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Proposed Glenmore Park Shopping Centre, Penrith

Environmental Noise Impact Assessment

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TABLE OF CONTENTS

1	INTRODUCTION	4
2	PROJECT DESCRIPTION.....	4
3	EXISTING ACOUSTIC ENVIRONMENT	6
3.1	EXISTING NOISE ENVIRONMENT	6
3.2	UNATTENDED BACKGROUND NOISE MEASUREMENTS	6
3.2.1	Measurement Locations	6
3.2.2	Monitoring Period	6
3.2.3	Monitoring Equipment	6
3.2.4	Rating Background Noise Levels	6
4	EXTERNAL NOISE EMISSION CRITERIA.....	7
4.1	INTRUSIVENESS CRITERION	7
4.2	AMENITY CRITERION	7
4.3	SLEEP AROUSAL	8
4.4	SUMMARY OF ASSESSMENT CRITERIA FOR PROPOSED SITE	8
4.5	EPA DAY PERIOD	8
4.6	EPA EVENING PERIOD	8
4.7	EPA NIGHT PERIOD	9
4.8	CRITERIA SUMMARY	9
5	ASSESSMENT OF NOISE EMISSIONS	9
5.1	ACTIVITIES WITHIN THE BUILDING	10
5.1.1	Noise Sources	10
5.1.2	Predicted Noise Levels- Day/ Evening Hours	11
5.2	MECHANICAL SYSTEMS	14
5.3	CARPARK	15
6	RECOMMENDED DEVELOPMENT CONTROLS.....	16
7	CONCLUSION	19

1 INTRODUCTION

This report presents our assessment of environmental noise emissions from the operation of the proposed Glenmore Park Shopping Centre, Penrith. The following noise sources have been assessed to determine the potential for adverse noise impacts on the nearby development:

- Loading Dock activities.
- Traffic and Carpark noise.
- Mechanical Plant.

2 PROJECT DESCRIPTION

The project site is located the corner of Glenmore Parkway and Luttrell St, Glenmore Park. The nearest noise receivers are those two storey residential dwellings located immediately across Glenmore Parkway.

Detailed site map and noise receiver locations are shown in Figure 1 below.

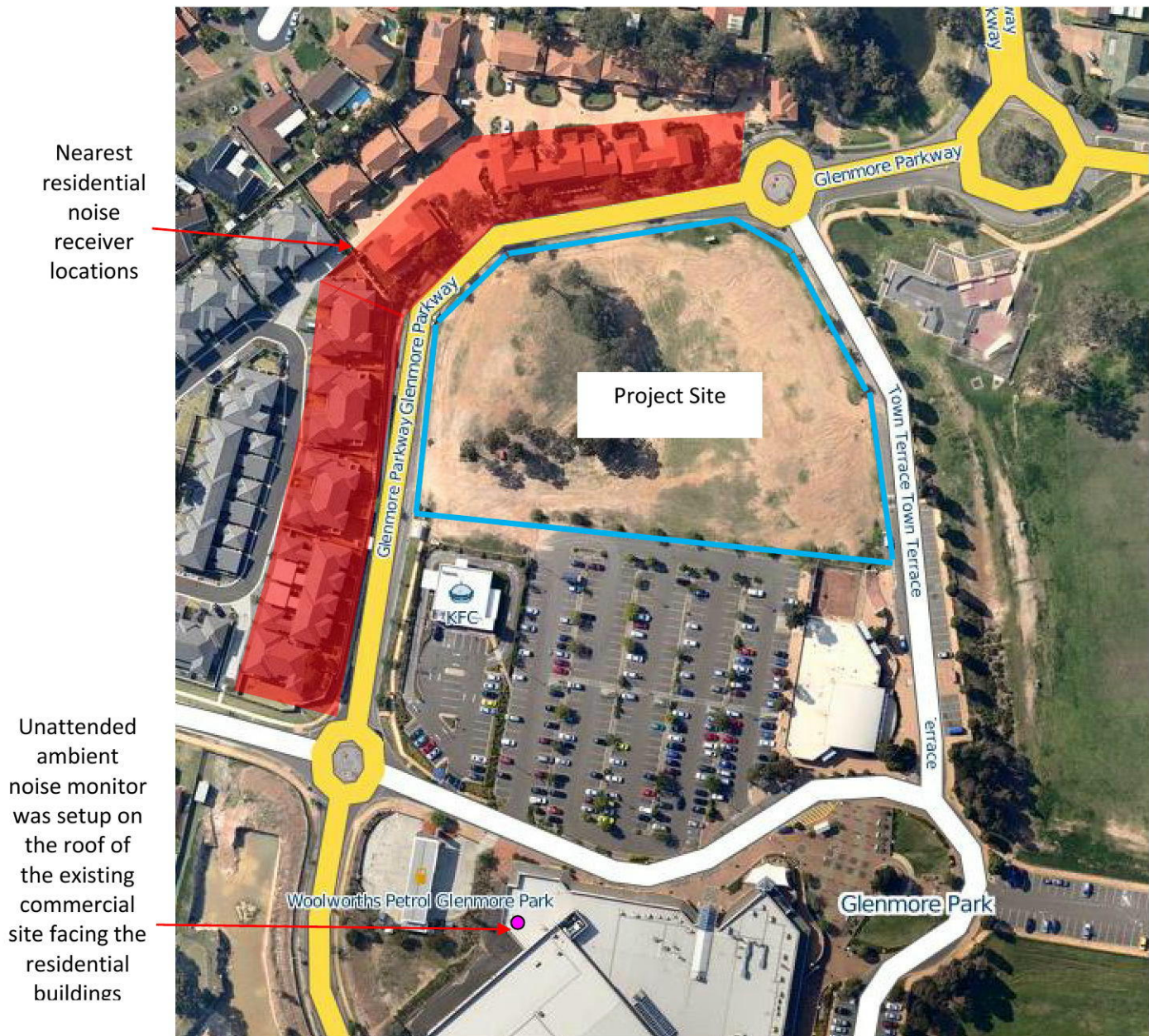


Figure 1 Site Map and Noise Receiver Location

3 EXISTING ACOUSTIC ENVIRONMENT

3.1 EXISTING NOISE ENVIRONMENT

The existing noise environment is dominated by traffic noise on neighbouring streets generated by the existing commercial development.

Ambient noise monitoring was conducted in the vicinity of the site using an unattended noise monitor. The purpose of the monitoring was to establish the background noise level in the vicinity (i.e. the typical minimum noise level occurring at the potentially affected properties adjacent the development).

3.2 UNATTENDED BACKGROUND NOISE MEASUREMENTS

3.2.1 Measurement Locations

The noise monitor was setup along the northern boundary on the roof of the existing Glenmore Park Town Centre with microphone facing the nearest residential receivers across Glenmore Parkway. The measurement location used is indicated in Figure 1. The location was selected as being representative of the existing sound environment at the residences around Glenmore Parkway, which are the residences, potentially most impacted noise generated by the development and noise emanating from the loading dock.

3.2.2 Monitoring Period

The monitoring period was between the 2nd to 8th May 2014.

3.2.3 Monitoring Equipment

Ambient noise levels were continuously monitored using an unattended noise monitor. The unattended monitor used continuously measures noise levels and every 15 minutes store statistical data within memory. The stored data was downloaded at the end of the measurement period. Acoustic Research noise monitors were used. These were set to A-weighted fast response. The monitors were calibrated before and after the measurement using a Rion NC-73 calibrator. No significant drift was recorded.

3.2.4 Rating Background Noise Levels

The monitored noise levels are indicated in Appendix 1. The rating background noise levels for period when the activities and plant operation proposed would occur are presented in the following table. In all cases the typical minimum noise level was used to determine the representative background noise level (determined in accordance with EPA Industrial Noise Policy (2000). This will give the most conservative estimate of noise impact. Table 1 lists the representative minimum background noise levels.

Table 1 - Rating Background Noise Levels at Receivers Surrounding the Proposed Development

Duration	Median L_{A90} (10th Percentile) Ambient Noise Levels
Day	46
Evening	41
Night (10pm- 7am)	37

- 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; and
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

4 EXTERNAL NOISE EMISSION CRITERIA

The NSW EPA Industrial Noise Policy provides guidelines for assessing noise impacts from industrial developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The EPA Industrial Noise Policy has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion. In addition, the EPA in its Environmental Noise Control Manual states that noise controls should be applied with the general intent to protect residences from sleep arousal.

4.1 INTRUSIVENESS CRITERION

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the 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.

4.2 AMENITY CRITERION

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

The EPA's Industrial noise policy sets out acceptable noise levels for various localities. Table 2.1 on page 16 of the policy indicates 4 categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Table 3 provides the recommended ambient noise levels for the suburban residential receivers for the day, evening and night periods. 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; and
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

Table 2 - EPA Recommended Amenity Industrial Noise Levels

Type of Receiver	Time of day	Recommended Acceptable Noise Level dB(A) L_{eq}
Residential	Day	55
	Evening	45
	Night	40

4.3 SLEEP AROUSAL

To minimise the potential for sleep arousal the $L_{1(1\text{ minute})}$ 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.

4.4 SUMMARY OF ASSESSMENT CRITERIA FOR PROPOSED SITE

EPA Industry Noise Policy requirements will be used as acoustic assessment criteria for this project. The intrusiveness, amenity and sleep arousal criteria for this project have been determined using these guidelines and the noise monitoring results. These are summarised below. We note that the formulation of the assessment criteria has been based on the lowest ambient levels determined from all monitoring data.

4.5 EPA DAY PERIOD

The following table sets out the measured L_{90} background noise levels, and the assessment criteria based on the suburban criteria. The day period applies between 7am and 6pm Monday to Saturday; and 8am to 6pm Sundays and public holidays.

Table 3 – Measured L_{90} Noise Levels and Criteria - Daytime

Measured L_{90} Noise Level dB(A)	Amenity Criterion dB(A) $L_{eq}(\text{Period})$	Intrusiveness Criterion dB(A) $L_{eq}(15\text{min})$
46	55	51

4.6 EPA EVENING PERIOD

The following table sets out the measured L_{90} background noise levels, and the assessment criteria based on the suburban criteria. The evening period applies between 6pm and 10pm.

Table 4 –Measured L₉₀ Noise Levels and Criteria - Evening Period

Measured L₉₀ Noise Level dB(A)	Amenity Criterion dB(A) L_{eq}(Period)	Intrusiveness Criterion dB(A) L_{eq}(15min)
41	50	46

4.7 EPA NIGHT PERIOD

The night period (that is, between 10pm and 7am) is the period where noise emissions can have the most significant effect on residential amenity. In addition to the quasi-steady state criteria the L₁ noise emission level should not exceed the background noise level by more than 15 dB(A) to prevent sleep arousal from intermittent events. The night time period applies between 10pm and 7am.

Table 5 –Measured L₉₀ Noise Levels and Criteria - Night Time Period

Measured L₉₀ Noise Level dB(A)	Amenity Criterion dB(A) L_{eq}(Period)	Intrusiveness Criterion dB(A) L_{eq}(15min)	Noise Objective for Intermittent Activities dB(A) L₁(1 Min) (Background + 15 dB(A))
37	40	42	52

4.8 CRITERIA SUMMARY

The table below provides a summary of the criteria applicable to the proposed development based on the information documented above.

Table 6 – Noise Objectives for Residential Receivers near Proposed Development

Daytime Noise Objective dB(A) L_{eq}(Period)	Evening Noise Objective dB(A) L_{eq}(Period)	Night Noise Objective dB(A) L_{eq}(Period)	Noise Objective for Intermittent Activities dB(A) L₁(1min) (Background + 15 dB(A))
51	46	42	52

5 ASSESSMENT OF NOISE EMISSIONS

I have undertaken an assessment of potential impact of the proposed development on the surrounding properties. The noise sources associated with the proposed development can be broadly defined as:

- Activities within the proposed two loading dock areas;
- Mechanical plant;
- Noise from within the proposed car park;

5.1 ACTIVITIES WITHIN THE BUILDING

The primary source of noise for activities conducted within the building will be the proposed two loading dock areas .

The activities carried out within the loading dock area would include:

- Loading/unloading of vehicles using hand pallets and fork lift trucks.
- Waste storage and compacting.

The potentially most impacted receivers are:

- The residences fronting Glenmore Parkway as shown in Fig 1 closest to the entry /exit to the loading areas.

5.1.1 Noise Sources

The potential noise sources associated with the loading dock are listed in table 7 along with the noise emission levels. The emission levels have been obtained from noise monitoring carried out at similar retail loading dock facilities. Noise measurements were obtained using a Norsonics SA 110 with (serial number 24692) or CEL-593 Type 1 sound level analysers (serial number C1. T 116962) set to fast response. The sound level analysers were calibrated before and after the measurements using a Rion NC-73 calibrator. No significant drift was recorded.

Assessment has been based on Heavy to Medium rigid trucks and articulated trucks up to 19m in length and the loading dock operation during day and evening only.

Table 7 - Noise Source Emission Levels

Noise Source	Sound Power Level dB(A)	Type of Noise Source
Truck Idle	95	Quasi-Steady
Trucks Manoeuvring	100	Quasi-Steady
Semi-trailer idle	100	Quasi-Steady
Semi-trailer Manoeuvring	103	Quasi-Steady
Waste Truck compacting load	103	Quasi-Steady
Truck Starting	97	Transient
Semi-trailer Starting	110	Transient
Truck reversing alarm	105 including 5 dB(A) tonality correction	Intermittent
Forklift	88	Intermittent
Truck /Semi- trailer air brake	114	Intermittent
Waste Truck compacting load	103	Quasi-Steady

5.1.2 Predicted Noise Levels- Day/ Evening Hours

The noise levels at the existing residential receivers from activities and vehicles within the loading dock were calculated based on the noise emission levels provided in

Table 7. These levels were corrected for:

- Distance between the noise source and receiver, barrier or directivity effects (when present) and topography.

A worst case 15 minute noise level based on the following for the receivers near the loading area entry :

- Two Heavy or Medium Rigid Truck arrives in and out during one hour time period.
- One Semi-trailer arrives in and out during one hour time period.
- All vehicles idling for 120 seconds upon arrival or departure.
- Loading/unloading of truck for balance of 15 minutes.
- Garbage compacting for 5 minutes.

The predicted boundary and façade noise levels are summarised below:

Table 8 – Receiver Noise Assessment – Loading Dock – Day/Evening dB Leq (15min)

Noise Receiver	Loading Dock Area	Time Period	Predicted Noise Level dB(A) Leq	Criteria dB(A) Leq	Compliance
Nearest Façade or Residential Building Across Glenmore Parkway	Western Retail Loading Dock	Day/Evening	45	51 dB(A)- Day	Yes
	Northern Retail Loading Dock		45	46 dB(A)- Evening	Yes

The noise assessment undertaken indicates that with the recommended development controls indicated in Section 6 noise emissions will comply with Council guidelines at all times, and would not adversely impact any of the surrounding receivers.

5.2 MECHANICAL SYSTEMS

Because detailed plant selections are not available at this stage it is not possible to carry out a detailed examination of the ameliorative measures that may be required to achieve the noise targets. Plant will be acoustically treated to prevent noise emissions from adversely impacting the surrounding properties. This may include selecting the quietest plant practicable, or treating the plant with enclosures, barriers, duct lining and silencers, vibration isolation etc as required complying with the sound level recommendations presented above.

During this assessment a preliminary review of mechanical plant will be conducted with the major plant items being identified.

Once mechanical plant selections and layouts have been finalised a detailed acoustic assessment will be conducted specifying acoustic treatments required to comply with council criteria. Mechanical plant design and acoustic treatments will be submitted as part of the Construction Certificate.

On completion of the proposed development a suitably qualified acoustic engineer should be required to conduct compliance testing at a number of surrounding receivers to ensure noise levels resulting from the operation of mechanical plant comply with the criteria above.

Provision has been made in the design for plant areas for major plant items and space for acoustic treatment, as described below.

1. Ventilation Equipment

Treatment of ventilation equipment associated with the carpark and commercial areas of the development will be addressed by selection of suitable quiet, appropriate enclosures, silencers, internal lining of ductwork, etc.

Experience with similar projects indicate that it would be possible and practical to achieve the project noise objectives with appropriate treatment of the plant. This treatment would be determined in detail at the Construction Certificate stage when greater detail regarding the size location and selections for the proposed plant would be available. Certification of compliance following completion is also recommended.

5.3 CARPARK

There are proposed to be two basement carpark levels. The entry and exit of the carpark are through northern side of project building. The potential noise source associated with the carpark is listed in Table 9 along with the noise emission levels. The emission levels have been obtained from noise monitoring carried out at similar facilities. Noise measurements were obtained using a Norsonics SA 110 with (serial number 24692) or CEL-593 Type 1 sound level analysers (serial number C1. T 116962), set to fast response. The sound level analysers were calibrated before and after the measurements using a Rion NC-73 calibrator. No significant drift was recorded.

Table 9 - Noise Source Emission Levels

Noise Source	Sound Power Level dB(A)	Type of Noise Source
Car Manoeuvring	84	Quasi-Steady
Door Slamming	92	Instantaneous

Noise predictions were based on following:

- Distance between the noise source and receiver, barrier or directivity effects (when present) and topography.
- Assuming 100% carpark spaces are occupied during half an hour period which represents worst scenario.
- Tabled noise emission data in Table 9.

The predicted boundary and façade noise levels are summarised below:

**Table 10 - Receiver Noise Assessment – Carpark – Day/Evening
dB Leq (15min)**

Noise Receiver	Time Period	Predicted Noise Level dB(A) Leq	Criteria dB(A) Leq	Compliance
Nearest Façade Across Glenmore Parkway-Northern to the site	Day/Evening	41	51 dB(A)- Day 46 dB(A)- Evening	Yes

6 RECOMMENDED DEVELOPMENT CONTROLS

The following development controls are recommended to ensure the proposed development will not result in adverse noise impacts:

- Operating hours for the Garbage compacting, loading docks, deliveries, garbage removals, upper level carpark, etc to be between 7am and 10pm.
- No more than two Heavy or Medium Rigid Truck arriving in one hour period to particular loading dock.
- No more than one Semi-trailer to arrive to particular loading dock in one hour time period.
- 50mm thick Tontine Acoustisorb 3 or equal covered by perforated FC /metal sheet should be installed on the available vertical face of the loading dock where vehicles park to absorb impacts (Detailed insulation areas refer to Figure 2 & 3).
- An acoustic barrier will be required to be constructed along the northern and western boundary of the loading dock areas facing the residential properties. The barrier can be constructed using Hebel, Colorbond, 15mm weatherproof plywood or 100% lapped and capped timber. Detailed barrier locations and barrier height have been presented in Figure 2 & 3 next.

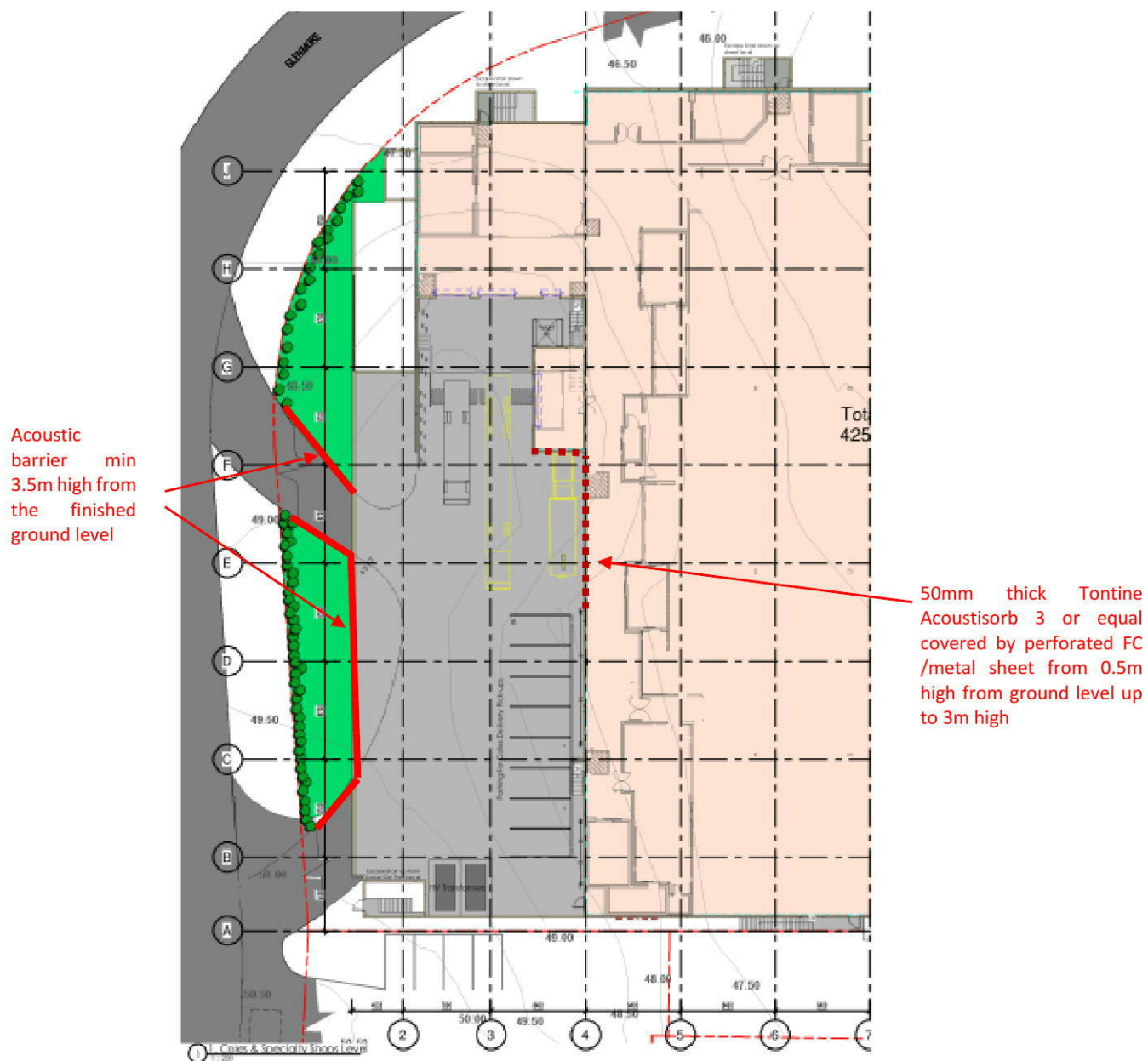
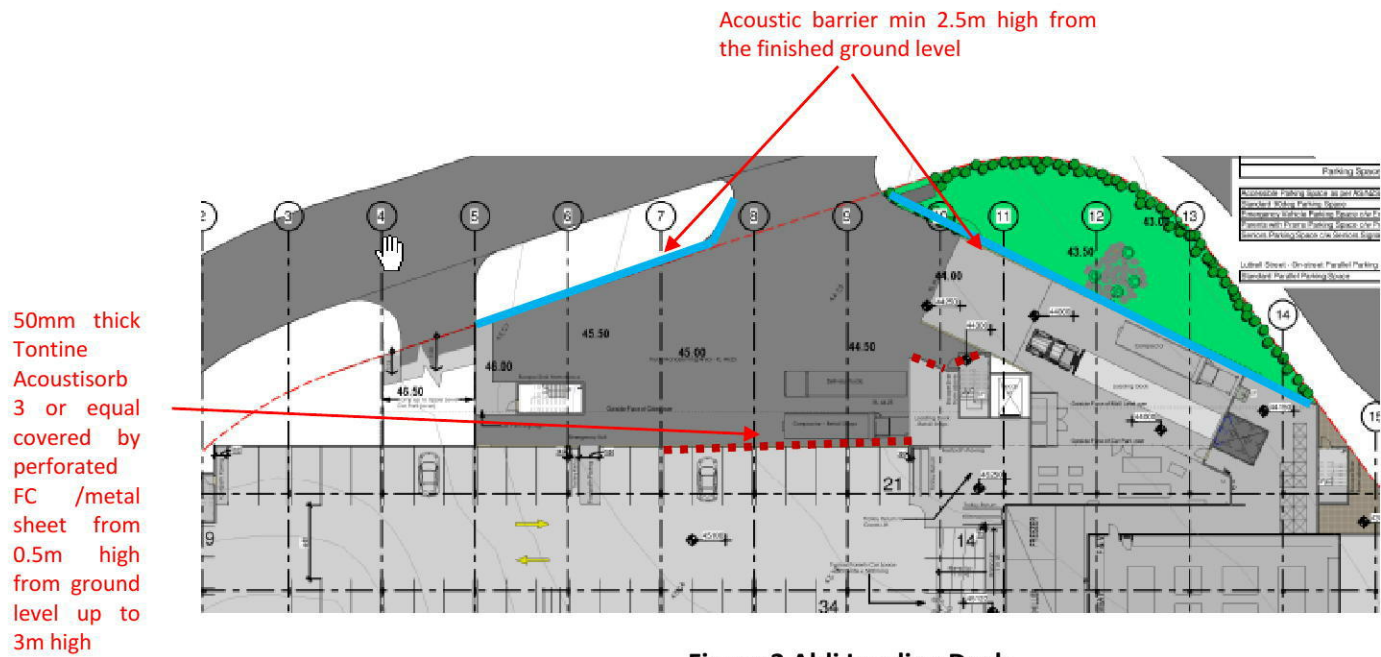


Figure 2 Coles Loading Dock



- A detailed assessment of noise emissions from mechanical plant and equipment associated with the proposed site is required to be conducted prior to installation in conjunction with council requirements as detailed in this report.

7 CONCLUSION

Potential environmental noise impacts from the operation of the proposed Glenmore Park Shopping Centre, Penrith have been assessed based on the requirements of NSW EPA Industrial Noise Policy. Noise from activities within the proposed building were assessed. Provided the recommendations for noise mitigation made in Section 6 are adopted the proposed development will comply with the recommendations of the EPA Industrial Noise Policy and would not adversely impact the acoustical amenity of any of the surrounding properties.

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

Yours faithfully,

A handwritten signature in black ink, appearing to read 'George Wei', is centered below the closing text.

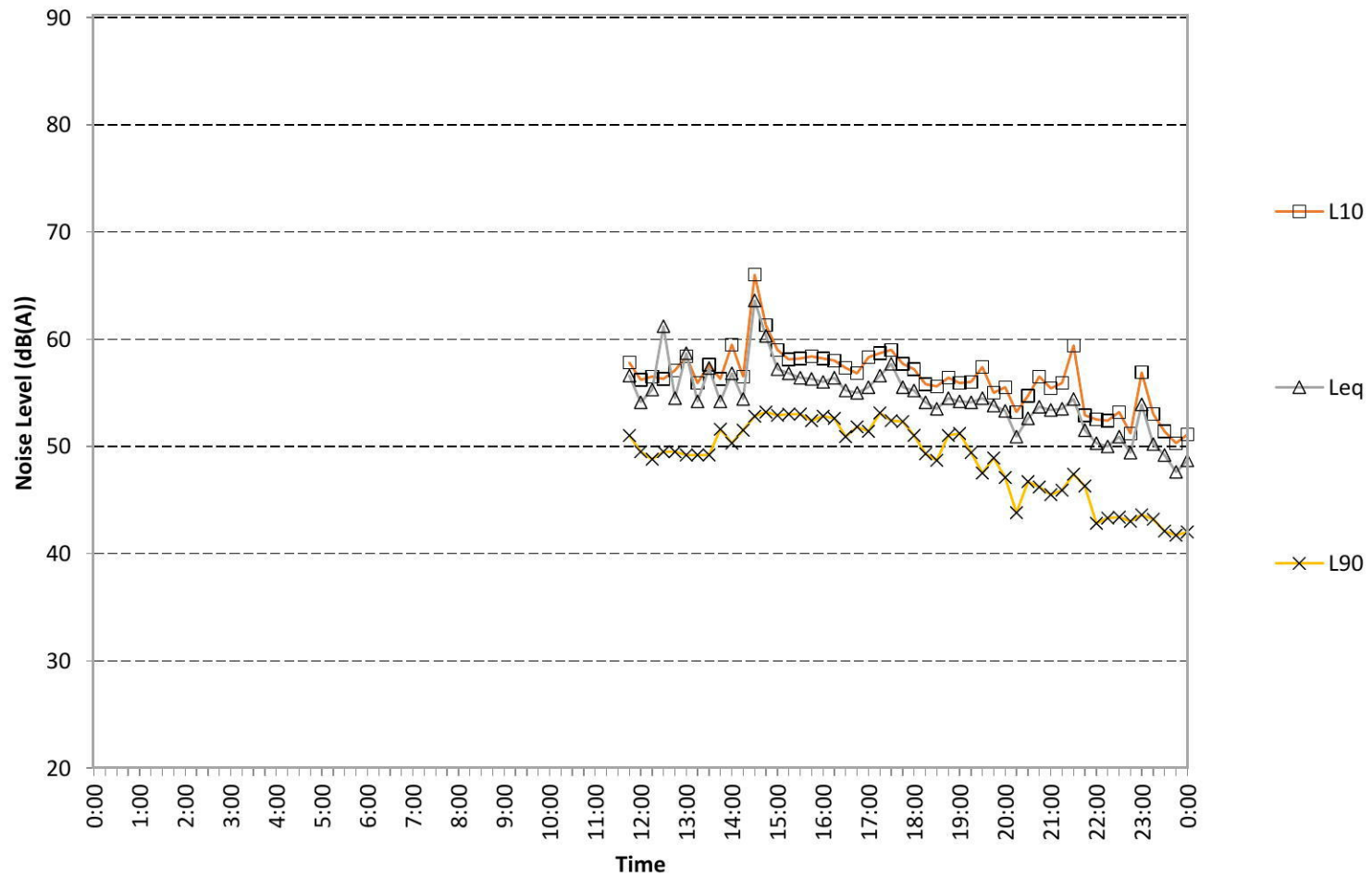
Acoustic Logic Consultancy Pty Ltd
George Wei

Senior Acoustic Engineer

Appendix 1- Unattended Background Noise Data

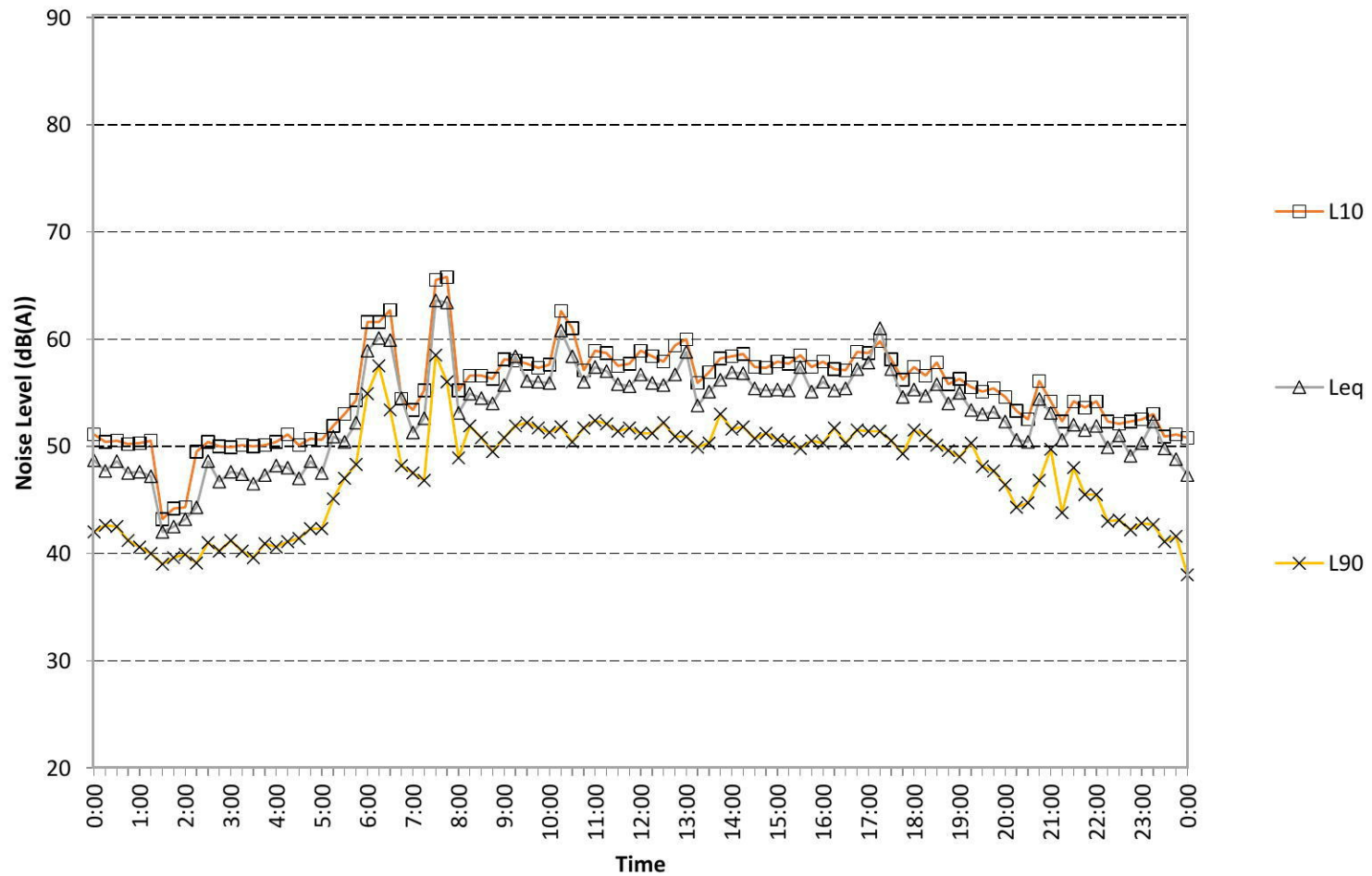
Roof of Town Centre

Friday May 2, 2014



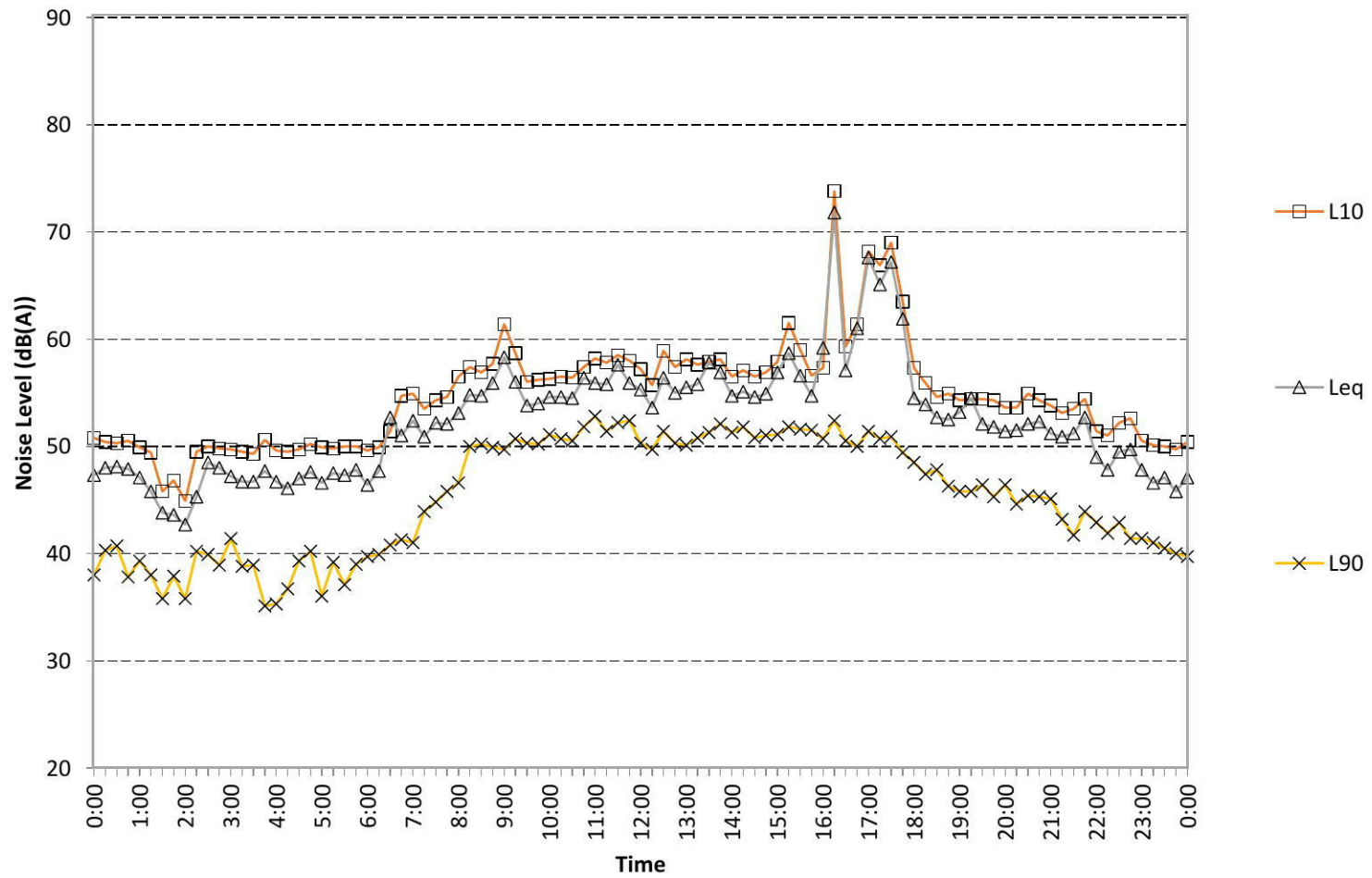
Roof of Town Centre

Saturday May 3, 2014



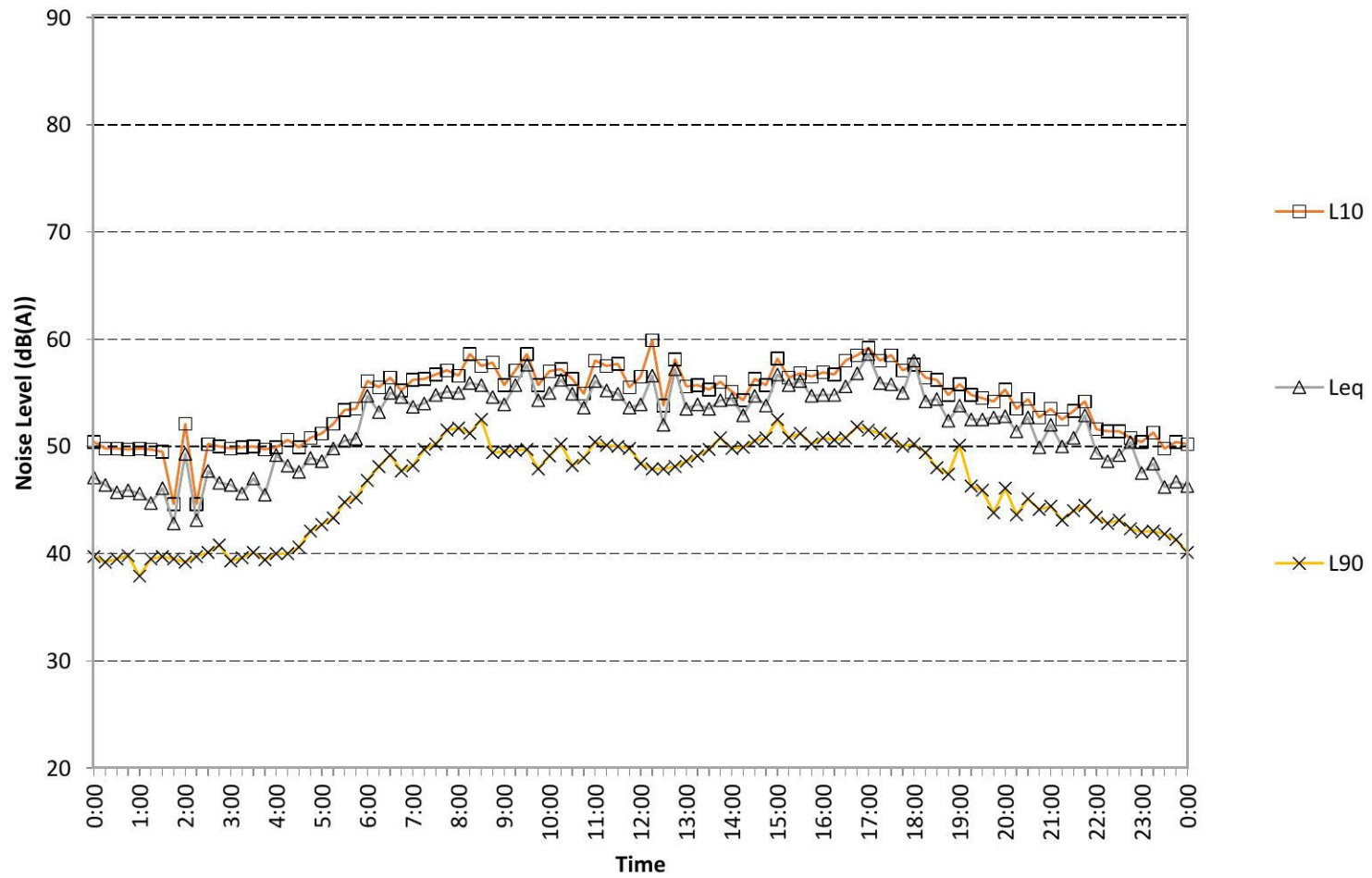
Roof of Town Centre

Sunday May 4, 2014



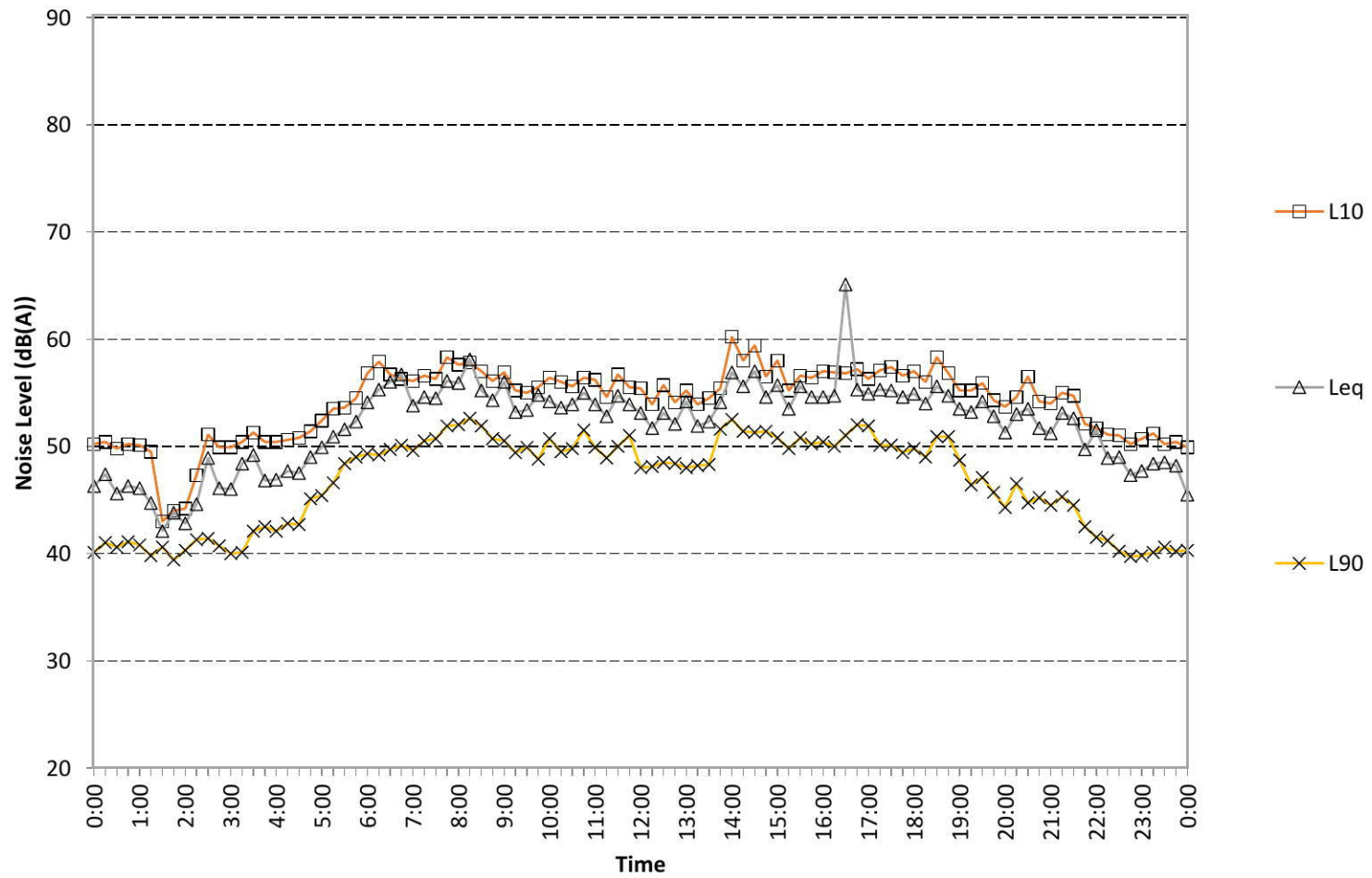
Roof of Town Centre

Monday May 5, 2014



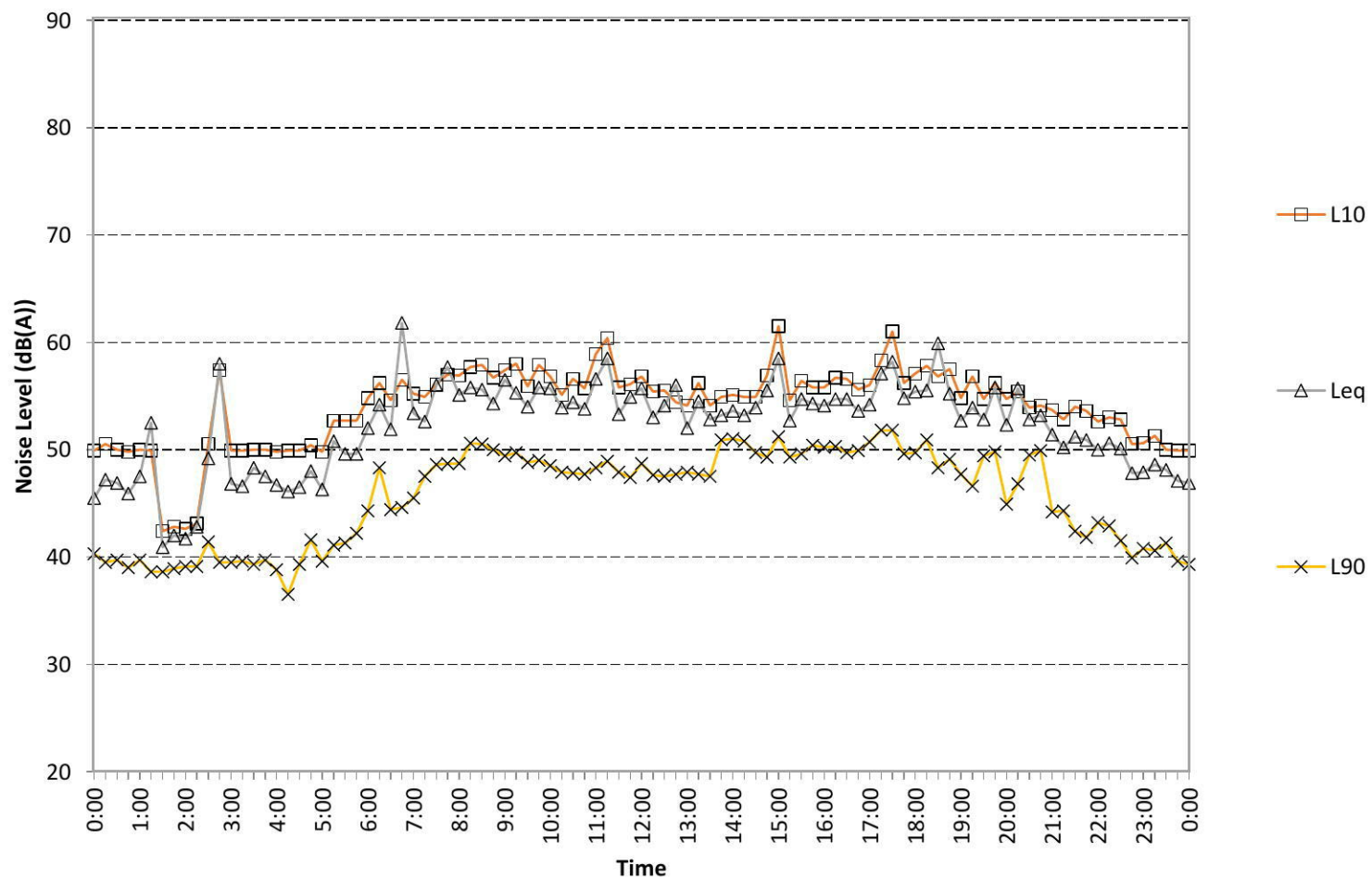
Roof of Town Centre

Tuesday May 6, 2014



Roof of Town Centre

Wednesday May 7, 2014



Roof of Town Centre

Thursday May 8, 2014

