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330 Church Street Parramatta

Part 3A Application Acoustic Assessment

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1 INTRODUCTION

This report presents our assessment of potential noise impact associated with the proposed development at 330 Church Street, North Parramatta.

The following have been addressed to determine the potential for adverse noise impacts:

- Potential impact associated with traffic movements generated by the development and other noise emitted by the proposed development on surrounding receivers;
- Potential impact associated with noise generated on Church Street and surrounding local streets; and
- Establish noise emissions goals for noise generation from the site construction and operation.
- Identify potential noise sources generated by the childcare centre and determine noise emission goals for the development to meet Council acoustic requirements to ensure that nearby developments are not adversely impacted.

This assessment has been conducted as required by the Director General's Requirement number 6 for Application Number MP 10_0171.

On site noise and vibration results have been measured and used to predict internal noise levels within the development. If necessary, appropriate, noise attenuation treatments will be recommended to prevent excessive impacts on residents.

The assessment is based on the architectural drawings provided by Tony Caro Architecture with drawing numbers as specified in the table below.

Table 1 – Drawings for assessment

Drawing No.	Issue	Date
A100	01	FEB 2010
A101	01	FEB 2010
A102	01	FEB 2010
A103	01	FEB 2010
A104	01	FEB 2010
A105	01	FEB 2010

2 SITE DESCRIPTION & PROPOSED DEVELOPMENT

The project is a development containing commercial, retail and residential areas. It consists of two towers which also include a basement park for the use of the future tenants. The Eastern & Western towers are intended to be used for serviced apartments and residential units and will consist of 22 & 32 floors (plus plant room) respectively.

The subject site is located at the south-eastern corner of the intersection of the Parramatta River and Church Street, which carries medium volumes of traffic. A car park is located to the east of the site.

Figure 1 details the site and measurement locations.

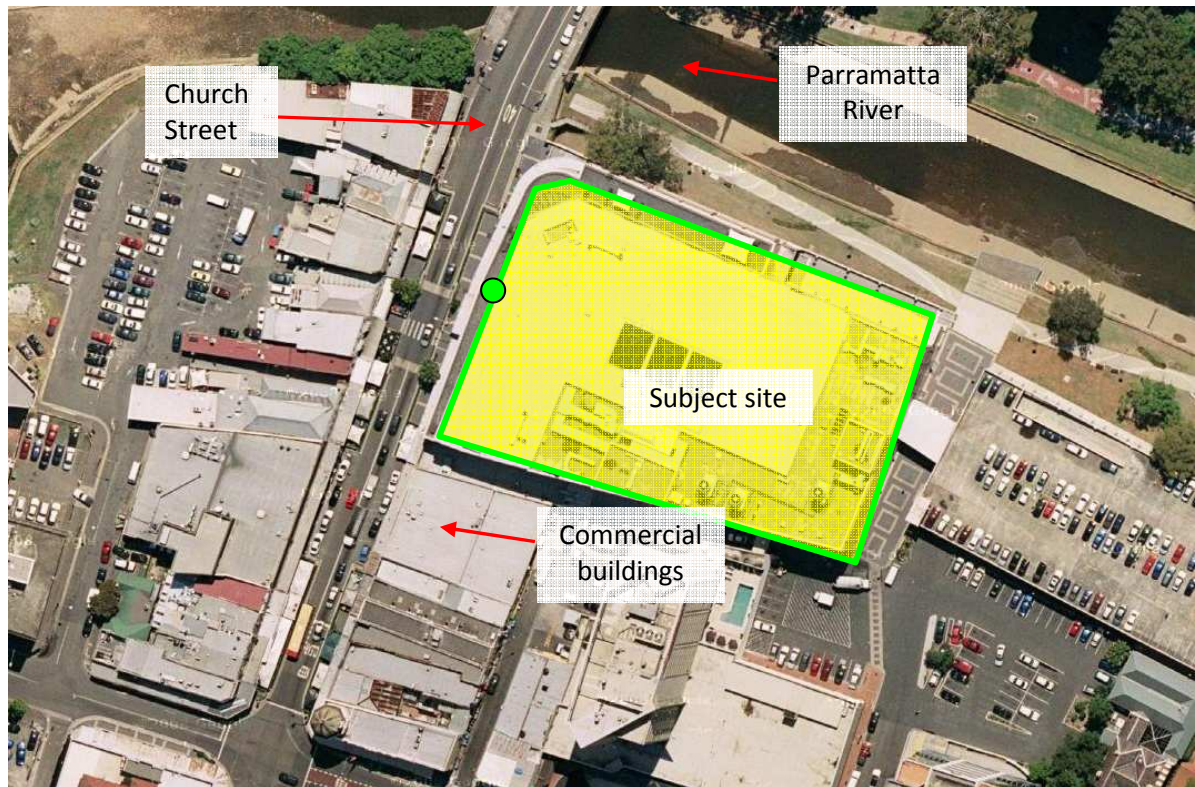


Figure 1 – Site and Measurement Locations

- Unattended noise measurements

3 NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic 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. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of 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 at 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 measurement 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 traffic noise.

4 TRAFFIC NOISE ASSESSMENT

4.1 ACOUSTIC CRITERIA

The Director General's Requirement number 6 for Application Number (MP 10_0171) states that:

"6. Environmental and Residential Amenity

The EA must address solar access, acoustic and visual privacy, view loss and overshadowing and achieve a high level of environmental and residential amenity."

In the absence of any criteria outlined in this section, a development located near a busy road is to be assessed in accordance with the SEPP (Infrastructure) 2007 and the NSW Department of Planning's policy *Development near Rail Corridors and Busy Roads –Interim Guideline*. As the guideline does not provide internal noise criteria for commercial areas, Australian Standard 2107:2000 will be the subject of application for the purposes of nominating criteria for these commercial spaces. These are detailed in Table 1 below.

The Infrastructure SEPP defines busy roads that are subject to an acoustic assessment as:

"Roads specified in Clause 102 of the Infrastructure SEPP: a freeway, tollway or a transitway or any other road with an average annual traffic (AADT) volume of more than 40,000 vehicles (based on the traffic volume data provided on the website of the RTA).

Any other road – with an average annual daily traffic (AADT) volume of more than 20,000 vehicles (based on the traffic volume data published on the website of the RTA).

Any other road – with a high level of truck movements or bus traffic."

For commercial and retail occupancies, recommended noise levels in AS2107-2000 "Recommended Design Sound Levels and Reverberation Times for Building Interiors" will be adopted. The absence of any other standard or guideline relating to traffic noise intrusion to commercial and retail premises means AS2107-2000 is used.

Table 2 - Traffic Noise Criteria for All Spaces

Space/Activity Type	Noise Level dB(A) Leq
Bedrooms	35 (9 hour)
Living Areas	40 (15 hour)
Commercial Areas	45 (9 Hour)
Retail Areas	50 (9 Hour)

4.2 MEASUREMENTS PROCEDURE

Unattended noise monitoring was conducted on Church Street during the period of 14 to 21 February 2011 using an Acoustic Research Laboratories Pty Ltd noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the monitoring period. The noise monitors were calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. Measurements were taken on A-frequency weighting and fast time weighting.

4.3 MEASURED NOISE LEVELS

The results of traffic noise monitoring are detailed in the table below.

Table 3 - Measured Traffic Noise Levels

Location	Time of Day	Noise Level - L_{Aeq}	Noise Level - L_{90}
Church Street – at façade/4m from the kerb.	7:00am – 10:00pm	66dB(A) L_{Aeq} (15Hr)	59dB(A) L_{90} (15Hr)
	10:00pm – 7:00am	62dB(A) L_{Aeq} (9Hr)	55dB(A) L_{90} (9Hr)

5 EVALUATION OF NOISE INTRUSION

Internal noise levels will primarily be as a result of noise transfer through the windows and doors and roof, as these are relatively light building elements that offer less resistance to the transmission of sound. **All external walls are proposed to be heavy masonry elements that will not require upgrading.**

The predicted noise levels through the windows, doors and roof are discussed below. The predicted noise levels have been based on the measured level and spectral characteristics of the external noise, the area of building elements exposed to traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

Calculations were performed taking into account the orientation of windows, barrier effects (where applicable), the total area of glazing, facade transmission loss and the likely room sound absorption characteristics. In this way the likely interior noise levels can be predicted.

Recommended acoustic treatments presented below will satisfactorily control traffic noise.

5.1 RECOMMENDED GLAZING

The following constructions are recommended to comply with the traffic noise objectives stated in Section 4. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria listed below – refer also to mark up, attached, appendix 1&2.

Table 4 – Residential Glazing

Facade	Room		Glazing requirements	Acoustic seals
East - Church Street (including south/north façade of corner units)	Bedrooms	Glazed area less than 6.0m ²	6.38 laminated	Yes
		Glazed area greater than 6.0m ²	10.38 laminated	
	Living Rooms	Glazed area less than 16.0m ²	6.38 laminated	
		Glazed area greater than 16.0m ²	10.38 laminated	
North Parramatta River	Bedrooms		6.38 laminated	
	Living Rooms		6.38 laminated	
South Commercial properties	Bedrooms		6.38 laminated	
	Living Rooms		6.38 laminated	
West Car Park	Bedrooms		6.38 laminated	
	Living Rooms		6.38 laminated	

Table 5 – Commercial/Retail Glazing

Space Type	Facade	Glazing requirements	Acoustic seals
Commercial / Retail areas generally.	All	6mm / 12mm air gap / 6mm OR 6mm	Yes
Child Care Centre	Church Street – Sleeping Areas	10.38mm laminated	Yes
	Church Street – Other Spaces	6.38mm laminated	Yes

It should be noted that the above glazing types are indicative, and should be further reviewed at Construction Certificate stage.

In addition to meeting the minimum glazing thickness requirements given, the design of the window mullions, perimeter seals and the installation of the windows/doors in the building openings shall not reduce the STC rating of the glazing assembly below the values nominated in the table above. Note that mohair type seals will not be acceptable for the windows requiring acoustic seals.

The window/door suppliers should provide evidence that the systems proposed have been tested in a registered laboratory with the recommended glass thicknesses and comply with the minimum listed STC requirements. Also, the glazing installer should certify that the window/doors have been constructed and installed in a manner equivalent to the tested samples.

Table 6 – Minimum STC/R_w of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum STC of Installed Window
6mm float	29
6.38mm laminated	31
10.38mm laminated	35
6mm / 12mm air gap / 6mm	30

Noise intrusion through the masonry walls will be negligible and will not contribute to internal noise levels. Similarly, noise intrusion through the concrete slab roof construction will not be significant.

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable.

5.1.1 Roof / Ceiling

The roof over the office is to be constructed of a concrete slab and will not require upgrading. The metal deck roof over the warehouse will not require any acoustic upgrading.

5.1.2 External Walls

External walls composed of concrete or masonry elements would not require upgrading.

5.1.3 Mechanical Ventilation

As internal noise levels cannot be achieved with windows open it is required that an alternative outside air supply system or air conditioning be installed to meet AS 1668.2 requirements. Any mechanical ventilation system that is installed should be acoustically designed such that the acoustic performance of the recommended constructions are not reduced by any duct or pipe penetrating the wall/ceiling/roof. Noise emitted to the property boundaries by any ventilation system shall comply with Council requirements.

6 NOISE EMISSIONS

The DGR requires:

“An Acoustic Report addressing any impacts of noise generation from the site during construction and noise from future land uses , as well as the impact of noise from surrounding uses on the site.”

6.1 ACOUSTIC CRITERIA

6.1.1 Construction Noise

The applicable guidelines and standards are:

- *“Australian Standard 2436-1981 “Guide to Noise Control on Construction Maintenance and Demolition Site”. The requirements stipulated in Section 3 of the standard will be followed.*
- *DECCW Interim Construction Noise Guideline*

Section 3 of AS 2436 states that care shall be taken in applying criteria that normally would be used to regulate noise emitted from industrial, commercial and residential premises to construction, particularly for those activities which are transitory and of short duration. For the control and regulation of noise from construction sites AS2436 nominates the following:

- *That reasonable suitable noise criterion is established. In this case, the DECCW Interim Guideline recommended level of 10dB(A) above the background noise level is recommended.*
- *In the event that strict compliance with the Interim Guideline is not achievable, that all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes on parts of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours.*
- *The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the building site.”*

6.1.2 Operational Noise

Noise emissions goals for the site will be developed to ensure that the amenity of nearby land users (both new occupants in the development and residents in nearby properties) is not adversely affected.

As the Parramatta Council DCP does not set out any specific noise emission criteria, noise emissions generated by the site will be assessed using the criteria set out in the DECC Industrial Noise Policy:

Noise emissions to residential receivers are to be assessed using the Industrial Noise Policy criteria, as set out below.

Table 7 - Noise Emission Requirements – Residential Receivers

Receiver Type	Time of Day	Intrusiveness Noise Objective (Background+5) dB(A)$L_{eq(15min)}$	Amenity Noise Objective dB(A)$L_{eq(Period)}$
Suburban	Day	63	55
	Evening	65	45
	Night	60	40

6.2 ASSESSMENT

6.2.1 Mechanical Plant

Mechanical plant items are not typically selected at Part 3A stage.

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Acoustic treatments should be determined in order to control plant noise emissions to the levels set out in section 6.2 of this report.

All plant can be satisfactorily attenuated to levels complying with noise emission criteria through appropriate location and (if necessary) standard acoustic treatments such as noise screens, enclosures, in-duct treatments (silencers/lined ducting) or similar.

6.2.2 Construction Noise

We note that detailed methodology statements for the demolition, excavation and construction of the development are not available at Part 3A Application stage, and as such, an assessment and subsequent treatment of items cannot be undertaken at this stage. We recommend that a detailed assessment of noise emissions from construction activities be undertaken at Construction Certificate Stage.

Management of construction noise and vibration is typical acoustic practice. Typical acoustic treatments include:

- Selection of equipment and process.
- Location of static plant.
- Use of screens or enclosures.
- Scheduling of noisy activities and provision of respite periods.

Detailed construction noise planning is typically undertaken after engagement of a builder (ie – after DA stage) and therefore, obviously, detailed noise planning is not possible at this stage. However, a plan for the management of noise as is consistent with AS2436 and the DECCW Interim Construction Noise Guidelines can be undertaken once construction program is determined.

7 CHILDCARE CENTRE ASSESSMENT

7.1 DESCRIPTION

A childcare centre is included in the proposal that includes an external area and an internal area of respectively 667m² and 705m².

As indicated by the client, the facilities are to accommodate up to 70 children.

It is assumed that all children may be using the outdoor play area at any one time. As advised per the client, opening hours of the centre will be as follows.

Table 8 - Hours of Operation – Outdoor play area

Day	Hours of Operation
Monday to Saturday	7am to 6pm
Sunday	8am to 6pm

7.2 ACOUSTIC CRITERIA – CHILD CARE CENTRE NOISE

The Parramatta City Council Child Care Centre DCP states:

“Appendix 1: Acoustic Privacy

TABLE A1: ACOUSTIC CRITERIA FOR CHILD CARE CENTRES

Noise Criteria	Applicable to:	Notes
Intrusiveness: LAeq 15 minute from the child care centre must not exceed the pre-existing background LA90 noise levels plus 5 dB(A), at 1 m from the facade of sensitive receivers.	Noise emissions from activities at the child care centre (including noise from external and internal play/teaching/ sleeping areas, car parking and fixed plant).	Applies at all sensitive receptors with a potential to be affected by noise emissions from all activities at the child care centre.
Internal Noise – Sleeping Rooms LAeq 15 minute of 35 dB(A)	Rooms at the centre which are primarily utilized for sleeping.	Existing ambient noise levels at the site must not result in internal noise levels in excess of the criterion.
Internal Noise – Other rooms LAeq 15 minute 40 dB(A)	Rooms at the centre that are not primarily used for sleeping.	Existing ambient noise levels at the site must not result in internal noise levels in excess of the criterion.
External Noise – Playgrounds and Activity Areas LAeq 1 Hour 55 dB(A)	All external areas at the centre that are utilized by children or babies for external recreation and learning activities.	Existing ambient noise levels at the site must not result in internal noise levels in excess of the criterion.”

7.3 ASSESSMENT

7.3.1 Noise Generated by the Use of Outdoor Play Area

The Acceptable Acoustic Management Measures of Parramatta City Council Child Care Centre DCP state that:

- *“A source noise level of 75dB(A) at 1m, positioned a minimum of 1 m above the ground, must be adopted for noise from children’s activities (internal and external). This source noise level must be adopted for each area and room where children’s activities can occur, and the modelling must assume that noise can be emitted from each play area or room simultaneously”*

The nearest noise receivers will be the residents of the western tower facing Church Street and above the childcare centre.

The nearest noise sensitive receivers are the residential apartments which will be located above the child care centre, overlooking the out door play area.

The noise level at the nearest receivers is predicted based on the following:

- The play area is operating at capacity (70 children) on the terrace at any one time.
- An average noise level of 75dB(A) at 1m per child (one in two speaking at any one time) as is consistent with the Parramatta DCP.
- Distance between noise source and the façade of the nearest receivers (the apartments above) taking into account, where appropriate, noise screening provided by the podium.

Predicted level is as follows, and take into account the noise reduction achieved as a result of installation of the acoustic treatments set in section 7.4

Table 9 – Predicted Noise Levels from Outdoor Play

Noise Receiver	Time	Predicted Noise Level $L_{eq, 15min}$ dB(A)	Criteria (Background+5) $dB(A)_{L_{eq}(15min)}$	Complies
Nearest noise receivers' boundary - Residents at Level 3 above the childcare centre	Daytime 7am to 10pm	63	64	Yes

At apartments below level 3, the screening effect of the podium is more pronounced, resulting in a noise level even lower than the one predicted above.

At apartments above level 3, the distance between the play area and the apartment is greater, also resulting in noise levels less than that predicted on level 13.

Noise levels will therefore be satisfactory at all noise sensitive receivers provided that the acoustic treatments set out in section 7.4 are adopted.

7.3.2 External Noise Impacts

7.3.2.1 Sleeping and other areas

The primary noise impact on the internal play areas will be during use of the outdoor play area. This is a more significant impact than road traffic noise from Church Street.

The noise level at the internal areas was predicted using the logging data and the predicted noise levels generated of the children playing and by taking into account any noise reduction provided by the building fabric, distance losses, directivity, and barrier effects, etc.

The table below shows the predicted noise levels from the children including recommended acoustic controls detailed in the section below (glass thickness as recommended in section 7.4).

Table 10 – Predicted Internal Noise Levels

Noise Receiver		Time	Predicted Noise Level $LA_{eq, 15min}$ dB(A)	Criteria $LA_{eq} 1 \text{ Hour}$ dB(A)	Complies
Noise receivers – Kids and staff	Sleeping rooms facing Church Street	Any	35	35	Yes
	Other rooms facing Church Street		37	40	Yes

7.3.2.2 Outdoor Playground Areas

The noise level at the outdoor playground area was predicted using the logging data and by taking into account any noise reduction provided by the building fabric, distance losses, directivity, and barrier effects, etc.

Table 11 – Predicted Traffic Noise Levels at the Outdoor Play Area

Noise Receiver	Time	Predicted Noise Level $LA_{eq, 15min}$ dB(A)	Criteria $LA_{eq} 1 \text{ Hour}$ dB(A)	Complies
Nearest noise receivers' – Kids in Playground area	Daytime 7am to 10pm	<50	55	Yes

7.4 RECOMMENDED CONSTRUCTIONS AND MANAGEMENT CONTROLS

Analysis of noise emissions from the proposed child care centre indicates that noise generated from indoor spaces will be significantly lower than that generated during outdoor play. To ensure compliance with all nominated assessment criteria the following management controls and acoustic treatment are recommended.

1. For the control of noise from the outdoor play area:
 - a. Noise more than 70 children to use the outdoor play area at any one time.
 - b. Install a band of noise absorptive lining on the inside face of the Church Street parapet wall around the play area (i.e. – the side of the wall facing the play area). Lining to consist of 50mm thick Bradford Ultratel with Ultraphon lining or other material with minimum NRC of 0.8. Lining may be faced with perforated sheeting for protection (e.g. perforated fc sheet/metal) with minimum 20% open area. Band of insulation to start at 1.5m above the level of the play area and extend upwards for 1.5m.
2. For control of external noise impacts:
 - a. Glazing/doors of sleeping rooms facing Church Street shall be installed with acoustic seals and consist of minimum 10.38mm laminated glass with a minimum STC of 35.
 - b. Glazing/doors of all other rooms shall be installed with acoustic seals and consist of minimum 6.38mm laminated glass with a minimum STC of 31.
3. Any mechanical plant would be selected and treated to comply with the noise levels stipulated by Parramatta City Council. Treatment may include acoustically rated enclosures, silencers, vibration isolation mounts, barriers, acoustic louvres, etc. Mechanical plant selections had not been finalised at the time of this assessment. Notwithstanding this, plant shall be treated to ensure full compliance with Council criteria for external noise emissions.

8 CONCLUSION

This report presents our assessment of potential noise impact associated with the proposed mixed use development, Church Street Apartments, located at 330 Church Street, Parramatta.

External noise impacts on the development from surrounding streets have been assessed in accordance with Director General Requirement number 6, the State Environmental Planning Policy (Infrastructure) 2007, the NSW Department of Planning's policy *Development near Rail Corridors and Busy Roads –Interim Guideline* and the Parramatta City Council and will comply with internal noise goals at all times with the implementation of constructions detailed in Section 5 and 7.4.

As a result, noise impact associated with the proposed development will comply with the requirements of the Director General Requirements and other relevant statutory authorities.

Potential operational and construction noise guidelines and have been identified in section 6. As detailed in section 6.2, further detailed analysis should be undertaken during design development (between DA and CC) to ensure that operational noise and construction noise is suitable managed to maintain the amenity of nearby land users.

In addition, potential noise impacts on the child care centre and operational noise emission from the centre have been assessed with reference to the requirements of the Parramatta City Council Child Care Centre DCP. Recommendations have been presented in section 7.4.

Yours faithfully,



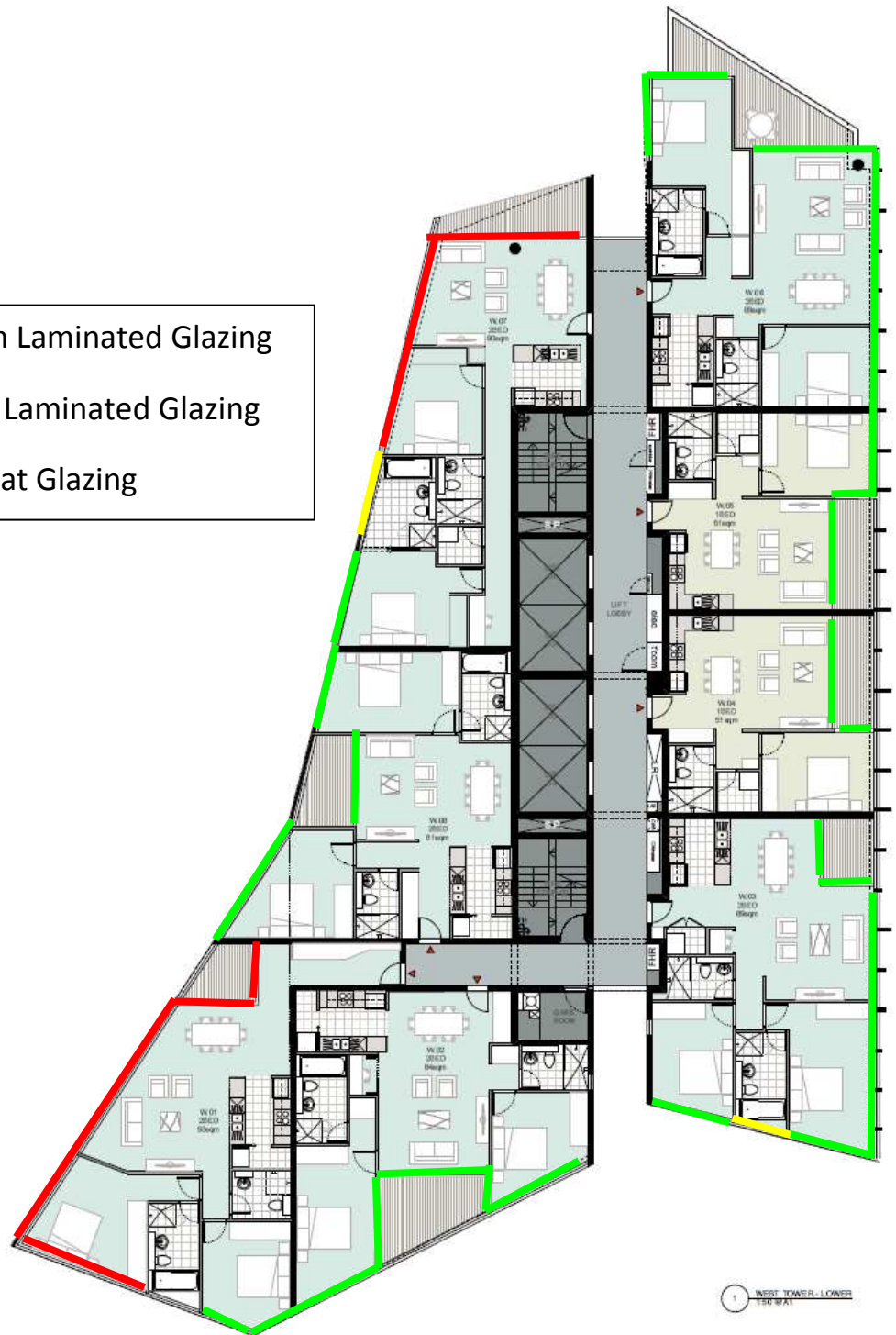
Acoustic Logic Consultancy Pty Ltd
Remi Larmandieu

Appendix 1 – Glazing Mark Up / West Tower/ Lower Floors

10.38mm Laminated Glazing

6.38mm Laminated Glazing

4mm float Glazing

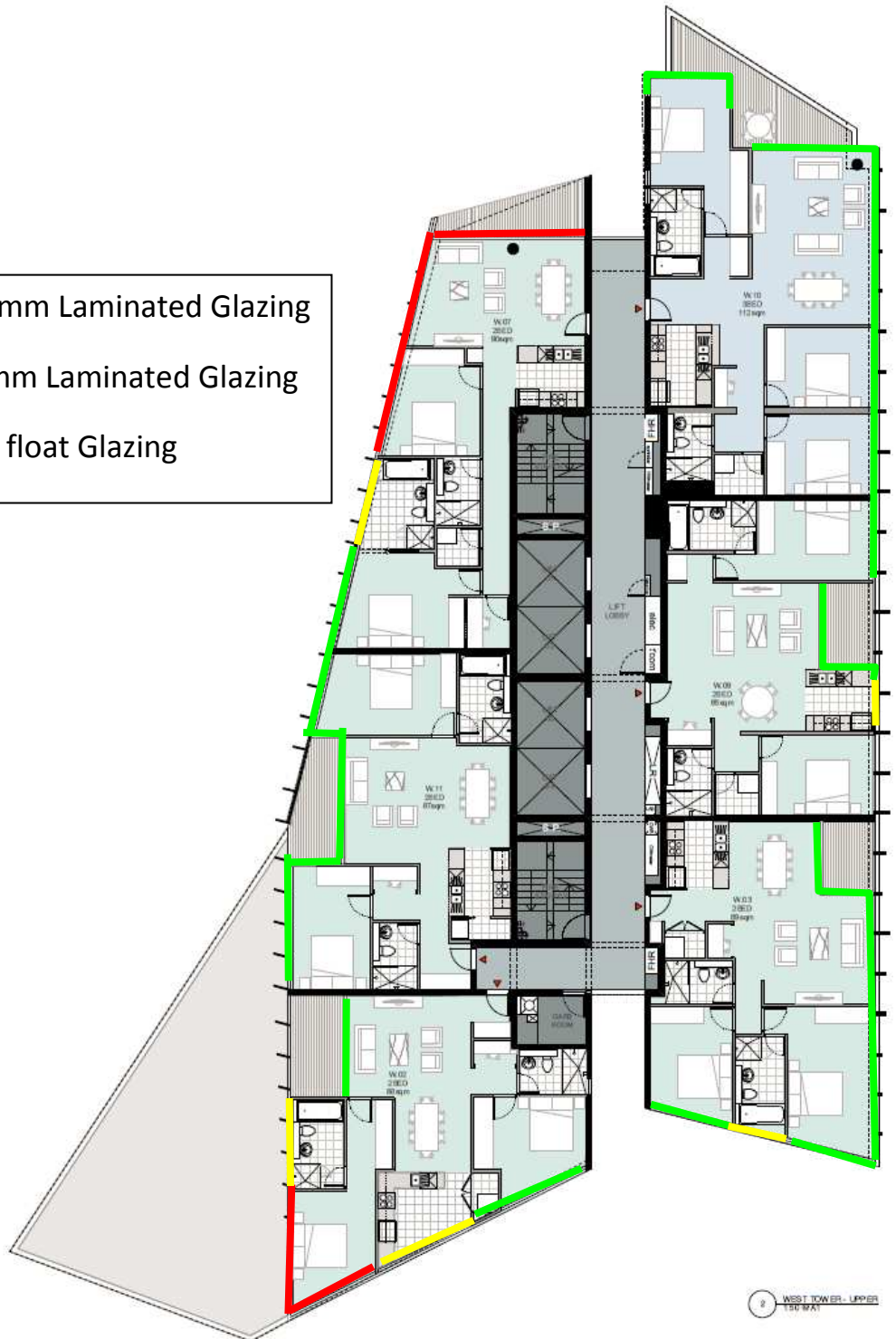


1 WEST TOWER - LOWER
1:500

WEST TOWER - LOWER

Appendix 2 – Mark Up / Glazing/ West Tower/ Upper Floors

- 10.38mm Laminated Glazing
- 6.38mm Laminated Glazing
- 4mm float Glazing

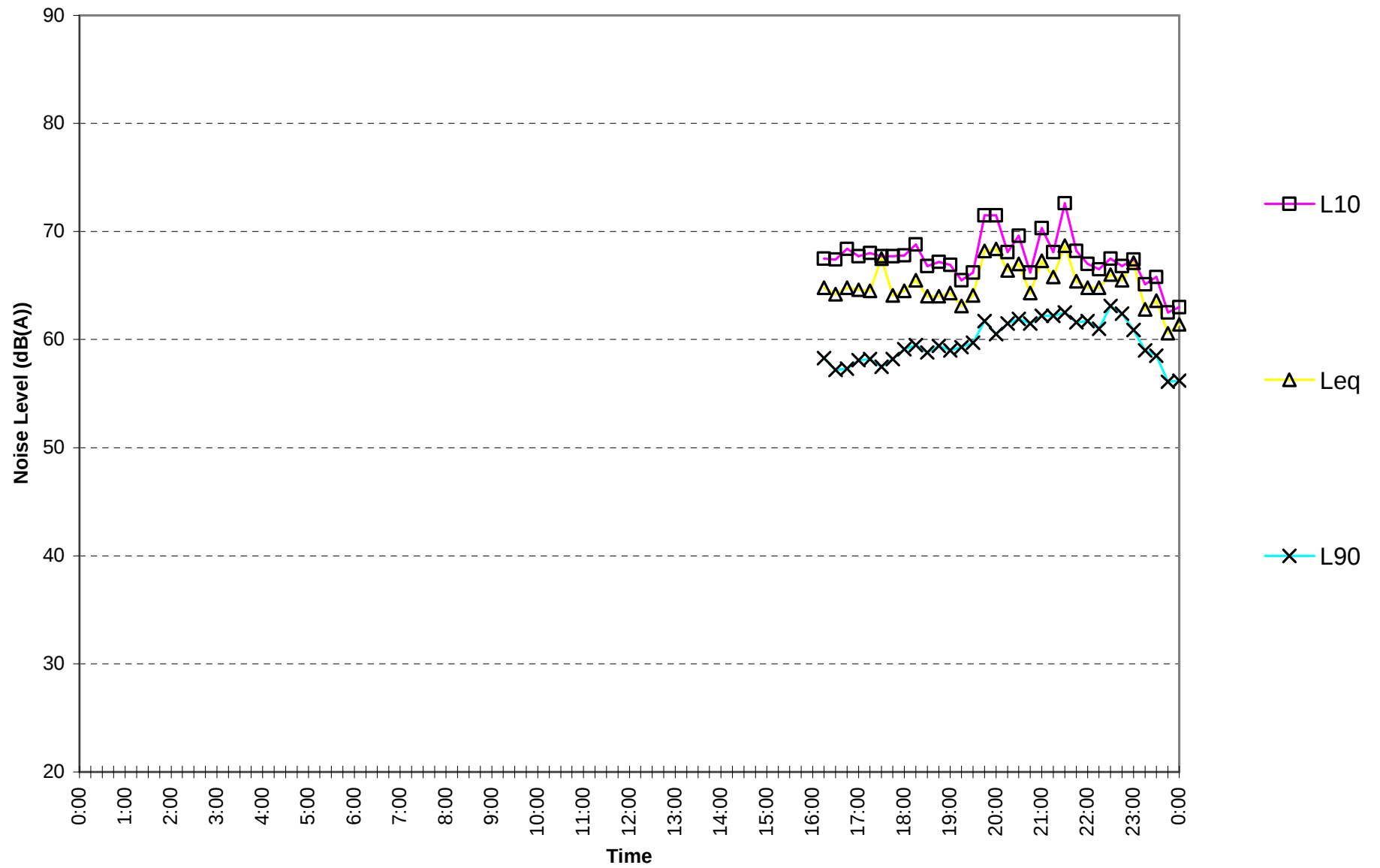


WEST TOWER - UPPER

Appendix 3 - Unattended Noise Monitoring Data

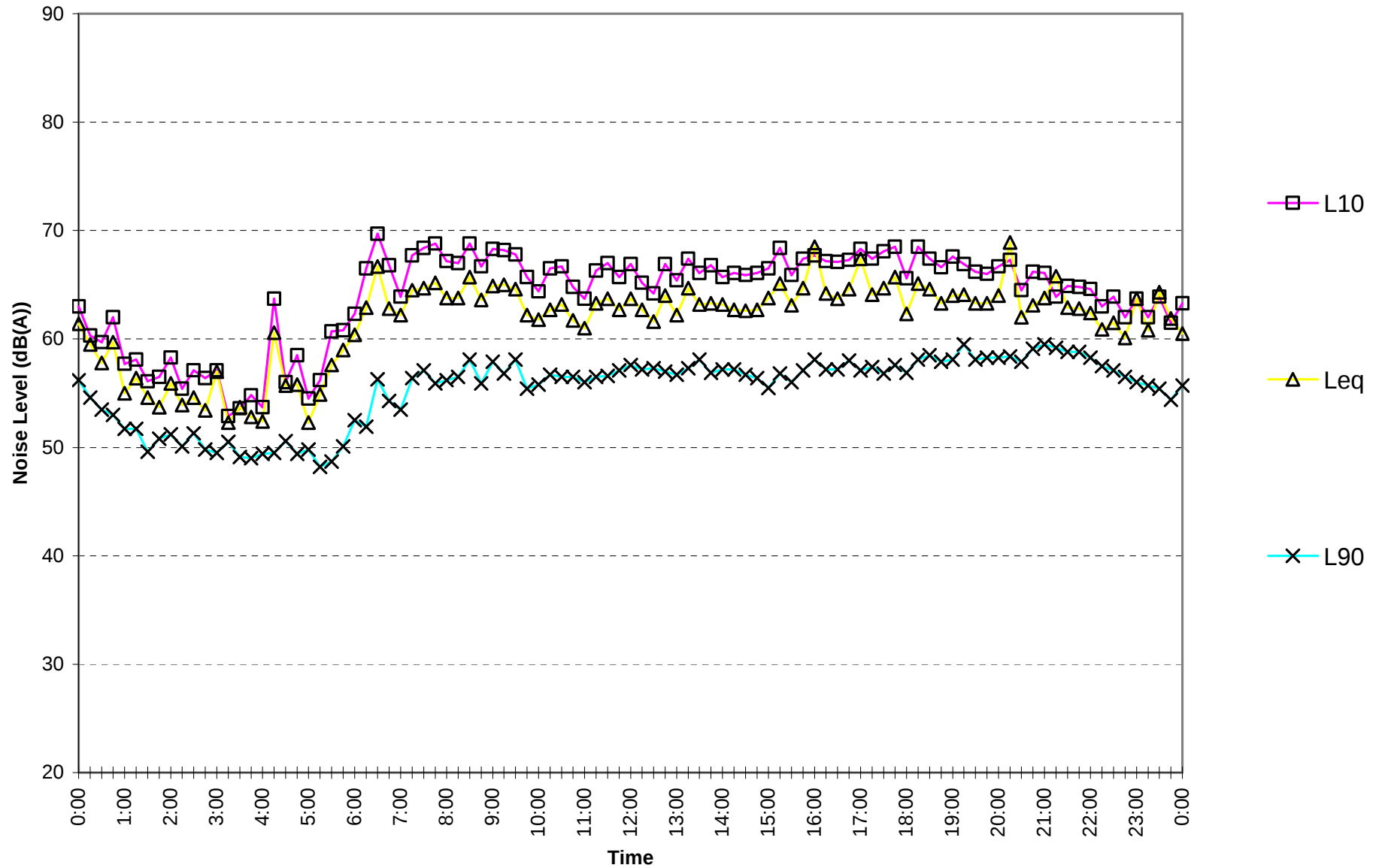
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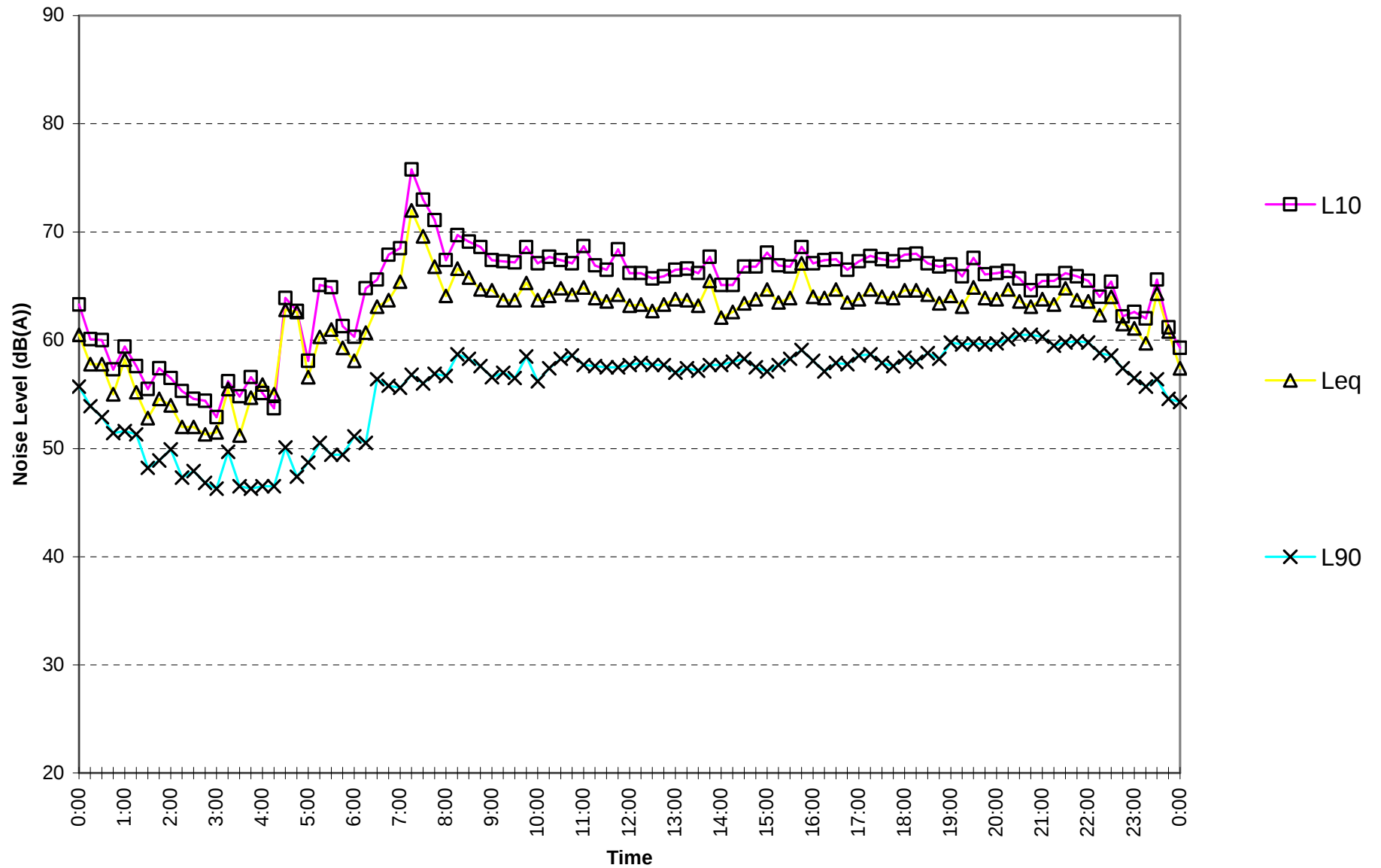
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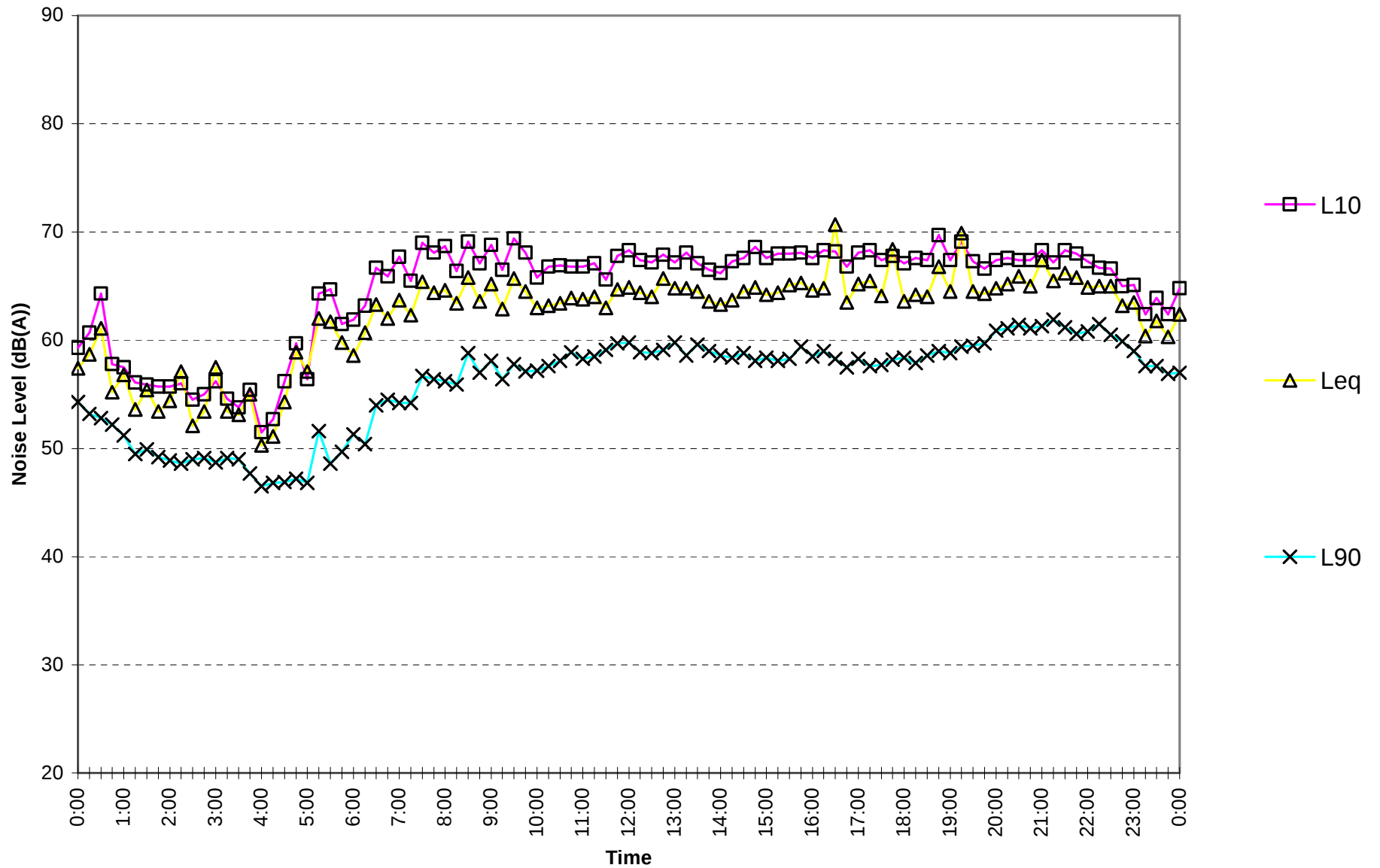
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Wednesday February 16, 2011



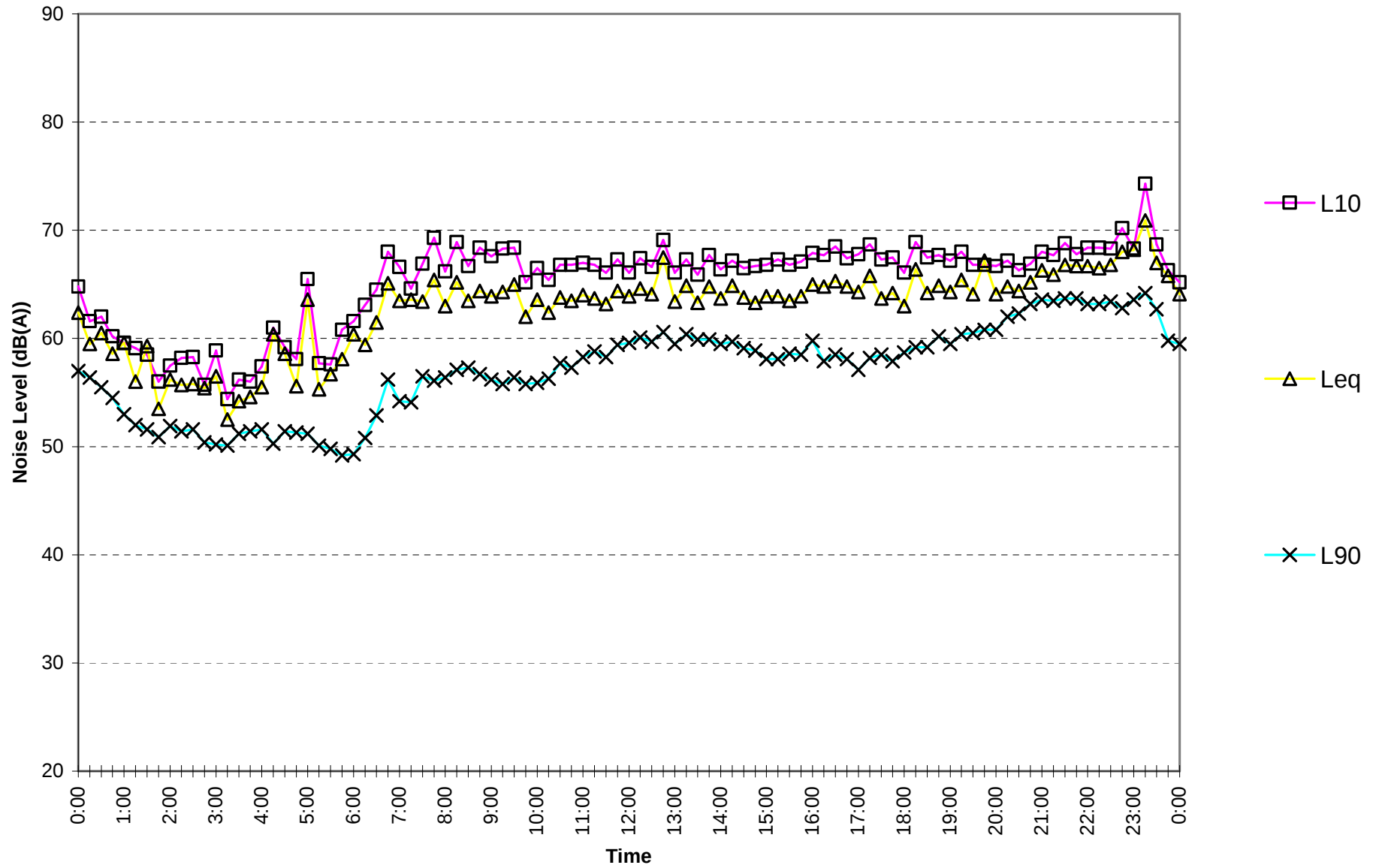
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Thursday February 17, 2011



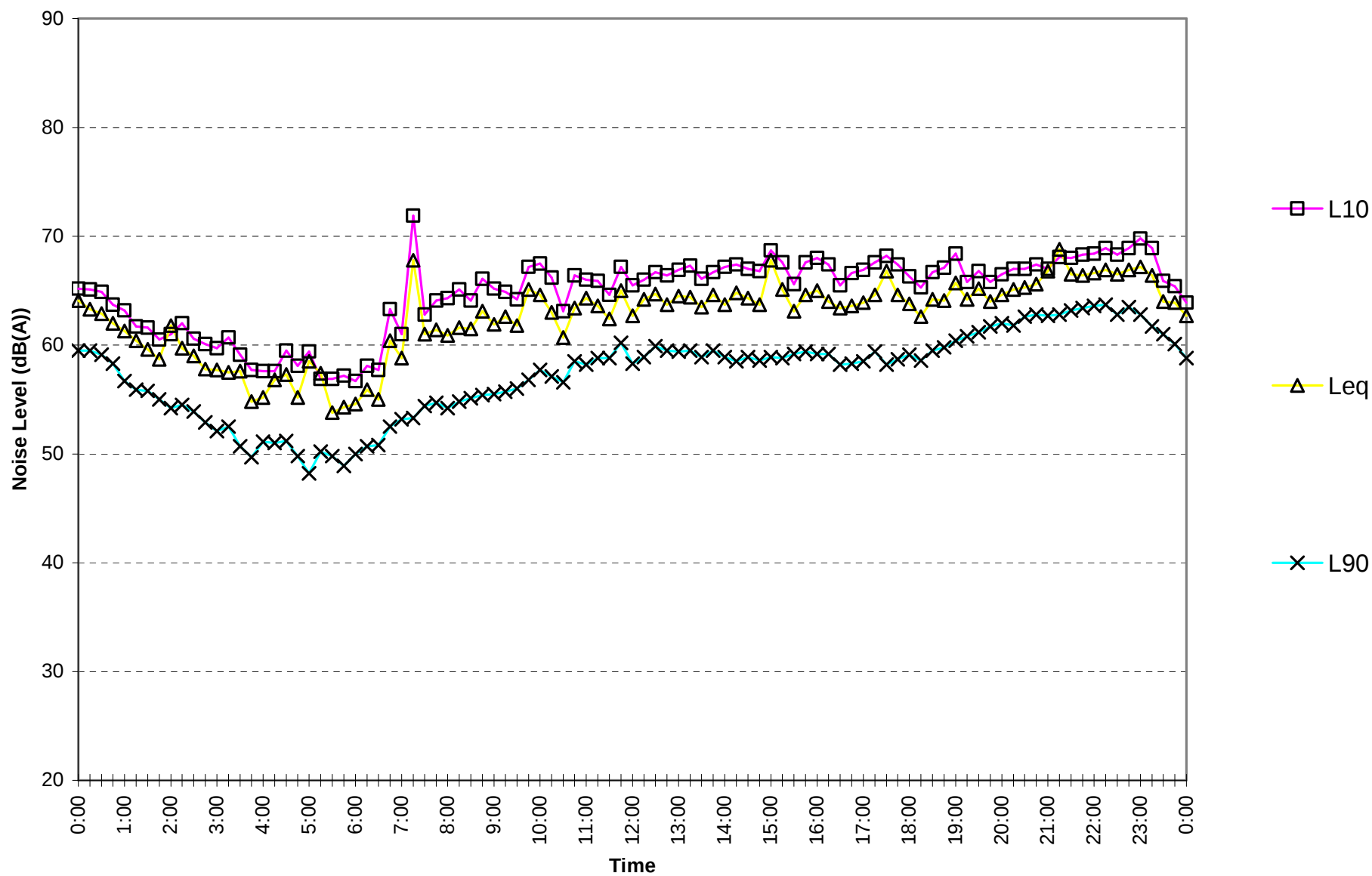
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Friday February 18, 2011



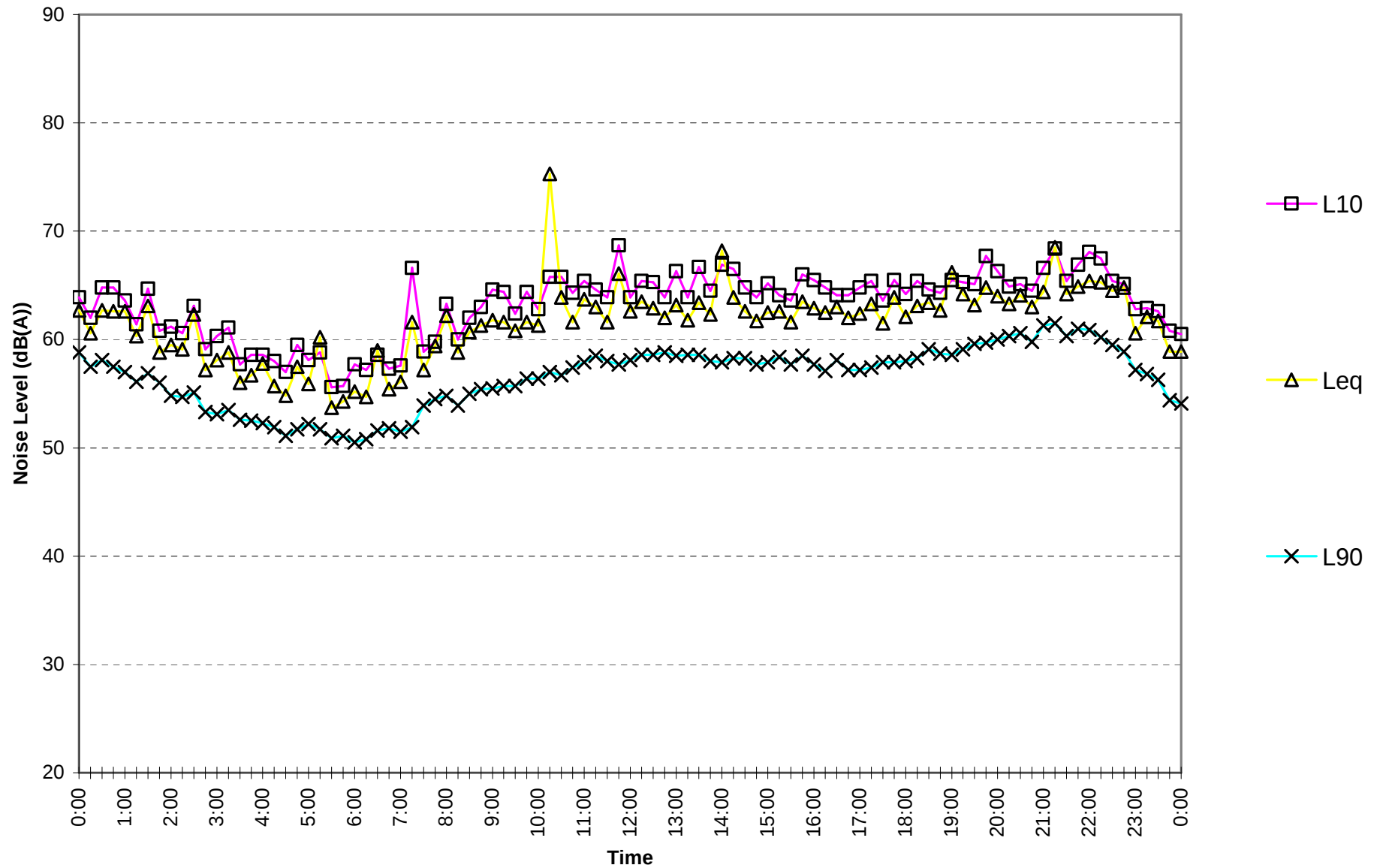
330 Church St.

Saturday February 19, 2011



330 Church St.

Sunday February 20, 2011



330 Church St.

Monday February 21,2011

