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Gladesville RSL Youth Centre Site Project

Environmental Noise Impact Assessment

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1 INTRODUCTION

This report presents an analysis of acoustic impacts associated with the proposed Gladesville RSL Youth Centre Site Project development located at 6-8 Weston Crescent, Gladesville.

In this report we will:

- Conduct an external noise intrusion assessment and recommend acoustic treatments to ensure that a reasonable level of amenity is achieved for future tenants. The external noise intrusion shall be assessed in accordance with Australian Standard AS2107:2000 and AS3671:1989.
- Identify potential noise sources generated by the site, and determine noise emission goals for the development to meet Council and NSW Office of EPA acoustic requirements to ensure that nearby developments are not adversely impacted. The environmental noise emission criteria will be assessed in accordance with the requirements of Ryde City Council DCP and NSW EPA Industrial Noise Policy

The assessment is based on architectural drawings provided to this office from Contempo Architects.

2 SITE DESCRIPTION

The proposed 8 storey multi-use development is located on the site bound by Western Crescent, Coulter Street and Ross Streets, Gladesville. The surrounding land uses include existing carpark and surrounding roadways which carry medium to low traffic volumes.

The following noise sources will potentially impact on the project site:

- Traffic Noise from surrounding roadways including Western Crescent and Ross Street.
- Noise from the use of the carpark located to the east of the site.

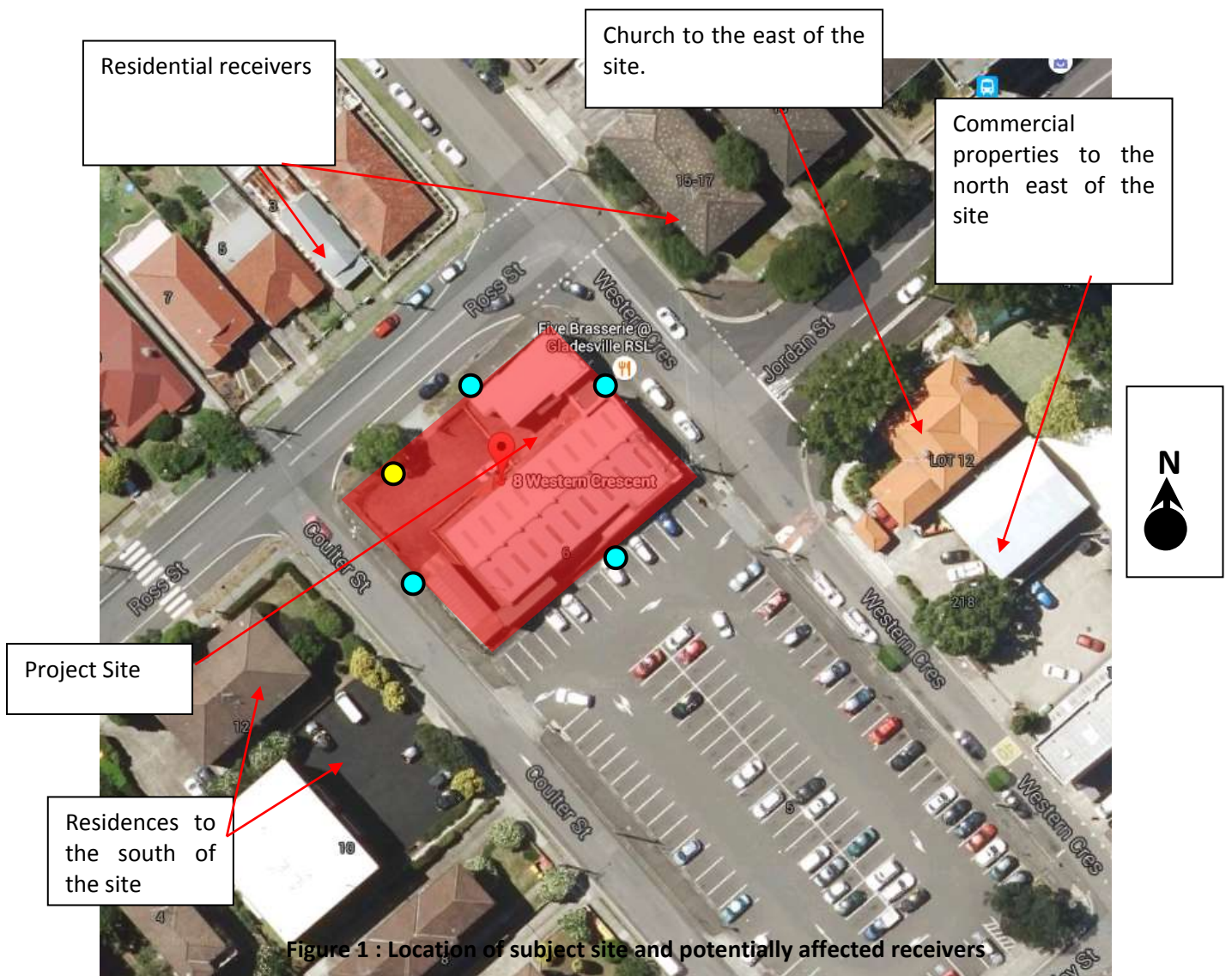
It is noted that traffic noise levels measured at the site included contributing noise levels from other roadways within the vicinity of the site including Victoria Road which is located approximately 80m to the east of the site.

Noise potentially generated by the site will consist primarily of noise from the proposed mechanical plant serving the project site.

The nearest potentially affected noise receivers are:

- Commercial receivers to the east of the site;
- Residential Receivers to the north, south and west of the site.
- Church to the east of the site.

Refer to Figure 1 below, which is an aerial photo of the existing development.



- UNATTENDED MEASUREMENT LOCATION
- ATTENDED MEASUREMENT LOCATION

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 interval.

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 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.

Current practice favours the L_{eq} parameter as a means of measuring traffic noise, whereas the L_{10} parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the L_{90} parameter is not used to assess traffic noise intrusion.

LA_{max} refers to the maximum noise level occurring during a measurement period, and is used when assessing sleep disturbance impacts.

4 EXTERNAL NOISE INTRUSION ASSESSMENT

Significant external noise sources in the vicinity of the site are as follows:

- Traffic noise from surrounding roadways including Ross Street, Coulter Street and Western Crescent.
- Victoria Road within the vicinity of the site to the east.

4.1 INTERNAL NOISE CRITERIA

4.1.1 Residential Internal Noise Criteria

The Australian Standards recommend maximum design sound levels for different areas of occupancy in the residential development while AS 3671 -1989 "Road Traffic Noise Intrusion - Building Siting and Construction" recommends that an appropriate L_{eq} for noise descriptor be used for the occupancy being assessed.

Based on AS2107-2000 and AS 3671-1989 the following assessment criteria would apply to the proposed development based on developments near minor roads.

Table 1 – Internal Noise Criteria

Space/ Activity Type	Time of Day	Noise Level dB(A) L_{eq} (Worst 1hr)
Living Areas	Day (7am to 10pm)	40
Sleeping Areas	Night (10pm to 7am)	35

4.1.2 Non-residential Traffic Noise Criteria

Non-residential uses will be assessed with reference to AS NZS 2107-2000 "Recommended Design Sound Levels and Reverberation Times for Building Interiors" for commercial recommended levels, as presented below.

Table 2 - Traffic Noise Level Objectives for Commercial and Retail Space

SPACE/ACTIVITY TYPE	OBJECTIVES
	Internal Noise Level dB(A) L_{eq}
Youth Centre	45-50
Apartment Common Areas (Main Entry)	45

4.2 EXTERNAL NOISE MEASUREMENT

As part of this investigation, noise from the perimeter roadways and industrial land uses has been measured. The results of this measurement will be used to determine the treatments required to reduce noise levels to within the project acoustic objectives.

Measurements included attended and unattended noise levels measurements conducted at the locations as detailed in Figure 1 above. Measurements were performed generally in accordance with the Australian Standard AS 1055 - "Description and measurement of environmental noise - General Procedures".

4.2.1 Unattended Noise Monitoring

Unattended noise monitoring was undertaken at the site which has been used in this assessment. Unattended noise logging was conducted using an Acoustic Research Laboratories Pty Ltd series 315 noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the unmanned monitoring period. Equipment was calibrated at the beginning and the end of the measurement using a Rion NC-74 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode. The unattended noise monitor was installed from 18th to the 25th January 2016.

4.2.2 Attended Measurements

Attended measurements were conducted at the site on all 4 future facades. Attended measurements were obtained using a Norsonics type 140 Precision Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonics Sound Calibrator type 1251. No significant drift was noted. Measurements were conducted on 18th January 2016 during peak periods.

4.2.3 Resultant Noise Levels

The following table presents the resultant noise levels at the proposed façade of the development. The noise levels are based on both the attended and unattended noise measurement results conducted by this office. The noise levels are based on the manned background noise measurement results adjusted by the difference with the noise monitor results of similar time periods and distance attenuation.

It is noted that traffic noise levels measured at the site included contributing noise levels from Victoria Road.

Table 3 – Measured Traffic Noise Levels

Location	Environmental Noise Level	
	Daytime (7am-10pm)	Night-time (10pm- 7am)
Western Crescent	66dB(A) L_{eq} (Worst 1 Hour)	63 dB(A) L_{eq} (Worst 1 Hour)
Ross Street	66dB(A) L_{eq} (Worst 1 Hour)	63 dB(A) L_{eq} (Worst 1 Hour)
Coulter Street	65dB(A) L_{eq} (Worst 1 Hour)	62 dB(A) L_{eq} (Worst 1 Hour)
Eastern façade	64dB(A) L_{eq} (Worst 1 Hour)	62 dB(A) L_{eq} (Worst 1 Hour)

4.3 RECOMMENDED CONSTRUCTIONS

Traffic noise intrusion into the proposed development was assessed using the measured external noise levels reported above as a basis.

Calculations were performed taking into account the orientation of windows, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted. Acoustic treatment required to ensure compliance with the assessment criteria are detailed in this section.

Internal noise levels will primarily be as a result of noise transfer through the windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound. Noise transfer through the masonry elements will not be significant and need not be considered further.

The constructions necessary to achieve the noise levels are detailed below. The predicted noise levels have been based on the expected 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.

4.3.1 Glazed Windows and Doors

The following constructions are recommended to comply with the traffic noise objectives stated in Section 4.2. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria.

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. The recommended constructions are listed in Table 4 below.

Table 4 – Glazing Construction

Façade	Level	Location	Room Type	Glazing	Acoustic Seals
Western Crescent	All	Youth Centre	All Room Types	6mm Toughened	Yes
		Residential Levels	All Room Types	6.38mm Laminated	Yes
Ross Street	All	Youth Centre	All Room Types	6mm Toughened	Yes
		Residential Levels	All Room Types	6.38mm Laminated	Yes
Coulter Street	All	Youth Centre	All Room Types	6mm Toughened	Yes
		Residential Levels	All Room Types	6.38mm Laminated	Yes
Eastern Façade	All	Youth Centre	All Room Types	6mm Toughened	Yes
		Residential Levels	All Room Types	6.38mm Laminated	Yes

The proposed glazing thickness will satisfy all acoustic requirements of Section 4.1. 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.

It is recommended that only window systems having test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

In addition to complying with the minimum scheduled glazing thickness, the STC rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 6 for all rooms. Where nominated, this will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 5 - Minimum STC of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum STC of Installed Window
6mm Toughened	29
6.38mm Laminated	30

4.3.2 Roof/Ceiling

Any roof of concrete construction will not require upgrading in order to satisfy the project acoustic objectives.

4.3.3 External Walls

External walls are of masonry construction and do not require upgrading in order to satisfy the project acoustic objectives.

4.3.4 Entry Doors

All entry door are from the internal areas of the project and are required to comply with the BCA criteria of Rw 30.

5 NOISE EMISSION ASSESSMENT

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.

The primary potential noise source from the site will be from mechanical plant.

The nearest potentially affected noise receivers are:

- Commercial and residential properties surrounding the site.
- Church located to the east of the site.

Noise emissions noise will be assessed to the following criteria:

- Ryde City Council DCP
- The EPA Industrial Noise Policy

5.1 BACKGROUND NOISE MONITORING

Background noise monitoring has previously been undertaken for the neighbouring site and has been used for the purpose of this assessment. The location of the logger conducted for the neighbouring site is suitable for the purpose of establishing background noise levels of the subject site.

5.1.1 Time of Measurement

The unattended noise monitor was installed from 18th to the 25th January 2016.

5.1.2 Measurement Equipment

Unattended noise monitoring was conducted using an Acoustic Research Laboratories Pty Ltd series 315 noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the unmanned monitoring period. Equipment was calibrated at the beginning and the end of the measurement using a Rion NC-74 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode. See Figure 1 for location.

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

Table 6 – Rating Background Levels

Description	Day Noise Level 7am to 6pm (dB(A))	Evening Noise Level 6pm to 10pm (dB(A))	Night Noise Level 10pm to 7am (dB(A))
Minimum Repeatable Background L _{90,15min}	52	47	42

5.2 ACOUSTIC OBJECTIVES

As City of Ryde DCP 2006 does not specify any criteria for noise emission, noise emissions from steady noise sources (e.g.: mechanical noise) on the subject site will be managed in accordance with EPA Industrial Noise Policy.

Noise emissions from the site should comply with all of the acoustic criteria outlined below.

5.2.1 INDUSTRIAL NOISE POLICY OBJECTIVES/GUIDELINES

The EPA Industrial Noise Policy provides guidelines for the assessment of noise impacts from industrial and commercial premises. The recommended assessment objectives vary depending on the nearest potentially affected residential receivers, the time of day and the type of noise source. The EPA Industrial Noise Policy has two requirements that must both be satisfied; that is, an intrusiveness criterion and an amenity criterion.

Criterion for neighbouring commercial/retail/recreation properties are based on set noise level criterion within the Industrial Noise Policy.

If a noise source achieves compliance with the INP guidelines it would generally be accepted the noise source would not cause “offensive noise” as defined in the Protection of the Environment Operations Act (refer below).

5.2.2 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions, and requires that noise emissions measured using the L_{eq} descriptor not exceed the existing background noise level by more than 5 dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality. The resulting intrusiveness criteria are presented in the table below.

Table 7 - EPA Intrusiveness Noise Emission Objectives

Location	Description	Noise Emission Goal - dB(A) $L_{eq}(15min)$		
		Day	Evening	Night
Surrounding affected receivers	Rating Background Noise Level $L_{90,15min}$	57	52	47

5.2.3 Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA Industrial Noise Policy sets out acceptable noise levels for various localities. Table 2.1 titled “*Amenity Criteria*” on page 16 of the Policy designates four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface. The EPA Industrial Noise Policy also includes recommended noise levels for other land uses such as commercial and industrial premises. The nearest potentially affected residential premises situated immediately to the south of the proposed development site which have been classified as being situated in an sub-urban noise amenity area as defined by the EPA NSW Industrial Noise Policy.

The following table presents the amenity criteria applicable to the nominated nearest potentially affected receivers. The receiver type utilised against the indicative noise amenity area is defined by the sub-urban criteria.

For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

Table 8 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A) $L_{eq}(\text{period})$
Residential - Suburban	Day	55
	Evening	45
	Night	40

5.2.3.1 Sleep arousal

To minimise the potential for sleep arousal the L_1 (1 minute) noise level of any specific noise source does not exceed the background noise level (L_{90}) by more than 15 dB(A) outside a resident's bedroom window between the hours of 10pm and 7am.

The L_1 noise level is the level exceeded for 1 per cent of the time and approximates the typical maximum noise level from a particular source. Where the typical repeatable existing L_1 levels exceed the above requirement then the existing L_1 levels form the basis for, sleep disturbance criteria.

5.2.4 Protection of the Environment Operations Act Regulation

Protection of the Environment Operations regulation limits the noise levels associated within the operation of domestic air conditioning criteria during night time periods which is presented below:

Protection of the Environmental Operations (Noise Control) Regulation 2000-Sect 52

52 Air Conditioners

(1) A person must not cause or permit an air conditioner to be used on residential premises in such a manner that it emits noise that can be heard within a habitable room in any other residential premises (regardless of whether any door or window to that room is open):

(a) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or

(b) before 7 am or after 10 pm on any other day.

5.3 NOISE EMISSION OBJECTIVES

Under the current EPA requirements the Industrial Noise Policy supersedes the requirements of the Noise Control Manual for assessment of mechanical plant noise. In addition we note that compliance with the Industrial Noise Policy will also indicate compliance with the Protection of the Environment Operations Act.

Based on the EPA's Industrial Noise Table 4 provides a summary of the assessment criteria applicable to the subject premises at the neighbouring potentially affected residential properties based on noise monitoring conducted for the subject site. The intrusiveness and amenity criteria for this project have been determined using the EPA guidelines and the AS1055.2-1997.

The projects external noise level criteria based on the INP criteria is detailed in the table below.

Time of day	Measured Background Noise Level dB(A) $L_{90}(\text{period})$	Amenity Criteria dB(A) $L_{eq}(\text{period})$	Intrusiveness Criteria Background + 5 dB(A) $L_{eq}(15\text{mins})$	OEH Criteria for Residential Condensers	OEH Criteria for Sleep Disturbance dB (A) $L_1(1\text{minute})$
Day	52	55	57	N/A	N/A
Evening	47	45	52	N/A	N/A
Night	42	40	47	Inaudible within neighbouring premises	57

5.4 RECOMMENDATIONS

Mechanical plant items are not typically selected at DA 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 table 6.3 of this report.

Based on previous experiences with similar developments, all plant can be satisfactorily attenuated to levels complying with the noise emission criteria through appropriate locations (where possible) and acoustic treatments such as lining of ductwork, acoustic silencers, variable speed controllers, time switches, acoustic screens etc.

5.5 YOUTH CENTRE

The propose development includes a Youth Centre within the Ground Floor and Mezzanine levels of the building as detailed in the figures below.



Figure 2 – Proposed Youth Centre

5.5.1 Recommendations

The following building and management controls are required to control noise emissions from proposed youth centre.

- Minimum 6mm float or toughened glazing with acoustic seals around perimeter is required for the whole project area, with minimum STC of 29.
- Signs reminding staff and visitors to minimise noise at all times shall be installed at ingress/egress points from the child care centre.
- The proposed outdoor communal area is not to be accessible during night time hours (ie 10pm to 7am).
- The floor of the proposed Dance and Karate area is to include a vibration matt similar to a 50mm thick Regupol FX matt.

6 CONCLUSION

This report presents the results of our assessment of environmental noise impacts on the proposed Gladesville RSL Youth Centre development location 6-8 Western Crescent, Gladesville.

Provided acoustic treatment in Section 4 of this report the internal environmental noise levels shall fully comply with the requirements of Australian Standard AS2107:2000 and AS3671:1989. Noise emissions objectives have been determined based on on-site noise logging and noise emission guidelines typically adopted by EPA and Council, and have been presented in Section 5.

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

Yours faithfully,

A handwritten signature in dark ink, reading "B.G. White." in a cursive style.

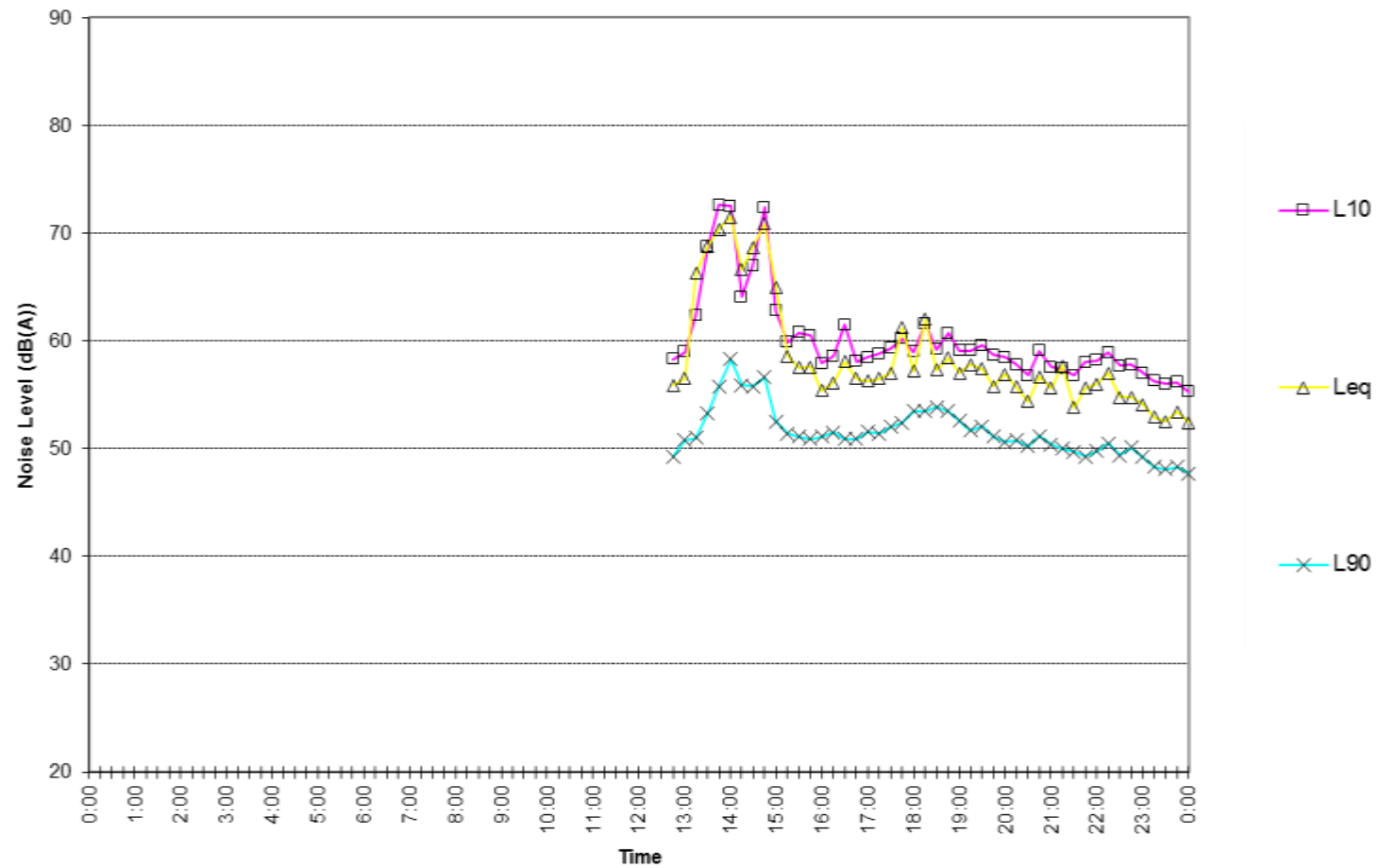
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Ben White

APPENDIX 1

Unattended Noise Monitoring Data

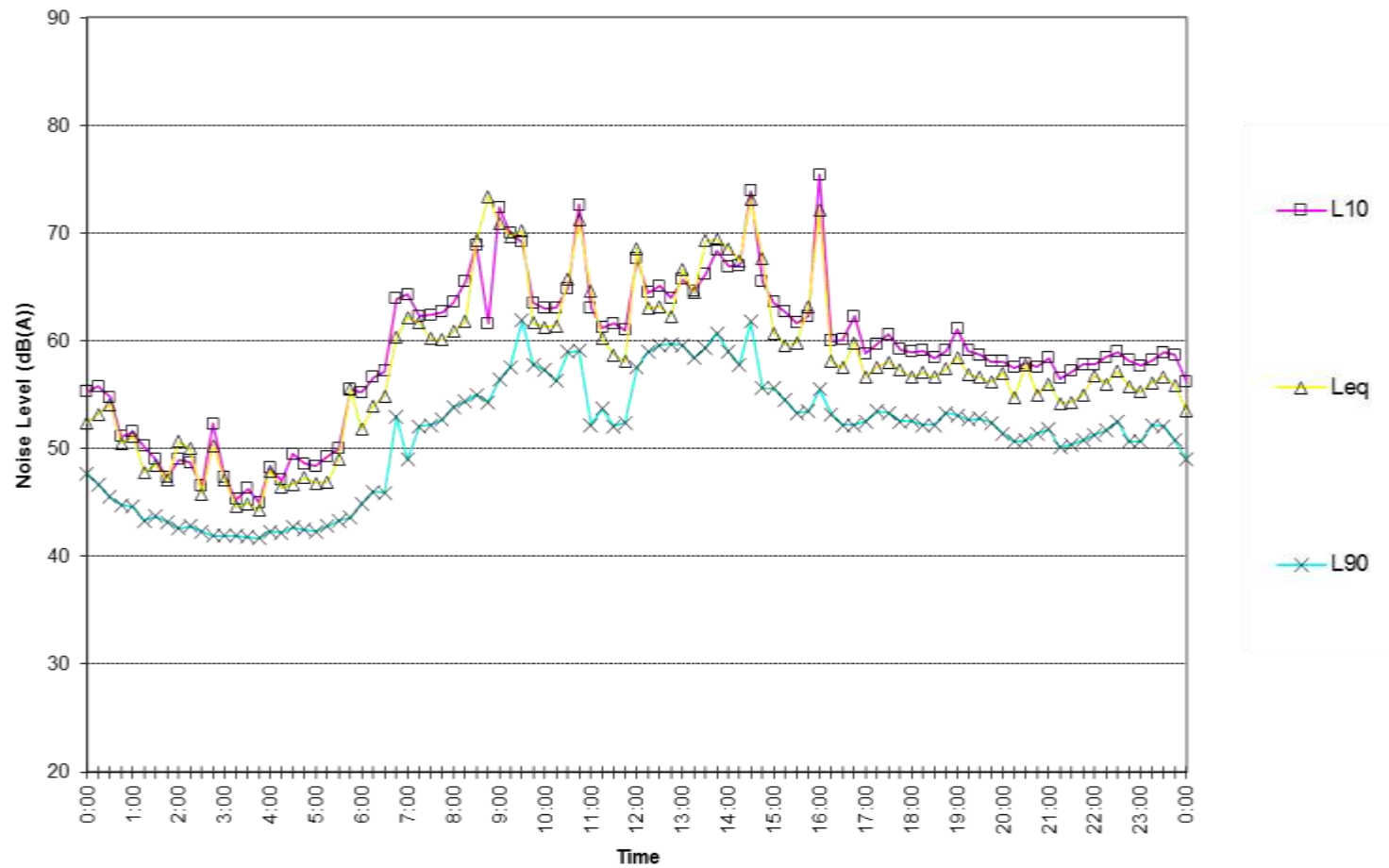
Gladesville RSL Youth Centre

Monday January 18, 2016



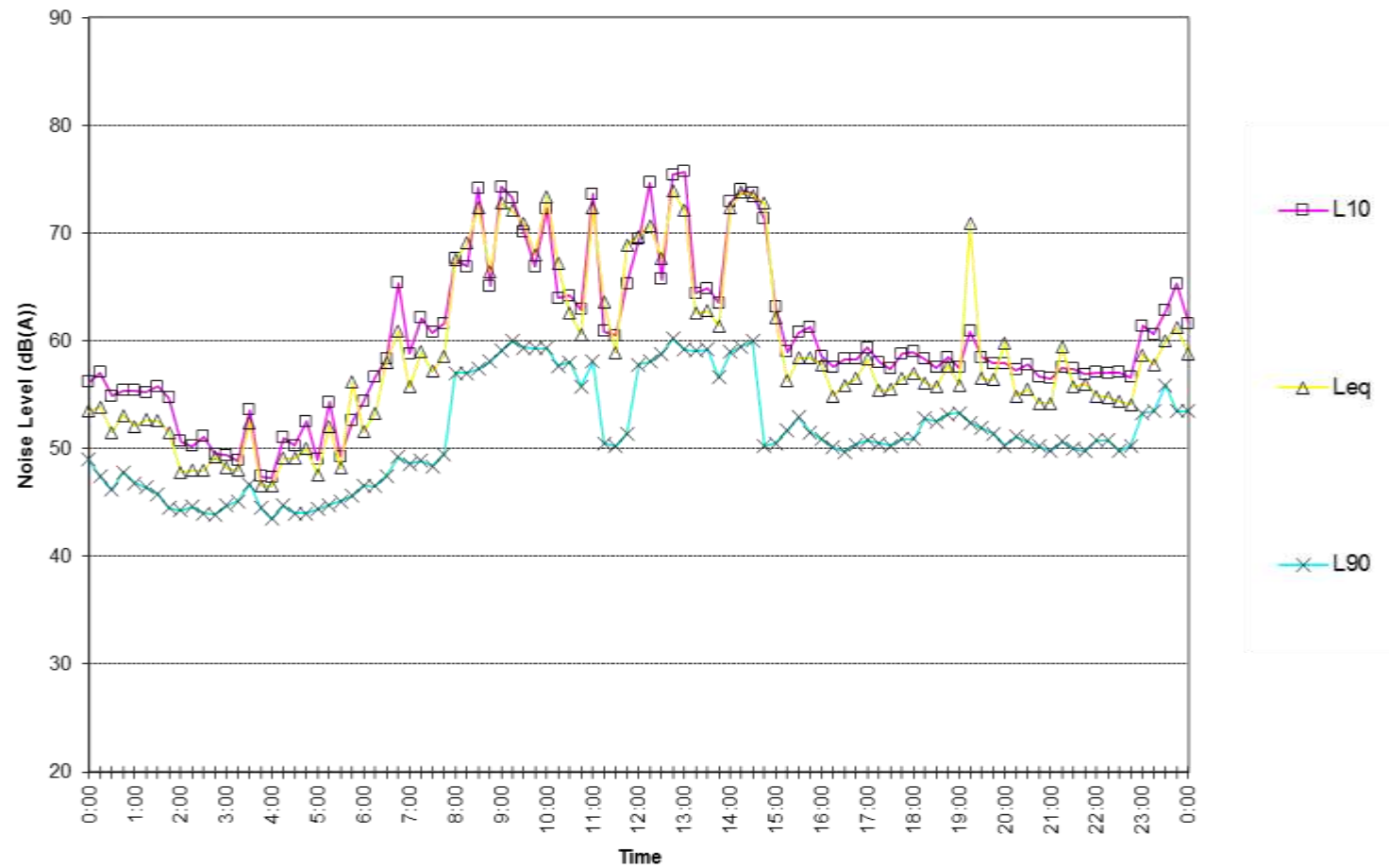
Gladesville RSL Youth Centre

Tuesday January 19, 2016



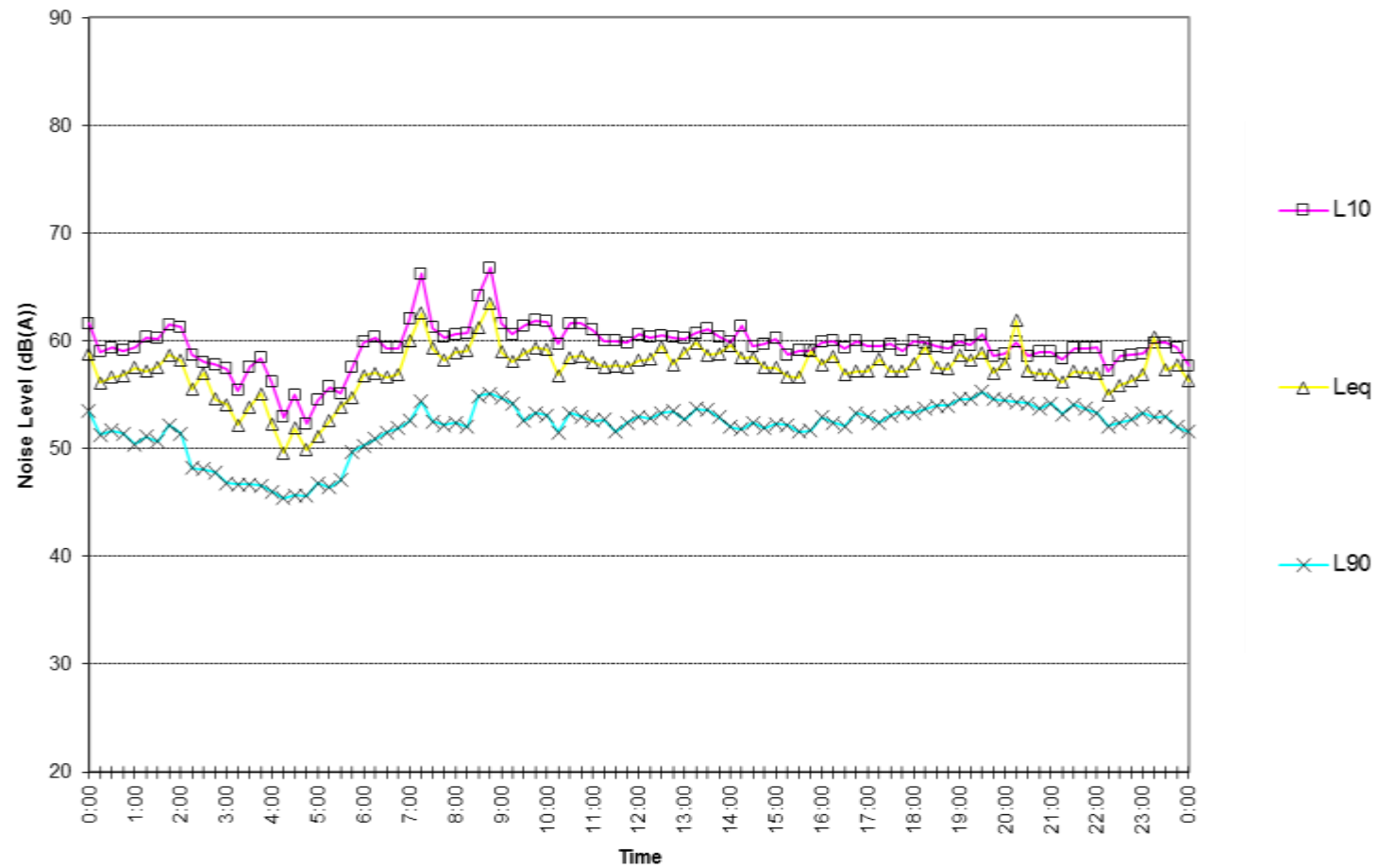
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Wednesday January 20, 2016



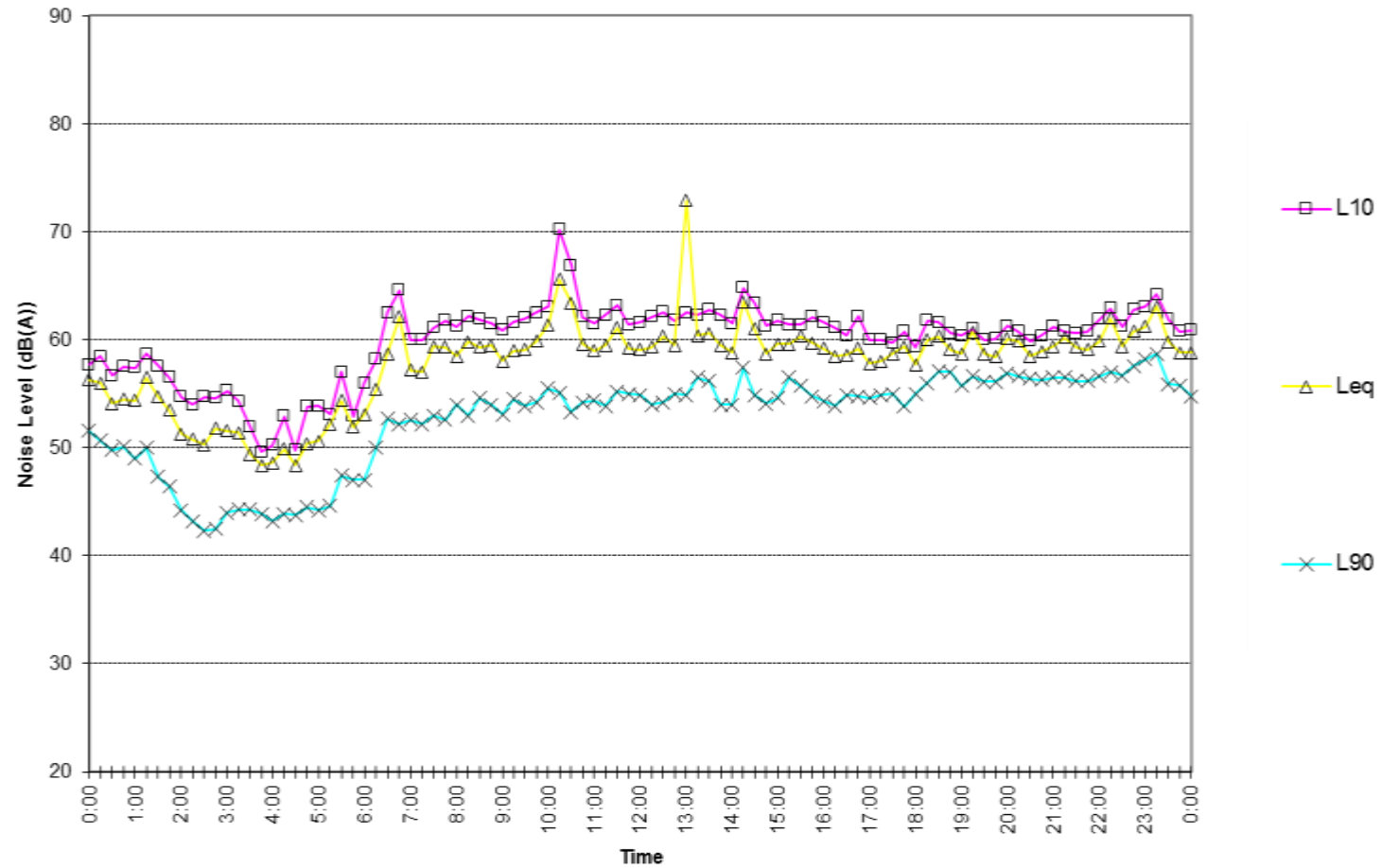
Gladesville RSL Youth Centre

Thursday January 21, 2016



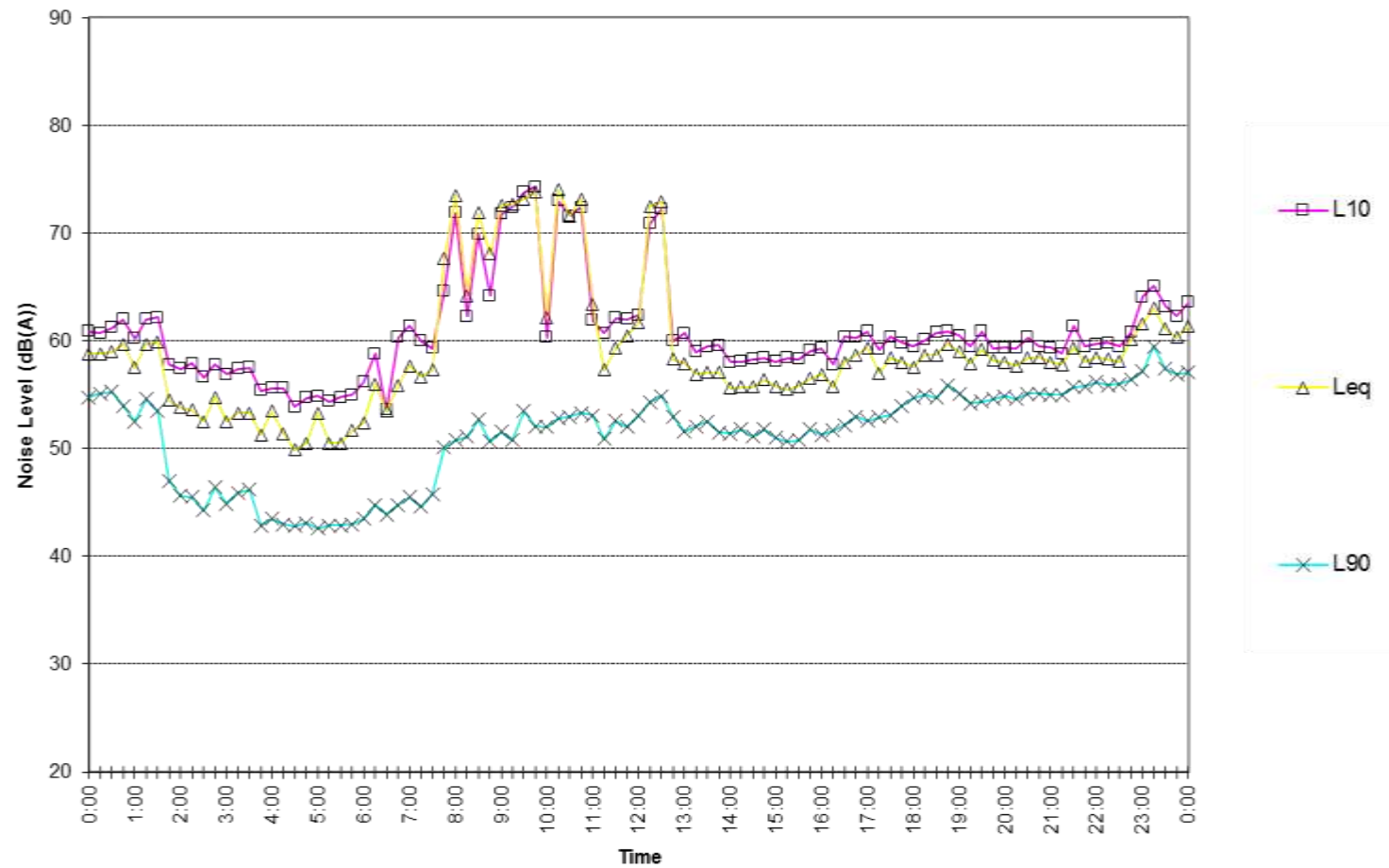
Gladesville RSL Youth Centre

Friday January 22, 2016



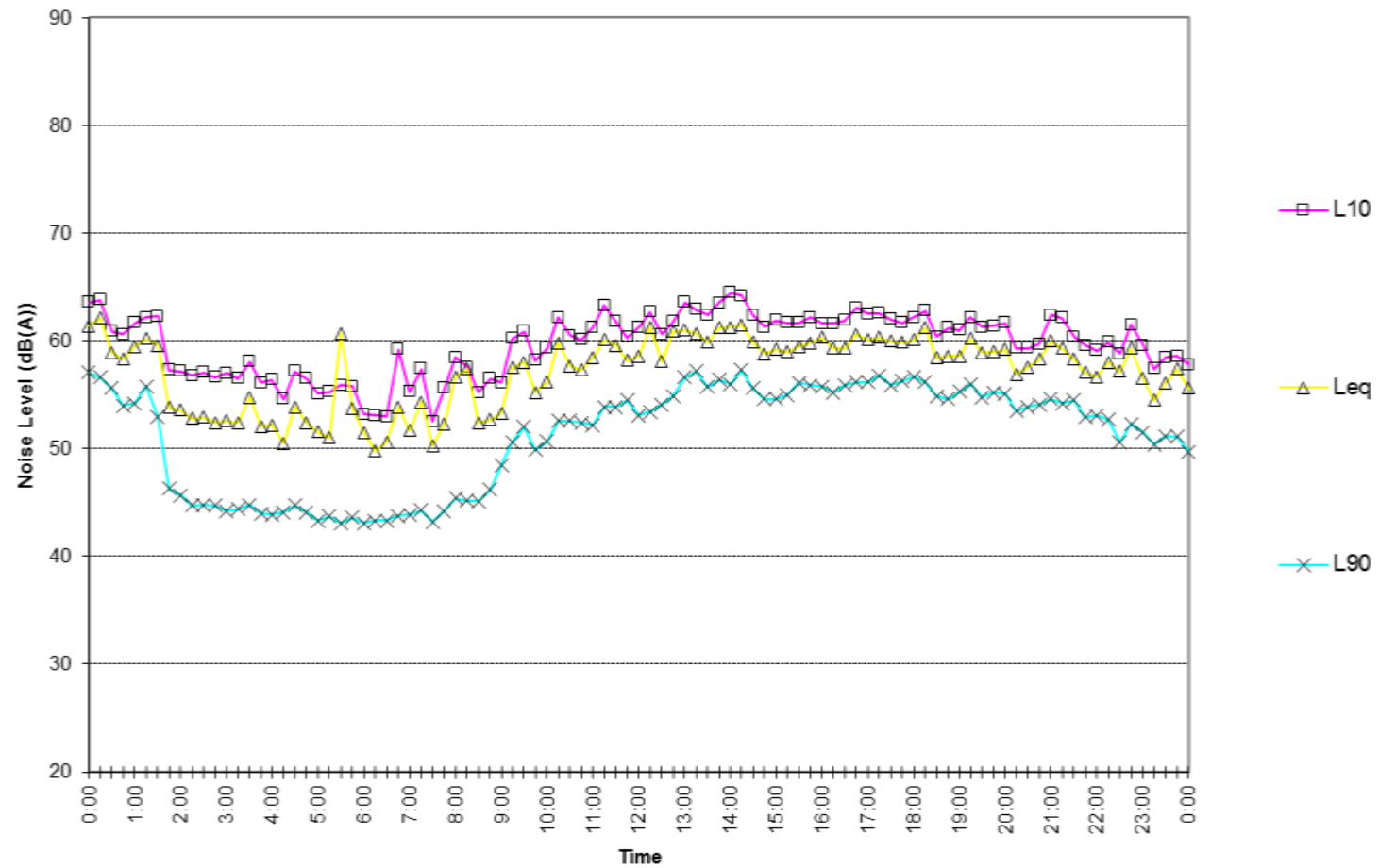
Gladesville RSL Youth Centre

Saturday January 23, 2016



Gladesville RSL Youth Centre

Sunday January 24, 2016



Gladesville RSL Youth Centre

Monday January 25, 2016

