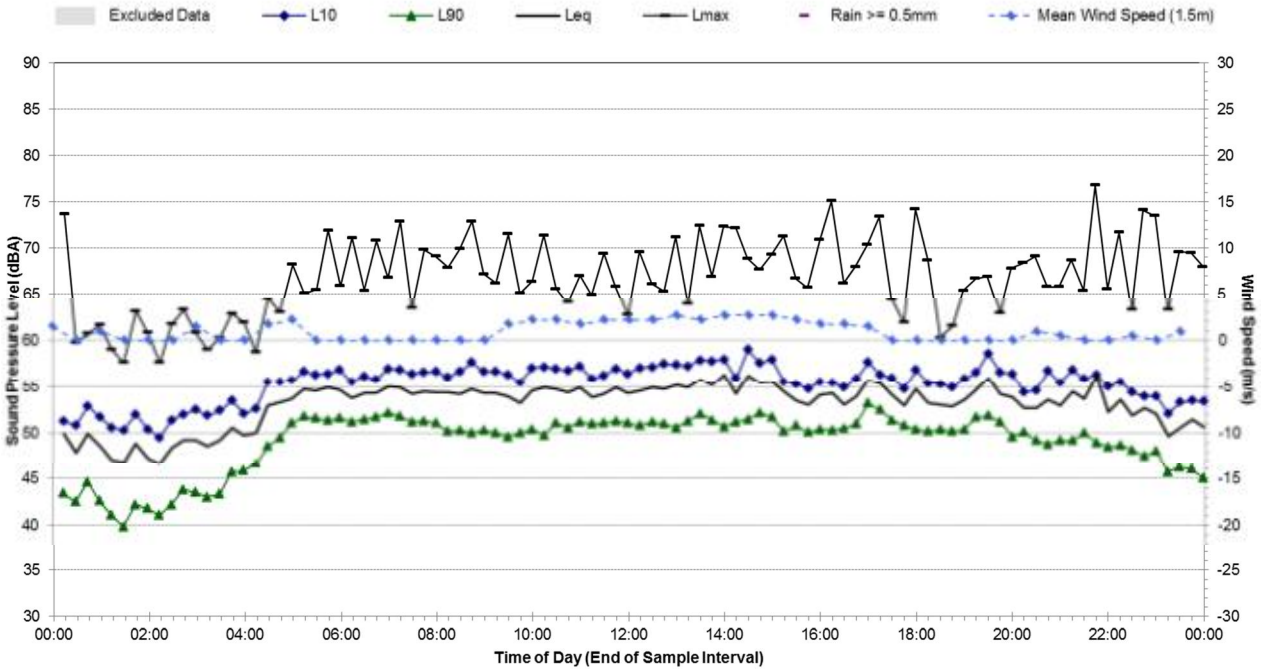
Statistical Ambient Noise Levels

L6 - Thursday, 22 May 2014



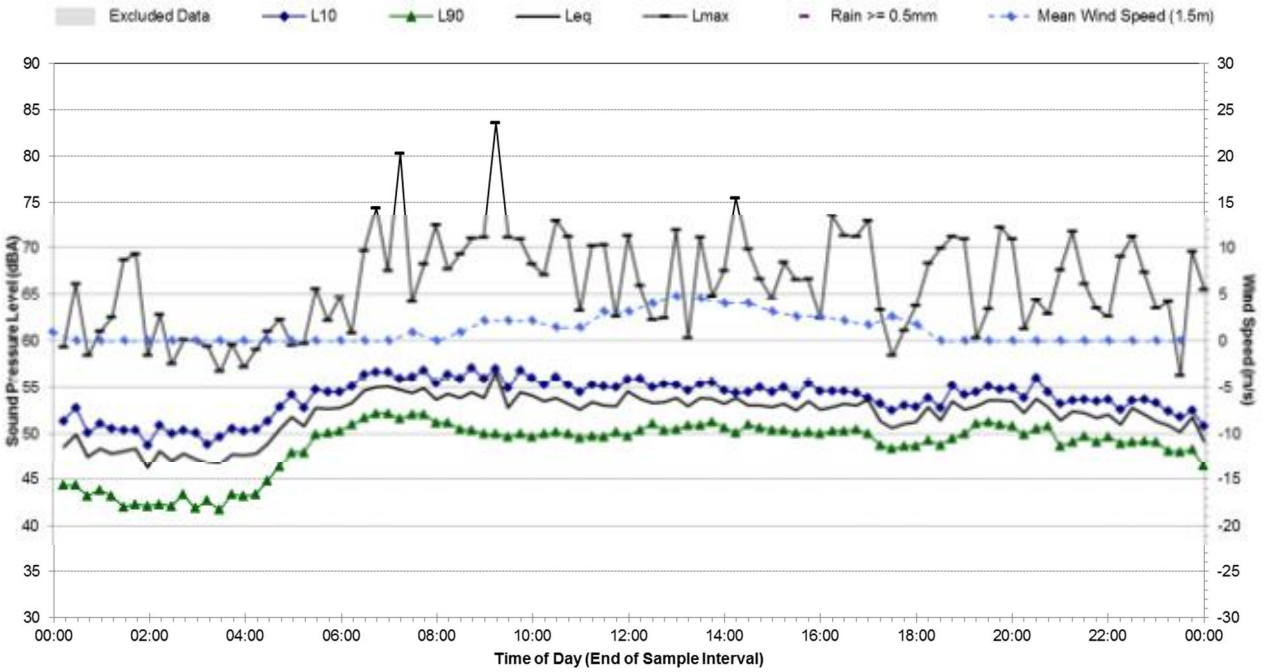
Statistical Ambient Noise Levels

L6 - Friday, 23 May 2014



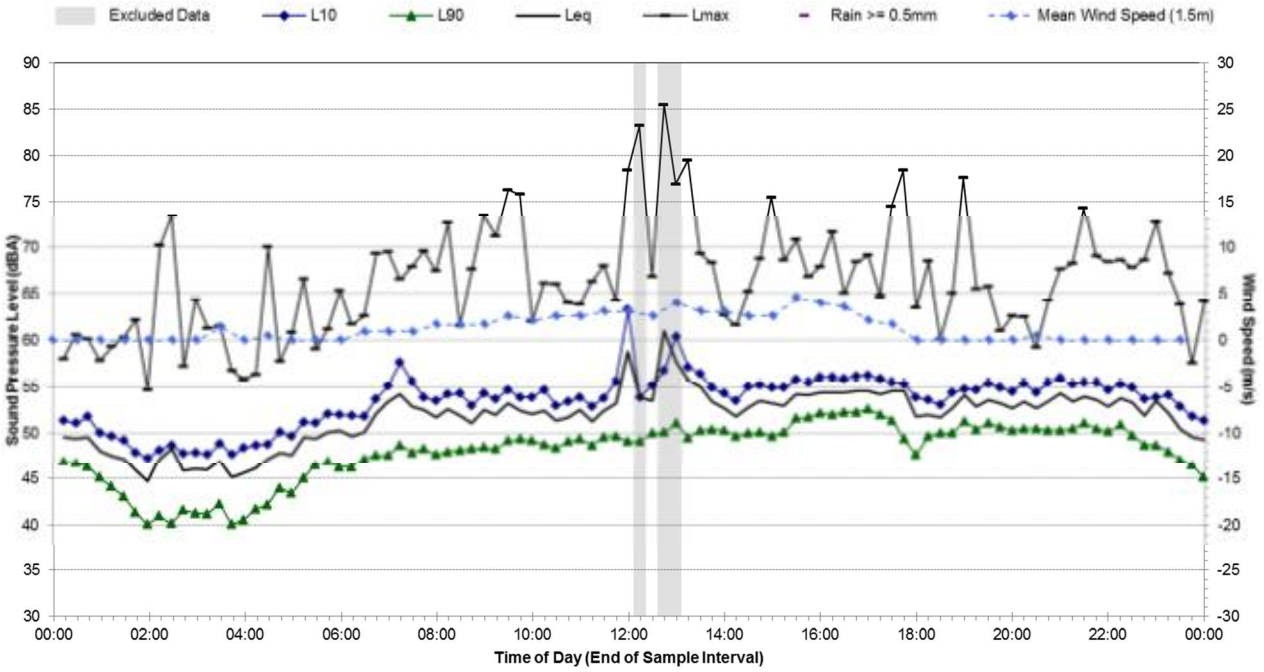
Statistical Ambient Noise Levels

L6 - Saturday, 24 May 2014



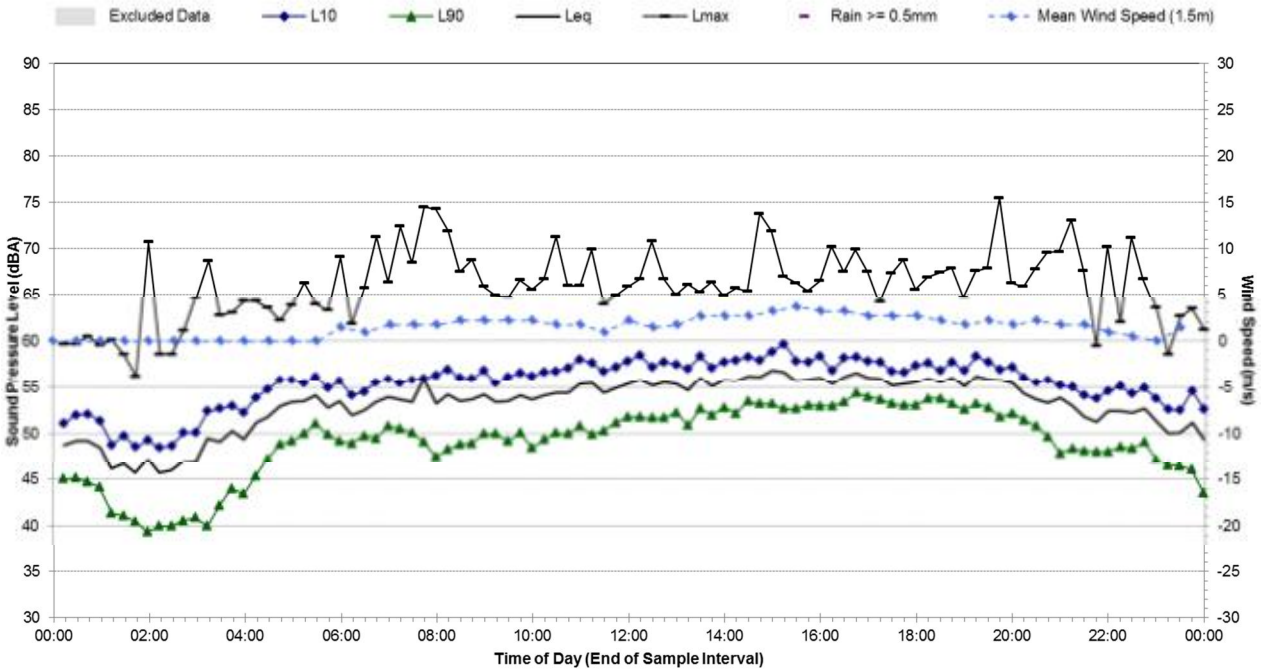
Statistical Ambient Noise Levels

L6 - Sunday, 25 May 2014



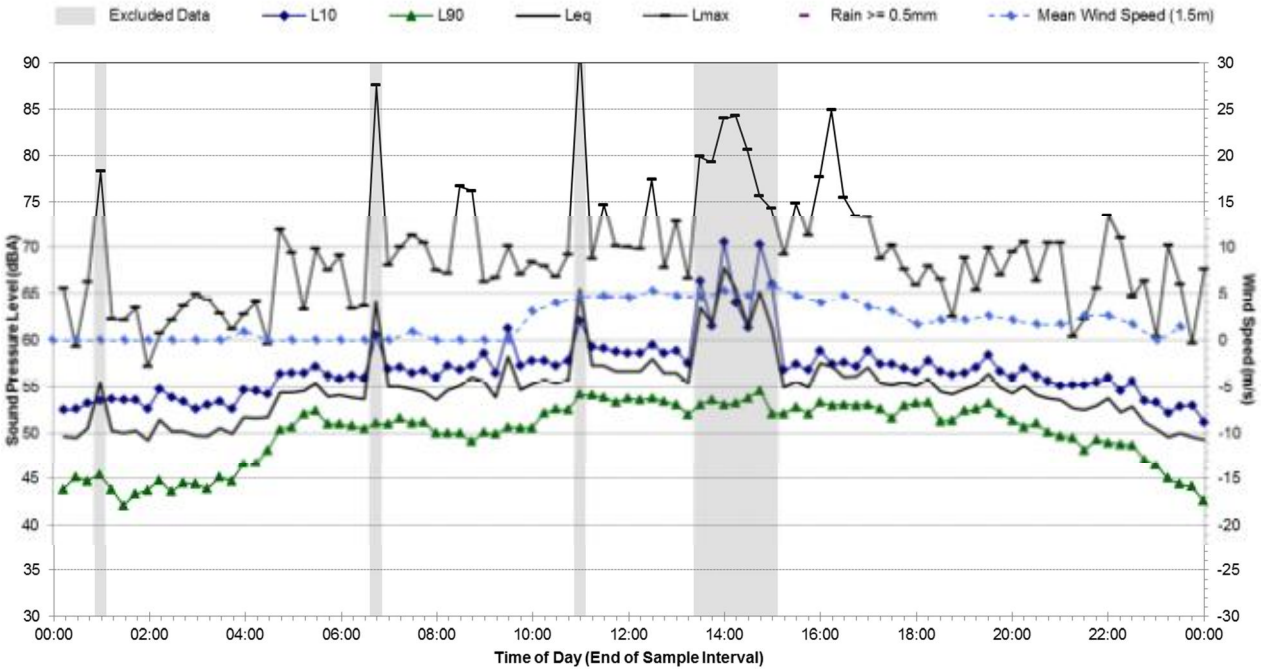
Statistical Ambient Noise Levels

L6 - Monday, 26 May 2014



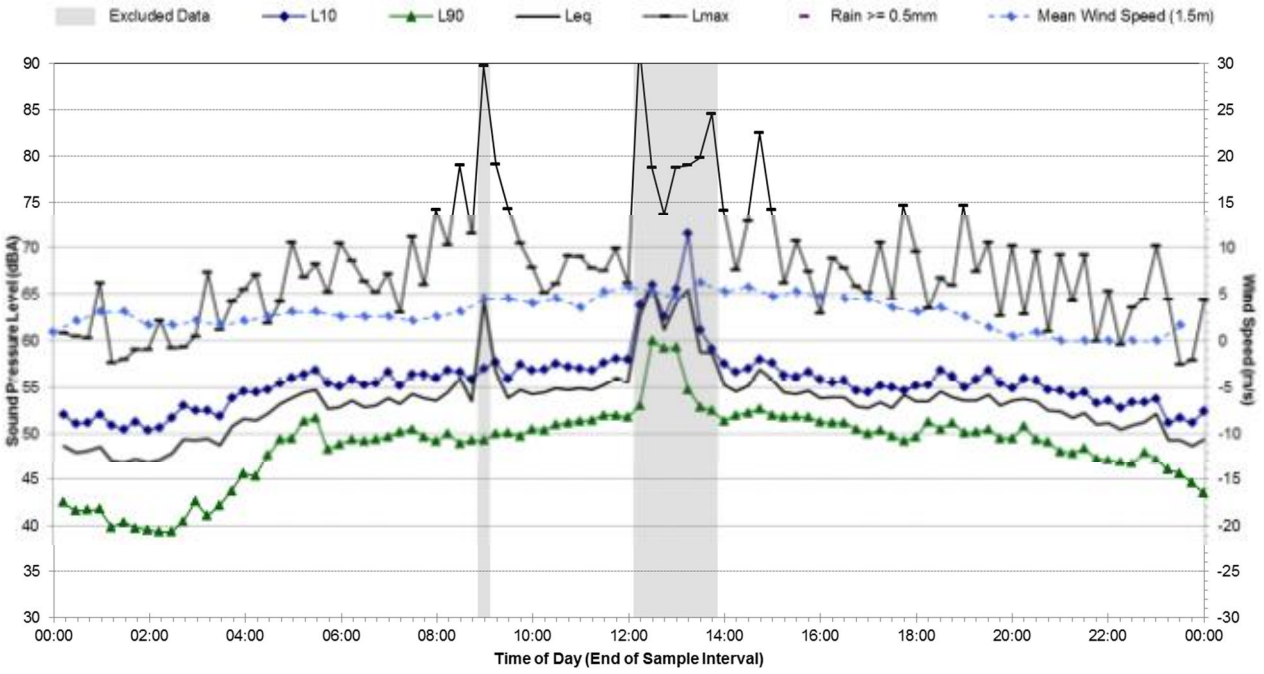
Statistical Ambient Noise Levels

L6 - Tuesday, 27 May 2014



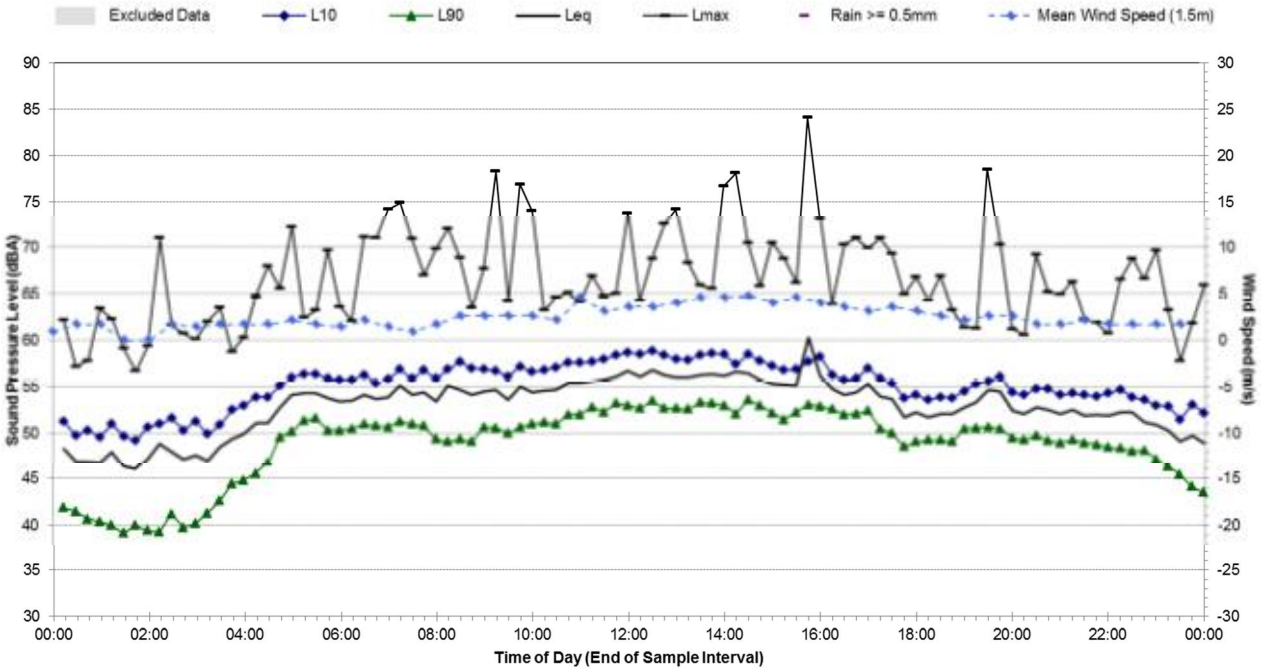
Statistical Ambient Noise Levels

L6 - Wednesday, 28 May 2014



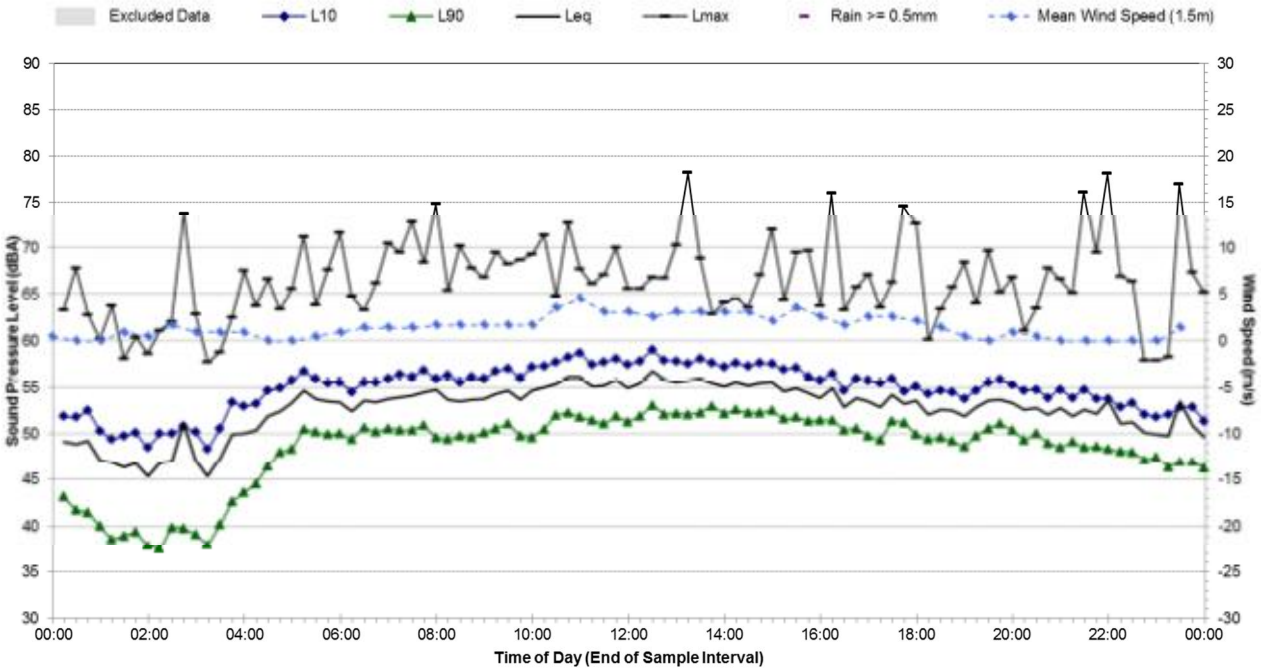
Statistical Ambient Noise Levels

L6 - Thursday, 29 May 2014



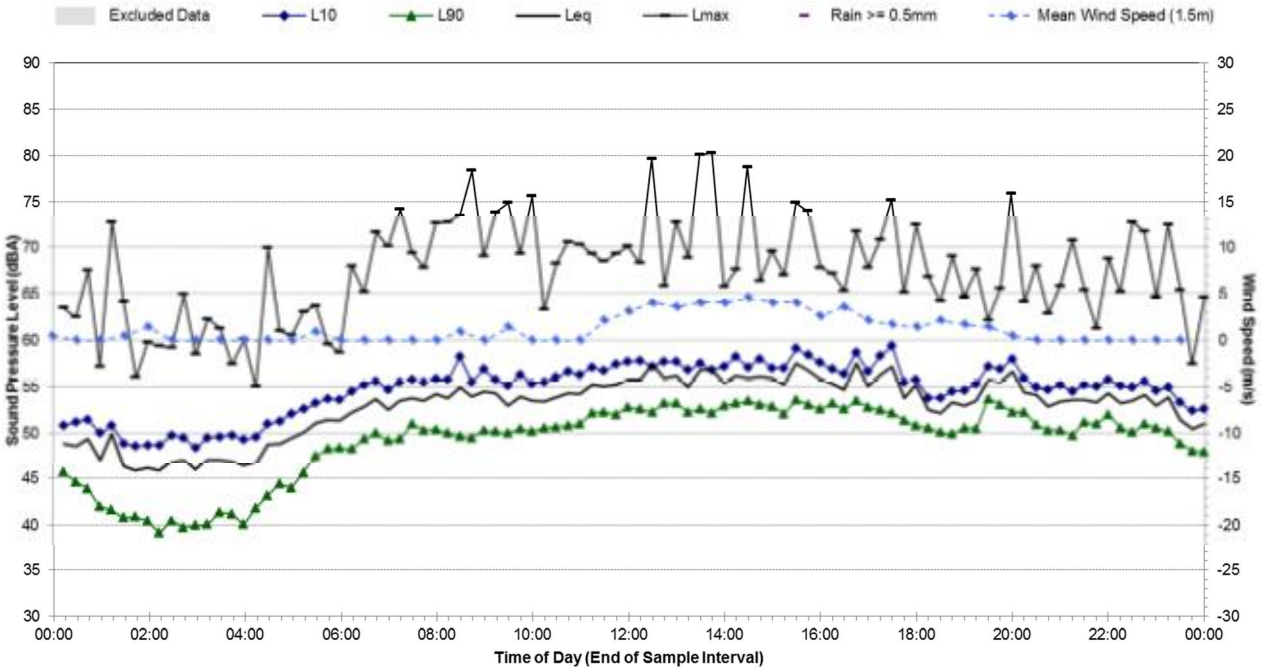
Statistical Ambient Noise Levels

L6 - Friday, 30 May 2014



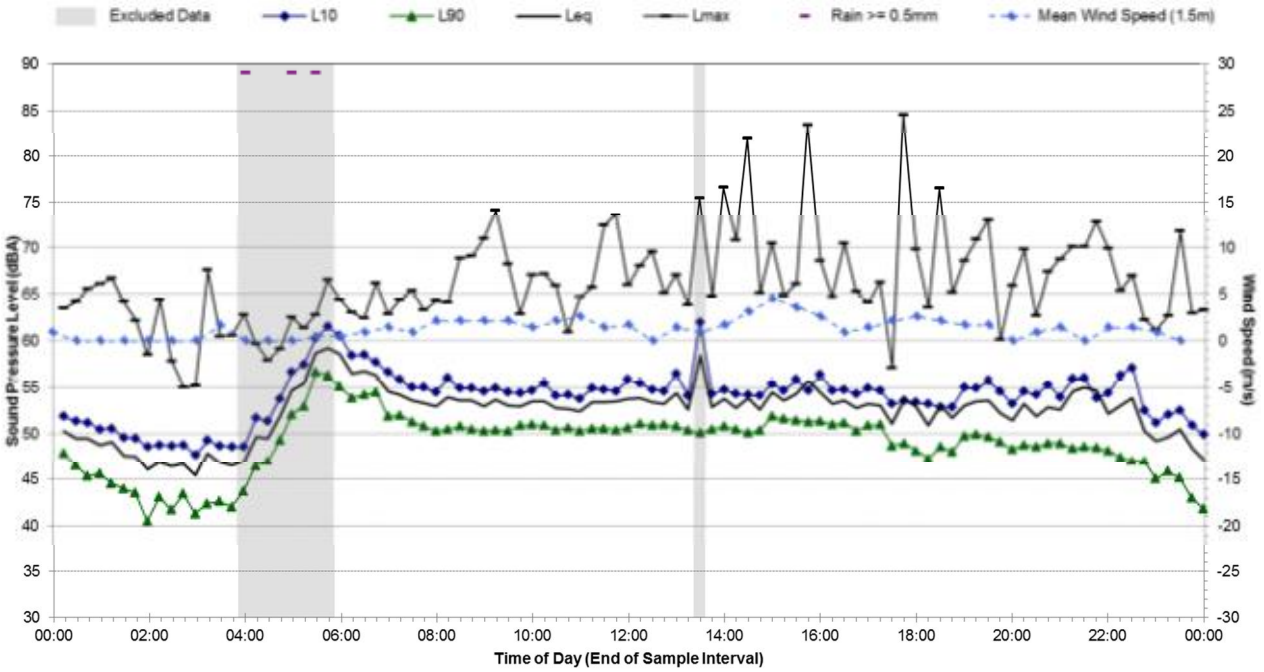
Statistical Ambient Noise Levels

L6 - Saturday, 31 May 2014



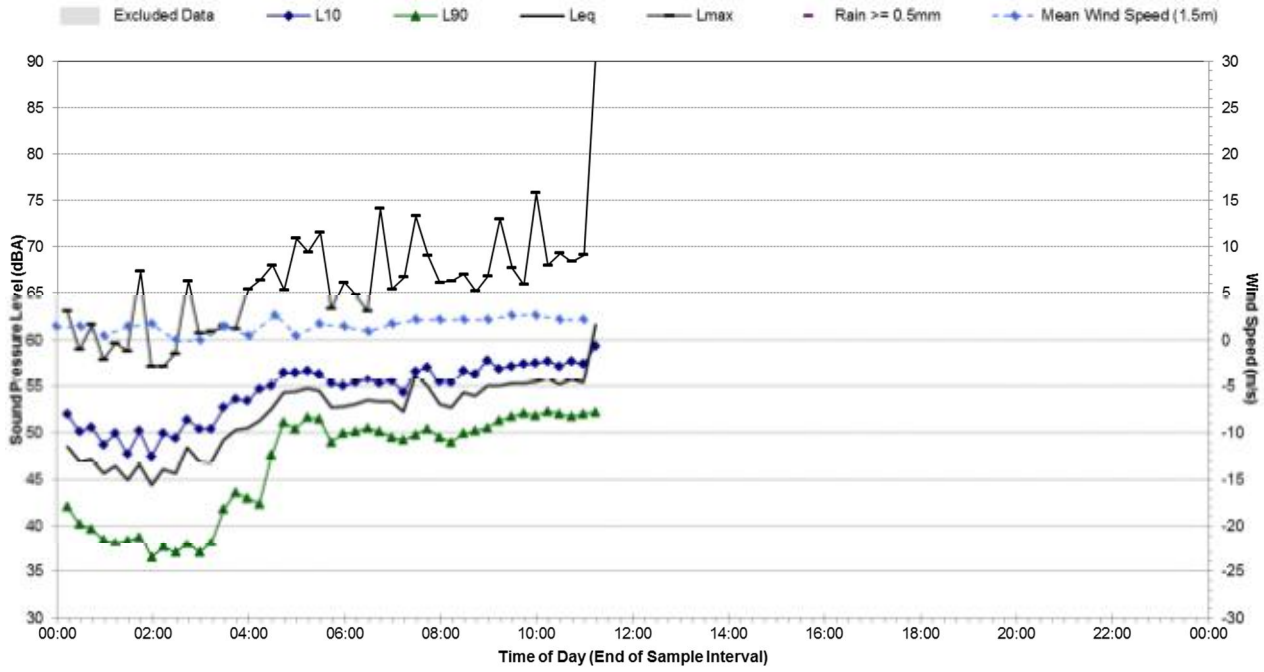
Statistical Ambient Noise Levels

L6 - Sunday, 1 June 2014



Statistical Ambient Noise Levels

L6 - Monday, 2 June 2014



Noise Monitoring Location:	**L7**
Noise Monitoring Address:	**25 Kirrang Street, Beverly Hills**

Logger Device Type: SVAN957
Logger Serial No: 20670

Ambient noise logger deployed outside residential address 25 Kirrang Street, Beverly Hills. Logger located in back yard on northern side of property.

Attended noise measurements indicate the ambient noise environment at this location is dominated by road traffic noise from the M5, with a steady flow of traffic throughout the measurement. Bird and dog noises were also present at times during the attended measurement.

Recorded Noise Levels (LAmax):
M5 Light-vehicle road traffic: typically ~50-53 dBA, M5 Heavy-vehicle road traffic: 54-58 dBA, Motorbike: 59-65 dBA, Birds: 47-66 dBA, Dog barking: ~50 dBA

Map of Noise Monitoring Location

Ambient Noise Logging Results – ICNG Defined Time Periods

Monitoring Period	**Noise Level (dBA)**			
	RBL	**LAeq**	**L10**	**L1**
Daytime	49	55	56	61
Evening	49	53	54	59
Night-time	42	51	52	56

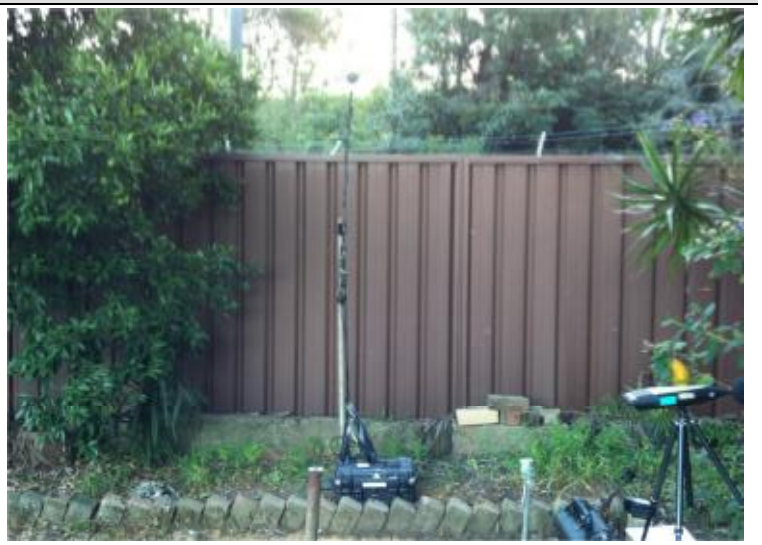
Ambient Noise Logging Results – RNP Defined Time Periods

Monitoring Period	**Noise Level (dBA)**		
	Weekday LAeq(Period)	**Weekend LAeq**(Period)	**Weekly LAeq**(Period)
Number of Valid Days	6	4	N/A
Daytime (7am-10pm)	54	53	54
Night-time (10pm-7am)	51	51	51

Attended Noise Measurement Results

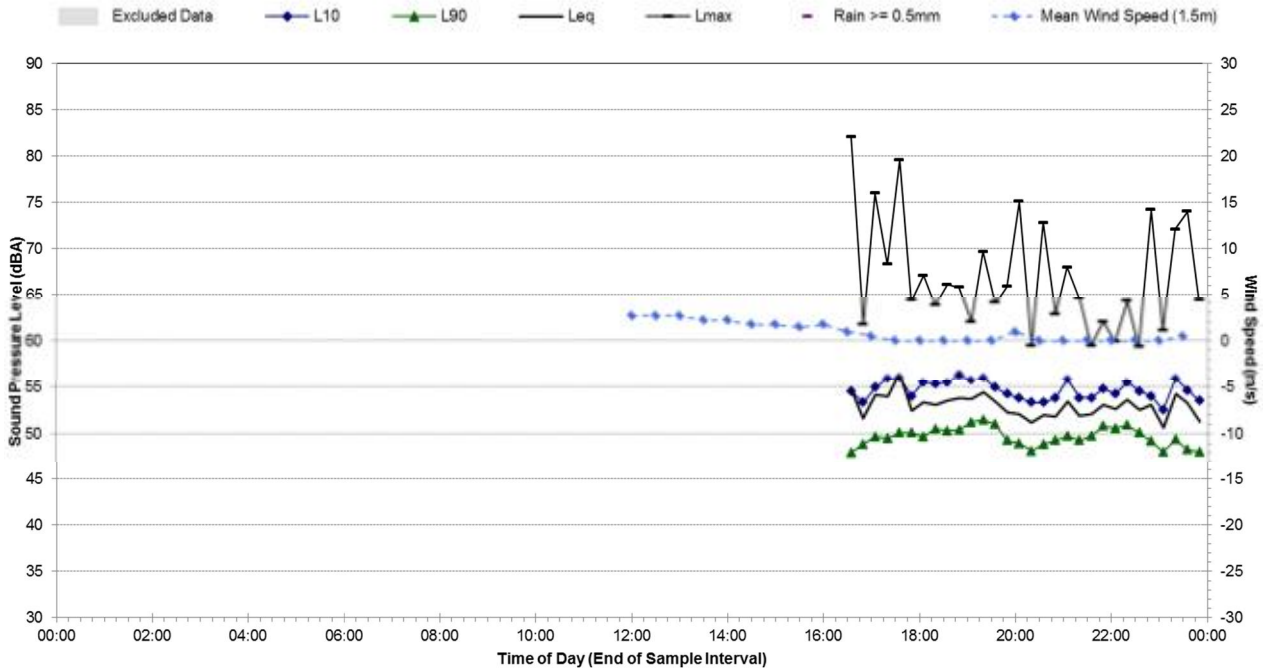
Date	**Start Time**	**Measured Noise Level (dBA)**		
		LA90	**LAeq**	**LAmax**
22/05/2014	15:50	46	51	67

Photo of Noise Monitoring Location



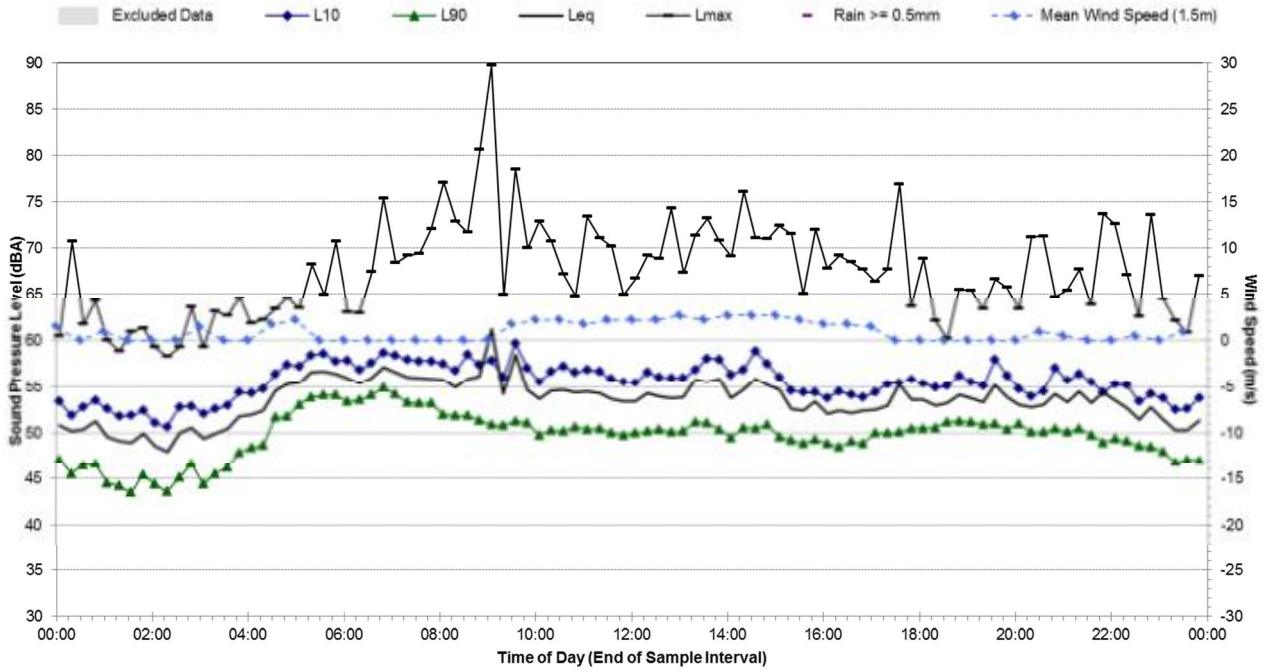
Statistical Ambient Noise Levels

L7 - Thursday, 22 May 2014



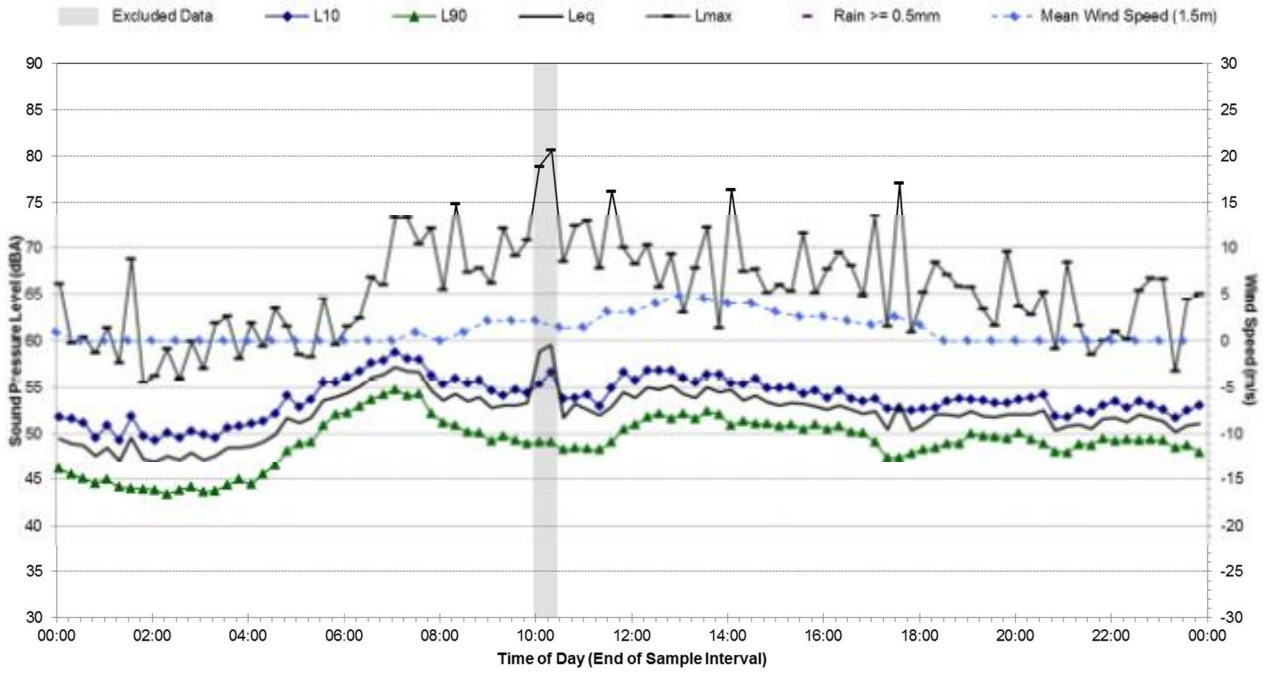
Statistical Ambient Noise Levels

L7 - Friday, 23 May 2014



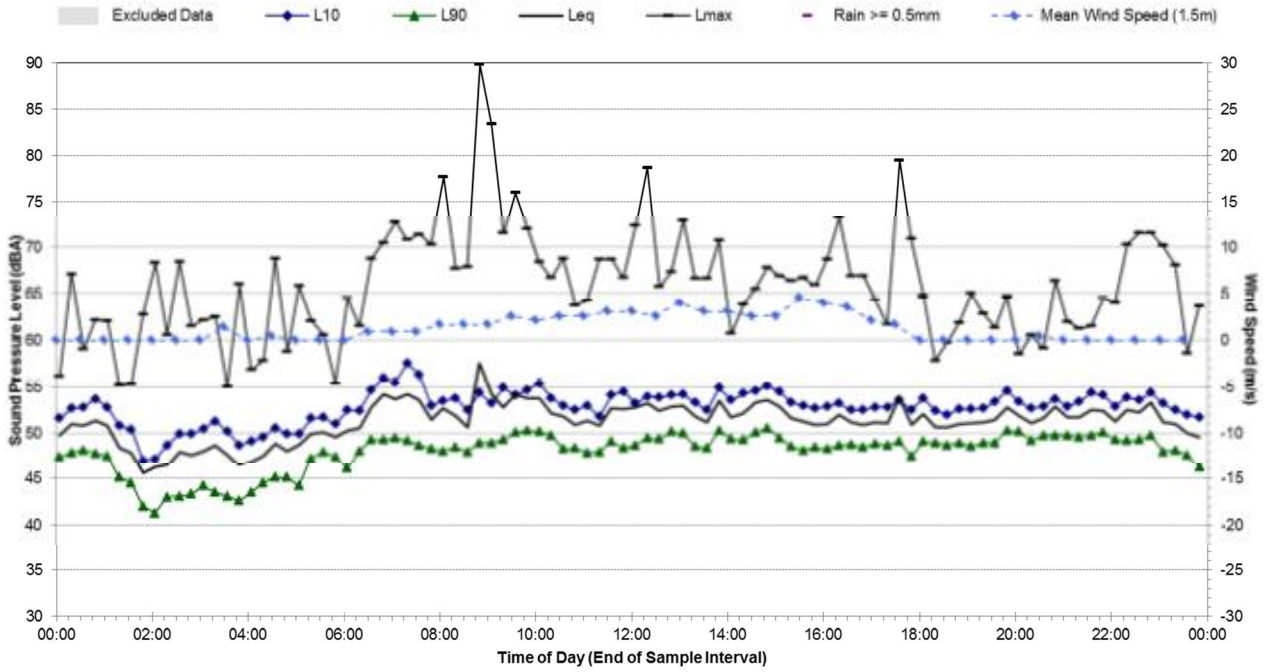
Statistical Ambient Noise Levels

L7 - Saturday, 24 May 2014



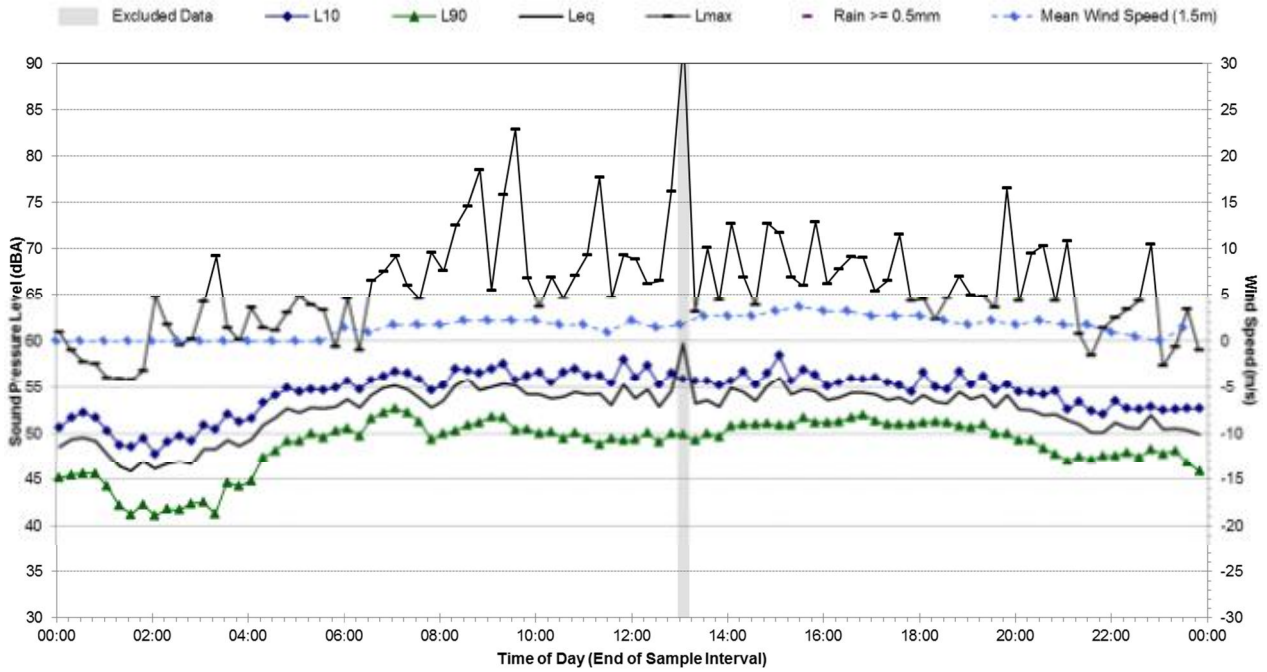
Statistical Ambient Noise Levels

L7 - Sunday, 25 May 2014



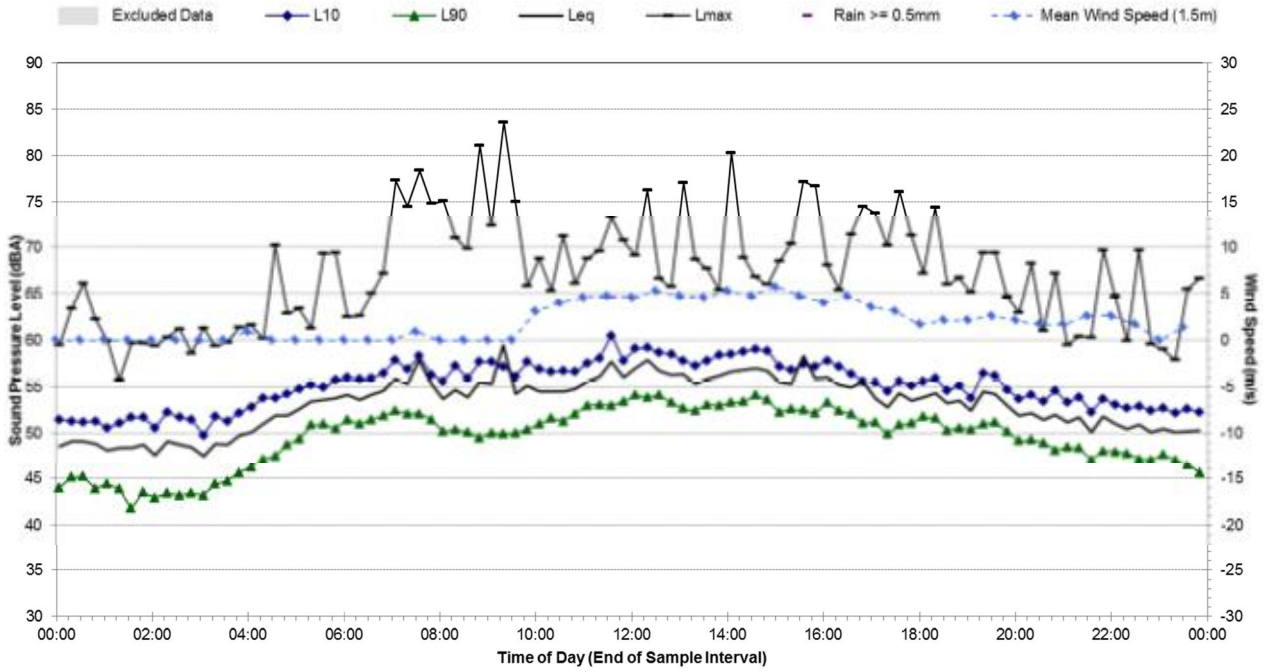
Statistical Ambient Noise Levels

L7 - Monday, 26 May 2014



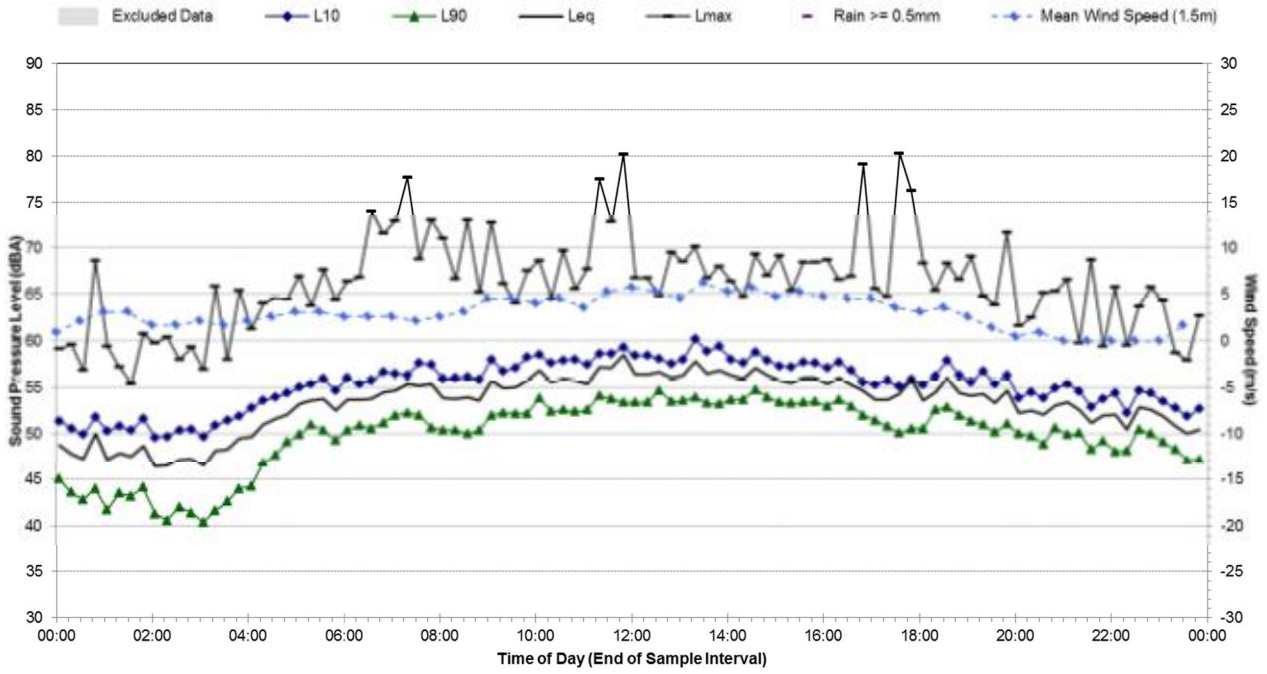
Statistical Ambient Noise Levels

L7 - Tuesday, 27 May 2014



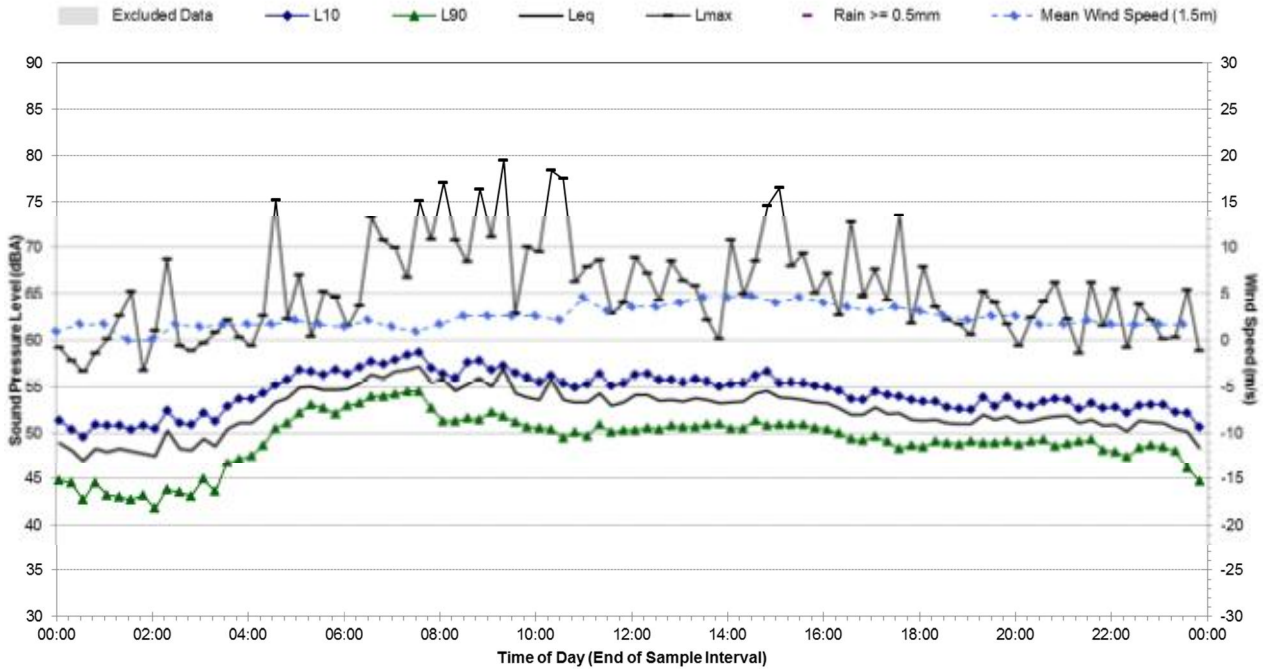
Statistical Ambient Noise Levels

L7 - Wednesday, 28 May 2014



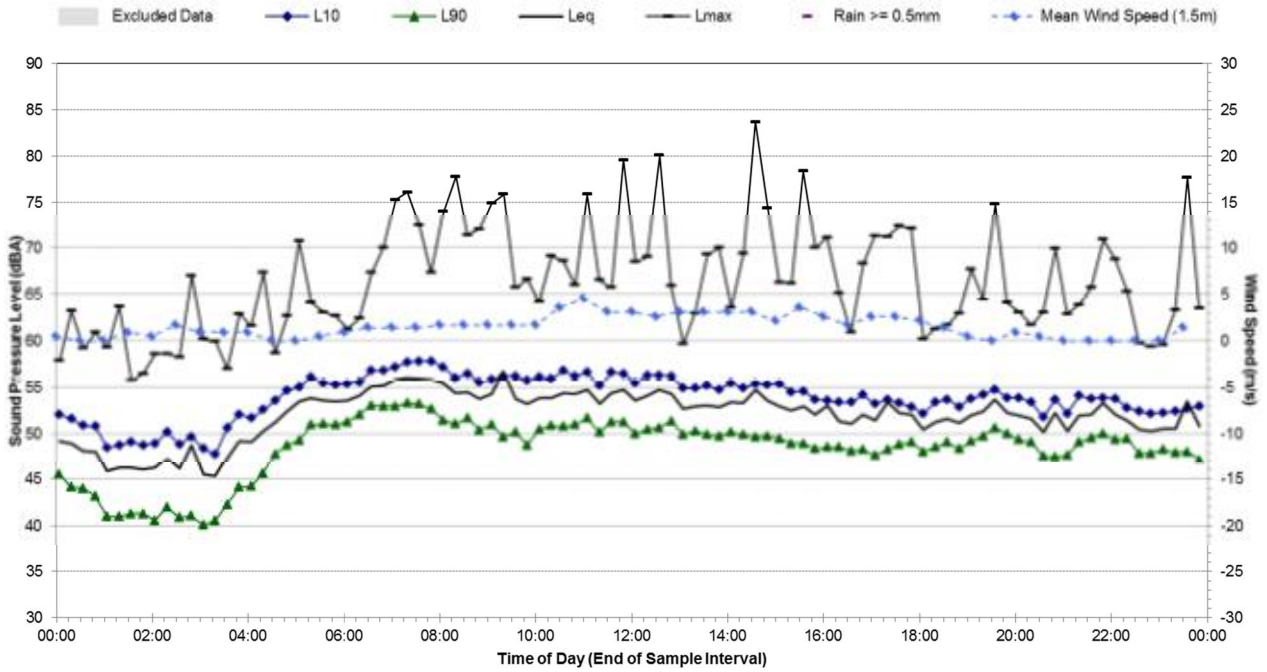
Statistical Ambient Noise Levels

L7 - Thursday, 29 May 2014



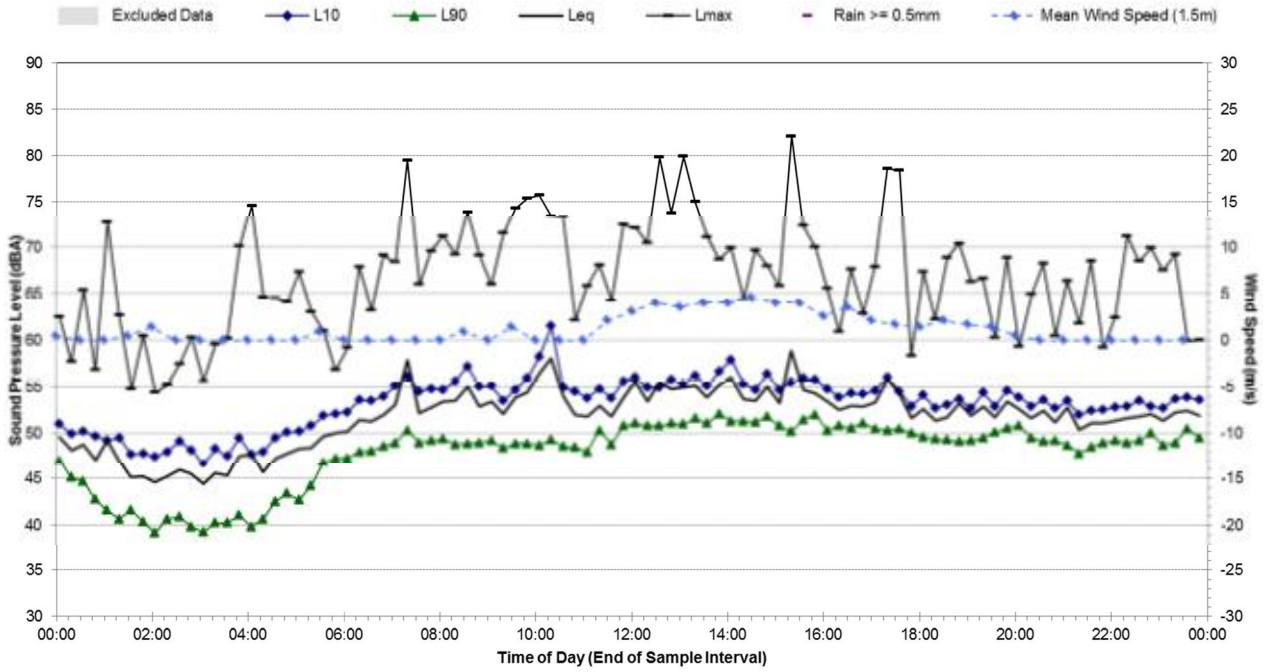
Statistical Ambient Noise Levels

L7 - Friday, 30 May 2014



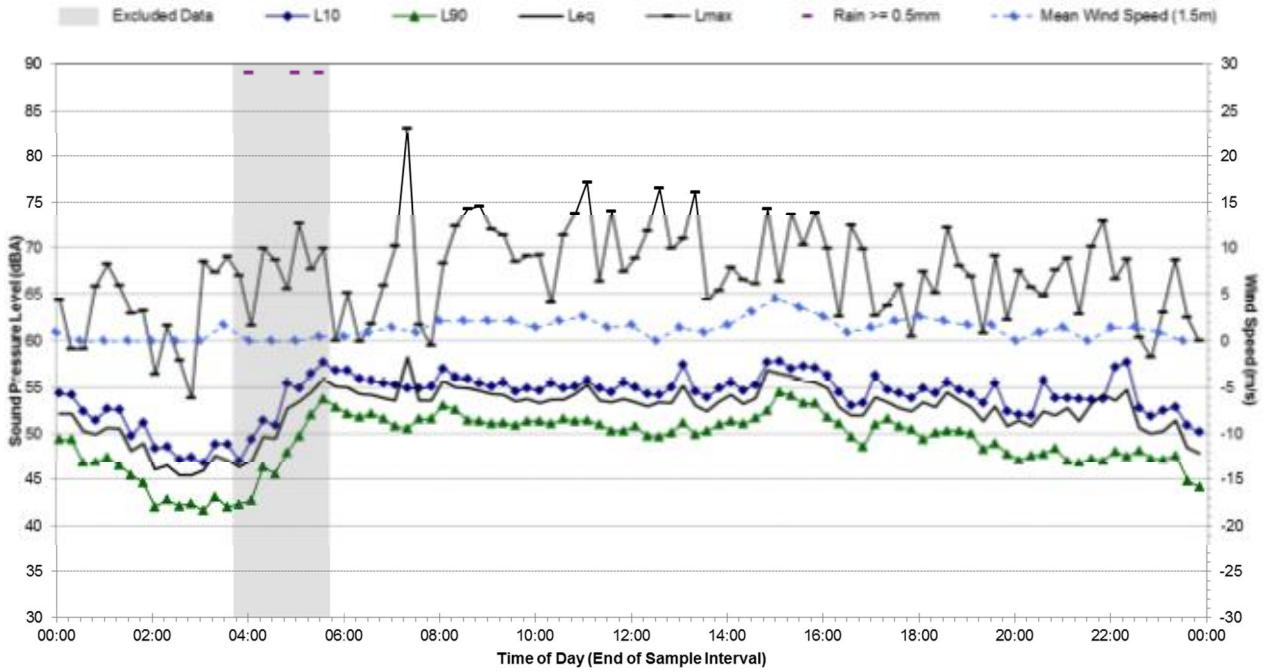
Statistical Ambient Noise Levels

L7 - Saturday, 31 May 2014



Statistical Ambient Noise Levels

L7 - Sunday, 1 June 2014



Statistical Ambient Noise Levels

L7 - Monday, 2 June 2014