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339 Forest Road, Bexley

Development Application Acoustic Report

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1 INTRODUCTION

Acoustic Logic Consultancy has been engaged to prepare a noise emission assessment for the proposed child care centre to be located at 339 Forrest Road, Bexley

Noise emissions will be assessed with reference to relevant Bayside Council (Rockdale City Council DCP) Guidelines. Where necessary, building and/or management controls will be recommended in order to reduce noise emissions to acceptable levels.

This report is prepared based on architectural drawings issue Q - Revised as per Council Discussion 03/02/21, provided by Couvaras Architects.

2 SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject site is located at 339 Forrest Road Bexley.

The proposed childcare centre is a two-storey facility with a capacity of 60 children aged up to 5 years. The development is proposed to consist of the following:

- Basement with 12 new parking spaces;
- Ground floor with two indoor areas and one outdoor play area;
- First floor with two indoor areas; and
- Rooftop outdoor play area.

Proposed hours of operation are 7am to 6pm, Monday to Friday. Two staff members are to be on site 15 minutes before opening and 15 minutes after closing.

Noise sensitive receivers in the vicinity of the site are the double-storey residential dwelling dwellings on Bayview Street, opposite the childcare centre. Compliance at this receiver location will result in compliance at all receiver locations.

An aerial photo of the site and nearby residences is presented below.

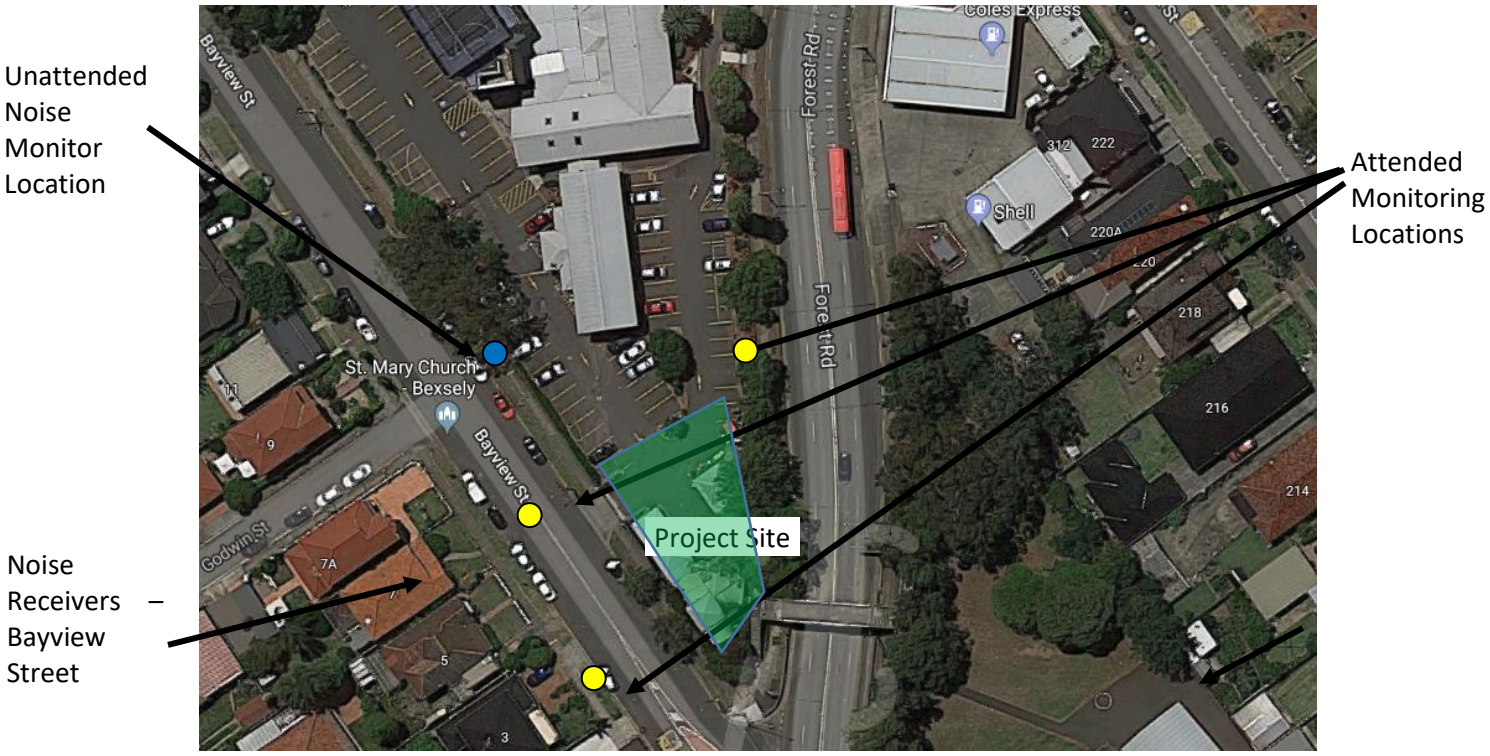


Figure 1: Site Map and Noise Measurement Locations

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 MEASUREMENTS

Unattended measurements were made using a unattended noise monitor in order to determine the existing background noise levels to be used for noise emission assessment.

4.1 MEASUREMENT LOCATION

Measurements were taken by a monitor installed on the south-western boundary of the site, adjacent to receivers on Bayview Street (see aerial photograph, section 2).

Background noise levels at this point will be indicative of the background levels that will be present at the nearby residential receivers.

4.2 MEASUREMENT EQUIPMENT

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The logger was calibrated at the beginning and the end of the measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

4.3 MONITORING PERIOD

Unattended noise monitoring was carried out between 19 and 24 April 2018.

4.4 MEASURED NOISE LEVELS

Appendix A provides the results of the unattended noise monitoring. Background noise levels during the times in which it is proposed to use the childcare centre are presented below.

Table 1 - Measured Background Noise Levels

LOCATION	PERIOD/TIME	BACKGROUND NOISE LEVEL dB(A)L_{90}
Surrounding Receivers (Bayview Street)	Day (7am-6pm)	49

5 ACOUSTIC CRITERIA AND NOISE EMISSION GOALS

The Bayside Council (Rockdale Council DCP) states the following with respect to noise emission from childcare centres:

> *20. An Acoustic Report undertaken by a suitably qualified acoustic consultant is required for centres in/adjacent to residential zones. The report must demonstrate how the site planning and building design minimise noise impacts, and that noise levels (measured at any point on the boundary of the site between the centre and adjoining property over a 15-miniute period) will not exceed 5dBA above the background level. The report should include recommended noise attenuation measures.*

5.1 ACOUSTIC CRITERIA

The resultant acoustic criteria to be used for this assessment is summarised in the table below.

Table 2 - Noise Emission Objectives at Residential Receivers

Noise Source	Location	Time of day	Background Level dB(A)L_{90}	Noise Emission Objective dB(A)$L_{eq\ (15min)}$
Child Care Centre	Nearest Residents	Day (7am to 6pm)	**49**	**54**

6 ASSESSMENT OF NOISE EMISSIONS

6.1 OUTDOOR PLAY AREAS

6.1.1 Assumptions Used in Assessment

Noise levels generated by children at play have been measured by this office in other childcare centres. The sound power levels determined from these measurements are then used in order to predict the likely noise emissions from the site.

Noise emissions from the play areas are based on the following assumptions:

- The average sound power level per child is 80dB(A)L_{eq} with one in two children assumed to be generating noise at any one time. This level has been calculated based on measurements made by Acoustic Logic at other similar childcare centres.

- All outdoor play areas are operating simultaneously (upper level play area and lower level play area); this scenario models the worst-case conditions for noise emissions from the proposed childcare centre (based on the room/play area capacities noted in the architectural drawings).

6.1.2 Noise from All Outdoor Play Areas

The predicted noise levels at nearby residents are presented below.

Noise emissions are predicted at the windows and yards of the residential properties on Bayview Street. Predicted noise levels are as follows. All predictions are based on the assumption that the acoustic treatments in section 8 are adopted.

Table 3 –Predicted Noise Levels at Nearby Residences

Residential Property	Predicted Noise Level dB(A)$L_{eq(15min)}$	Allowable Noise Level dB(A)$L_{eq(15min)}$	Complies
Bayview Street Residences	49	54	Yes

Noise emissions comply with Council requirements at all nearby properties.

6.2 CAR PARK NOISE

Nosie from the operation of the car park is predicted below.

Nose emissions are predicted based on the following assumptions:

- The sound power level of a car driving within a car park is 84dB(A)L_{eq} (based on measurements conducted by this office).

- Any inbound or outbound movement typically takes 15 seconds (for cars in manoeuvring within the ground floor car park space)

That in a peak one-hour period, there are up to 64 vehicle movements associated with the site (32 inbound, 32 outbound).

Predicted noise levels are as follows:

Table 4 - Noise Emission Assessment (Car Park Noise)

Receiver Location	Predicted Noise Level dB(A)$L_{eq(15min)}$	Permissible Noise Level dB(A)$L_{eq(15min)}$	Complies
Bayview Street Residences	44dB(A)L_{eq}	54dB(A)L_{eq}	Yes

6.3 CUMULATIVE NOISE ASSESSMENT

Traffic and operational noise from the child-care centre have been assessed, and the cumulative noise level is compliant with the noise emission criteria of the Rockdale Council DCP.

Attended noise monitoring of the existing school has been conducted and the outdoor play has been measured to be 58dB(A). The conservative, cumulative, predicted noise level from the use of the proposed child-care centre, as detailed within the updated acoustic report (ref: 20180555.1/2802C/R2/TA) is 50dB(A).

This will result in an increase of no more than less than 1dB(A) to existing noise levels received by the residents, which is a subjectively imperceptible increase to the current noise exposure. This is in accordance with the guidance of the EPA Noise Policy for Industry which states that an increase of up to 2dB(A) is negligible and would not be discernible by the average listener and therefore would not warrant receiver-based treatments or controls. Given that the increase of less than 1dB(A) is indiscernible, the proposed child-care centre will not have an adverse impact on the existing amenity of surrounding residences.

It is also noted that this is a conservative cumulation of traffic and children noise, as the peak use of the car park is outside the time of use of the outdoor play areas.

7 NOISE INTRUSION ASSESSMENT

7.1 NOISE INTRUSION CRITERIA

The Bayside Council (Rockdale Council DCP) states the following with respect to noise intrusion to childcare centres

> *Childcare centres must be insulated according to AS 2021-2000 Acoustics Aircraft Noise Intrusion if it is located on land that exceeds 20 Australian Noise Exposure Forecast (ANEF) contours.*

AS2021 states that a full evaluation of internal noise levels should be carried out for locations with an aircraft noise exposure close to or exceeding ANEF 20. This full evaluation requires an examination of likely levels of internal noise from aircraft flyovers.

AS2021 does not have specific noise intrusion criteria for child care centres. In the absence of any criteria ALC have recommended the most suitable internal performance requirement determined similar use. These levels will be used to assess aircraft noise intrusion into the specific areas of the development.

Table 5 - Aircraft Noise Levels inside Buildings

Activity	Indoor Design Sound Level from Aircraft Flyover, dB(A)
Sleeping areas	50 dB(A)
Indoor Teaching Areas	55 dB(A)
Bathrooms, toilets, laundries	60 dB(A)

In addition, the childcare centre is affected by traffic noise from Forest Road. Section 3.6.1 of the *Development near Rail Corridors and Busy Roads – Interim Guideline* nominates an internal noise level of 40dB(A) $_{(15\ hour)}$ for childcare centres.

7.2 NOISE INTRUSION ASSESSMENT

7.2.1 Aircraft Noise Levels

Based on the distance from the site to the runways and an assessment of all the aircraft listed in AS 2021, the Standard predicts that the highest typical aircraft movement will be from an Airbus A330-301 taking off from the east-west Runway. The noise level at the site as indicated by the standard is 83dB(A). This noise level will be used to predict the resultant internal noise levels.

7.2.2 Traffic Noise Levels

Unattended and attended traffic noise measurements have been carried out. Unattended measurements were obtained at 356 Forest Road between 8th September until the 15th September 2016. The noise logger was located on the awning approximate 1m distance from Forest Road. Attended noise measurements were obtained on 24 April 2018 between 9am and 11am.

A noise level of 70dB(A) $_{(15\ hour)}$ has been measured and determined at the Forest Road façade of the child care centre.

7.2.3 Outdoor Traffic Noise Levels

The NSW Road Noise Policy recommends outdoor play areas be designed so that traffic noise levels do not exceed 55dB(A) $L_{eq\ (1\ hour)}$./

7.2.4 Recommended Treatments

See Section 8 for façade treatments to result in compliance with AS2021 and *Development near Rail Corridors and Busy Roads – Interim Guideline.* and the NSW Road Noise Policy for external areas.

8 RECOMMENDED TREATMENTS

In order to control noise emissions to acceptable levels, the following treatments are required:

- A minimum 1.6m high solid (masonry, glass) boundary fence is required for the perimeter of the rooftop outdoor play area. This barrier is recommended to control noise intrusion to the recommendations of the NSW Road Noise Policy (55dB(A) external, and to control noise emissions from the outdoor play area to the residents.

- The surface of rooftop floor play area to be artificial turf or porous rubber soft fall.

- Underside of the shade structures are to have a minimum 60% even coverage with an absorptive material with a noise reduction coefficient (NRC) of 0.8, similar to EchoSoft.

- Management is to ensure children are supervised at all times to minimise noise generated by the children whenever practical and possible.

- 4-5 Year old play area to have 12.38mm laminated glass with a minimum sound reduction index of R_w 37. Proposed concrete façade and concrete roof are acceptable without upgrades in order to attenuate aircraft and traffic noise levels

- 2-3 and 0-2 year old play area to have 10.38mm laminated glass with a minimum sound reduction index of R_w 35. Proposed concrete façade and concrete roof are acceptable without upgrades in order to attenuate aircraft and traffic noise levels

- Noise from any new mechanical services (air-conditioners, kitchen exhaust fan or similar) should comply with the acoustic requirements of the Bayside City Council. Detailed review of new plant items should be undertaken at Construction Certificate stage, once plant items are selected and locations determined. Compliance with Council guidelines will be achievable with standard acoustic treatments.

9 CONCLUSION

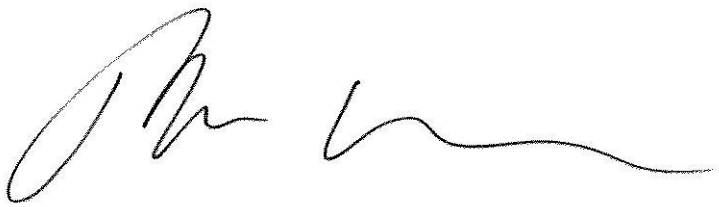
Potential noise impacts on nearby residential properties from the operation of the proposed childcare centre to be located at 339 Forest Road, Bexley have been assessed in this report.

The potential impacts have been assessed against the acoustic criteria of the Bayside Council Requirements (Rockdale DCP 2011).

Provided that the acoustic treatments set out in section 8 of this report are adopted, both noise emissions and noise intrusion from external sources will comply with the nominated criteria.

We trust this information is satisfactory. Please contact us should you have any further queries.

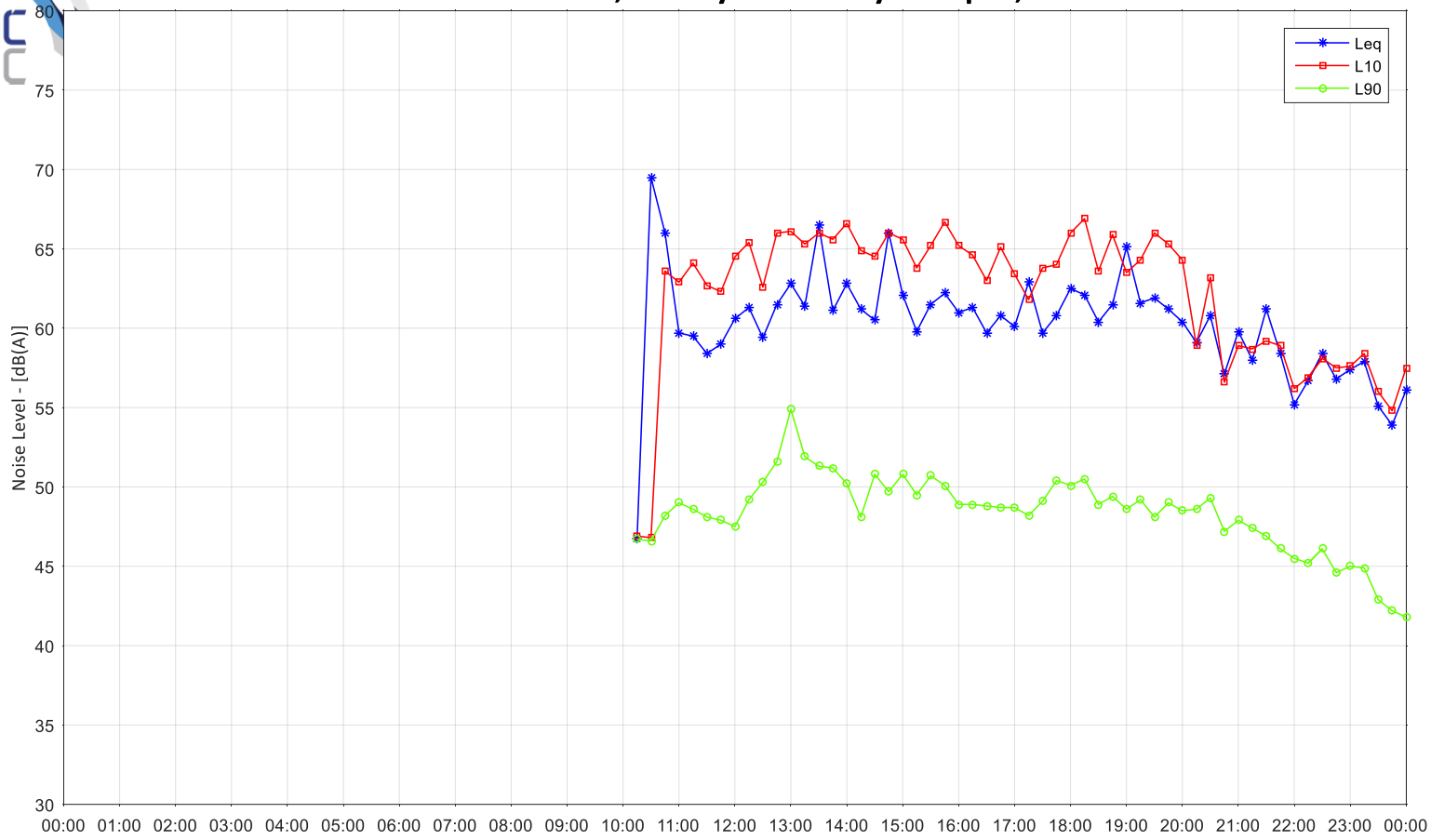
Yours faithfully,



Thomas Aubusson MAAS

APPENDIX A

NOISE MONITOR MEASUREMENTS


339 Forrest Road, Bexley: Thursday 19 April, 2018
Noise Level - [dB(A)]
80
75
70
65
60
55
50
45
40
35
30
Leq
L10
L90
00:00
01:00
02:00
03:00
04:00
05:00
06:00
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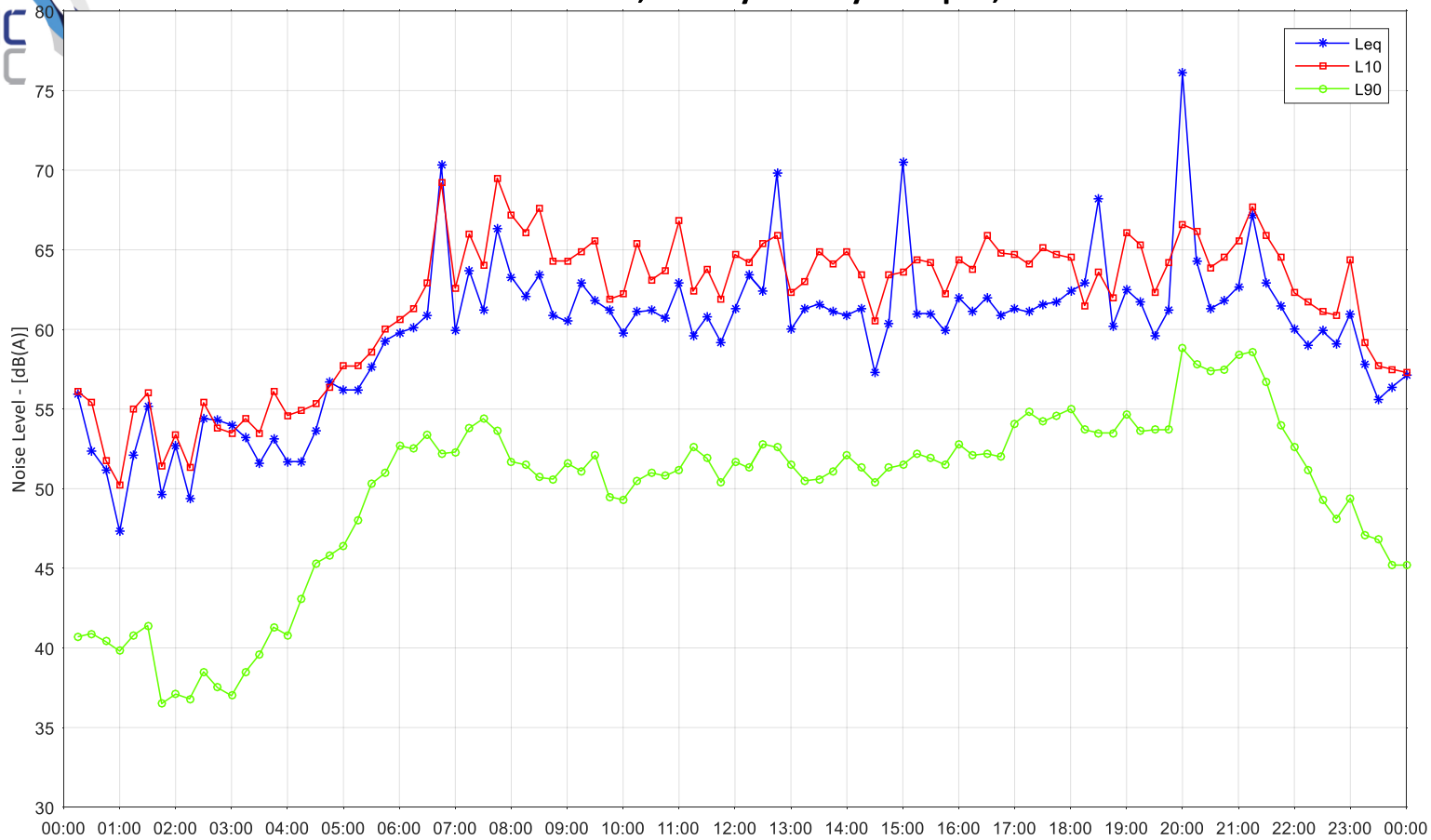
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Noise Level - [dB(A)]
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L10
L90
80
75
70
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35
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00:00
01:00
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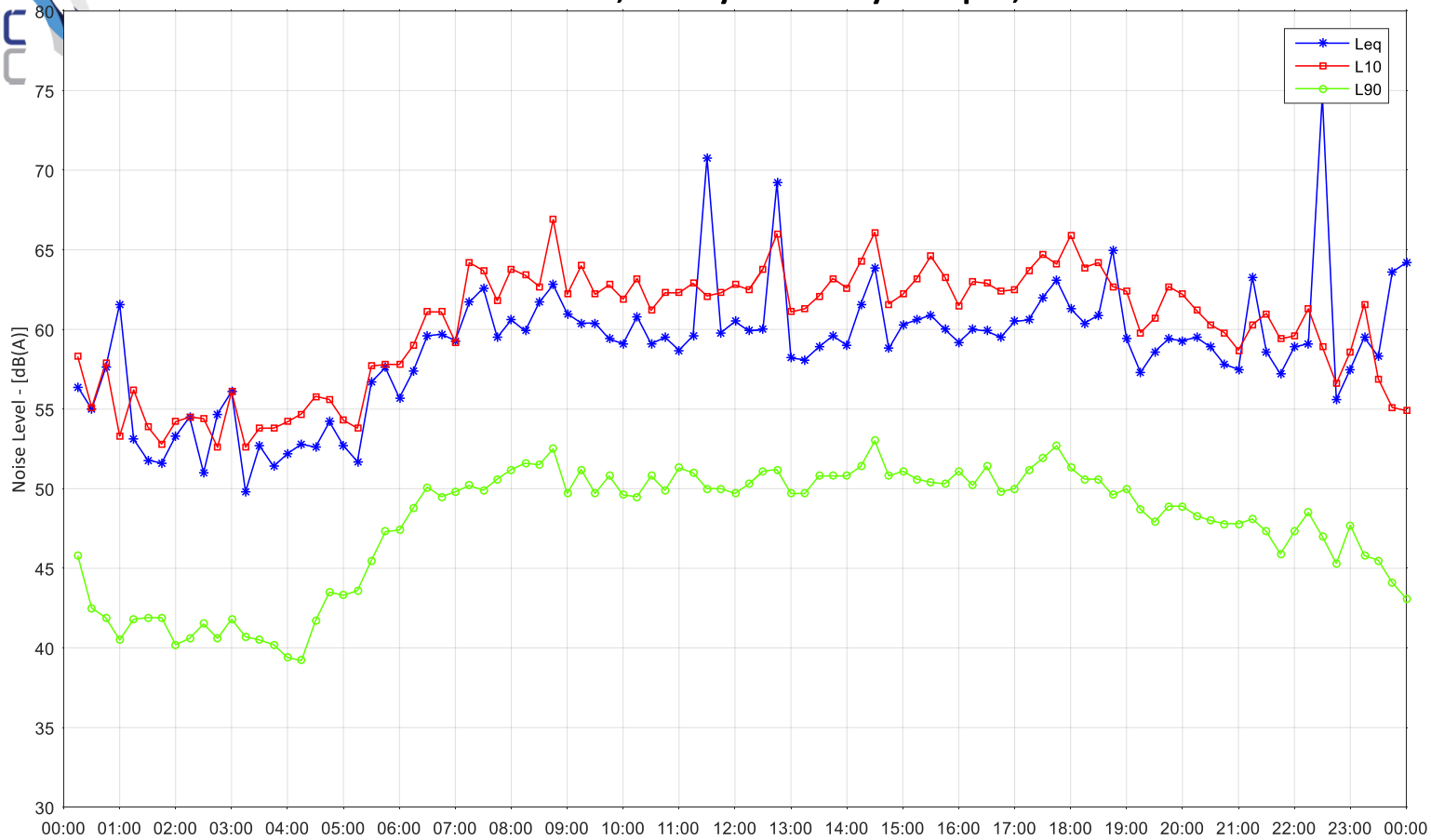
339 Forrest Road, Bexley: Saturday 21 April, 2018
Noise Level - [dB(A)]
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L10
L90
80
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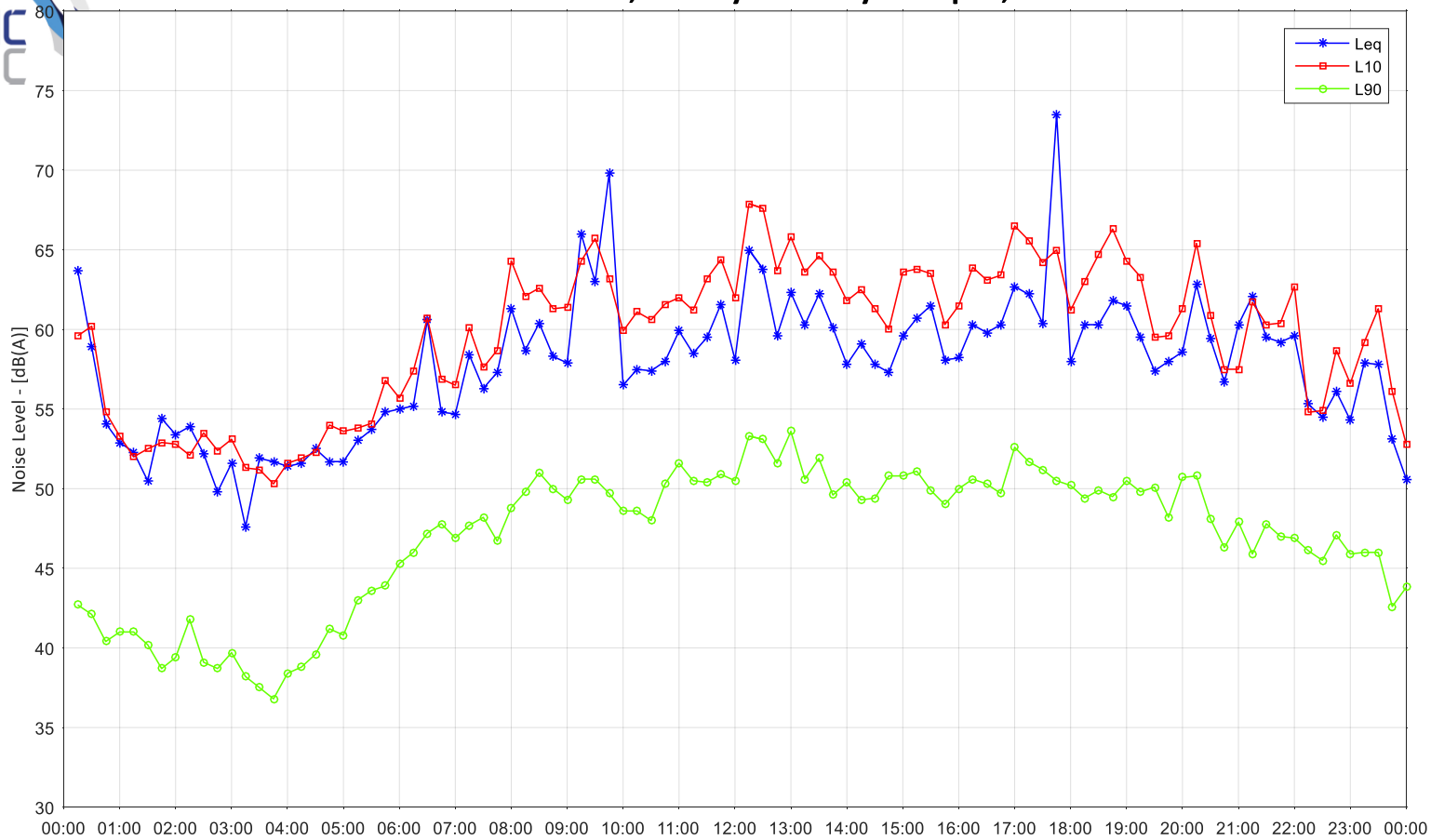
339 Forrest Road, Bexley: Sunday 22 April, 2018
Leq
L10
L90
Noise Level - [dB(A)]
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70
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45
40
35
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01:00
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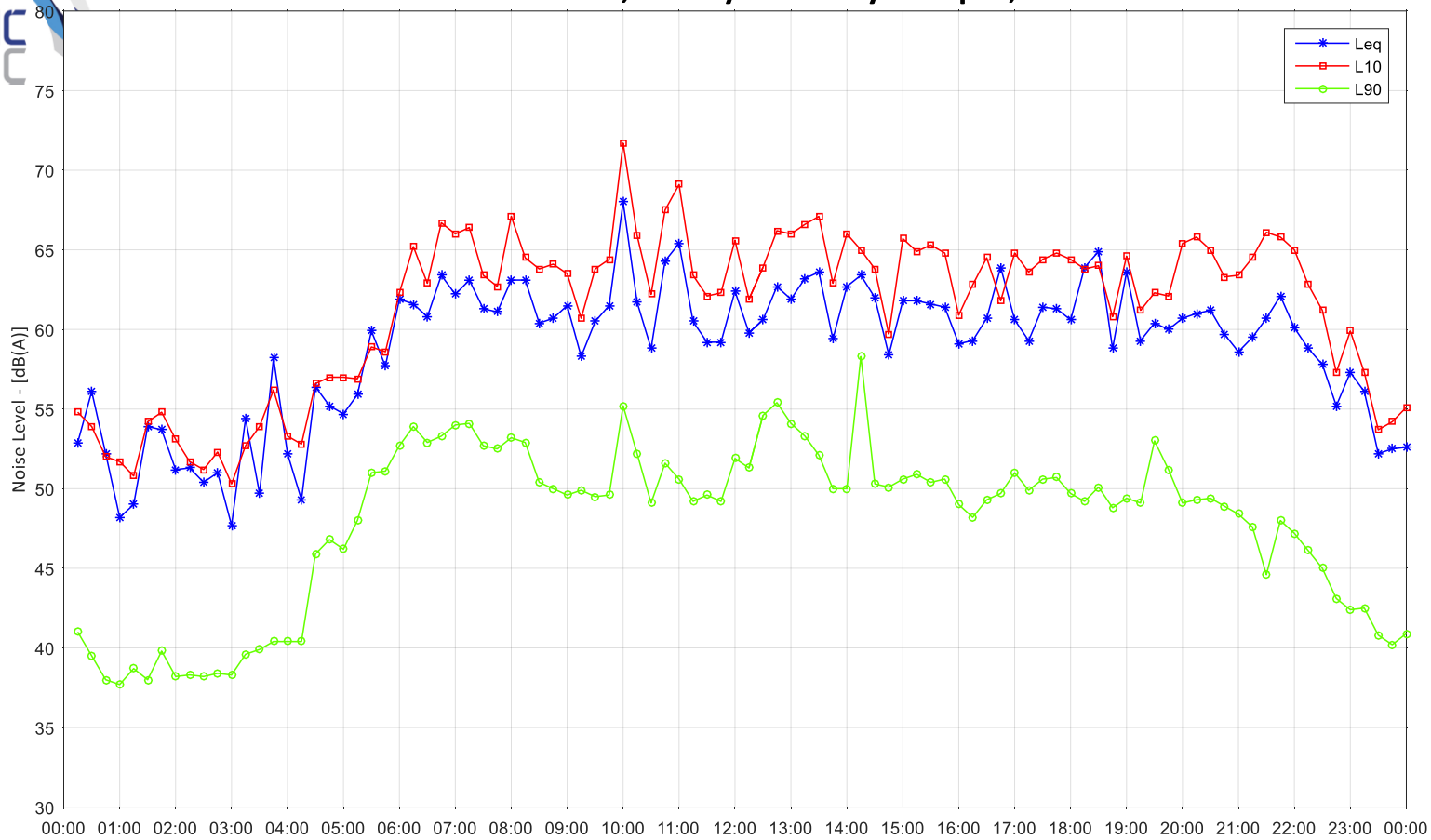
339 Forrest Road, Bexley: Monday 23 April, 2018
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Leq
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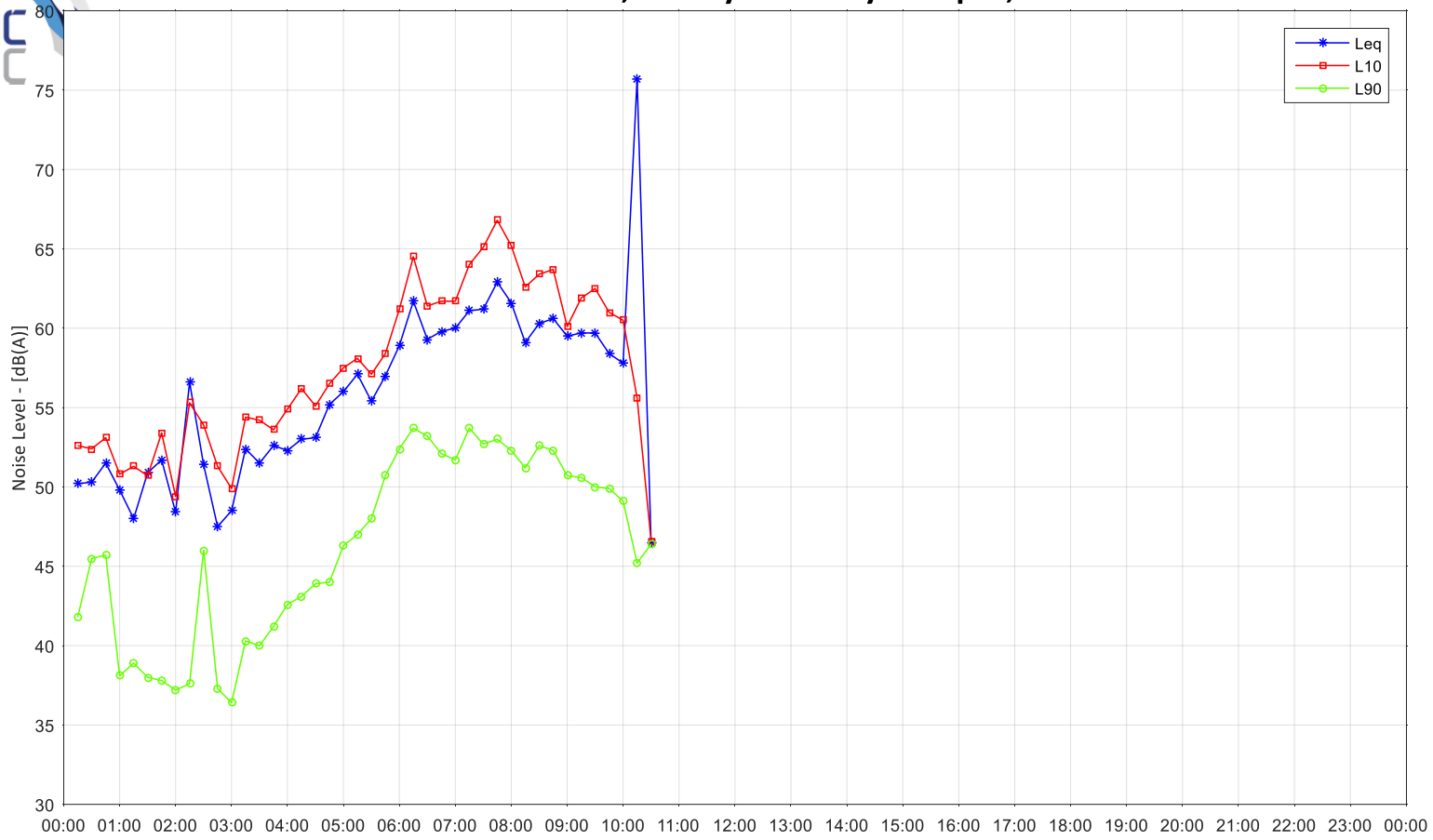
339 Forrest Road, Bexley: Tuesday 24 April, 2018
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75
70
65
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50
45
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L10
L90
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APPENDIX A

SAMPLE NOISE EMISSION CALCULATION

Contribution - Noise Emission from Rooftop Play Area (Active Play)

Noise Source/Correction	Noise level $dBL_{eq(15min)}$ – Frequency (Hz)									
	31.5	63	125	250	500	1k	2k	4k	8k	**A-wt**
Noise Source - Sound Power (Active Play) - $dB(A)L_{eq}$	72	72	75	72	73	77	73	68	62	**80**
Distance Correction – Upper play area to window (28m)	-37	-37	-37	-37	-37	-37	-37	-37	-37	
Correction – 39 of 78 children creating noise (=10*log(39))	16	16	16	16	16	16	16	16	16	
Noise Screening	-7	-7	-8	-9	-10	-11	-14	-16	-18	
Predicted Noise Level at Window of Residence	**44**	**46**	**42**	**42**	**45**	**38**	**31**	**23**	**44**	**48**
Criteria (45BG+5)										**54**
Complies										**Yes**