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Atkins Acoustics and Associates Pty Ltd.

Consulting Acoustical & Vibration Engineers

**NOISE ASSESSMENT
YENNORA DISTRIBUTION CENTRE
LOFTUS ROAD, GUILDFORD**

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Rev 02

Prepared for: Stockland
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1.0 INTRODUCTION

Stockland is seeking to amend part of the approved Yennora Distribution Park Masterplan and conditions of Development Consent No 264-09-01 dated January 2002. As part of detailed studies undertaken in 2001/2002, DUAP requested the preparation of a Masterplan Planning Report (Acoustics) prior to approving the Staged development of the YDC. The approved Masterplan included new multi-commodity warehousing buildings, more efficient use of the existing rail sidings and improved handling and distribution facilities.

The site is now known as Yennora Distribution Centre (YDC) (*Attachment 1*). This study has been prepared to address noise impacts associated with the redevelopment of Building 3 and the construction of Building 8A on the north western portion of the estate (*Attachment 2*). The main sources of operational noise identified and addressed in this study, include site forklift trucks and trucks.

The main aims of this study were:

- to review the existing site Consent Conditions (Noise);
- review ambient background noise trends;
- identify the main noise sources associated with the envisaged uses;
- model and evaluate the likely range of noise emissions from the envisaged uses; and
- recommend appropriate measures to ameliorate identified potential noise impacts.

Stockland is also seeking to amend the Development Consent to increase train movements into YDC from 10 to 14 per day. A separate report has been prepared to evaluate the acoustic impact of this and concludes the additional train movements would not contribute to additional cumulative noise from YDC or the noise projections detailed in this report.

The information presented in this report has been prepared for the particular investigation described herein, and should not be used in any other context or for any other purpose without the written approval of *Atkins Acoustics* and *Stockland*.

2.0 BACKGROUND

2.1 Minister Approval (Masterplan)

The Ministers 2002 Approval for YDC allowed for twenty-four (24) operating hours, seven (7) days a week.

The Approval allowed for a staged development of YDC set out long term development plans for the site, including:

- five new buildings on the site: Buildings 7, 8A, 8B and 9;
- alterations to Buildings 1 and 2;
- construction of new internal roads, parking, and container and general storage areas;
- construction of acoustic walls; and
- construction of a new vehicle entrance off Byron Road.

2.2 Council DCP

Council DCP (2013) Part D identifies that YDP is one of the most significant industrial sites in Sydney and the Holroyd local area. The DCP confirms that the site location, size, accessibility and the well developed railway infrastructure provides a strategically important asset having local, regional and state significance.

Councils vision for YDP is to maximise its efficient use and development as a strategic industrial property, which will be a major employment and business centre in Holroyd and the greater metropolitan area ^(DCP 2013).

Councils reported objectives for the site include enhancing the economical potential of the site as a major inter-modal distribution centre serving Western Sydney ^(DCP 2013).

Vehicle access to the site is provided on Dennistoun Avenue, Byron Road and Loftus Road. Truck site access and egress is restricted to Byron Road (south) and Loftus Road.

Rail access to the site is provided from the Main South Railway Line between Yennora and Guildford Railway Stations. The rail service is controlled by Interrail and time slots providing access to the railway network.

2.3 Residential Areas

Established residential areas in the vicinity of YDC and the Yennora Industrial Area are located on the north of Dennistoun Avenue and north-east of Byron Road/Carrington Road. More distant residential areas are located on the eastern side of the Main South Railway Line (Railway Street) and Orchardleigh Street (*Attachment 1*).

The residential properties to the north and north-east form an interface between the Yennora Industrial Precinct and residential areas. Over recent years Council has approved demolition of existing residential dwellings and the construction of new residential development at the interface.

Site investigations confirmed that the ambient noise in the residential areas is controlled by industrial sources, road and rail traffic, and local domestic activities.

2.4 Site Noise Sources

The main sources of semi continuous noise from the YDC include fork-lift trucks, road trucks and trains.

2.5 The Proposal

Stockland proposes to modify Development Consent No. 264-09-01 as follows:

- include the redevelopment of existing Building 3;
- amend the proposed configuration of new Building 8A (previously known as Building 9); and
- increase trains movement from 10 to 14 per day.

The application will be made via a Section 75W submission to the Department of Planning and Environment

2.6 Noise Control Management

To manage site noise emission associated with the proposal, the following measures and controls have been considered and adopted for modelling and assessing noise.

- Dependent on final tenant operational requirements and operating hours for Building 8 the extension of the return to the existing acoustic wall along southern side of the drainage easement (conceptually approximately 30 metres). The trigger for consideration of noise mitigation should be when the predicted or measured noise levels from the proposal are sustained and above consent conditions;
- dependent on final tenant operational requirements and operating hours, the finished floor, driveways and forecourt levels for Building 8A modifications to existing acoustics wall on the northern and western sides of Building 8A. to be approximately eight point four (8.4) metres above finished floor and driveway level. The trigger for consideration of noise mitigation should be when the predicted or measured noise levels from the proposal are sustained and above consent conditions;
- location of the service road to Building 8A to maximise acoustic shielding from the acoustic wall;
- the underside of the forecourt canopy no greater than six (6) metres above finished forecourt level;
- extension of the forecourt canopy (Building 8A) to approximately twelve (12);
- acoustic lining to the underside of the forecourt canopy to minimise reverberant noise;
- precast concrete wall panels upto 2400mm above finished floor level (Buildings 3 and 8A);
- roof cladding for Buildings 3 and 8A to incorporate insulation blanket with heavy density thermofoil or similar to provide a R_w 22 or greater;
- all permanent mobile plant operated onsite to be fitted with low level or broad band 'quaker' reversing alarms;
- site management plans to incorporate procedures to minimise the need to use truck horns;

- site management plans to incorporate procedures to ensure vehicle speeds onsite are less than 20kph;
- site management plan to incorporate procedures to close doors in the western facade of Building 8A (nighttime) when not required for building access or egress;
- site management plan to incorporate procedures to minimise the use of truck engine brakes and air release from brakes;
- replacement of onsite raised speed humps with alternative approved traffic speed management systems;
- site management plan to minimise requirements for trucks to reverse onsite.

3.0 REVIEW OF AMBIENT BACKGROUND NOISE

To assist with the assessment of noise trends in the area ambient background noise levels reported for October 1998 have been compared to measurements undertaken during 2014.

3.1 Reference Assessment Locations

The reference measurement/assessment locations are described in *Table 1*.

Table 1: Reference Measurement Locations

Reference Location		Measurement Locations
Location 1	69 Dennistoun Avenue	Front yard
Location 2	29 Dennistoun Avenue	Front yard
Location 3	64 Byron Road	Front yard

3.2 Instrumentation

The instrumentation used for the measurements consisted of RTA Technology Environmental Noise Loggers. The reference level of each instrument was checked before and after the measurement period with a Brüel & Kjær Sound Level Calibrator Type 4230, and remained within specification limits. In accordance with the EPA assessment procedures, the loggers were set to A-weighting, fast response, and fifteen (15) minute sampling periods. The noise loggers were placed on residential properties in free field conditions, therefore, no corrections have been applied to the measured levels.

3.3 Measurement Procedures

The noise levels were measured and assessed as percentile A-weighted sound levels. The levels regarded as being the most important amongst these, are the “ L_{A90} ”, the level exceeded for 90% of the sample period and referenced as the “background or average minimum noise level”, and the “ L_{Aeq} ”, which is the “A-weighted energy equivalent continuous (constant) sound level”.

From the measurement results and assessment procedures recommended in the EPA,

“Industrial Noise Policy”, the existing Rating Background Level (RBL) and the ambient L_{Aeq} noise levels were determined for each assessment period. The RBL represents the median of the tenth percentile background levels for each measurement period. The L_{Aeq} level represents the energy averaged noise level for each assessment period. The RBL’s and the amenity noise levels are used to determine the noise criteria for assessing noise from the proposal. For assessment purposes the periods are identified as day (7.00am to 6.00pm); evening (6.00pm to 10.00pm); and night (10.00pm to 7.00am).

3.4 Results

Site attended investigations during the survey periods identified that the noise environment of the area was controlled by industry, distant road and rail traffic, local traffic and domestic activities.

Table 2 presents a summary of the '98 and existing ambient noise levels for the daytime, evening and nighttime periods, the RBL and the ambient L_{Aeq} levels. A graphic representation of the existing ambient noise measurements is presented in *Attachment 3*.

Table 2 Ambient Background Sound Pressure Level Measurements
dBA re: 20×10^{-6} Pa

Location/Date	Assessment Background Level (L_{A90})			Equivalent Continuous Level (L_{Aeq})		
	Day	Evening	Night	Day	Evening	Night
Audit Measurement Results 1998						
Location 1: 69 Dennistoun Avenue						
Rating Background Level	43	42	41			
Logarithmic Average L_{Aeq}				58	57	53
Location 1: 29 Dennistoun Avenue						
Rating Background Level	43	41	38			
Logarithmic Average L_{Aeq}				58	58	54
Location 3: 64 Byron Road.						
Rating Background Level	43	41	39			
Logarithmic Average L_{Aeq}				57	54	53
Audit Measurement Results August 2014						
Location 1: 69 Dennistoun Avenue						
Rating Background Level	41	45	41			
Logarithmic Average L_{Aeq}				56	55	52
Location 1: 29 Dennistoun Avenue						
Rating Background Level	43	44	40			
Logarithmic Average L_{Aeq}				59	57	53
Location 3: 64 Byron Road.						
Rating Background Level	40	41	39			
Logarithmic Average L_{Aeq}				58	55	51

NOTE: Daytime : (7.00am to 6.00pm)
Evening : (6.00pm to 10.00pm)
Nighttime: (10.00pm to 7.00am)

The measurement results summarised in *Table 2* show that there has been no noticeable change in the ambient background noise levels over the past 15 years.

4.0 SITE NOISE GOALS

The Minister for Planning, Development Consent (No. 264-09-01) for the Yennora Distribution Park (YDP) now known as Yennora Distribution Centre (YDC) dated April 2002, sets out operational noise conditions for the site. *Table 3* presents a summary of Conditions 11 and 12. Resulting from access agreements with the residents at 64 Byron Road the property identified as 66 Byron Road was selected for noise monitoring and assessment.

Table 3 Operational Noise Assessment Goals.

dBA re: 20×10^{-6} Pa

Assessment Location	Intrusive Noise Goal			Amenity Noise Goal			Sleep Disturbance Goal
	$L_{Aeq,15min}$			$L_{Aeq,T}$			$L_{A1,1min}$
	Day	Evening	Night	Day	Evening	Night	Night
69 Dennistoun Avenue	48	47	46	65	47	43	56
29 Dennistoun Avenue	48	46	43	65	48	44	53
64 Byron Road	48	46	44	65	49	43	54

From the Minister Conditions *Table 4* provides a summary of the Project Noise Goals referenced in the Site Operational Noise Management Plan

Table 4: Project Noise Assessment Goals

dBA re: 20×10^{-6} Pa

Assessment Location	Sound Pressure Level			
	Intrusive Noise			Sleep Arousal
	L_{Aeq} dBA			$L_{A1,1min}$
	Day	Evening	Night	Night
Location 1. 69 Dennistoun Avenue	48	47	43	56
Location 2. 29 Dennistoun Avenue	48	46	43	53
Location 3. 64 Byron Road	48	46	43	54

5.0 OPERATIONAL SITE NOISE SOURCES

The main identified sources of noise associated with the proposed new Buildings 3 and 8A include internal forklifts, trucks maneuvering and mechanical plant servicing the administration buildings.

5.1 Continuous Transient Noise Sources

The semi continuous noise sources would be associated with forklift trucks and onsite trucks. Audit measurements conducted at the existing site established the level of noise from typical operations and activities. *Table 5* presents a summary of the sound power levels established and adopted for the noise modelling.

Table 5: Operational Source Sound Power Levels
L_{eq} dB re: 10⁻¹² Watts

Source Description	A-weighted Level dBA	Octave Band Sound Power Levels dB re: 10 ⁻¹² Watts							
		63	125	250	500	1K	2K	4K	8K
Yard Fork Lift Trucks (SEL)	96	92	93	90	92	91	91	86	84
Trucks (SEL)	120	117	121	120	116	113	113	110	99

5.2 Intermittent Transient Noise Sources

The main intermittent transient noise sources identified from site activities include impact noise from forklifts, reversing alarms and trucks exhausts. To control the noise from forklift reversing alarms, it is recommended that level varying reversing alarms be fitted to the permanent site plant. Additionally, to manage and minimise noise impacts from truck movements, the site layout has been developed to reduce the need for trucks to reverse and it is recommended that the site be sign posted in regards to the use of air brakes. *Table 6* presents a summary of the sound power levels from truck airbrakes. Noise levels from truck horns and fork truck tyres (impact) are typically 10-15dBA less than from truck airbrakes exhaust.

Table 6: Maximum Sound Power Levels from Transient Sources
dBA re:10⁻¹² W

Source Description	A-weighted Level	Octave Band Sound Power Levels (Hz)								
	dB(A)	dB re: 10 ⁻¹² Watts								
		31	63	125	250	500	1K	2K	4K	8K
Truck Airbrakes	119	105	110	104	95	101	106	109	114	116

6.0 OPERATIONAL SITE NOISE PREDICTIONS

Operational noise from the site was modelled with the Environmental Noise Model (ENM) computer model. The ENM model approved by the NSW Environment Protection Authority for assessing environmental noise, takes into account attenuation factors such as distance, ground coverage, atmospheric absorption, topographical features and shielding from barriers and structures. For the purpose of the noise modelling, calm, 20°C, 70% relative humidity meteorological conditions were adopted

The model input data for the terminal was based on ground contours from 1:10,000 topographical maps, shielding provided by existing and proposed buildings and structures and noise reductions provided by building cladding.

6.1 Operational Noise

Noise modelling for the envisaged operational activities was based on the site activities discussed and twenty-four hour, seven (7) day operations. The noise modelling adopted a conservative worst case scenario, ie., the cumulative effects of all noise sources operating simultaneously. Where plant and equipment is operated inside buildings, a noise reduction of 15dB(A) was assumed.

Table 7 presents a summary of the project assessment goals, noise modelling results for Buildings 8A and 3, and the cumulative noise from the overall site.

Table 7: Operational Noise Predictions

L_{Aeq} dB(A) re: 20×10^{-6} Pa

Reference Assessment Location	Project Assessment Goals			Predicted Sound Pressure Levels	
	L_{Aeq} dBA			L_{Aeq} dBA	
	Day	Evening	Night	Contribution (B'Ids 8A + 3)	Cumulative Sound Pressure Level (Overall Site)
69 Dennistoun Avenue	48	47	43	31	42
29 Dennistoun Avenue	48	46	43	19	43
64 Byron Road	48	46	43	12	40

6.2 Intermittent Noise Sources

The results of the noise modelling for intermittent sources are summarised in *Table 8*. The results show that the nighttime disturbance goals are satisfied. Noise from truck horns and fork truck tynes (impact) are typically 10-15dBA less than from truck airbrakes exhaust.

Table 8: Intermittent Noise Predictions

$L_{A1, 1 min}$ dB(A) re: 20×10^{-6} Pa

Reference Assessment Location	Sound Pressure Level $L_{A1, 1 min}$ dB(A)	
	Intrusive Goal	Predicted Sound Pressure Level
Location 1: 69 Dennistoun Road		
Airbrakes	56	36
Location 2: 29 Dennistoun Road		
Airbrakes	53	25
Location 3: 64 Byron Road		
Airbrakes	54	11

7.0 ASSESSMENT

Stockland is seeking to amend the approved Yennora Distribution Park Masterplan and conditions of Development Consent No 264-09-01, dated January 2002. As part of detailed studies undertaken in 2001/2002 DUAP requested the preparation of a Masterplan Planning Report (Acoustics) prior to approving the Staged development of the YDP.

The Minister for Planning, Development Consent (No. 264-09-01) for the Yennora Distribution Park (YDP) now known as Yennora Distribution Centre (YDC) dated April 2002, sets out operational noise conditions for the site. As part of this proposal Stockland propose to redevelop Building 3 and construct Building 8A. The main sources of operational noise identified and addressed in this study include forklift trucks and site trucks. It is understood that Building 8A would not provide for handling or storage of containers.

Operational noise for Buildings 3 and 8A was modelled with the Environmental Noise Model (ENM) computer model. The modelling results have shown that noise from the proposal and the cumulative noise from the whole site can be controlled to satisfy the Ministers Consent Conditions (Noise).

To minimise noise from the proposed development and control noise exposure for nearby residential receivers, the report presents management and noise controls options for the site.

ATTACHMENT 1: SITE LOCATION

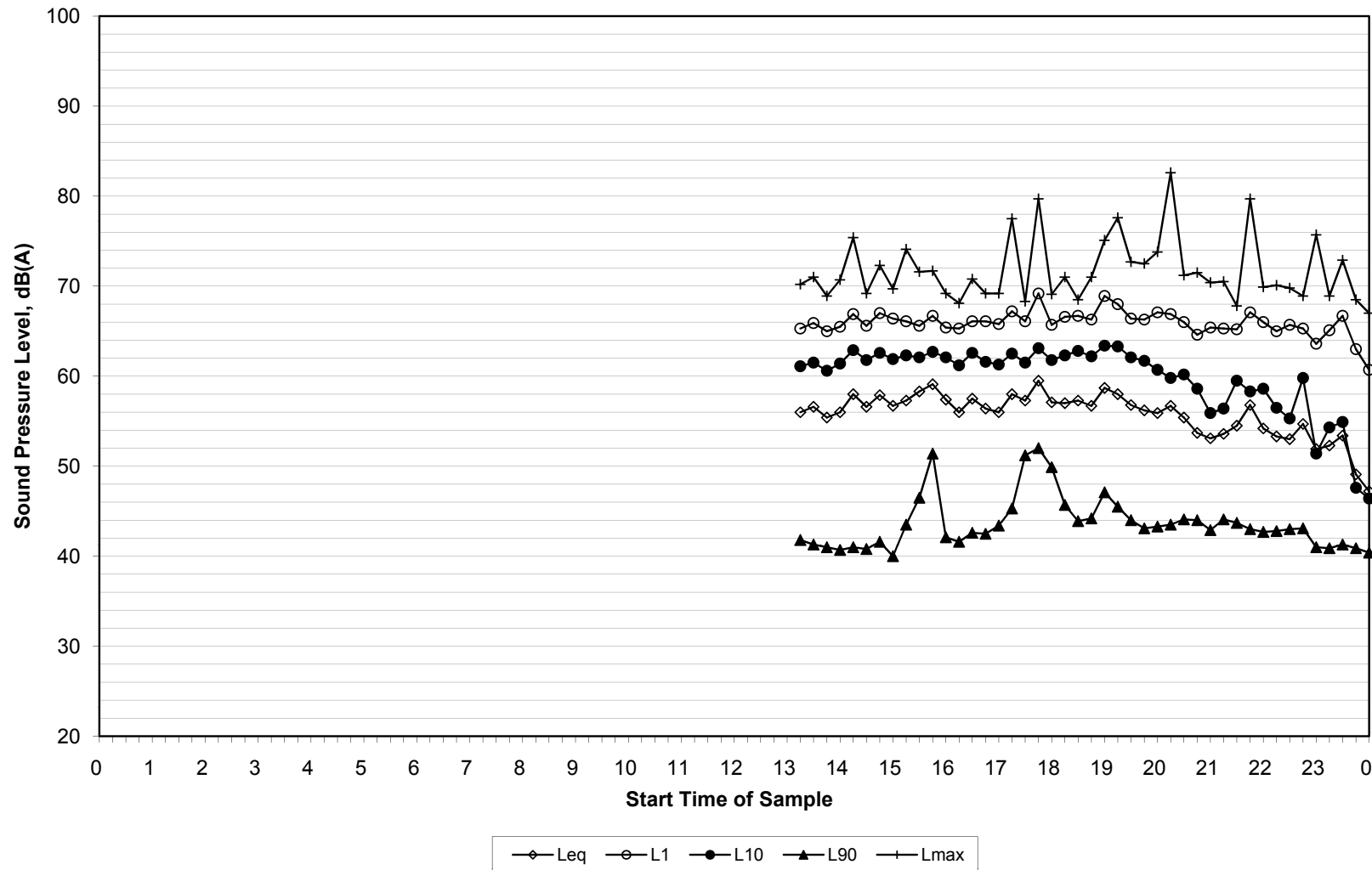


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ATTACHMENT 3: AMBIENT BACKGROUND NOISE MEASUREMENTS

Ambient Sound Pressure Levels

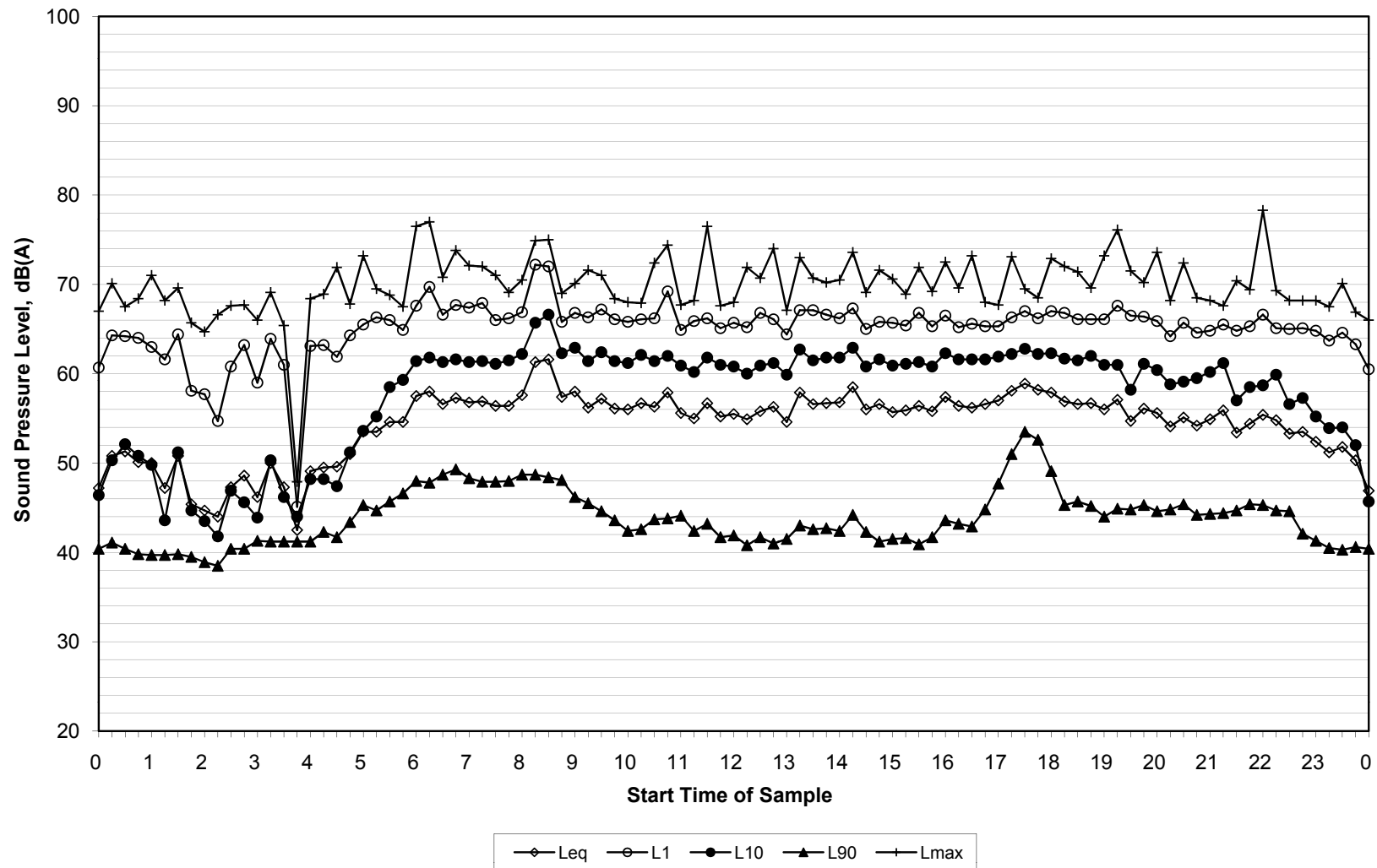
Tuesday, 19 May 2015



Location 1
69 Dennistoun Avenue, Guildford West

Ambient Sound Pressure Levels

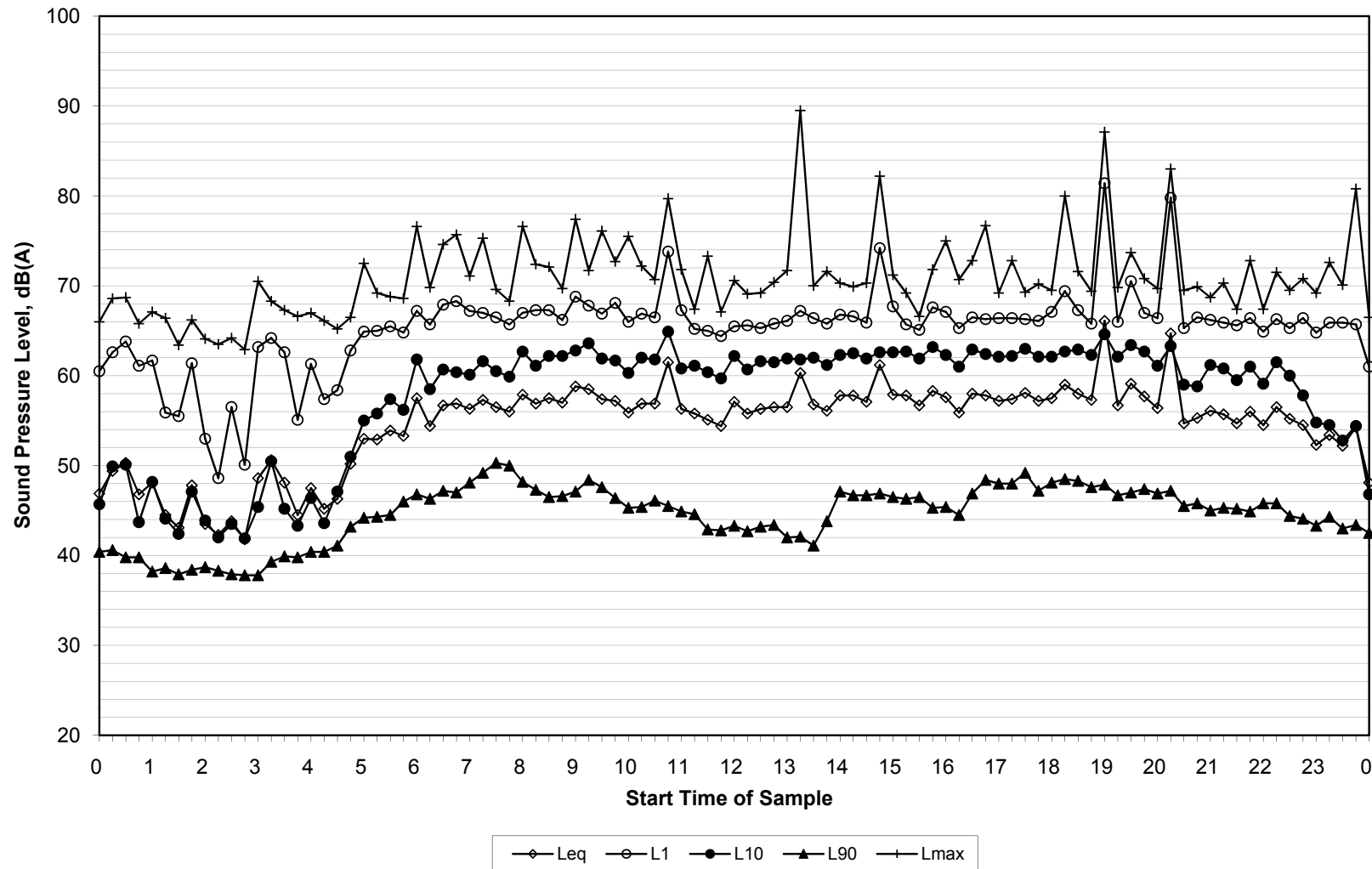
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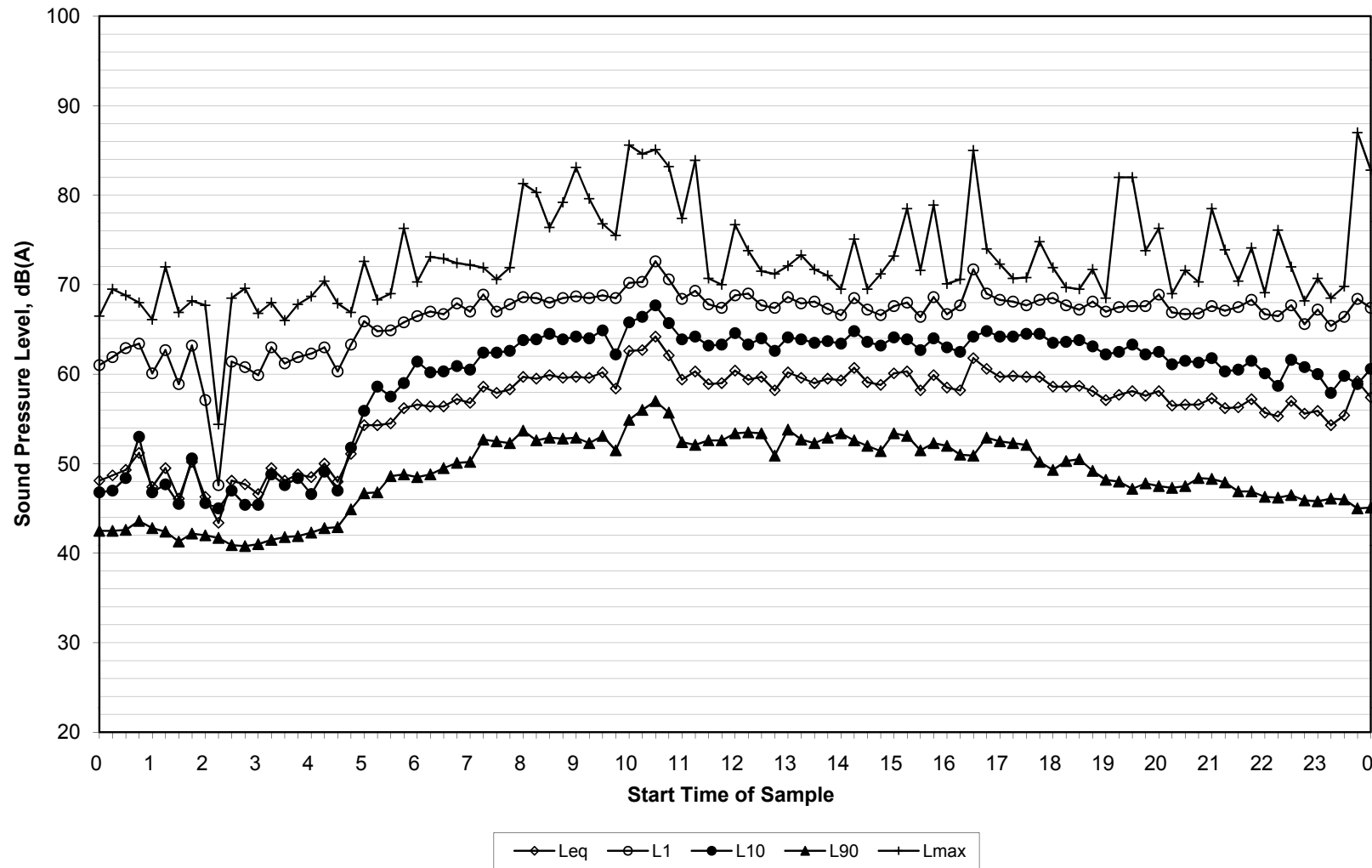
Thursday, 21 May 2015



Location 1
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Ambient Sound Pressure Levels

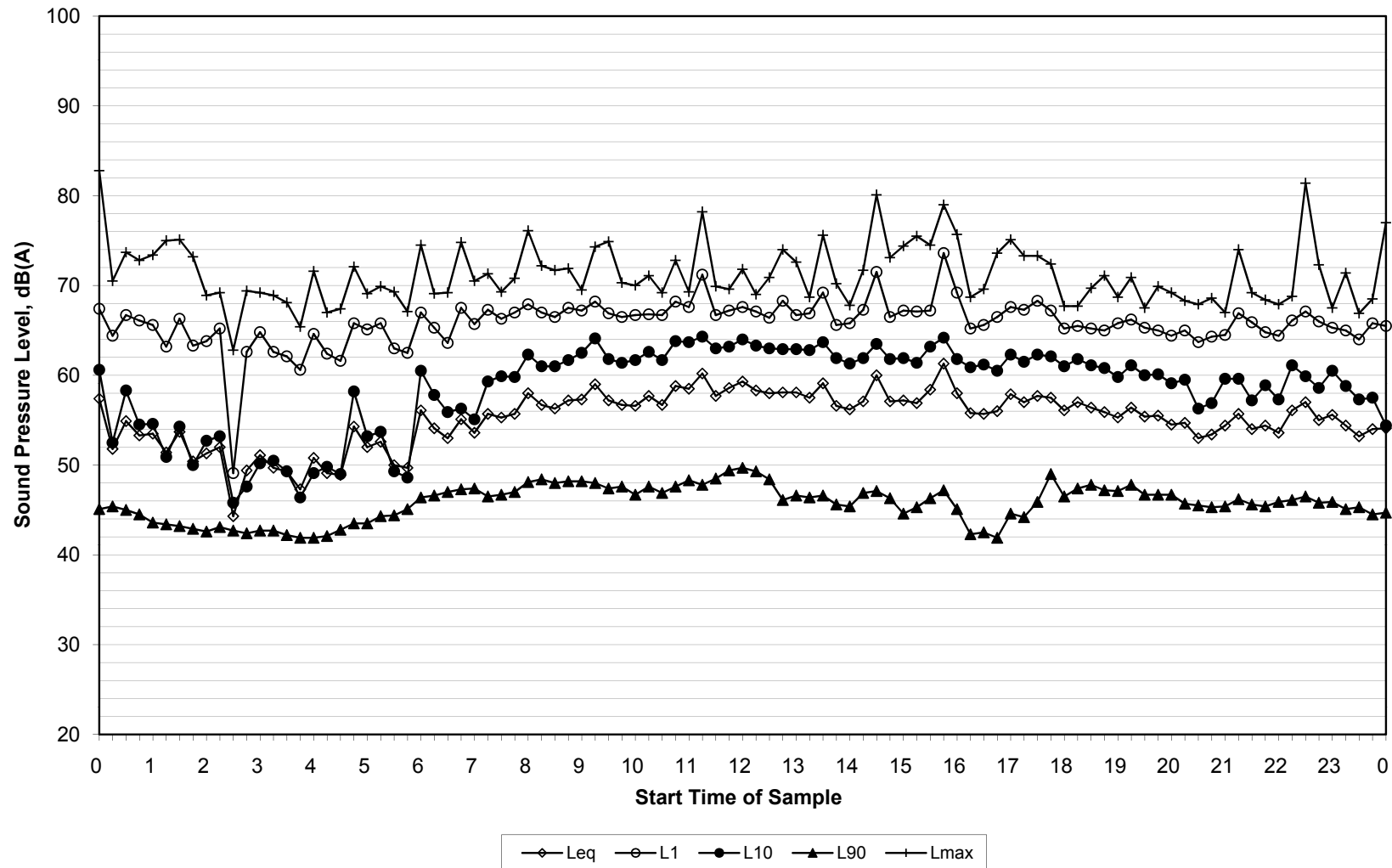
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Location 1
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Ambient Sound Pressure Levels

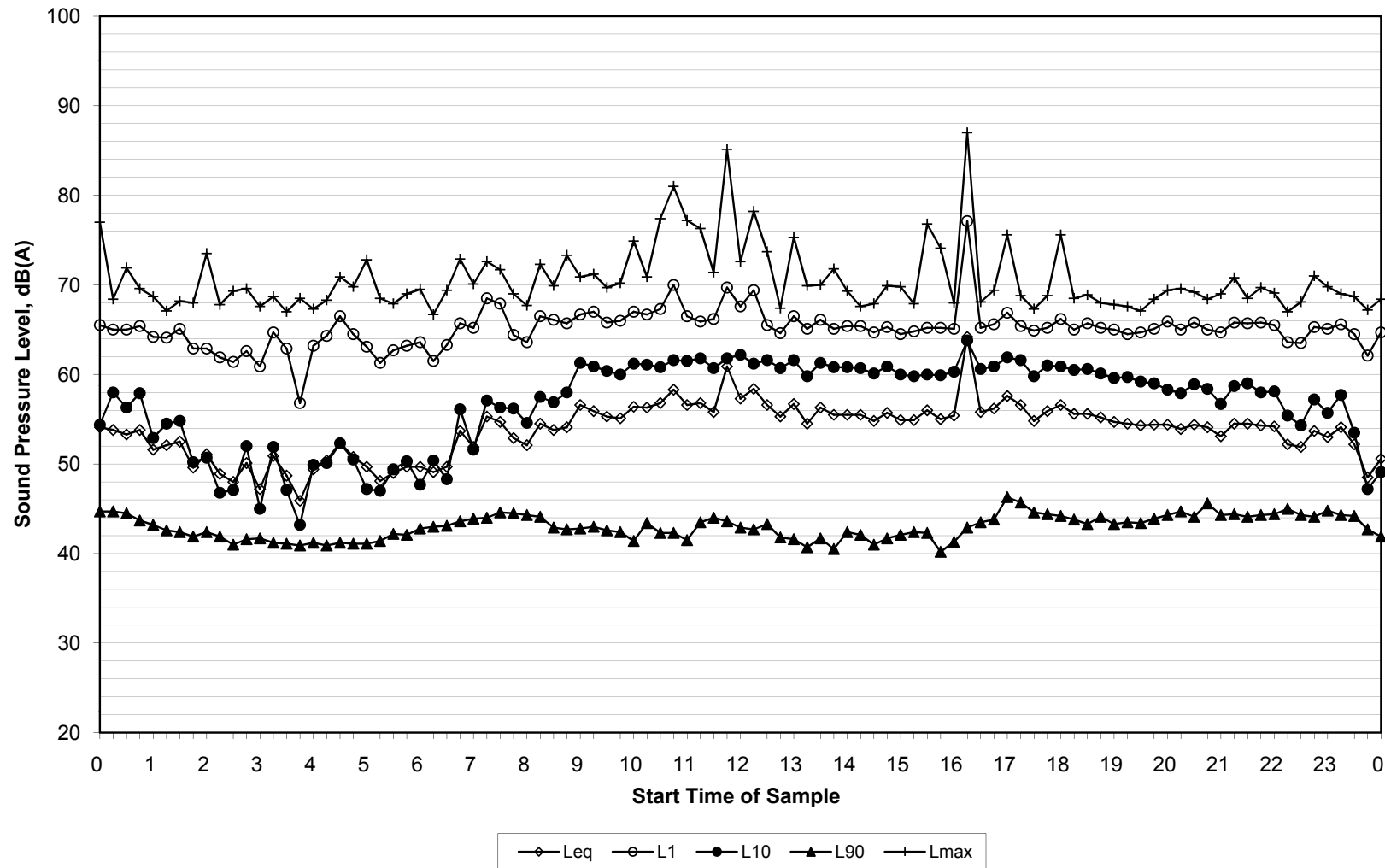
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Location 1
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Ambient Sound Pressure Levels

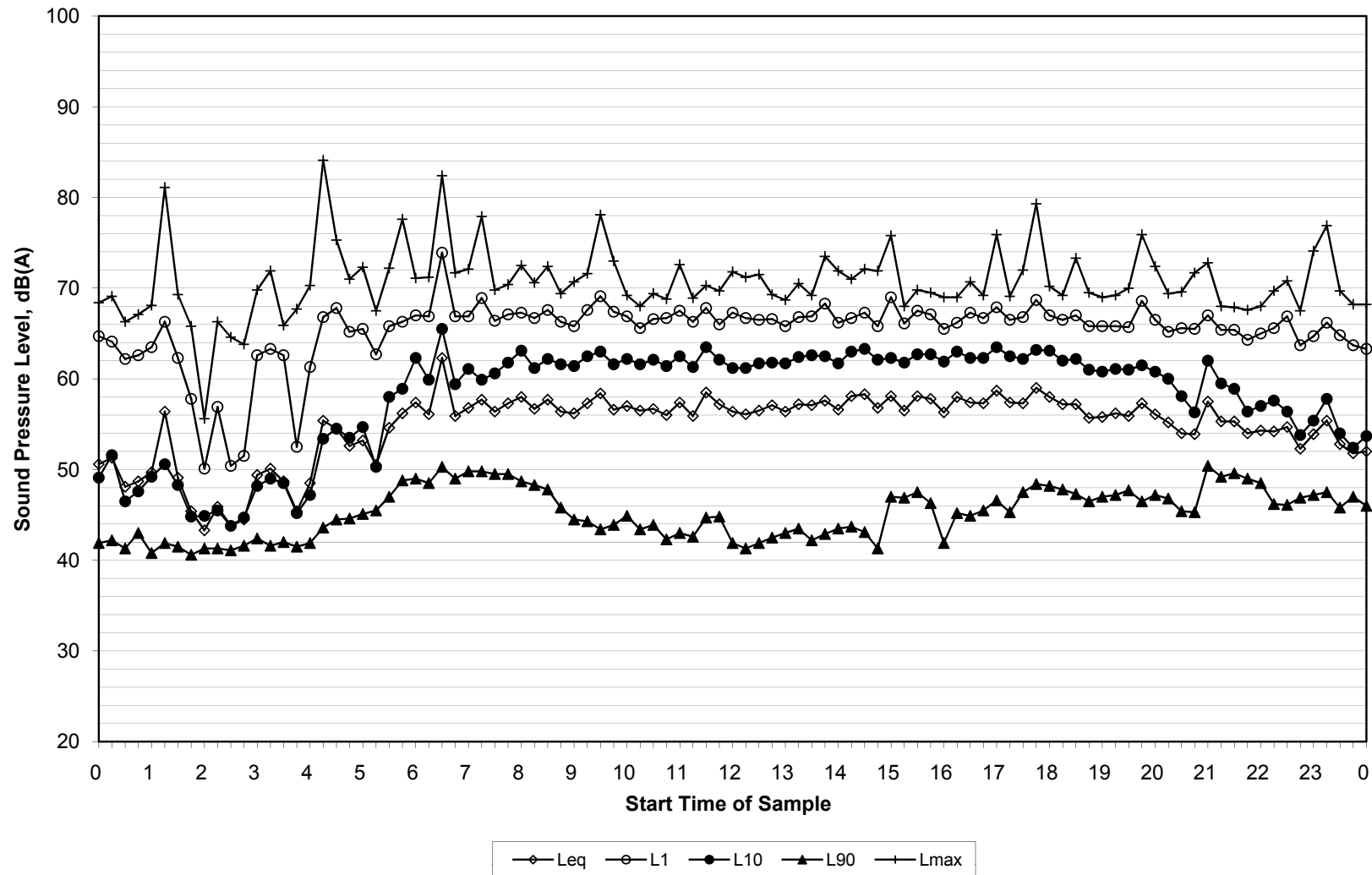
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Location 1
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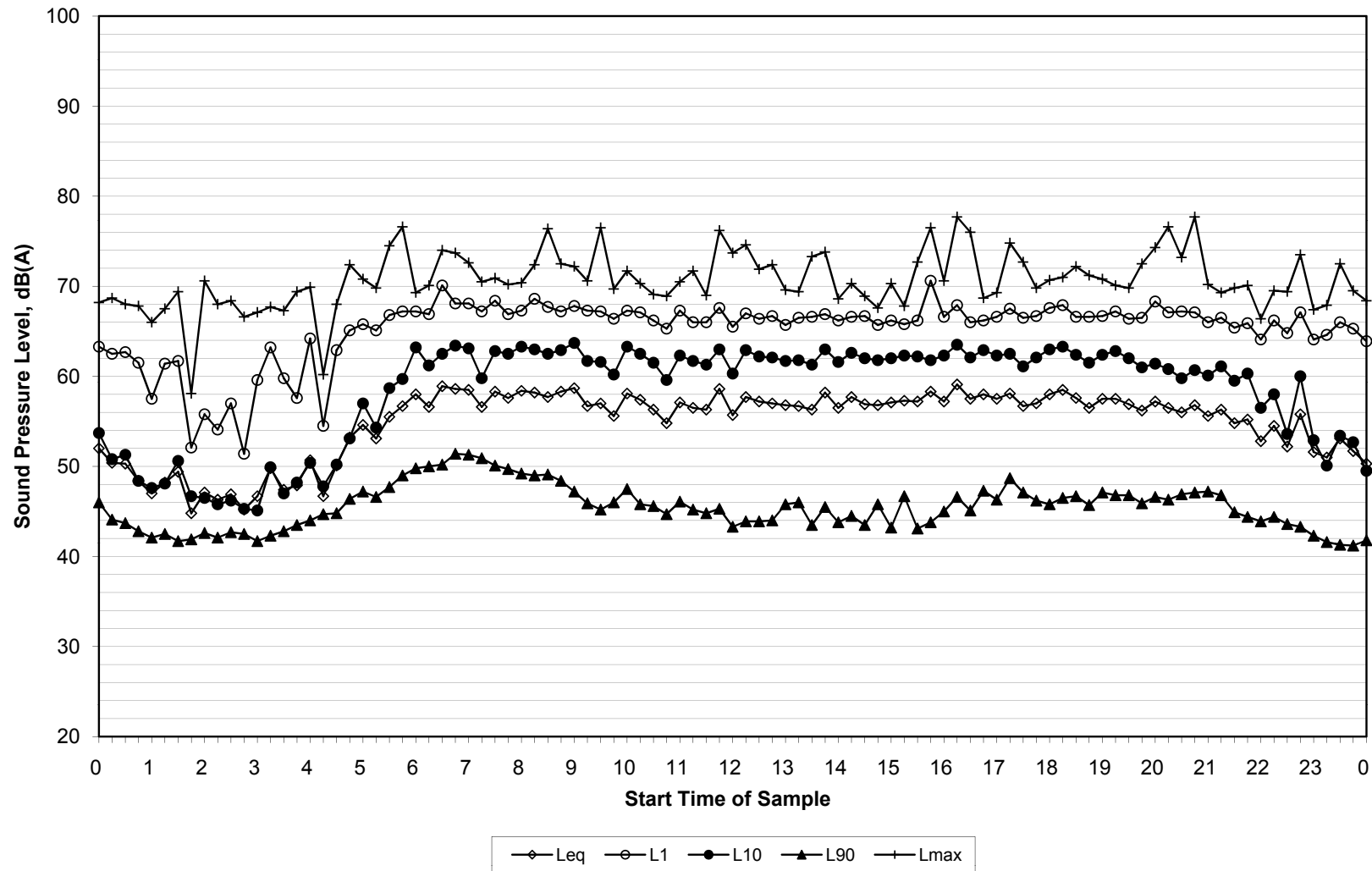
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Location 1
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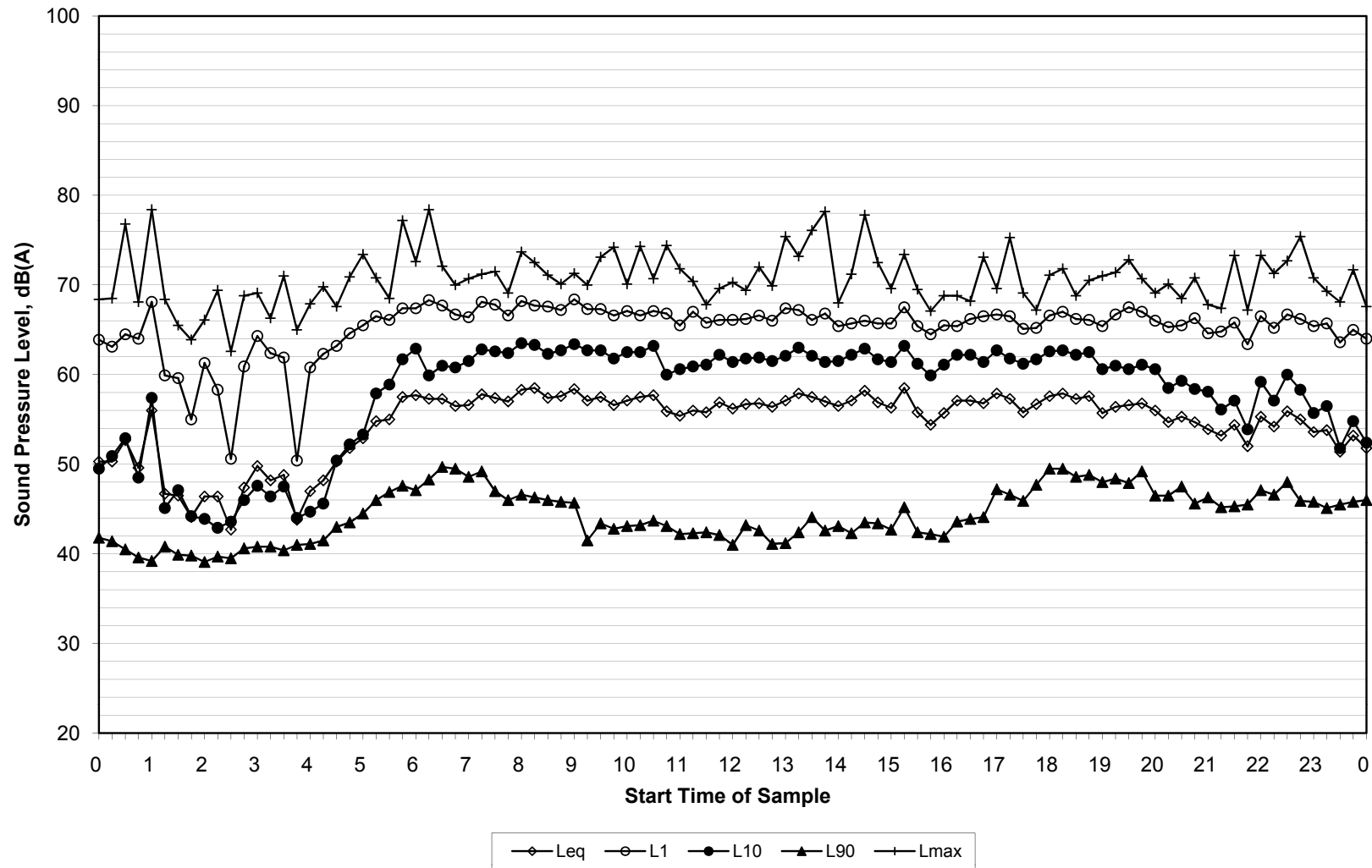
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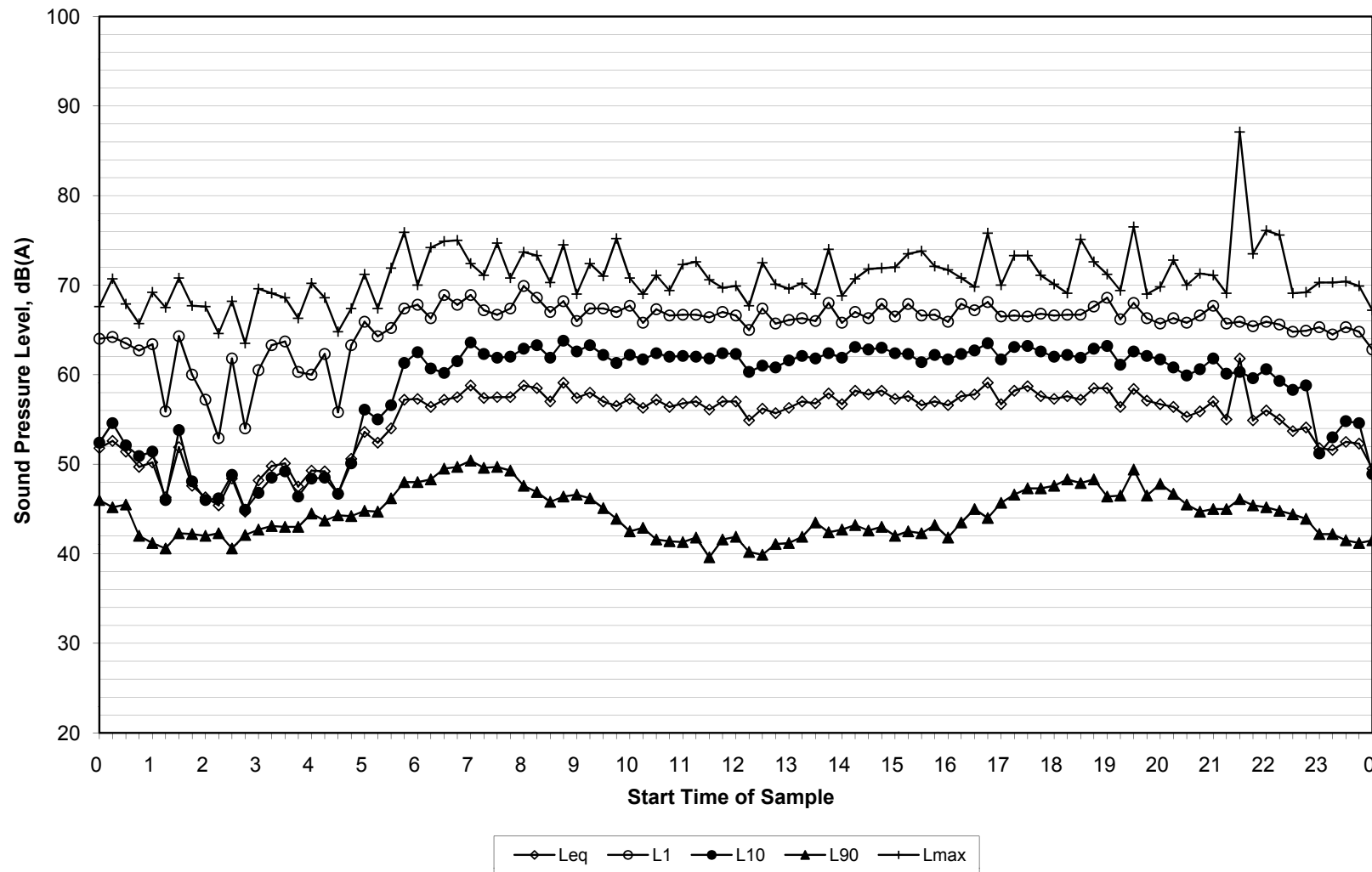
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Location 1
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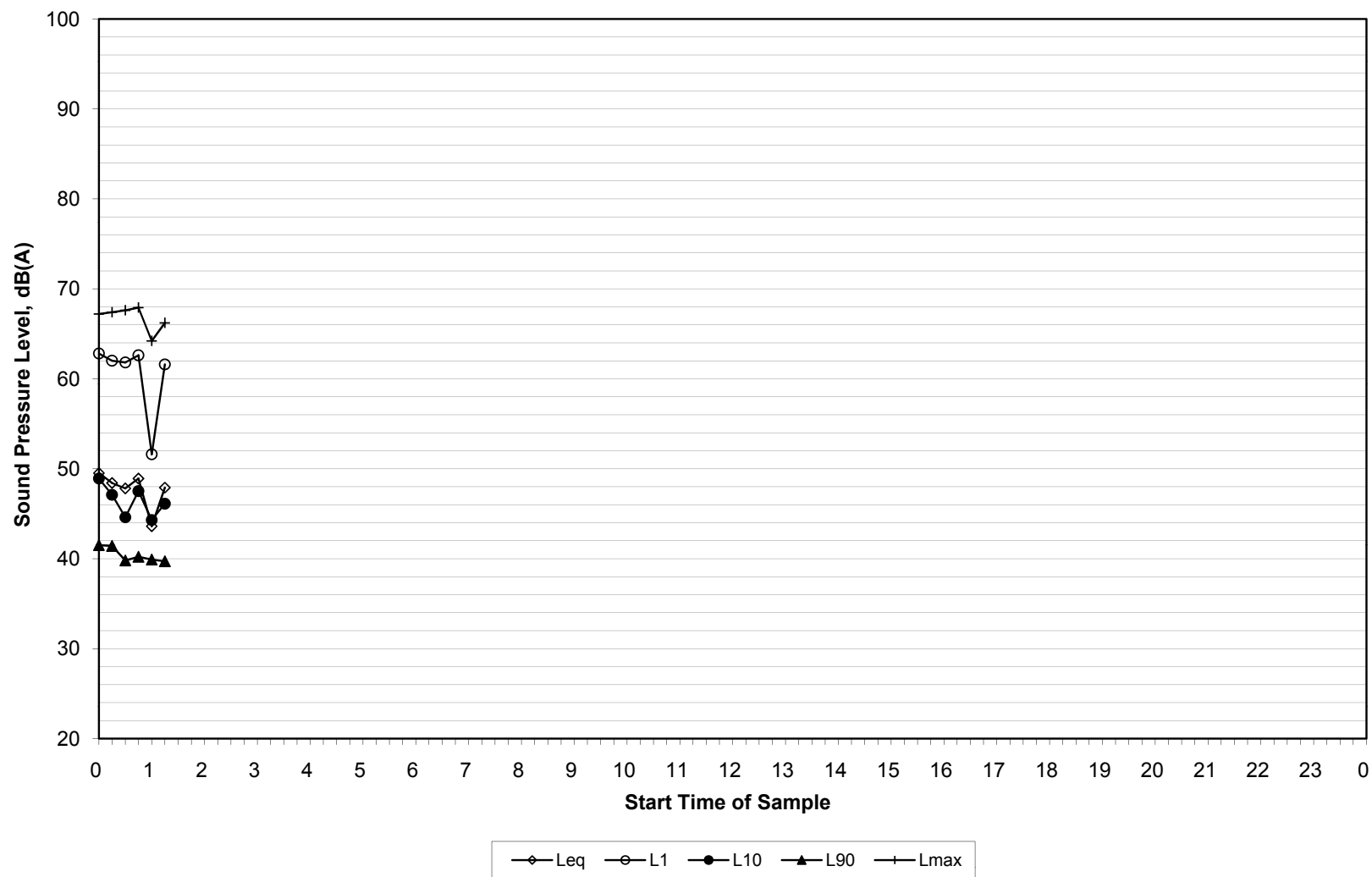
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Location 1
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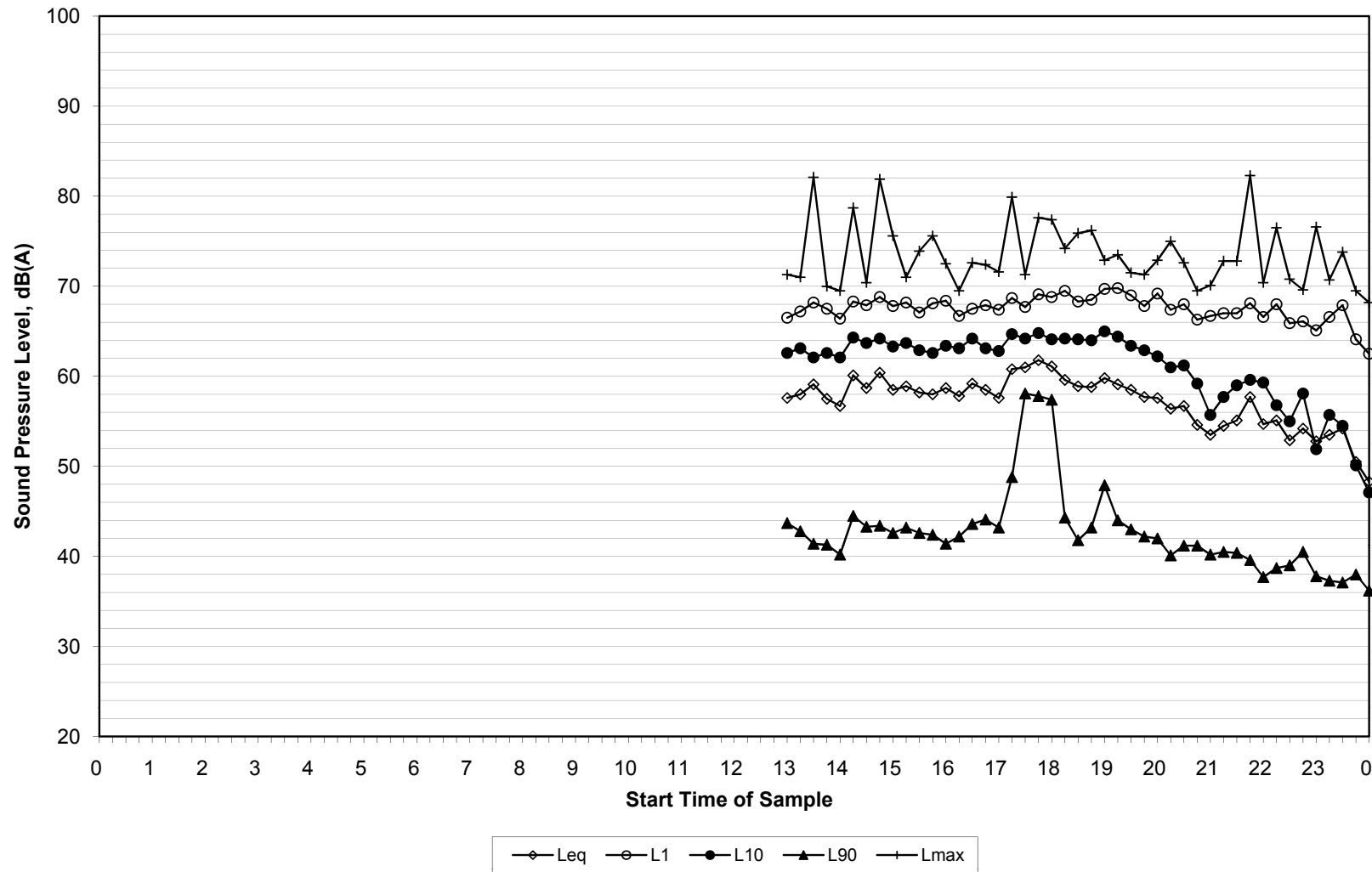
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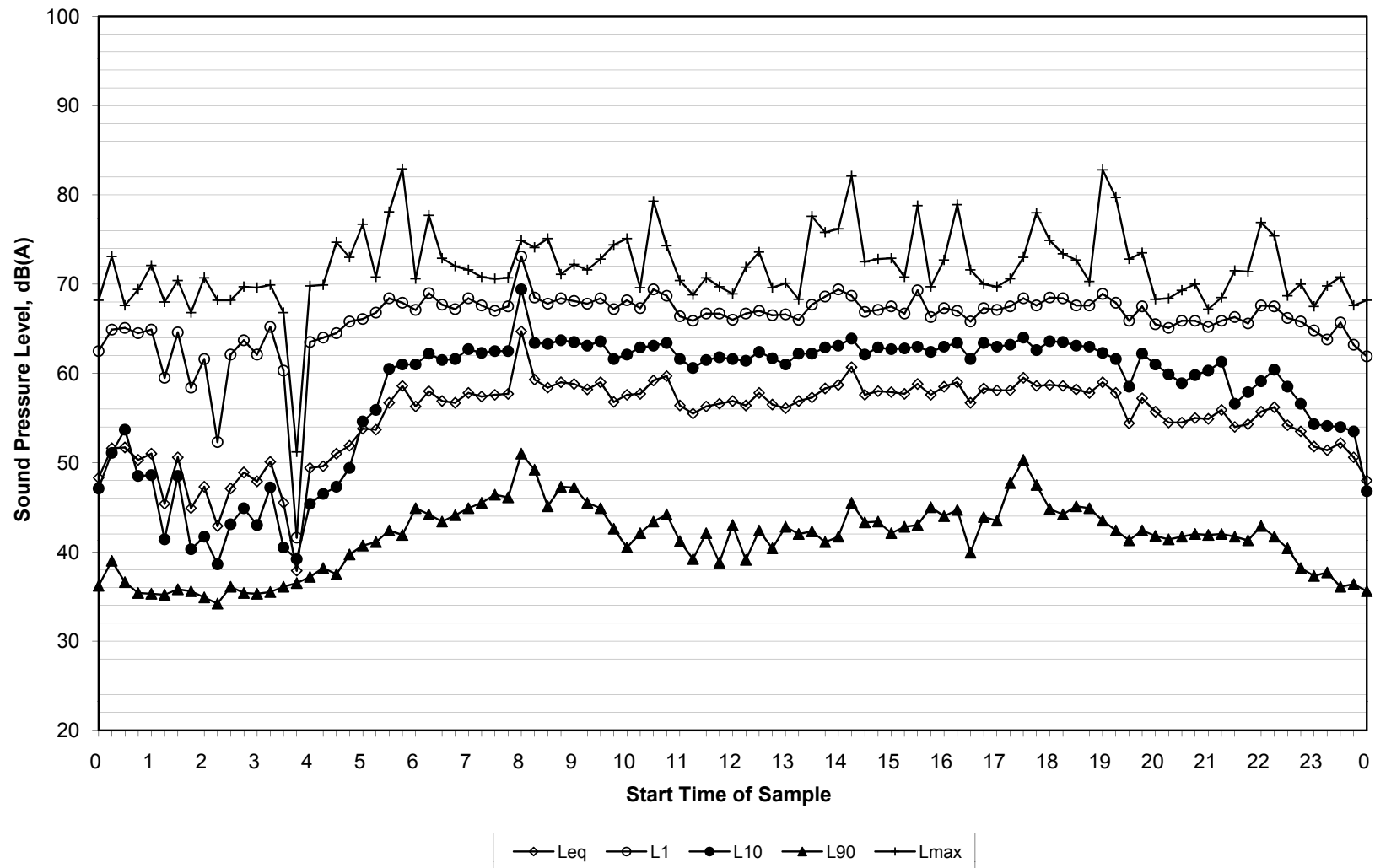
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Location 2
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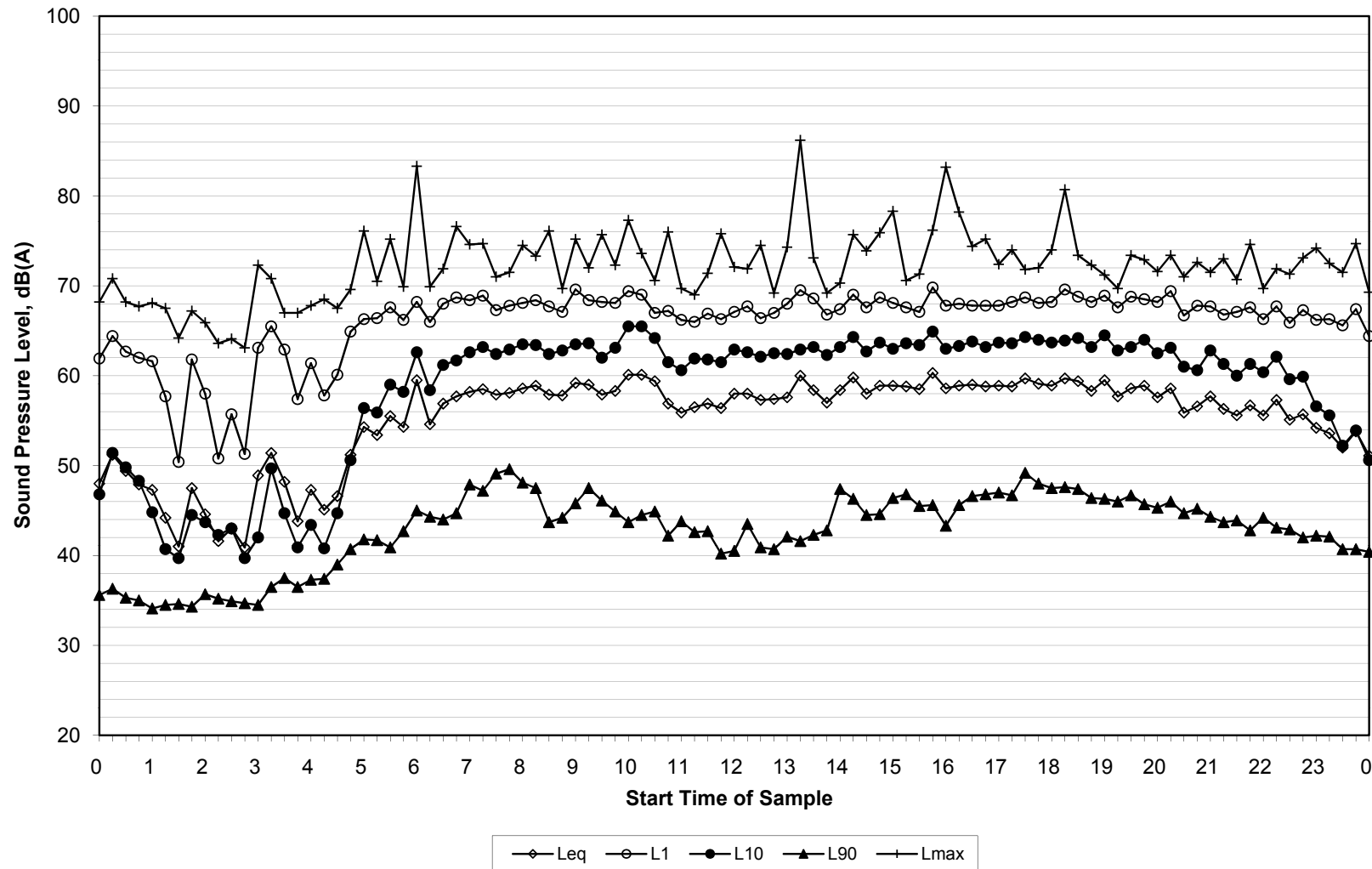
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Location 2
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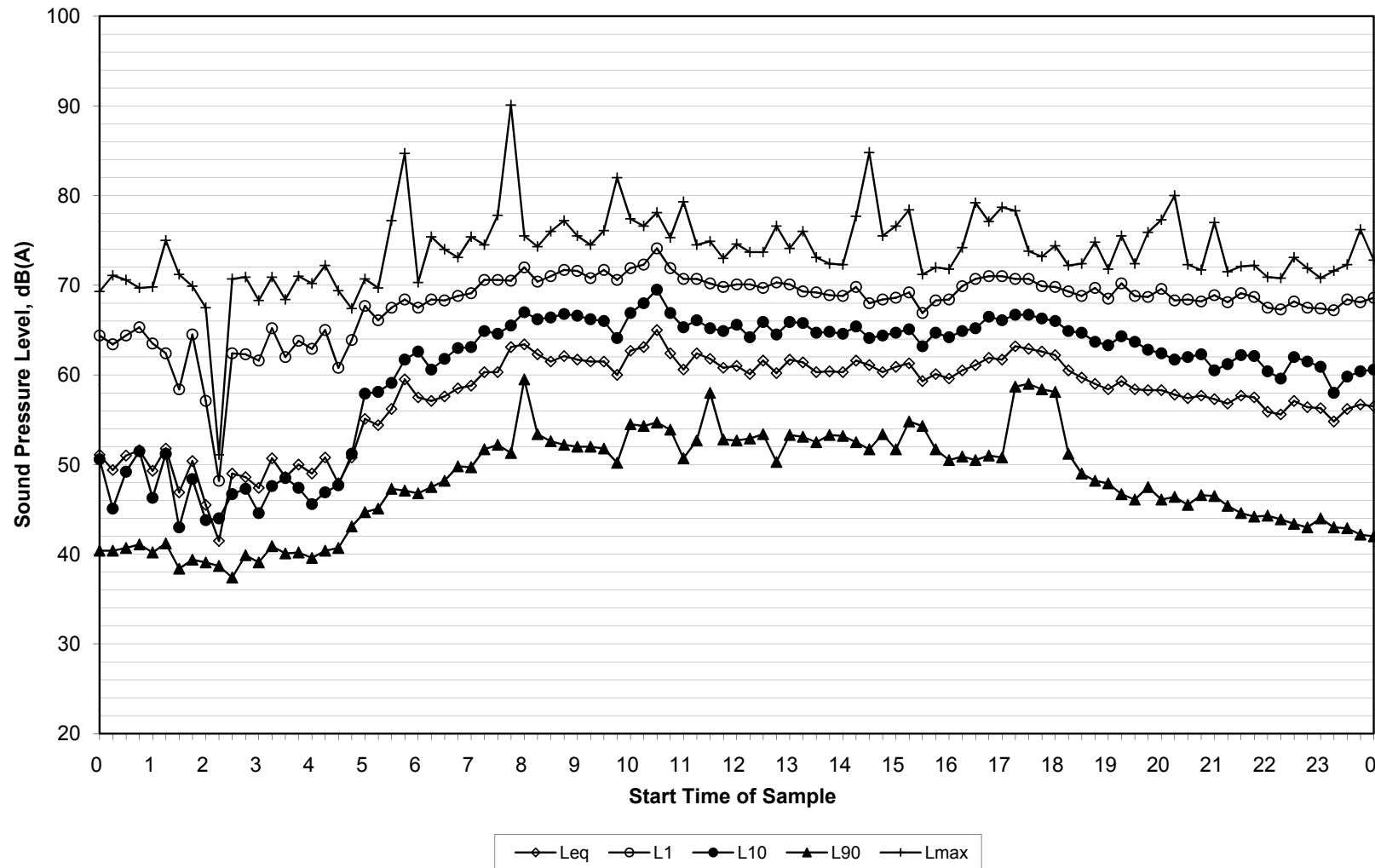
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Location 2
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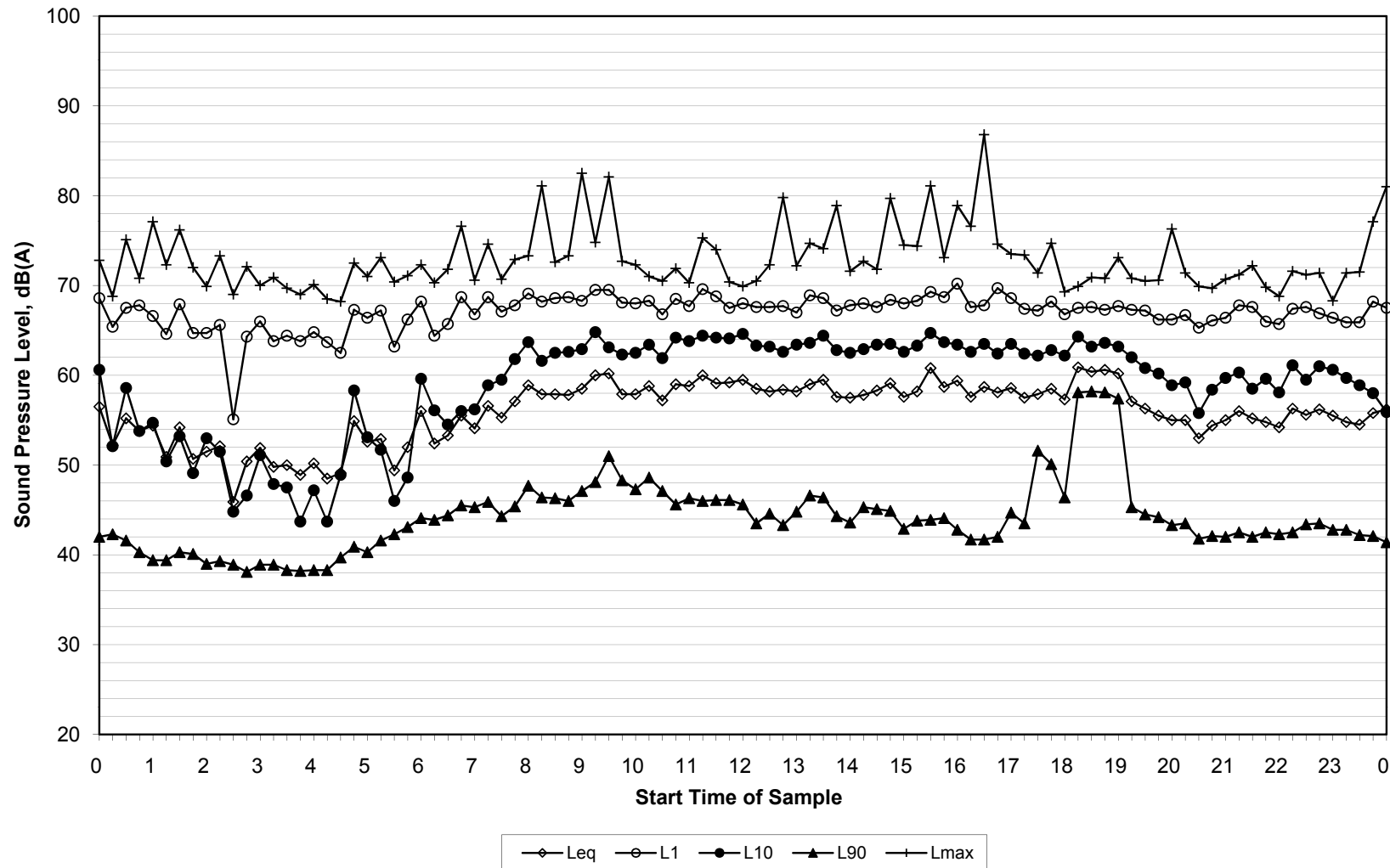
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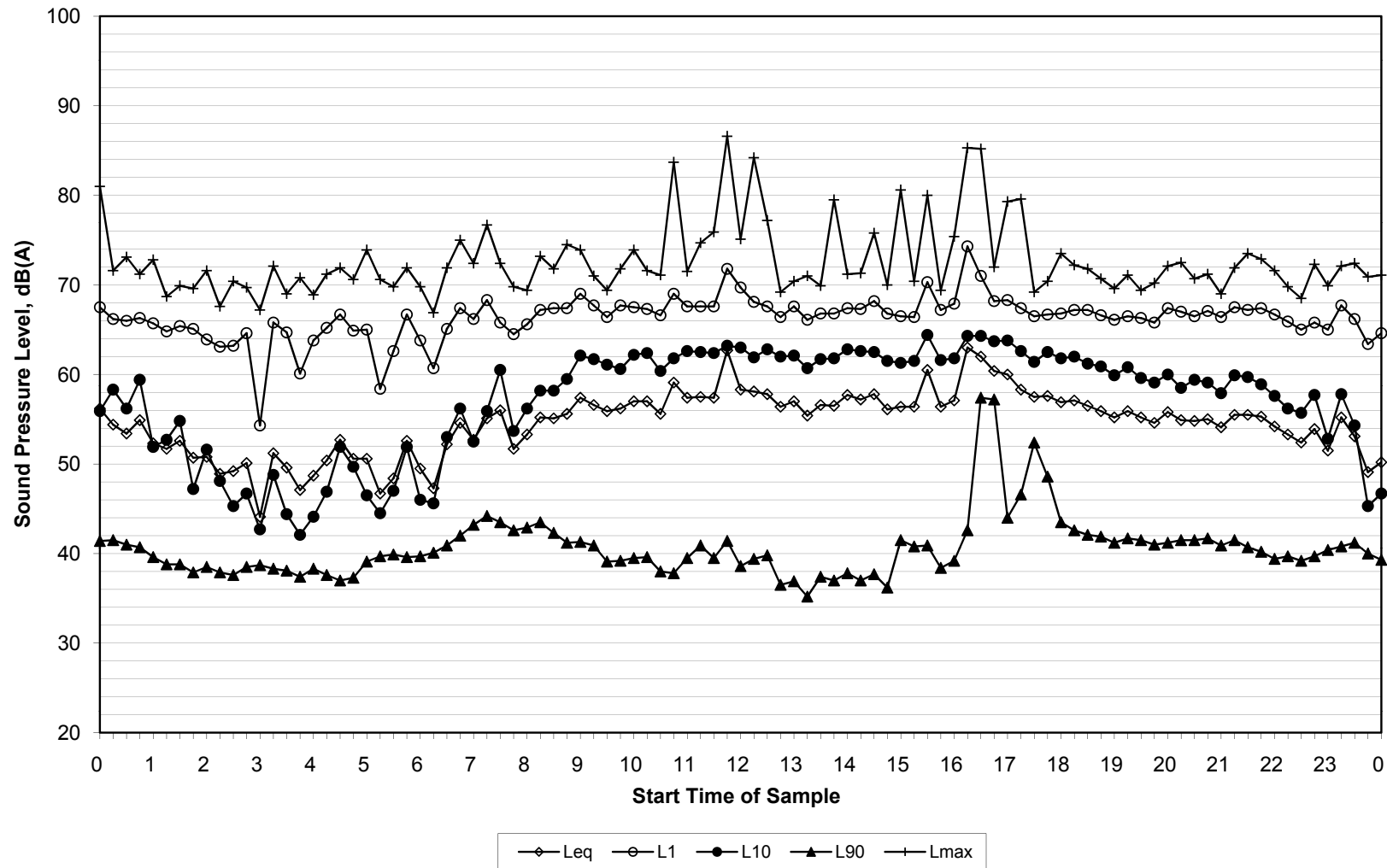
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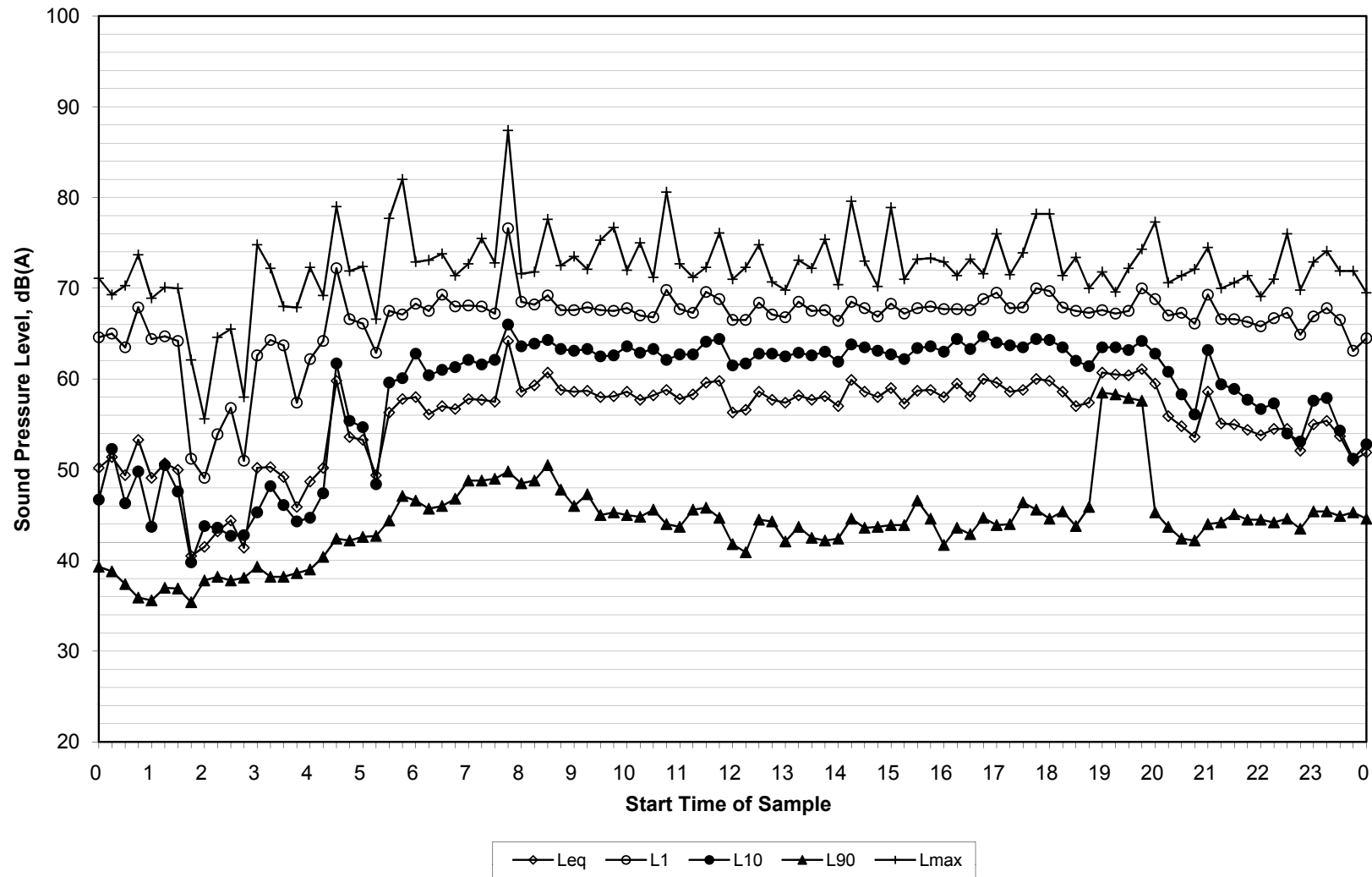
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Ambient Sound Pressure Levels

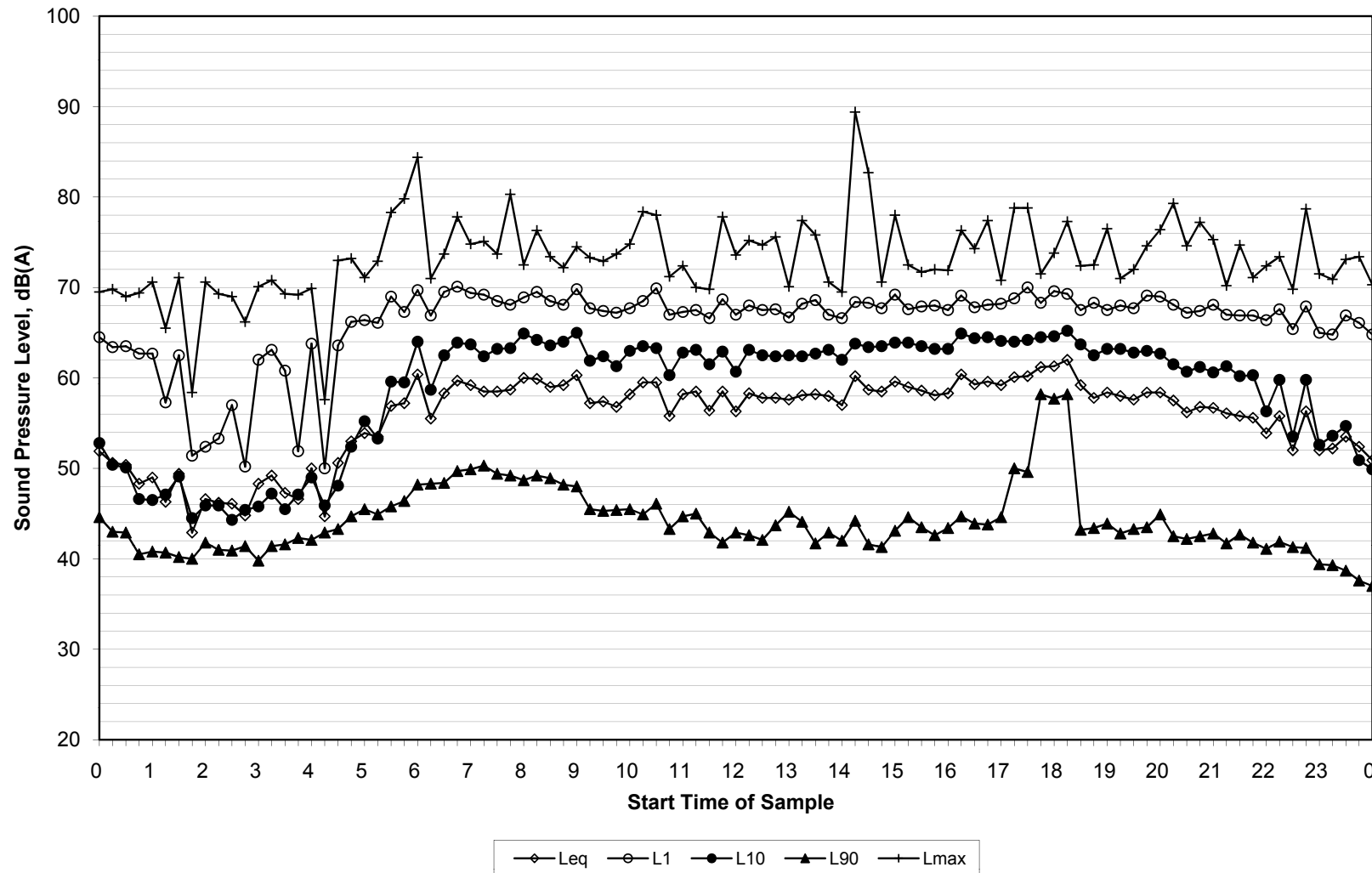
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Ambient Sound Pressure Levels

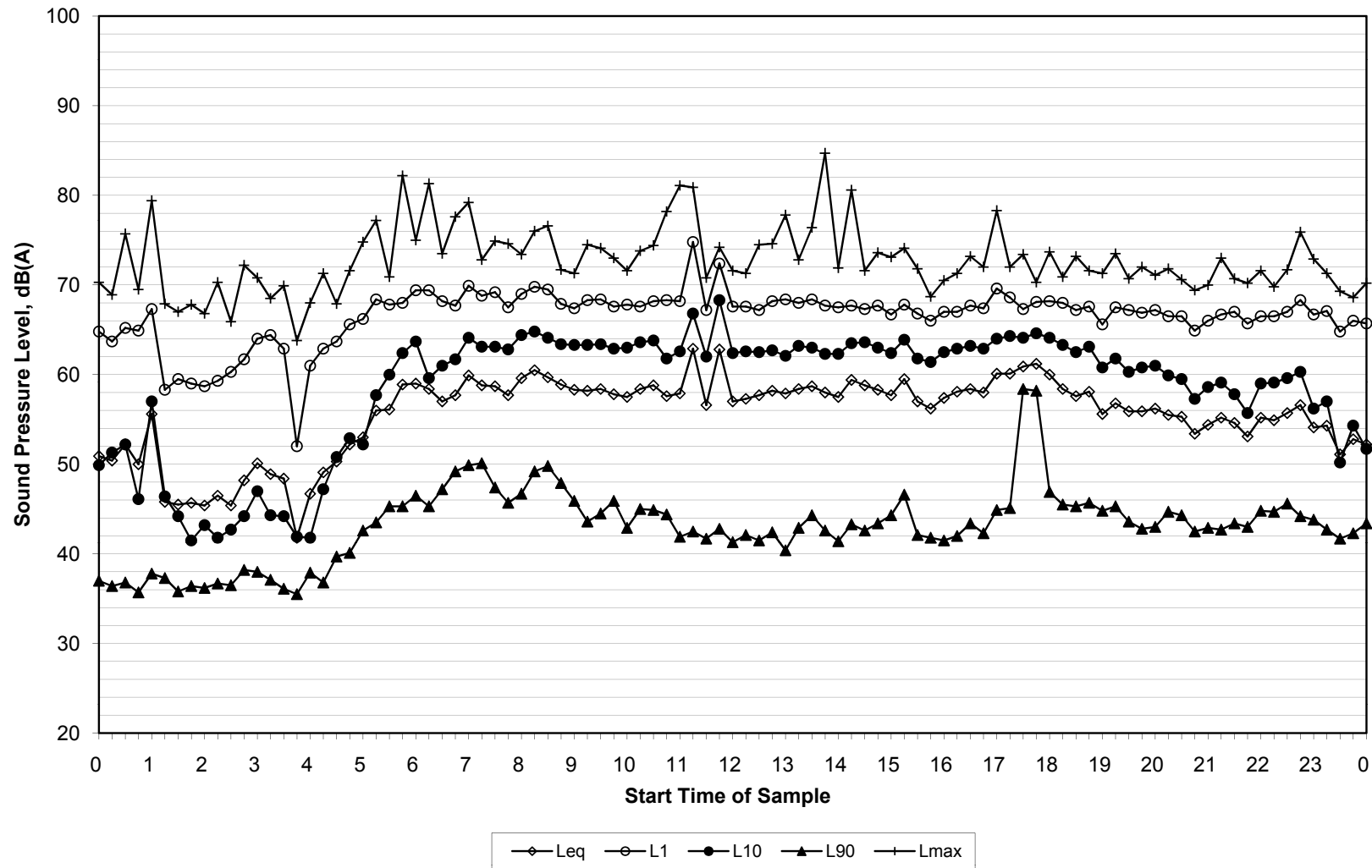
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Ambient Sound Pressure Levels

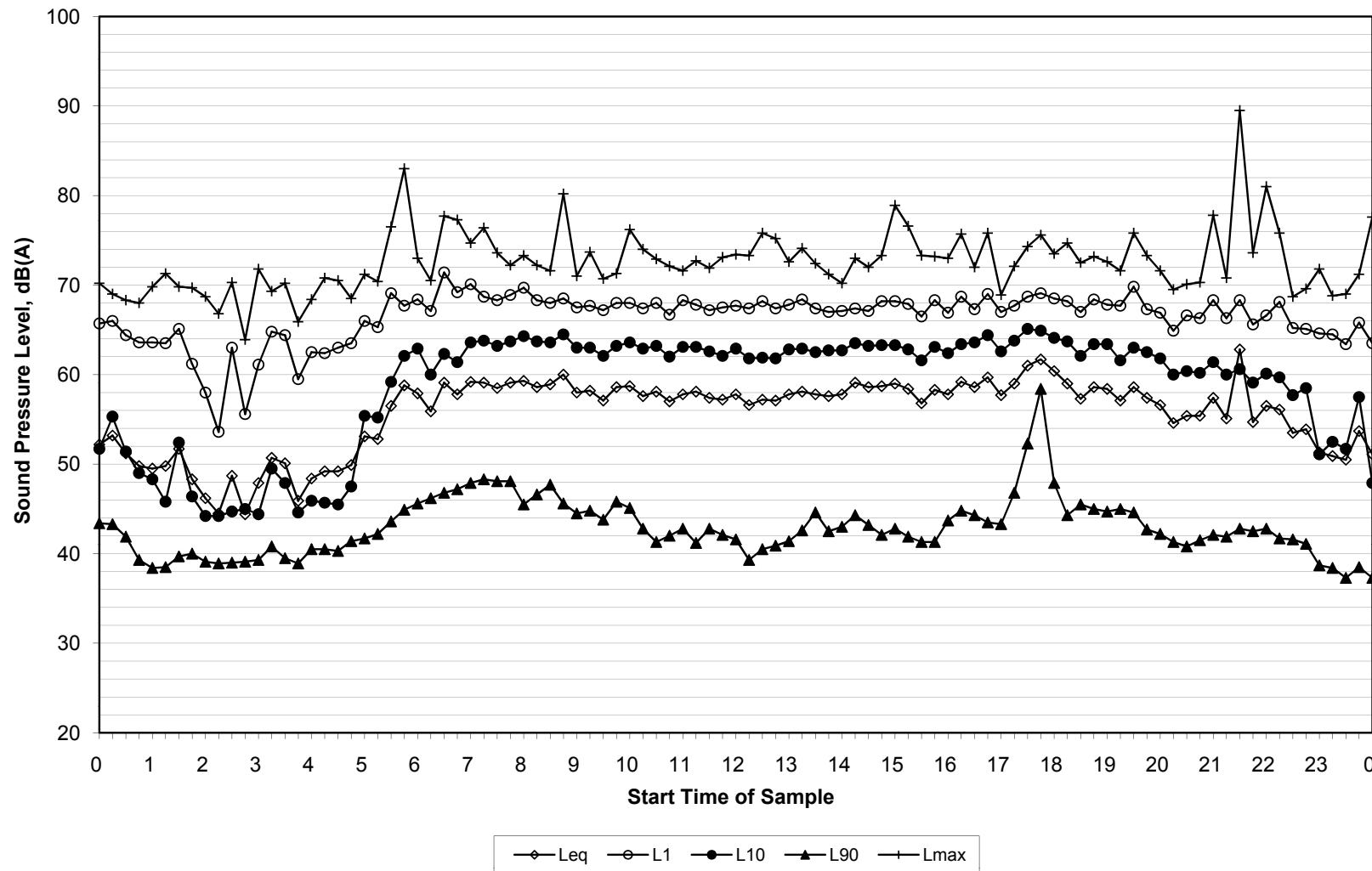
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Ambient Sound Pressure Levels

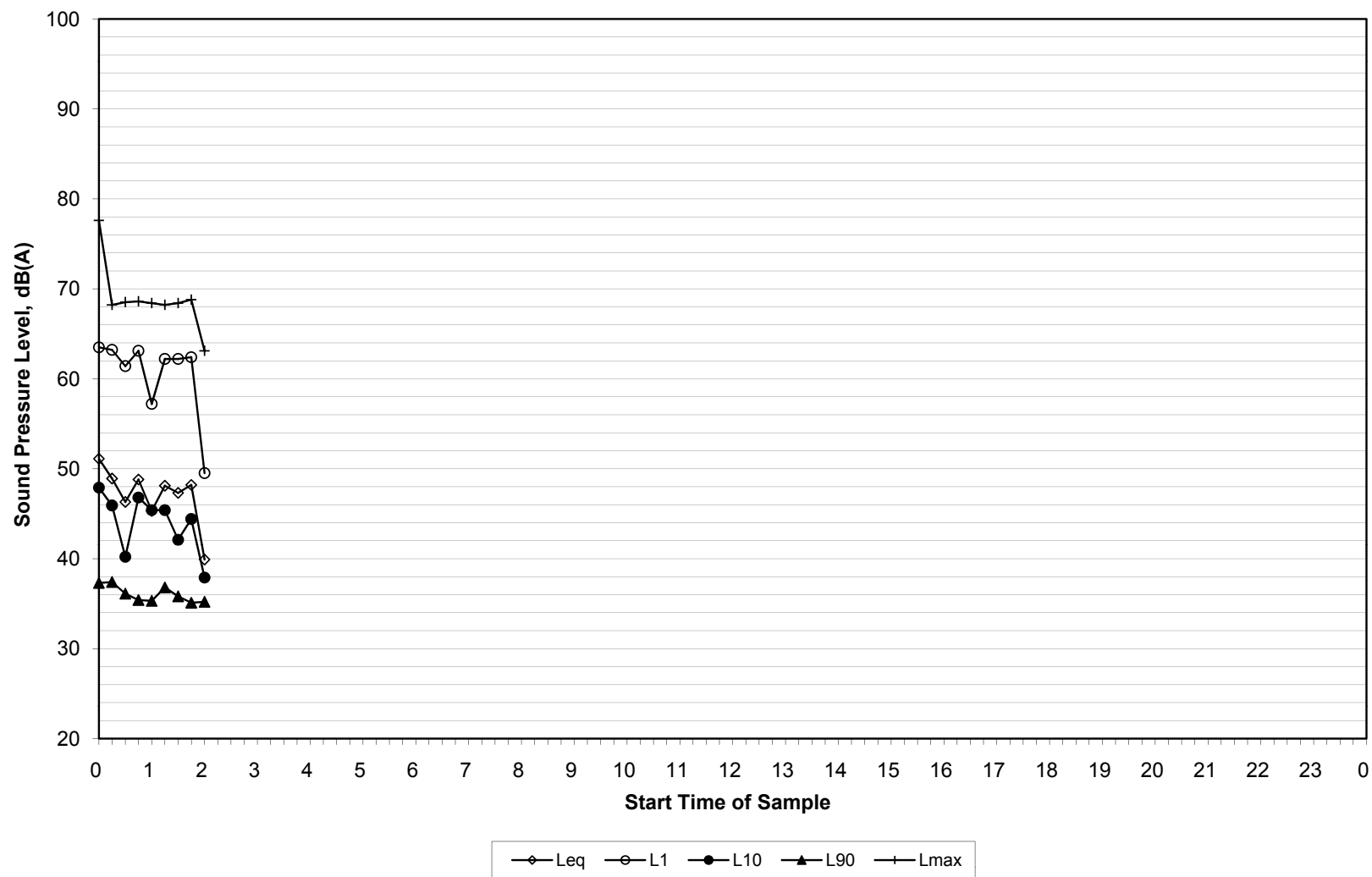
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Ambient Sound Pressure Levels

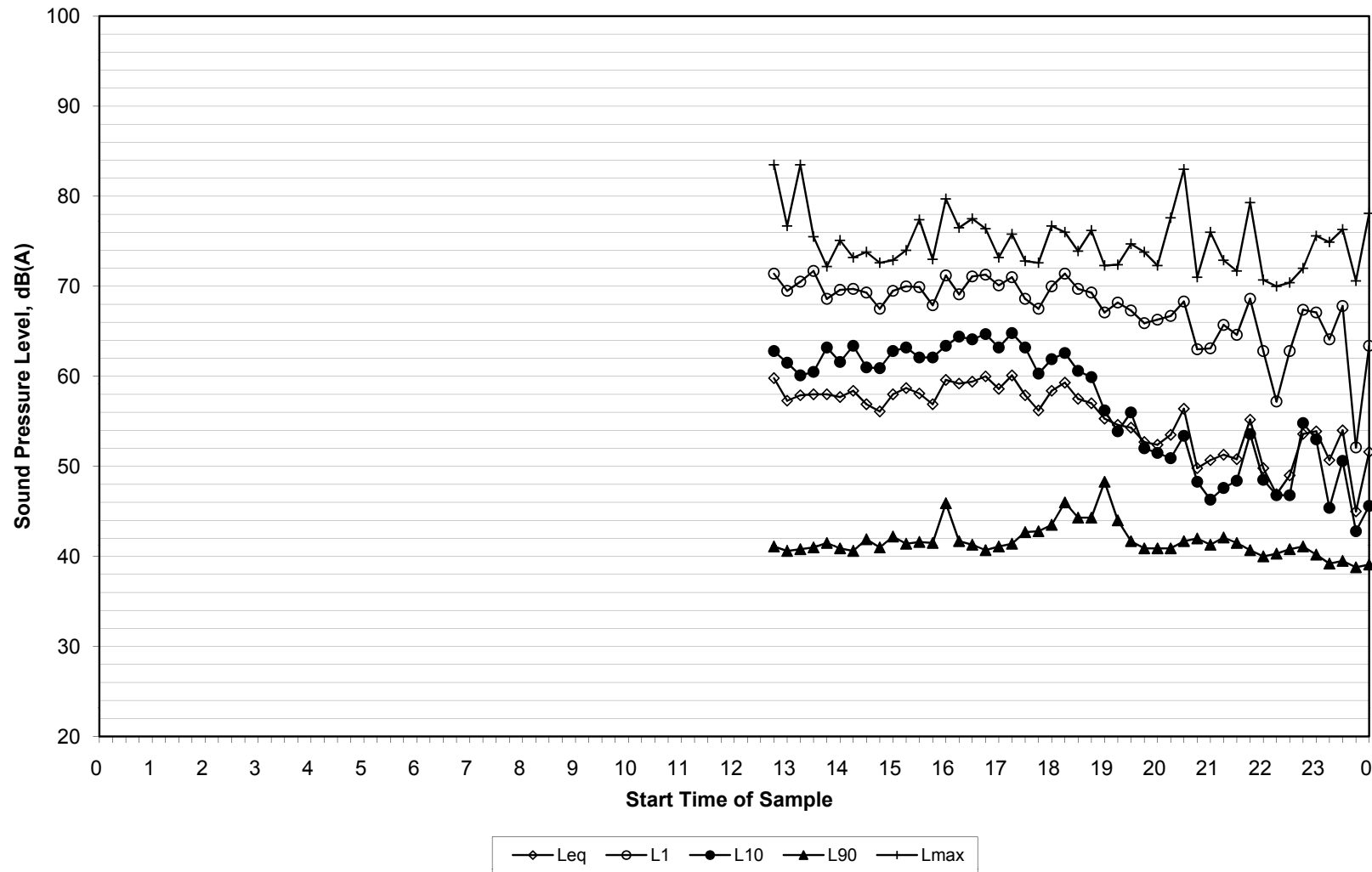
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Ambient Sound Pressure Levels

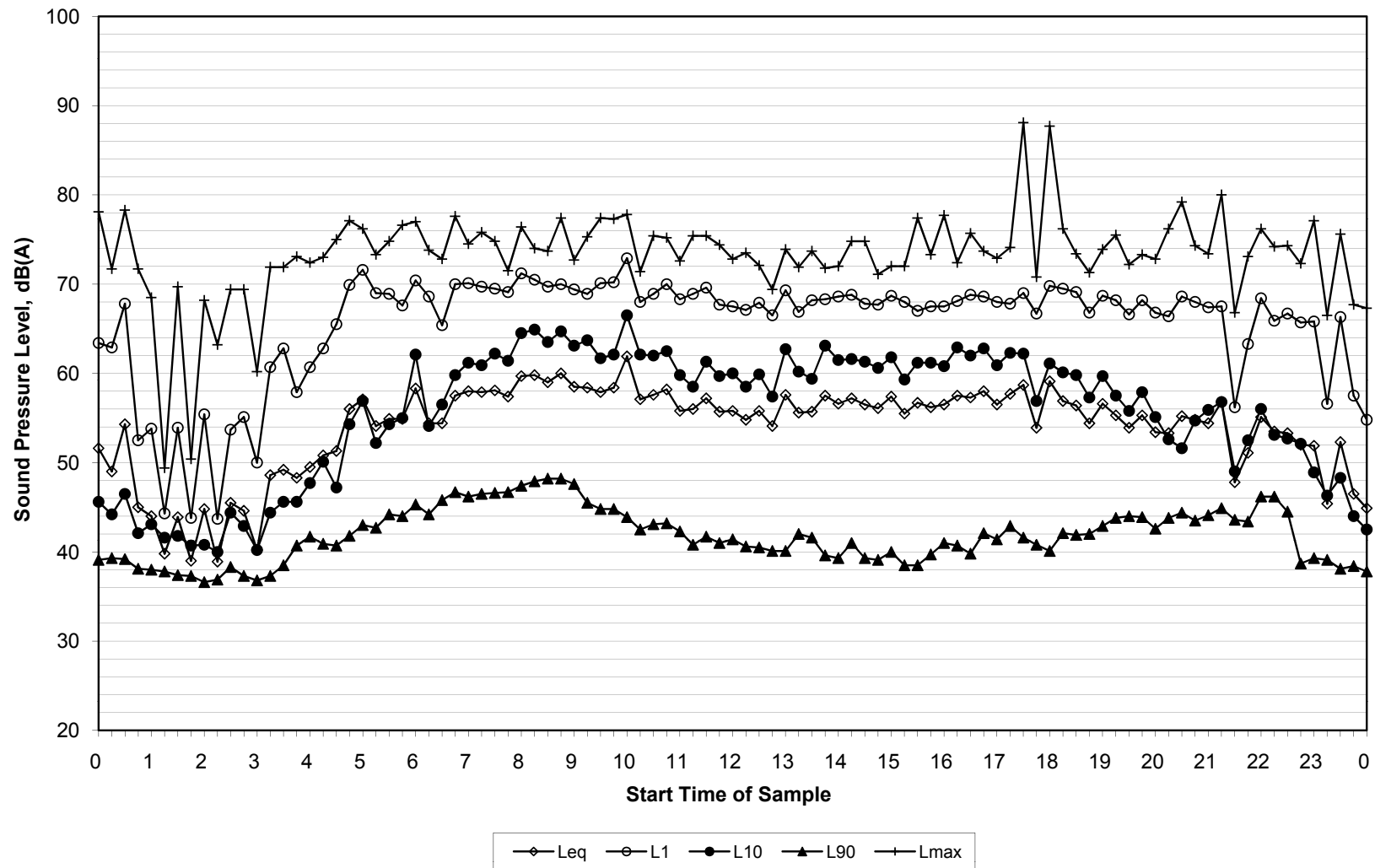
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Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

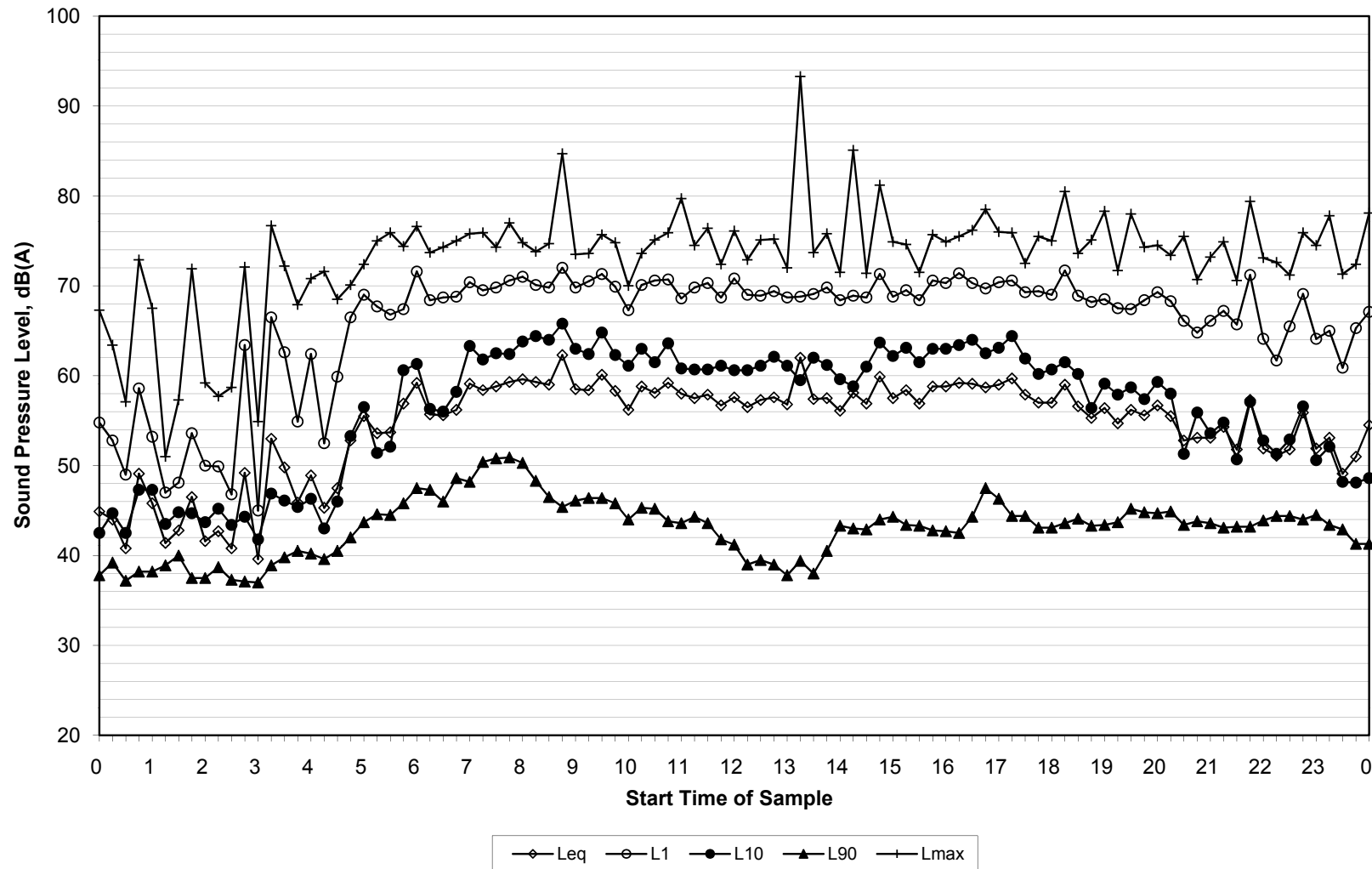
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Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

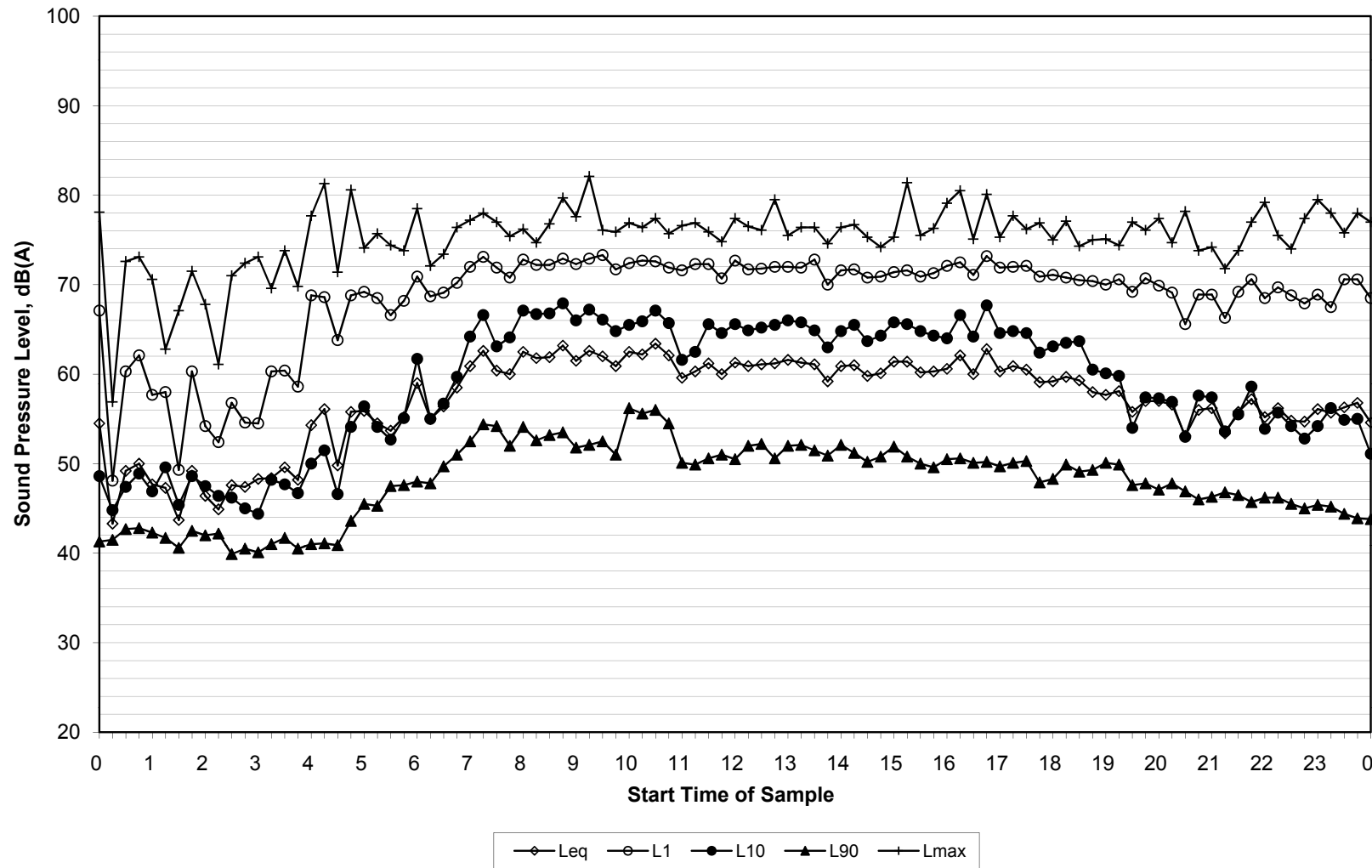
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Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

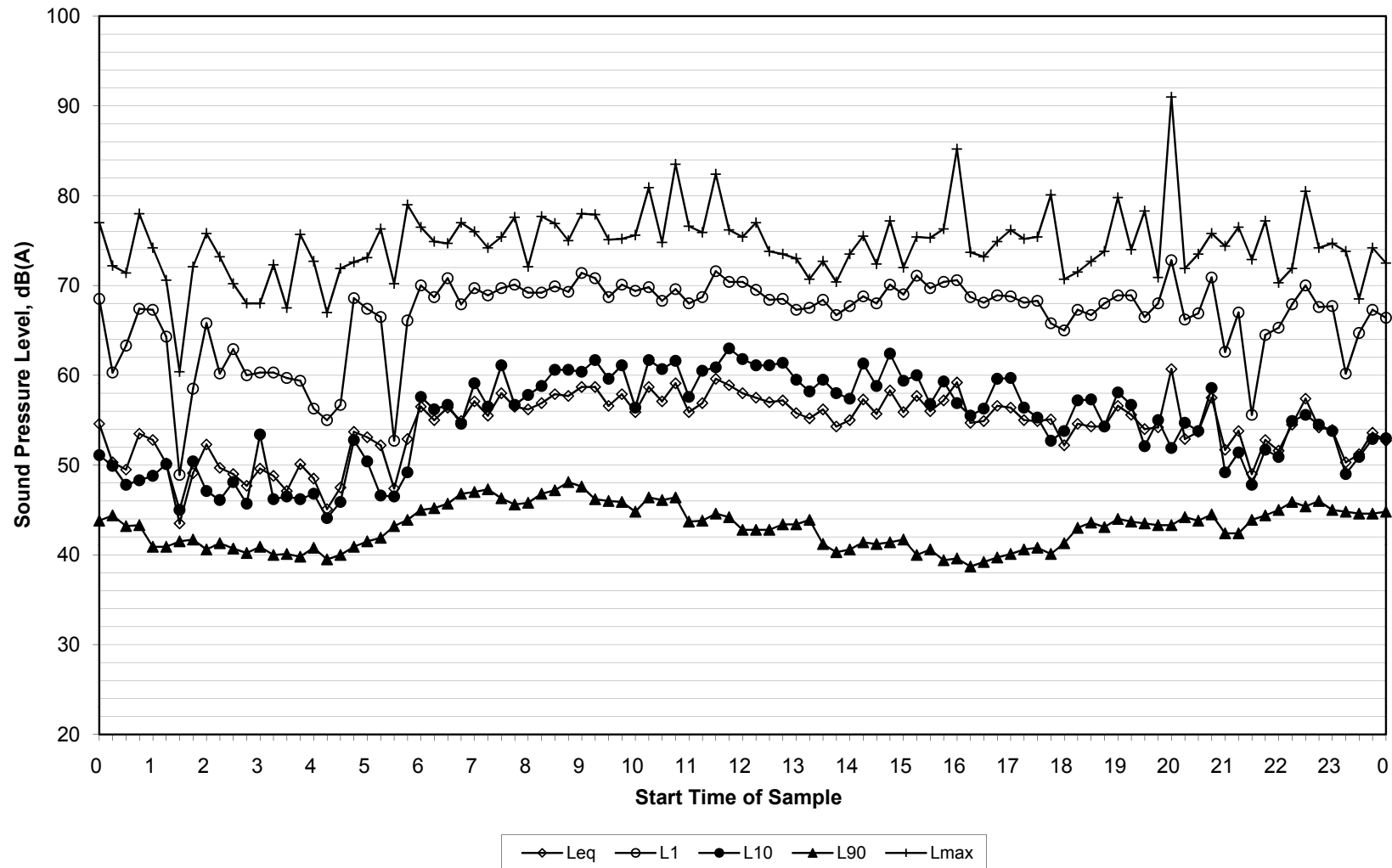
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Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

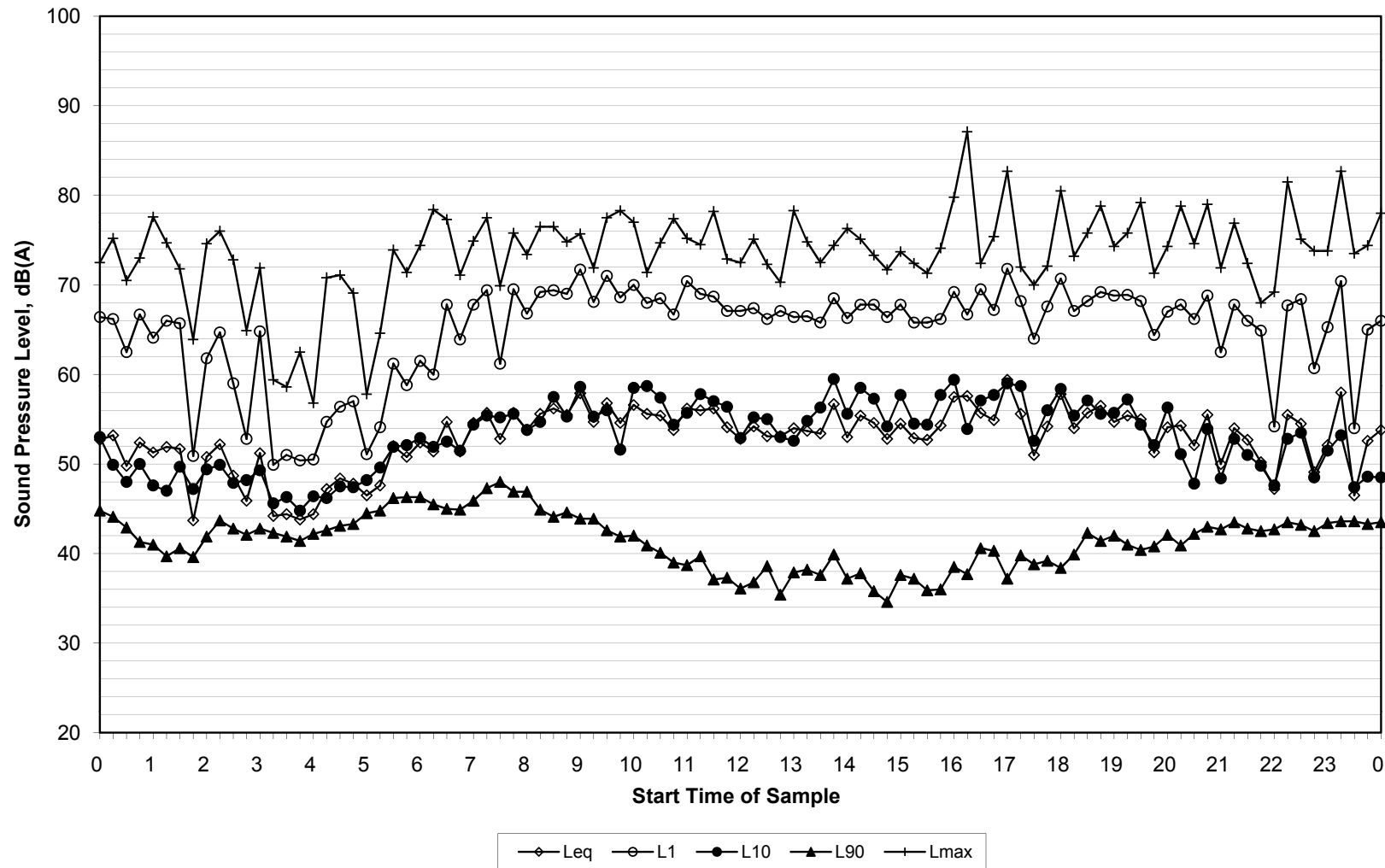
Saturday, 23 May 2015



Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

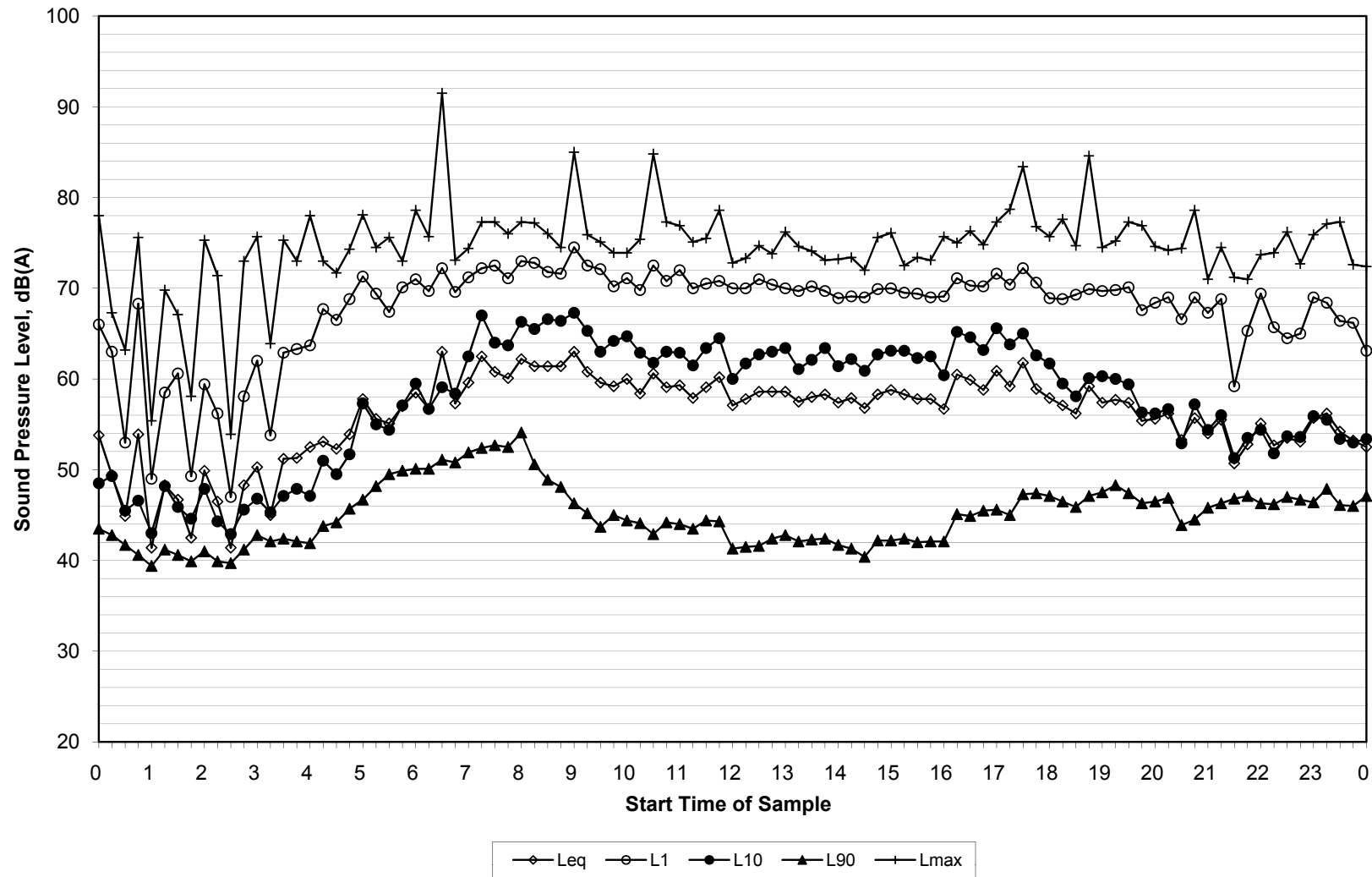
Sunday, 24 May 2015



Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

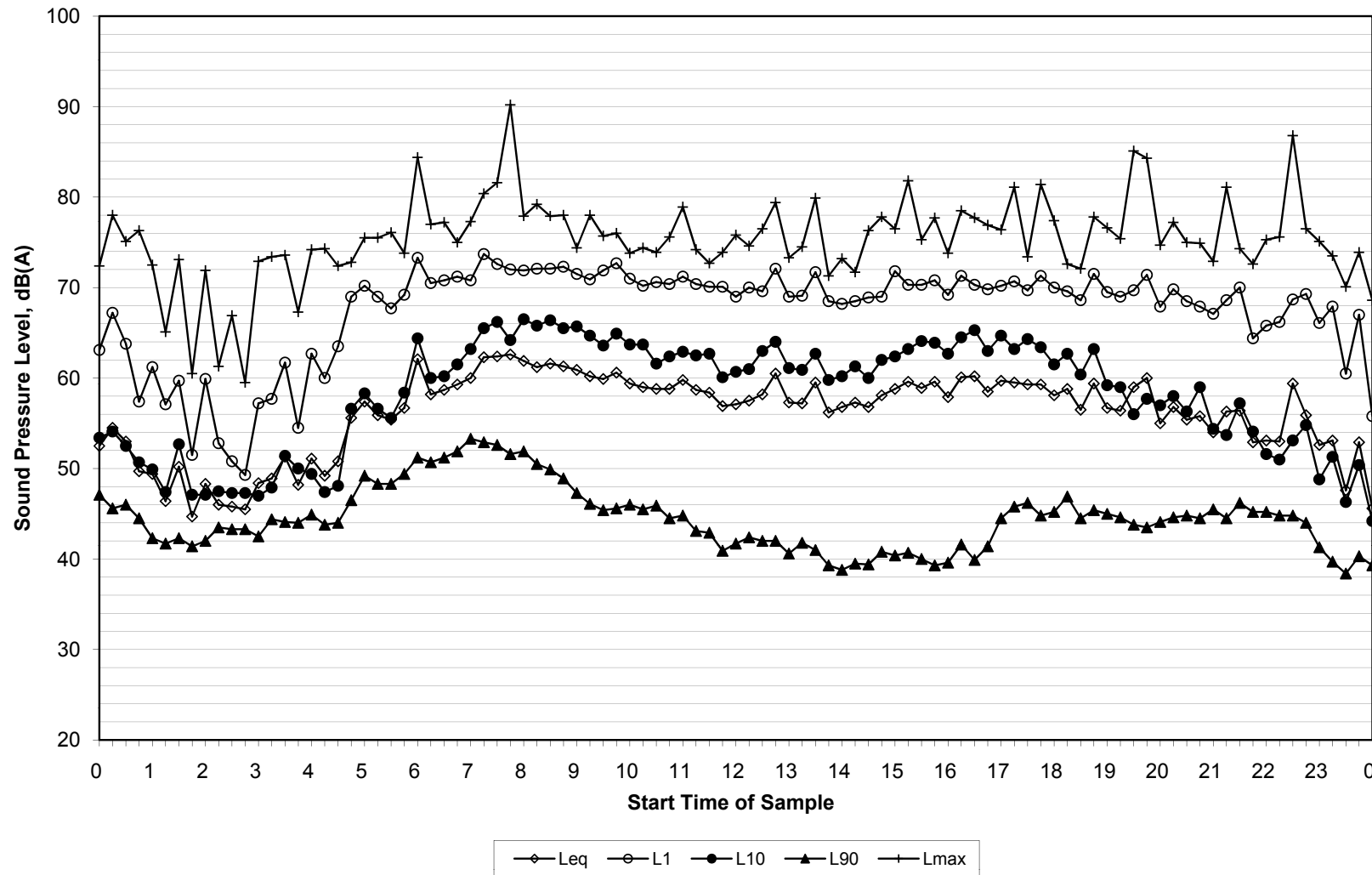
Monday, 25 May 2015



Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

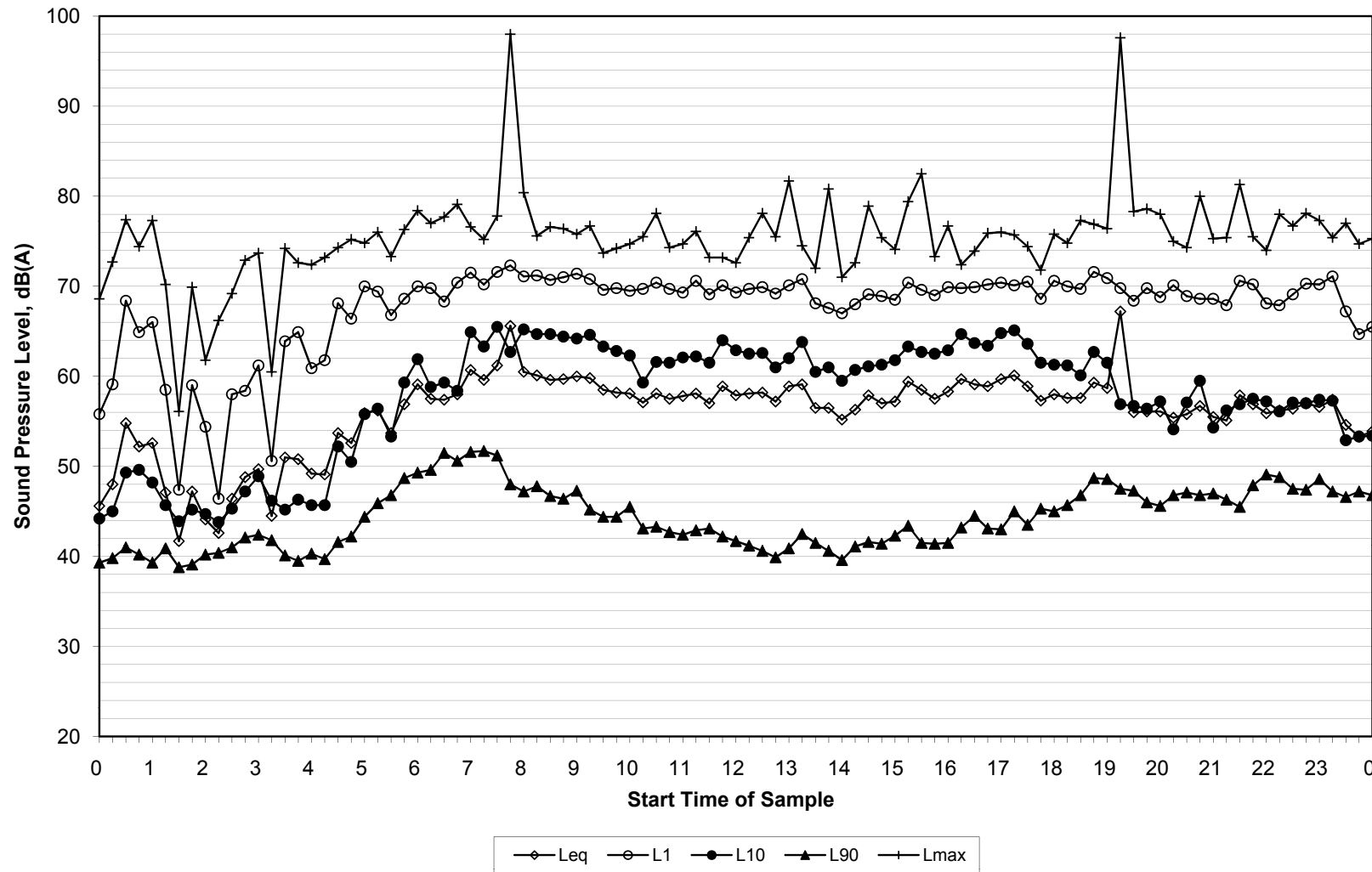
Tuesday, 26 May 2015



Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

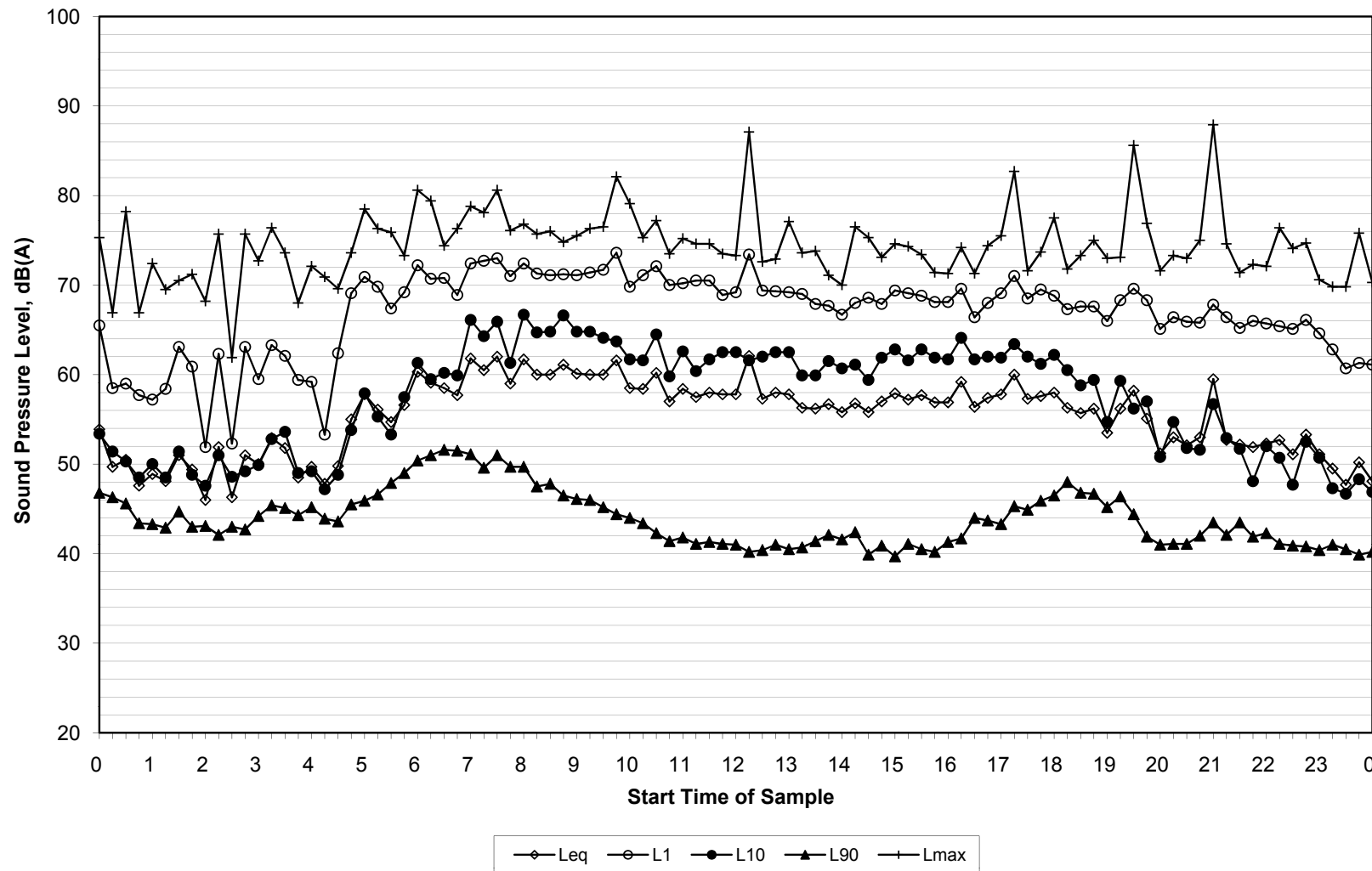
Wednesday, 27 May 2015



Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

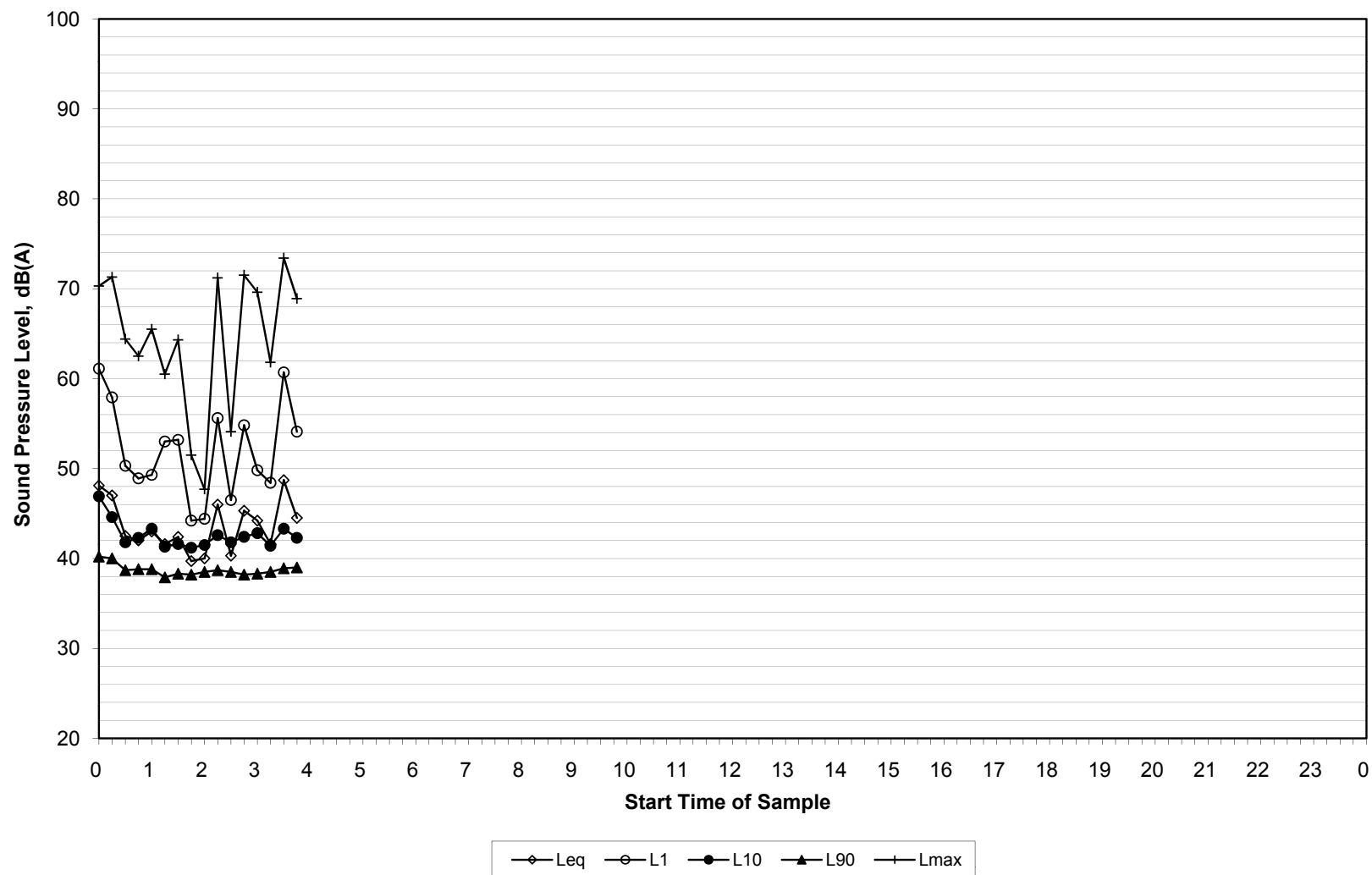
Thursday, 28 May 2015



Location 3
64 Byron Road, Guildford

Ambient Sound Pressure Levels

Friday, 29 May 2015



Location 3
64 Byron Road, Guildford