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7 PARKVIEW DRIVE, SYDNEY OLYMPIC PARK - BUILDING A

ACOUSTIC ASSESSMENT OF COMMERCIAL DEVELOPMENT

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Appendix 1 – Noise Logging Data

1. INTRODUCTION

This report presents our acoustic assessment of Building A of a mixed used development at 7 Parkview Place, Homebush.

This report has been prepared in order to satisfy the acoustic reporting requirements of the following:

- The Director General's Requirements.
- The Department of Environment and Climate Change.
- The Sydney Olympic Park Authority.

In this report we will:

- Identify environmental noise sources (noise from major events in the Sydney Olympic Park precinct, rail noise) and recommend acoustic treatments to reduce these impacts to acceptable levels.
- Identify noise emissions which will be generated by the site (primarily noise from external mechanical plant) and recommend acoustic and management controls in order to reduce noise impacts on nearby properties to levels complying with relevant acoustic criteria.

In each case, we will identify acoustic criteria to be used for assessment.

This report is based on the architectural plans by Turner and Associates as revised on November 2009.

2. SITE DESCRIPTION / PROPOSAL

The site is located at the eastern end of Parkview Place, Homebush. Building A is the first proposed building in a mixed use development consisting of 5 buildings (A to E) which will contain a mixture of commercial, retail and residential development.

Building A will consist of a multi storey development comprising approximately 12,068m² of net lettable area with two level basement car park.

Building A will be bounded as follows:

- To the west by a car park. This car park is also used for a period of approximately 2-3 weeks for year for rides at the Royal Eater Show.
- To the north by undeveloped land and the Brickpit.
- To east by a proposed commercial development (Building B of the 7 Parkview Place development).
- To the south by Murray Rose Avenue (to be constructed). On the opposite site of Murray Rose Ave will be Building C of the Parkview Place development (another commercial building).

Nearest residential development to the site are the proposed D and E buildings of the Parkview Place project.

Development in the vicinity of the site with the potential to create an acoustic impact on the site is as follows:

- The car park adjoining the site to the west, particularly when used for amusement rides during the Royal Easter Show.
- ANZ Stadium and the Sydney Showground, to the west of the site.
- Noise from the rail line serving the Olympic Park train station.

Potential noise sources associated with the development are:

- Noise from external mechanical plant (primarily roof top plant) which has the potential to adversely impact adjoining (existing and future) development.
- Noise during construction.

3. NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10} , L_{90} and L_{eq} .

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

4. BACKGROUND NOISE MONITORING

Ambient noise levels in the vicinity of the site were determined using long term, unattended noise logging conducted on site. This monitor was installed

Unattended noise monitoring was conducted between 11 and 16 March 2008 using an Acoustic Research Laboratories monitor set on A-weighted fast response mode. The monitor was calibrated before and after the measurements using a Rion Type NC-73 calibrator. No significant drift was recorded.

The long term noise logger was installed near the eastern property boundary of the site (away from existing commercial development in the vicinity of the site).

The long term logging data was collected as part of an assessment of an earlier scheme at this site in 2008, and background noise levels measured at this time will still be applicable now.

As an abundant precaution, an additional attended background noise measurement was conducted on site on the morning of 6 October 2009 using a Norsonics 140 Type 1 sound analyser, and verified that data measured by the long term logger remained accurate.

Measured background noise levels from long term logging are presented below. Refer to Appendix 1 for unmanned noise monitoring data.

Table 1 – Measured Background Noise Levels – Long Term Noise Logging

Location	Background noise level dB(A)L ₉₀		
	Daytime (7am-6pm)	Evening (6pm-10pm)	Night time (10pm-7am)
Unattended noise logger	49	49	41

5. ASSESSMENT REQUIREMENTS AND ACOUSTIC CRITERIA

This report has been prepared in order to satisfy the acoustic reporting requirements of the following:

- The Director General Requirements (issued 16 January 2009).
- The Department of Environment and Climate Change as per its letter of 9 January 2009.
- The Sydney Olympic Park Authority as per its letter of 13 January 2009.

The required assessment pursuant to these directions are summarised below:

- Issue 6 of Director Generals Requirements– Impact of Major Events in Sydney Olympic Park on the proposed development must be taken into account.
- Issue 2 of DECC requirements – Environmental impacts of the proposed development must be assessed. Acoustic guidelines relevant to this assessment will include the DECC Industrial Noise Policy, Noise Control Manual Sleep Disturbance Assessment and assessment of construction noise.
- Issue 5 of Sydney Olympic Park Authority requirements - Impact of Major Events in Sydney Olympic Park on the proposed development must be taken into account.

The following assessment will be made to meet the requirements presented above:

- Noise impacts from Major Events. Noise from ANZ stadium, the Sydney Showground, the use of the car park for Easter Show amusement rides and from rail movements at Sydney Olympic Park station will be assessed. Appropriate acoustic treatments will be determined to mitigate these impacts.
- Noise impacts generated by the site. The only significant noise source which will be generated by the site will be from external mechanical plant, which will be assessed.

5.1 NOISE IMPACTS FROM MAJOR EVENTS

Major events such as use of ANZ Stadium, the Showground and noise generated by rides during the Royal Easter Show will be assessed to ensure there is no unacceptable impact on the proposed development.

Acoustic objectives to be adopted for the proposed development have been determined with reference to Australian Standard 2107 "Acoustics-Recommended Design Sound Levels and Reverberation Times for Building Interiors", as presented below.

Table 2 – Internal Noise Level Goals for External Noise Impacts

Space type	Time	Criteria
Commercial / Retail Spaces	When in Use	45dB(A) _{L_{eq}(Worst 1 hour)}

The following noise sources will not be assessed:

- Noise from the rail line. As the rail line lies more than 60m from the site, Rail Infrastructure Corporation guidelines do not require assessment of potential noise and vibration impacts.
- Noise from the V8 Supercar Street circuit. Proposed circuit layout shows that the closest the circuit will come to the site is as it runs along Australia Ave (at the western end of Parkview Drive, approximately 250m from the site). We note that this circuit will be used for a three day event only once per year, with only one day of the event expected to be on a weekday (and therefore affecting the commercial spaces). Given the infrequency of the event, the building will not be specifically upgraded for that noise impact alone.

5.2 OPERATIONAL NOISE GENERATED BY THE SITE

5.2.1 Mechanical services Noise

Noise from mechanical services should comply with the DECC Industrial Noise Policy and the EPA Noise Control Manual Sleep Disturbance Guidelines, as summarised below.

Noise emissions to both nearby (future and existing) residential and commercial development will be assessed).

As is consistent with the EPA Noise Control Manual, noise from emergency plant (generators) may be an additional 5dB(A) louder than the levels allowed for plant running during standard operation (as documented below)

DECC Industrial Noise Policy - Intrusiveness Criteria (Residential Receivers Only)

The Intrusiveness guideline is intended to limit the audibility of noise emissions at a residential property and requires that noise emissions measured using the $L_{eq(15min)}$ descriptor not exceed the background noise level by more than 5 dB(A) (i.e- noise from a particular noise source, when averaged over a 15 minute period, must not exceed background noise levels by more than 5dB(A).

The allowable noise level for all times of day is set out below.

Table 3 - Intrusiveness Criteria

PERIOD/TIME	BACKGROUND NOISE LEVEL dB(A) L_{90}	ACCEPTABLE LEVEL dB(A) $L_{eq(15min)}$
Daytime (7am-6pm)	49	54
Evening (6pm-10pm)	49	54
Night (10pm-7am)	41	46

DECC Industrial Noise Policy - Amenity Objectives

Noise emission objectives for "suburban" receivers based on the Industrial Noise Policy "Amenity Criteria" are presented below. Amenity criteria are assessed using the $L_{eq(Period)}$ descriptor – ie noise from the a particular noise source is average over the entire daytime/evening/night time period. Acoustic criteria are as follows:

Table 4 - Amenity Objectives

Location	Time of Day	Amenity Noise Objective dB(A) _{L_{eq}(Period)}
Potentially Affected Residential Properties.	Day Time (7am – 6pm)	55
	Evening (6pm – 10pm)	45
	Night (10pm-7am)	40
Potentially Affected Commercial Properties	When in use	65

Noise Control Manual – Sleep Disturbance Guidelines (Residential Receivers Only)

Sleep arousal is a function of both the noise level and the duration of the noise. The EPA (now DECC) in its Environmental Noise Control Manual states that noise controls should be applied with the general intent to protect people from sleep arousal.

To assess potential sleep arousal impacts, an emergence test is first carried out. That is, the L₁ noise level of any specific noise source should not exceed the background noise level (L₉₀) by more than 15 dB(A) outside a resident's bedroom window between the hours of 10pm and 7am. If the noise events are within this, then sleep arousal impacts are unlikely and no further analysis is needed. If there are noise events that could exceed the emergence level, then an assessment of sleep arousal impact is required to be carried out taking into account the level and frequency of noise events during the night, existing noise sources, etc. This more detailed sleep arousal test is conducted with reference to the DECC Environmental Criteria for Road Traffic Noise (appendix B of that document).

The guideline level is set out below.

Table 5 – Sleep Arousal Emergence Criteria (10pm-7am)

Location	BACKGROUND NOISE LEVEL dB(A) _{L₉₀}	EMERGENCE LEVEL (dB(A) L ₁)
Potentially Affected Residential Properties.	41	56

5.3 NOISE GENERATED DURING CONSTRUCTION.

Where possible, noise generated by construction should comply with DECC Interim Construction Noise Guidelines. Where exceedances of recommended levels are likely, noise impacts on nearby properties should be minimised through appropriate noise management controls. Recommended levels are as follows:

Table 6– Construction Noise Emission Guidelines

Location	Time of Day	Noise Objective dB(A) _{Leq(15min)}
Potentially Affected Residential Properties.	Standard construction hours (7am-6pm)	59 (BG+10dB(A))
Potentially Affected Commercial Properties	When in use	70

6. EXTERNAL NOISE INTRUSION

The following noise sources will be assessed in order to determine their impact on the development:

- Noise from ANZ Stadium and the Sydney Showground.
- Noise from rides during the Sydney Easter Show.

6.1 NOISE LEVELS USED FOR ASSESSMENT

6.1.1 ANZ Stadium and Sydney Showground

These venues will potentially have large crowds (during sporting events etc) and amplified music performances.

Noise from ANZ Stadium was measured on Parkview Drive on 4 October 2009 during the Rugby League Grand Final (approximately 80,000 crowd, amplified music). This will be indicative of a peak period of operation of the stadium. Given that the size of the Sydney Showground and the distance between the Showground and the site is similar, noise from the Showground is expected to be similar in noise level to that from ANZ Stadium.

During the site visit, noise from ANZ stadium (crowd/music) was inaudible at Parkview Drive. The only audible noise associated with the event was that from the media helicopters flying over the stadium, generating noise levels of 61-64dB(A)_{Leq}. Given that other noise was inaudible over the helicopter noise, it is the helicopter noise which will be the loudest typical noise level associated with the use of the stadium / showground. Satisfactory attenuation of helicopter noise will also provide sufficient protection against the other noise sources.

6.1.2 Noise from the Easter Show Rides.

This is the most significant potential noise impact on the site, as amusement rides will be located as close as (approximately) 25m from the western façade of Building A. In order to determine the noise levels likely to be generated, a noise survey of the Luna Park amusement park (Milsons Point) was undertaken. The loudest typical noise sources are presented below.

Table 7 – Measured Noise Levels

Ride	Primary Noise source	Measured Noise Level – dB(A) _{Leq(15min)}
Power Surge Ride (high speed ferris wheel)	Motor noise, screaming	77dB(A) at 10m
Wild Mouse (single carriage roller-coaster)	Motor noise, noise from carriage on track	70dB(A) at 25m

In determining the acoustic treatments, it will be assumed that one of these rides (loudest typical noise source based on our survey) is located near the eastern boundary of the rides area, as close as 25m from the western façade of Building A.

6.2 RECOMMENDED TREATMENTS

Recommended glazing constructions for control of external noise impacts to levels complying with the acoustic guidelines presented above are presented below:

Table 8 – Recommended Glazing

Location	Required Glazing	Acoustic Seals Required
Northern and Western Facade	6.38mm laminated/12mm airgap/6mm	Yes
Southern and Eastern Facade	6mm/12mm airgap/6mm	Yes

In addition to complying with the minimum scheduled glazing thickness, the STC rating of the glazing fitted into openable frames and fixed into the building opening should not be lower than the values listed in the table below for all rooms. Where nominated, this will require the use of acoustic seals around the full perimeter of openable frames and the frame will need to be sealed into the building opening using a flexible sealant. Note that mohair seals in windows and doors are not acceptable where acoustic seals are required. The proposed suppliers should provide evidence that the window systems proposed have been tested in a registered laboratory with the recommended glass thicknesses and comply with the minimum STC requirements listed in the table below, and that they will be constructed and installed in a manner equal to the test samples.

Table 9 – Minimum STC of Glazing

Glazing Assembly	Acoustic Seals	Minimum STC of Installed Window
6.38mm laminated/12mm airgap/6mm	Yes	33
6mm/12mm airgap/6mm	Yes	31

Provided that these treatments are installed, noise levels will comply with the acoustic criteria set out in section 5.1.

7. NOISE EMISSION ASSESSMENT

7.1 NOISE FROM MECHANICAL PLANT

7.1.1 Equipment Selection

Primary roof top mechanical plant is as follows (indicative selections only at this stage):

- Diesel generator (sound power level of 114dB(A) L_{eq}) – to be used in emergency only.
- 2xPower Pax Chillers (68dB(A) at 1m).
- 1xTemcel TED1200 cooling towers (for base building).
- 2xTemcel TES 420 cooling towers (tenant fitout).

7.1.2 Recommendations

Detailed review of noise from mechanical plant should be undertaken once plant selections and layouts are finalised. However, preliminary analysis indicates that noise emissions from plant items can be adequately addressed using standard acoustic treatments, as discussed below:

- Chiller – acoustic screen between plant item and nearest property is recommended. Screen to be constructed of imperforate material (eg Colorbond) and should be equal in height to the top of the plant item.
- Generator :
 - Acoustic screen between plant item and nearest property is recommended. Screen to be constructed of imperforate material (eg Colorbond) and should be equal in height to the top of the plant item.
 - Testing not to be conducted during night time periods.
- Base building cooling tower – Air intake must not be directed towards nearest development to the east or west of the site.
- All plant items should be installed using vibration isolation mounts to prevent structure borne noise transfer to offices below.

7.2 NOISE GENERATED DURING CONSTRUCTION

As with any major construction site there will be noise associated with construction. The management of impacts arising from these activities is now routine practice, both to address impacts to surrounding properties, and for commercial reasons, to limit impacts on retail tenancies.

Adequate control of construction noise can be achieved through the development of a Construction Demolition Noise Management Plan which may be required to be undertaken prior to works commencing.

8. CONCLUSION

Potential noise impacts from the Building A at 7 Parkview Avenue have been assessed to address the acoustic concerns raised by the Director General, DECC and Sydney Olympic Park Authority.

Both an assessment of noise impacts on the site (from Major Events and other local noise sources) and noise generated by the site have been assessed against appropriate acoustic criteria.

Compliance with appropriate acoustic goals is achievable provided that the recommendations in sections 6.2, 7.1 and 7.2 are adopted.

Report prepared by

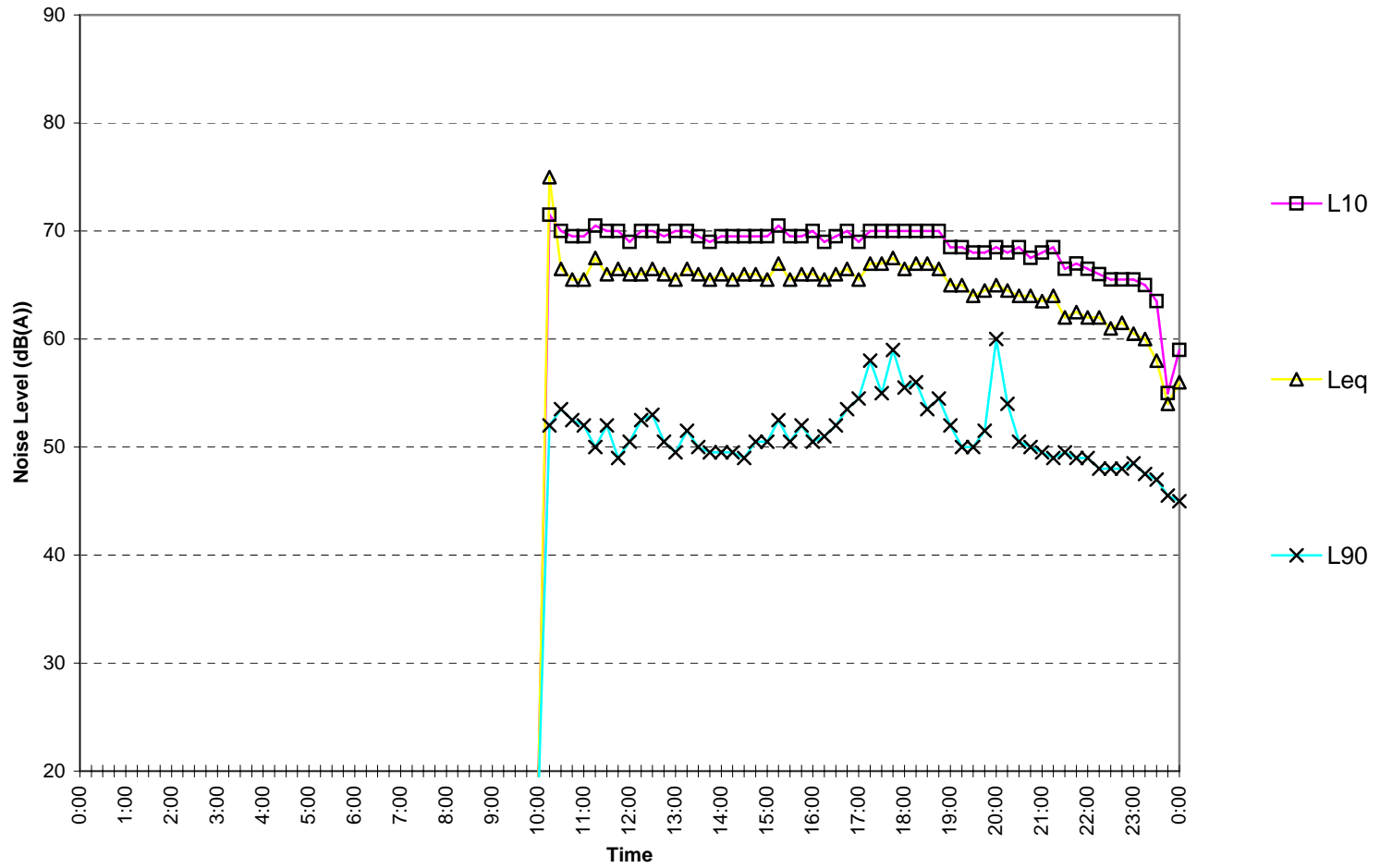


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Thomas Taylor

APPENDIX 1
NOISE LOGGING DATA

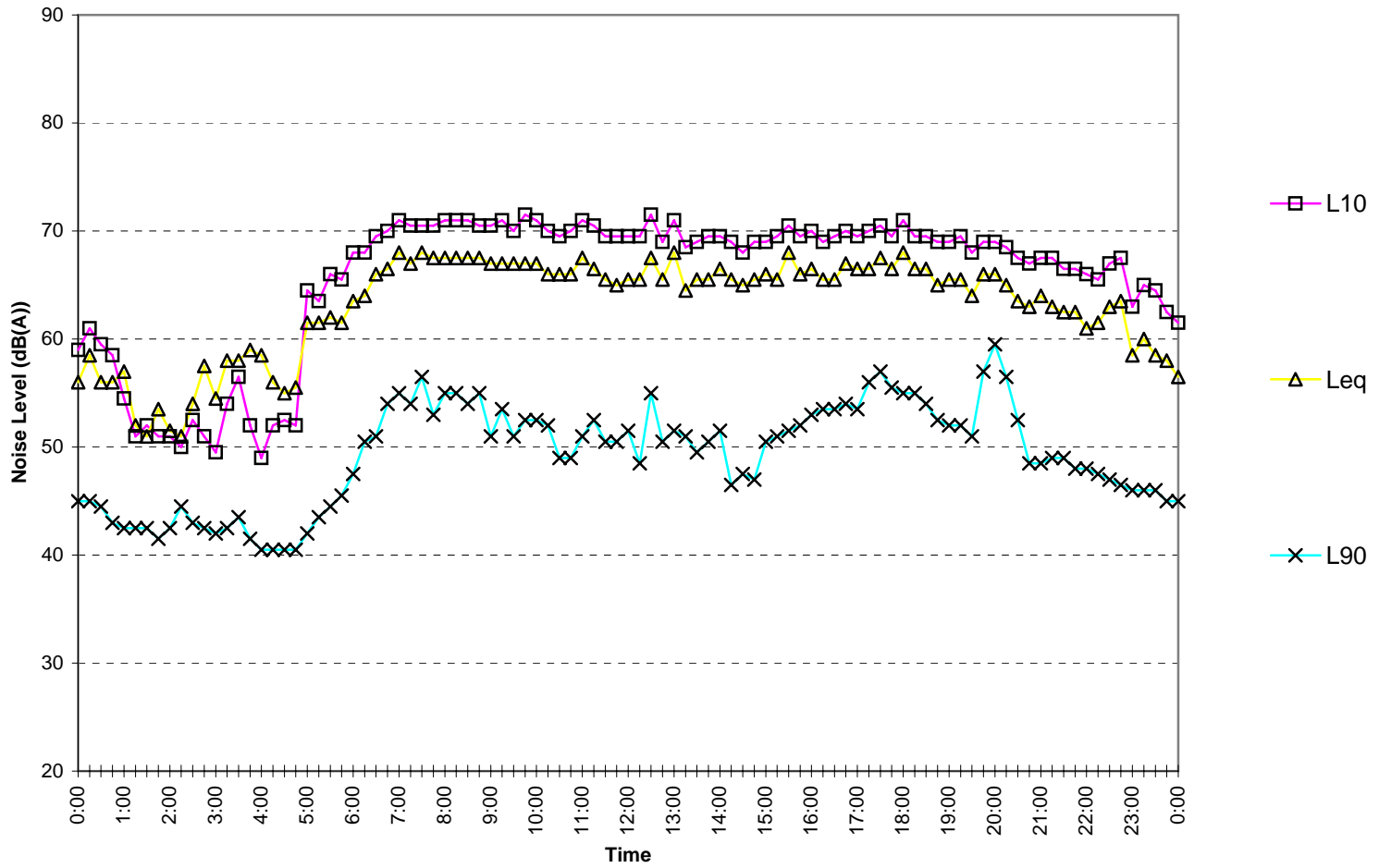
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Tuesday March 11, 2008



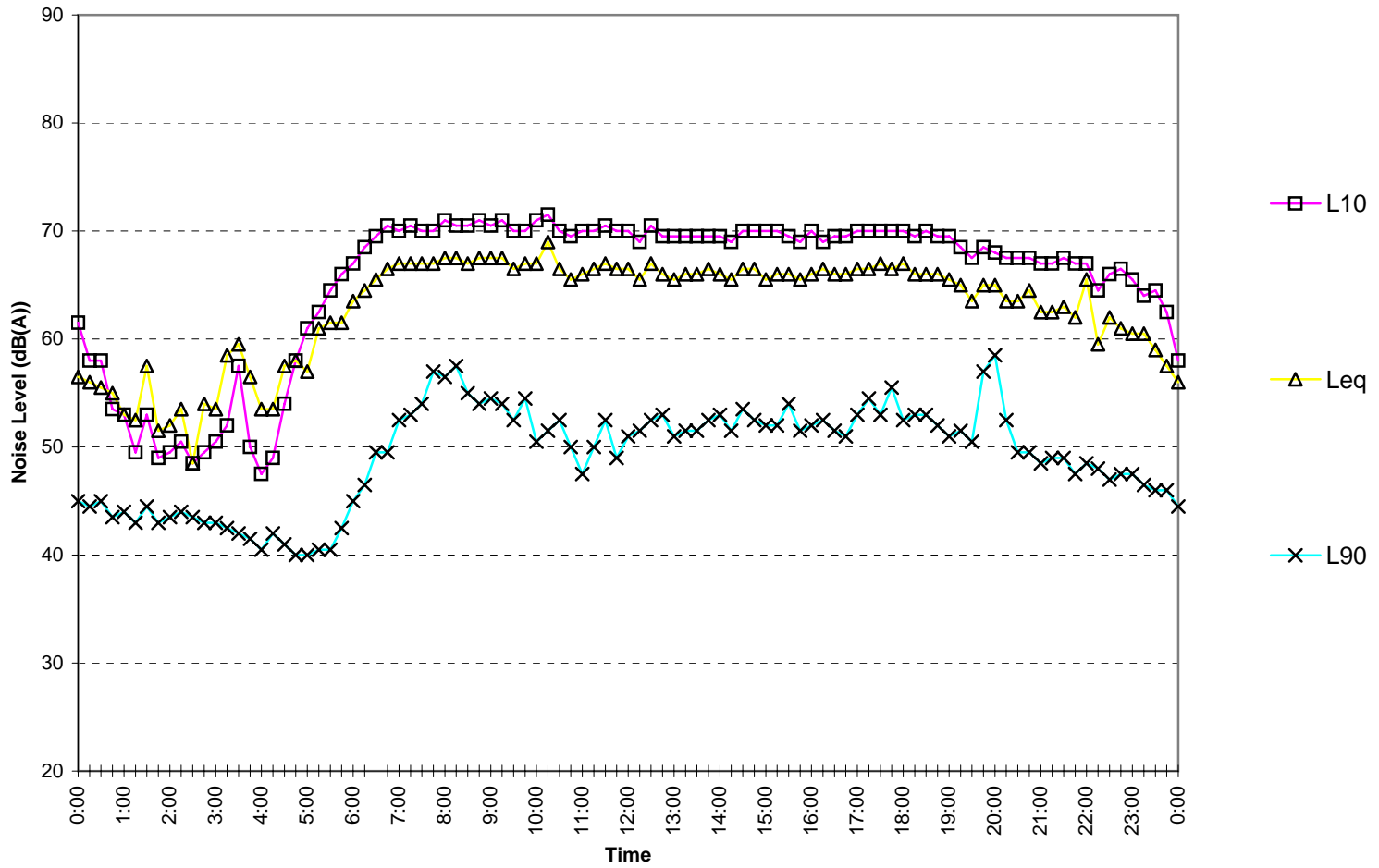
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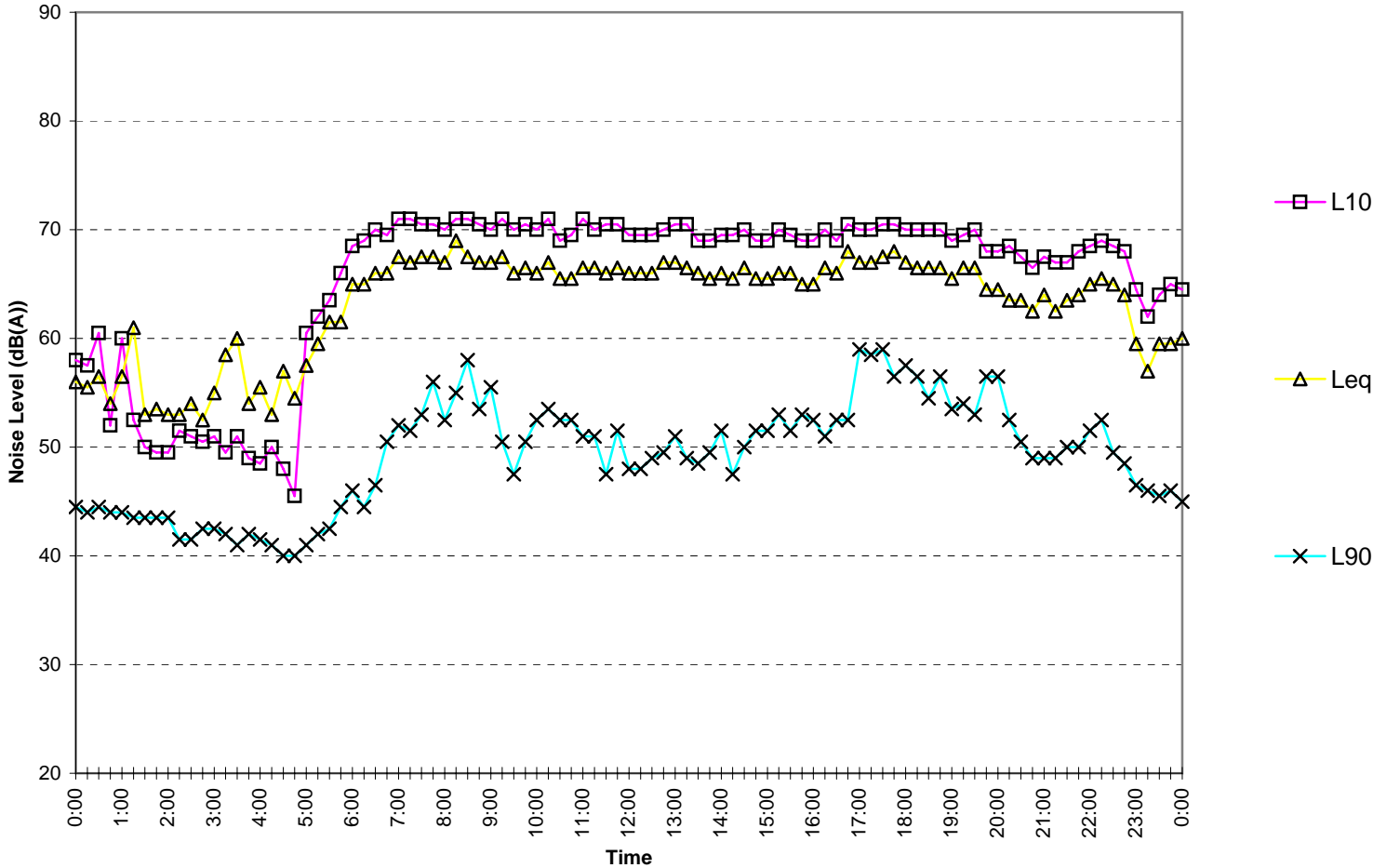
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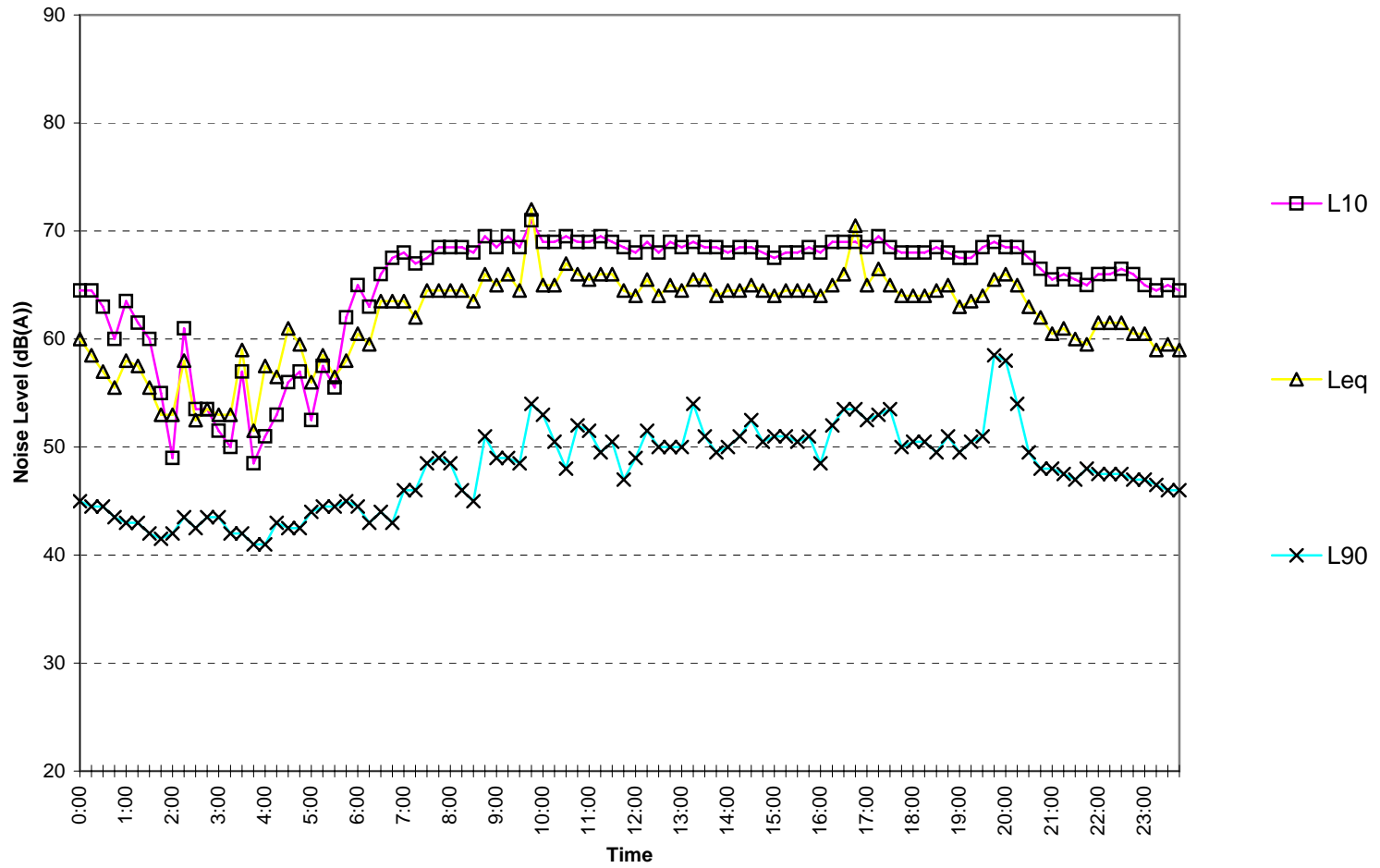
Parkview Drive

Friday March 14, 2008



Parkview Drive

Saturday March 15, 2008



Parkview Drive

Sunday March 16, 2008

