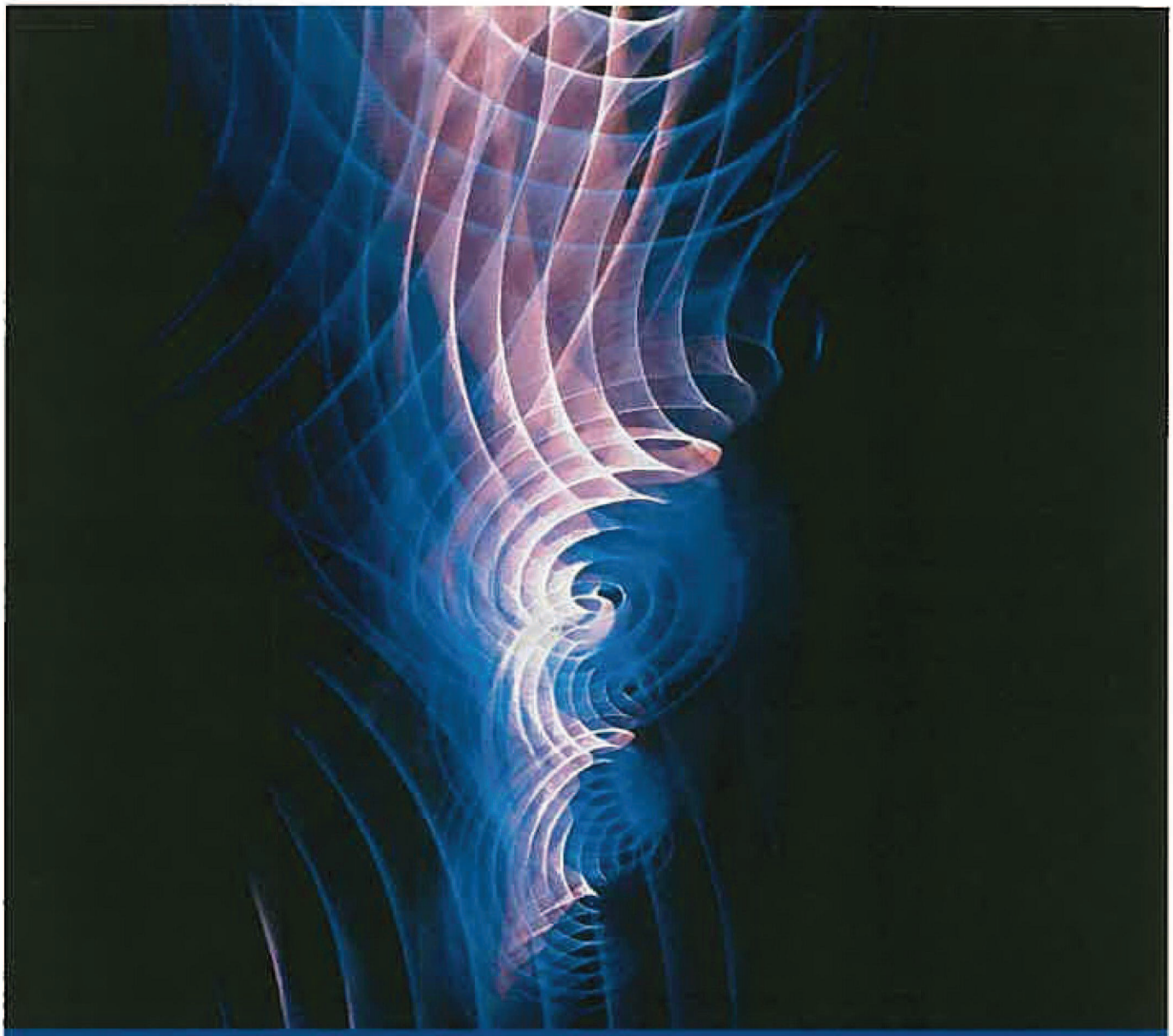
# APPENDIX G

## Noise Impact Assessment

gln planning



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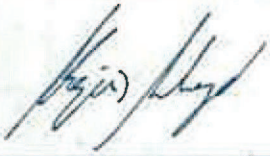
WSP

# MANLY RESERVOIR - FAIRLIGHT

## Noise Impact Assessment

04/12/2013

# Quality Management

| Issue/revision | Issue 1 | Revision 1 | Revision 2 | Revision 3 |
|---|---|---|---|---|
| Remarks | Issue | | | |
| Date | 04/12/2013 | | | |
| Prepared by | D Rowe | | | |
| Signature |  | | | |
| Checked by | K Lloyd | | | |
| Signature |  | | | |
| Authorised by | A Campbell | | | |
| Signature |  | | | |
| Project number | ACG131200 | | | |
| Report number | | | | |
| File reference | | | | |

# Manly Reservoir - Fairlight
## Noise Impact Assessment

04/12/2013

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# 1 Introduction

WSP Acoustics has been appointed by Sydney Water Corporation to provide a noise impact assessment supporting a Rezoning Application for the site from "Special Uses" to "Residential" type zoning. The site is the Manly Reservoir owned by Sydney Water located on the corner of Ashley Parade and Fairlight Street, Fairlight, NSW.

This Noise Impact Assessment addresses the following acoustic items:

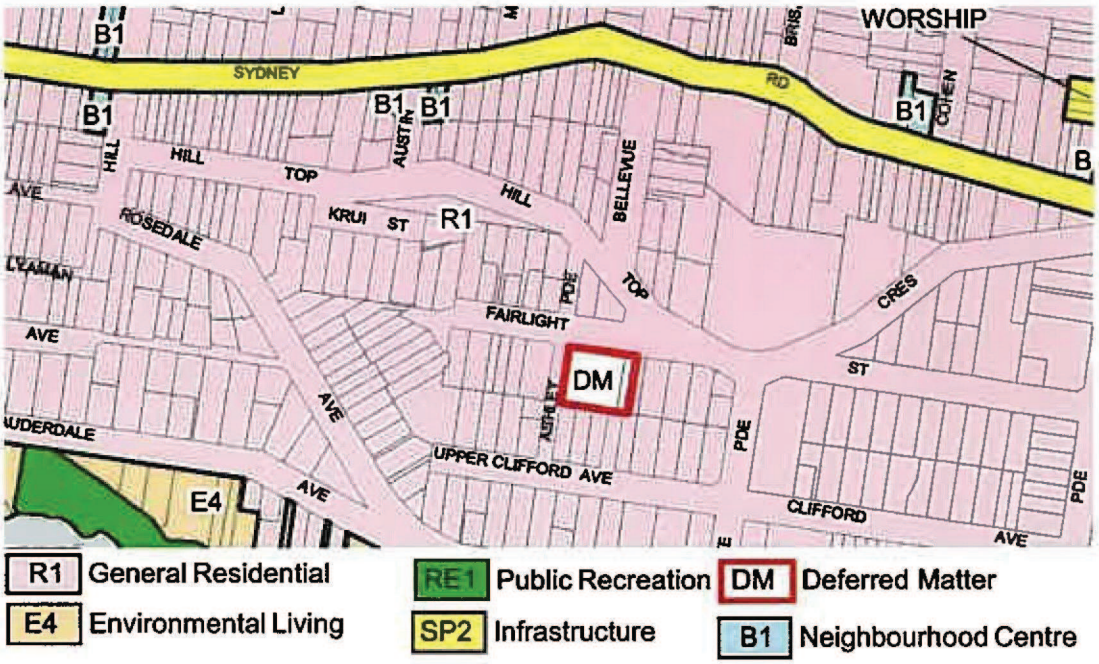
- Local and state criteria
- Noise ingress to the development
- Noise egress from the development
  - Noise from increased traffic
  - Noise from mechanical equipment located on site

# 2 Subject Site Description

The site in question is located on Fairlight Street, Fairlight, NSW. Currently the site is an unused water reservoir and it is proposed to change the zoning of the site from "Special Uses" to "Residential". The site is situated in a predominantly residential area, bounded by residential properties to the south and east, Fairlight Street to the north and an access way from Ashley parade to the west.

**Figure 2-1 - Site Location**


**Figure 2-2 - Manly council– Local Environment Plan 2013 – Sheet LZN_003**



# 3 Noise Survey

Noise measurements and observations were undertaken on site to determine the prevailing noise environment. Extended period log measurements were taken on the north-east side of the site highlighted in the figure below. This survey was undertaken on the 25th through to the 31st of October 2013.

The primary source of noise observed on site was traffic on Hilltop Crescent to the north.

**Figure 3-1 - Extended period log measurement location**


The measurements of noise made during this visit were conducted in accordance with AS 1055 "*Acoustics—Description and Measurement of Environmental Noise*". Class 1 sound level meters as described by IEC 61672-01:2002 were used.

The equipment used during the survey is as follows;

**Table 3-1 - Equipment used**

| Equipment Description | Manufacturer & Type No. | Serial No. | Calibration Due Date |
|---|---|---|---|
| Sound Level Meter | NTI XL2 | 05718 | 01/10/2014 |
| Microphone | M2210 | 2408 | 01/10/2014 |
| Calibrator 1 | Pulsar Model 105 | 55041 | 21/10/2014 |

The sound level meter was fitted with a windshield during the survey and was calibrated prior to, and on completion of the survey with the associated acoustic calibrator listed above. No significant calibration drift occurred.

## 3.1 Results

The following table summarises the key results of the logged noise survey relevant to this noise assessment.

Note, L90 is generally considered to reflect the background noise level, as it is the sound pressure level exceeded for 90% of the measurement period.

**Figure 3-2 - Log measurement - Summary of results for assessment**

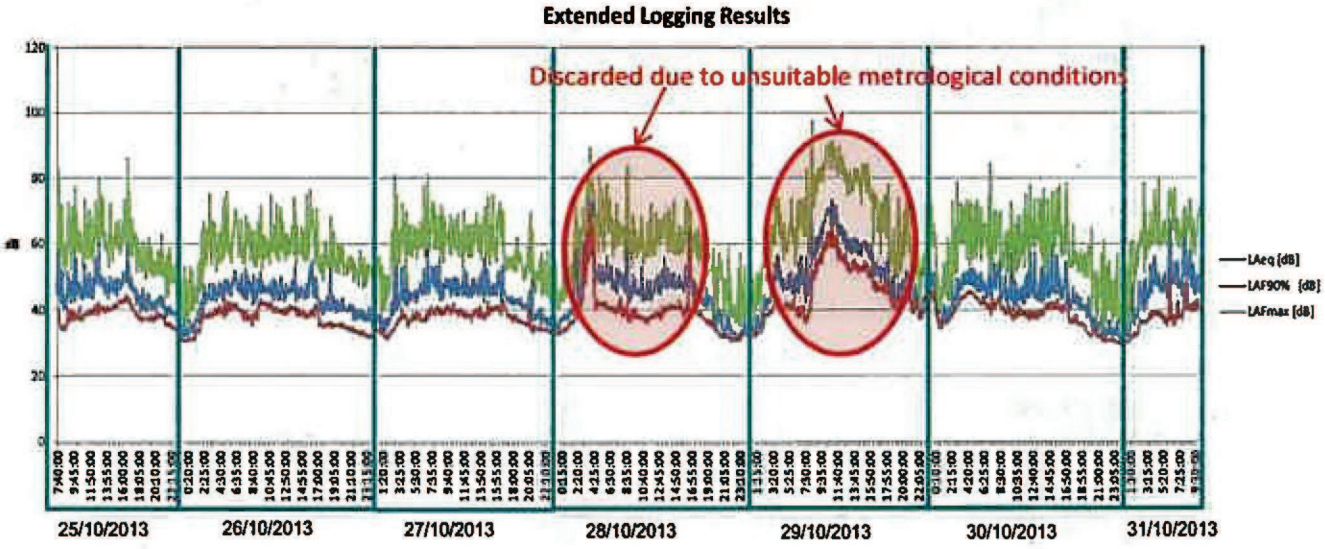
| Classification | Time of Day | $L_{Aeq,T}$ (dB) | $L_{A90,T(min)}$ (dB) | Period. *T* (hh:mm) |
|---|---|---|---|---|
| Day time | 0700 hrs – 1800 hrs | 47 | 35 | 00:15 |
| Evening | 1800 hrs – 2200 hrs | 41 | 30 | 00:15 |
| Night time | 2200 hrs – 0700 hrs | 42 | 30 | 00:15 |

Daily noise logging results are shown in the appendix. The following figure shows the extended noise logger results.

Meteorological conditions for the duration of the noise survey were primarily conducive to the measurement of environmental noise. Where windy and wet days occurred within the extended period measurements, these have been excluded from the results and highlighted in the figure below. This is in accordance with the methodologies contained in Australian Standard 1055-1:1997 "*Acoustics – Description and Measurement of Environmental Noise. Part 1 – General Procedures*"

The sound level meter was fitted with a windshield during the survey and was calibrated prior to, and on completion of the survey with the associated acoustic calibrator listed above. No significant calibration drift occurred, i.e., the difference between the 2 calibration readings was below 0.3 dB.

**Figure 3-3 - Extended period measurements**



# 4 Assessment Criteria

The following criteria have been established based on the following documents;

- Environmental Protection Authority (EPA) – *NSW Industrial Noise Policy 2000* (INP)
- NSW Government – Environment, Climate Change & Water – *NSW Road Noise Policy 2011* (RNP)
- Australian Standards 2107:2000 – *Acoustic recommended design sound levels and reverberation times* (AS2107:2000)

The INP document outlines procedure to assess noise from industrial noise sources, while the RNP outlines procedures to assess road traffic noise generated by the proposed development.

Noise ingress to the site has been assessed in accordance with AS2107:2000 – *Acoustic recommended design sound levels and reverberation times.*

## 4.1 Industrial Noise Policy

The following criteria have been taken from the EPA NSW *Industrial Noise Policy 2000* and are designed to protect the acoustic amenity of the surrounding residences and community.

The assessment procedure for industrial noise sources has two components:

1. Controlling intrusive noise impacts in the short term for residences.
2. Maintaining noise level amenity for particular land uses for residences and other land uses.

Of the two components the more onerous (for the relevant land use) becomes the project specific noise criteria that should be applied to any development on the site.

### 4.1.1 Component one - Intrusive noise

Controlling **intrusive noise** impacts in the short term for residences:

> *Such that, the equivalent continuous noise level ($L_{Aeq}$) of the noise source/sources under consideration should be no more than 5dB over the background noise level.*
>
> $LAeq, 15\,\text{min} \leq rating\ background\ level\ plus\ 5$

$L_{Aeq,15minute}$ represents the equivalent continuous (energy average) A-weighted sound pressure level of the source over 15 minutes.

### 4.1.2 Component two – Amenity

The Amenity component aims to maintain noise level **amenity** for particular land uses for residences and other land uses.

To limit continuing increases in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the Acceptable Noise Levels (ANL) specified in *'Table 2.1 Amenity criteria'* of the INP. To meet this, a correction factor, determined by the existing noise environment, is applied to the ANL. This ensures that the ANL for the area is met, protecting against noise impacts such as speech interference, community annoyance and, to some extent, sleep disturbance.

The site in question has local traffic with characteristically intermittent traffic flows. Therefore, the indicative noise amenity area is classed as 'Suburban' and the type of receiver, 'Residence'. With the relevant corrections applied, the amenity criteria are included in Table 4-1 below.

### 4.1.3 Project specific noise criteria

Of the two components (4.1.1 and 4.1.2) the more onerous becomes the project specific noise criteria that should be applied to any residential development on this site.

**Table 4-1 - Project Specific Criteria**

| Time Period | Measurement Results dB $L_{Aeq,\ 15\ minute}$ | Intrusiveness Criteria dB $L_{Aeq(15min)}$ | Amenity Criteria dB $L_{Aeq,t}$ | Project Specific Criteria dB $L_{Aeq,t}$ |
|---|---|---|---|---|
| Day (0700 – 1400) | 47 | 52 | 55 | 52 |
| Day - Sunday and Public Holidays (0600 – 1400) | 47 | 52 | 55 | 52 |
| Evening (1400 – 2200) | 41 | 46 | 43 | 43 |
| Night (2200 – 0700) | 42 | 47 | 38 | 38 |

## 4.2 Road Noise Policy

To assess the effect of the increase of traffic on the nearby residences, NSW Government –*NSW Road Noise Policy 2011* (RNP) provides objective criteria. The relevant criteria have been drawn out of the policy and detailed below.

Noise generated by additional traffic on the road is to be assessed against façade corrected noise levels when measured in front of a building façade.

**Table 4-2 - Extract from RNP Section 2.3.1- Noise assessment criteria - residential land uses**

| Project type/land use | Assessment Criteria (dBA) | |
|---|---|---|
| | Day (7am-10pm) | Night (10pm-7am) |
| Land use development with potential to create additional traffic on local roads | $L_{Aeq\ (1\ hour)}$ 55 (external) | $L_{Aeq\ (1\ hour)}$ 50 (external) |

## 4.3 Noise Ingress

The criteria for internal ambient noise form the basis of the noise ingress analysis and are designed to protect the amenity of a development's future occupants.

The following criteria have been tabulated in accordance with guidance contained within *AS 2107:2000 - Acoustic recommended design sound levels and reverberation times*.

These are the combined levels from external noise ingress and any building services systems.

**Table 4-3 - Excerpt of relevant criteria from AS2107:2000 Table 1**

| Type of Residential Space (Developments Near Minor Roads) | AS/NZS 2107 Recommended Noise Levels, dB $L_{Aeq,15min}$ | |
|---|---|---|
| | Satisfactory | Maximum |
| Sleeping areas | 30 | 40 |
| Living areas | 30 | 35 |
| Common rooms (dining, lounge, activity, foyer) | 45 | 55 |

# 5 Assessment

This assessment is based on a zoning type of "Residential" and demonstrates how compliance of the criteria in Section 4 can be achieved for this type of land use.

## 5.1 Plant noise emissions

All noise emitting equipment to be on site will be designed to not exceed the Project Specific Criteria stated in Section 4.1.3 as measured at the most affected noise sensitive receiver.

This can be achieved with consideration in the selection, design and placement of all mechanical equipment that emit noise. However, where equipment is in excess of these criteria, acoustic mitigation can be provided, these measures may include, but are not limited to;

- Careful placement of equipment
- Attenuators
- Noise barriers
- Acoustic louvres
- Acoustic absorption

## 5.2 Road noise policy

Traffic flow information for an example residential development, based on 13 car spaces, has been provided by the Traffic Engineering Report by Traffix, *TRAFFIX SW Fairlight – Traffic Statement - Reference: 13.436l0v4* 27th November 2013. Within this report the traffic flow for peak hour was predicted as 5 cars per hour for the analysed development scenario.

The calculation has considered a peak hour scenario occurring during the night period. This is a worst case scenario, and demonstrates the limited impact of the additional traffic movement on the immediate area.

The following assumptions have also been used in the calculation of the assessment results;

- The car has been assumed to pass by the closest noise sensitive receiver at 1 meter.
- Cars are at a constant distance from the façade for the duration of their pass-by. This is a worst case as the scenario.

Measurements of car movements have been conducted to inform this calculation. This data is provided below and detailed calculations have been attached in Appendix A.

**Table 5-1 - Car movement data used within calculation**

| | Octave band centre frequency (Hz) | | | | | | | | dBA |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | |
| Car passing by at 3 3m within a carpark (dB Leq) | 64 | 62 | 54 | 53 | 54 | 52 | 43 | 37 | 58 |

The following table shows the comparison of the predicted noise levels and the RNP criteria based on the example residential development's predicted car movements.

**Table 5-2 - RNP traffic increase assessment**

| RNP assessment requirement | | Predicted level at 1m from roadway | Meets RNP criteria |
|---|---|---|---|
| Day (7am-10pm) | 55 dB $L_{Aeq, (1\ hour)}$ | 45 dB $L_{Aeq, (1\ hour)}$ | Yes |
| Night (10pm-7am) | 50 dB $L_{Aeq, (1\ hour)}$ | 45 dB $L_{Aeq, (1\ hour)}$ | Yes |

Based on the RNP assessment and the predicted traffic flow increases of an example residential development, there is no negative noise impact predicted due to traffic associated with a residential development on this site when assessed in accordance with the relevant NSW policy.

## 5.3 Noise ingress

As the prevailing noise environment is considered low noise, ingress to a residential development is negligible and the acoustic criteria stated in Section 4.3 can easily be achieved with standard building materials.

# 6 Summary

WSP Acoustics has been appointed by Sydney Water Corporation to provide a noise impact assessment supporting a Rezoning Application for the site from "Special Uses" to "Residential" type zoning. The site is the Manly Reservoir owned by Sydney Water located on the corner of Ashley Parade and Fairlight Street, Fairlight, NSW.

Currently the site is an unused water reservoir and it is proposed to change the zoning of the site from Special Uses to Residential. The site is bounded by residential properties to the south and east, Fairlight Street to the north and has site access from Ashley parade on the west side.

Assessments have been taken in full accordance the following relevant NSW Policies and Australian Standards;

- Environmental Protection Authority (EPA) – *NSW Industrial Noise Policy 2000* (INP)
- NSW Government – Environment, Climate Change & Water – *NSW Road Noise Policy 2011* (RNP)
- Australian Standards 2107:2000 – *Acoustic recommended design sound levels and reverberation times* (AS2107:2000)

Full compliance with the criteria outlined in these polices has been demonstrated. As such, it has been found that the proposed re-zoning of the site will have no adverse noise impacts on either the surrounding properties or the residents of any proposed future development on the site.

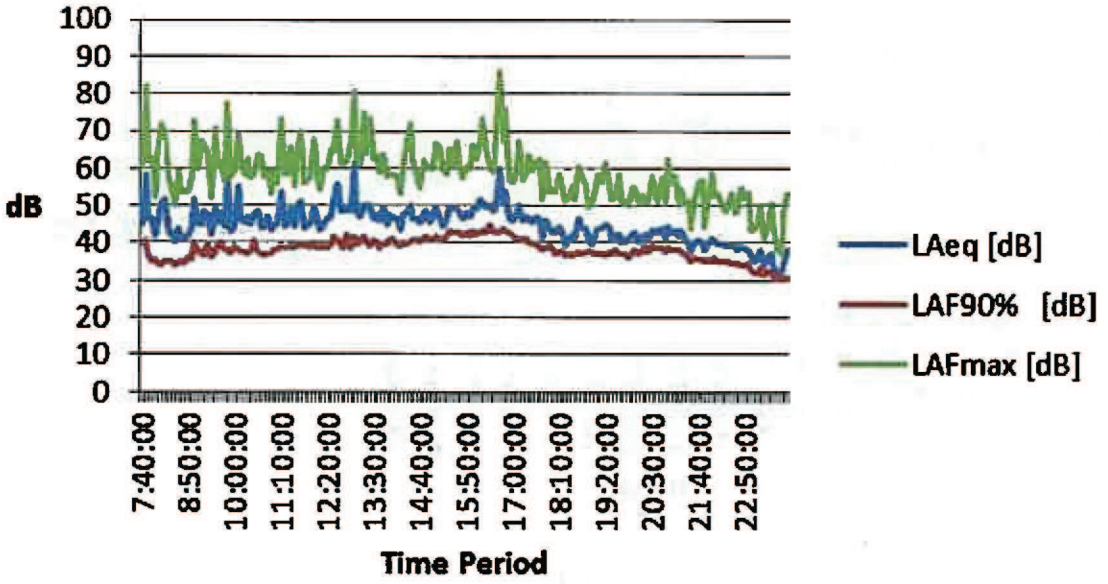
# Appendix A Calculations

**Table A-1 - NSW Road Noise Policy - noise from additional traffic movements**

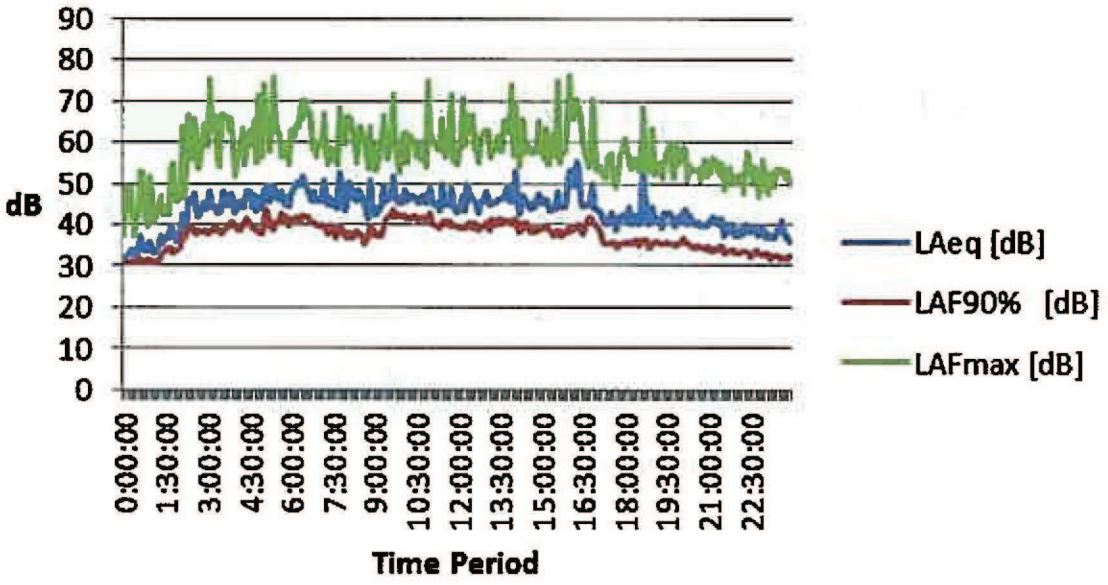
| Additional traffic movement noise | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Octave band centre frequencies (HZ) | | | | | | | | | | |
| | Quantity | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k | | dBA | |
| | | | | | | | | | | | | |
| Estimated No of Vehicles - Peak Hour | 5 | | | | | | | | | | | |
| Hours | 1 | | | | | | | | | | | |
| Car at 3.3m travelling slowly | 3.3 | 64 | 62 | 54 | 53 | 54 | 52 | 43 | 37 | | | |
| distance to receiver (m) | 1 | | | | | | | | | | | |
| distance correction | | 69 | 67 | 60 | 58 | 59 | 57 | 48 | 42 | | 63 | distance corrected SPL |
| | | | | | | | | | | | | |
| Duration (seconds) | 12 | | | | | | | | | | | |
| **1 hour - peak - worst case** | 5 | | | | | | | | | | | cars in or out |
| car duration correction | -17.8 | | | | | | | | | | | |
| SPL at receiver | | 51 | 49 | 42 | 41 | 41 | 39 | 31 | 25 | | 46 | duration corrected SPL |

# Appendix B Daily Noise Logging results

**25/10/2013**




**26/10/2013**



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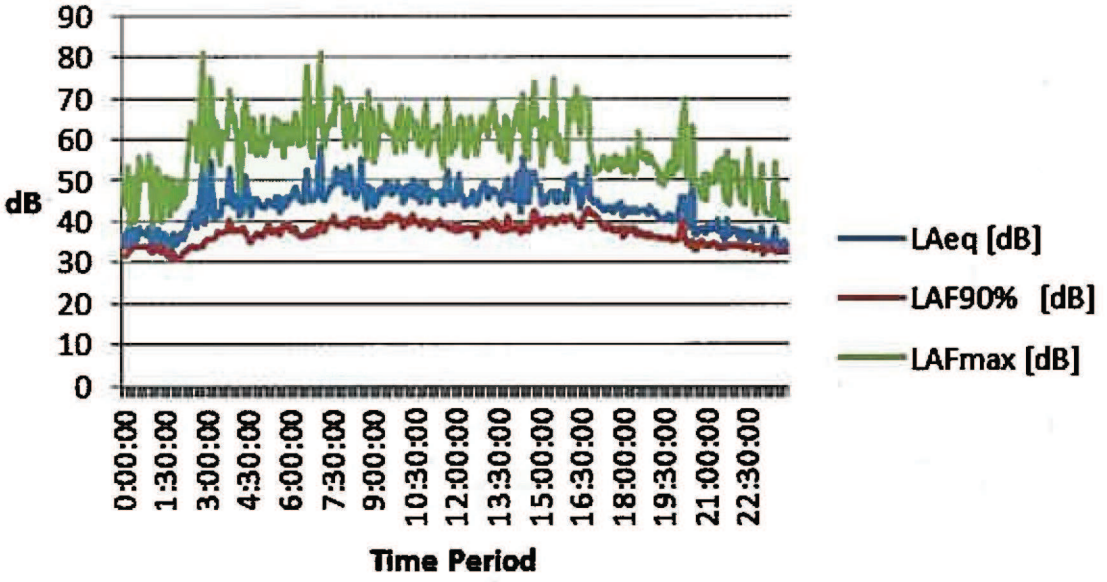


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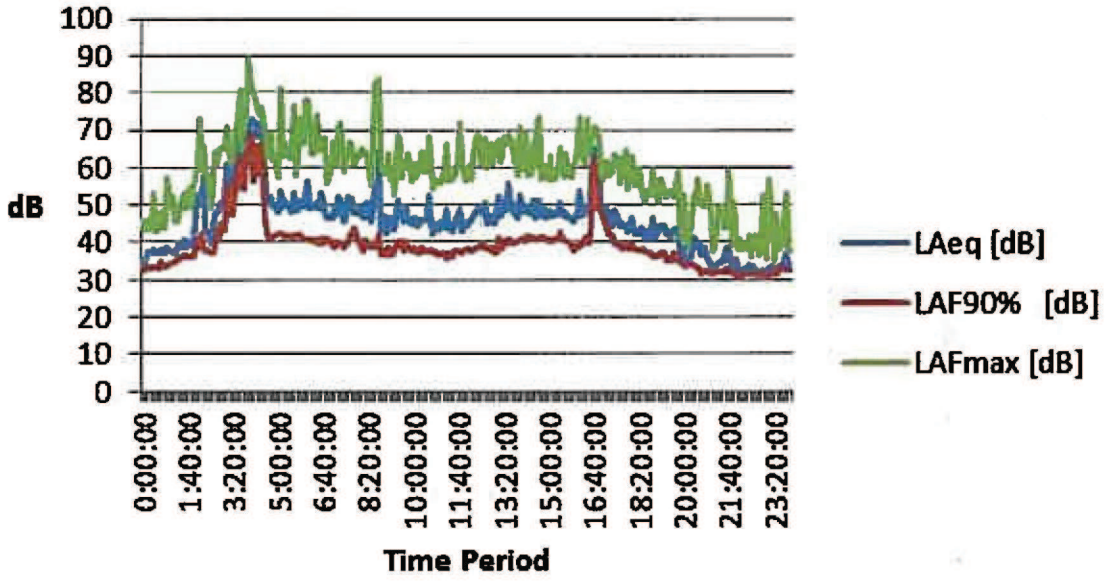

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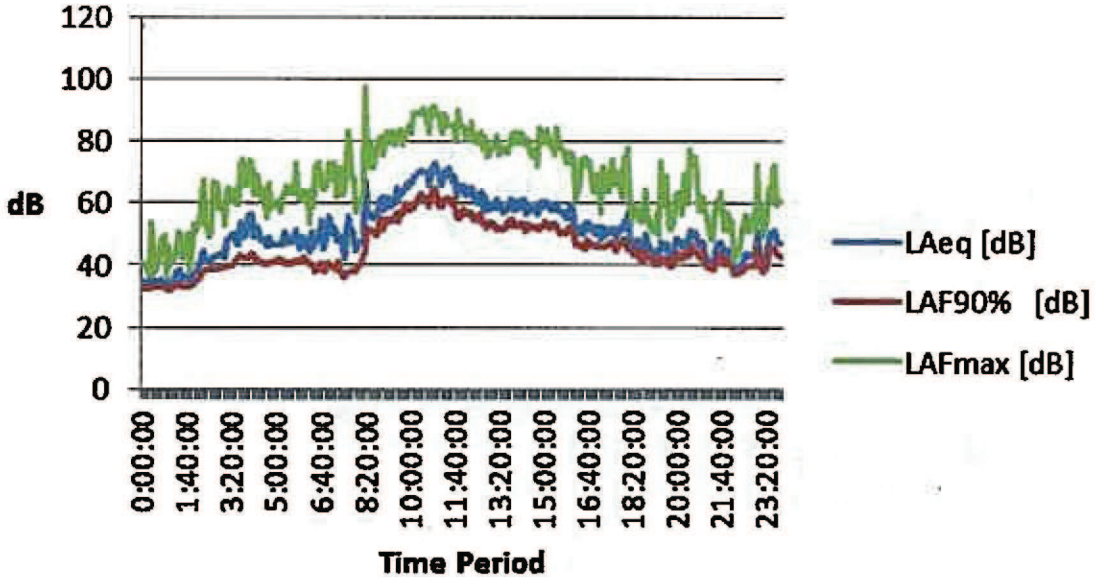


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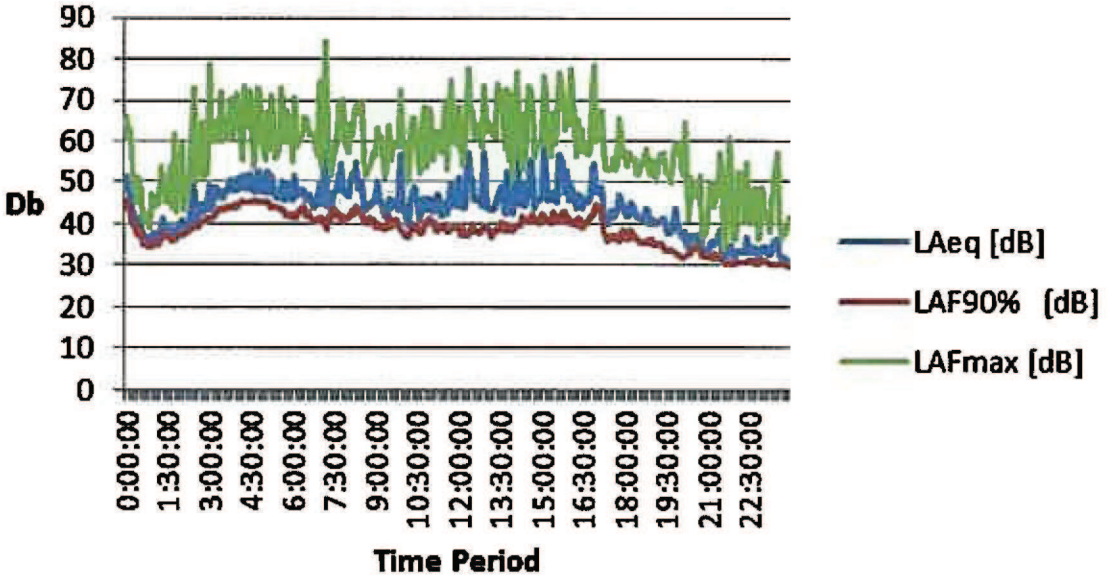

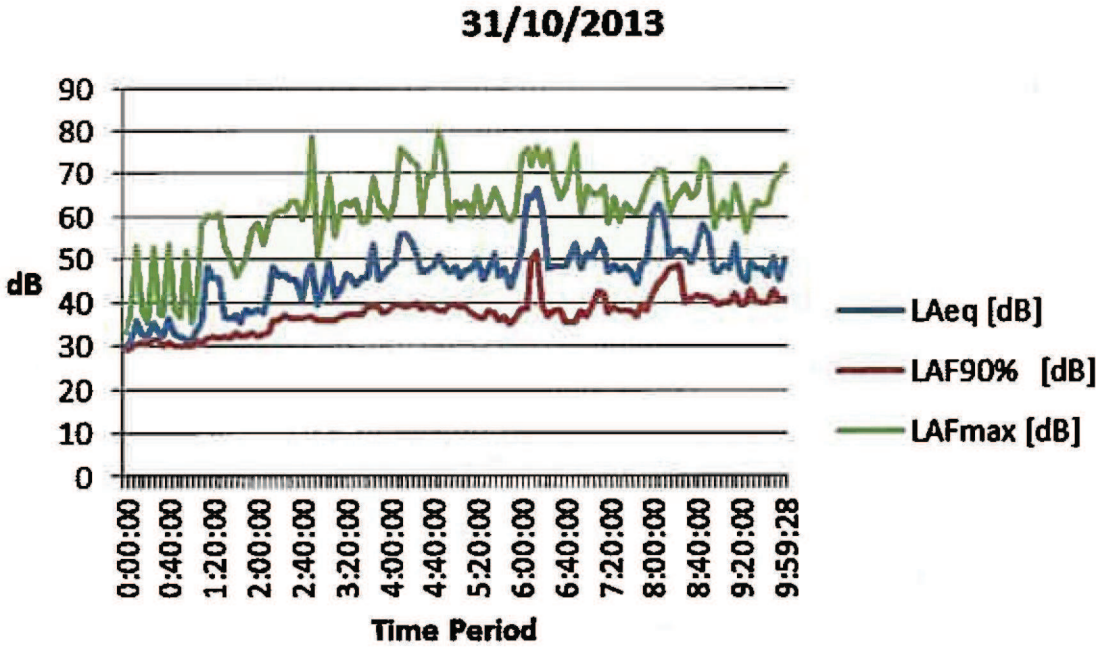
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