TRUCK NOISE COMPLIANCE ASSESSMENT
FOURTH QUARTER
VISY PULP AND PAPER PTY LIMITED
TUMUT

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1. INTRODUCTION

This report provides the details of the traffic noise assessment conducted for Visy Pulp and Paper as part of a Development Consent Condition 3.9. This is the fourth traffic noise assessment conducted.

The primary aims of this report are outlined as follows:

- Measure the existing road traffic noise at residential locations along the major transport routes;
- Calculate the noise contribution provided by heavy vehicles related to Visy Pulp and Paper operations;
- Compare measured noise levels with relevant NSW Environment Protection Authority (NSW EPA) criteria; and
- Provide recommendations for possible noise reduction techniques, where necessary.

Existing traffic noise levels have been measured using noise data loggers at seven (7) residential locations over a minimum period of seven (7) days.

Visy Pulp and Paper weight bridge records have been provided and utilised in combination with noise logger data in order to calculate the Visy-related traffic noise contribution.

2. ROAD TRAFFIC NOISE CRITERIA

The applicable criteria for Visy Pulp and Paper road traffic noise were outlined by Benbow Environmental in 2007 (report n. 17001_Truck Noise) as part of the noise impact assessment for the site's operations and related generation of road traffic noise.

The traffic noise criteria were referenced from the NSW EPA document "Environmental Criteria for Road Traffic Noise" (ECRTN) ISBN 0 7313 0203 6 EPA 99/3.

From 1 July 2011 the ECRTN was replaced by the "NSW Road Noise Policy (RNP)", therefore calculations for road traffic noise have been carried out in accordance with the new policy. Section 4.4 of the RNP states:

> ''*For existing roads where no redevelopment is taking place, the primary role of the RNP is to provide a basis for measuring and defining the extent of any existing traffic noise impacts. The target levels in Table 2-1 are provided as a guide to assessing impacts rather than as achievable targets.*''

The criteria examine two time periods (day and night) described by using the $L_{Aeq(period)}$ noise descriptor.

The target noise abatement levels for existing roads not subject to redevelopment are displayed below in Table 2-1 and explanation of the terminology is provided in Attachment 1.

Table 2-1: Target Noise Level – dB(A)

Existing Road Category	Day (7:00am – 10:00pm)	Night (10:00pm – 7:00am)
Freeway/arterial/sub-arterial road	$L_{Aeq\ (15\ hour)}$ = 60 (external)	$L_{Aeq\ (9\ hour)}$ = 55 (external)

The sleep disturbance assessment is more complex. The sleep disturbance criterion contained within the industrial noise policy is readily exceeded by cars passing along roadways that have residences typically within 30m of the roadway and therefore cannot be effectively applied.

Trucks exceed this level further, so a voluntary management plan was presented in Attachment 3 of the 2007 Truck Noise report to reduce the L_{Amax} or $L_{A1\ (1\ min)}$ noise levels that may be experienced, as a part of best management practices.

3. ROAD NETWORK AND MONITORING LOCATIONS

All heavy vehicles entering and leaving the Visy Pulp and Paper site would drive along Snowy Mountains Highway either eastbound or westbound. Traffic counters were not considered in this assessment.

Several residences located along the Snowy Mountains Hwy, Batlow Rd, Wee Jasper Rd and Gocup Rd are potentially affected by road traffic noise.

Noise monitoring has been carried out at seven (7) residential locations utilizing type 1 environmental noise loggers over 15 minute statistical intervals.

Table 3-1 presents the list of all monitored residential locations. The following figures below show an aerial view of all the considered locations.

Table 3-1: Noise Monitoring Residential Locations

Receiver	Address	Approx. distance from the road [m]
R1 – Brentwood	1518 Snowy Mountains Highway, Gadara, NSW	75
R2 – Glengarry	1393 Snowy Mountains Highway, Gadara, NSW	217
R3 – Beale	1006 Snowy Mountains Highway, Gadara, NSW	50
R4 – Batlow	379 Batlow Road (corner Gadara Ln), Gilmore, NSW	30
R5 – Wee Jasper	214 Wee Jasper Rd, Bombowlee	7
R6 – Gocup Rd	923 Gocup Rd, Minjary	28
R7 - Minjary	1575 Gocup Rd, Minjary	36

Figure 3-1: Aerial View - Residences and Traffic Monitoring Locations

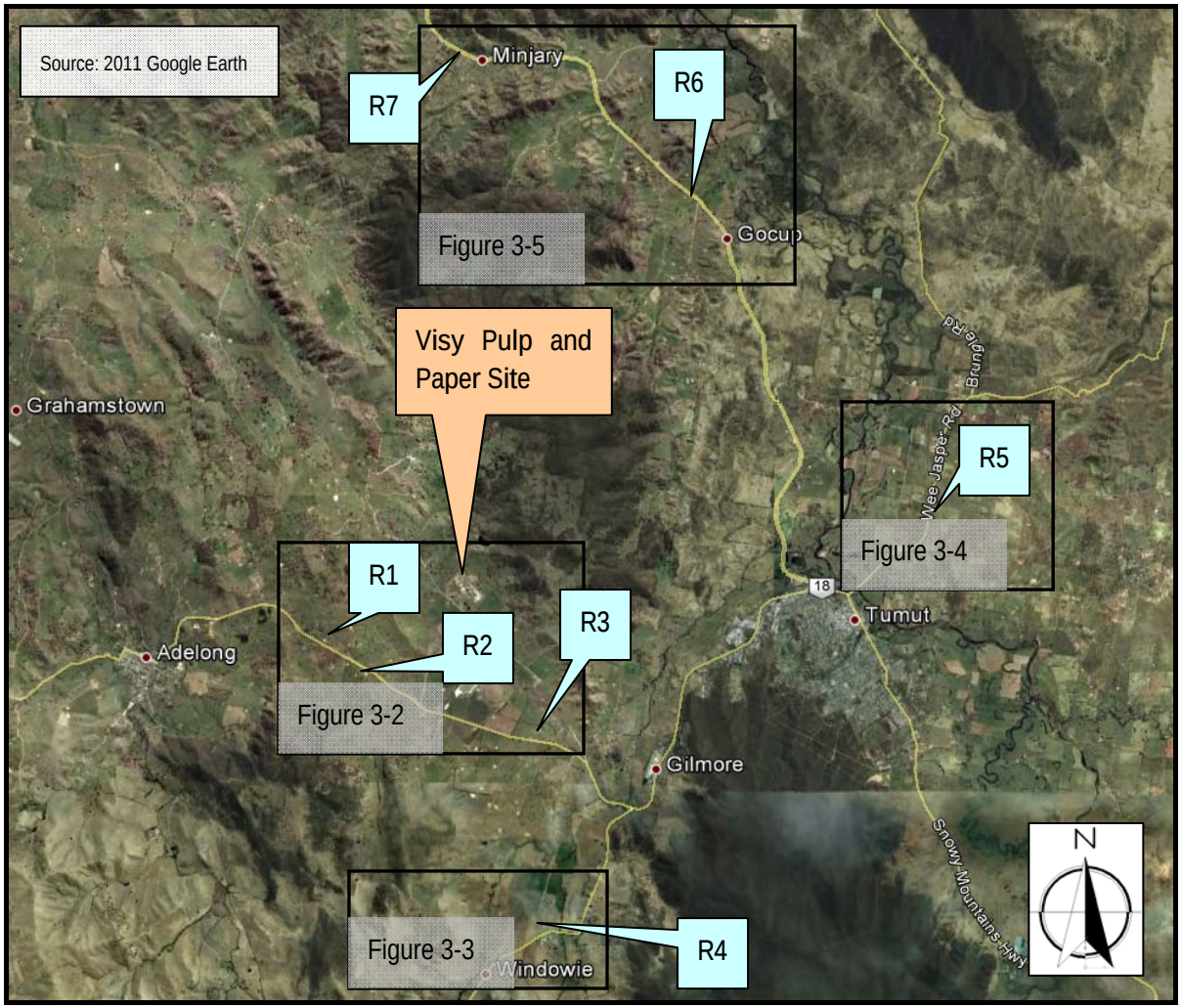


Figure 3-2: Snowy Mountain Hwy - Residences and Traffic Counter Locations

Figure 3-3: Batlow Rd - Residence Locations

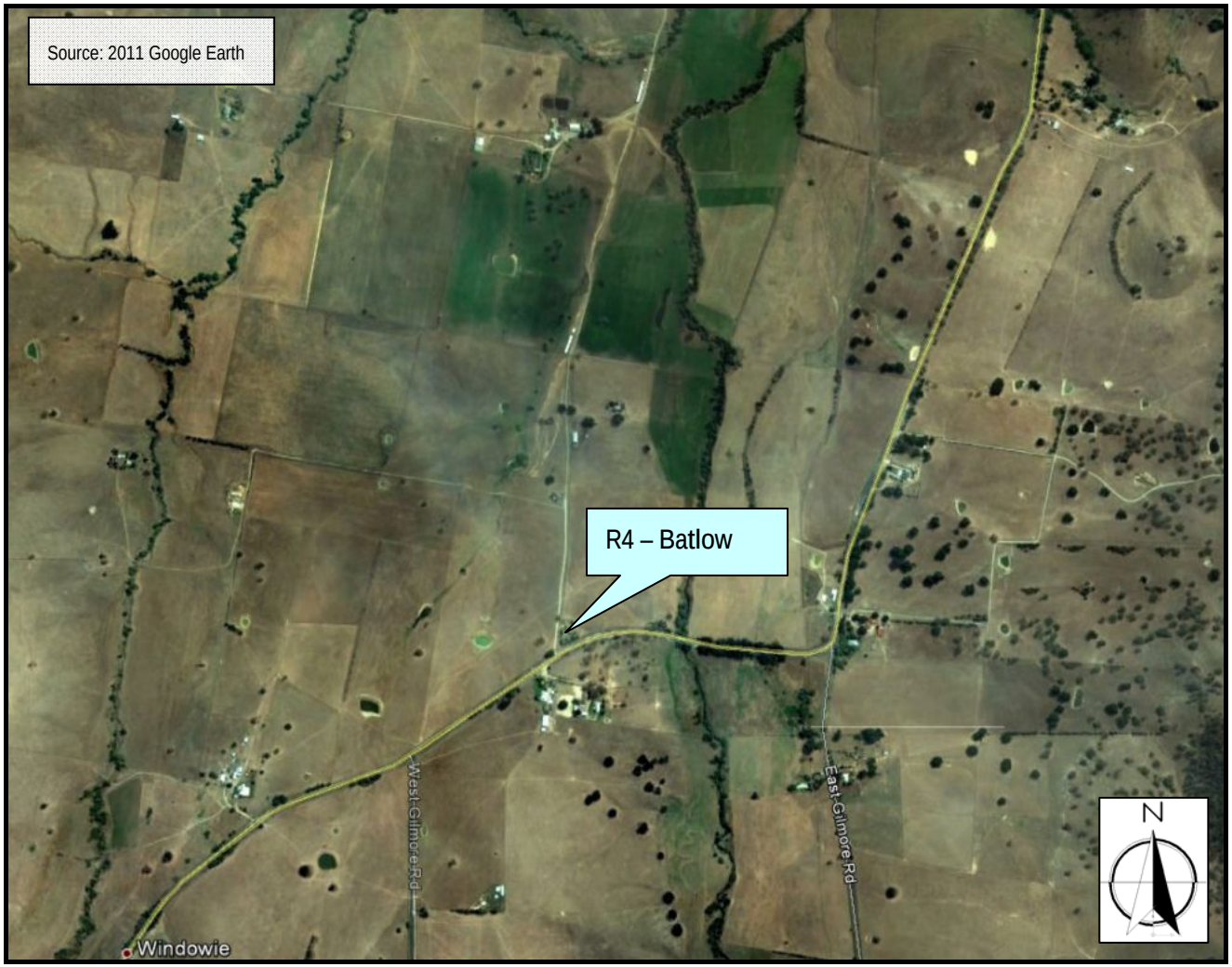


Figure 3-4: Wee Jasper - Residences and Traffic Counter Locations

Figure 3-5: Gocup Rd - Residence Locations

4. ROAD TRAFFIC NOISE LEVELS

4.1 METHODOLOGY

The unattended noise measurements were carried out using Acoustic Research Laboratories statistical Environmental Noise Loggers type Ngara and EL-215.

The instrument sets were calibrated by a NATA accredited laboratory within two years of the measurement period. The instrument sets comply with AS 1259. The instruments were set on A-weighted, fast response and logged noise levels over fifteen minute statistical intervals. Calibration Certificates have been included in the Attachments.

The microphones were positioned at 1.2 metres above ground level and were fitted with windsocks. To ensure accuracy and reliability in the results, field reference checks were applied both before and after the measurement period with an acoustic calibrator. There were no significant variances observed in the reference signal between the pre-measurement and post-measurement calibrations.

A discussion of the QA/QC procedures applied by Benbow Environmental (BE) in relation to sound level meters and the measurement of ambient noise levels has been included in the Attachments section of this report.

In assessing the background noise levels, any data affected by rain and wind greater than 5m/s has been discarded. The weather data was sourced from Visy Weather Station on the Havilah property near the mill site.

4.2 EXISTING MEASURED TRAFFIC NOISE LEVELS

Noise levels have been monitored continuously for at least one (1) week between Thursday 13th September 2012 and Monday 24th September 2012 except for logger located at receiver R5, utilising environmental noise loggers measuring 15 minute statistical intervals. Noise data was obtained at this location only for a period of 4 days.

The $L_{Aeq\ (15\ hour)}$ and $L_{Aeq\ (9\ hour)}$ noise descriptors have been calculated accordingly with the EPA's *NSW Road Noise Policy (Appendix B3)* and the noise levels have been rounded to the nearest integer.

Noise loggers were located at the seven (7) aforementioned residential locations in line with the front facades of the residences. The measured traffic noise levels are presented from Table 4-1 to Table 4-7. The daily logger graphs have been provided in the attachments.

Table 4-1: Measured Traffic Noise Levels at R1, dB(A)		
Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$
13/09/2012	66	47
14/09/2012	50	50
15/09/2012	54	48
16/09/2012	48	51
17/09/2012	49	51
18/09/2012	49	51
19/09/2012	55	50
20/09/2012	50	51
21/09/2012	50	52
22/09/2012	49	50
23/09/2012	48	51
24/09/2012	50	55
Logarithmic Average	57	51

Table 4-2: Measured Traffic Noise Levels at R2, dB(A)		
Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$
13/09/2012	48	47
14/09/2012	46	46
15/09/2012	47	46
16/09/2012	47	48
17/09/2012	50	49
18/09/2012	48	50
19/09/2012	49	49
20/09/2012	49	48
21/09/2012	51	51
22/09/2012	49	49
23/09/2012	48	49
24/09/2012	47	48
Logarithmic Average	49	49

Table 4-3: Measured Traffic Noise Levels at R3, dB(A)		
Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$
13/09/2012	55	53
14/09/2012	56	53
15/09/2012	51	51
16/09/2012	51	49
17/09/2012	66	52
18/09/2012	55	54
19/09/2012	54	54
20/09/2012	55	52
21/09/2012	55	53
22/09/2012	52	50
23/09/2012	51	49
24/09/2012	54	53
Logarithmic Average	57	52

Table 4-4: Measured Traffic Noise Levels at R4, dB(A)		
Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$
13/09/2012	56	54
14/09/2012	56	55
15/09/2012	60	49
16/09/2012	52	49
17/09/2012	57	54
18/09/2012	57	55
19/09/2012	56	54
20/09/2012	57	52
21/09/2012	57	54
22/09/2012	52	49
23/09/2012	58	45
24/09/2012	58	56
Logarithmic Average	57	53

Table 4-5: Measured Traffic Noise Levels at R5, dB(A)		
Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$
13/09/2012	62	58
14/09/2012	67	64
15/09/2012	63	57
16/09/2012	62	55
Logarithmic Average	64	60

Table 4-6: Measured Traffic Noise Levels at R6, dB(A)		
Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$
13/09/2012	53	53
14/09/2012	53	55
15/09/2012	51	52
16/09/2012	57	51
17/09/2012	54	54
18/09/2012	54	54
19/09/2012	53	53
20/09/2012	53	52
21/09/2012	56	53
22/09/2012	60	51
23/09/2012	50	49
24/09/2012	54	53
Logarithmic Average	55	53

Table 4-7: Measured Traffic Noise Levels at R7, dB(A)		
Date	$L_{Aeq(15\ hour)}$	$L_{Aeq(9\ hour)}$
13/09/2012	58	57
14/09/2012	59	57
15/09/2012	58	56
16/09/2012	58	55
17/09/2012	60	57
18/09/2012	59	57
19/09/2012	59	57
20/09/2012	59	57
21/09/2012	60	58
Logarithmic Average	59	57

4.3 SUMMARY OF MEASUREMENT RESULTS

The table below summarises the key noise monitoring results detailed within section 4.2 and states the status of compliance for all considered residential receiver locations.

Table 4-8: Summary of the Measured Traffic Noise Levels

Location	$L_{Aeq(15\ hour)}$ Criteria 60 dB(A)	$L_{Aeq(9\ hour)}$ Criteria 55 dB(A)	Compliance
R1 – Brentwood	57	51	Yes
R2 – Glengarry	49	49	Yes
R3 – Beale	57	52	Yes
R4 – Batlow	57	53	Yes
R5 – Wee Jasper	64	60	No
R6 – Gocup Rd	55	53	Yes
R7 – Minjary	59	57	No

Note: Cell in bold indicates that the level exceeds the noise criteria

Comments

The measured noise levels comply with the current noise criteria at receivers R1, R2, R3, R4 and R6. Non-compliance has been recorded at location R5 throughout both the daytime and night time periods and at location R7 throughout the night time period. An exceedance up to five (5) dB and two (2) dB was measured for the night time period at locations R5 and R7 respectively.

The noise logger positioned at location R7 was established at 1 m from the façade of the property, approximately 36 m from the road as indicated in the RNP. However, during logger retrieval, the noise device was found to be moved and placed in a different position approximately 20 m from the road resulting in higher measured noise levels due to the closer proximity to the trucks passing by (See Section 4.5). Therefore, the measured noise level of 57 dB(A) at R7 is considered to be greater to the level that would be measured at the façade of the property. A simple distance calculation was undertaken in order to extrapolate the noise levels at the façade resulting in compliance at this receiver location as the noise levels does not exceed 55 dB(A) for the night time period.

A comparison with the previous noise assessment carried out in May 2012 (110068_Truck Noise Study 2012_Final) indicates that the noise levels at location R5 have decreased by 2 dB and 1 dB for the day and night time periods respectively. Report 110068_Truck Noise Study 2012_Final states that after undertaking a noise analysis of the data, noise compliance was found at this location R5.

It is important to mention that the unattended noise monitoring is influenced by extraneous noises such as wild life, people and traffic not related to Visy Pulp and Paper. Therefore, an additional analysis has been

carried out for receiver R5 in order to determine if the noise exceedances at this location are attributable to Visy truck movements.

4.4 NOISE ANALYSIS AT RECEIVER R5

As the recorded noise levels are not only representative of noise generated by heavy vehicles but also include car movements and wildlife (e.g. birds and crickets), the traffic noise contribution from Visy-related trucks is expected to be lower than the actual L_{Aeq} measured.

Measured noise levels undertaken at locations R1, R2, R3, R4 and R6 achieved compliance including extraneous noise sources and therefore further analyses is considered unnecessary. Additionally, compliance was also predicted at R7 during day and night time period (see Section 4.3).

Visy Pulp and Paper provided Benbow Environmental with the following truck access data from the weight bridge:

- Entry Date and Time;
- Exit Date and Time;
- Access Route;
- Return Route;
- Weight (nett, gross, tare); and
- Supplier and transported product.

This information was utilized for determining the number of Visy truck movements travelling along Wee Jasper Road which represents the number of trucks passing by receiver R5.

The CoRTN model (Calculation of Road Traffic Noise) algorithms are not valid for low traffic volumes and therefore are not suitable for this study.

Calculation of road traffic noise contribution from Visy trucks has been undertaken using a method that takes into account sound exposure levels and calculates the L_{Aeq} due to the time of exposure to the truck noise.

The following noise descriptors have been calculated:

- $L_{Aeq\ (15\ hour)}$; and
- $L_{Aeq\ (9\ hour)}$.

The method used to calculate sound exposure levels is explained below and is based on procedures referenced in AS 1055.1 and reference texts on assessing the environmental impact of roads and traffic.

AS 1055.1 Clause 3.6 defines L_{AE} as being:

> *"the sound exposure level of a discrete noise event is the instantaneous A-weighted sound pressure integrated over the specified time duration at the noise event and referenced to a duration of 1 sec".*

AS 1055.1 Clause 6.4.5 explains how the sound exposure level can be used:

> *"where a noise environment is the result of a number of identifiable noise events, the time weighted average A-weighted sound pressure level may be calculated from the sound exposure levels of the individual events occurring within a time period from the following equation:"*

$$L_{Aeq,T} = 10\log_{10}\frac{1}{T}\sum_{n=1}^{n}10^{0.1SEL}$$

The sound exposure level has been obtained from noise measurements carried out by Benbow Environmental during this assessment at Tumut. The noise logger positioned at R5 was set up to measure audio files. This data was analyzed after logger retrieval and a representative SEL for Visy trucks was obtained.

The results of the truck noise calculations are shown in the following table:

Table 4-9: Calculated Visy Trucks Noise Contribution Levels at R5

Date	Visy Trucks Day	Visy Trucks Night	Estimated Visy Contribution $L_{Aeq(15\ hour)}$ Criteria 60 dB(A)	Estimated Visy Contribution $L_{Aeq(9\ hour)}$ Criteria 55 dB(A)	Compliance Day	Compliance Night
13/09/2012	105	20	59.1	54.1	Yes	Yes
14/09/2012	68	19	57.2	53.9	Yes	Yes
15/09/2012	6	4	46.7	47.1	Yes	Yes
16/09/2012	0	0	-	-	Yes	Yes

Comments

Contribution from Visy trucks has been calculated to comply with the criteria for every day between and including the 13th September 2012 and 16th September 2012.

No trucks from Visy passing through Wee Jasper Road were observed on 16th September 2012. In contrast to this, Table 4-5 shows that the noise levels on this day were measured to be 62 dB(A) and 55 dB(A) for the day and night time periods respectively. Therefore, a noise exceedance of 2 dB was measured for the day time period with the absence of Visy trucks. This indicates that Visy trucks may not be the main noise contributors at this location as several cars and trucks unrelated to Visy also travel along this road.

The western façade of this property is located approximately 7 m from the closest edge of the road. For this reason the trucks passing by at Wee Jasper Road are clearly audible at this location. Compliance with the criteria can be explained as trucks are considered to be intermittent noise events for durations below 30 seconds and although noise levels associated with trucks passing by significantly exceed 60 dB(A) and 55 dB(A) for day and night time respectively, the total noise contribution must be calculated over 15 hr and 9 hr respectively.

4.5 PHOTOGRAPHS

Figure 4-1: Unattended Measurements at Location R1

Figure 4-2: Unattended Measurements at Location R2

Figure 4-3: Unattended Measurements at Location R3

Figure 4-4: Unattended Measurements at Location R4

Figure 4-5: Unattended Measurements at Location R5

Figure 4-6: Unattended Measurements at Location R6

Figure 4-7: Unattended Measurements at Location R7 (Establishment Position)

Figure 4-8: Unattended Measurements at Location R7 (Retrieval Position)

5. CONCLUSIONS

The traffic noise study was conducted at seven (7) residential locations.

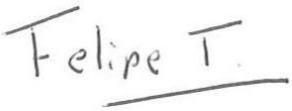
Compliance is achieved at all considered residential locations (R1, R2, R3, R4, R5, R6 and R7).

Noise levels at location R5 were initially found to be higher than the noise limits even for periods when there were no recorded trucks associated with Visy passing through Wee Jasper Rd. Therefore, the traffic noise contribution from Visy at this receiver was calculated and found to comply with the traffic noise criteria.

Benbow Environmental recommends continued noise monitoring at all seven (7) receivers in order to assess compliance with the established noise criteria for off-site Visy trucks. Special attention should be considered at location R5 due to the close proximity between this location and Wee Jasper Rd.

This concludes the report.

Prepared by:



Felipe Torres
Acoustical Engineer

R T Benbow
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6. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

This report has been prepared solely for the use by Visy Pulp and Paper Pty Ltd, as per our agreement for providing environmental assessment services. Although all due care has been taken in the preparation of this study, no warranty is given, nor liability accepted (except that required by law) in relation to the information contained within this document.

Visy Pulp and Paper Pty Ltd is entitled to rely upon the findings in the report within the scope of work described in this report. No responsibility is accepted for the use of any part of the report in any other context or for any other purpose.

Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

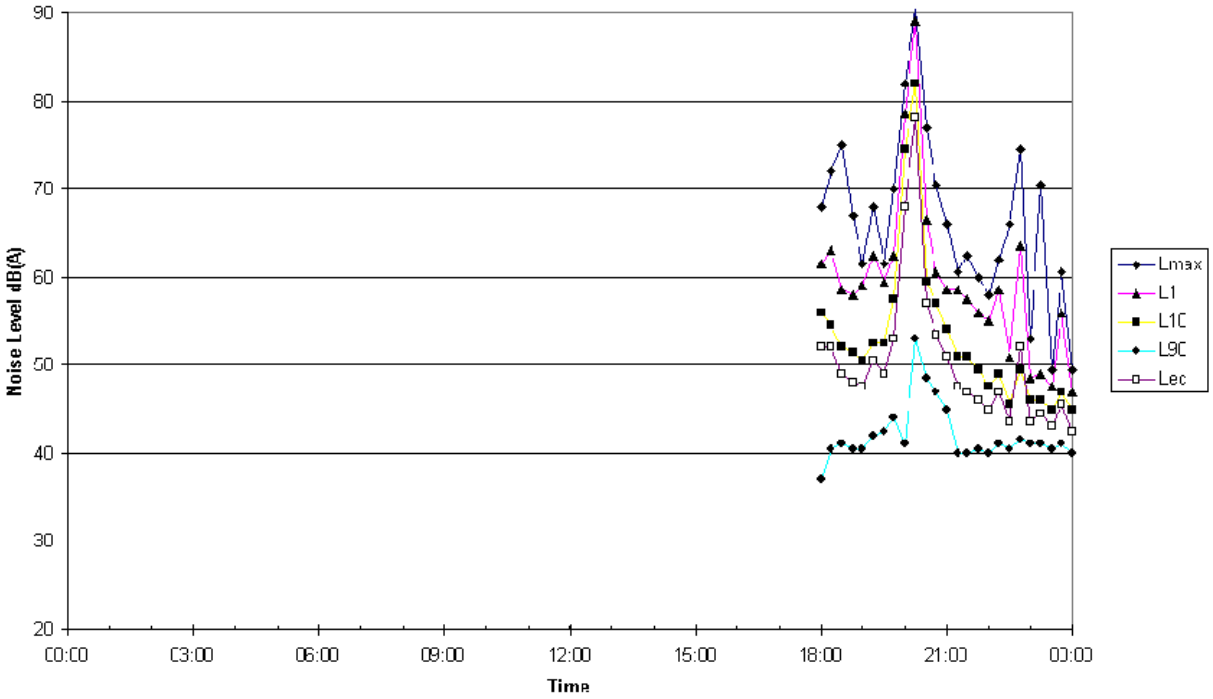
ATTACHMENTS

Terminology

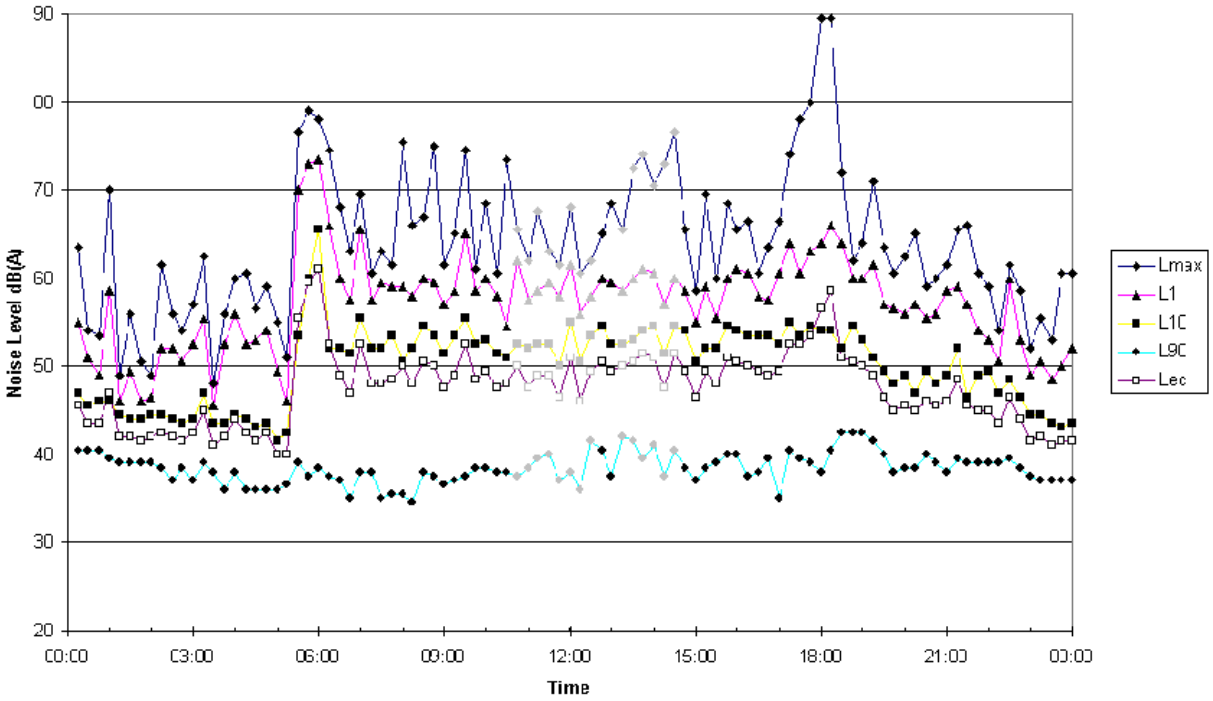
This section provides an explanation of the terms used throughout the report. In order to characterise the noise levels measured over a period of time the following noise descriptors are used:

- L_{A1}
  The L_{A1} is the level of noise exceeded for 1% of the time and is, therefore, the average peak level of noise experienced during the measurement period.
- L_{A10}
  The L_{A10} is the level of noise exceeded for 10% of the time and is, therefore, the maximum level of noise experienced during the measurement period.
- L_{Aeq}
  The L_{Aeq} is the equivalent continuous level of noise and is a single number that is equivalent to the fluctuations of noise level that are occurring based on the energy contained within the noise signal. The L_{Aeq} is determined by an integration of the noise level with respect to time.
- L_{A90}
  The L_{A90} is the level of noise exceeded for 90% of the sample time and is therefore the minimum level of noise experienced during the measurement period. The L_{A90} is referred to as the background noise level.
- Daytime and Night Time Periods
  For the criteria outlined in the NSW EPA Environmental Noise Control Manual, daytime is defined as from 7.00am to 10.00pm, Monday to Saturday, and 8am to 10pm on Sunday and Public Holidays. Night time is defined as 10pm to 7am, Monday to Friday, and 10pm to 8am on Sundays and Public Holidays.
- Sound Pressure Level (abbreviated SPL)
  Is the instantaneous measurement of pressure variations in the ambient air compared to a reference pressure. A precision sound level meter measures SPL and measurements are expressed as dB(A).
- Tonal Noise
  Noise containing a prominent frequency and characterised by a definite pitch.
- Low frequency noise
  Containing major components within the low frequency range (20Hz – 250 Hz) of the frequency spectrum.
- Impulsive noise
  Noise having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
- Fluctuating noise
  Noise that varies continuously and to an appreciable extent over the period of observation.
- Intermittent noise
  The level suddenly drops to that of the background noise several times during the period of observation.
- Adjustment for duration
  Applied where a single – event noise is continuous for a period of less than two and a half hours in any 24-hour period.

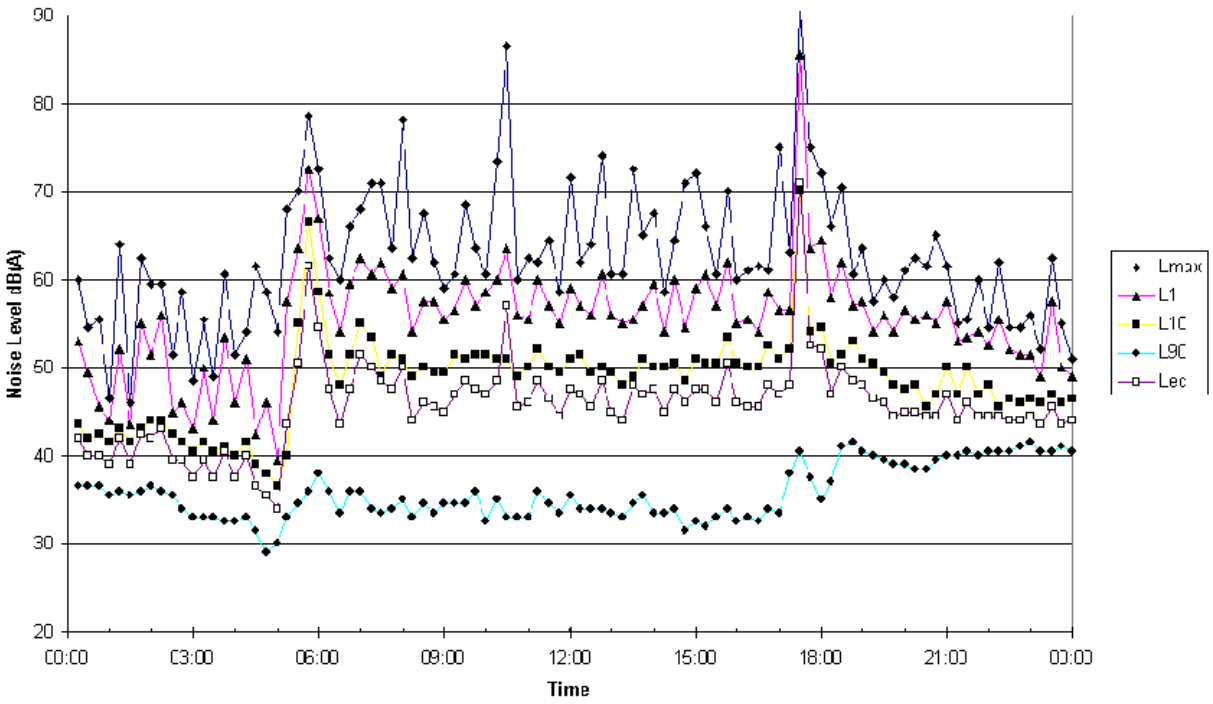
Measured Noise Levels
Location R1 - Thursday 13/09/2012



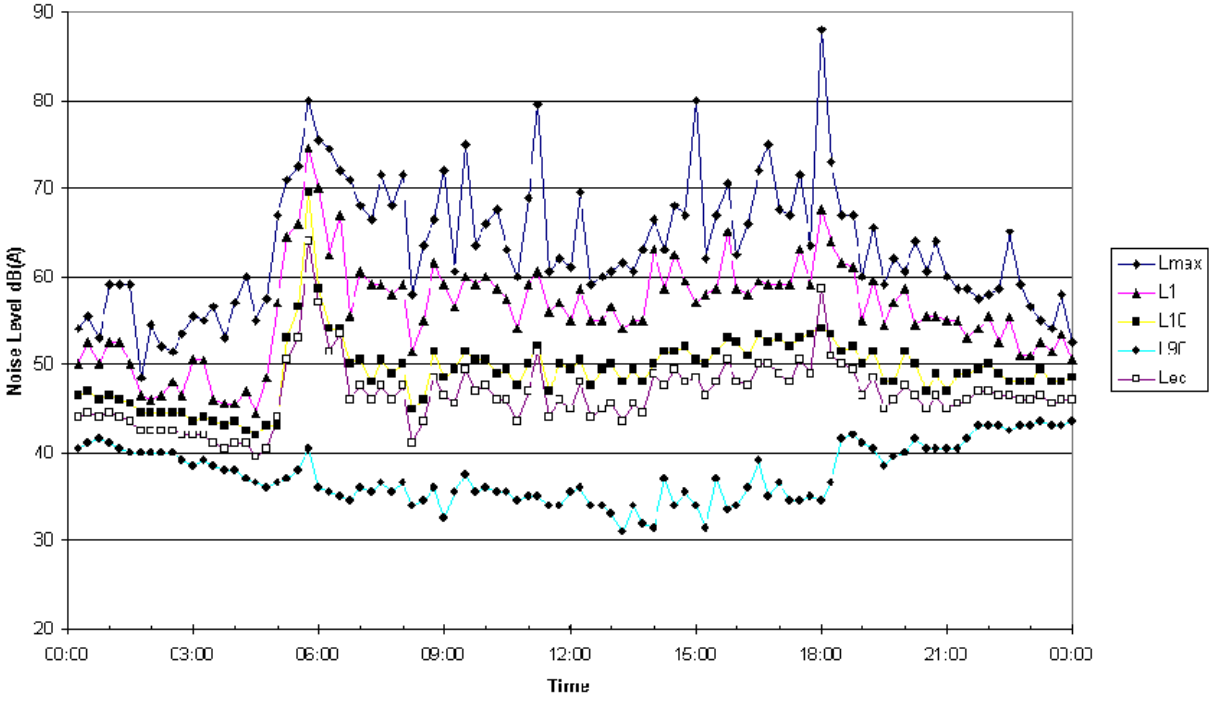
Measured Noise Levels
Location R1 - Friday 14/09/2012



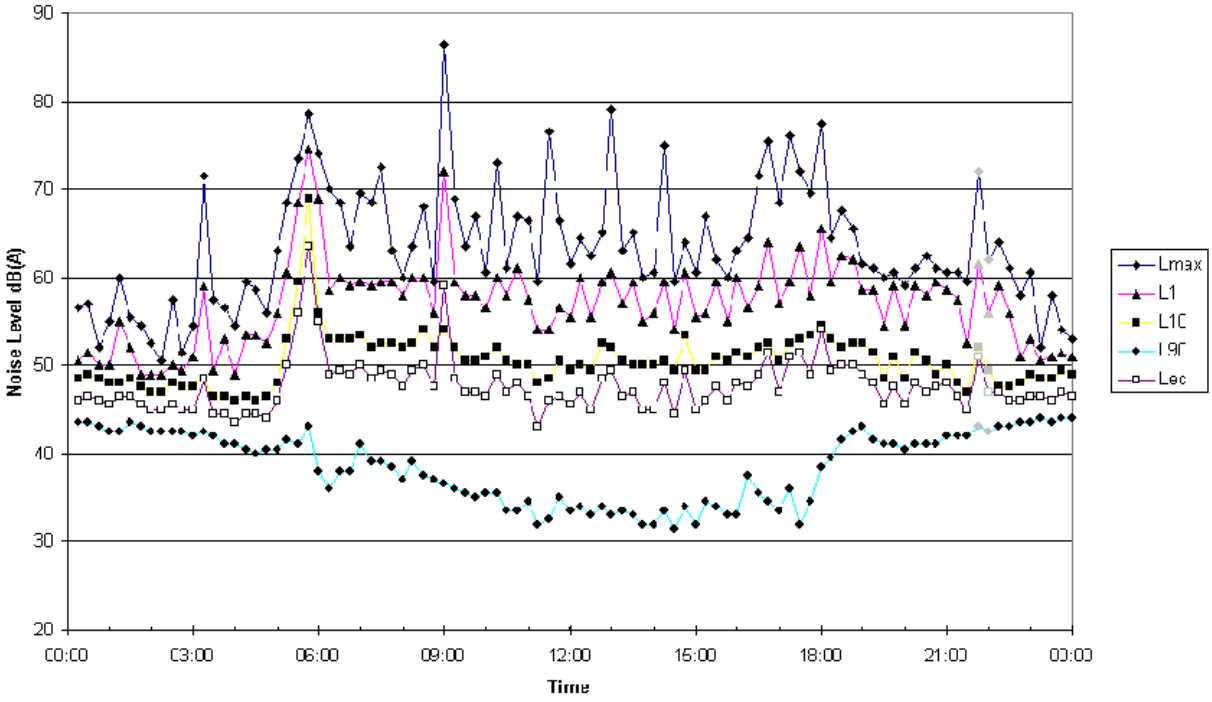
Measured Noise Levels
Location R1 - Saturday 15/09/2012



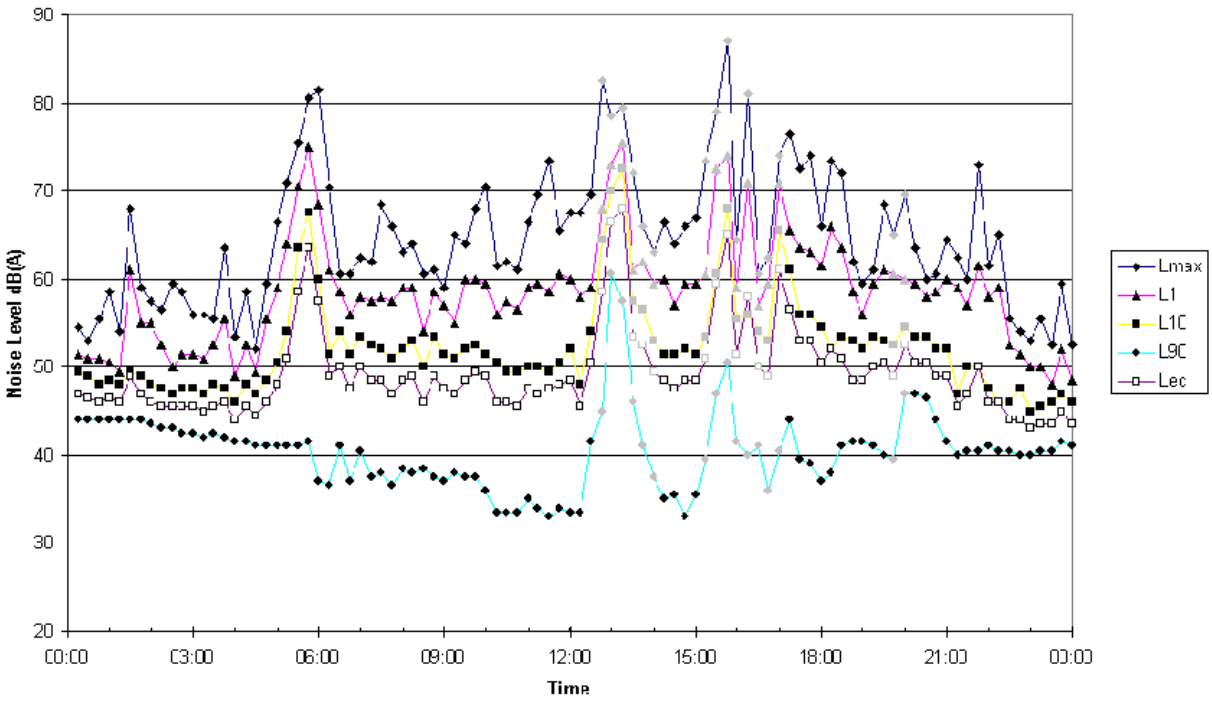
Measured Noise Levels
Location R1 - Sunday 16/09/2012



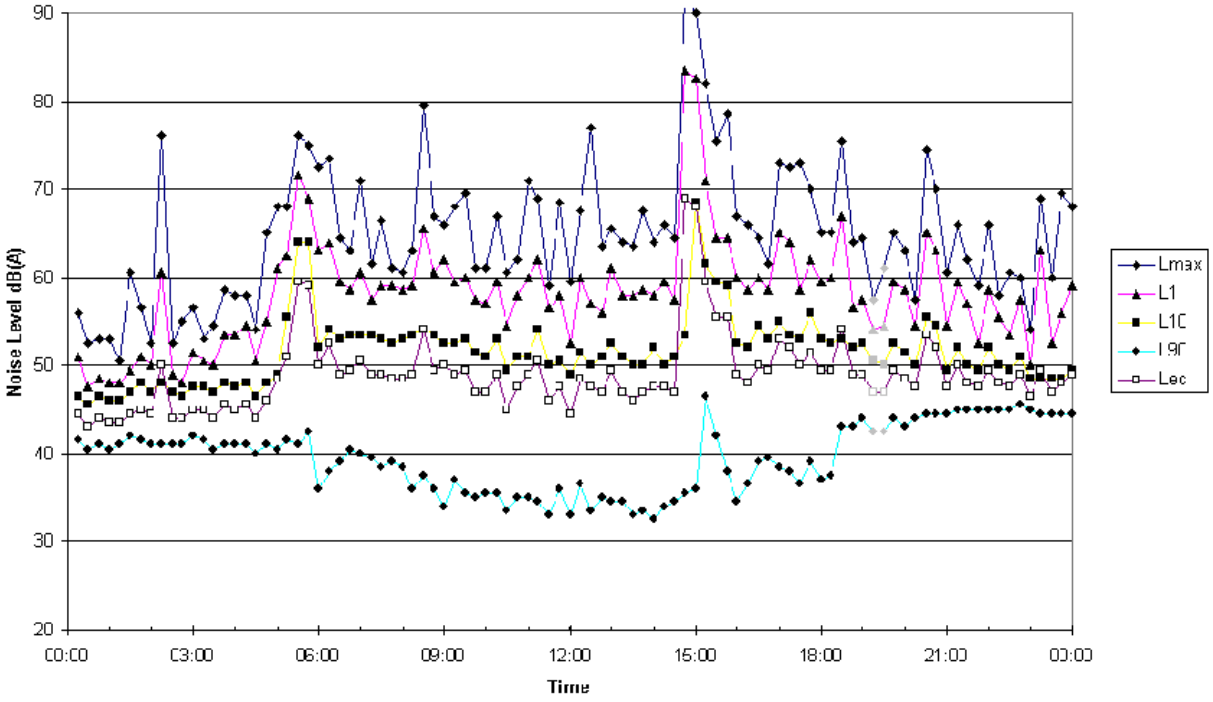
Measured Noise Levels
Location R1 - Monday 17/09/2012



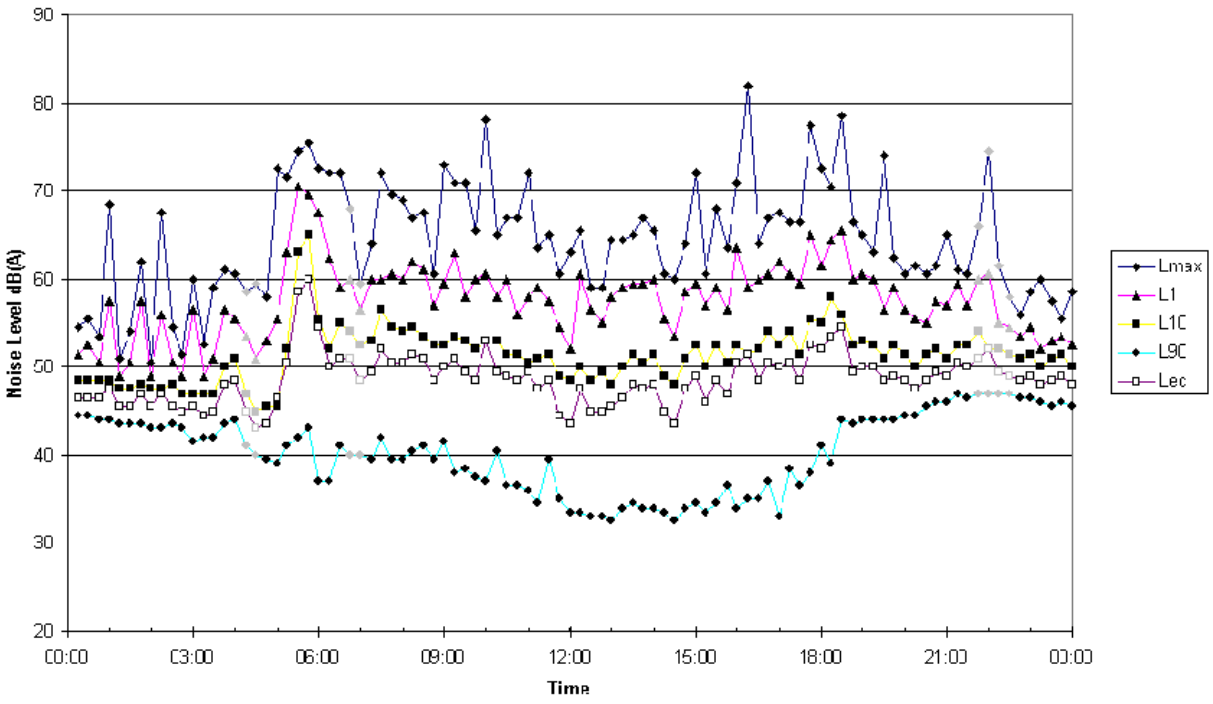
Measured Noise Levels
Location R1 - Tuesday 18/09/2012



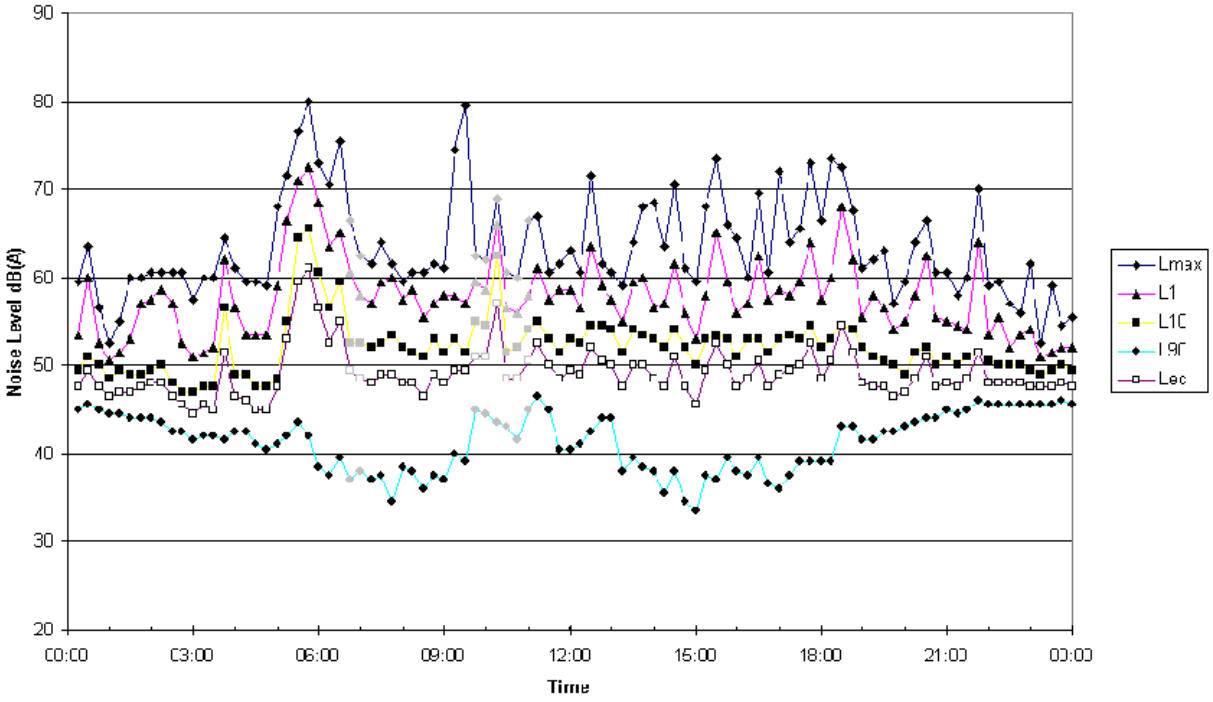
Measured Noise Levels
Location R1 - Wednesday 19/09/2012



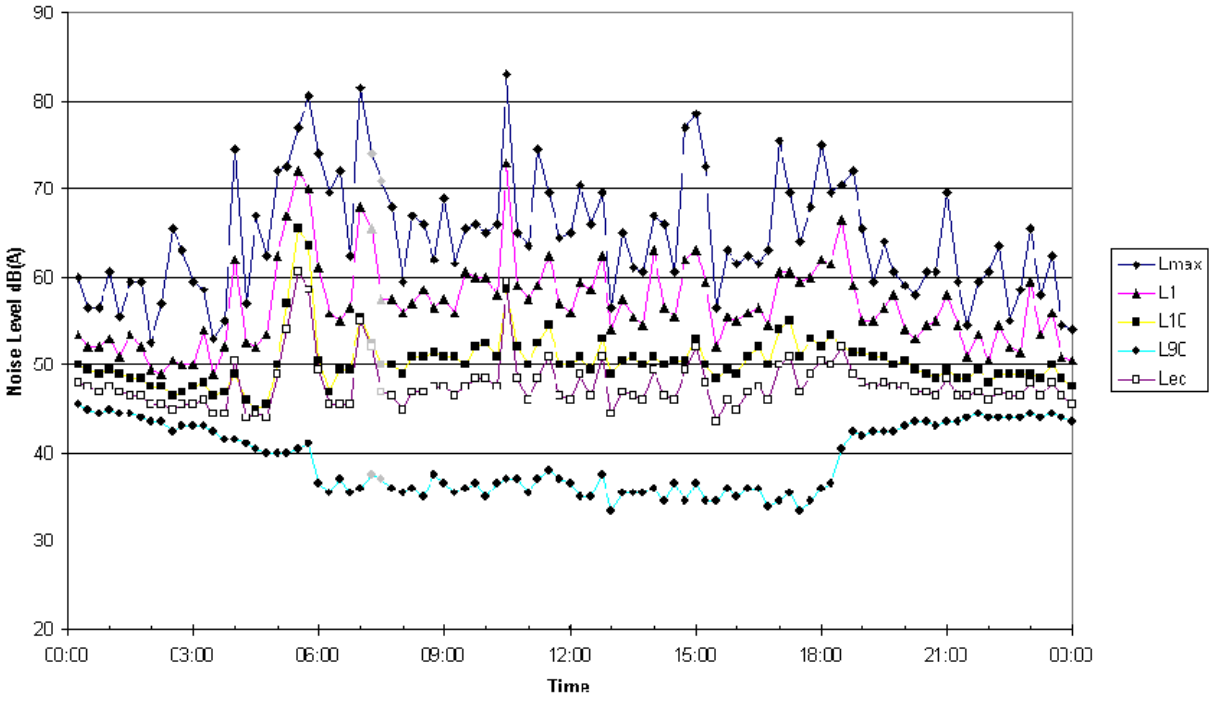
Measured Noise Levels
Location R1 - Thursday 20/09/2012



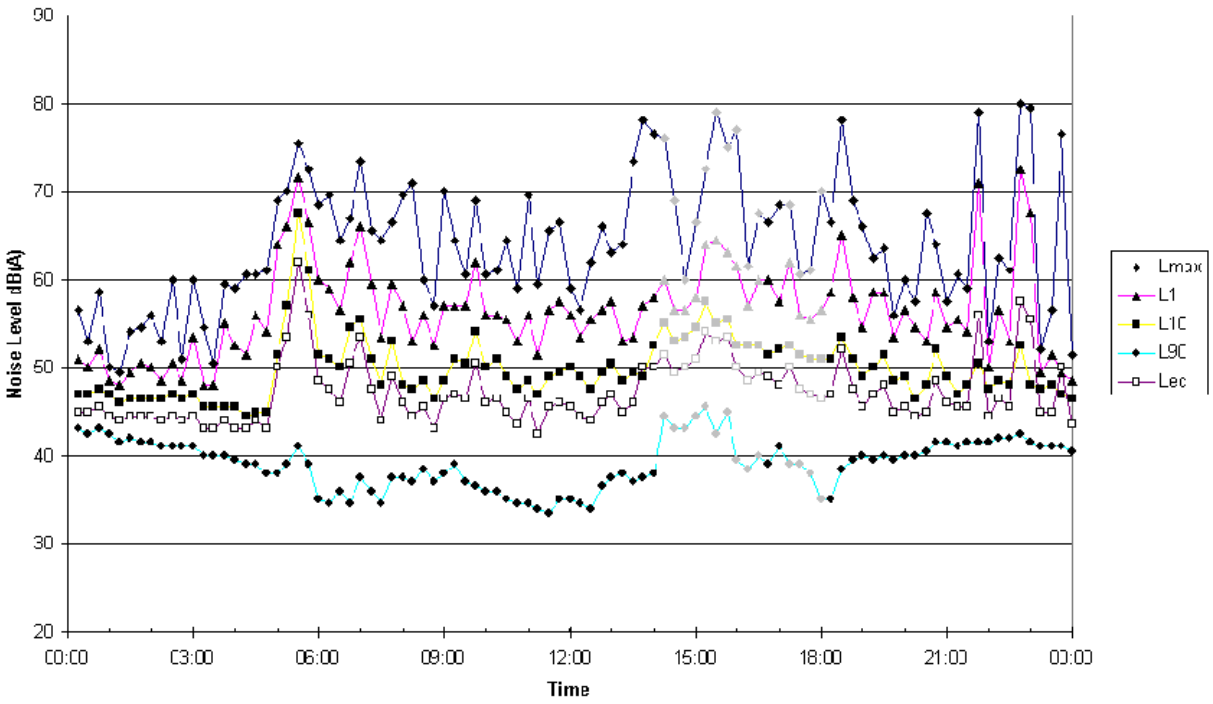
Measured Noise Levels
Location R1 - Friday 21/09/2012



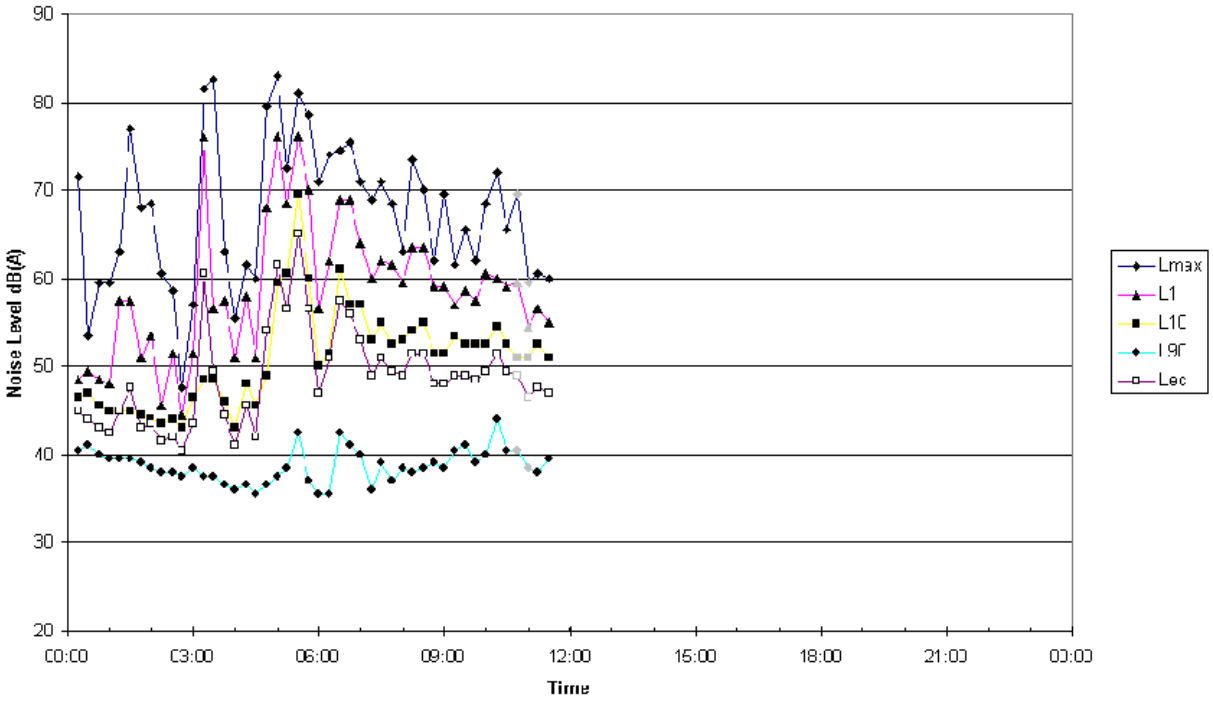
Measured Noise Levels
Location R1 - Saturday 22/09/2012



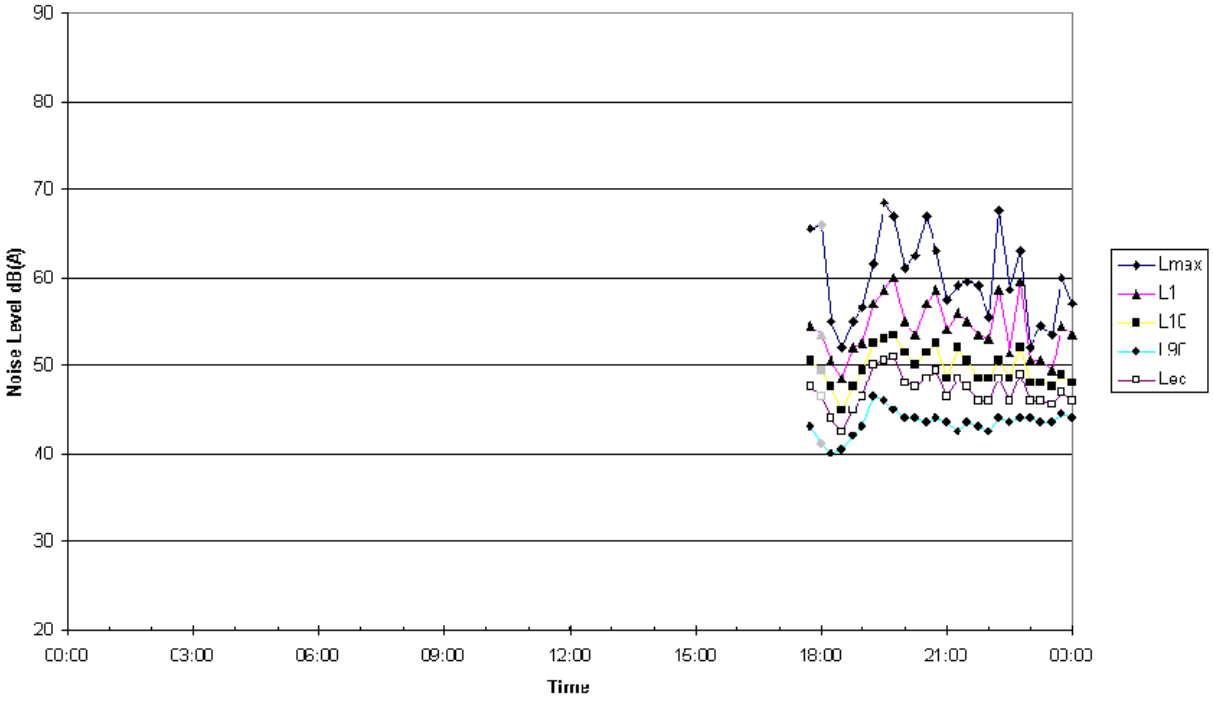
Measured Noise Levels
Location R1 - Sunday 23/09/2012



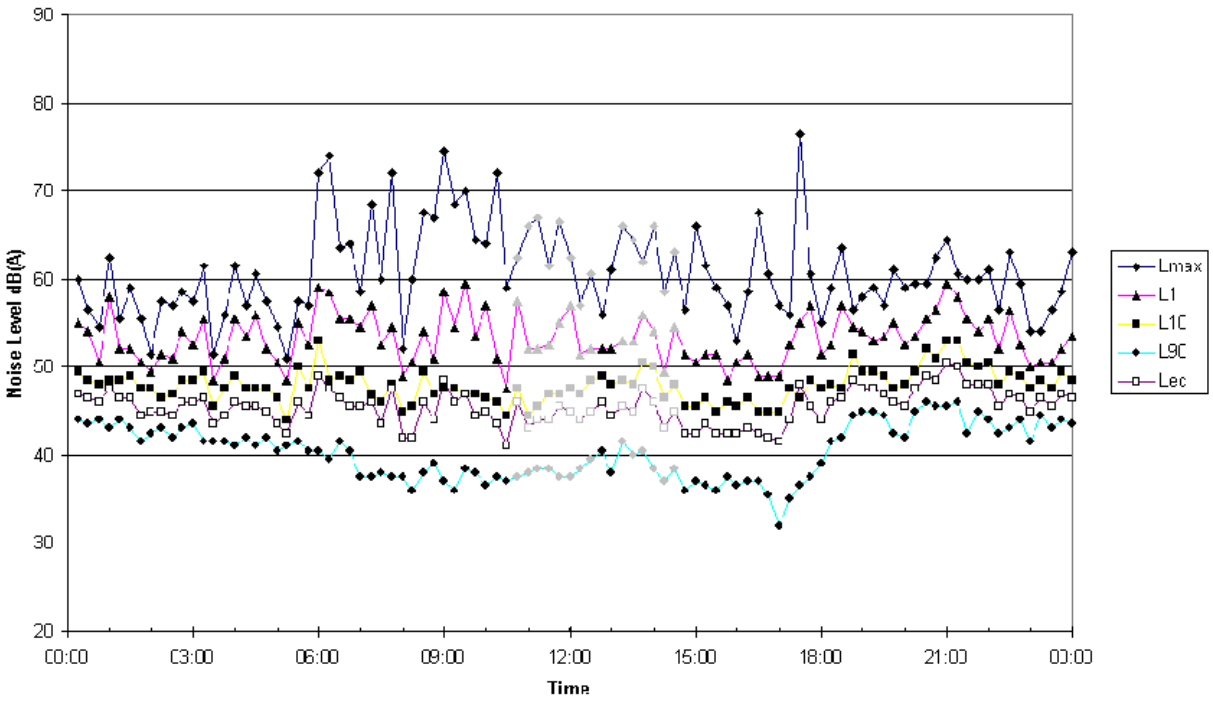
Measured Noise Levels
Location R1 - Monday 24/09/2012



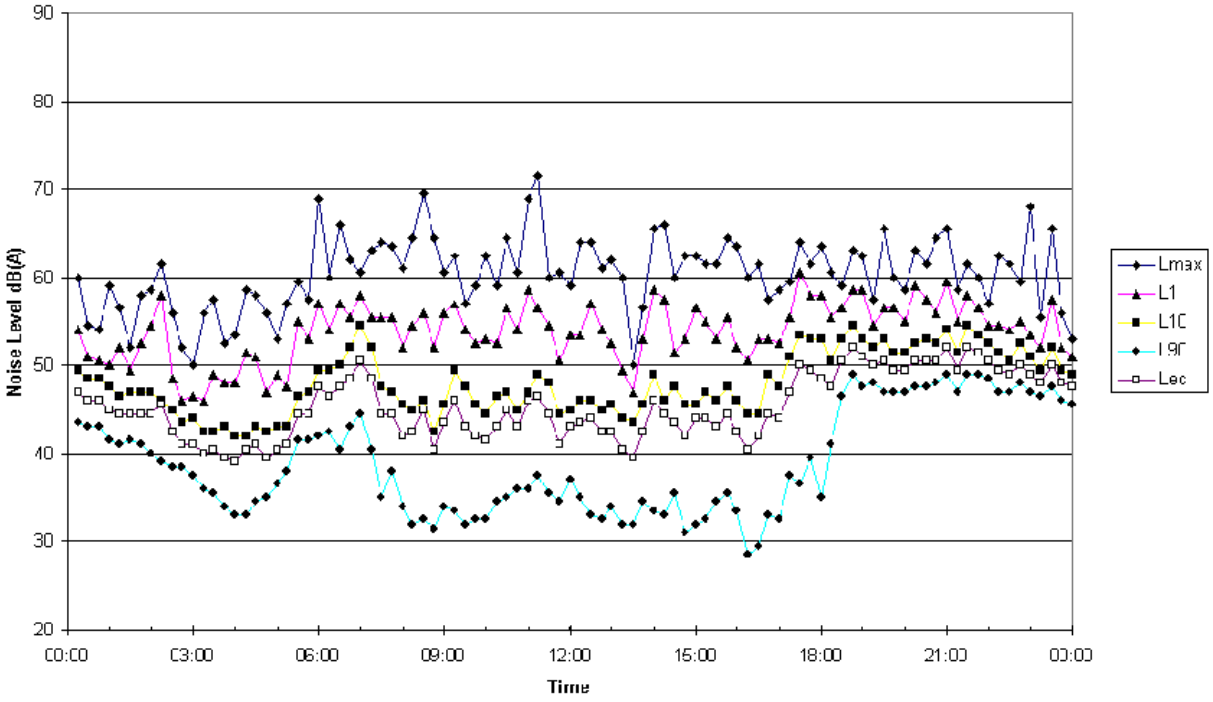
Measured Noise Levels
Location R2 - Thursday 13/09/2012



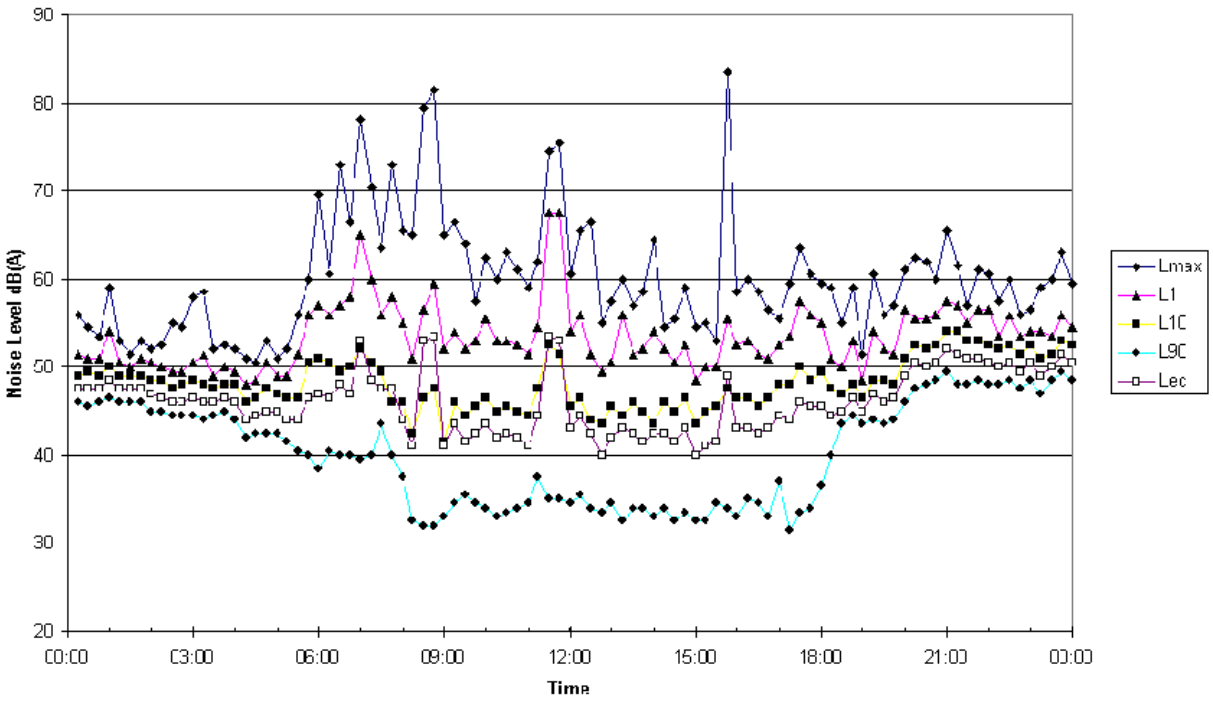
Measured Noise Levels
Location R2 - Friday 14/09/2012



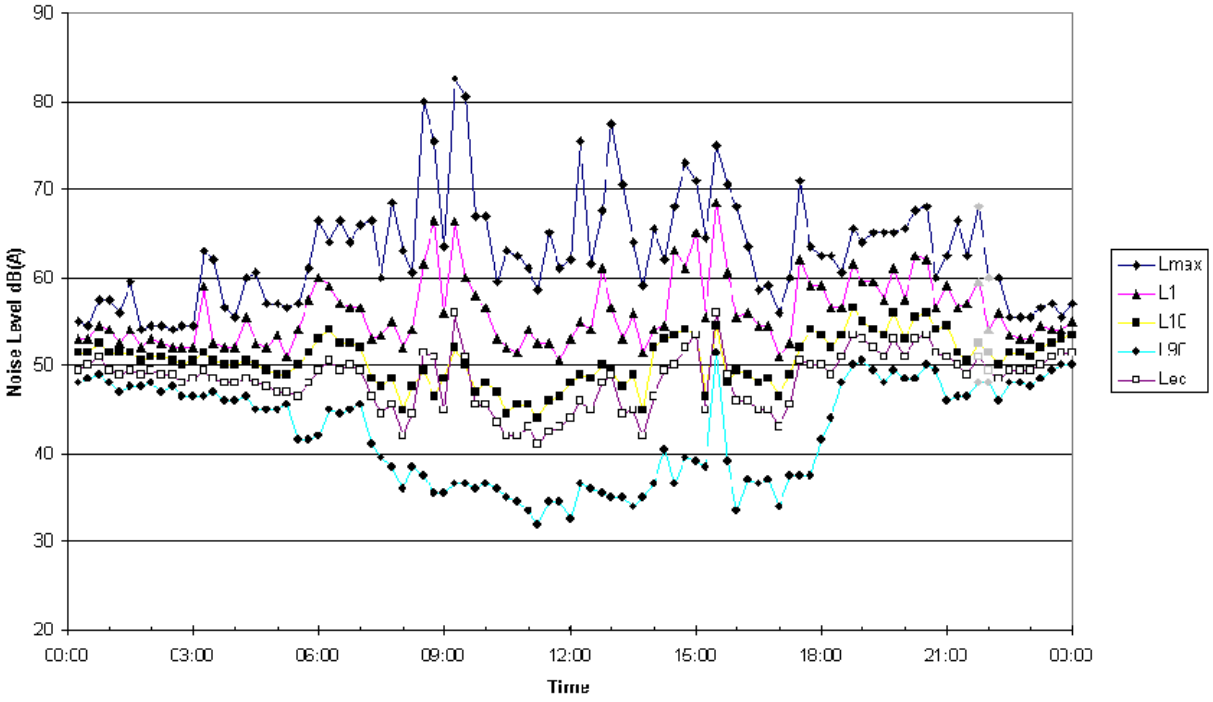
Measured Noise Levels
Location R2 - Saturday 15/09/2012



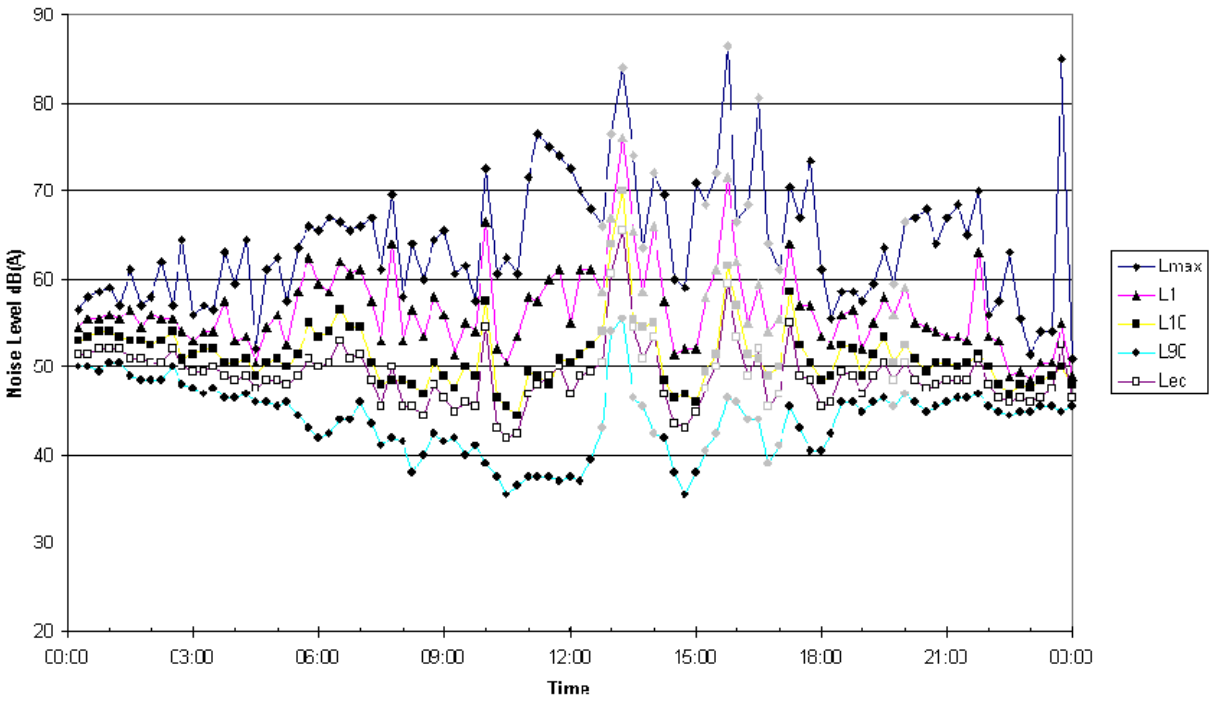
Measured Noise Levels
Location R2 - Sunday 16/09/2012



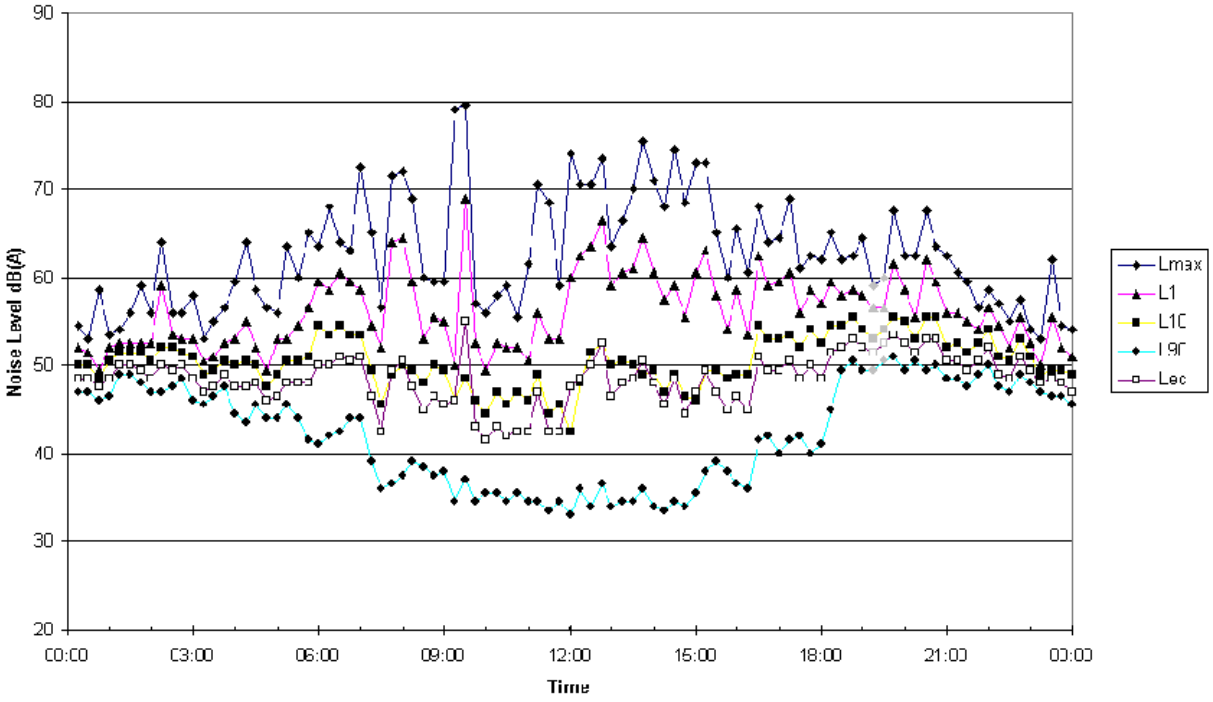
Measured Noise Levels
Location R2 - Monday 17/09/2012



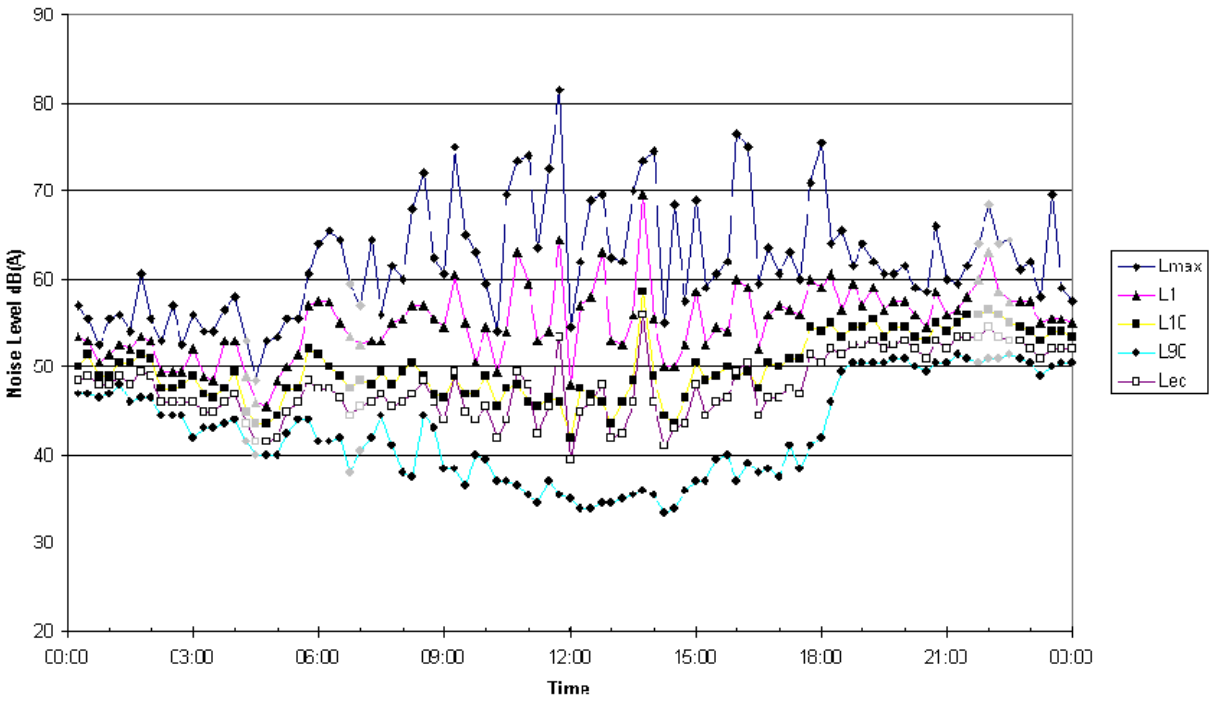
Measured Noise Levels
Location R2 - Tuesday 18/09/2012



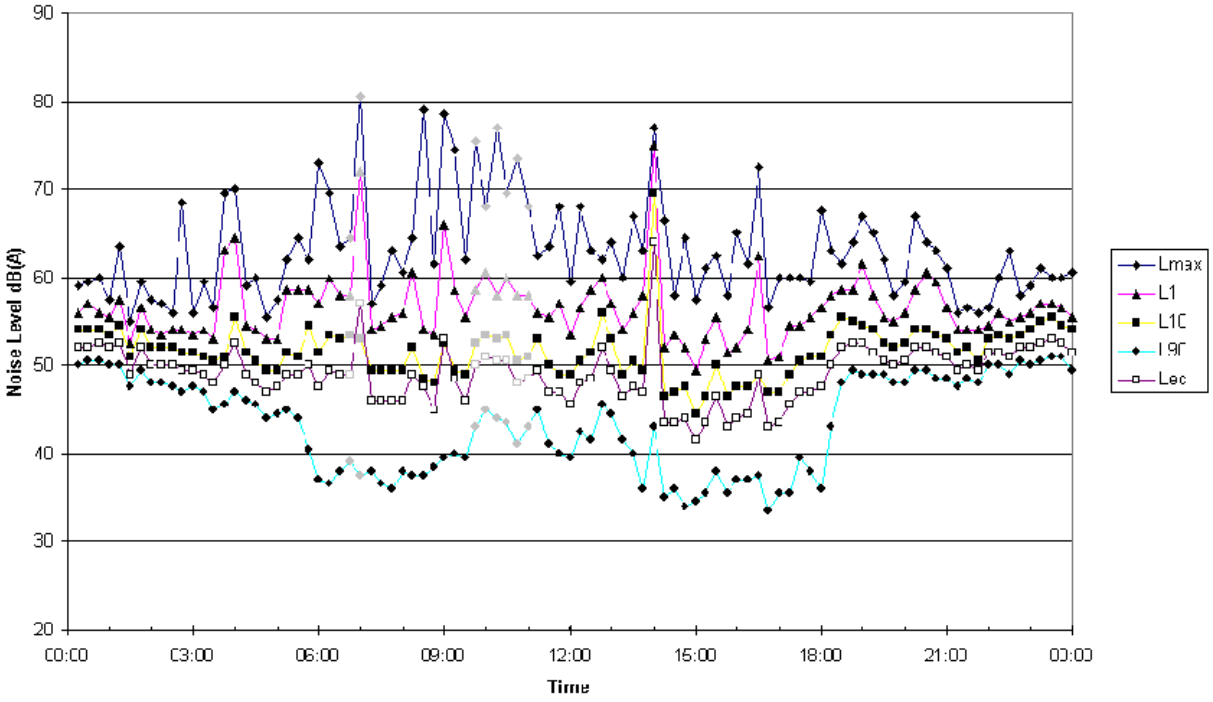
Measured Noise Levels
Location R2 - Wednesday 19/09/2012



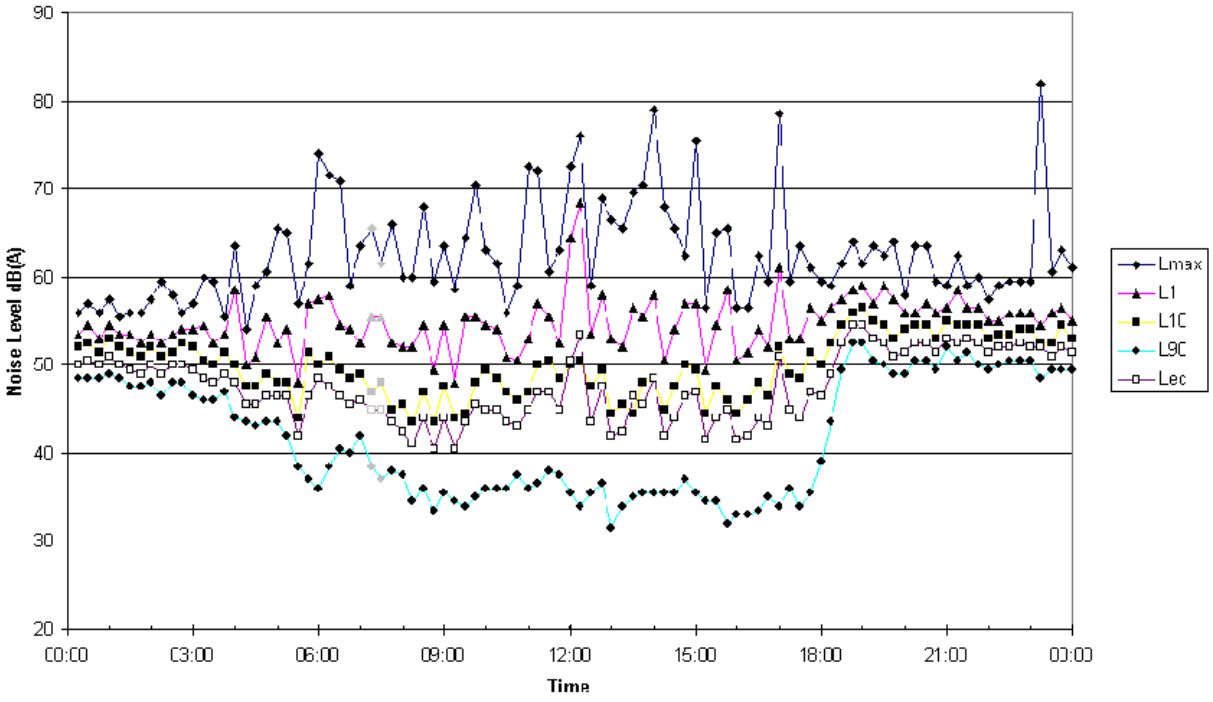
Measured Noise Levels
Location R2 - Thursday 20/09/2012



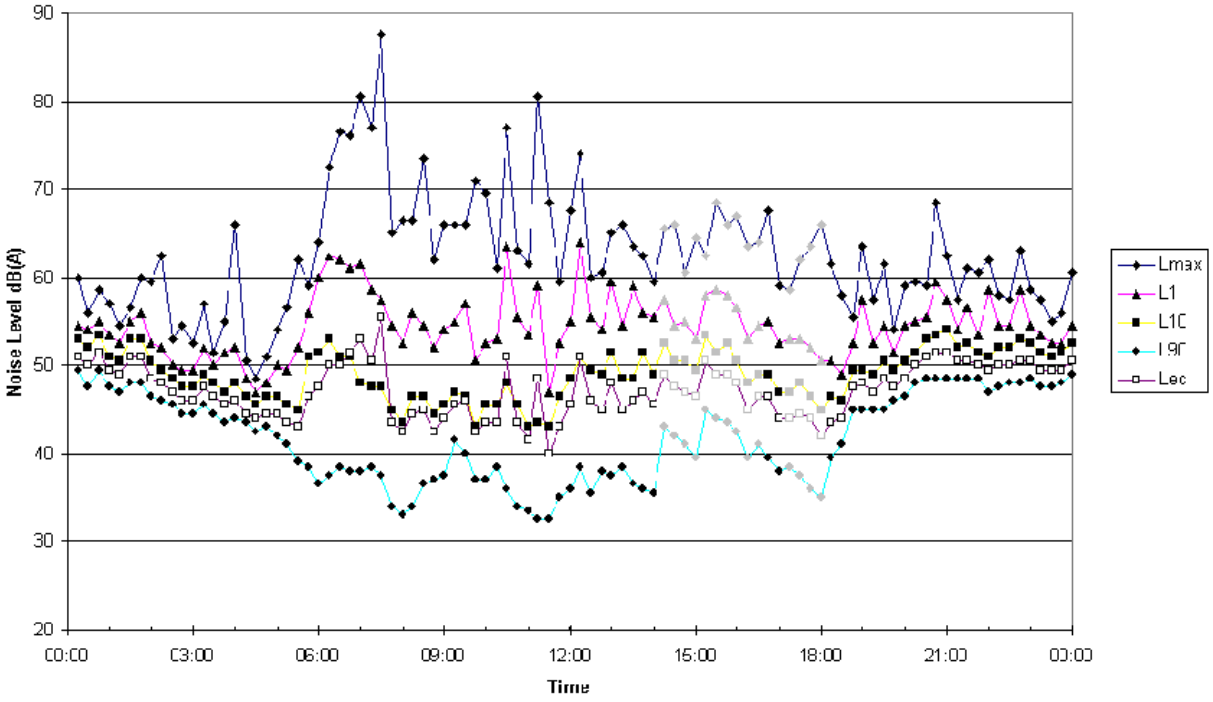
Measured Noise Levels
Location R2 - Friday 21/09/2012



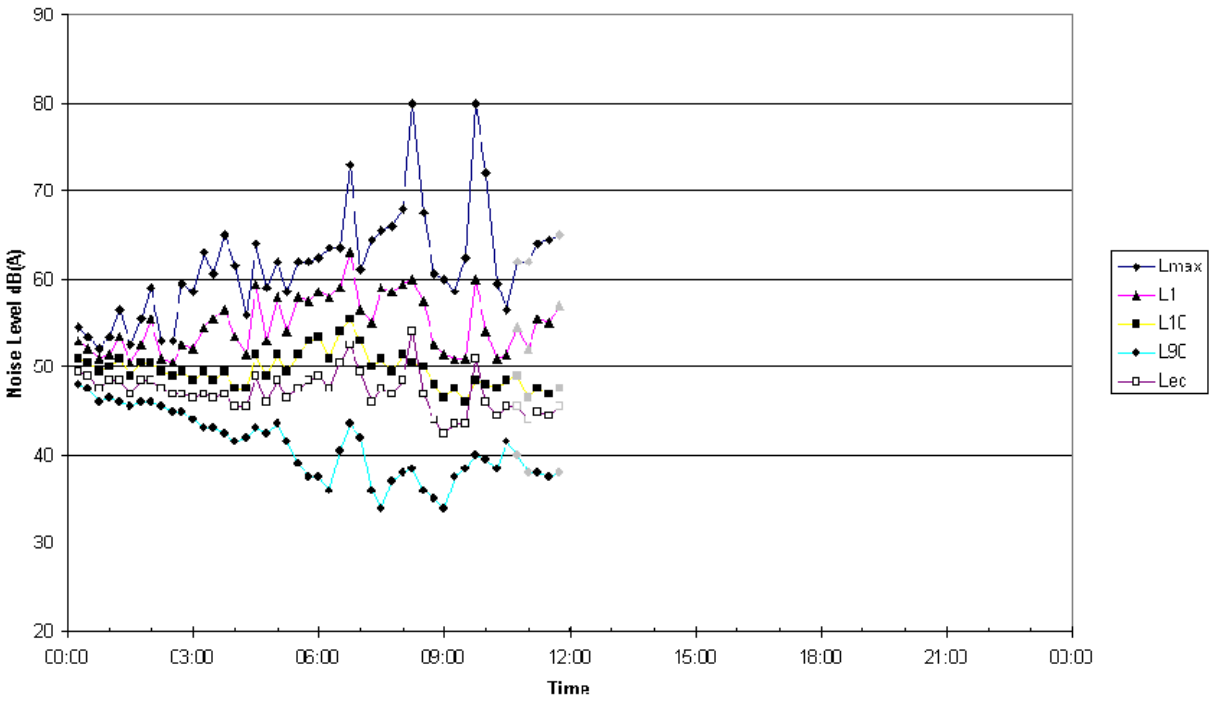
Measured Noise Levels
Location R2 - Saturday 22/09/2012



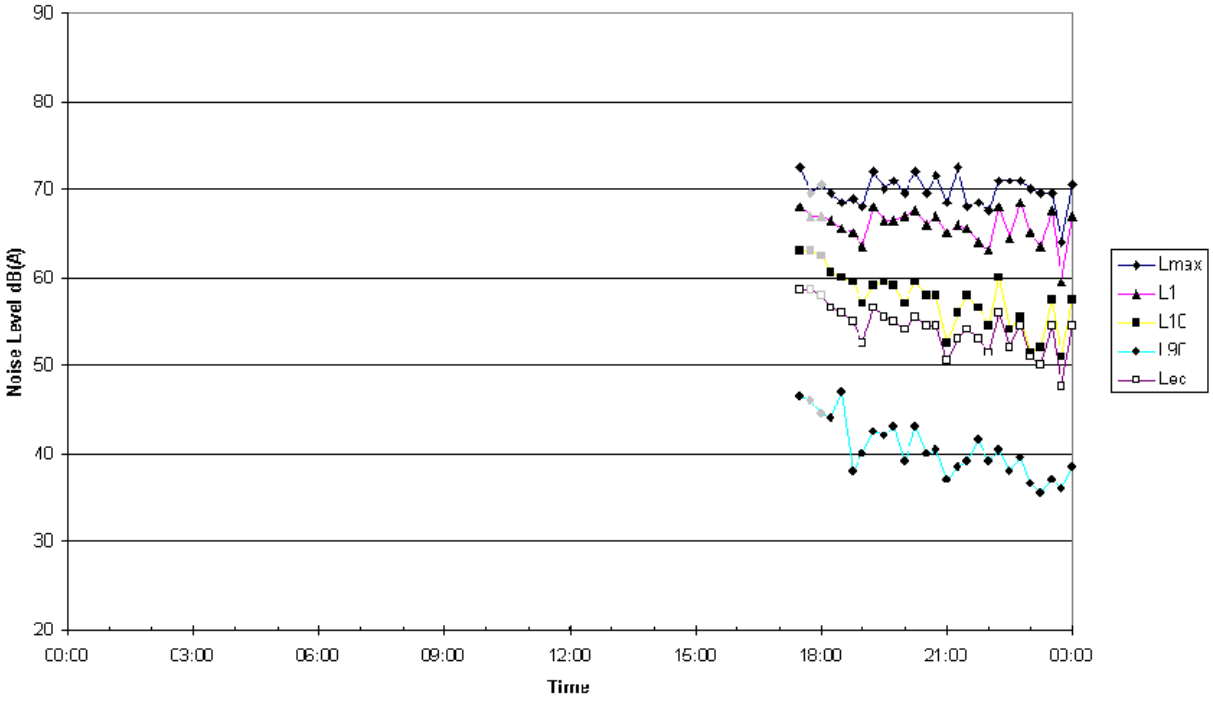
Measured Noise Levels
Location R2 - Sunday 23/09/2012



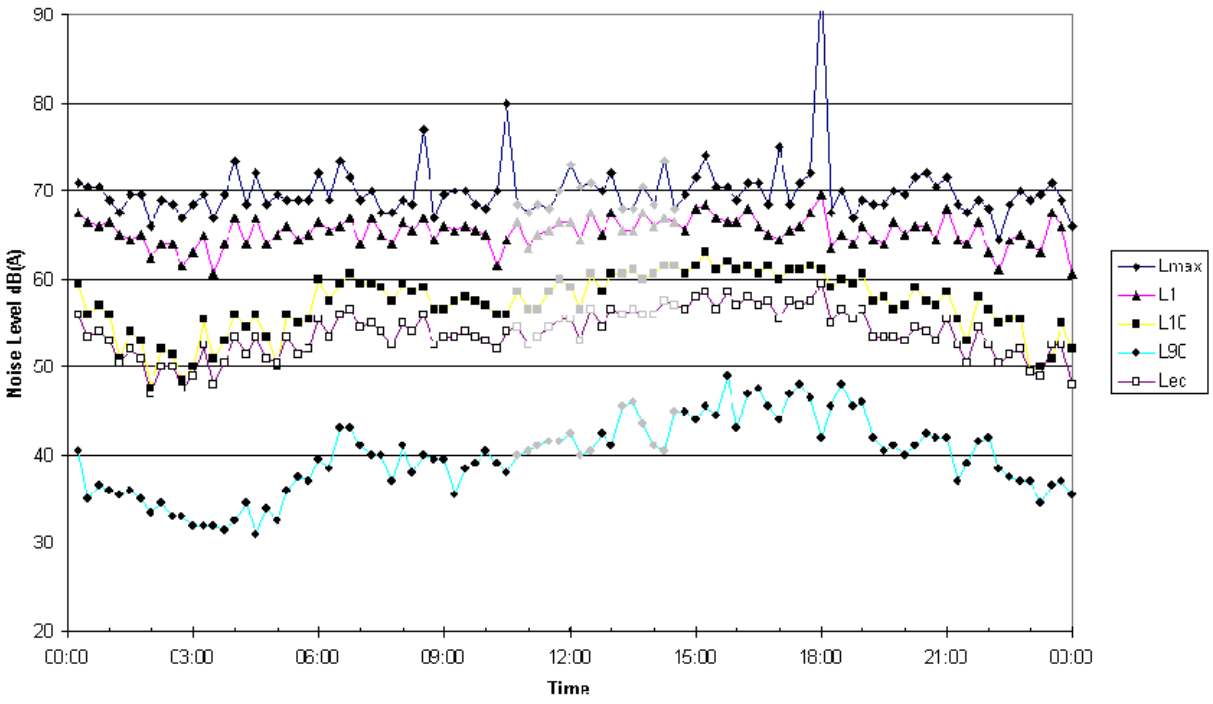
Measured Noise Levels
Location R2 - Monday 24/09/2012



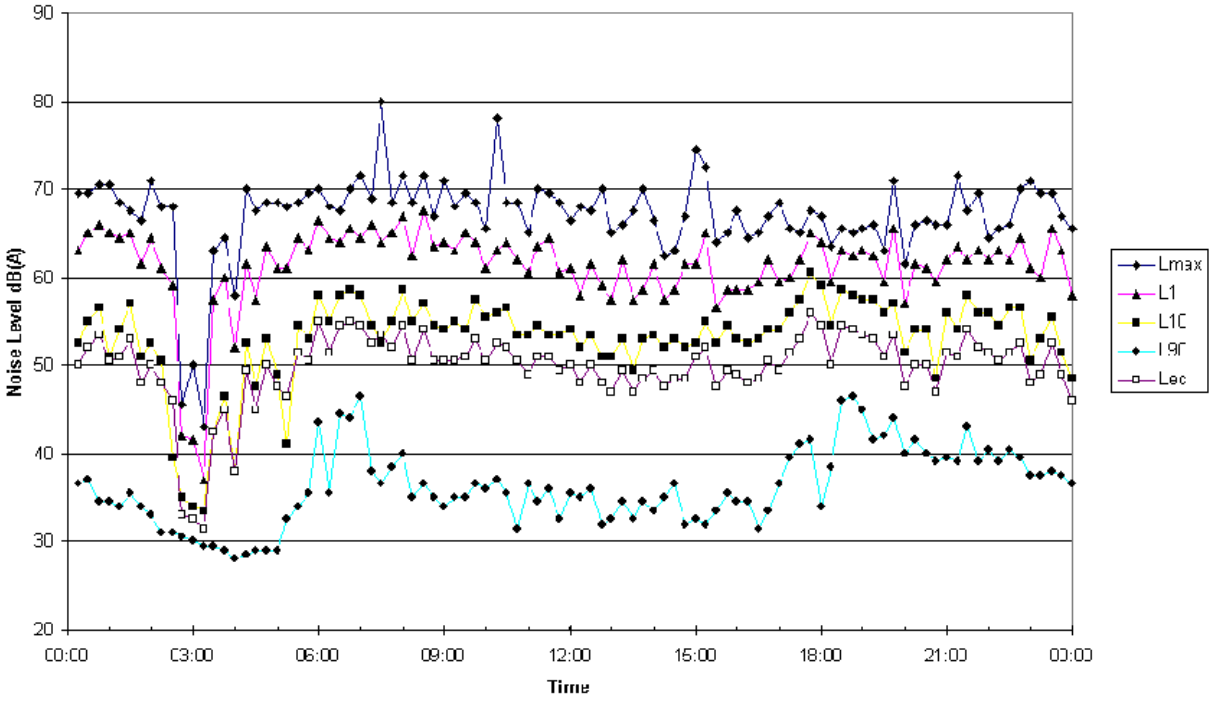
Measured Noise Levels
Location R3 - Thursday 13/09/2012



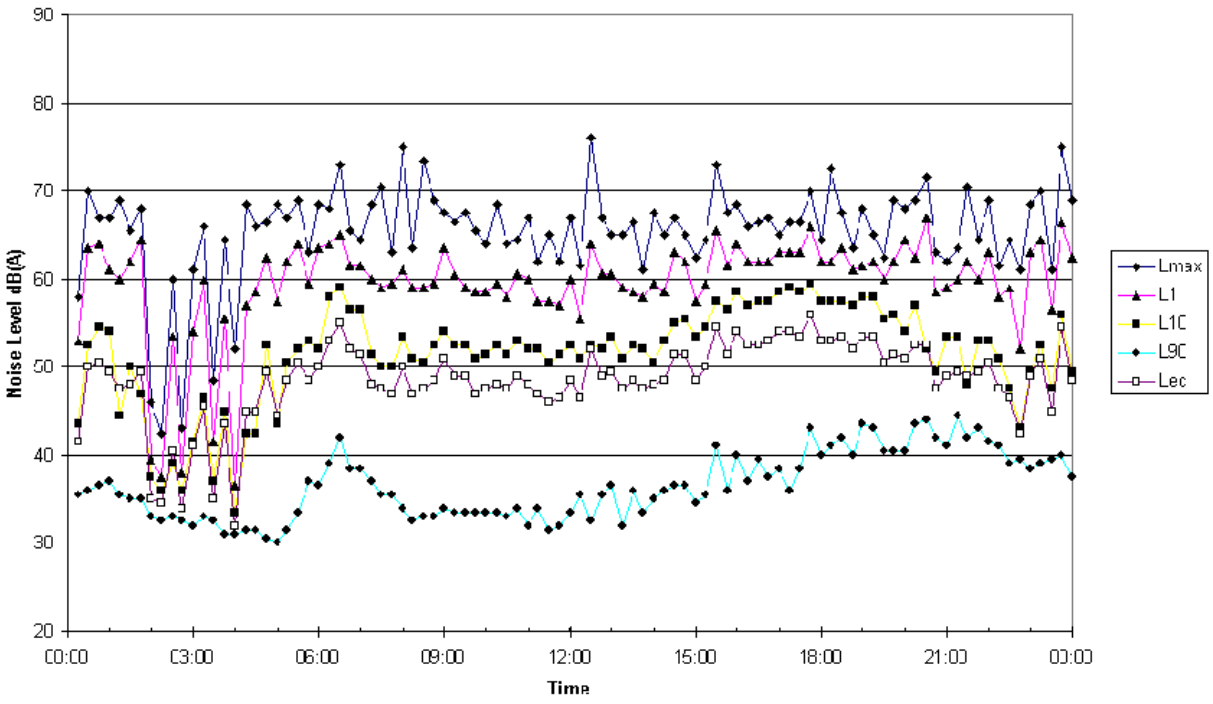
Measured Noise Levels
Location R3 - Friday 14/09/2012



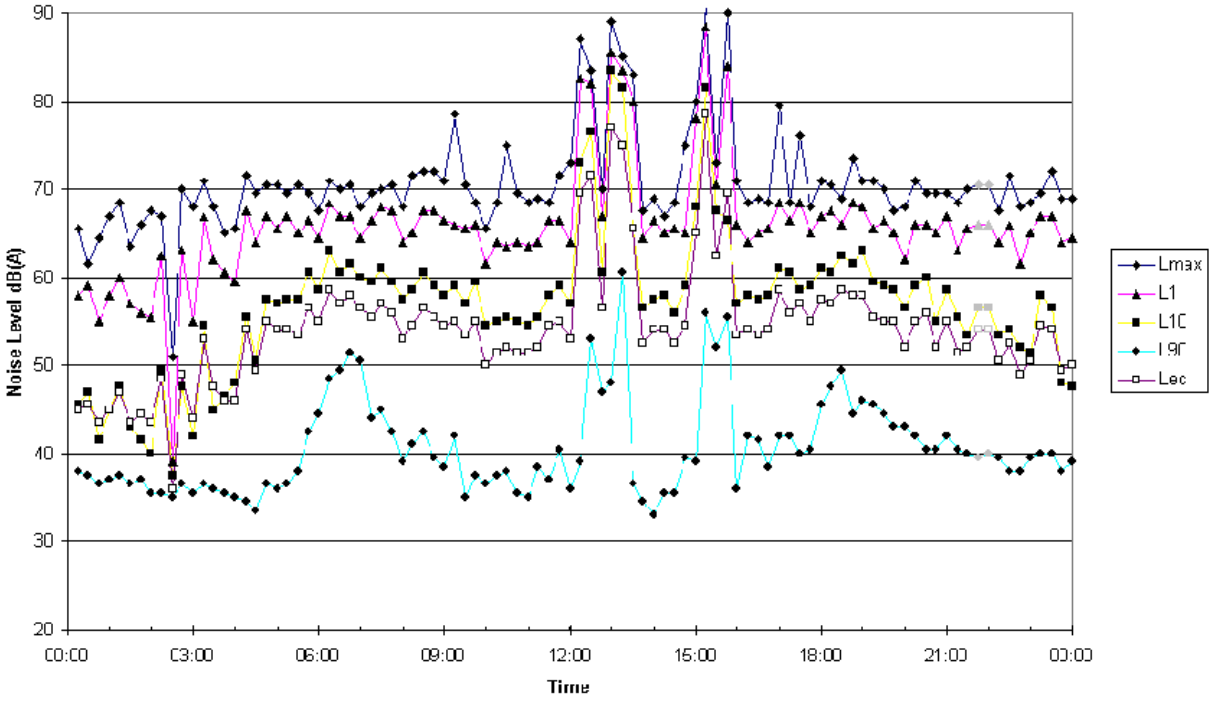
Measured Noise Levels
Location R3 - Saturday 15/09/2012



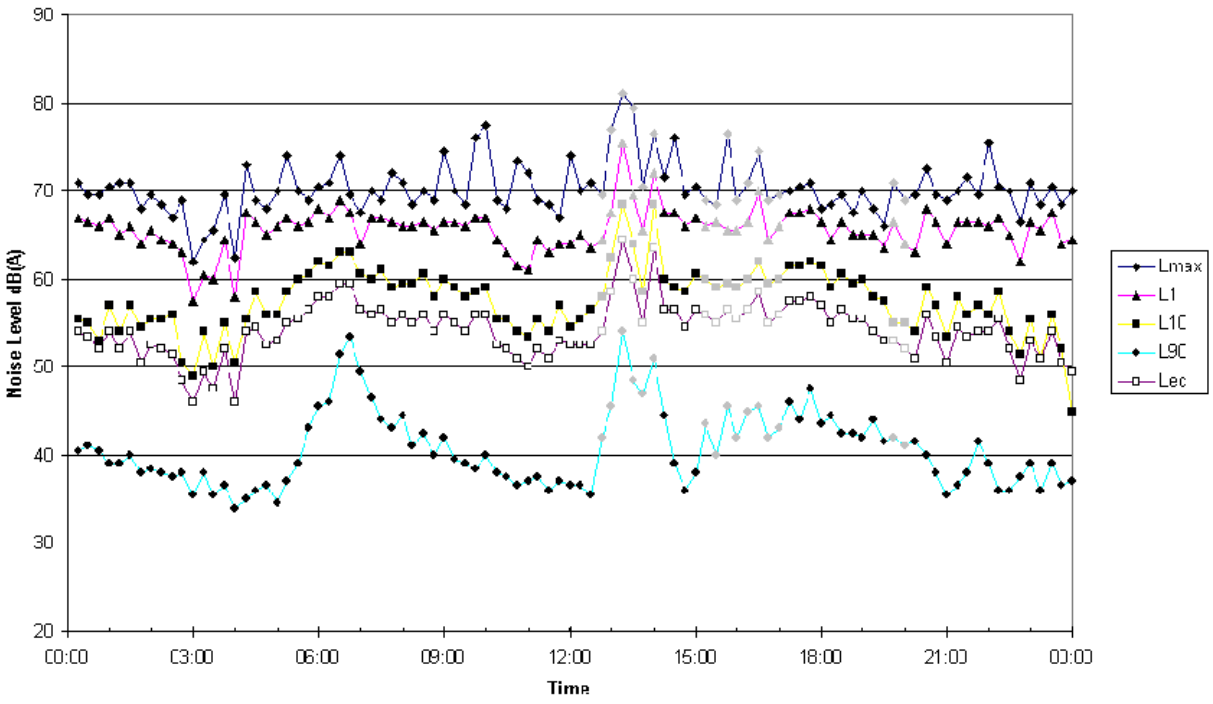
Measured Noise Levels
Location R3 - Sunday 16/09/2012



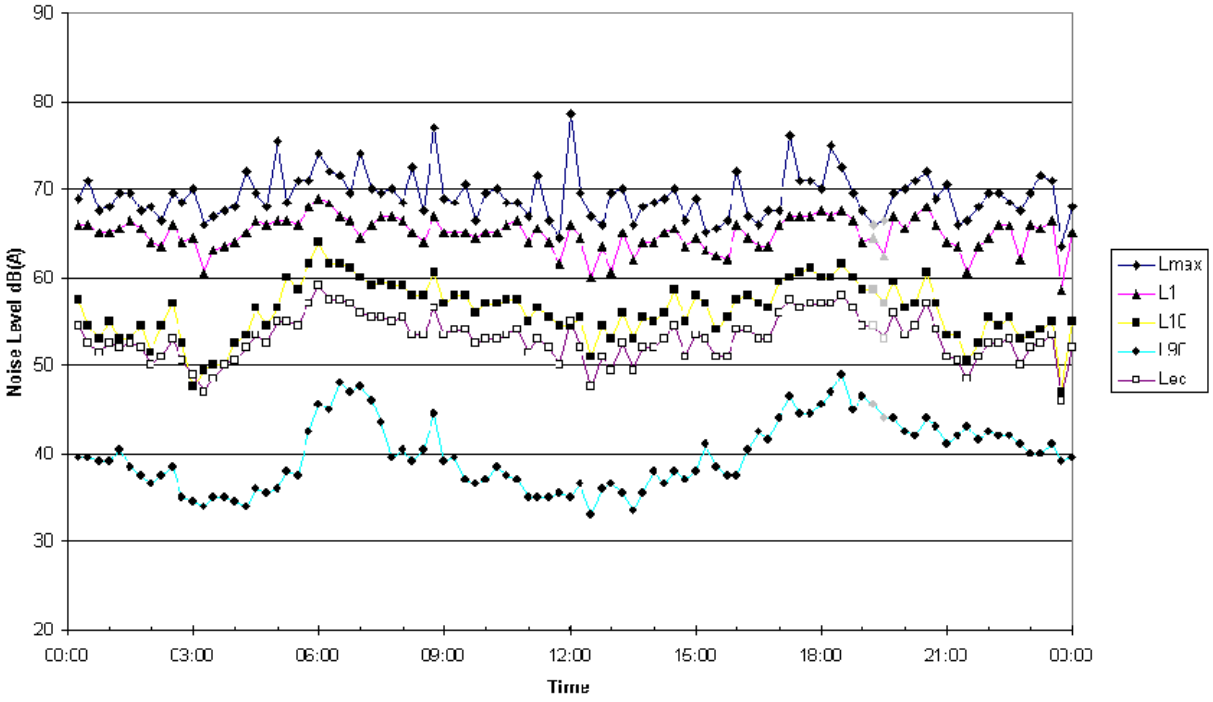
Measured Noise Levels
Location R3 - Monday 17/09/2012



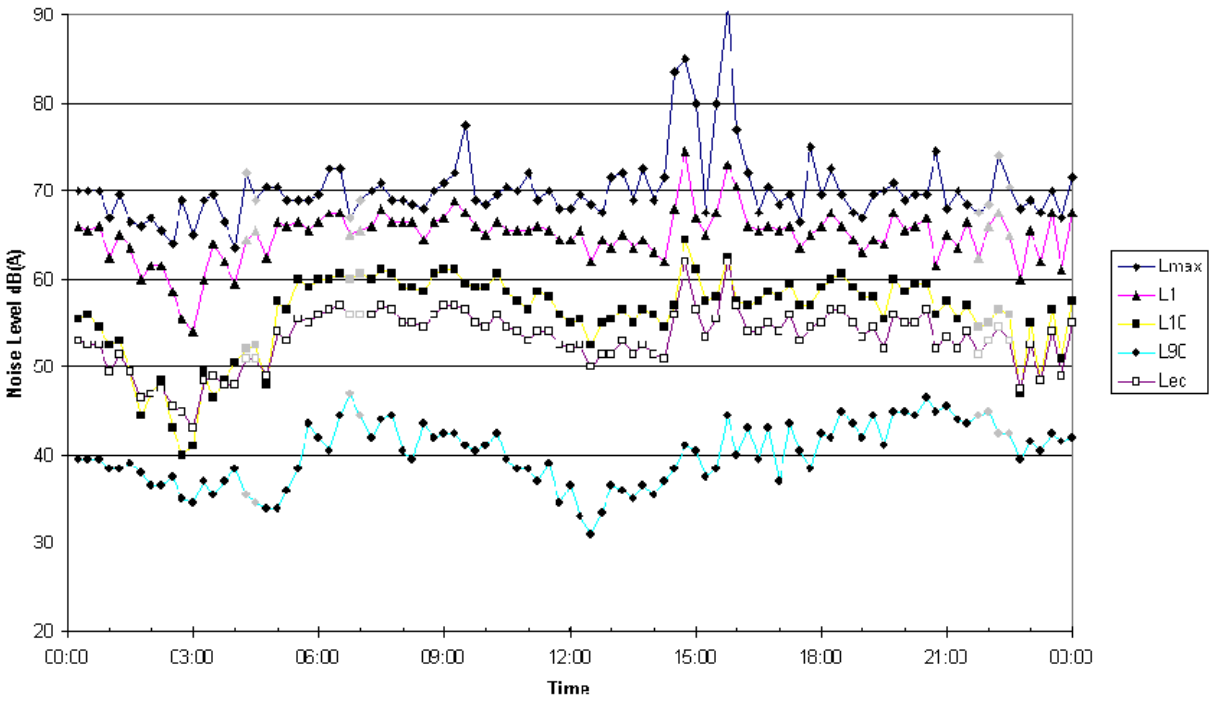
Measured Noise Levels
Location R3 - Tuesday 18/09/2012



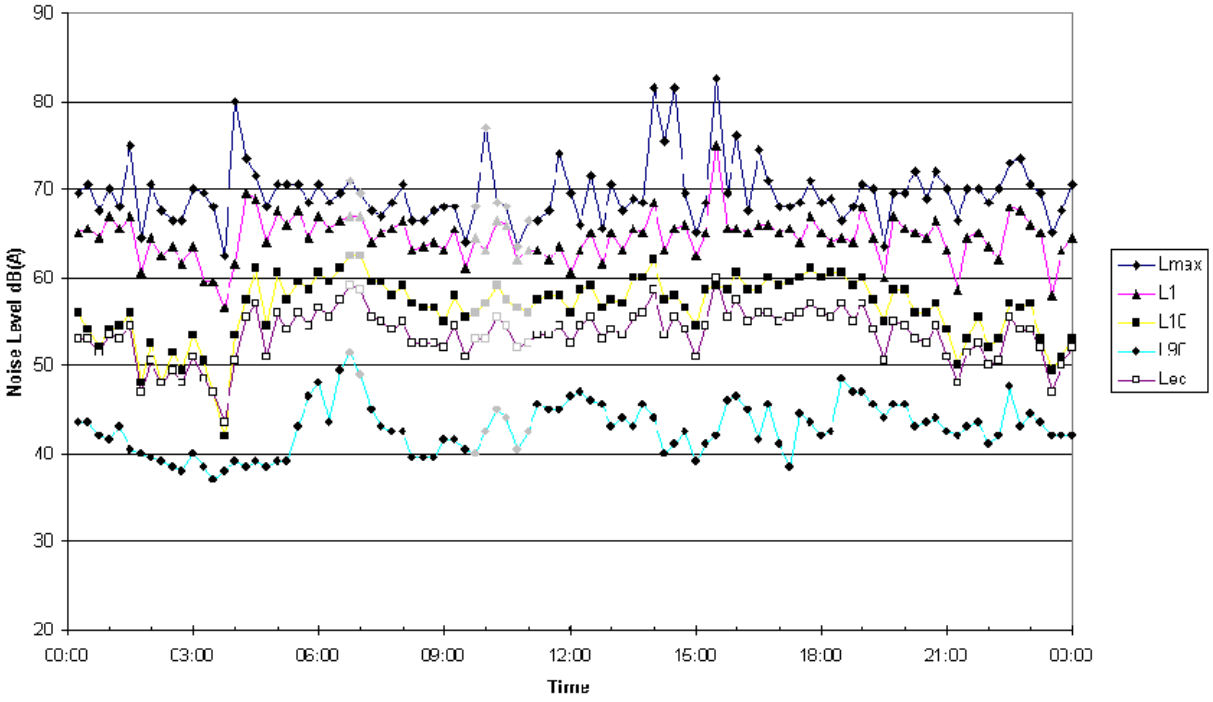
Measured Noise Levels
Location R3 - Wednesday 19/09/2012



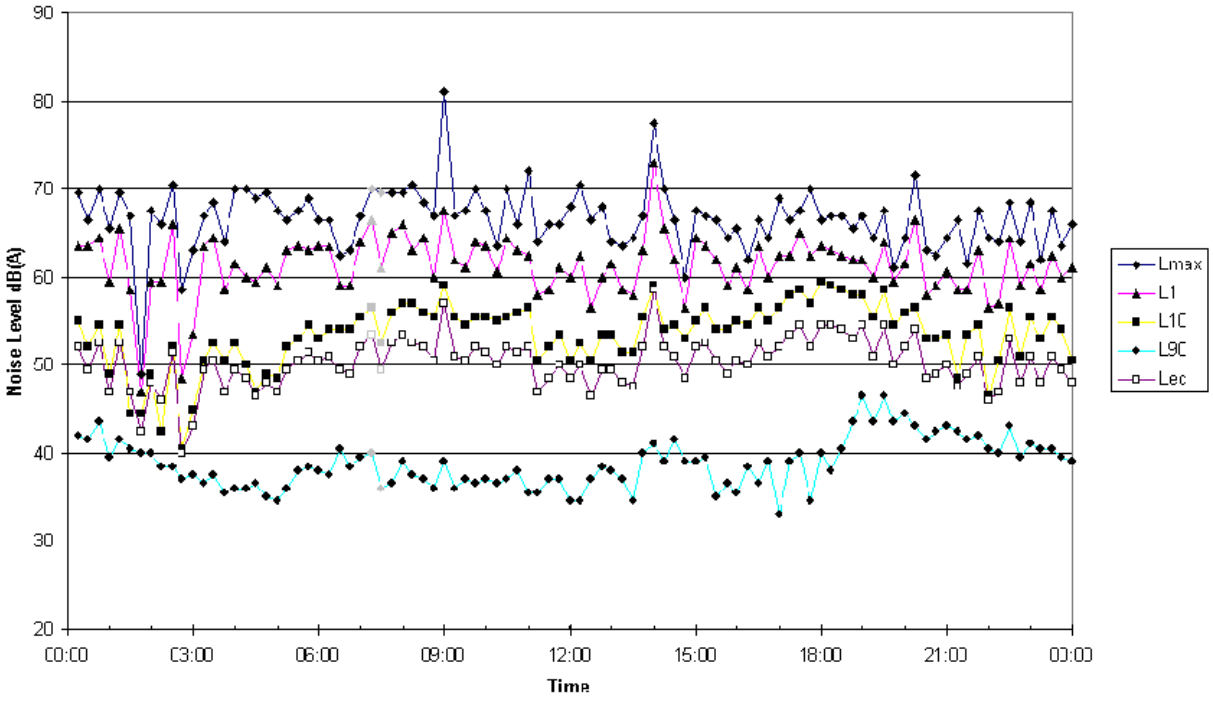
Measured Noise Levels
Location R3 - Thursday 20/09/2012



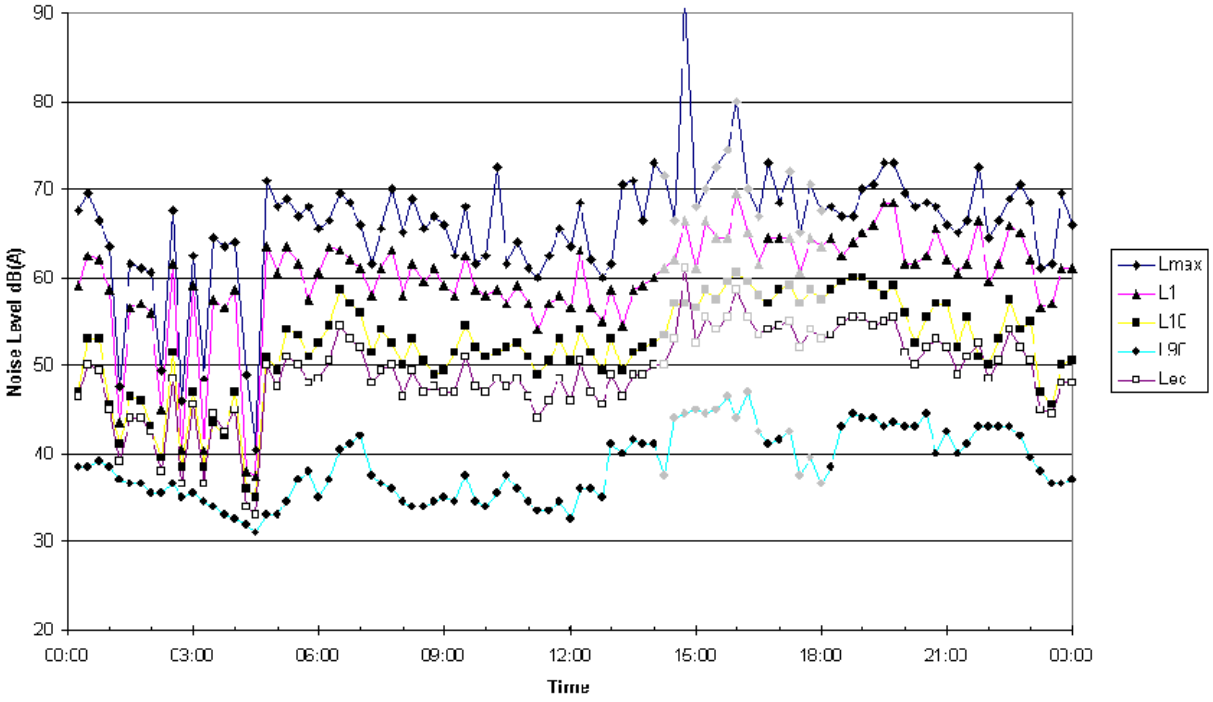
Measured Noise Levels
Location R3 - Friday 21/09/2012



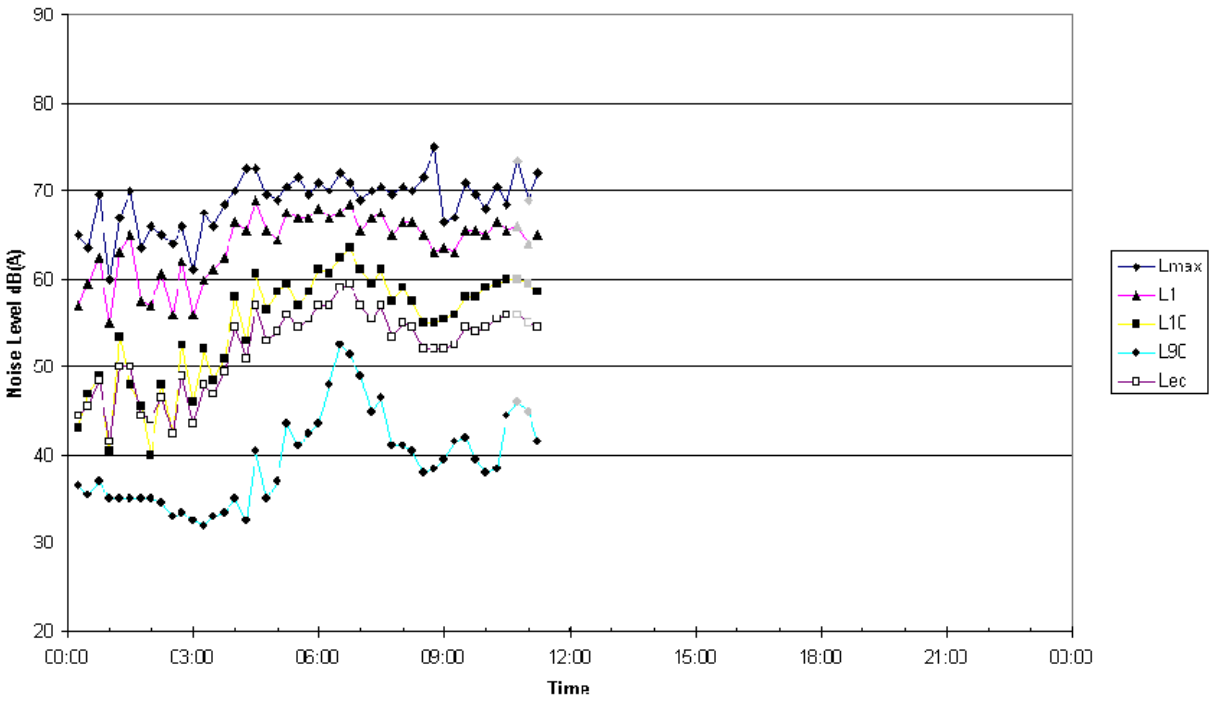
Measured Noise Levels
Location R3 - Saturday 22/09/2012



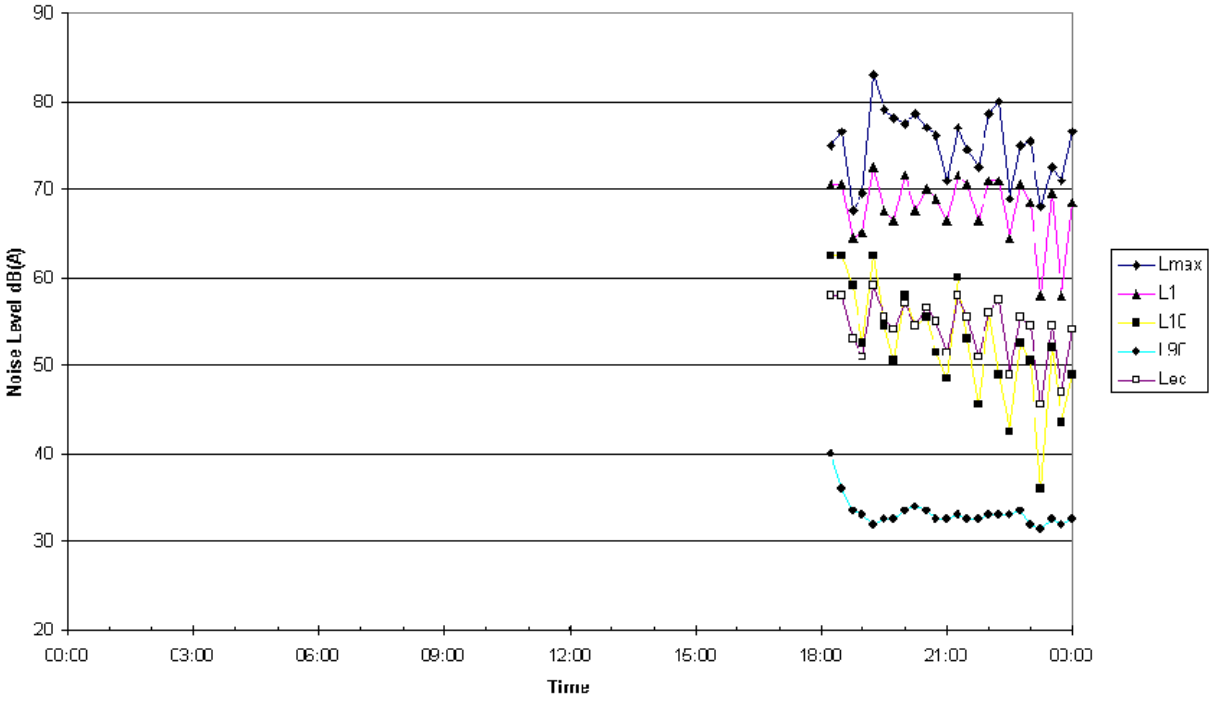
Measured Noise Levels
Location R3 - Sunday 23/09/2012



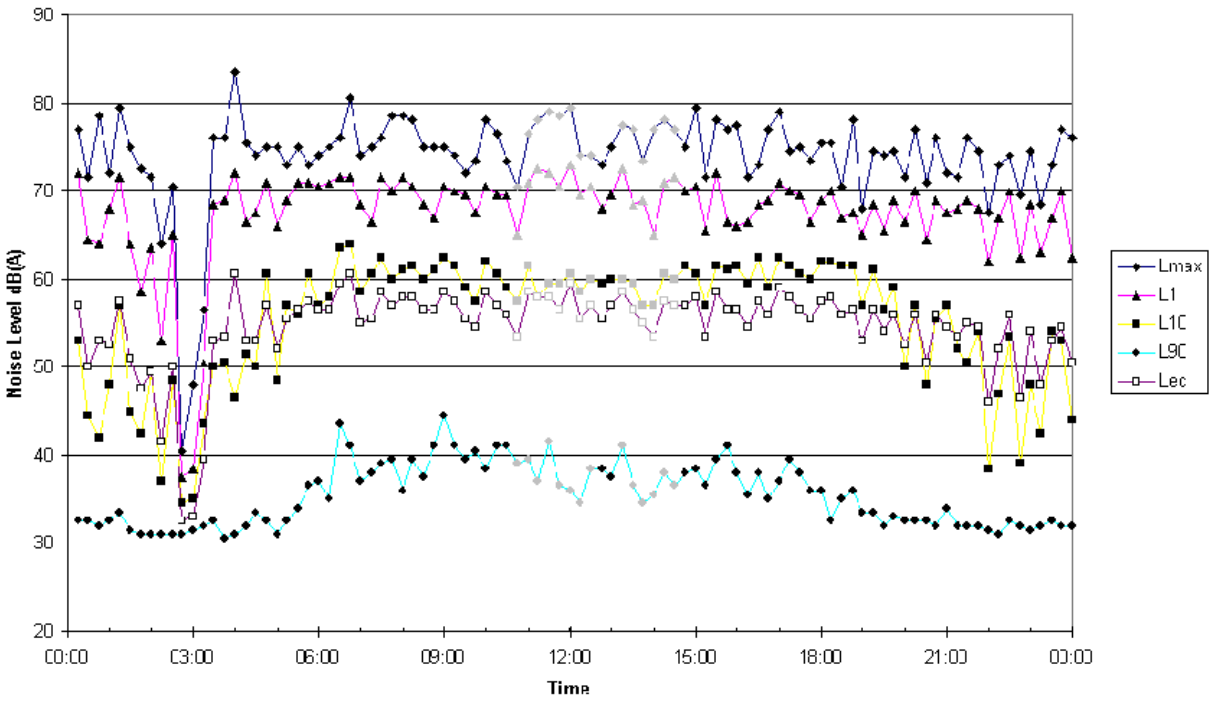
Measured Noise Levels
Location R3 - Monday 24/09/2012



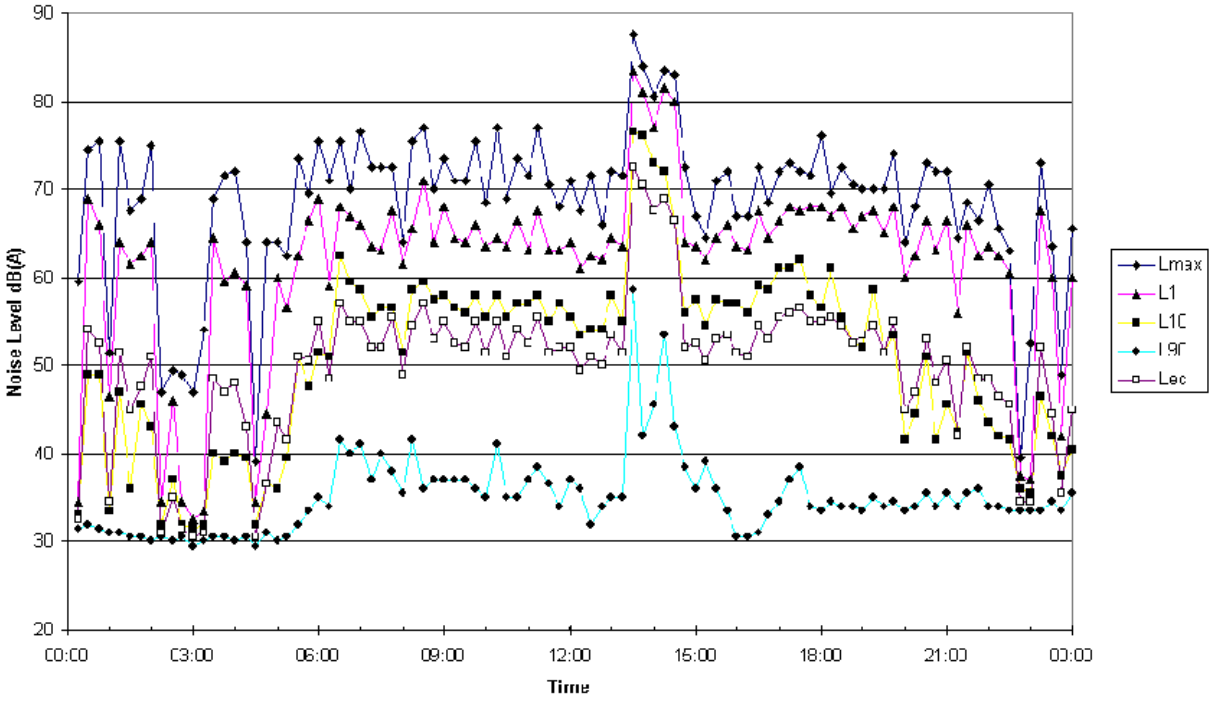
Measured Noise Levels
Location R4 - Thursday 13/09/2012



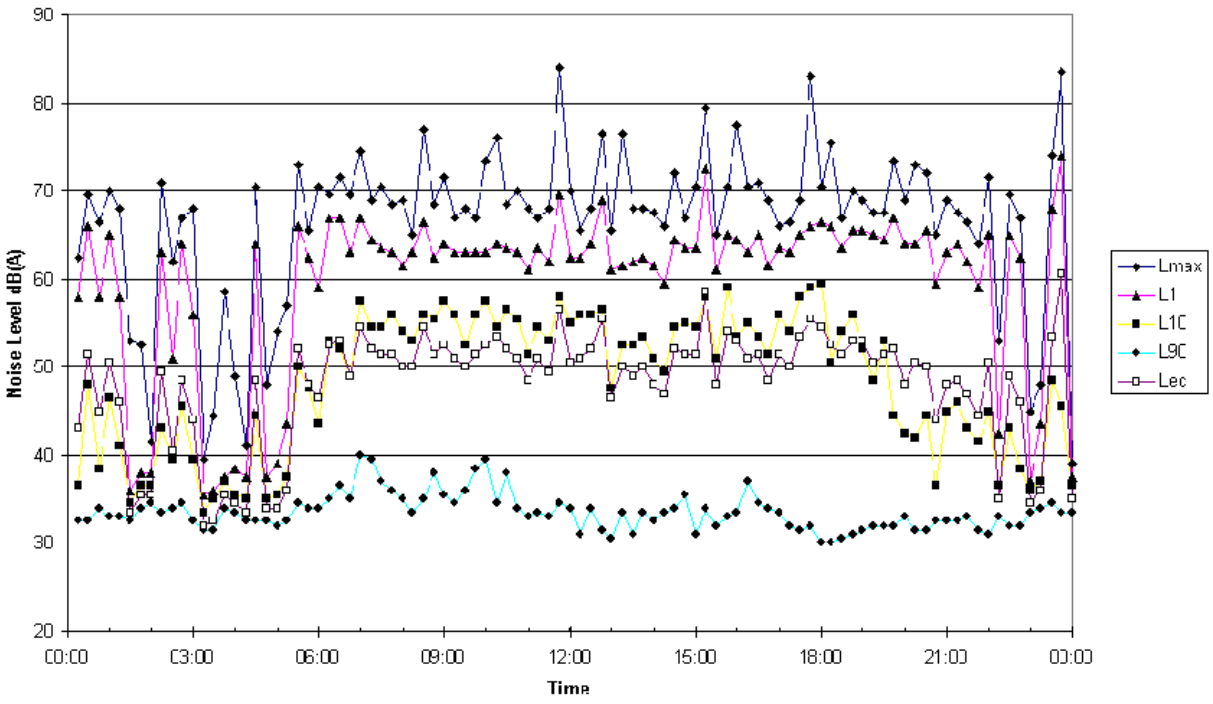
Measured Noise Levels
Location R4 - Friday 14/09/2012



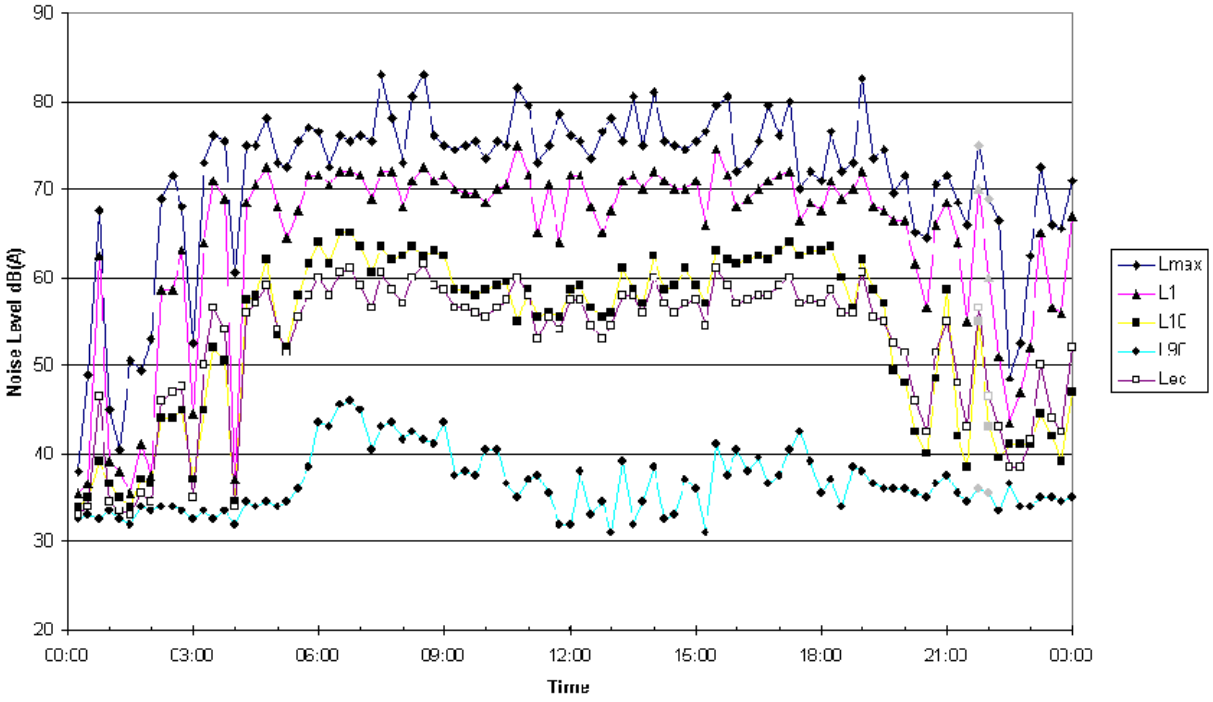
Measured Noise Levels
Location R4 - Saturday 15/09/2012



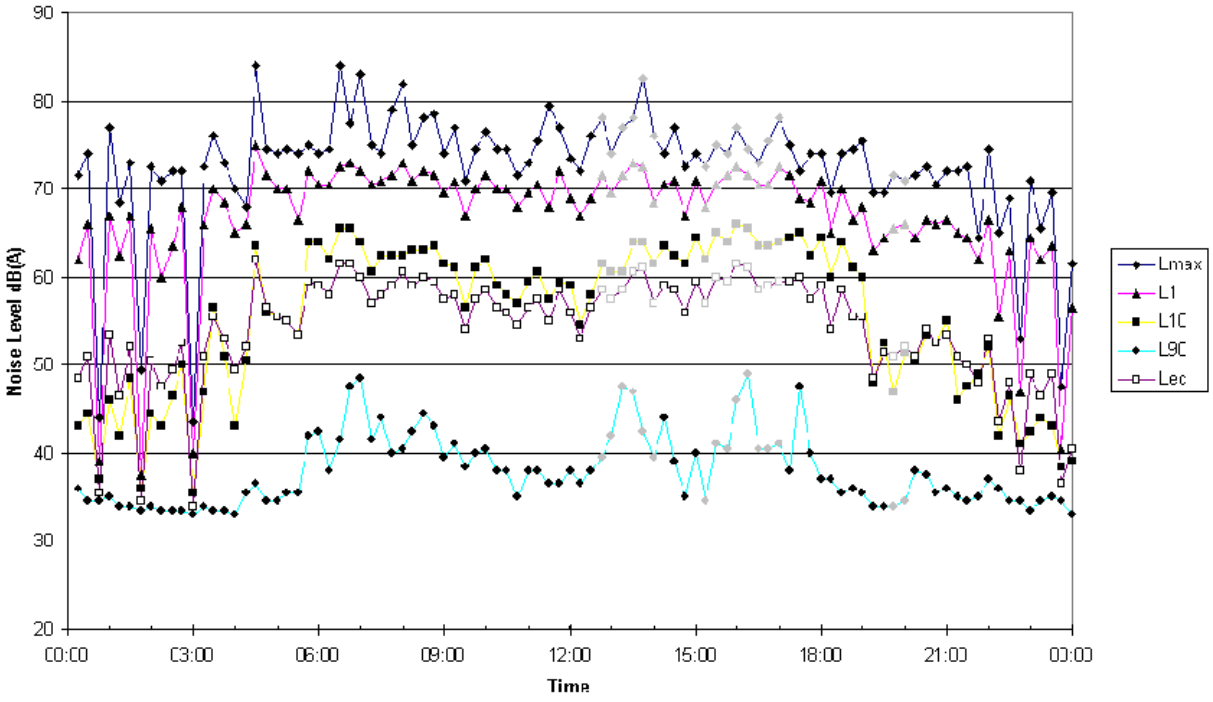
Measured Noise Levels
Location R4 - Sunday 16/09/2012



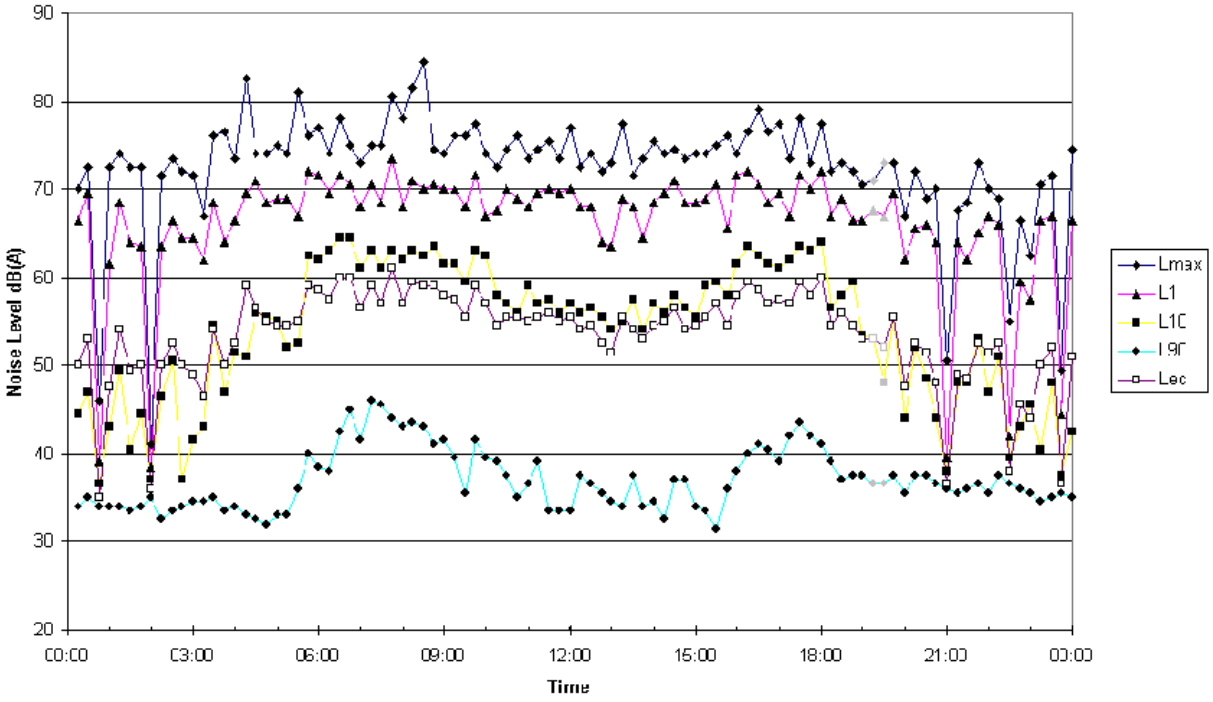
Measured Noise Levels
Location R4 - Monday 17/09/2012



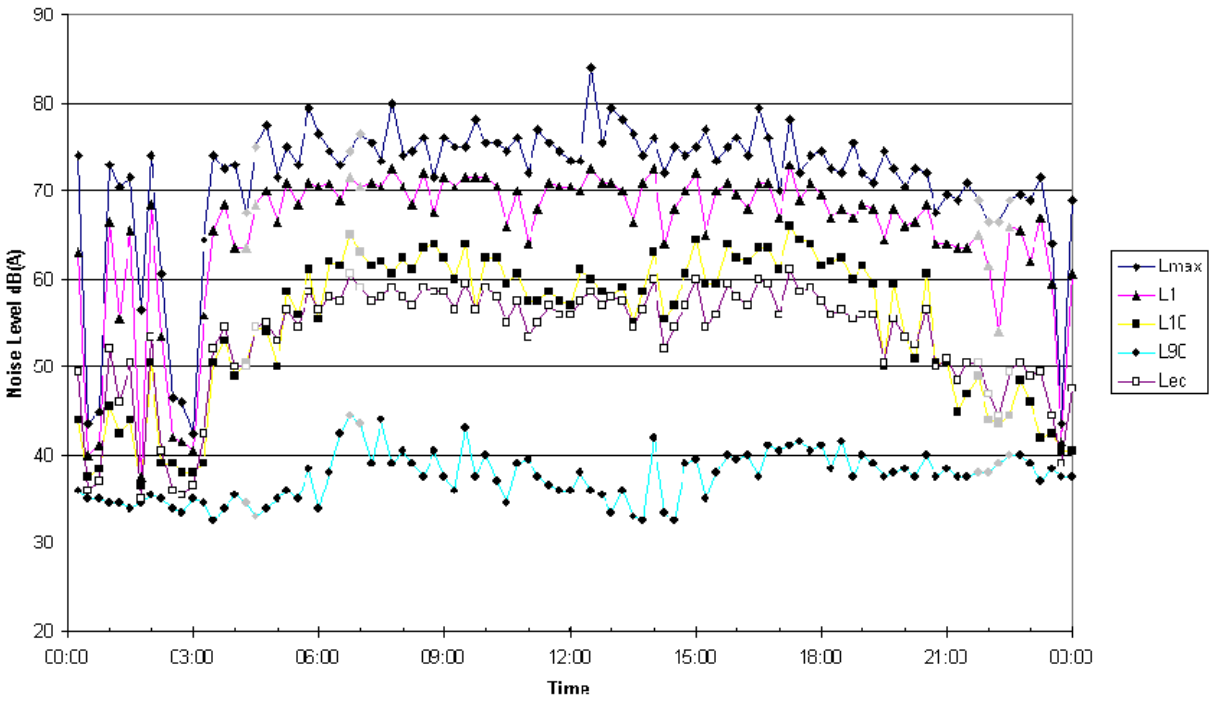
Measured Noise Levels
Location R4 - Tuesday 18/09/2012



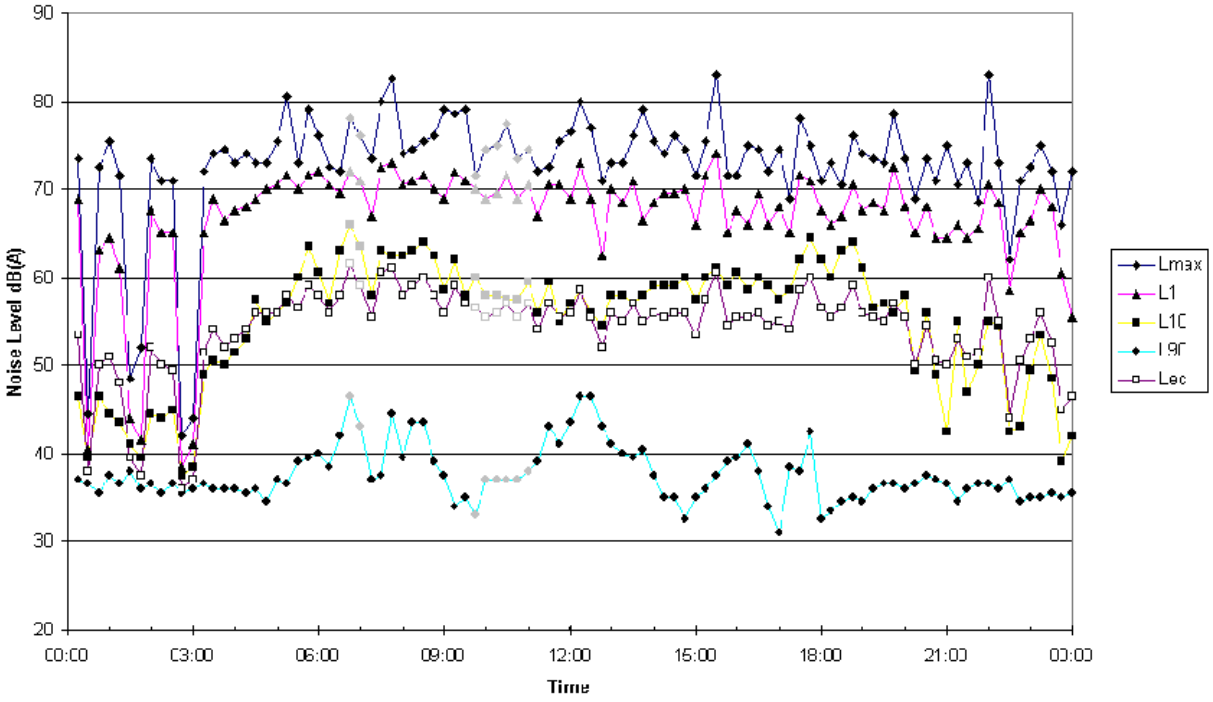
Measured Noise Levels
Location R4 - Wednesday 19/09/2012



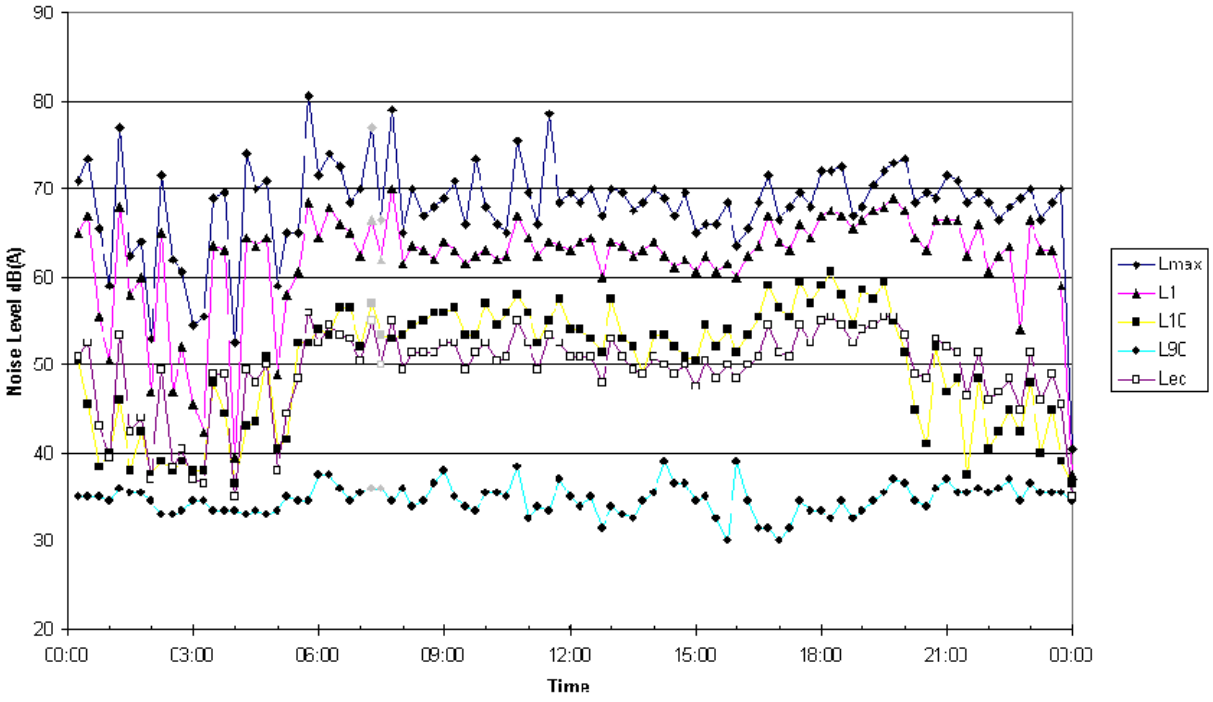
Measured Noise Levels
Location R4 - Thursday 20/09/2012



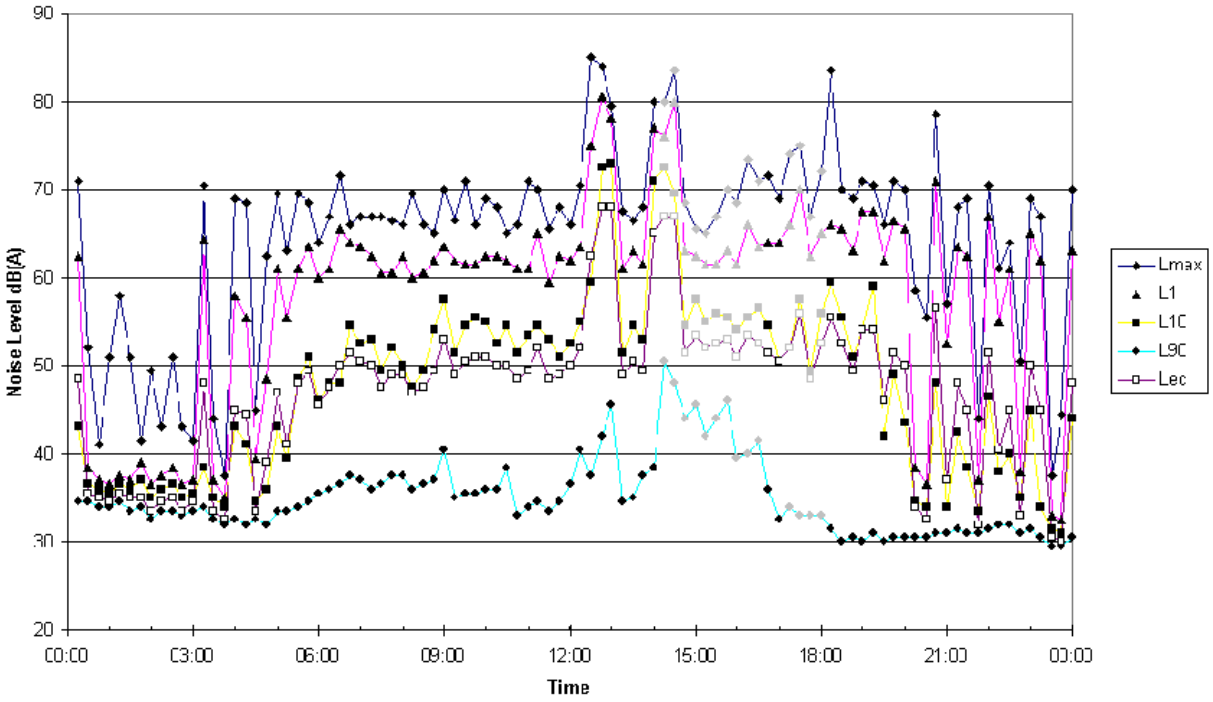
Measured Noise Levels
Location R4 - Friday 21/09/2012



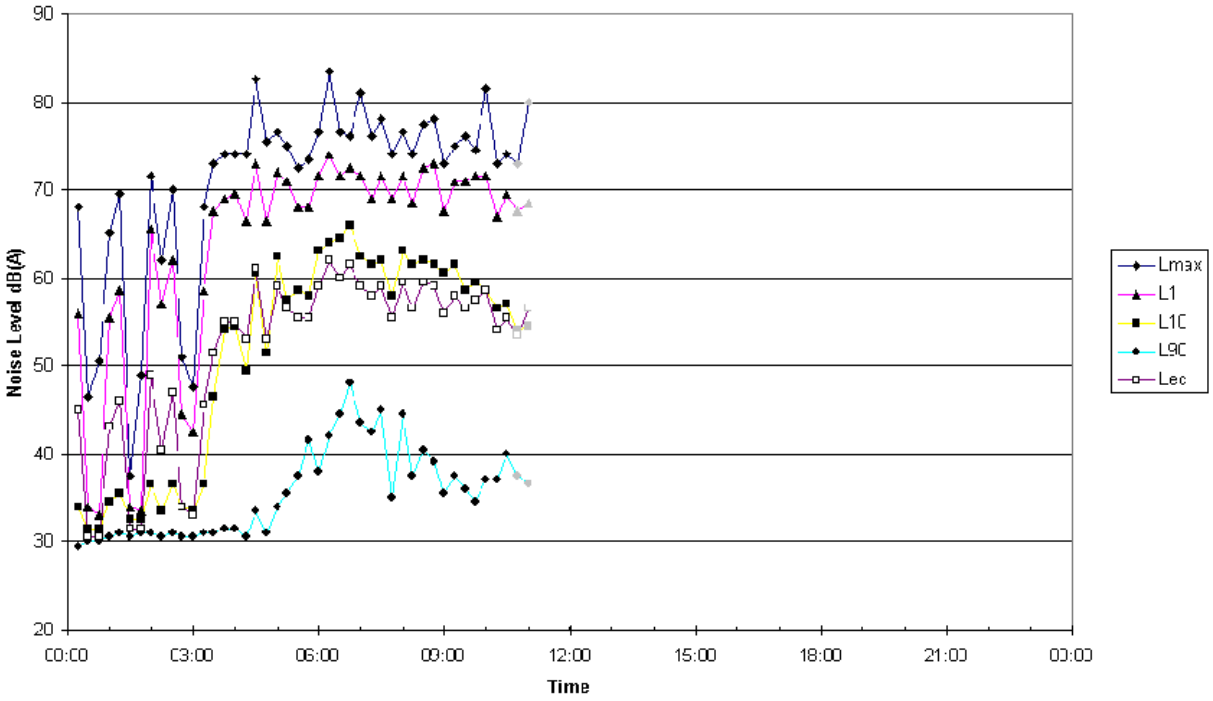
Measured Noise Levels
Location R4 - Saturday 22/09/2012



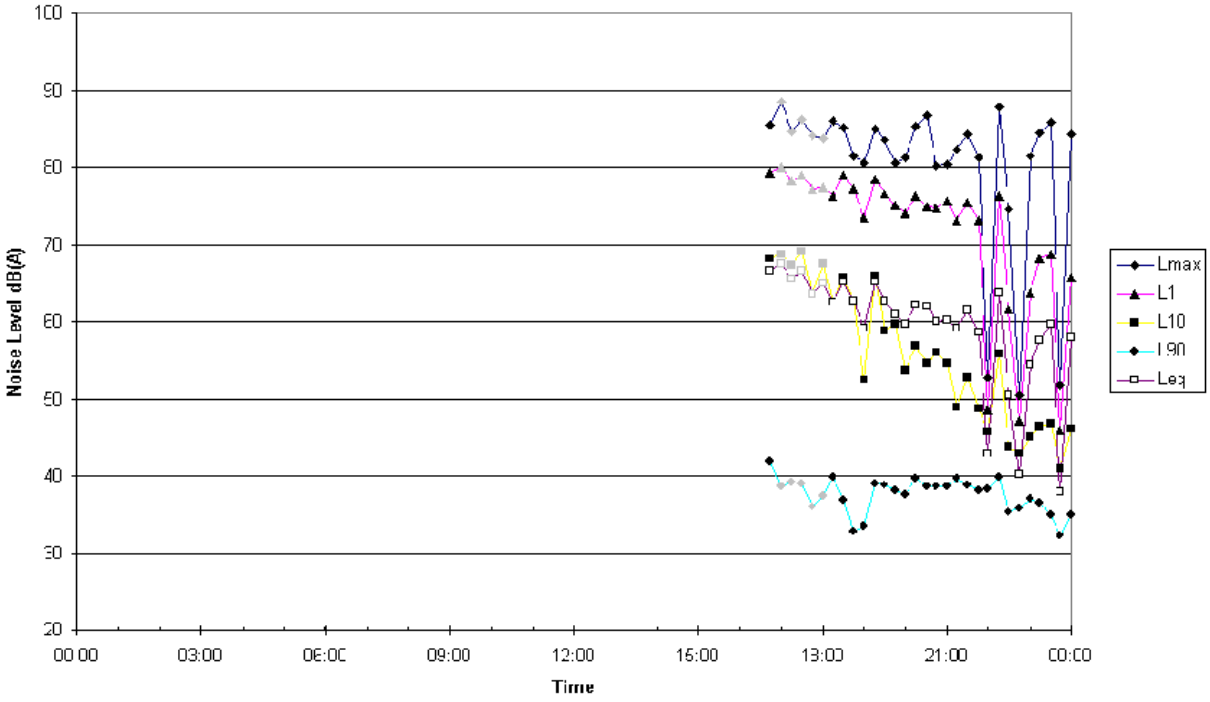
Measured Noise Levels
Location R4 - Sunday 23/09/2012



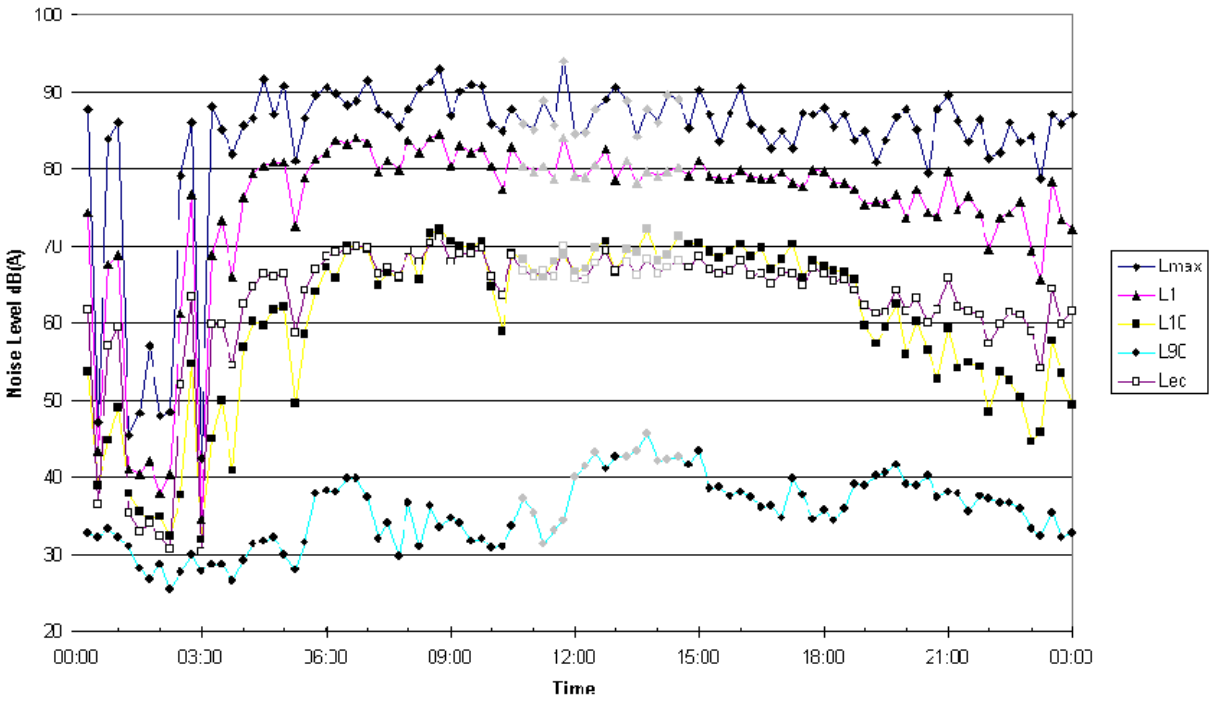
Measured Noise Levels
Location R4 - Monday 24/09/2012



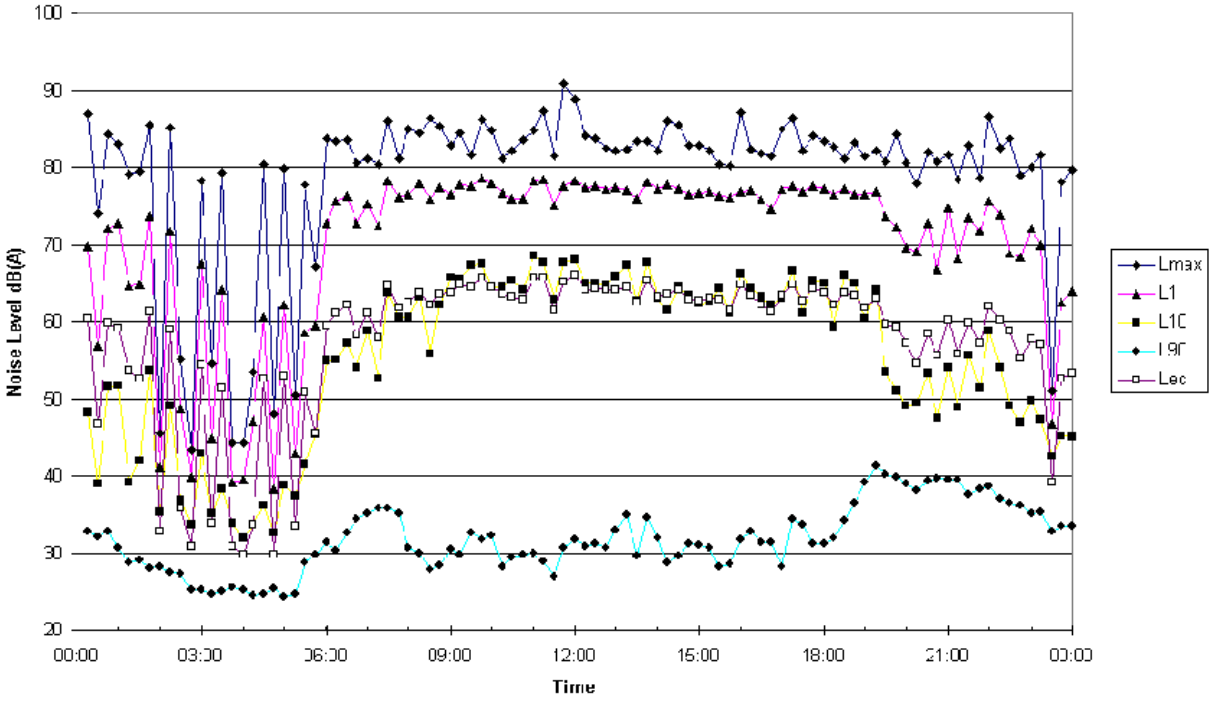
Measured Noise Levels
Location R5 - Thursday 13/09/2012



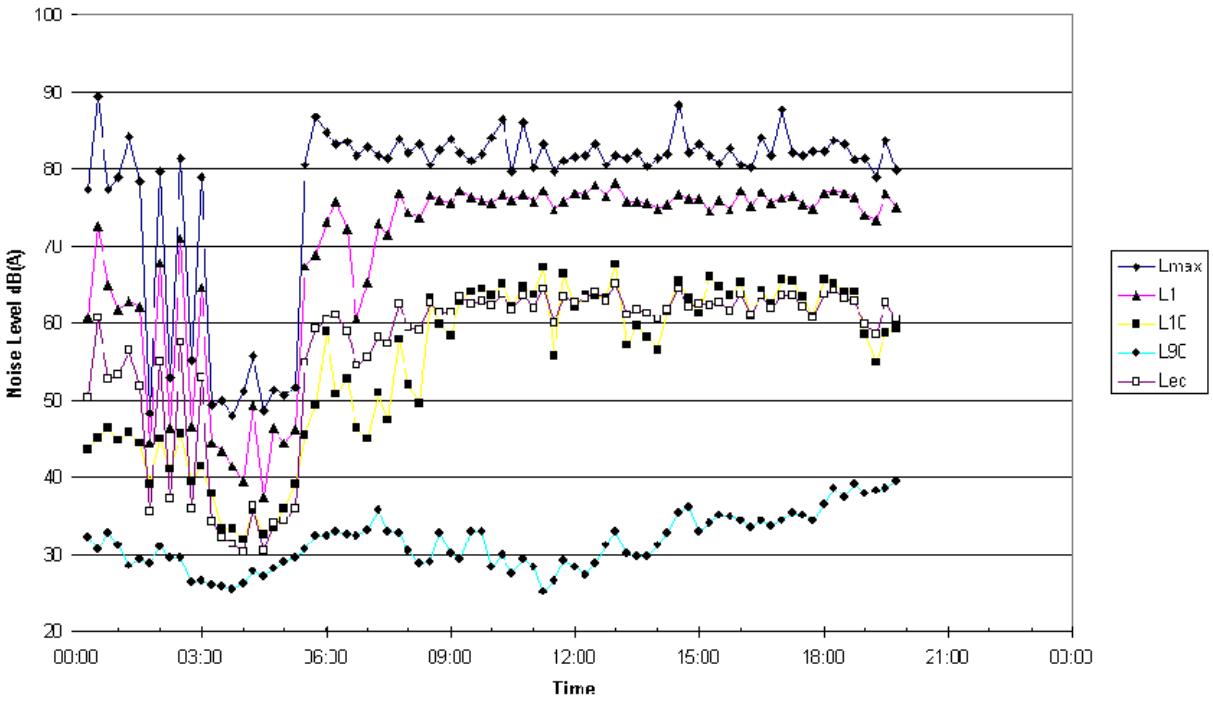
Measured Noise Levels
Location R5 - Friday 14/09/2012



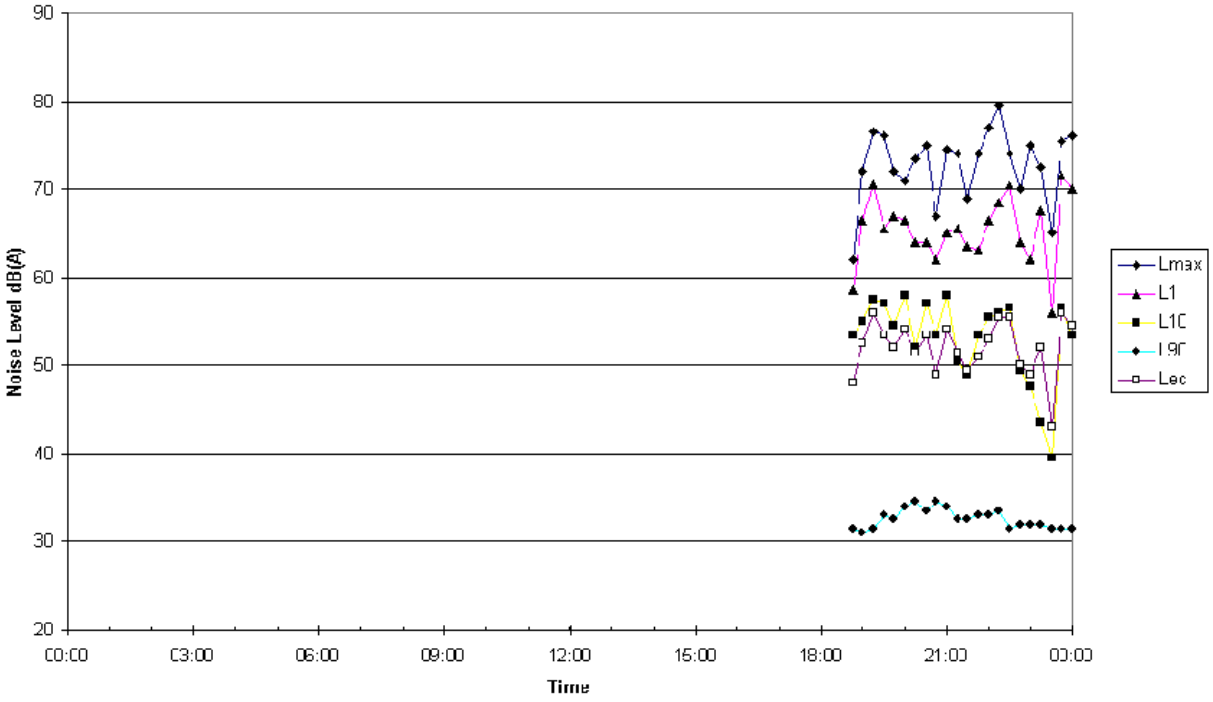
Measured Noise Levels
Location R5 - Saturday 15/09/2012



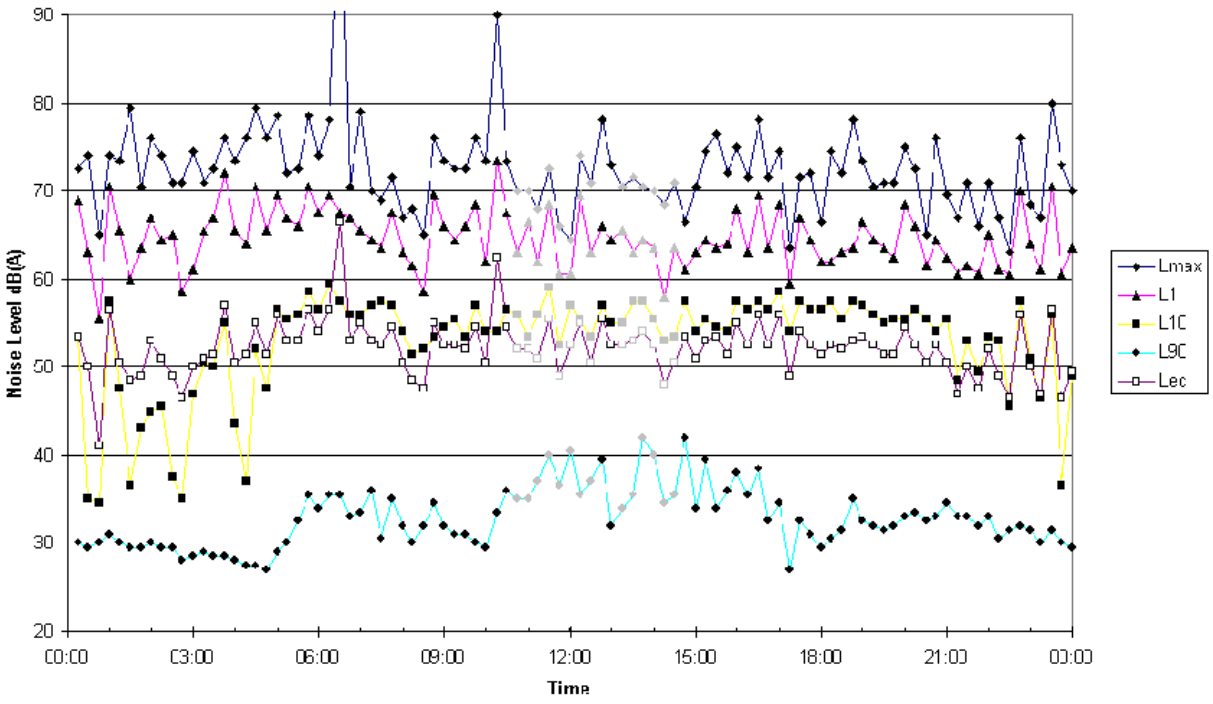
Measured Noise Levels
Location R5 - Sunday 16/09/2012



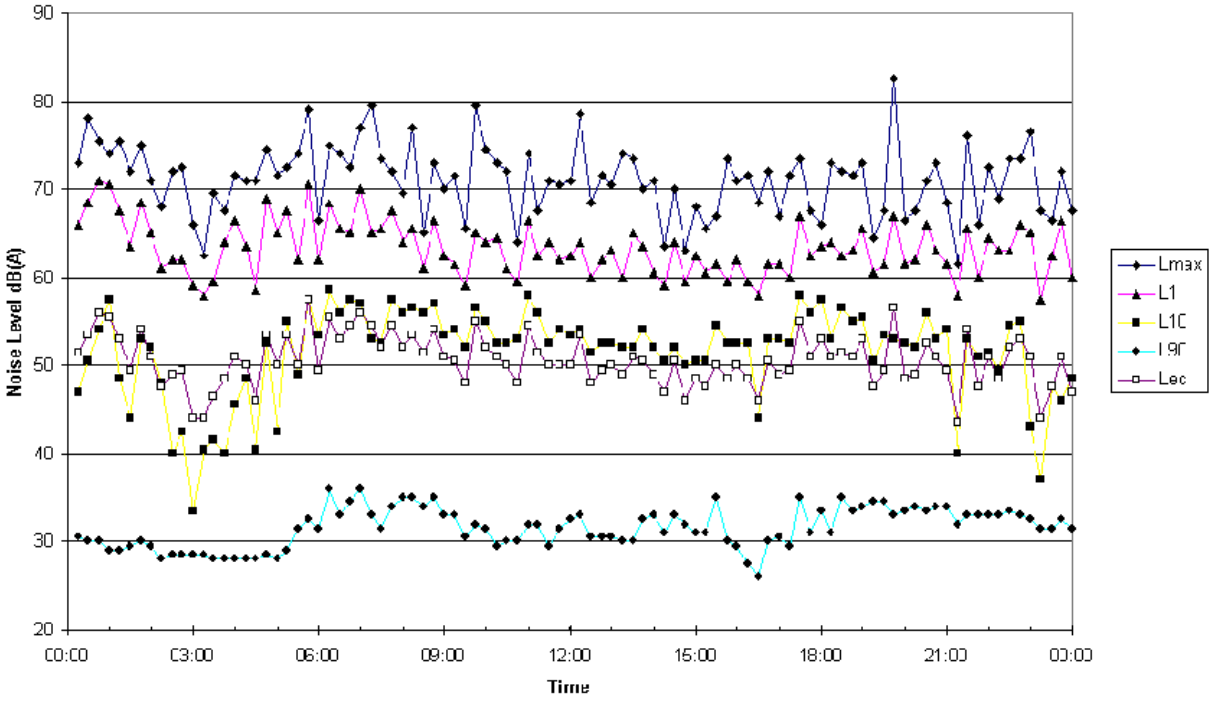
Measured Noise Levels
Location R6 - Thursday 13/09/2012



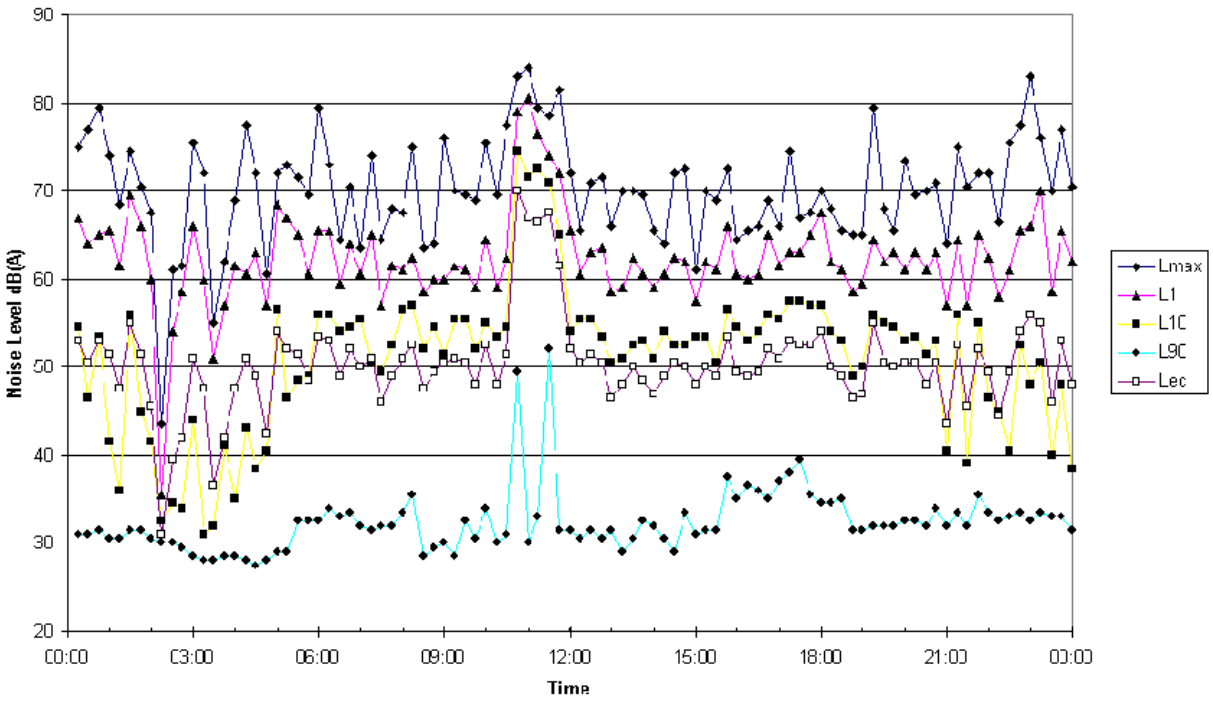
Measured Noise Levels
Location R6 - Friday 14/09/2012



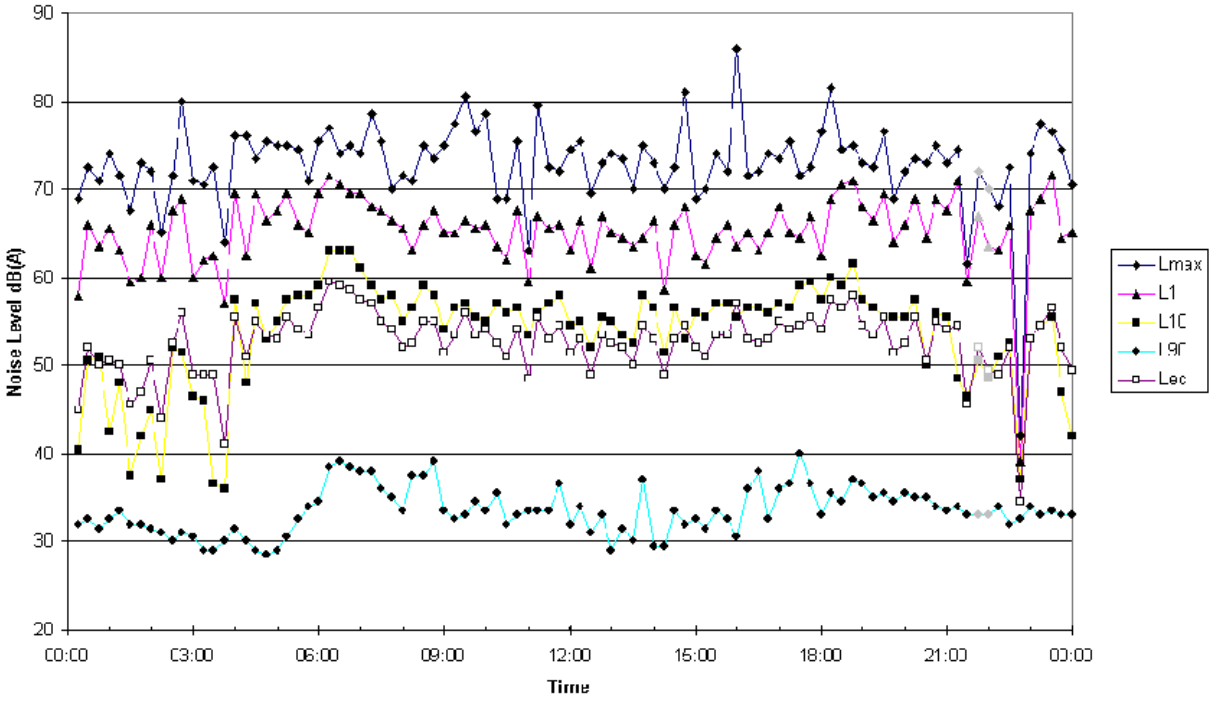
Measured Noise Levels
Location R6 - Saturday 15/09/2012



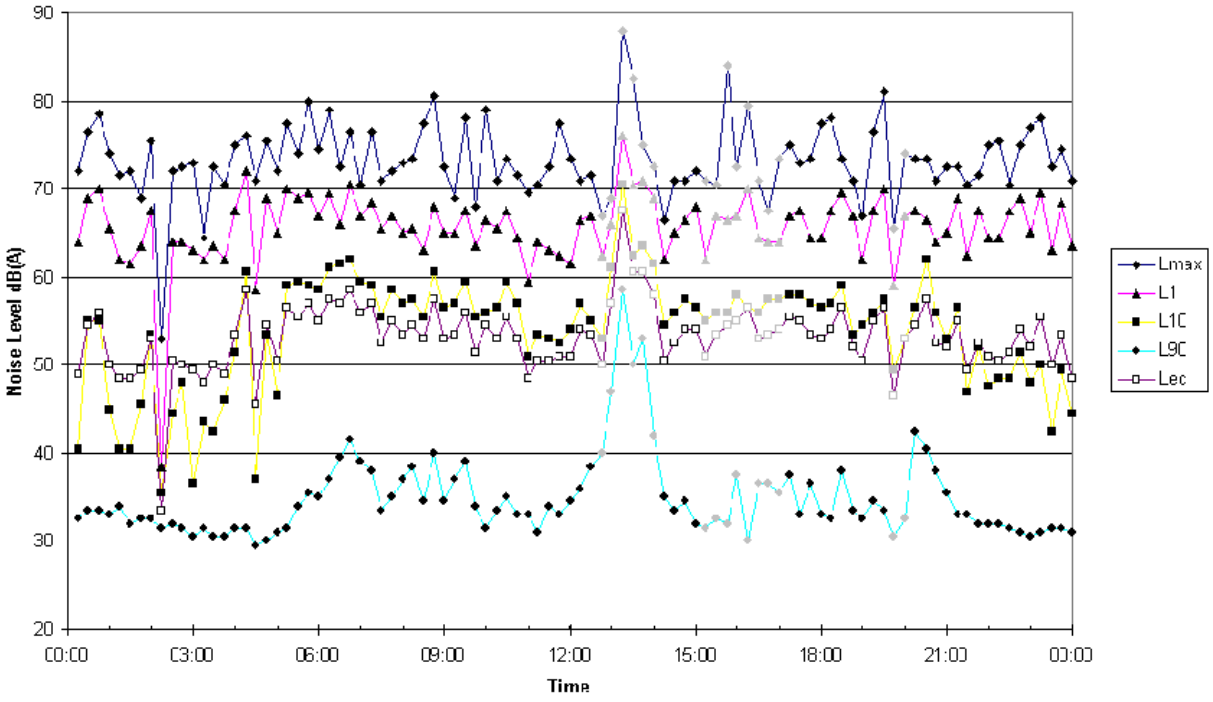
Measured Noise Levels
Location R6 - Sunday 16/09/2012



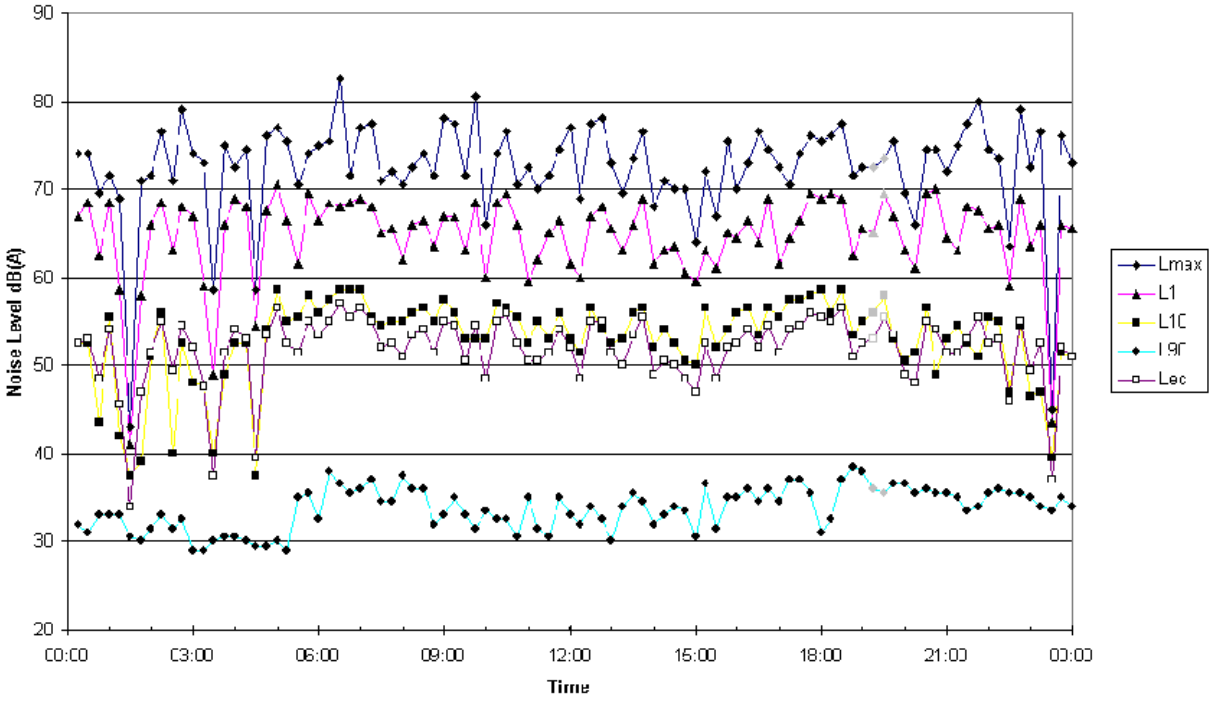
Measured Noise Levels
Location R6 - Monday 17/09/2012



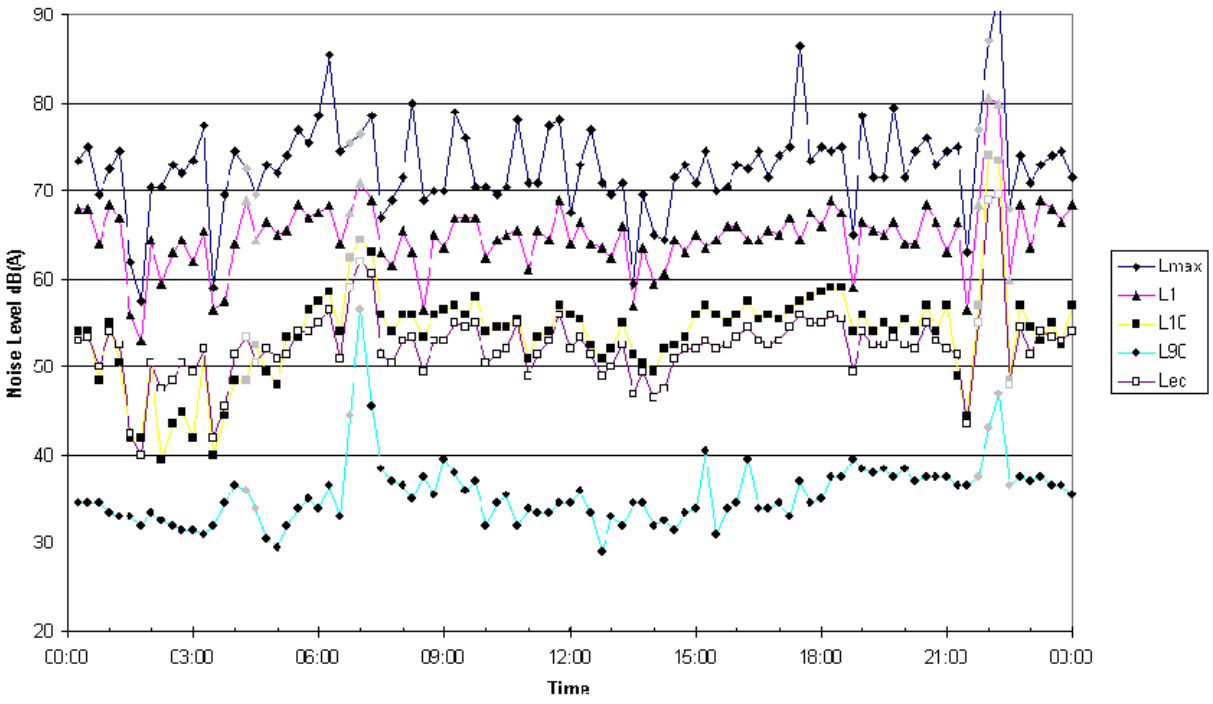
Measured Noise Levels
Location R6 - Tuesday 18/09/2012



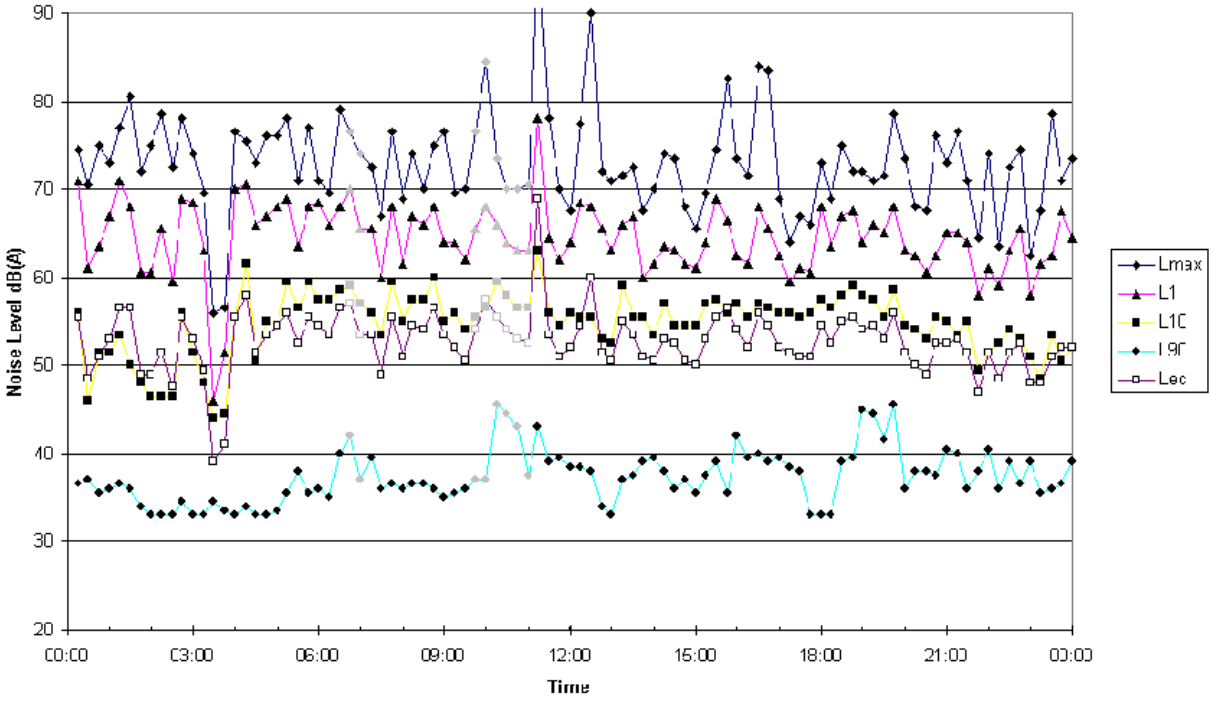
Measured Noise Levels
Location R6 - Wednesday 19/09/2012



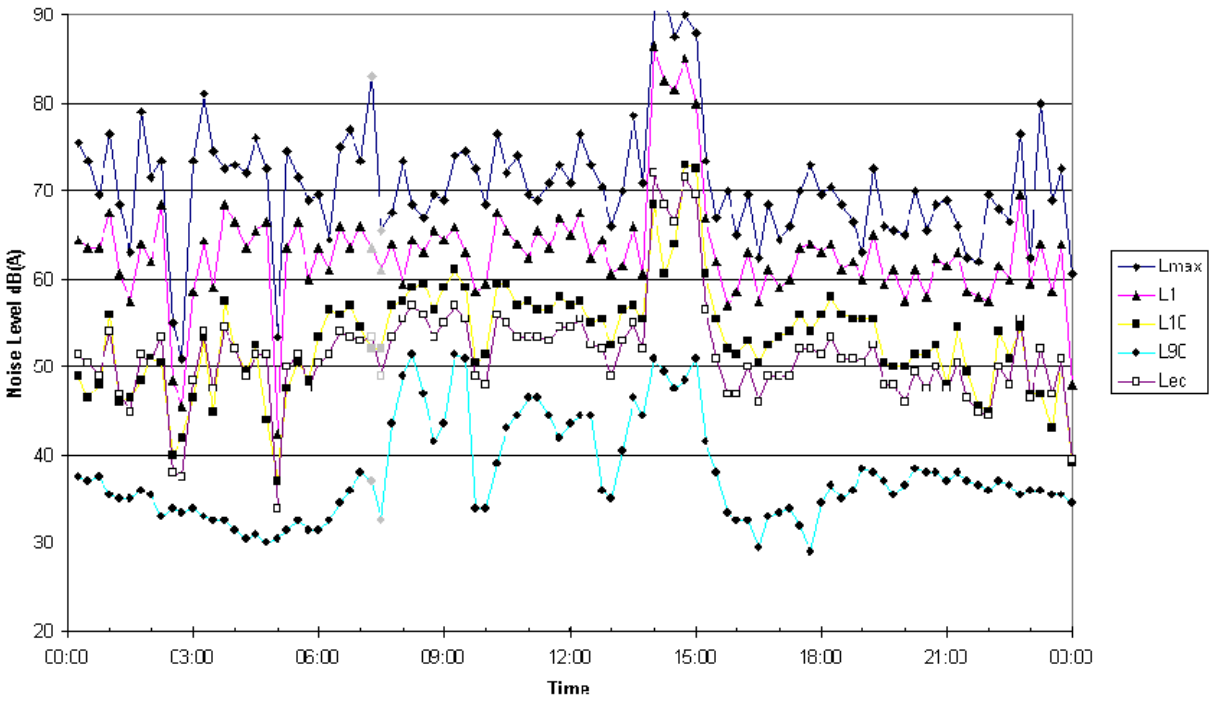
Measured Noise Levels
Location R6 - Thursday 20/09/2012



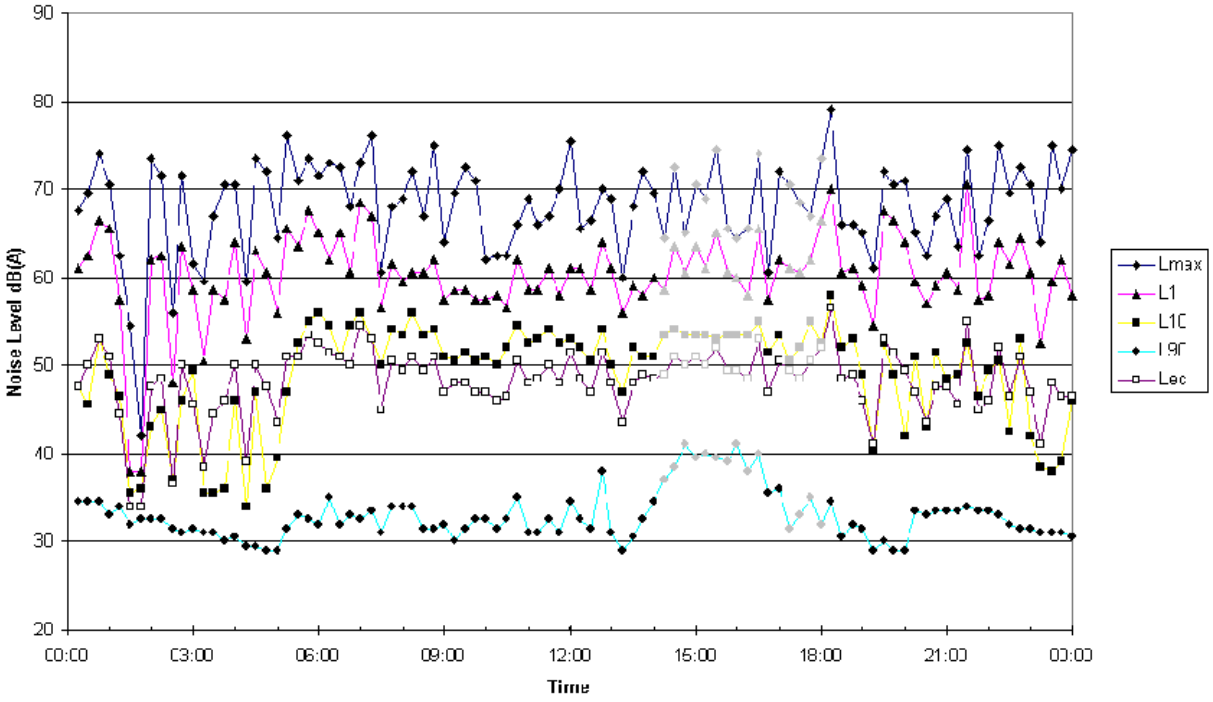
Measured Noise Levels
Location R6 - Friday 21/09/2012



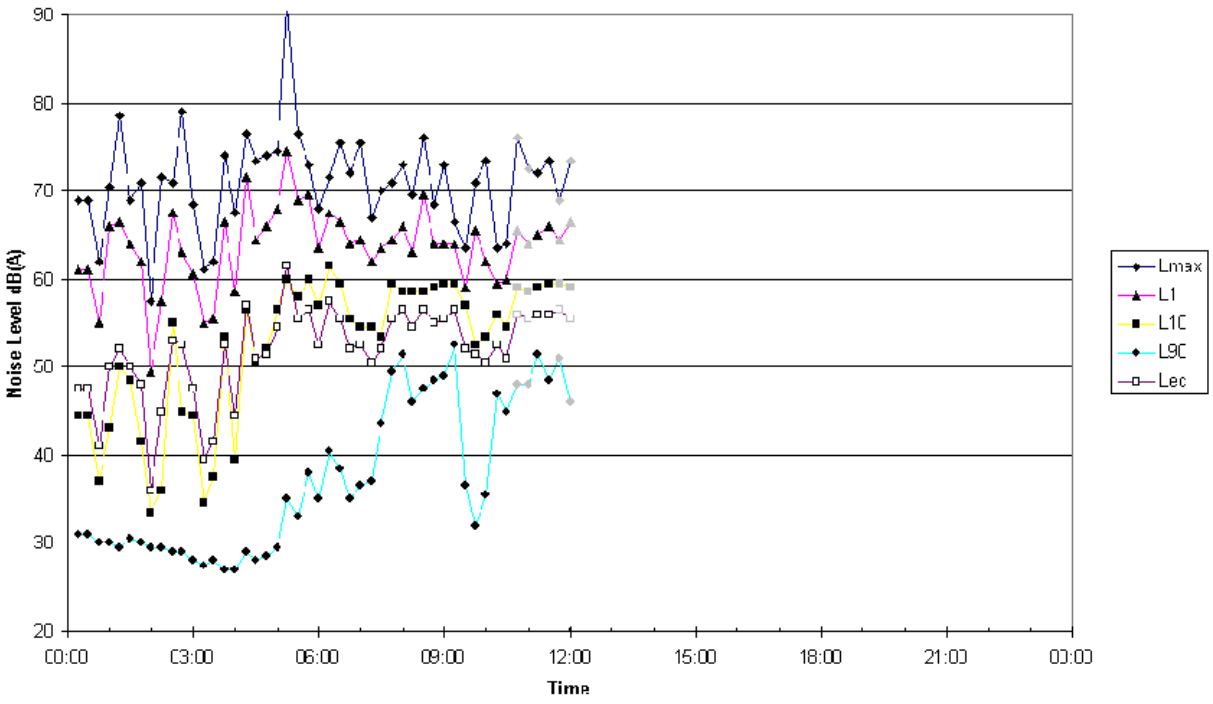
Measured Noise Levels
Location R6 - Saturday 22/09/2012



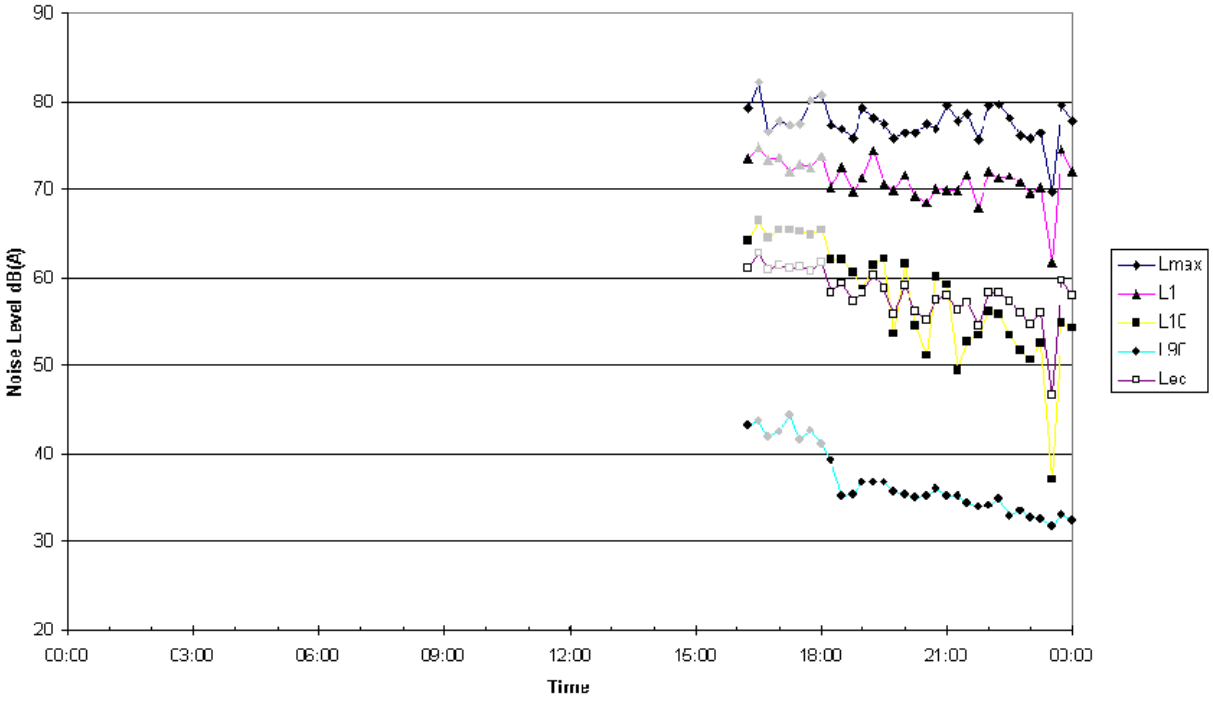
Measured Noise Levels
Location R6 - Sunday 23/09/2012



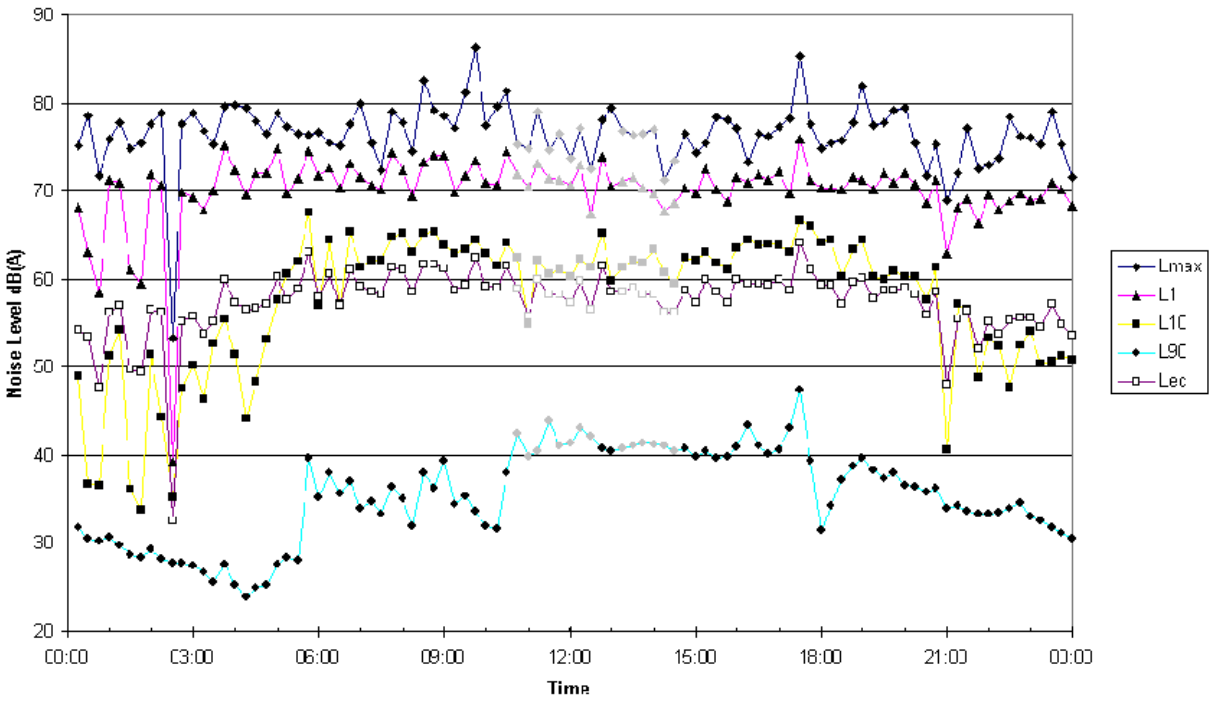
Measured Noise Levels
Location R6 - Monday 24/09/2012



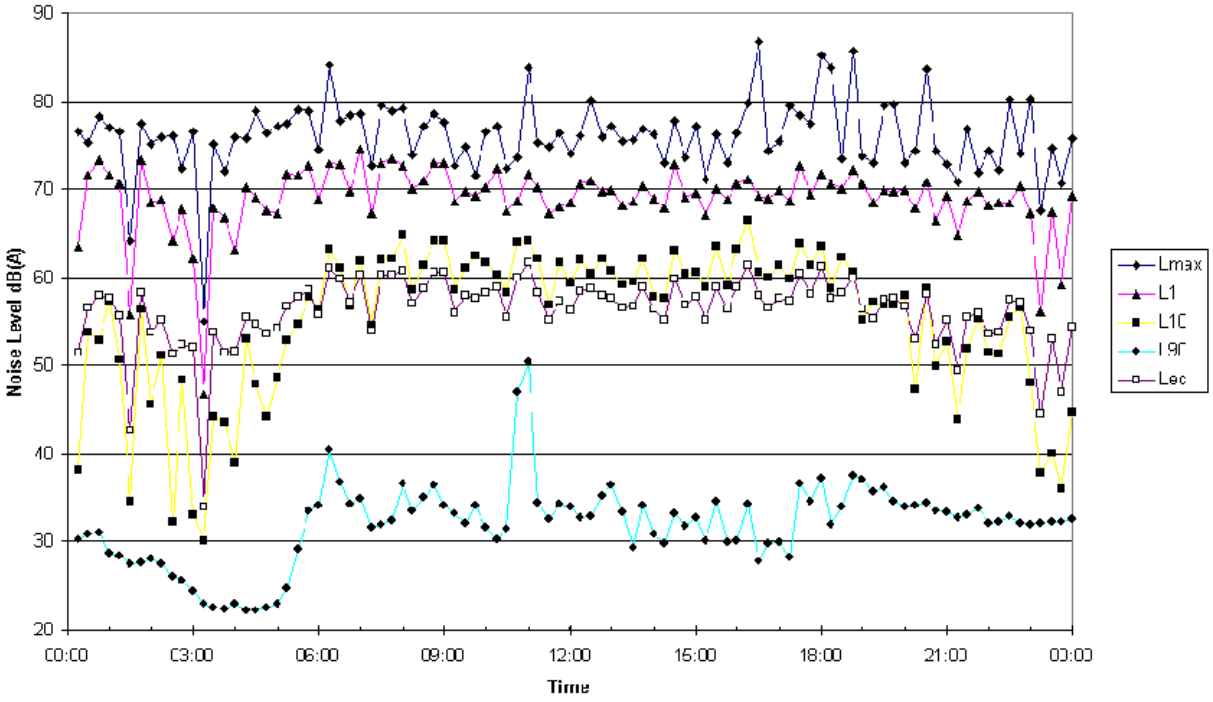
Measured Noise Levels
Location R7 - Thursday 13/09/2012



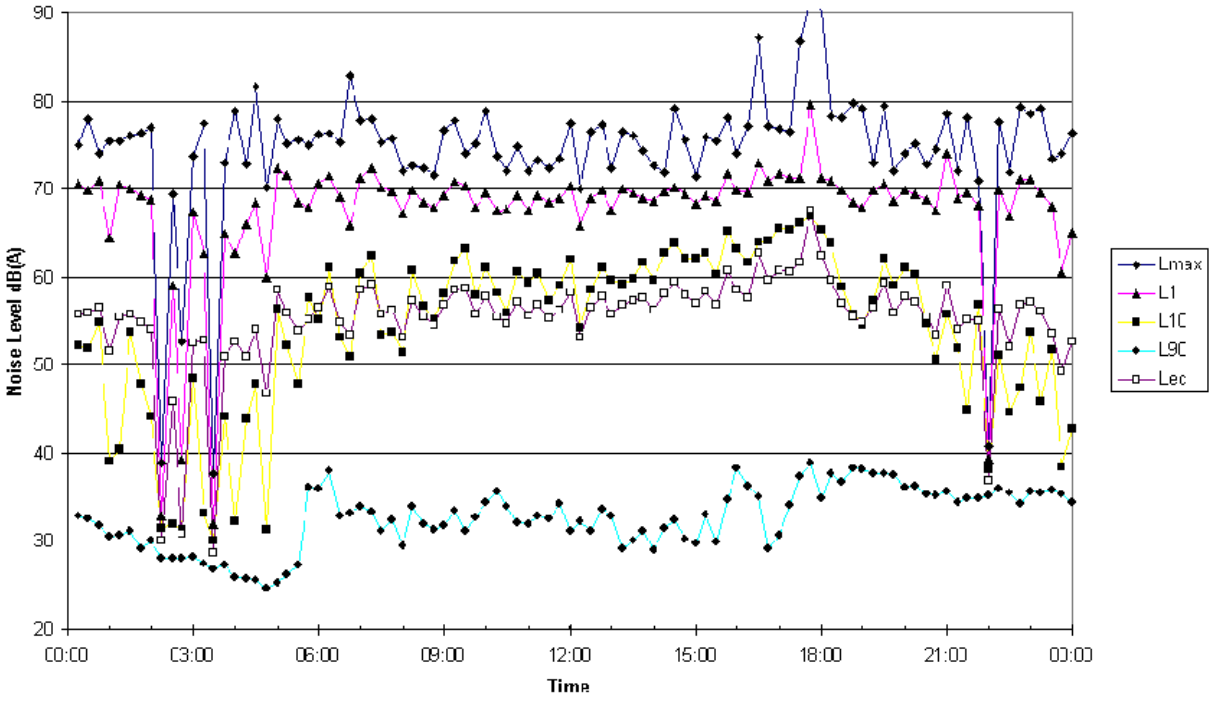
Measured Noise Levels
Location R7 - Friday 14/09/2012



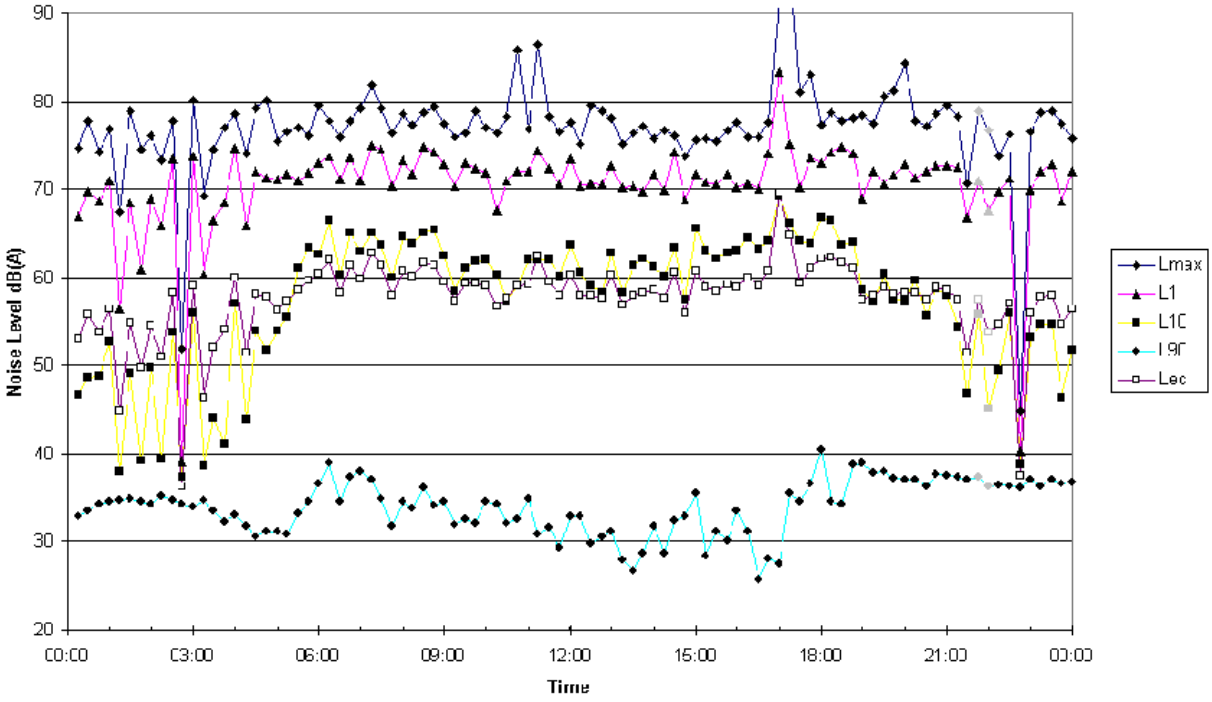
Measured Noise Levels
Location R7 - Saturday 15/09/2012



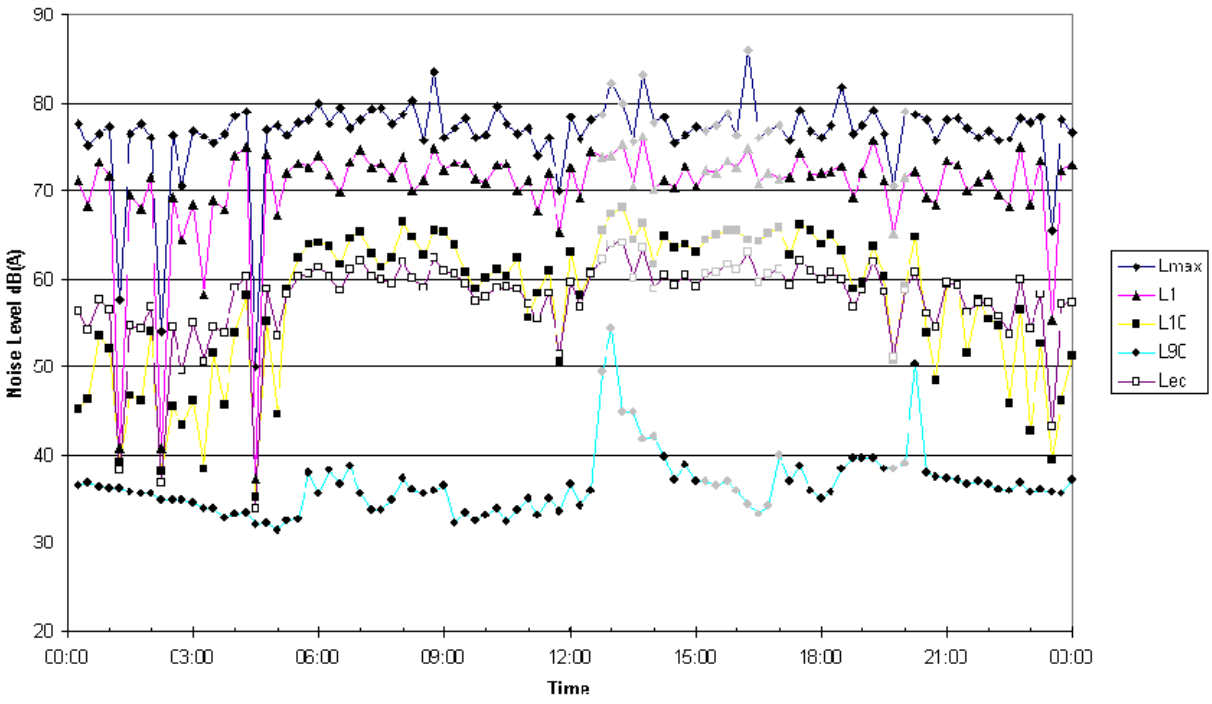
Measured Noise Levels
Location R7 - Sunday 16/09/2012



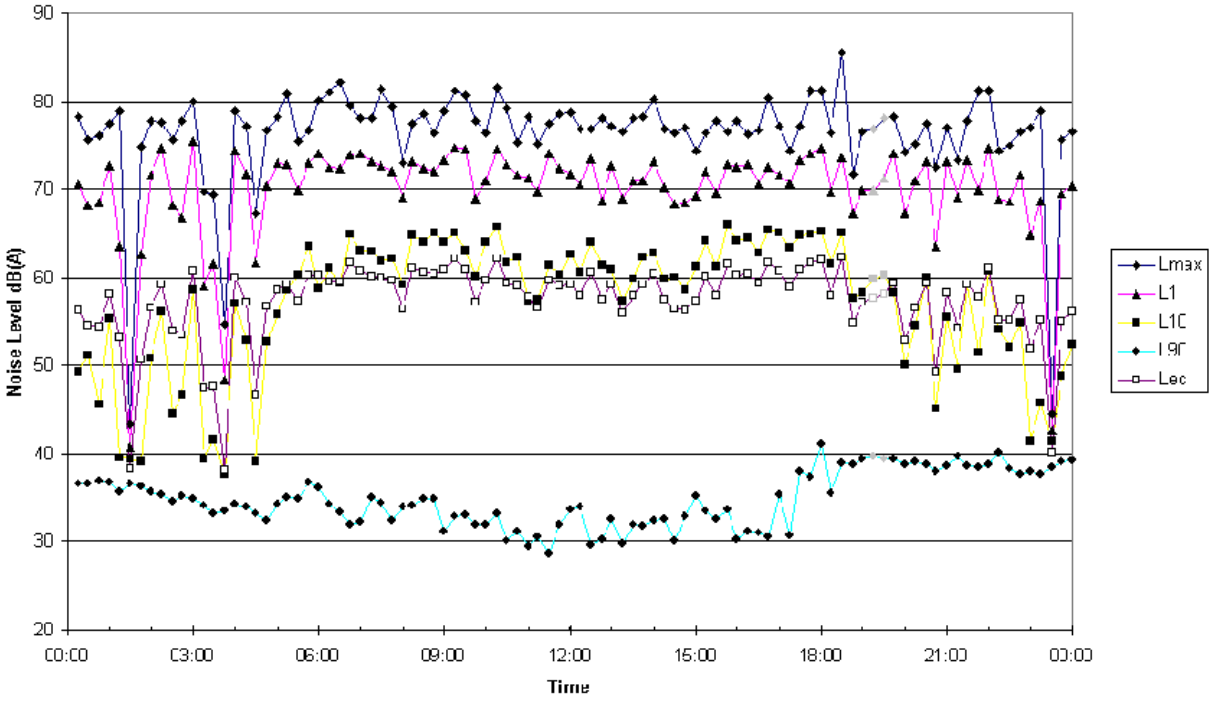
Measured Noise Levels
Location R7 - Monday 17/09/2012



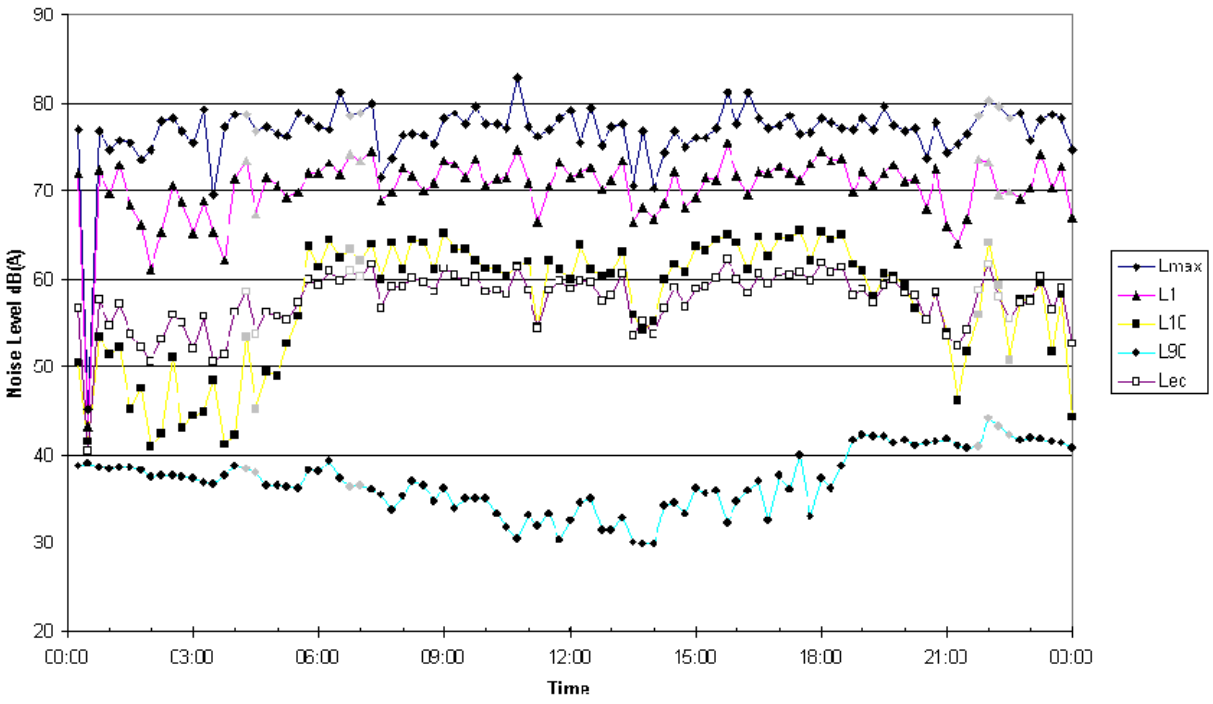
Measured Noise Levels
Location R7 - Tuesday 18/09/2012

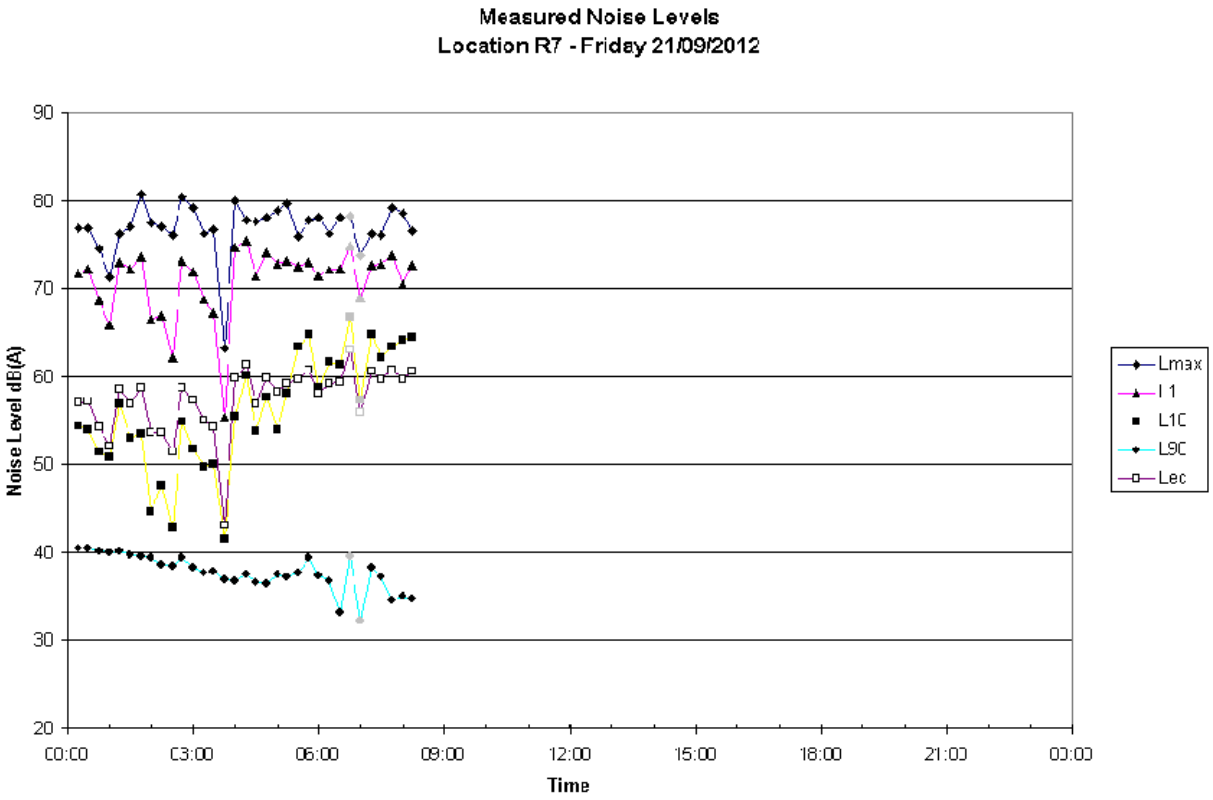


Measured Noise Levels
Location R7 - Wednesday 19/09/2012



Measured Noise Levels
Location R7 - Thursday 20/09/2012




Measured Noise Levels
Location R7 - Friday 21/09/2012
Noise Level dB(A)
90
80
70
60
50
40
30
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time
Lmax
L1
L1C
L9C
Lec

CERTIFICATE OF CALIBRATION

CERTIFICATE NO.: SLM 38290

Equipment Description:	Noise Logger		
Manufacturer:	ARL		
Model No:	EL-215	**Serial No:**	194593
Microphone Type:	Electret	**Serial No:**	194593
Filter Type:	-	**Serial No:**	-
Comments:	All tests passed for type 2.		
Owner:	Benbow Environmental 13 Daking Street North Parramatta NSW 2151		
Ambient Pressure:	1013 hPa ±1.5 hPa		
Temperature:	23 °C ±2° C	**Relative Humidity:**	31 %RH ±5% RH
Date of Calibration:	14/07/2011	**Issue Date:**	15/07/2011

Acu-Vib Test Procedure: AVP05 (SLM) & AVP06 (Filters) if applicable

CHECKED BY: AM **AUTHORISED SIGNATORY:** .....

Jack Rielt

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Acoustic and Vibration Measurements

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ELECTRONICS

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

Acoustic Research Laboratories
Proprietary Limited A.B.N. 47 050 100 804
Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Sound Level Meter Test Report

Report Number : C12456

Date of Test : 23/07/2012

Report Issue Date : 27/07/2012

Equipment Tested/ Model Number: **ARL EL-215 Logger**

Instrument Serial Number: 194438

Microphone Serial Number: N/A

Preamplifier Serial Number: N/A

Client Name : Benbow Environmental
13 Daking Street
North Parramatta NSW 2151

Contact Name : Steffi Contad

Tested by : Brianna Sparre

Approved Signatory :

Date : **27 July 2012**

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www.acousticresearch.com.au

CERTIFICATE OF CALIBRATION

CERTIFICATE NO.: SLM 38288

Equipment Description:	Noise Logger		
Manufacturer:	ARL		
Model No:	EL-215	**Serial No:**	194702
Microphone Type:	Electret	**Serial No:**	194702
Filter Type:	-	**Serial No:**	-
Comments:	All tests passed for type 2.		
Owner:	Benbow Environmental 13 Daking Street North Parramatta NSW 2151		
Ambient Pressure:	1013 hPa ±1.5 hPa		
Temperature:	23 °C ±2° C	**Relative Humidity:**	31 %RH ±5% RH
Date of Calibration:	14/07/2011	**Issue Date:**	15/07/2011

Acu-Vib Test Procedure: AVP05 (SLM) & AVP06 (Filters) if applicable

CHECKED BY: ..... **AUTHORISED SIGNATORY:** .....

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO.: SLM 38389

Equipment Description:	Noise Logger		
Manufacturer:	ARL		
Model No:	EL-215	**Serial No:**	194682
Microphone Type:	Electret	**Serial No:**	194593
Filter Type:	-	**Serial No:**	-
Comments:	All tests passed for type 2.		
Owner:	Benbow Environmental 13 Daking Street North Parramatta NSW 2151		
Ambient Pressure:	1007 hPa ±1.5 hPa		
Temperature:	23 °C ±2° C	**Relative Humidity:**	67 %RH ±5% RH
Date of Calibration:	29/08/2011	**Issue Date:**	29/08/2011

Acu-Vib Test Procedure: AVP05 (SLM) & AVP06 (Filters) if applicable

CHECKED BY: ..... **AUTHORISED SIGNATORY:** .....

Jack Rielt

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Acoustic Research Laboratories
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Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Sound Level Meter Test Report

Report Number : C11621

Date of Test : 2/12/2011

Report Issue Date : 5/12/2011

Equipment Tested/ Model Number: **Ngara S-Pack Sound Acquisition System**

Instrument Serial Number: 8780AC

Microphone Serial Number: 317859

Preamplifier Serial Number: 27984

Client Name : Benbow Environmental

13 Daking Street

North Parramatta NSW 2151

Contact Name : Daniel Albanese

Tested by : Ken Williams

Approved Signatory :

Date : **5th December 2011**

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO.: **SLM 38289**

Equipment Description:	Noise Logger		
Manufacturer:	ARL		
Model No:	EL-215	**Serial No:**	194441
Microphone Type:	Electret	**Serial No:**	194441
Filter Type:	-	**Serial No:**	-
Comments:	All tests passed for type 2.		
Owner:	Benbow Environmental 13 Daking Street North Parramatta NSW 2151		
Ambient Pressure:	1013 hPa ±1.5 hPa		
Temperature:	23 °C ±2° C	**Relative Humidity:**	31 %RH ±5% RH
Date of Calibration:	14/07/2011	**Issue Date:**	15/07/2011

Acu-Vib Test Procedure: AVP05 (SLM) & AVP06 (Filters) if applicable

CHECKED BY: ..... **AUTHORISED SIGNATORY:** .....

Jack Kielt

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Noise and Vibration Monitoring Instrumentation for Industry and the Environment

Sound Level Meter Test Report

Report Number : C11622

Date of Test : 2/12/2011

Report Issue Date : 2/12/2011

Equipment Tested/ Model Number: **Ngara S-Pack Sound Acqusition Systen**

Instrument Serial Number: 8780AD

Microphone Serial Number: 317856

Preamplifier Serial Number: 27983

Client Name : Benbow Environmental

13 Daking Street

North Parramatta NSW 2151

Contact Name : Daniel Albanese

Tested by : Adrian Walker

Approved Signatory :

Date : **2nd December 2011**

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: 11838

EQUIPMENT TESTED: Sound Level Calibrator

Manufacturer: Rion
Type No: NC-73 **Serial No:** 10186522
Owner: Benbow Environmental
13 Daking Street
North Parramatta NSW 2151

Tests Performed: Measured output sound pressure level was found to be:
Before adiustment: 93.97 dB re 20 uPa at 994.7 Hz THD< 1%.
After adjustment: 93.97 dB re 20 uPa at 994.7 Hz THD< 1%.

Uncertainty (at 95% c.l.) k=2: Output ±0.11dB
Freq. ±0.05 Hz

CONDITION OF TEST:

Ambient Pressure: 993 hPa ±1.5 hPa **Relative Humidity:** 66 % RH ±5% RH
Temperature: 23 °C ±2° C
Date of Calibration: 18/01/2011 **Issue Date:** 18/01/2011
Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2004
CHECKED BY: ..... **AUTHORISED SIGNATORY:** .....
Jack Kielt

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