ACOUSTIC CONSULTING

Acoustic Report

POWMRI - NRP
Environmental Noise Impact Report

Project 208 125

January 2009

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Prepared For

Prince of Wales Hospital Medical Research Institute

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The work reported herein has been carried out in accordance with the terms of membership. We stress that the advice given herein is for acoustic purposes only, and that the relevant authorities should be consulted with regard to compliance with regulations governing areas other than acoustics.

1 INTRODUCTION

It is proposed to establish a Neuroscience Research Precinct within the Prince of Wales Hospital Locale, at the site of the existing smaller POWMRI.

Stage 1 of the project has currently been approved and provides temporary accommodation while the larger scale 2A and 2D constructions are completed.

Stage 2A is the subject of the current proposal and comprises a 7 level building at the corner of Barker and Easy Streets Randwick.

Stage 2B to 2D comprise future conceptual stages to the north and West of Stage 2A and to be constructed as demand requires.

This report provides am overview of the likely noise impacts associated with the proposal, due to both construction and operational phases.

Both assessments are in outline form only during the preliminary nature of the design proposals. In particular it will be necessary to carry out the following additional work.:

- The managing contractor must prepare a Noise Management Plan prior to construction in order to manage and mitigate noise and vibration impacts on the nearby hospital accommodation and the nearby residential properties.

- The project must be designed such that operational noise is limited to within acceptable limits imposed by the consent authority. This could be carried out by the principal during the detailed design phases or by the managing contractor as part of an enhanced Design and Construct specification.

The conclusions in this report are base on the following documentation:

- DA submission drawings prepared by Cox Richardson Architects

- Indicative Construction Management Plan prepared by Winton Associates

- Outline mechanical plant concepts prepared by Shelmerdines

2 SUMMARY OF ACOUSTIC ISSUES TO BE CONSIDERED.

2.1 Construction Noise

The following represents the major activities scheduled for this project:

Clearing and paving near Black dog institute for additional parking
Temporary car park ramp constructed off existing ramp
Installation of crane
Demolition of SE wing of Barker Street Villa
Construction of Basement retaining wall using concrete piles,
Bulk and detailed excavation as required
Concrete frame including columns, core walls, beams and slabs poured progressively to the required height.
Services rough in
Installation of hoist
Completion of wet work and hot metal work
Installation of façade
Completion services and building fitout.

It is anticipated that at this stage it would not be necessary to require construction works outside of standard hours ie 7am to 6pm weekdays and Saturday 8am to 1 pm.

We have concluded that there is likely to be some noise impact during the construction stages. This will be may be at external residential boundaries or to other hospital buildings within the precinct. It will be necessary to prepare a Construction Noise Management Plan in order to implement suitable noise mitigating controls.

2.2 Noise from the operational Facility

The following operational activities could be expected to generate a degree of noise, potentially impact on the nearby property and other site within the POW complex.

- Noise emissions from the carpark via the access ramp to the residential properties across Hospital Road
- Noise from additional traffic generation associated with the completed development.
- Noise from trucks access the loading dock
- Mechanical plant rooms and Level 1-6
- Fume Cupboard Fans and Level 7
- General Ventilation Fans and equipment on level 7
- Chillers on level 7
- Hot water plant on level 7

We have concluded that mechanical plant noise can be satisfactorily controlled using standard noise control measures such as acoustic screening from the chillers and suitable silencers for the fans.

We have also concluded that traffic noise generated by the development will be generally within satisfactory limits. The peak hour arrivals off Hospital Road does have the potential to exceed these limits however this is only when based on conservative traffic flow projections. As a result of the short duration and the likely staggered starting time of the research staff, screening measures are not proposed.

3 THE SITE

The general site layout is shown on the following site photo overlay prepared by Cox Richardson architects..

The nearest residentially sensitive properties are as follows:

- Residential properties located across Hospital Road, approximately 20 metres from the western site boundary.
- Residential properties in Barker street, nearby Hospital Road entrance, approximately 35 metres from the South Western corner of the proposed site.
- More distant residential properties in Jane Street Randwick, approximately 90 metres from the South Western corner of the proposed site.

There are other sensitive building and properties that surround the site. While these are part of the POW complex, they could be considered sensitive as they include patient accommodation. Additionally, a childcare centre is located nearby.

- Royal Hospital for Women approximately 15 metres North of the closest site boundary
- Kiloh Centre approximately 5 metres east of the closest site boundary
- Childcare building approximately 40 metres east of the closest site boundary

4 DEVELOPMENT PROPOSAL

The proposal has been documented by Cox Richardson Architects as part of the proposed DA submission. The relevant drawings comprise PA-201-PA402 all revision 2 . It is proposed to construct a 7 level + basements concrete frame building comprising the following levels:

- Basement B2 parking spaces
- Basement B1 parking spaces and auditorium plant
- Level 1 ramp to B1 parking off hospital road, mechanical plant spaces, storage, freezer and workshops, staff cafeteria, auditorium, administration and scientific facilities
- Level 2 Central Atrium, offices and laboratory spaces, plantrooms and staff kitchen
- Level 3 Similar to level 2
- Level 4 Similar to level 2
- Level 5 Similar to level 2
- Level 6 Similar to level 2
- Level 7 Plant areas and rooms - major items include chillers, fume cupboard fans, general ventilation fans, hot water plant

5 OPERATIONAL NOISE CRITERIA

5.1 Previous POWMRI Criteria

An acoustic report was previously prepared by PKA for POWMRI building adjacent the site. In that instance, acoustic conditions where imposed on the project by the Consent authority. These are reproduced in the section below.

The following conditions have been applied to ensure that noise emissions from the development satisfy legislative requirements and maintain reasonable levels of amenity to the area:

5. A report or correspondence prepared by a suitably qualified and experienced person shall be obtained prior to a **construction certificate** being issued for the works, which demonstrates that noise and vibration from the air conditioning plant and equipment will satisfy the relevant provisions of the Protection of the Environment Operations Act 1997 and relevant regulations, guidelines and conditions of approval. A copy of the report or correspondence is to be included in the construction certificate documentation.

6. The proposed use of the premises and the operation of all plant and equipment shall not give rise to an 'offensive noise' as defined in the Protection of the Environment Operations Act 1997 and Regulations.

   In this regard, the operation of the premises and plant and equipment shall not give rise to a sound pressure level at any affected premises that exceeds the background (LA90), 15 min noise level, measured in the absence of the noise source/s under consideration by more than 5dB(A). The source noise level shall be assessed as an LAeq, 15 min and adjusted in accordance with the NSW Environmental Protection Authority's Industrial Noise Policy 2000 and Environmental Noise Control Manual (sleep disturbance).

7. The use of the premises and the operation of plant and equipment shall not give rise to the transmission of a vibration nuisance or damage to other premises.

8. A report, prepared by a suitably qualified and experienced consultant in acoustics, shall be submitted to the Council prior to an **occupation certificate** being issued for the development, which demonstrates and certifies that noise and vibration emissions from the development comply with the relevant provisions of the Protection of the Environment Operations Act 1997, NSW Environmental Protection Authority Noise Control Manual & Industrial Noise Policy and conditions of Council's approval, to the satisfaction of Council's Manager Environmental Health & Building Services.

5.2 Other References

Acoustic reports have been prepared by Hyder Consulting in order to investigate other, previous plant installations.

Hyder have reported the following background noise levels in correspondence dated 31 May 2000:

Day (7am-10pm) 46 L_{A90}
Night (10pm-7am) 45 L_{A90} (43 minimum)

The reports indicate the existing DA conditions require that the plant and equipment does not give rise to an L10 sound pressure level which is greater than 5 dB(A) above the background.

This would indicate the following noise limits are applicable:

Day (7am-10pm) 51 L_{A90}
Night (10pm-7am) 48 L_{A90} (using minimum background level)

We caution that in some instances, some Councils have required a 0 dB exceedance after 10pm. This would decrease the night time target to 43 dB(A).

5.3 Additional Noise Measurements

In order to update the previously measured background noise levels, further measurements were carried out at the boundary of the site.

Two noise data loggers were left on site for 7 days. (see locations 1 and 2)

Noise Logger 1 was located at the corner of Magill street and Hospital Road, logger 2 was located at the corner of Barker street and Hospital Road. Both started from 3rd December 2008 to 9th December 2008 and noise.

All levels were measured using Acoustic Research laboratory EL215 and SVANTEK type 949 precision sound level meter. The results are appended to this report. The logger location has been marked in the following figure.

We have also included the result of a previous survey carried out for the stage 1 works. In this instance the logger (Logger 3) was located at Hospital Road from 20th August 2008 to 26th August 2008

In each instance the logger microphone was positioned at 1.2 metres above ground level at the residential boundary. The logger sampled in 15 minute periods, using an A-weighting curve before converting the information to statistical quantities and commencing a new period. The logger stored various statistical information, with relevant information set out on the attached graphs in Appendix A.

The results of the noise level monitoring are shown in the graphs appended (appendix A) to this report. The Rating Background Level (RBL) is the overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period.
The RBL is to be determined in the absence of noise from the industrial source under investigation. If the premises under investigation are operational at most times during the measurement period, the RBL is determined from the periods when normal operation has ceased. The RBL is used for analysis of the intrusiveness criteria and can also be described as the lowest repeatable background noise level over the measurement period. The calculated RBL's for the measurement period are as follows;

	RBL at Logger Location		
	1	2	3
Day (0700-1800)	50	46	47
Evening (1800-2200)	47	44	45
Night (2200-0700)	40	43	44

The Council consent condition 6 requires a maximum exceedance of background + 5 dB(A). This is equivalent to compliance with the DECC intrusiveness criteria except that the comparison with be with the background noise at any time not necessarily the RBL. (minimum measured noise level is 40 dB(A) + 5 = criteria of 45 dB(A)

The limits are therefore :

Day:	51.5 dB(A)
Evening	50.0 dB(A)
Night time	45.0 dB(A)

Hence the governing criteria is typically 45.0 dB(A) as plant may be required to operate during the evening or night time hours.

5.4 Traffic Noise Criteria

For vehicle movements generated by the completed site the noise criteria is contained in the DECC *Environmental Criteria for Road Traffic Noise (ECRTN).*

Table 1 of this code lists for "Land use developments with potential to create additional traffic on local roads" façade levels of 55 $L_{eq(1hour)}$ during the Daytime (7am-10pm).

In addition, the table recommends that in the instance where the recommended noise criteria are already exceeded traffic arising from the development should not lead to an increase in existing noise levels of more than 2 dB.

As the table requires the 2 dB limit to apply in all instance we have use this level as an assessment guideline.

6 CONSTRUCTION NOISE CRITERIA

Construction noise is often difficult to assess due to the variation in possible noise levels and durations. Further, noise emission guidelines or requirements vary between consent authorities.

The Department of Environment and Climate change have recently (August 2008) released a "draft for consultation" NSW Construction Noise Guideline".

While only a draft at this stage, the Guide Line includes the following tables:

> Table 4.1 sets out the noise management levels and how they are to be applied. This approach intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints.
>
> In Table 4.1 the rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours).

Table 4.1 Noise at residences using quantitative assessment

Time of day	Management level $L_{Aeq\ (15\ min)}$ *	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB(A)	• The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	• The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. • If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.
Outside recommended standard hours	Noise affected RBL + 5 dB(A)	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see section 7.2.2.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence

Table 4.2 presents management levels for noise at other sensitive land uses based on the principle that the characteristic activities for each of these land uses should not be unduly disturbed. The noise management levels apply only to when the property is being used, for example classrooms during school hours.

Internal noise levels are to be assessed at the centre of the occupied room. External noise levels are to be assessed at the most-affected point within 50 m of the area boundary.

Table 4.2 Noise at other sensitive land uses using quantitative assessment

Land use	Management level, $L_{Aeq\ (15\ min)}$ – applies when land use is being utilised
Classrooms at schools and other educational institutions	Internal noise level 50 dB(A)
Hospital wards and operating theatres	Internal noise level 40 dB(A)
Places of worship	Internal noise level 45 dB(A)
Active recreation areas (such as parks and sports grounds or playgrounds)	External noise level 65 dB(A)
Passive recreation areas (such as outdoor grounds used for teaching, outdoor cafes or restaurants)	External noise level 60 dB(A)

- From table 4.1 the preferable management level at the closest residential properties to Hospital Road would be 46.5+10 = 56.5 $L_{AEQ(15\ minutes)}$ during standard construction hours.
- From table 4.2 the preferable internal management level within Hospital wards and operating theatres is 40 $L_{AEQ(15\ minutes)}$.
- We also suggest that this limit be applied for internal spaces within the childcare centre particularly during lunch time hours when children may be sleeping. For external play areas a limit of 60 $L_{AEQ(15\ minutes)}$ could be applied as per the recommendation for Passive Recreation areas in table 4.2
- Noise Levels within administrative spaces and training spaces are best limited to 50 $L_{AEQ(15\ minutes)}$, equivalent to that recommended for classrooms within table 4.2.

7 CONSTRUCTION NOISE ASSESSMENT

7.1 Noise data

This section sets out the applicable noise data for the various process likely to be associated with the works.

The calculation of construction site noise levels is set out in AS 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites". Table D2 of AS 2436 sets out typical A-weighted sound power levels from site equipment. While some of these values can be subject to variation, depending on equipment type used, they allow for a standard assessment basis.

We have also reference other sources in addition to AS 2436. These are marked as *

We have extracted from this table data relevant to the expected processes based on the procedures anticipated in the report prepared by Winton and Associates.

Major Plant Items	Measured range of A weighted sound Power Level dB ref 10^{-12} W
Clearing and Paving	
Skid Steer loader	103* LwA (1)
Paver	89 dB(A) at 15 metres (2)
Compactor	82 dB(A) at 15 metres (2)
Carpark Ramp Construction	
Concrete Pump	102 – 107 LwA
Concrete Vibrator	99-112 LwA
Concrete Mixer Truck	107-116 LwA
Demolition of SE wing	
Dumper Truck	114 LwA
Compressor	100 LwA
Breaker	110 LwA
Claw Excavator	110 LwA
Basement Retaining Wall	
CFA Auger	115 LwA PKA estimate
Concrete Mixer Truck	107-116 LwA
Concrete Pump	102 – 107 LwA
Excavation	
Excavator	115 LwA
Ripper	115 LwA PKA estimate
Dumper Truck	114 LwA
Mini breaker	114 LwA
Rock Breaker (where used)	119 LwA

Major Plant Items	Measured range of A weighted sound Power Level dB ref 10^{-12} W
Concrete Construction	
Concrete Pump	102 – 107 LwA
Concrete Vibrator	99-112 LwA
Concrete Mixer Truck	107-116 LwA
Hoist – Electric	92 LwA
Crane	108 LwA

7.2 Calculated noise levels

We have estimated the following typical noise levels as $L_{AEQ(15\ minute)}$ based on the data set out in section 7.1. The table below shows two separate data for the excavation process, depending on whether rock breaking by hydraulic hammer is required to a significant degree.

Major Activity or stage	Estimated Typical Noise Levels $L_{AEQ(15\ minute)}$						
	Residential across Hospital Road	Barker Street Residential	Jane Street Residential	Royal Hospital for Women Interior (allows 25 dB reduction for façade)	Kiloh Centre Interior (allows 25 dB reduction for façade)	Blackdog Interior (allows 25 dB reduction for façade)	Childcare Exterior
Clearing and Paving	89	81	73	53	53	64	67
Temp Ramp	84	73	67	48	48	59	62
Demolition	67	70	64	39	43	42	70
Basement Retaining wall	60	59	50	40	48	44	75
Excavation – little or no rock breaking	63	71	57	43	50	47	76
Excavation – with rock breaking	67	75	61	46	54	51	80
Concrete Construction	71	71	67	43	50	48	77

7.3 Comments on Predicted Levels of Construction Noise

Residential

We would expect that there is the potential for the preferable management noise goals for the residential areas to be exceeded, particularly near Hospital Road.

Noise levels at these properties may be sufficiently high during clearing/paving and temporary ramp construction to be above the 75 dB(A) level considered to be “highly noise affected”.

Noise mitigation measures are likely to be required particularly during the clearing/paving and temporary ramp construction phases.

Noise impact will also be increased where it is necessary to use hydraulic rock breaker to remove bedrock.

Hospital / Blackdog / Kiloh Accommodation

The proximity of the clearing/paving and temporary ramp construction operations to these buildings means that exceedance of the noise management goals is likely, evening with windows closed. Noise mitigation measured will therefore be required.

The hospital building should not ne unduly impacted for the remainder of the construction, provided rock breaking is not required. Some mitigation measures for the Blackdog and Kiloh buildings will be required from time to time, particularly for patient accommodation.

Noise impact will be increased where it is necessary to use hydraulic rock breaker to remove bedrock. This will generate noise impacts beyond those recommended for the above spaces.

Childcare

It is possible that the preferable management noise goals for the childcare centre to be exceeded. Noise mitigation measures are also likely to be required for the protection of the childcare centre. Use of rockbreakers will cause excessive noise impacts to the childcare centre.

7.4 Noise Mitigation Measures

- Construction noise management typically comprises of the following techniques:
- Selection of appropriate plant and processes
- Scheduling of noisier work during less sensitive periods
- Provision of temporary screening as necessary.

The Indicative Construction Management Plan already includes a number of features that will reduce noise impacts from the site:

Hoardings will be constructed across the Barker and Easy Street Alignments providing a base for site sheds. Where the hoarding and sheds are made continuous with appropriate plywood infill, this will provide a substantial noise reduction (for activities up to say 1st – 2nd levels) to the residential properties across Barker Street and to the ChildCare centres.

The retaining walls for the Basement will be constructed by non-driven CFA piling. This will substantially mitigate noise impacts from this process.

Bulk Excavation will be carried out by bulldozer and ripper attachments, with breaking limited to the sandstone bedrock. Where the excavation can exclude breaking to the greatest extent possible, noise and vibration impacts can be minimised.

Work carried out inside the building façade, once installed should not impose further impacts.

Further recommendations:

- Provision of appropriate screening and hoarding along the Northern site boundary in order to provide noise mitigation to the Kiloh Centre and to a lesser extent the Block Dog Building.
- Provision of temporary screening around the carpark and ramp construction sites in order to reduce noise impacts to the Blackdog, POWMRI and residential buildings adjacent.
- Coordination with Childcare Centre to limit noisy work to outside of rest periods (eg 12pm to 1pm)
- Where possible, provide electric tower crane.

8 MECHANICAL SERVICES PLANT NOISE ASSESSMENT

We have considered the levels of noise associated with the major outdoor plant items. These comprise the following:

Roof top ventilation Fans

RoofTop Fume cupboard fans

Roof top Chillers

We estimate noise levels from the roof top fans to be of the over of 50- 55 dB(A) at the nearest residential areas, depending on the size and type of the fans. This may be in excess of the applicable noise criteria particularly where the fan are required to operate over night.

The excess can however be resolved using appropriate discharge silencers and fan enclosures where necessary.

The noise emissions from the Power Pax chillers are expected to be of the order of 50 dB(A) at the nearest residential properties. This is likely to just comply with the recommended daytime noise goal. The night time goal may be exceeded however.

The possible chiller noise excess can however be resolved using appropriate screening (typically extending in height 0.5 metres above the top of the chiller) . Shelmerdines have also indicated that Variable Speed Fans would be specified as part of the chiller package. This enables a night mode setback to around 40-50 % of full duty, allowing for a substantially reduction in noise emissions. We expect that the chillers can therefore be specified an located such that their noise emissions would meet the applicable requirements.

Other Plant Recommendations

It will also be necessary to design and specify other mechanical plant such that the applicable noise limits are met by these items:

Mechanical plant room on levels 1-6 (eg outside air intakes)

Carpark ventilation plant

Roof top air handling plant

Roof top Hot water plant

9 NOISE GENERATED BY TRAFFIC MOVEMENTS

The traffic flow generated by the completed development has been forecast for 2018 within a draft report *Prince of Wales Medical Research Institute Neuroscience Precinct - Traffic Study and TMAP* prepared by Parsons Brinckerhoff Australia, dated November 2008.

Projections are provided within Table 5-3 and 5-4 of the report, showing traffic flows at various locations.

9.1 Traffic Noise Assessments

We have reproduced the tables within this report, modifying them to show the estimated noise level increases:

PB Table 5-3 2018 Forecast AM Peak Hour Traffic Volumes

Location	Base		With Development			
	NB/EB	SB/WB	NB/EB	Noise level increase	SB/WB	Noise level increase
High Street, west of Avoca Street	361	356	362	-	390	0.4
Belmore Road, north of High street	564	286	564	-	286	-
Avoca Street, north of High street	1062	878	1064	-	912	0.2
Perouse Road, east of Avoca Street	602	4 (Bicycles)	603	-	4 (bicycles)	-
Cuthill Street, east of Avoca Street	0	891	0	-	925	0.2
Avoca Street, south of Cuthill Street	980	852	982	-	886	0.2
St Pauls Road, east of Avoca Street	2	110	2	-	110	-
Avoca Street, north of Barker Street	1054	335	1056	-	369	0.4
Barker Street, east of Avoca Street	622	209	622	-	209	-
Avoca Street, south of Barker Street	1144	700	1155	-	700	-
Barker Street, west of Avoca Street	408	1062	410	-	1107	0.2
Easy Street, north of Barker Street	389	305	389	-	305	-
Barker Street, west of Easy Street	436	557	438	-	602	0.3
Young Street, south of Barker Street	13	16	13	-	16	-
Hospital Road, north of Barker Street	105	22	269	4.1	30	1.4
Barker Street, east of Botany Street	682	860	828	0.8	868	-
Botany Street, south of Barker Street	292	252	308	0.2	253	-
Barker street, west of Botany Street	570	555	682	0.8	561	-
Botany Street, north of Barker Street	741	480	742	-	497	0.2
High Street, west of Botany Street	601	534	601	-	534	-
Botany Street, north of High Street	638	757	639	-	774	0.1
High Street, east of Botany Street	610	424	610	-	424	-
Hospital Road, south of High Street	42	224	44	0.2	253	0.5

- Nil or negligible increase

PB Table 5-3 2018 Forecast PM Peak Hour Traffic Volumes

Location	Base		With Development			
	NB/EB	SB/WB	NB/EB	Noise level increase	SB/WB	Noise level increase
High Street, west of Avoca Street	588	258	617	0.2	259	-
Belmore Road, north of High street	390	328	390	-	328	-
Avoca Street, north of High street	865	837	894	0.1	838	-
Perouse Road, east of Avoca Street	700	0	728	0.2	0	-
Cuthill Street, east of Avoca Street	0	593	0	-	595	-
Avoca Street, south of Cuthill Street	785	904	814	0.2	905	-
St Pauls Road, east of Avoca Street	0	72	0	-	72	-
Avoca Street, north of Barker Street	791	896	820	0.2	898	-
Barker Street, east of Avoca Street	271	382	271	-	382	-
Avoca Street, south of Barker Street	710	950	710	-	960	-
Barker Street, west of Avoca Street	748	502	787	0.2	504	-
Easy Street, north of Barker Street	224	412	224	-	412	-
Barker Street, west of Easy Street	581	652	620	0.3	654	-
Young Street, south of Barker Street	21	24	21	-	24	-
Hospital Road, north of Barker Street	13	123	21	2.1	263	2.1
Barker Street, east of Botany Street	616	559	623	-	685	0.9
Botany Street, south of Barker Street	169	334	170	-	348	0.2
Barker street, west of Botany Street	473	487	478	-	584	0.8
Botany Street, north of Barker Street	484	703	499	0.1	703	-
High Street, west of Botany Street	635	586	635	-	586	-
Botany Street, north of High Street	723	603	738	0.1	603	-
High Street, east of Botany Street	573	469	573	-	469	-
Hospital Road, south of High Street	192	28	216	0.5	29	-

- Nil or negligible increase

9.1 Comment on Traffic Generated Noise Levels

We expect that there would be generally little noise impact from traffic flow associated with the development as most of the increase are either insignificant or well below the 2 dB permissible increase.

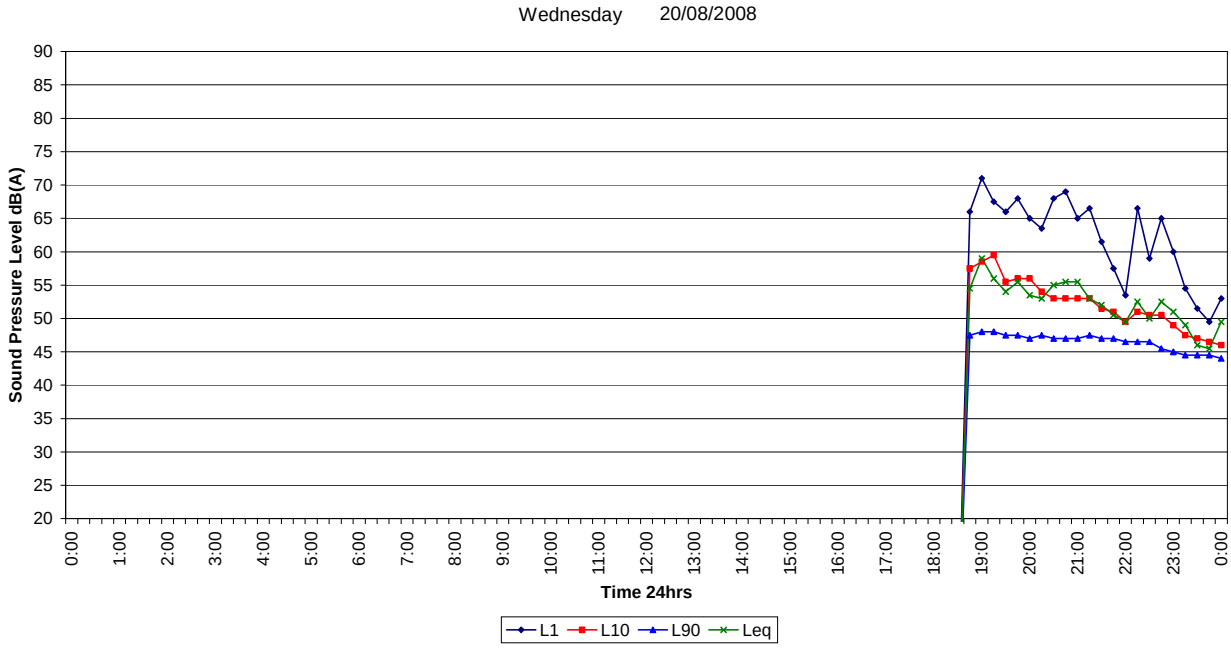
There is a possible exception however in that Hospital Road, north of Barker Street will increase of the order of 4 dB(A) during the morning peak dB(A), in excess of the 2 dB(A) recommended in the ECRTN. The PM peak is less significant at 2.1 dB(A) increase.

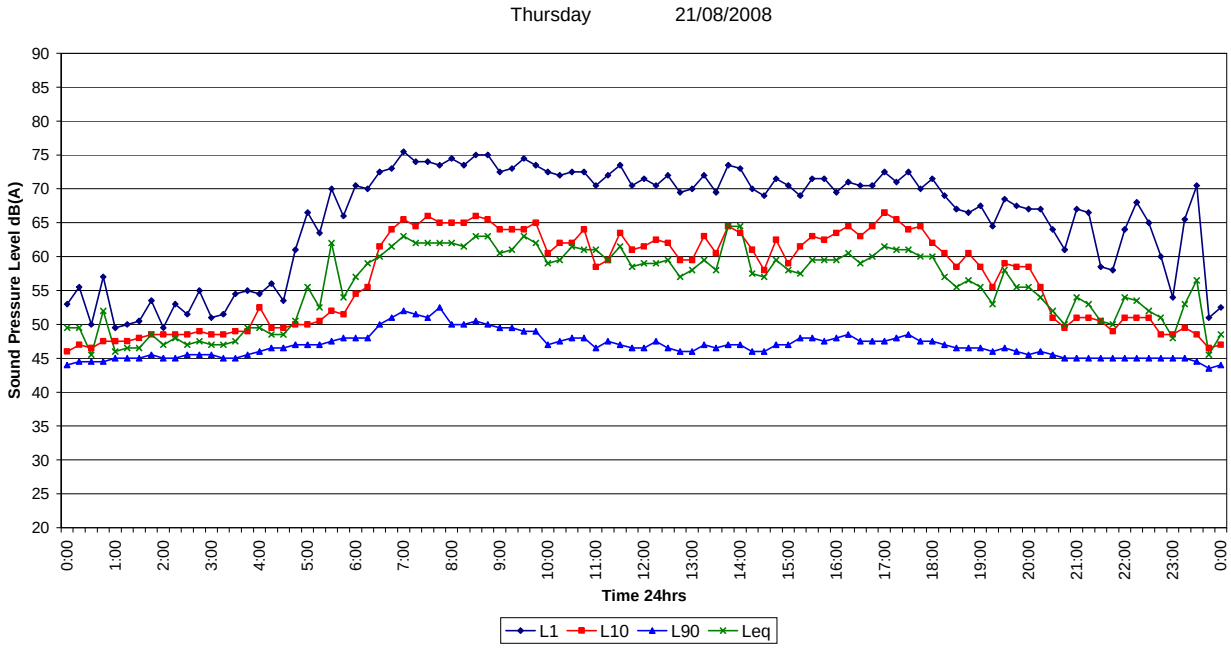
It is likely that the possible exceedance would occur only over a short time period of the day (ie am peak).

This is only a possible exceedance as PB have indicated that the facility would mainly be used by researchers who do not follow standard travel patterns. PB have advised that their projections took a conservatively high risk management approach and that in practice arrival would be expected to be spread across a greater time period. Where the projected peak hour traffic flows are spread over a greater time frame, then the noise increase should reduce to the recommended margin. By way of example where the arrivals are actually spread say between 6.30am and 9.30 am then the noise increase would be within acceptable limits.

Further, the location of the existing roadway means that noise controls would be difficult to implement without visual impact to the nearby properties. The boundary beyond Hospital Road is also not under the control of POWMRI . As a result of the these difficulties and the likely reduced concentration of vehicle arrivals in practice (say a minimum 2 hour period) screening measures are unlikely to be warranted.

Appendix A: Noise Logger data results at location 3





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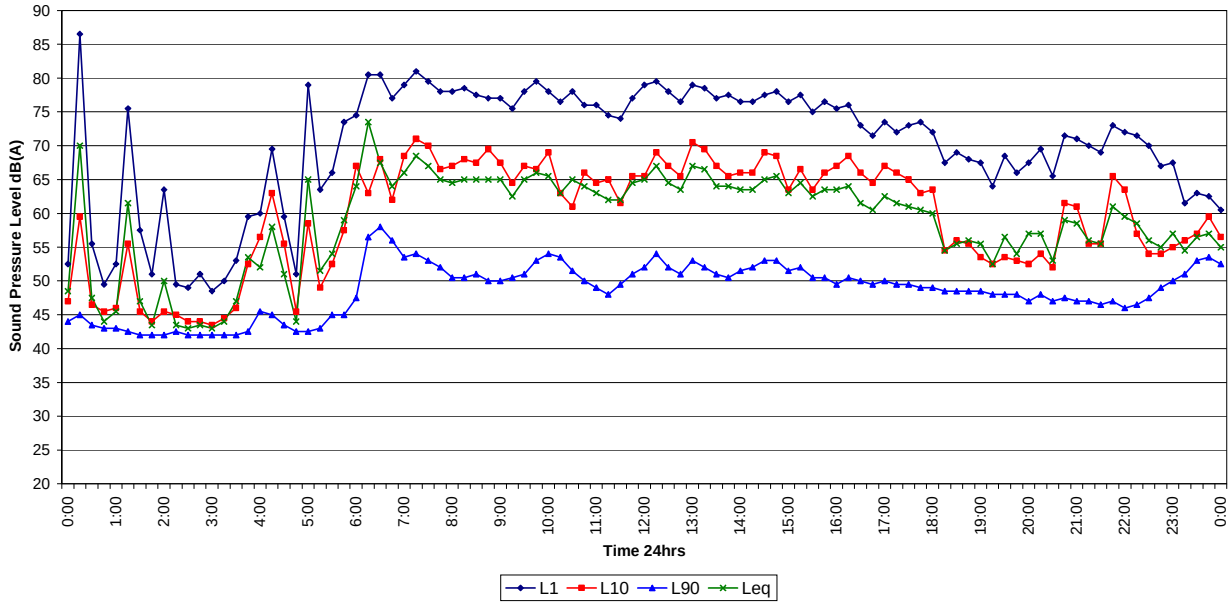
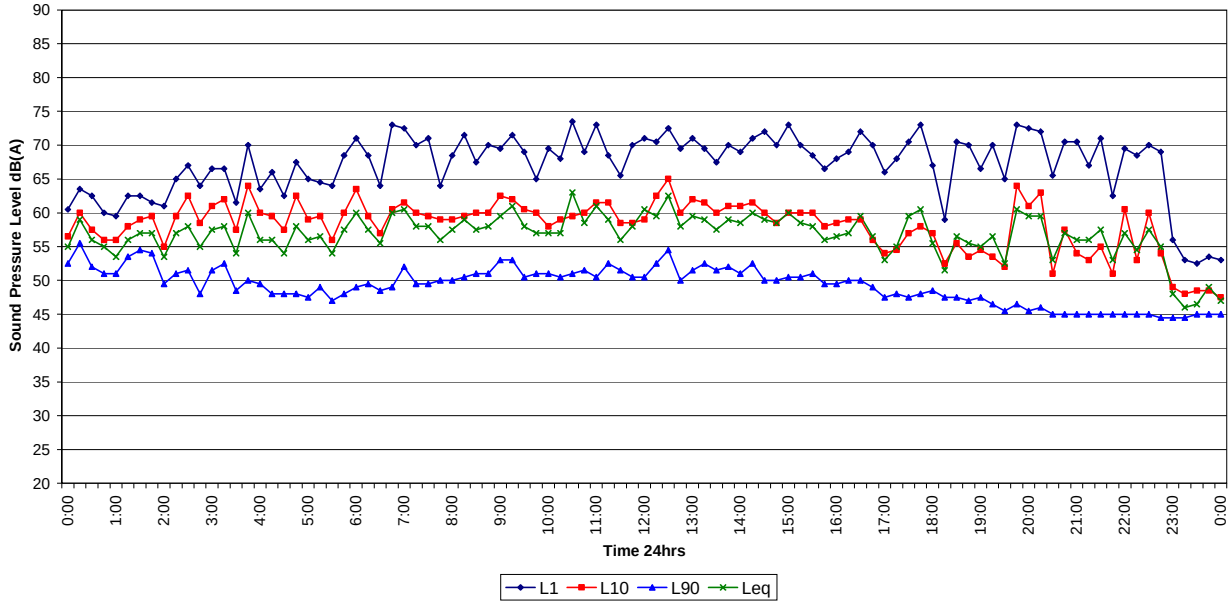
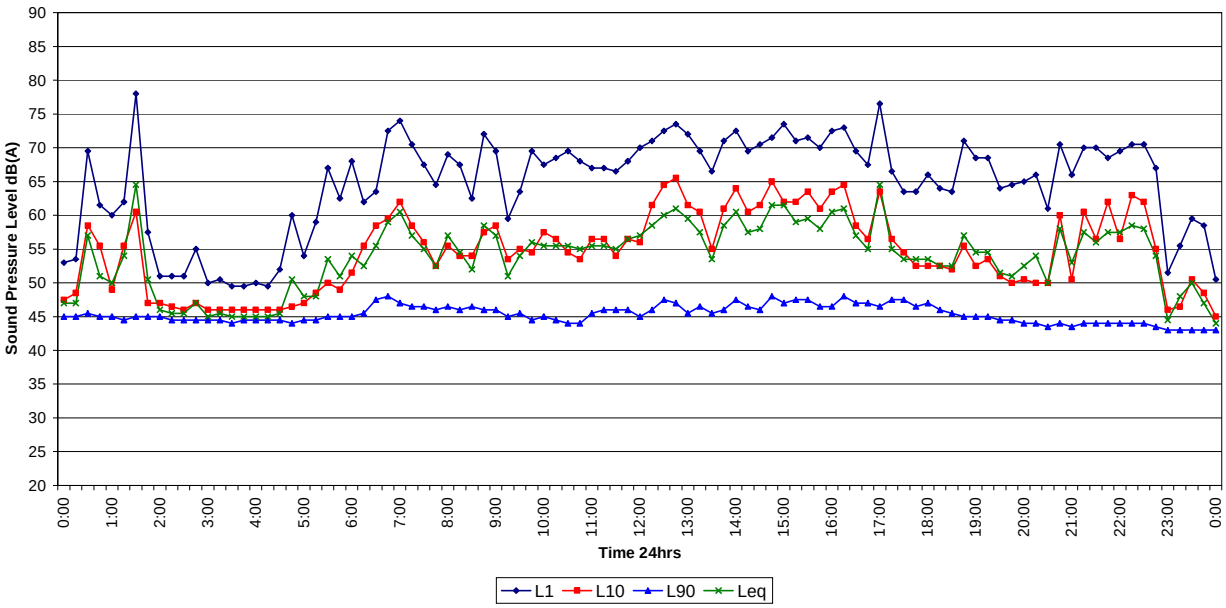
Friday 22/08/2008



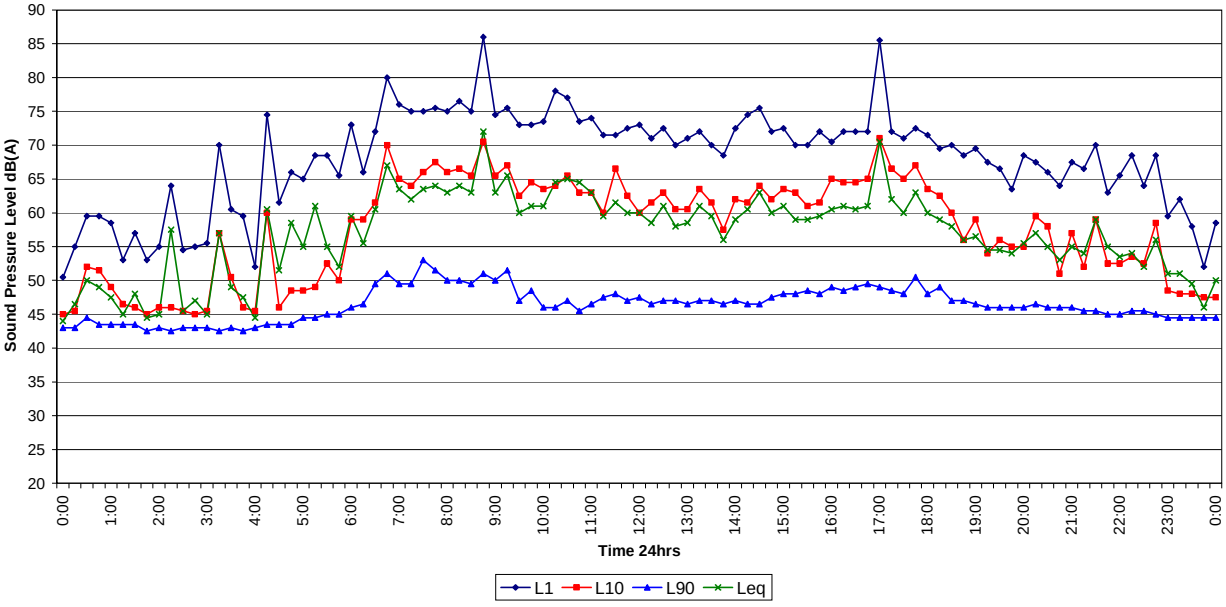
Saturday 23/08/2008

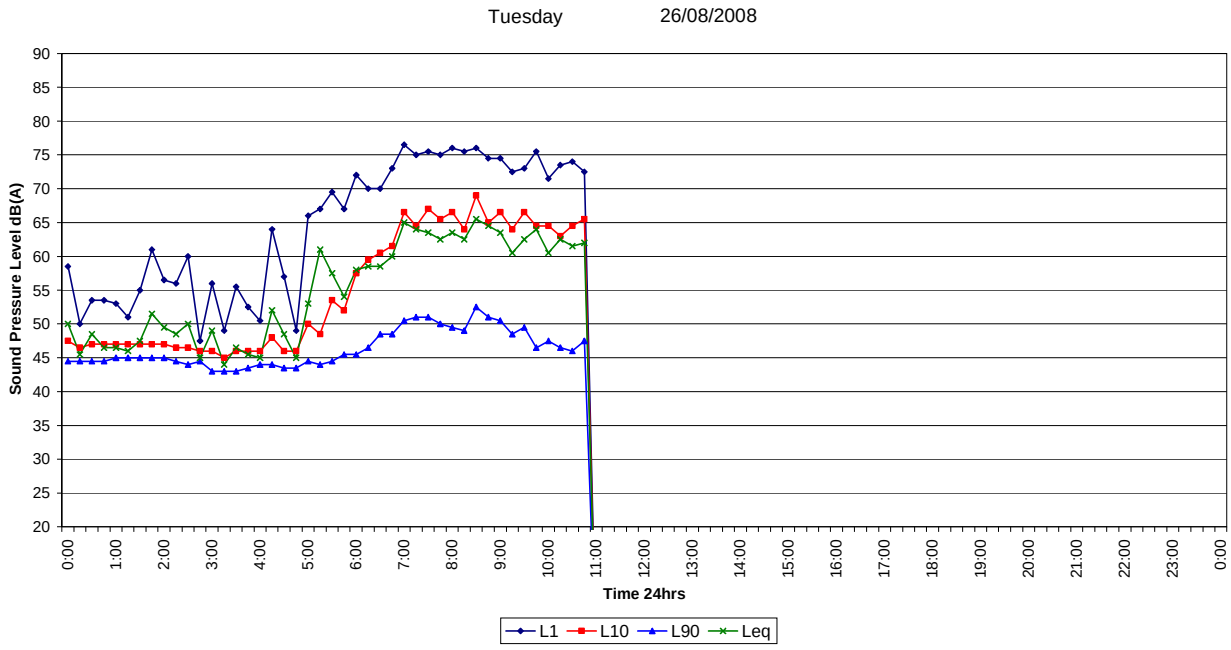


Sunday 24/08/2008

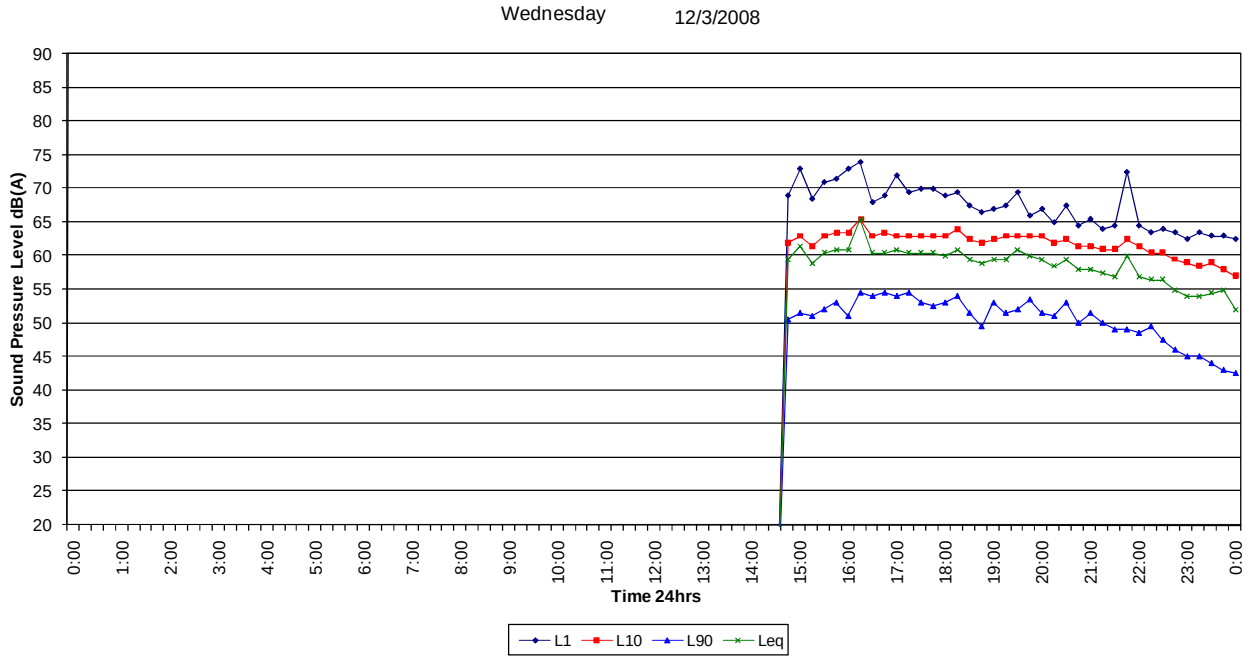


Monday 25/08/2008

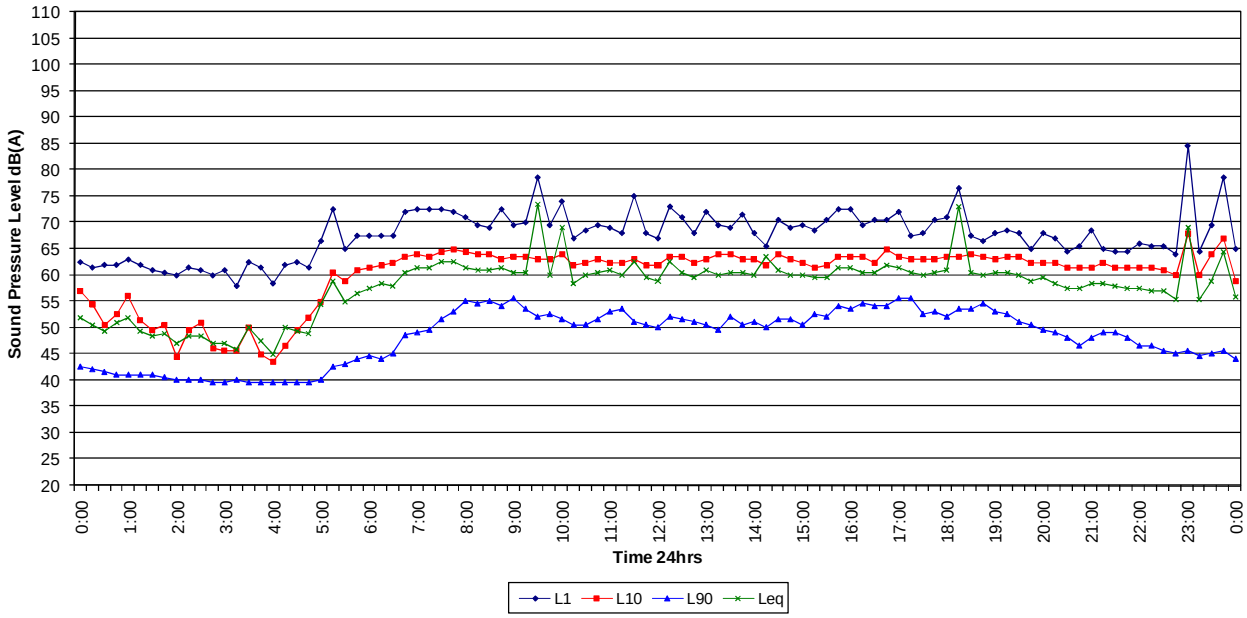



Tuesday 26/08/2008
Sound Pressure Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time 24hrs
L1
L10
L90
Leq

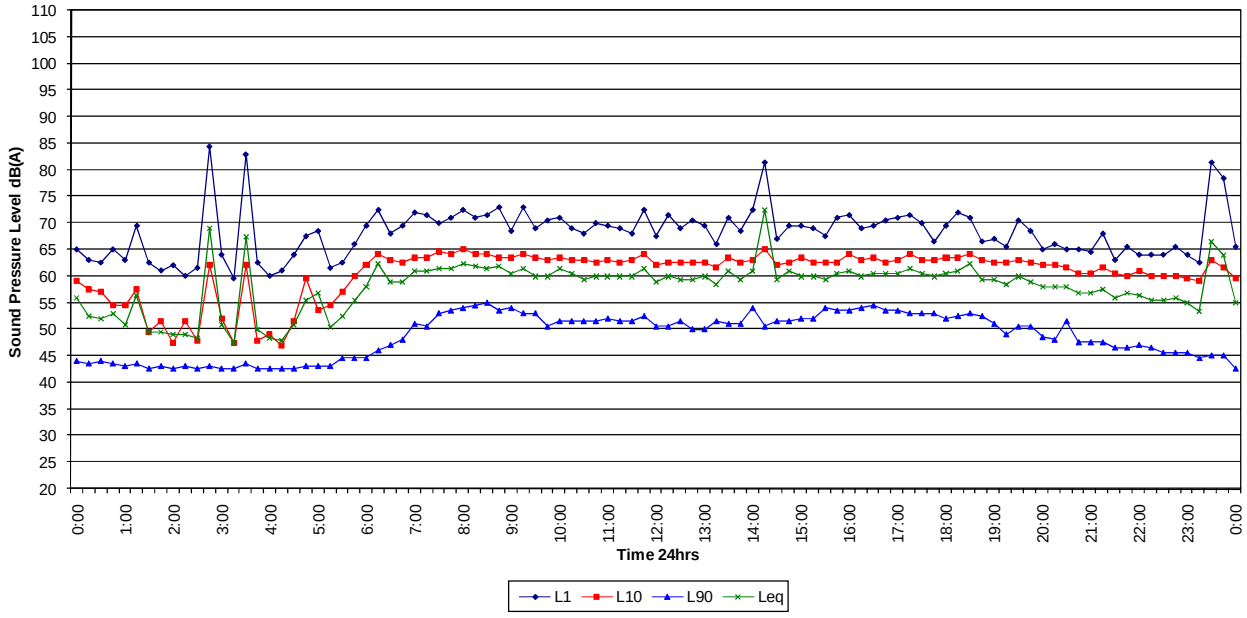
Appendix B: – Noise logger data results at location 1



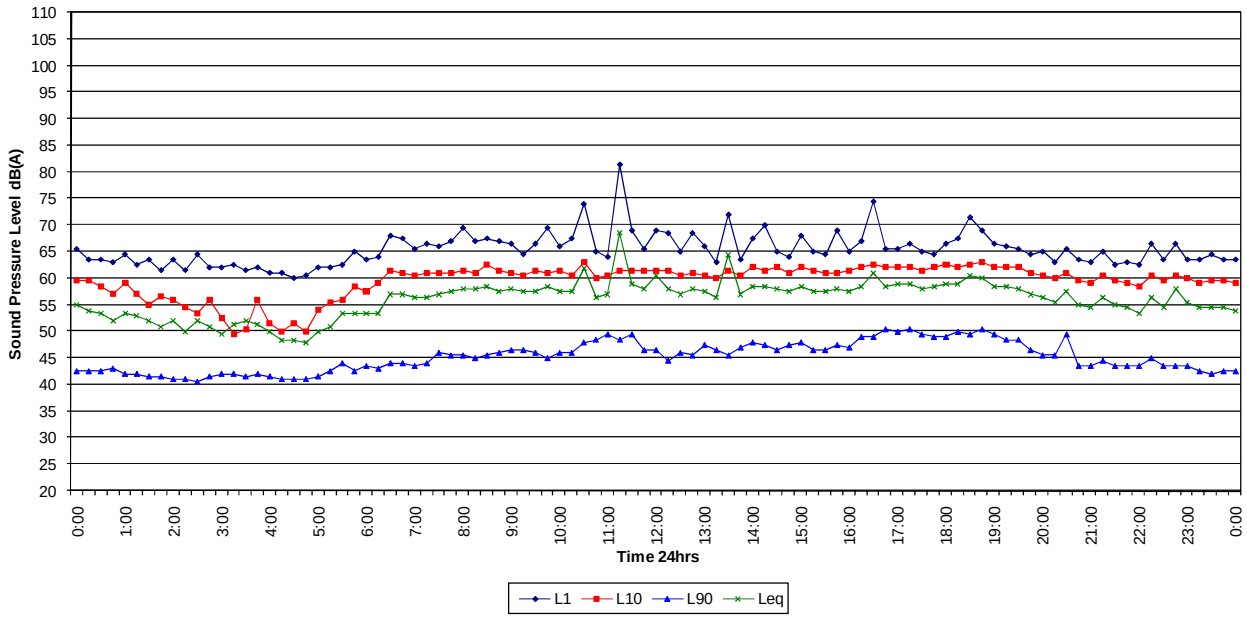
Thursday 12/4/2008



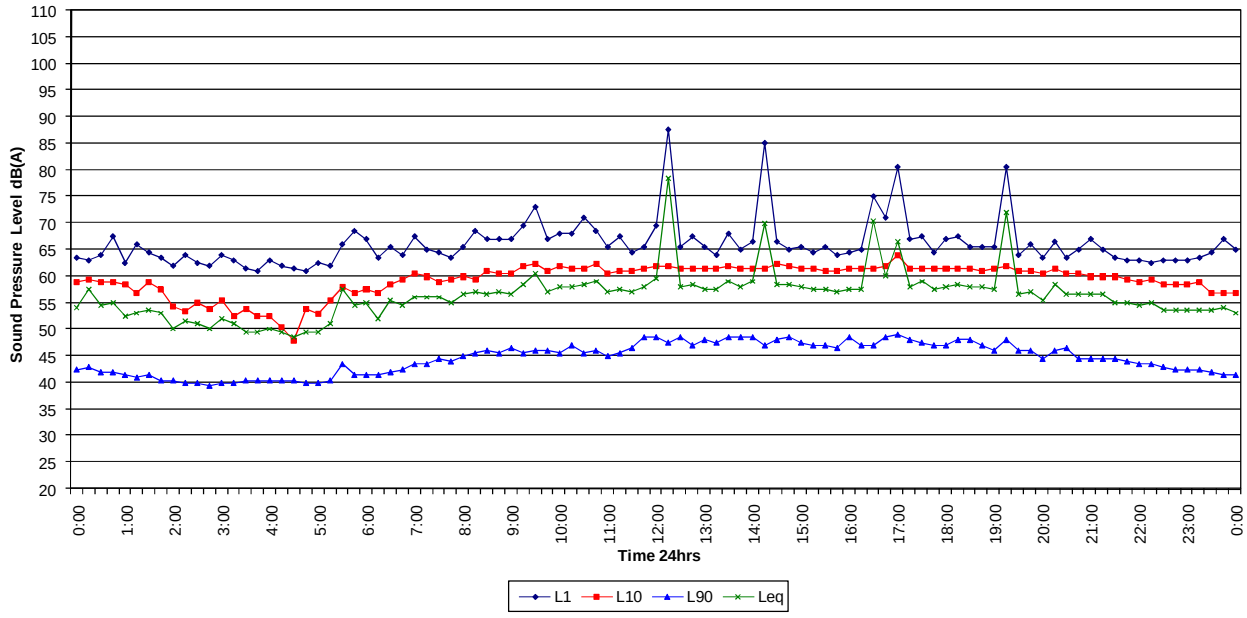
Friday 12/5/2008



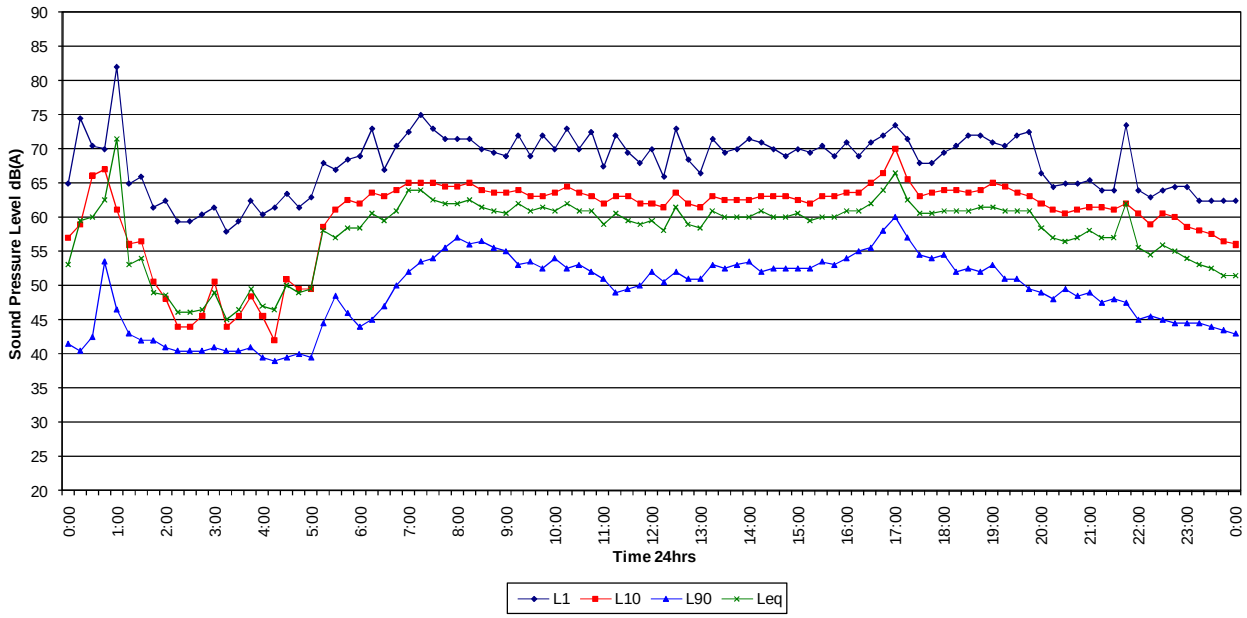
Saturday 12/6/2008



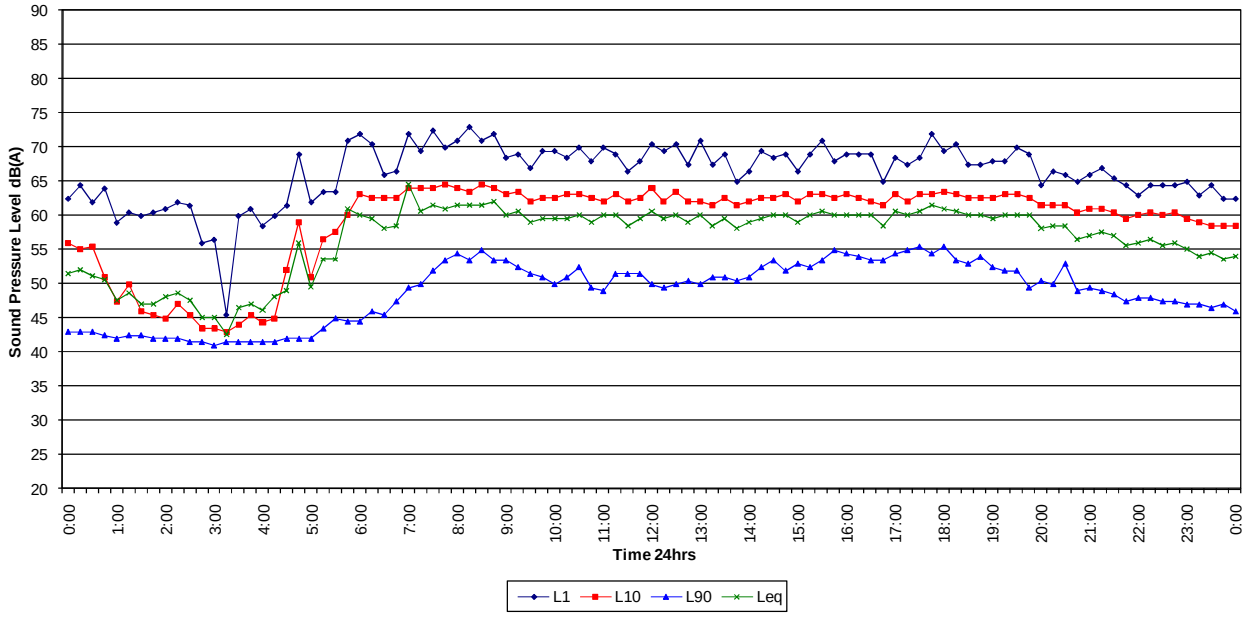
Sunday 12/7/2008



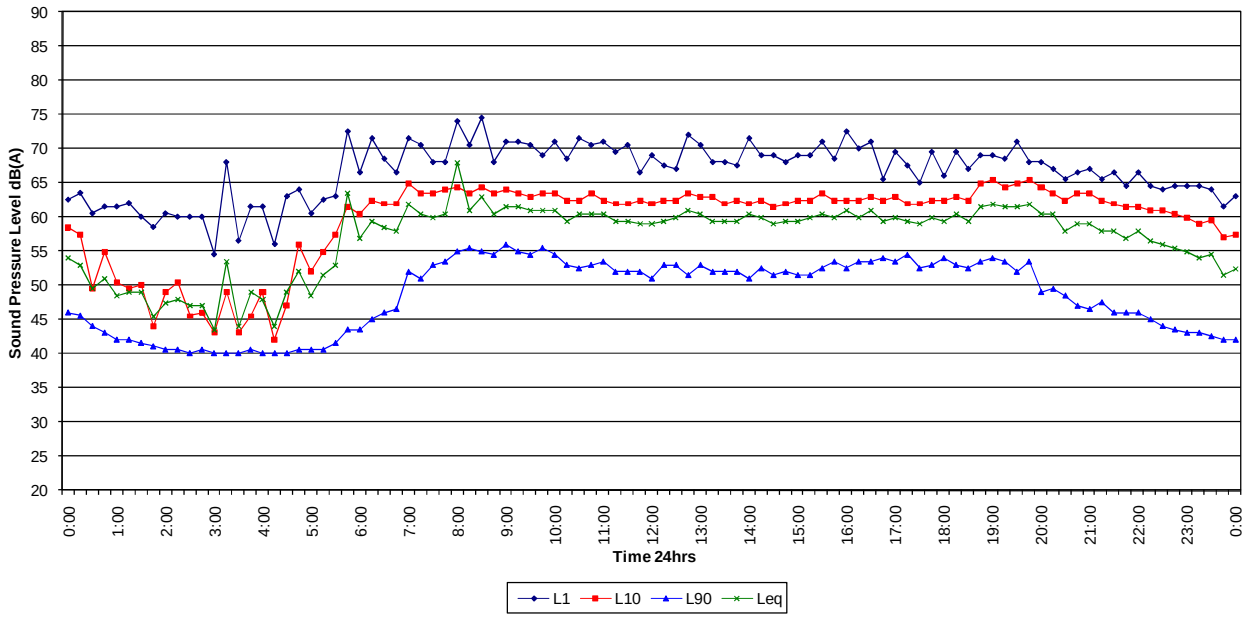
Monday 12/8/2008



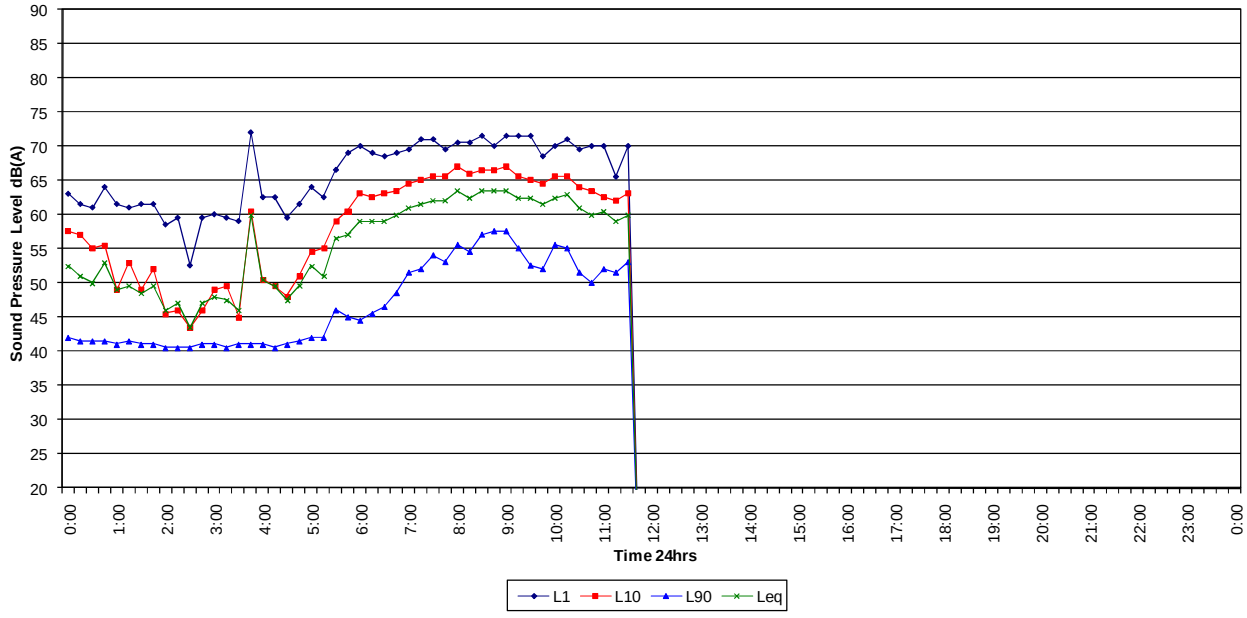
Tuesday 12/9/2008



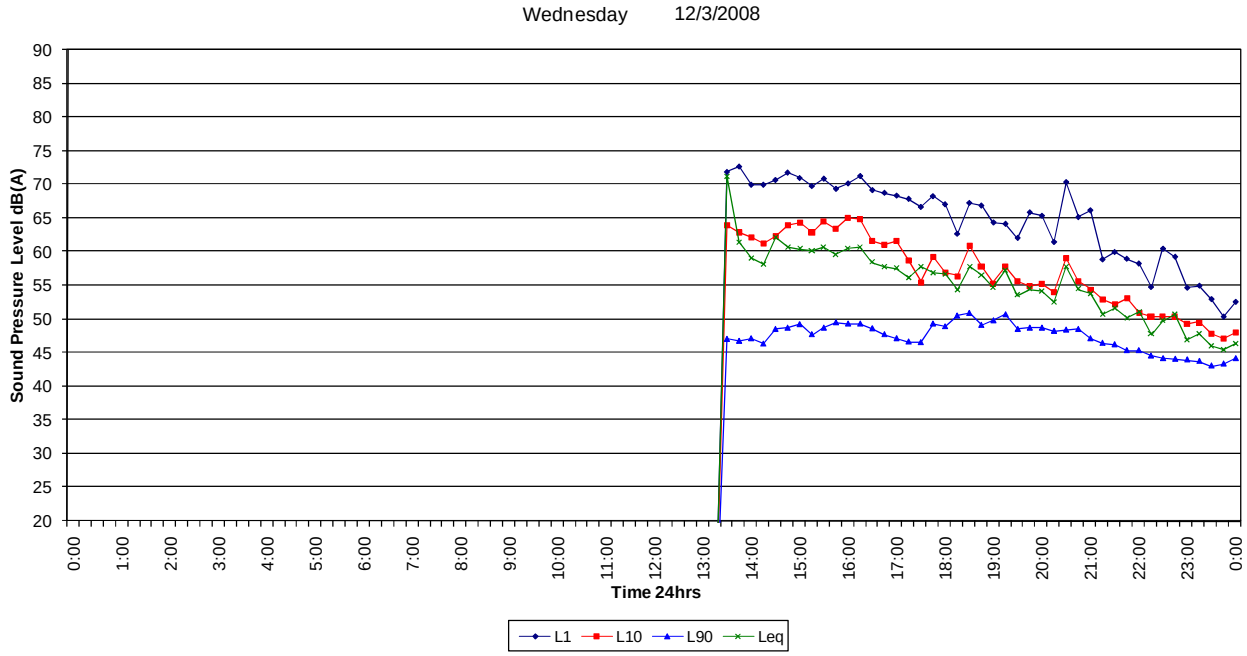
Wednesday 12/10/2008

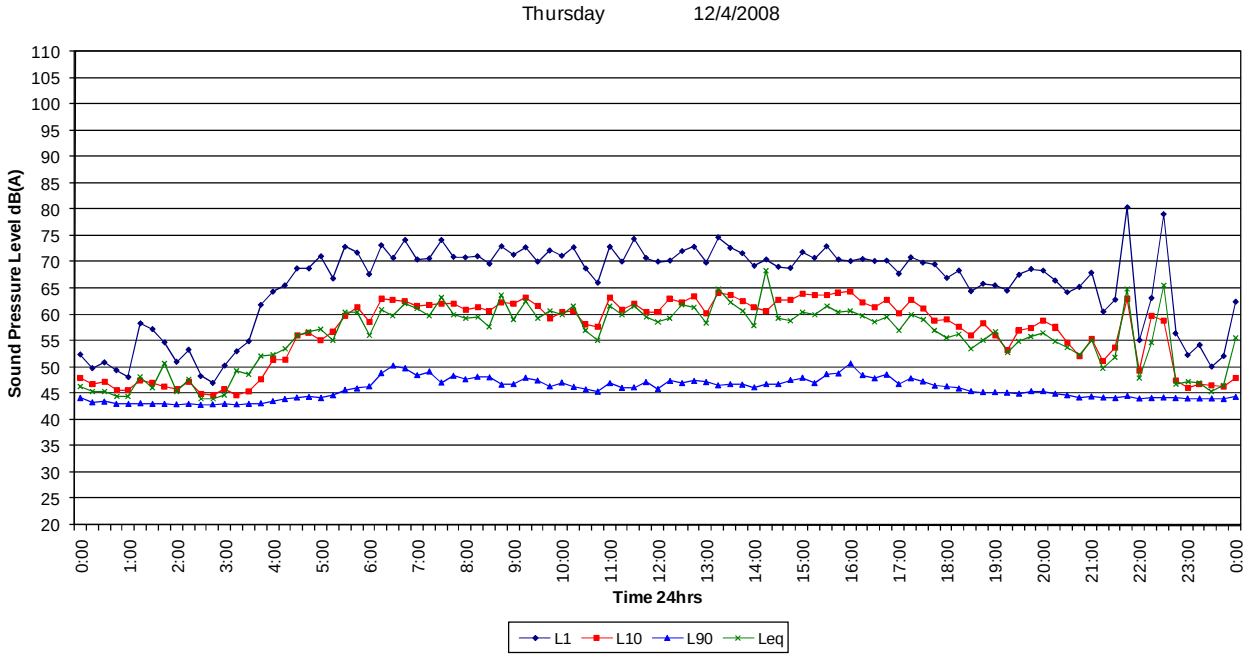


Thursday 12/11/2008

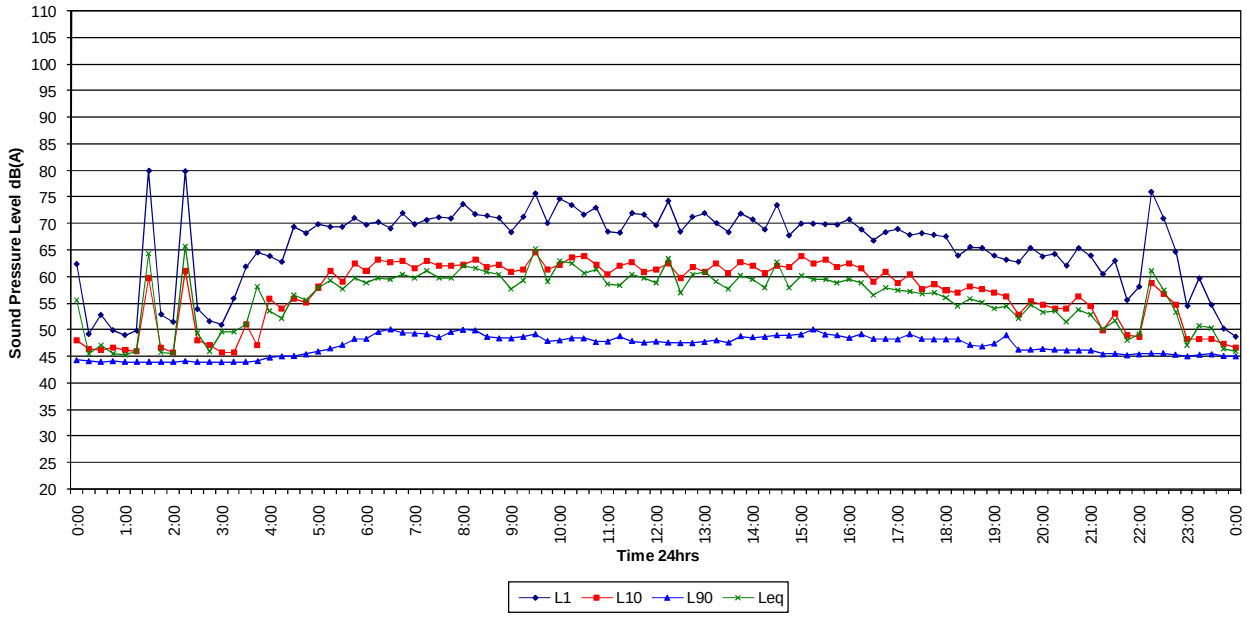


Appendix C: – Noise Logger data results at location 2

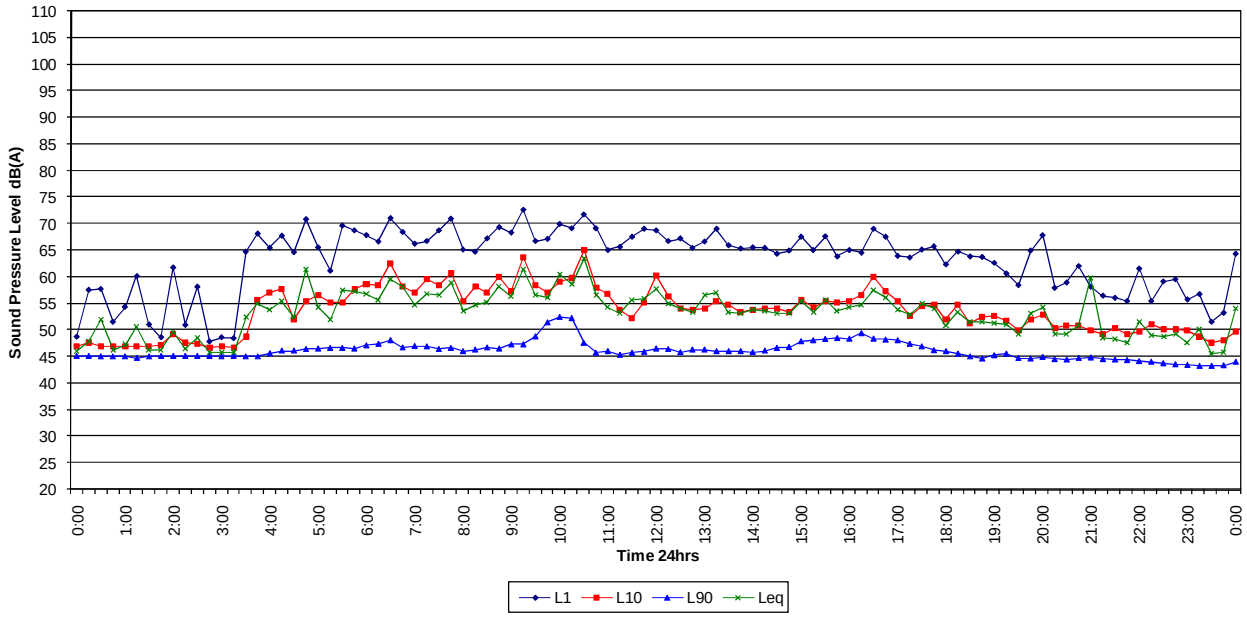




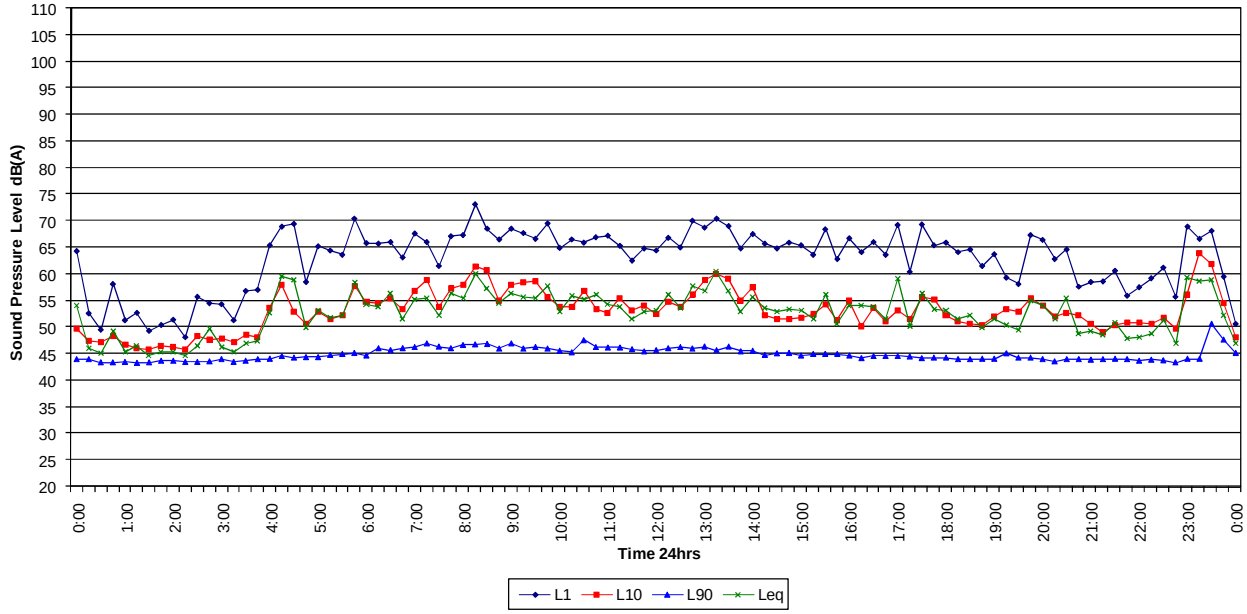
Friday 12/5/2008



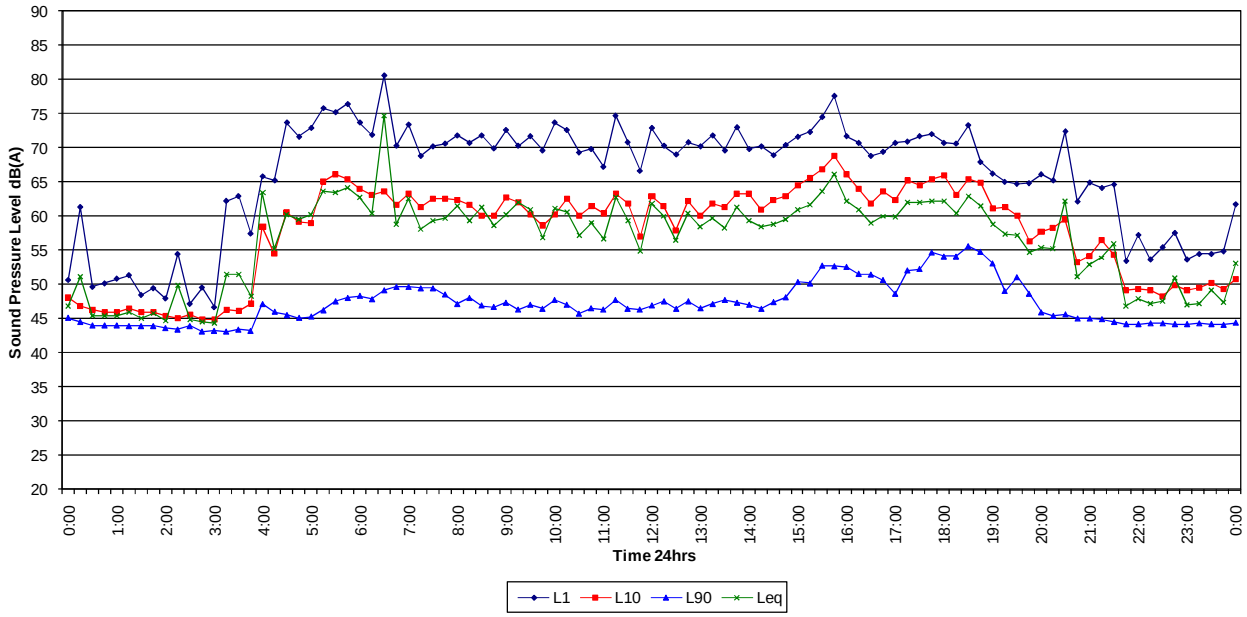
Saturday 12/6/2008



Sunday 12/7/2008



Monday 12/8/2008



Tuesday 12/9/2008