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ACOUSTIC ASSESSMENT

PEMULWUY PROJECT, REDFERN

MIXED-USE RETAIL COMMERCIAL RESIDENTIAL

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CONTENTS

1.0 INTRODUCTION

Koikas Acoustics Pty Ltd was requested by DeiCorp Constructions (NSW) Pty Ltd to undertake an acoustic assessment of the proposed mixed-use retail commercial residential development proposed as the Pemulwuy Project in Redfern. The acoustic assessment addresses a number of noise related matters in regards to the design, construction and operation of premises associated with the Pemulwuy Project.

The Pemulwuy Project is to comprise of three (3) separate 'Precincts' that will include a mix of retail commercial and residential premises. The premise will accommodate retail stores, commercial office space, a gym, student accommodation and residential townhouses and units.

A number of acoustic matters were addressed within this report so that the use of the premise and acoustic effect of the surrounding environment do not adversely affect neighbours and occupants within the development alike. Within this report, acoustic issues were addressed that relate to:

- Construction noise and vibration.
- Road and rail traffic noise intrusion to the proposed new spaces within the Pemulwuy Project.
- The noise effect to surrounding premises resulting from the use of the Pemulwuy Project, in particular that of the proposed Child Care Centre and Gallery/Multi-function room
- The effect of noise from mechanical plant and equipment associated with the development.
- Acoustic isolation requirements for partitions that separate one sole-occupancy unit from another.

To address the above acoustic matters it was necessary to reference specific criteria from current and relevant documentation. The basis for design and the acoustic recommendations provided herein are to satisfy the requirements of the following publications:

- DECCW Interim Construction Noise Guidelines
- NSW Department of Planning, Developments Near Rail Corridors and Busy Roads, Interim Guidelines, December 2008
- EPA Industrial Noise Policy and standard LAB noise conditions where a licensed premise is proposed
- Part F5 Sound Insulation of the Building Code of Australia 2011.

The calculations, noise model scenarios and included recommendations were specifically based on architectural drawings provided by Nordon Jago Architects, Project No. DEI00210 last dated the 2nd December 2011.

2.0 SITE DESCRIPTION

The proposed Pemulwuy Project site is located in Redfern in close proximity to Redfern Train Station, off Lawson Street.

Precinct 1 is located on the block that is enclosed by Eveleigh Street to the east, Louis Street to the west, Vine Street to the north and Caroline Street to the south.

Precinct 2 occupies the block of land that adjoins Caroline Street to the north, Eveleigh Street to the east and Lawson Street to the south.

Precinct 3 adjoins the existing rail corridor to the east and Eveleigh Street to the west. A detailed photograph showing the proposed locations of all precincts is attached in Appendix A.

Due to the proximity of the rail corridor and vehicular traffic along Lawson Street there is the potential for intrusive noise to be experienced within premises associated with the proposed development. Similarly, there is the potential for noise from the use of premises within the proposed development generating intrusive noise to residents surrounding the Pemulwuy Project site. As the surrounding area is predominantly for residential use, care must be taken to ensure there is no unreasonable loss of acoustic amenity as a result of the new development.

Particular noise sensitive receiver sites are located in Caroline Street, Lawson Street, Louis Street and to a lesser extent, Hugo Street.

Appendix A provides a detailed aerial view of the assessment site in relation to the surrounding environment.

2.1 AMBIENT NOISE PROFILE OF THE SITE

The vast nature of the development site means that there is significantly differing levels of existing ambient noise at various locations within the proposed site.

In the vicinity of Precinct 2 there is a dominant ambient noise of vehicles traversing along Lawson Street along with pedestrian activity along Lawson Street, much of which is due to the proximity of the train station and pedestrians associated with its use.

The ambient noise at Precinct 3 is far different with less effect of the road traffic noise and a much more substantial noise effect of passing trains. Typically rail noise can be characterised as intermittent with each pass-by only resulting in a moderate noise exposure over a short duration. However as Redfern Station is one of the busiest stations in Sydney, there are trains constantly arriving and departing this station.

Being set-back from both the road and rail corridors results in a lower ambient noise level in the vicinity of Precinct 1. Noise at this location is dominated by distant traffic movements (road and rail) and noise from surrounding commerce and industrial sources. With the inclusion of the two buildings proposed for Precinct 2 and 3 there will likely be a decline in ambient noise levels as a result of road and rail noise being shielded by the new buildings.

3.0 NOISE SURVEYS

All noise methodologies and equipment used comply with the following Australian Standards:

- *AS IEC 61672.1-2004 "Electroacoustics - Sound Level Meters – Part 1 Specifications", and AS IES 61672.2-2004 Part 2 Patter evaluation tests.*
- *AS1055.1 "Acoustics - Description and measurement of environmental noise".*

3.1 UNATTENDED NOISE SURVEYS

3.1.1 Survey Dates and Duration

Unattended noise monitoring was conducted by Koikas Acoustics at three (3) separate locations to determine the existing acoustic environment in the area that makes up the proposed Pemulwuy Project. One logger each was placed to quantify the acoustic environment in each of the 3 precincts. Of the 3 loggers, 2 would serve a concurrent purpose of quantifying the spectral noise levels of road traffic (Precinct 2) and rail traffic (Precinct 3).

The three surveys were conducted between Wednesday 15th June and Tuesday 21st June 2011 over seven (7) consecutive days. Meteorological records obtained from the Bureau of Meteorology website indicate that the measurement results were not compromised by adverse weather conditions.

3.1.2 Location

The sound level meter data loggers were installed at the following site locations;

- Precinct 1: In the rear yard of Vine Street residence between Eveleigh Street and Louis Street (property number unknown).
- Precinct 2: On the first floor balcony of the residence directly adjoining the proposed in Lawson Street.
- Precinct 3: On the roof level of the existing Eveleigh Street parking facility fronting the rail corridor.

Refer to Appendix A for an aerial photo showing the unattended noise monitoring locations.
Refer to Appendix B for logger graphs at the monitoring sites.

3.1.3 Instrumentation

The unattended noise surveys were conducted with two (2) Type 1 precision Svantek 957 octave band sound level meter data loggers S/N 14573 (Precinct 2) and 14574 (Precinct 1) and one (1) Type 1 precision BSWA 801 octave band sound level meter data logger S/N 14989.

All sound level meters currently carry manufacturer's calibration settings as determined in a NATA certified laboratory.

3.1.4 Logger Function and Descriptors

The sound level meter was programmed to log the noise data at consecutive 15 minute intervals. The data for each 15 minute period was stored in the data logger memory. The data stored included the following noise metrics:

- L_{eq} Known as the continuous equivalent noise level
- L_{max} The maximum hold sound pressure level
- L_1 The noise that was exceeded for 1 percentile of the measurement period
- L_{10} The noise that was exceeded for 10 percentile of the measurement period
- L_{90} The noise that was exceeded for 90 percentile of the measurement period
- L_{min} The minimum sound pressure level

All noise level measurements were A-frequency and Fast-time weighted.

3.1.5 Unattended Noise Survey Results

A brief summary of the daily noise survey results is shown below.

Table 1: Existing RBL and Amenity Noise Levels: PRECINCT 1 (Vine Street location)

VINE STREET	L_{A90} Background Noise Level, dB(A)			L_{Aeq} Amenity Noise Level, dB(A)		
	Day	Evening	Night	Day	Evening	Night
Day 1 – Thurs 28th July	-	-	-	-	-	-
Day 2 – Fri 29th July	45	42	37	51	46	46
Day 3 – Sat 30th July	43	44	37	51	49	42
Day 4 – Sun 31st July	43	41	37	51	47	47
Day 5 – Mon 1st August	38	41	38	49	48	45
Day 6 – Tue 2nd August	43	42	38	51	48	44
Day 7 – Wed 3rd August	46	42	38	52	45	44
L_{90} Median/L_{eq} Log Average	**43**	**42**	**38**	**51**	**48**	**45**

Table 2: Existing RBL and Amenity Noise Levels: Precinct 2 (Lawson Street location)

LAWSON STREET	L_{A90} Background Noise Level, dB(A)			L_{Aeq} Amenity Noise Level, dB(A)		
	Day	Evening	Night	Day	Evening	Night
Day 1 – Thurs 28th July	-	-	-	-	-	-
Day 2 – Fri 29th July	57	53	44	67	65	62
Day 3 – Sat 30th July	55	52	43	66	65	61
Day 4 – Sun 31st July	54	50	44	65	64	60
Day 5 – Mon 1st August	51	49	45	64	63	60
Day 6 – Tue 2nd August	55	52	42	66	69	59
Day 7 – Wed 3rd August	55	51	42	65	65	63
L_{90} Median/L_{eq} Log Average	**55**	**51**	**43**	**66**	**66**	**61**

Table 3: Existing RBL and Amenity Noise Levels: Precinct 3 (Eveleigh Street location)						
EVELEIGH STREET	**L_{A90} Background Noise Level, dB(A)**			**L_{Aeq} Amenity Noise Level, dB(A)**		
	Day	**Evening**	**Night**	**Day**	**Evening**	**Night**
Day 1 – Thurs 28th July	-	-	-	-	-	-
Day 2 – Fri 29th July	56	53	47	71	71	67
Day 3 – Sat 30th July	56	54	47	71	71	66
Day 4 – Sun 31st July	54	52	47	72	70	66
Day 5 – Mon 1st August	52	52	48	70	69	67
Day 6 – Tue 2nd August	56	54	47	71	70	66
Day 7 – Wed 3rd August	57	53	48	72	70	66
L_{90} Median/L_{eq} Log Average	**56**	**53**	**47**	**71**	**70**	**66**

Notes: **Day** is defined as 7.00am to 6.00pm, Monday to Saturday and 8.00am to 6.00pm Sundays and Public Holidays.
Evening is defined as 6.00pm to 10.00pm Monday to Sunday and Public Holidays
Night time is defined as 10.00pm to 7.00am, Monday to Saturday and 10.00pm to 8am Sundays and Public Holidays.

From the unattended noise survey results, the following spectral levels were recorded for the minimum background noise level (Vine Street location), rail noise levels (Eveleigh Street location) and road traffic noise levels (Lawson Street location).

Table 4. Octave band ambient noise levels										
Description	***Metric***	**Measured noise level, dB(A)**								
		31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Total**
Minimum background noise	L90 Day	14	20	29	35	38	39	33	23	16	**43**
	L90 Evening	11	20	28	34	36	37	31	20	16	**42**
	L90 Night	8	15	24	31	32	33	26	18	16	**38**
Rail traffic noise	Leq 15 hr	33	45	55	63	66	65	62	57	46	**71**
	Leq 9hr	29	40	51	59	62	61	58	54	42	**66**
Road traffic noise	Leq 15 hr	34	44	49	54	57	62	60	55	47	**66**
	Leq 9hr	28	38	43	48	52	57	55	50	43	**61**

3.2 ATTENDED VIBRATION MONITORING

Attended vibration level measurements were also taken for numerous train pass-by. On account of the low speed that trains traverse adjacent to the subject development, ground induced vibration levels were almost insignificant and less than perceptible with the palm of the hand on the ground. This is indicative of rail noise measurements being less than 2 mm/s which is the threshold of feel on the palm of the hand from vibration. As these levels are barely perceptible, no special vibration isolation mounts or pads are required for the proposed new buildings adjacent to the rail corridor.

4.0 NOISE MODELLING

All noise level predictions (for all stages of the assessment) have been calculated using CADNA (A), a software package developed by DataKustik. Cadna (A) incorporates a computer aided drafting (CAD) program which utilises the height of the ground, the position of buildings and other structures to run through a set of algorithms and calculate at 'user defined' grid points and 'user input' receiver locations the overall sound pressure level and frequency dependant noise level spectrum. It then interpolates the calculated noise levels at each of the grid points to produce noise level contours.

The noise level calculations take into account the propagation of sound from a sound source as a function of its distance, the shielding effects of barriers and buildings, the attenuation and reflection off the ground and buildings.

Receiver locations were assigned in the computer model at representative positions so as to ascertain the predicted noise levels and spectra resulting from the applicable noise sources under assessment. The calculated noise levels at these receiver locations were used to:

1. Determine the building materials required to provide satisfactory noise attenuation so that the indoor noise criterion can be achieved.
2. Assess compliance or non-compliance with the project specific noise goals relating to an assessment of a particular noise generating source or activity.

Noise level contours were produced where necessary to illustrate the propagation of sound from the noise sources to the most noise affected residential receivers and are attached in Appendix C.

5.0 CONSTRUCTION NOISE AND VIBRAITON

5.1 DESIGN OBJECTIVE/CRITERIA

The aim of the NSW Interim Construction Noise Guidelines (hereby referred to as ICNG) is to provide a framework for managing noise that is generated as a result of construction activities by way of involving and cooperating with all parties involved in, or affected by, construction noise.

The ICNG aim to achieve these goals through:

1. Identifying sensitive land uses affected by construction
2. Identifying hours for the proposed construction work
3. Identifying noise impacts at affected sensitive land uses
4. Applying best work practices to minimise noise impacts

Where high levels of construction noise are likely to affect surrounding sensitive land uses community involvement and communication between parties is required to determine best practice strategies to minimise the effect of construction noise.

Two main assessment methods are detailed within the ICNG, those being the Qualitative Assessment predominantly for small scale works of less than three (3) weeks, and the Quantitative Assessment for larger scale works of greater than three (3) weeks.

As the construction activities associated with this development will take longer than three (3) weeks to complete, the Quantitative Assessment method is required to assess noise impacts.

The Quantitative Assessment method considers noise management levels that determine if an affected premise is within a 'Noise Affected' level, or above and being 'Highly Noise Affected' or worse. The noise affected level as defined in the ICNG is considered as being the point at which there may be some community reaction to noise. This corresponds to a level at 10dB above the existing Rating Background Level (as defined in the EPA INP). The highly noise affected level is 75dB(A) at which there may be strong community reaction to noise. Figure 1 is an excerpt from the ICNG relating to the noise management levels.

Both the Noise Affected and Highly Noise Affected levels defined above relate to work during standard hours, being:

- 7am to 6pm Monday to Friday and
- 8am to 1pm Saturday with
- No work allowed on Sundays or public holidays.

Construction vibration impacts are not covered in the ICNG. For this specific assessment a vibration exposure limit is recommended to be detailed by the consulting geotechnical engineer.

Table 2: Noise at residences using quantitative assessment

Time of day	Management level $L_{Aeq\ (15\ min)}$ *	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see section 7.2.2.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Figure 1. NSW Interim Construction Noise Guidelines – Table 2

5.2 NOMINATED DESIGN CRITERIA

For work during standard hours the nominated Noise Affected level will vary depending on what receivers are affected by the noise. Due to the large scale of the site we expected Noise Affected Levels of 66dB(A) to residents in Eveleigh Street, 65dB(A) to residents in Lawson Street and approximately 53-55dB(A) to residents in Louis Street. The Highly Noise Affected level remains at 75dB(A).

Due to the scale of the project Koikas Acoustics recommends a consulting geotechnical engineer specify a maximum vibration limit. The amount of excavation required for this site is not considered excessive considering the scale of the proposed development. The location of nearby potentially affected premises is such that Koikas Acoustics is of the opinion that vibration levels will not give rise to adverse comment.

5.3 SOURCE NOISE LEVELS

5.3.1 Noise

During earthworks on-site there may be the requirement the incorporate the use of Rippers and/or Rock Breakers. This equipment is likely to be the most intrusive in terms of noise and vibration during both the construction and excavation stages of the development.

Pneumatic type rock breakers of greater than 75mm in diameter have sound power levels ranging from 124-140dB(A).

Hydraulic type rock breakers are significantly lower in sound power level ranging from 110-119dB(A), a reduction of 14-21dB.

In terms of noise emanating from typical construction activity, levels range depending on the process or sources involved. A brief summary of typical construction activities and associated sound power levels can be seen in Table 5 which is summarised from Table D2 of AS2436 *Guide to noise control on construction, maintenance and demolition sites*.

Table 5. Construction activity sound power levels – as in AS2436

Plant / Associated construction activity	A-weighted sound power level - dB
- Circular saw	- 112 to 114
- 50-100kW Loader	- 115 to 119
- Trucks 20t	- 103 to 108
- Hand tools – Electric drill	- < 94
- Hand tools – Electric hammer drill	- 101 to 112

5.3.2 Vibration

Typical vibration levels from excavating medium to high strength sandstone are generally kept below 5mm/sec provided the excavator is fitted with hydraulic hammer equipment and operates at a distance of greater than 3m from any neighbouring masonry structure. Where a geotechnical report nominates that this type of material may be encountered, it is expected that vibration levels will be within any adopted criteria.

5.4 CALCULATIONS

During the excavation phase of the construction works there is likely to be the highest level of noise exposure to surround properties. Affected premises are likely to be:

- Residents in Louis Street
- Residents in Lawson Street and Caroline Street
- Residents in Eveleigh Street

Where excavation works occur in close proximity to neighbouring residential / commercial premises there will likely be a need for some kind of fencing to isolate the construction area. If this fencing (hoarding) were to be of a solid type such as ply-board panels to a height of say 2.4 metres, this will provide some noise attenuation and thus minimise construction noise impacts to the adjoining or nearby premises.

The benefit from this hoarding will likely only be realised on the ground floor level and partially for the 1st floor level, and significantly less for any upper levels of multi-storey apartment blocks as these units will continue to have an unobstructed view of the construction works.

Considering the use of hydraulic rock breakers in the excavation phase with a minimum 2.4m ply-board hoarding enclosing the construction site, the following noise levels may present at an adjoining premise:

Table 6. Predicted excavation noise levels to nearby premises

Calculation parameter	Noise levels to **ground floor** premises Leq 15 mins dB(A)	Noise levels to **upper floor** premises Leq 15 mins dB(A)
- Sound power level (Hydraulic rock breaker)	- 110 to 119	- 110 to 119
- Distance attenuation	- 22dB over 5m	- 30dB over 12m
- Barrier attenuation	- 15dB	- 0dB
- **PREDICTED NOISE AT APARTMENTS**	- **73 to 82**	- **80 to 89**

At the completion of the excavation and during the construction phase residents will be exposed to various other sources of noise. For these calculations we have assumed a circular saw, truck and various hand tools being cumulative sources of noise at a particular time.

Due to the complex nature of construction sites and the constantly varying location of noise sources within, we have considered the cumulative noise from the above mentioned sources in a centralised location with an approximated attenuation due to shielding from building elements of 7dB. Significantly more noise attenuation can be achieved if portable light weight noise barriers are utilised as close as practically possible to noisy activities. When barriers are placed near a sound source, the height of the noise barriers can be reduced.

Table 7. Predicted construction noise levels to nearby premises

Calculation parameter	Noise levels to **ground floor** premises Leq 15 mins dB(A)	Noise levels to **upper floor** premises Leq 15 mins dB(A)
- Sound power level (Construction)	- 113 to 117	- 113 to 117
- Distance attenuation	- 27dB over 9m	- 28dB over 10m
- Barrier attenuation	- 7dB	- 7dB
- **PREDICTED NOISE AT APARTMENTS**	- **79 to 83**	- **78 to 82**

As indicated above the noise from excavations and construction will be well above the Noise Affected levels of 66, 65 and 53-55dB(A) and will likely be above the Highly Noise Affected level of 75dB(A). This is no surprise due to the proximity of adjoining premises in relation to the assessment site.

5.5 RECOMMENDATIONS

The purpose of the ICNG is to limit the noise exposure for premises surrounding construction sites by applying all reasonable and feasible noise mitigation measures where construction noise exceeds the nominated Noise Affected level. The calculations in Section 4.4 of this report consider all reasonable and feasible noise mitigation measures to be applied for this site, those being:

- Construction works are not be conducted outside of the standard work hours as defined within the ICNG, reproduced in this report.
- A 2.4m hoarding around the construction site to be installed.
- Rock breakers used on-site during construction are of the hydraulic type as these operate with significantly lower noise levels in comparison with the pneumatic rock breakers.
- Where possible the smallest diameter hydraulic hammers are used on the rock breakers to minimise vibration to surround premises.
- Where alternate construction practices are known to produce less noise, these are to be considered and employed during the construction works. This may consist of silenced plant and equipment.

Even considering the reasonable and feasible noise control measures listed above, construction noise will still exceed the Noise Affected level and will likely still exceed the Highly Noise Affected level. As such, consultation with the residents/tenants and the applicable regulatory authority should be sought to discuss appropriate times for construction activities and to schedule particularly high noise generating activity outside of identified noise sensitive periods. This process is recommended in the ICNG.

6.0 ROAD / RAIL NOISE ASSESSMENT

6.1 ACOUSTIC DESIGN CRITERIA

Clause 87 and 102 in the Infrastructure SEPP state that for developments affected by road and/or rail noise, the resultant indoor traffic noise levels need to be considered and adequate noise attenuation measures provided.

For a residential use building, rail noise is required to be assessed when that development is in, or in the immediate vicinity of a rail corridor.

Similarly, a traffic noise assessment is required where a development site is on land or adjacent to a road corridor for a freeway, a toll-way or a transit way or any other road that carries an annual average daily traffic volume of 40,000 vehicles, or any road that council deems likely to cause a noise disturbance to residents.

The *NSW Department of Planning, Developments Near Rail Corridors and Busy Roads, Interim Guidelines, December 2008* considers the Infrastructure SEPP and requires development sites as outlined in Clause 87 and 102 to take appropriate measures to ensure that the following L_{Aeq} noise levels are not exceeded:

- In any bedroom in the building: 35dB(A) at any time between 10pm - 7am
- Anywhere else (including bedrooms after night time hours) in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time.

It is also states that, should internal noise levels with windows and doors open exceed the criteria by more than 10dB(A), the design of the ventilation for that space must be such that the windows and doors can remain closed.

The note to Table 3.1 in Section 3.6.1 Airborne Noise in the NSW Department of Planning, Developments near Rail Corridors and Busy Roads - Interim Guidelines 2008 states that the airborne noise is calculated as:

- $L_{eq(9hr)}$ for night-time - 10pm to 7am, and
- $L_{eq(15hr)}$ for daytime - 7am to 10pm.

The assessment procedures outlined in *Australian Standard 3671-1989 Traffic noise intrusion building siting and construction* have been used to determine the traffic noise levels that will affect the proposed development. These traffic noise levels will determine the type and extent of building materials required to adequately reduce traffic noise intrusion to residents.

Australian Standard AS2107:2000 Recommended design sound levels and reverberation time for building interiors has been referenced to determine the appropriate indoor traffic noise levels for retail spaces, commercial premises, the Child Care Centre and the gym facility.

6.2 PROJECT SPECIFIC NOISE CRITERION

A summary of the project specific traffic noise criteria used in this assessment is given below. The noise levels shown all refer to internal noise levels.

Table 8. Traffic noise criteria to each internal space

Location	Windows Closed	Windows Open
Residential: Bedrooms	35dB(A), LAeq, 9 hrs	45dB(A), LAeq, 9 hrs
Residential: Living areas	40dB(A), LAeq, 15 hrs	50dB(A), LAeq, 15 hrs
Retail spaces	45dB(A), LAeq, 15 hrs	55dB(A), LAeq, 15 hrs
Commercial spaces	40dB(A), LAeq, 15 hrs	50dB(A), LAeq, 15 hrs
Gallery	40dB(A), LAeq, 15 hrs	50dB(A), LAeq, 15 hrs
Child Care Centre	40dB(A), LAeq, 15 hrs	50dB(A), LAeq, 15 hrs
Gym	45dB(A), LAeq, 15 hrs	55dB(A), LAeq, 15 hrs

6.3 SOUND POWER LEVELS

The calculated sound power levels used in the computer modelling are summarised in Table 9. The levels represent each lane of traffic, be that the two opposing lanes of road traffic along Lawson Street, or the multiple rail tracks in the vicinity of Redfern Station.

Table 9. Calculated sound power levels

Description		Metric	31.5	63	125	250	500	1000	2000	4000	8000	Total
Daytime	ROAD Traffic SWL	LAw/m	42.6	52.6	57.6	62.5	65.4	70.3	68.4	63.6	56.5	**74.2**
Night-time	ROAD Traffic SWL	LAw/m	37.6	47.6	52.6	57.5	60.4	65.3	63.4	58.6	51.5	**69.2**
Daytime	RAIL Traffic SWL	LAw/m	39.6	51.6	61.7	69.8	72.8	71.8	68.9	64.5	55.5	**77.5**
Night-time	RAIL Traffic SWL	LAw/m	35.6	46.6	57.7	65.8	68.8	67.8	64.9	61.5	51.5	**73.5**

6.4 CALCULATED NOISE LEVEL CONTOUR RESULTS

Receiver points were located around the facades and roof of each building (Precinct) in the computer model in order to predict traffic noise levels around the periphery of the proposed building envelopes. The calculated maximum L_{eq} noise levels outside the most noise affected facade and floor level were found to be:

Table 10. Maximum predicted facade noise levels

Precinct	Location	Period	Noise level, dB(A)	Required noise reduction, dB
Precinct 1	Townhouses: TH 33	Daytime Night-time	58.2 54.2	18.2 **19.2**
	Units: Floor level 5	Daytime Night-time	57.5 53.1	17.5 **18.1**
Precinct 2	Commercial: Floor level 3	Daytime Night-time	66.1 n/a	**26.1**
Precinct 3	Residential: Floor level 1	Daytime Night-time	73.1 69.1	33.1 **34.1**
	Gallery/Multi Function	Daytime Night-time	72.1 69.1	**32.1** 29.1

A maximum noise reduction of 33dB during the daytime and 34dB during the night-time for Precinct 3 is required in order to satisfy the project specific noise criterion. Due to the location and orientation of the other Precincts in relation to the surrounding traffic noise sources, a lesser noise impact is predicted.

6.5 RECOMMENDED BUILDING MATERIALS

The noise attenuation required of each building component to achieve the required traffic noise reduction was calculated for all noise affected spaces of the proposed residential development.

In these calculations the average reverberation time (RT_{60}) is expected to be about:

0.4 seconds for bedrooms,
0.6 seconds for the Gallery and kitchen/dining/living rooms and
0.7 seconds for the retail and commercial premises along with the CCC staff room.

Indicative calculations are attached in **Appendix D** to demonstrate the assessment procedure. Where alternate building materials to those nominated below are intended to be used in the development, advice is to be sought from an acoustic engineer as to the proposed materials acceptability. Failure to follow the recommendations in this report may lead to non-compliance with the design criteria.

6.5.1 Ceiling / Roof System

Table 11. Ceiling / Roof construction requirements

Construction	Areas this applies
PRECINCT 1: Townhouses - 0.45mm metal roofing - Roof framing structure - 250mm air gap between the metal roof over and plasterboard ceiling under - 100mm roof cavity insulation (24kg/m3) - 1 layer of 13mm plasterboard ceiling material *(Plasterboard ceiling to butt up against walls and be sealed with cornice)* PRECINCT 1: Units/Apartments - 150mm concrete slab roof/ceiling will be satisfactory	This type of construction applies to all roof areas over habitable spaces in Precinct 1.
PRECINCT 2: Commercial tenancies - 150mm concrete slab roof/ceiling will be satisfactory	This type of construction applies to all roof areas in Precinct 2.
PRECINCT 3: Student accommodation and Gallery/Multi-Function Room - 150mm concrete slab roof/ceiling will be satisfactory	This type of construction applies to all roof areas in Precinct 3.

6.5.2 External Walls

Table 12. External wall construction requirements	
Construction	**Areas this applies**
- Double brick and cavity (minimum cavity width 20mm) - 1 layer of 13mm cement render applied to either external or internal wall face	All external wall areas, all Precincts

6.5.3 Glazed Windows and Doors

Table 13. Glazing Recommendations			
Precinct	**Location description**	**Glazing recommendation**	**Mechanical ventilation required**
Precinct 1	- All areas	Minimum 4mm float glass (windows) Minimum 4mm toughened glass (SD)	No
Precinct 2	- Child Care Centre - Retail - Offices (fronting Caroline St) - All other offices	4mm float glass 4mm float glass 4mm float glass 6.38mm laminated	No No No Yes
Precinct 3	Ground Floor - Commercial/Gallery - Commercial tenancies - Caretakers studio - Student lounge	 6.38mm laminated 6.38mm laminated 10.38mm laminated 6.38mm laminated	 Yes Yes Yes Yes
	First Floor - Gallery (fronting rail corridor) - Gallery (other facades) - Units 1-7 (bedrooms) - Units 1-7 (living areas)	 12.38mm laminated 10.38mm laminated 6.38mm laminated 4mm float glass	 Yes Yes Yes No
	Second Floor - Units 8-14 (bedrooms) - Units 8-14 (living areas) - Units 15-21 (living areas)	 6.38mm laminated 10.38mm laminated 4mm float glass	 Yes Yes No
	Third Floor - Gallery (fronting rail corridor) - Gallery (other facades) - Units 15-21 (bedrooms 1-4) - Units 15-21 (bedrooms 5-6)	 12.38mm laminated 10.38mm laminated 10.38mm laminated 4mm float glass	 Yes Yes Yes No
	Fourth Floor - Units 23,26,29,32,35,38,41 Bedrooms - Units 23,26,29,32,35,38,41 Living	 10.38mm laminated 4mm float glass	 Yes No
	Fifth Floor - Units 22,25,28,31,34,37,40 Bedrooms & Living - Units 24,27,30,33,36,39,42 Living	 10.38mm laminated 4mm float glass	 Yes No
	Sixth Floor - Units 24,27,30,33,36,39,42 Bedrooms	 10.38mm laminated	 Yes

Koikas Acoustics notes that the recommendations provided in this report are for the minimum required glazing that will achieve the desired acoustic performance indoors. No consideration has been given to other factors such as safety, thermal or energy efficiency that may render the recommended glazing as non-compliant. It is the responsibility of the client to ensure all glazed windows and sliding doors installed on-site meets all building design requirements.

The following is to be noted:

- All glazing systems should be built into a solid frame.
- All open-able windows and glazed door systems should be air tight when closed.
- Q-lon type seals should be fitted along the perimeter of all glazing systems to minimise all gaps. If the windows/doors are not designed to be air-tight when closed, the total noise attenuation performance of the walls and ceiling-roof system will be reduced.

6.5.4 Mechanical Ventilation

In order to achieve the indoor design sound levels to habitable spaces from traffic noise intrusion, windows/doors will be required to be closed. Therefore in order to meet the Codes and recommendations of relevant Australian Standards it will be necessary to provide mechanical ventilation to these particular spaces.

It is noted that traffic noise transmitted into the habitable spaces through the mechanical ventilation duct work should be at least 10dB less than the recommended indoor sound level of road noise intrusion through the building envelope. This can be achieved by using internally lined (rigid grade fibreglass batts 50 mm thick)) metal duct work and selecting a quiet fan unit. See Appendix E for mechanical ventilation details.

The spaces where mechanical ventilation is required are nominated in the glazing schedule.

7.0 CHILD CARE CENTRE NOISE IMPACT ASSESSMENT

The ground floor level of Precinct 2 has been allocated in the design as a Child Care Centre.

The proposed CCC is to operate within the hours of 7am and 6pm Monday to Friday and can accommodate a maximum of 60 children between the ages of 0-5 years.

As shown on the architectural plans the breakdown of children is as follows:

- 9 children aged 0-1 years
- 12 children aged 1-2 years
- 18 children aged 2-3 years
- 21 children aged 3-5 years

The design of the space is that each age group of children has their own room along with a staff room, laundry, office, 2 cot rooms and 3 bathrooms. A large outdoor play area is located along Caroline Street.

7.1 ACOUSTIC DESIGN CRITERIA

The noise impact to surrounding premises resulting from the operation of the proposed Child Care Centre has been assessed against the Industrial Noise Policy (INP) released in 1999 by the Environmental Protection Authority (EPA – now the NSW Office of Environment and Heritage).

The Industrial Noise Policy (INP) is primarily used to assess noise from industrial extractive, commercial and warehousing industries, individual industrial sources such as rotating machinery, heating, ventilation and air conditioning.

This document was amended by the DEC with Application Notes in March 2006, with further amendments in July 2006.

The DEC's specific objective was to assess noise from industrial noise sources scheduled under the new Protection of the Environment Act 1997. The aim for the assessment of industrial noise was to control intrusive impacts in the short term for residents and maintain noise level amenity for particular land uses.

The assessment of noise sources associated with the above entails the determination of the L_{90} background noise and L_{eq} noise in the absence of the mechanical plant or other extraneous noise so that one can derive the noise criteria that would apply with respect to the intrusive and the amenity noise criteria.

The following steps are undertaken for the purpose of applying the INP:

- Measure the existing background and ambient noise levels;
- Determine project specific noise levels from intrusive and amenity noise criteria;
- Determine the magnitude and nature of all relevant noise sources;

- Compare the measured noise levels with the project specific noise levels;
- Consider cost effective and practical noise mitigation measures where noise levels exceed the nominated criteria; and
- Undertake a further noise survey for the purpose of determining compliance with the consent licence conditions.

EPA's Intrusive Noise Criterion

The intrusiveness of an industrial noise source is generally considered acceptable if the equivalent continuous (A-weighted) noise level ($L_{Aeq,\ 15\ minutes}$) does not exceed the background noise level by more than 5dB. The intrusiveness criterion is defined as:

$$L_{Aeq,\ 15\ minutes} \leq \text{(rating background noise level)}\ L_{90,\ 15\ minutes} + 5dB$$

When the noise source contains annoying characteristics such as prominent tonal, impulsive, intermittent, irregular and dominant low frequency components, adjustments are made.

In this case, the noise emitted does not include tonal, impulsive, intermittent, irregular or dominant low frequency noise component characteristics.

EPA's Noise Amenity Criterion

In order to limit the continuing increase in noise, the EPA has nominated recommended acceptable and maximum ambient noise levels for various receiver sites from industrial noise.

Table 2.1 of the EPA INP (below) specifies the following acceptable and maximum recommended $L_{Aeq,\ 15\ minutes}$ noise levels for this project specific type of area. In this case, the area is described as being urban.

The EPA refers to 'urban' as an area with an acoustical environment that:

- Is dominated by 'urban hum' or industrial source noise
- Has through traffic with characteristically heavy and continuous traffic flows during peak periods
- Is near commercial or industrial districts
- Has any combination of the above,

Where 'urban hum' means the aggregate sound of many unidentifiable, mostly traffic related sound sources.

This area may be located in either a rural, rural-residential or residential zone as defined on an LEP or other planning instrument, and also includes mixed land-use zones such as mixed commercial and residential zones.

			Recommended L_{Aeq}, Noise Level, dB(A)	
Type of Receiver	**Indicative Noise Amenity**	**Time of Day**	**Acceptable**	**Recommended Maximum**
Residential	Suburban	Day Evening Night	60 50 45	65 55 50
Commercial	All Areas	Day Evening Night	65	70
Industrial	All Areas	Day Evening Night	70	75

Table 2.2 of the EPA's INP (below) specifies the modification to the acceptable noise level to account for existing level of industrial noise:

Total existing LAeq noise level from industrial sources, dB(A)	**Maximum LAeq noise level from new sources alone, dB(A)**
Acceptable noise level plus 2	If existing noise level is *likely* to decrease in future: acceptable noise level minus 10 If existing noise level is *unlikely* to decrease in future: existing level minus 10
Acceptable noise level plus 1	Acceptable noise level minus 8
Acceptable noise level	Acceptable noise level minus 8
Acceptable noise level minus 1	Acceptable noise level minus 6
Acceptable noise level minus 2	Acceptable noise level minus 4
Acceptable noise level minus 3	Acceptable noise level minus 3
Acceptable noise level minus 4	Acceptable noise level minus 2
Acceptable noise level minus 5	Acceptable noise level minus 2
Acceptable noise level minus 6	Acceptable noise level minus 1
< Acceptable noise level minus 6	Acceptable noise level

7.2 PROJECT SPECIFIC NOISE CRITERION

The project specific noise level (PSNL) criterion as determined from applying the INP becomes the Intrusive Noise Criterion.

Table 14. INP Intrusive Noise Criterion

Period	**Measured L90**	**PSNL (Criteria)**
Daytime	55	**60**
Evening	51	56
Night-time	43	48

As the proposed CCC will only be operating between the hours of 7am and 6pm, the daytime criterion has been considered as the appropriate design criteria.

7.3 SOUND POWER LEVELS

The sound power levels used in the computer modelling of noise sources are shown in Table 15. This data has been collected either from field measurements conducted by Koikas Acoustics.

Table 15. Calculated sound power levels

Description	Metric	Sound Power Level, dB(A)									
		31.5	63	125	250	500	1000	2000	4000	8000	Total
Children aged 0-2 (Free play)	Lw	27	43	53	61	64	67	67	60	50	**72**
Children aged 3-5 (Free play)	Lw	35	50	56	61	70	75	74	68	58	**79**

7.4 NOISE MODEL SCENARIOS

The computer modelling considers the following noise scenario to define the predicted noise output from the proposed Child Care Centre.

Table 16. Noise model scenarios

Scenario	Noise Source	Number of Children	Location	Associated sound power level [dBA]
1	Children 0-2 years: Free play Children 3-5 years: Free play	30 30	Outdoor play area	72 per child 79 per child

It is noted that the above would constitute a 'worst case scenario' where every child was outdoors at the same time. The likelihood of this occurring is minimal as outdoor activities would likely be staggered for different age groups and as a result a lesser noise impact would be perceived at surrounding premises.

7.5 CALCULATED NOISE LEVELS

The calculated receiver noise levels at the most noise affected residences in relation to the noise criteria are shown in Table 17 below.

Table 17. Predicted receiver noise levels

Scenario	Receiver location	Receiver noise level, [dB(A)] $L_{Aeq\ 15\ mins}$	Noise Criterion [dB(A)]
1	- R1: Caroline Street	54.2	60
	- R2: Caroline Street	57.4	60
	- R3: 112 Lawson Street	49.8	60
	- R4: 110 Lawson Street	49.7	60
	- R5: 108 Lawson Street	51.7	60
	- R6: 106 Lawson Street	56.7	60

Based on the above, the proposed Child Care Centre will be able to operate within the nominated noise criterion provided that the noise mitigation measures outlined below are implemented.

7.6 NOISE MITIGATION MEASURES

For the Child Care Centre to achieve the predicted noise levels stated above to surrounding residents the following noise mitigation/control strategies must be implemented:

- A 3.0m high noise barrier is to be constructed along the southern site boundary adjoining Caroline Lane. Along the western site boundary the barrier is to be 2.1m high. The reference point for the heights of the barriers is to be taken from the ground level of the playground area.

  A composite noise barrier may be considered that includes (transparent) polycarbonate panels fixed above either masonry, double layered 20mm timber, or 9mm compressed fibre cement. There is to be no air gaps present at the joint locations.

At all times children are occupying outdoor areas, staff should be monitoring the noise levels to minimise any excessive noise that may lead to non-compliance with the noise criterion.

8.0 MECHANICAL NOISE ASSESSMENT

An assessment of the noise impact from mechanical plant and equipment used on-site for the Pemulwuy project is required to maintain the noise level amenity of residents and other surrounding premises. Such mechanical systems will likely include air conditioning condensers, exhaust and supply fans for car parks and kitchens, cool room condenser units etc.

The mechanical plant noise assessment is to be considered in terms of the criteria of the Industrial Noise Policy. Not only does the assessment need to consider the residents and other premises surrounding the proposed Pemulwuy site, but also the tenancies contained within the development so that noise from one particular use does not adversely impact another.

Due to the scale of the proposed development, the mechanical design has not yet been finalised, and as such, an assessment of the noise impact generated from the mechanical systems could not be undertaken at this stage. At such time as the completed mechanical design can be forwarded to Koikas Acoustics a further assessment of the mechanical noise impacts can be conducted.

The current building design for all precincts in the Pemulwuy development provides sufficient scope for incorporating noise control measures should noise from the mechanical systems be an issue at the acoustic design stage.

Further, on the basis of having conducted detail mechanical plant noise assessments in the past for similar environs, it is unlikely that the mechanical plant likely to be used will require special acoustic attenuation measures.

9.0 GALLERY / MULTI-FUNCTION ROOM

Koikas Acoustics Pty Ltd has been informed that the Gallery / Multi-function area (located in Precinct 3) proposed use has not been fully defined, however instruction has been given to consider the space to be licensed to serve and consume alcohol and to incorporate a Public Address system that may be used for speech or to provide music.

As there are no proposed outdoor areas shown on plan, noise egress can be minimised by selecting appropriate external facade materials. However due to the proximity of surrounding premises, both residential and commercial, an assessment needs to be conducted and recommendations provided.

This assessment has been generalised and based on direction provided to Koikas Acoustics. A supplementary, more detailed assessment may consider the space as it will be used at a time that more information is made available for specific use of the premise.

9.1 ACOUSTIC DESIGN CRITERIA

As per the standard LAB criterion that governs noise emanating from a licensed premise, the following is to be achieved in the acoustic design:

(a) *The L_{A10} noise level emitted from the use must not exceed the background noise level (L_{A90}) in any Octave Band Centre Frequency (31.5Hz to 8kHz inclusive) by more than 5dB between the hours of 7.00am and 12 midnight when assessed at the boundary of any affected residence.*

(b) *The L_{A10} noise level emitted from the use must not exceed the background noise level (L_{A90}) in any Octave Band Centre Frequency (31.5Hz to 8kHz inclusive) between the hours of 12 midnight and 7.00am when assessed at the boundary of any affected residence.*

(c) *Notwithstanding compliance with (a) and (b) above, the noise from the use must not be audible within any habitable room in any residential property between the hours of 12.00 midnight and 7.00 am.*

(d) *The L_{10} noise level emitted from the use must not exceed the background noise level (L_{90}) in any Octave Band Centre Frequency (31.5Hz to 8kHz inclusive) by more than 3dB when assessed indoors at any affected commercial premises.*

(e) *The use of the premise must be controlled so that any emitted noise is at a level so as not to create an "offensive noise" as defined in the Protection of the Environment Operations Act 1997 to any affected receiver.*

9.2 PROJECT SPECIFIC NOISE CRITERION

For the Gallery / Multi-function Room to be in compliance with the nominated noise criterion the following noise levels are not to be exceeded to any surrounding residential premise:

Table 18: Project specific noise criterion levels

Period	Noise Metric	$L_{10,T}$ Sound Pressure Level – [dBA]									
		31.5	63	125	250	500	1k	2k	4k	8k	Total A
7am to 12 midnight	L_{10}	24	37	43	48	51	53	49	37	22	58
12 midnight to 7am	L_{10}	13	26	33	38	41	43	38	25	14	47
Business hours (Commercial)*	L_{10}	22	35	41	46	49	51	47	35	20	56
Inaudibility (Indoors)**											
Windows Open	L_{10}	18.0	10.0	13.3	18.2	21.1	23.1	18.1	6.2	13.0	-
Windows Closed	L_{10}	18.0	10.0	5.0	6.7	7.0	5.8	2.6	0.1	13.0	-

Notes: * Criterion of L_{90} + 3 applies indoors when in use, however if noise from the licensed premise is within the L_{90} + 3 outdoors, compliance often achieves the indoor criterion too.
** Inaudibility criterion calculated from the outdoor L_{90} level, facade STL, typical indoor household noise level and threshold of audibility.

9.3 SOURCE SOUND LEVELS

The dominant noise sources that may be associated with the operation of the Gallery / Multi-function Room are that of patrons and the PA system. The noise predictions take into account only the aforementioned noise sources.

Patron numbers used in the modelling and calculations have been assumed by Koikas Acoustics based on the rough sizes for each space. The calculated and predicted noise levels stated within this report relate specifically to the numbers of patrons nominated.

The level of patron noise has been considered at 72dB(A) as an L_{10} sound power level. This is based on previously measured levels of patron noise from surveys conducted by Koikas Acoustics. Similarly, music has been considered as per spectrum noise level data catalogued by Koikas Acoustics from previous surveys. An overall A-weighted L_{10} level of 80dB has been considered at any indoor external wall facade.

Table 19: Source sound levels – Licensed Premise

Source	Noise Metric	L_{10} Sound Level – [dBA]									
		31.5	63	125	250	500	1k	2k	4k	8k	Total A
Patron noise	L_W	33	39	56	61	66	66	67	61	46	72
Typical music spectrum Internally at any external wall facade	L_P	-	53.6	63.0	72.5	75.7	74.2	68.8	69.5	60.3	80.0

9.4 CALCULATED RESULTS

9.4.1 Expected use of Gallery / Multi-function Room

The noise modelling and associated predicted receiver noise levels have been based on the following:

Table 20: Noise modelling and calculation parameters	
Source	**Description**
Patrons	- 170 patrons to the ground floor and mezzanine floor levels.
Music	- Max SPL at external wall facade: 80dB(A) measured as an L10 - Max SPL at internal wall common to apartments: 70dB(A) measured as an L10

- All glazed windows and doors have been considered as minimum 6.38mm laminated glass. All glazing to external areas has been considered as closed at all times.
- The location of patrons and speakers should be such that the area in the vicinity of the stairs is kept clear and quiet at all times. This is due to the adjoining bedroom for Units 7, 14 and 15.

9.4.2 Predicted Receiver Noise Levels

The predicted receiver noise levels are shown along with the criterion level that needs to be achieved for each scenario.

Table 21: Modelling results

Description	Receiver	L_{10} Sound Level – [dBA]									
		31.5	63	125	250	500	1k	2k	4k	8k	Total A
Noise Criteria: Before Midnight	**Criteria**	**-**	**37**	**43**	**48**	**51**	**53**	**49**	**37**	**22**	**58**
Noise at receiver (See Cadna layout)	P1 Level 3	-	16	23	28	31	26	22	18	4	34
Criteria exceeded by	*P1 Level 3*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Noise Criteria: After Midnight	**Criteria**	**-**	**26**	**33**	**38**	**41**	**43**	**38**	**25**	**14**	**47**
Noise at receiver (See Cadna layout)	P1 Level 3	-	16	23	28	31	26	22	18	4	34
Criteria exceeded by	*P1 Level 3*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Noise Criteria: Commercial/Retail	**Criteria**	**-**	**35**	**41**	**46**	**49**	**51**	**47**	**35**	**20**	**56**
Noise at receiver (See Cadna layout)	P1 Level 2	-	16	24	28	31	27	22	19	5	35
Criteria exceeded by (see note below)	*P1 Level 2*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Noise Criteria: After Midnight	**Criteria**										
Windows Open	**Open**	**18.0**	**10.0**	**13.3**	**18.2**	**21.1**	**23.1**	**18.1**	**6.2**	**13.0**	**-**
Windows Closed	**Closed**	**18.0**	**10.0**	**5.0**	**6.7**	**7.0**	**5.8**	**2.6**	**0.1**	**13.0**	**-**
Noise at receiver (See Cadna layout)	P1 Level 3										
Windows Open	Open	-	6.0	13.0	18.0	21.0	16.0	12.0	8.0	-6.0	24.4
Windows Closed	Closed	-	-3.5	1.1	1.9	2.6	-5.9	-12.3	-13.7	-31.7	7.4
Criteria exceeded by	*Open*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*1.8**	*n/a*	*n/a*
	Closed	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*

Notes: * 1.8dB above the inaudibility noise criterion level at a single 1/1 octave band frequency (4kHz) is not considered excessive and therefore not expected to result in adverse comment.

A calculation of noise transmitted through the internal walls common to the gallery and adjoining apartments has determined that, with the recommended partition wall considered (see Recommendations), noise will be below the nominated levels used for calculating inaudibility with the exception of a 3dB exceedance at 250Hz. Due to the fact that indoor background levels can vary significantly, this is not deemed to be excessive and at final testing, may not even be an issue.

In any case there is sufficient scope to control the noise levels within the Gallery/Multi-function Room by tuning the PA system and by supplying further acoustic treatment to the room.

9.5 RECOMMENDATIONS

The calculated noise levels within this report were based on the following:

- All windows and glazed doors to outdoor areas are to be a minimum of 6.38mm laminated glass and are to be closed at all times. Ventilation may be required.
- The level of noise (music or speech) from the PA system was considered at an L_{10} sound pressure level of 80dB(A) indoors at any external wall facade. With 6.38mm laminated glass windows there will be sufficient sound reduction through the building facade to minimise noise impacts to surrounding receivers.
- The level of noise (music or speech) from the PA system was considered at an L_{10} sound pressure level of 70dB(A) indoors at the wall common to both the Gallery and adjoining apartments.
- The partition wall separating the Gallery and adjoining apartments is to be constructed of no less than double layer 110mm brick separated by an air gap of no less than 50mm. The two layers of brick should have no physical connection where possible (no brick ties) or at least acoustic type brick ties where necessary (NI-TIES ATIE-50 – See Appendix F), 50mm fibreglass insulation (minimum density 24kg/m^3) required to wall cavity.
- Speakers from the PA system are to be located and patrons directed away from the stairwell area that has a common wall with Bedroom 4 of Unit 7. Am airlock door system may be required if the perimeter and threshold seals are found to be inadequate.
- 170 patrons were considered indoors to each floor level of the Gallery/Multi-function Room (Ground and Mezzanine levels). This number was based on the approximate floor areas.
- No external noise sources were considered.

9.6 DISCUSSION

For all the predicted noise levels at surrounding receiver locations detailed within this report, the noise control recommendations as stated above have been considered. As a result of the proximity of surrounding noise sensitive receivers there needs to be restricted use of the indoor areas after midnight to accord with the adopted noise criteria.

Before midnight, noise levels to surrounding residences will be well within the noise criterion level. Commercial premises are likely to be subject to minimal noise exposure. As premises for commercial use will not include open doors or windows but rather conditioned air systems, noise from the use of the licensed premise will be further attenuated by the glazed wall facade, reducing the perceived level within the commercial tenancies to levels that will likely be inaudible.

As such, provided the recommendations stated above (Section 4.5) are adhered to, noise from the use of the Gallery / Multifunction Room will not exceed the standard LAB noise criteria, adopted for use in this assessment.

10.0 NOISE ISOLATION IN MULTI-UNIT RESIDENTIAL DWELLINGS

The objective of Part F5 of the BCA is to safeguard occupants from illness or loss of amenity as a result of undue sound being transmitted between adjoining units, from common spaces to sole occupancy units and from parts of different classifications to sole-occupancy units.

The sound isolation between units is assessed in accordance with the requirements of Part F5 'Sound Transmission and Insulation' of the BCA. It is noted that Part F5 of the BCA does not specify a degree of sound insulation performance between different areas of occupancy, rather, it nominates the laboratory acoustic performance of various elements of the building.

Where a building solution is proposed to comply with the Deemed to Satisfy Provisions, Performance Requirements FP5.1 to FP5.6 (of the BCA) will be satisfied by complying with F5.1 to F5.7.

Where a building solution is proposed as an alternative solution to the Deemed to Satisfy Provisions of F5.1 to F5.7, the relevant Performance Requirements must be determined in accordance with A0.10 of the BCA.

The BCA refers to four classes of buildings:

Class 1: Detached house, terrace, Villa or small boarding house;

Class 2: Flat or apartments with two or more dwellings (units);

Class 3: Boarding house, hotel or residential part of other buildings;

Sound Insulation Ratings of Floors

A floor in a Class 2 or 3 building must have an

R_{w+Ctr} (airborne) not less than 50 and

$L_{n,w+Ci}$ (impact) not more than 62 if it separates-

(i) Sole-occupancy units; or

(ii) A sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification.

Sound Insulation Ratings of Walls

A wall in a Class 2 or 3 building must-

(i) Have an R_{w+Ctr} (airborne) not less than 50, if it separates sole -occupancy units; and

(ii) Have an R_w (airborne) not less than 50, if it separates a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification; and

(iii) Comply with F5.3(b) if it separates:

(A) A bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy unit from a habitable room (other than a kitchen) in an adjoining unit; or

(B) A sole-occupancy unit from a plant room or lift shaft.

F5.3(b) states that:

A wall in a building required to have an impact sound insulation rating must -

(i) For a Class 2 or 3 building be of discontinuous construction

A door may be incorporated in a wall in a Class 2 or 3 building that separates a sole-occupancy unit from a stairway, public corridor, public lobby or the like, provided the door assembly has an R_w not less than 30.

Sound Insulation Ratings of Services

If a duct, soil, waste, storm water or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an R_{w+Ctr} (airborne) not less than-

(i) 40 if the adjacent room is a habitable room (other than a kitchen); or

(ii) 25 if the adjacent room is a kitchen or non-habitable room.

10.1 BCA RECOMMENDATIONS

10.1.1 Wall Partitions

Habitable to Habitable

For internal partition walls that separate a habitable room in one tenancy from another habitable room in a separate tenancy the following system is proposed:

- 190mm core filled concrete blocks with 13mm cement render to each side.

This system has been predicted (with the Insul v6.4 acoustic modelling program) to achieve an $R_w + C_{tr}$ of greater than 50 and therefore satisfy the BCA requirements.

Further, this system will satisfy the requirements for walls separating a plant room, lift shaft or stairwell from a tenancy.

Alternatively, a double brick and cavity wall would also achieve the desired acoustic performance.

Habitable to Wet Area

For internal partition walls that separate a habitable room in one tenancy from a wet area such as a bathroom, kitchen or laundry in a separate tenancy the following system is proposed:

- 190mm core filled concrete blocks with 13mm cement render to one side,
- 64mm steel stud framed wall with 13mm plasterboard wall lining,
- Minimum 20mm air gap between the concrete block and steel stud wall. There is to be no physical connection between the steel frame and concrete walls.

A 20mm air gap is considered by the BCA to be the minimum air gap allowed to satisfy the requirement of discontinuous construction.

This system has been predicted (with the Insul v6.4 acoustic modelling program) to achieve an $R_w + C_{tr}$ of greater than 50 and therefore satisfy the BCA requirements.

Alternatively, a double brick and cavity wall would also achieve the desired acoustic performance, provided that there is no physical connection between each of the masonry layers.

10.1.2 Floors

The BCA has nominated 'Deemed to Satisfy' systems that will achieve the desired sound isolation ratings. The recommended 'Deemed to Satisfy' floor system consists of:

- Minimum 150mm concrete slab
- 28mm furring channels and isolation mounts fixed to underside of slab, at 600mm centres
- 65mm thick polyester insulation with a density of 8kg/m3 positioned between furring channels
- One layer of plasterboard fixed to the furring channels.

The 'Deemed to Satisfy' system will comply irrespective of the floor covering over. Where rigid type floor coverings are proposed *(such as timber floor boards or tiles)* they are not to make contact with the walls. Temporary spacers should be used during installation and when removed the gaps filled with silicone or similar non-rigid type material.

These recommendations must also be considered for outdoor balconies that extend over indoor areas below.

Alternative floor/ceiling systems could be considered provided that the acoustic performance is tested in accordance with the Specification F5.5 Impact Sound - Test of Equivalence or with relevant impact noise testing standards.

10.1.3 Timber Entry Doors

For timber doors incorporated into a partition separating a sole-occupancy unit from a common area, hallway or lobby area, that door is required to provide an Rw of not less than 30. A suitable door system for this purpose would be a 40mm solid core timber door with Raven type acoustic seals.

10.1.4 Soil and Waste Pipes

For services and/or waste pipes from one unit that pass through another unit the following noise control measures are recommended:

To achieve an Rw + Ctr not less than 25:

- Minimum of two (2) layers of 13 mm plasterboard are required to partition the services/ waste pipes from any non-habitable room (including the kitchen),

To achieve an Rw + Ctr not less than 40:

- Minimum of two (2) layers of 13 mm plasterboard are required as a partition for the services/waste pipes from a habitable room, and in addition the pipes are to be lagged with an acoustic lagging material such as Pyrotech's Soundlag 4525C or similar.

Further, an access door or panel must be firmly fixed so as to overlap the frame or rebate the frame by not less than 10 mm, and be fitted with a proper sealing gasket along all edges and constructed of:

- Wood, particle board or block board not less than 38 mm thick; or
- Compressed fibre reinforced cement sheeting not less than 9 mm thick; or
- Other suitable material with a mass per unit area not less than 24 kg/m2.

Alternative building materials could be considered provided that test certificates are provided as evidence of their performance.

11.0 CONCLUSION

Koikas Acoustics was requested to conduct an acoustic assessment of the proposed Pemulwuy development to be located in Redfern. The site has been designed to incorporate 3 separate Precincts, Precincts 1-3. These areas are located:

- Between Eveleigh Street and Louis Street PRECINCT 1
- Between Lawson Street and Caroline Street PRECINCT 2
- Between Eveleigh Street and the existing rail corridor PRECINCT 3

The development may potentially be affected by noise from the nearby rail corridor and also by noise from Lawson Street, as 2 major contributors of environmental noise in the area.

There is also the potential for noise generated by the use and operation of tenancies within the proposed to adversely affect residents and other type premises that surround the proposed site.

The acoustic report addresses these noise issues along with providing additional recommendations relating to:

- Construction Noise and Vibration as per the *NSW DECCW Interim Construction Noise Guidelines,*
- The sound isolation performance of the common partition elements in the proposed as per the BCA requirement of Parts F5 and 3.8.6.

Unattended noise monitoring conducted by Koikas Acoustics determined the existing acoustic environment that would typically present in the area surrounding the assessment site.

The survey results were used in conjunction with our noise modeling software to predict the noise the noise exposure resulting from noise sources considered in each stage of the assessment.

Recommendations, where appropriate, have been included within this report to minimize any adverse noise impact the proposed may present to premises surrounding the development site, and also within the development site itself.

As the proposed is still at the approval stage detail design information necessary to provide a complete noise impact assessment is not yet available. Where applicable this noise assessment has nominated that a further noise assessment be conducted to address any outstanding noise issues at such time as full detailed information can be made available. In all cases, due to the nature of the development, there is clearly scope for addressing any identified acoustic or noise related issues that may arise.

This report addresses the potential noise issues resulting from the construction and operation of the proposed Pemulwuy development in Redfern. With the recommendations provided in this report faithfully implemented into the building design it is the opinion of Koikas Acoustics that all acoustic issues can be adequately addressed. Koikas Acoustics supports this development.

APPENDIX A

APPENDIX A

APPENDIX A


Unattended noise monitoring location
Eveleigh St, Redfern NSW, Australia
PRECINCT 1
PRECINCT 3
Unattended noise monitoring location
PRECINCT 2
Unattended noise monitoring location
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Image © 2011 Sinclair Knight Merz
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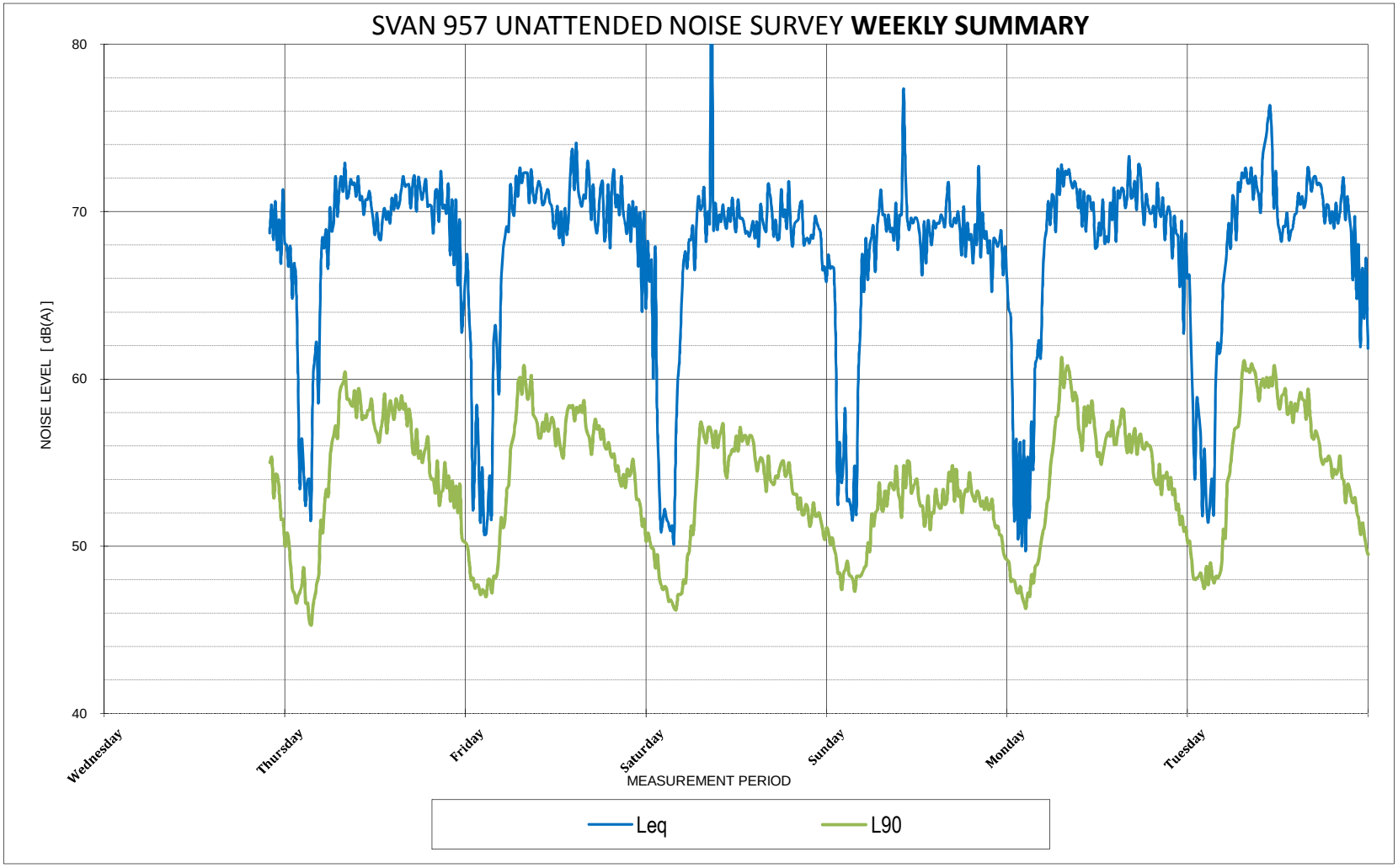
Google

APPENDIX B

APPENDIX B

APPENDIX B

WEEKLY SUMMARY ADDRESS: Location 3 - Eveleigh St, Redfern PERIOD: 15th to the 21st June 2011



SUMMARY OF AMBIENT NOISE LEVELS

	L90 Daytime	*L90* Evening	*L90* Nighttime
Day 1			
Day 2	56	53	47
Day 3	56	54	47
Day 4	54	52	47
Day 5	52	52	48
Day 6	56	54	47
Day 7	57	53	48
RBL	56	53	47

	Leq Daytime	*Leq* Evening	*Leq* Nighttime
Day 1			
Day 2	71	71	67
Day 3	71	71	66
Day 4	72	70	66
Day 5	70	69	67
Day 6	71	70	66
Day 7	72	70	66
Average	71	70	66

SUMMARY OF TRAFFIC & MISC. NOISE LEVELS

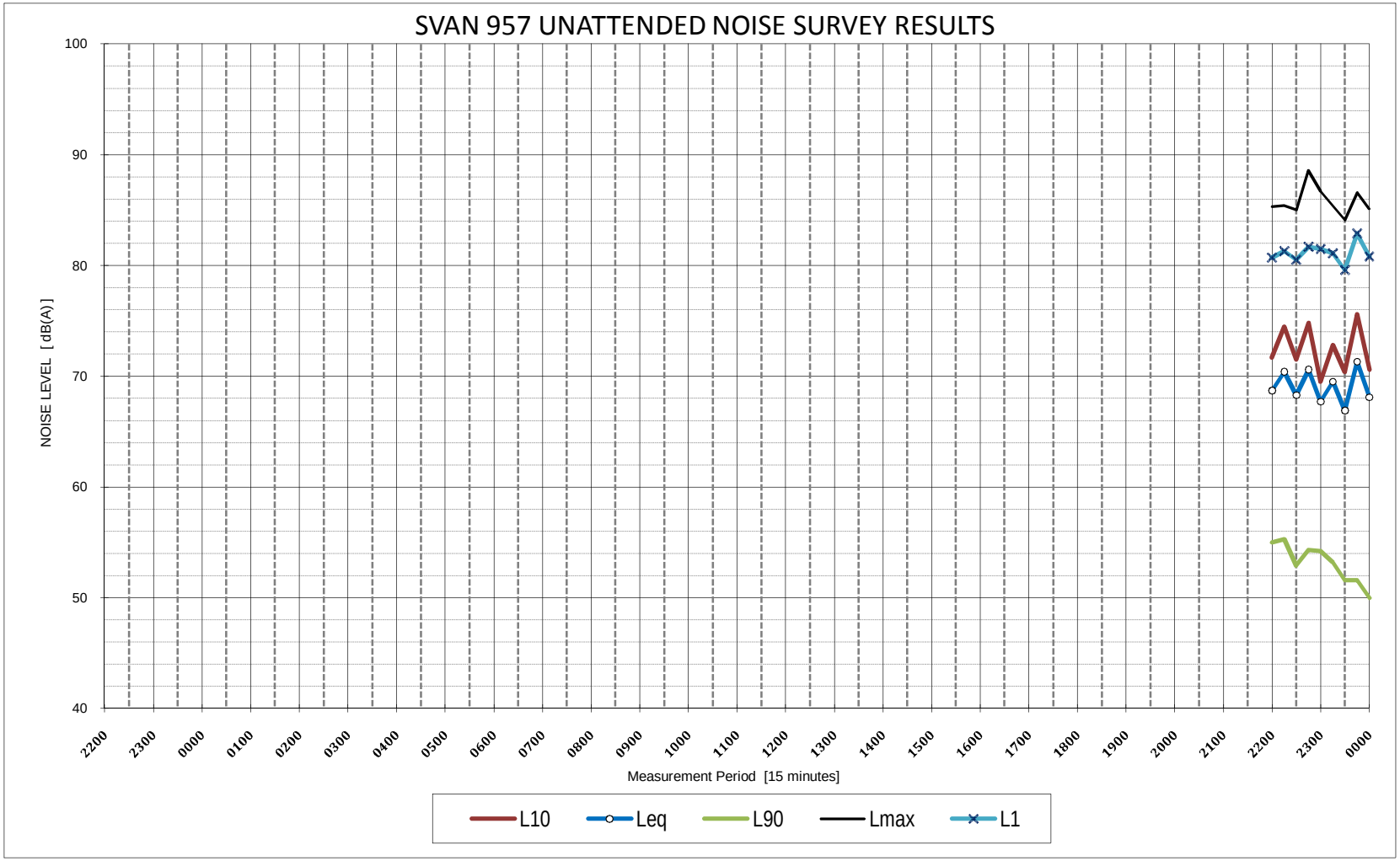
Leq 15 hrs	0700-2200	71	dB(A)
Leq 9 hrs	2200-0700	66	dB(A)
Leq 24 hrs	0000-2400	70	dB(A)
L10 18 hrs	0600-2400	73	dB(A)
max Leq 1 hr	0700-2200	72	dB(A)
max Leq 1 hr	2200-0700	69	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual 7 day average - [Lmax - Leq ≥ 15]	29

WEEKKLY SUMMARY

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	22	34	41	46	49	52	48	37	22	56
10% min L90 Evening	1800-2200	19	32	39	43	47	49	45	32	17	53
10% min L90 Night	2200-0700	13	26	33	38	41	43	38	25	14	47
10% min L90 Period	0000-0700	13	26	33	38	41	43	38	25	14	47
10% min L90 Period	0700-0000	19	32	38	43	46	48	44	32	17	53
Leq 15 hours	0700-2200	33	45	55	63	66	65	62	57	46	71
Leq 9 hours	2200-0700	29	40	51	59	62	61	58	54	42	66

DAY 1 ADDRESS: Location 3 - Eveleigh St, Redfern DATE: Wednesday, 15 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

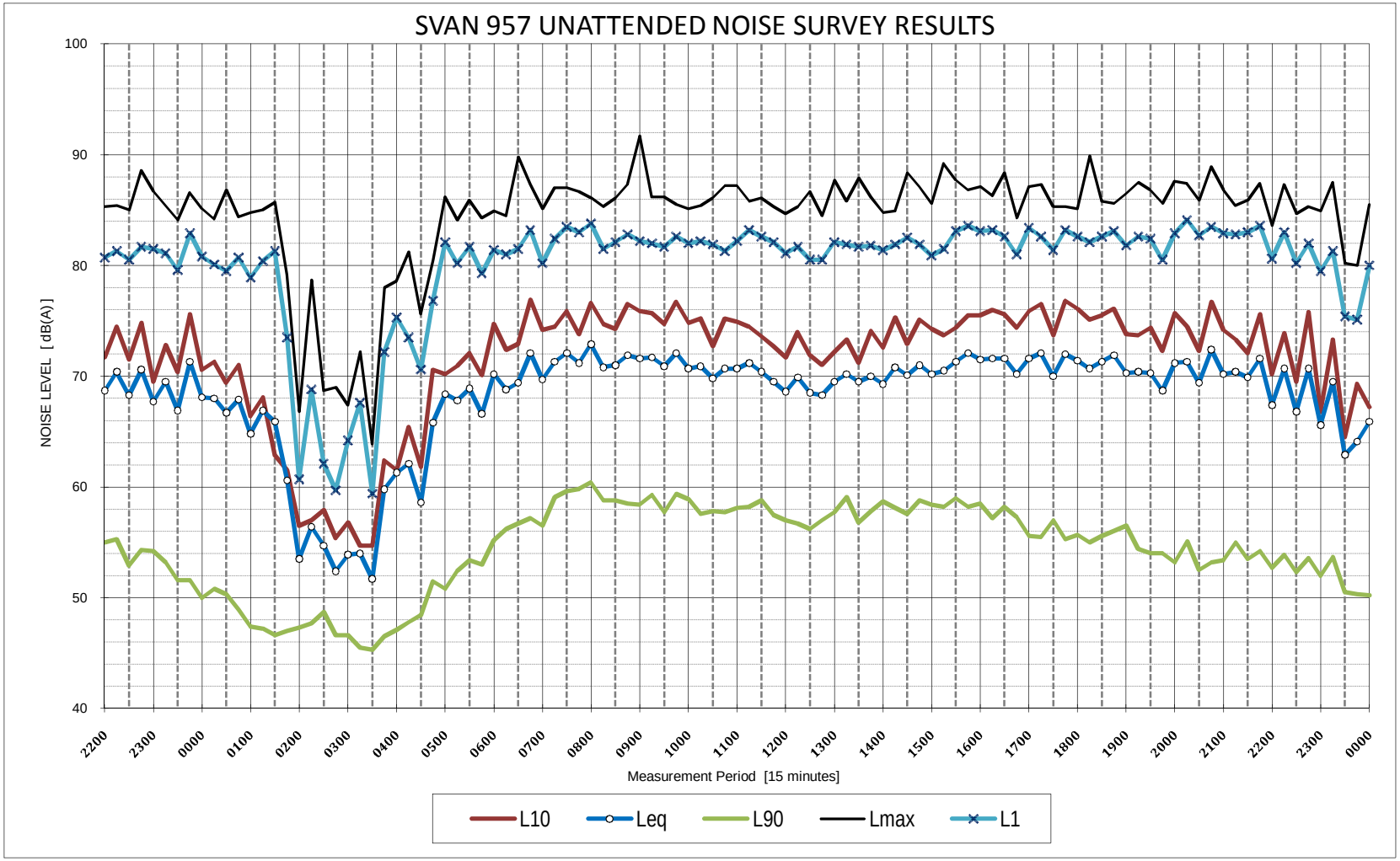
Leq 15 hours	0700-2200		dB(A)
Leq 9 hours	2200-0700		dB(A)
Leq 24 hours	0000-2400		dB(A)
L10 18 hours	0600-2400		dB(A)
max Leq 1 hour	0700-2200		dB(A)
max Leq 1 hour	2200-0700		dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										

DAY 2 ADDRESS: Location 3 - Eveleigh St, Redfern DATE: Thursday, 16 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	56	dB(A)
L90 Evening	1800-2200	53	dB(A)
L90 Nighttime	2200-0700	47	dB(A)
Leq Daytime	0700-1800	71	dB(A)
Leq Evening	1800-2200	71	dB(A)
Leq Nighttime	2200-0700	67	dB(A)

TRAFFIC & MISC. NOISE METRICS

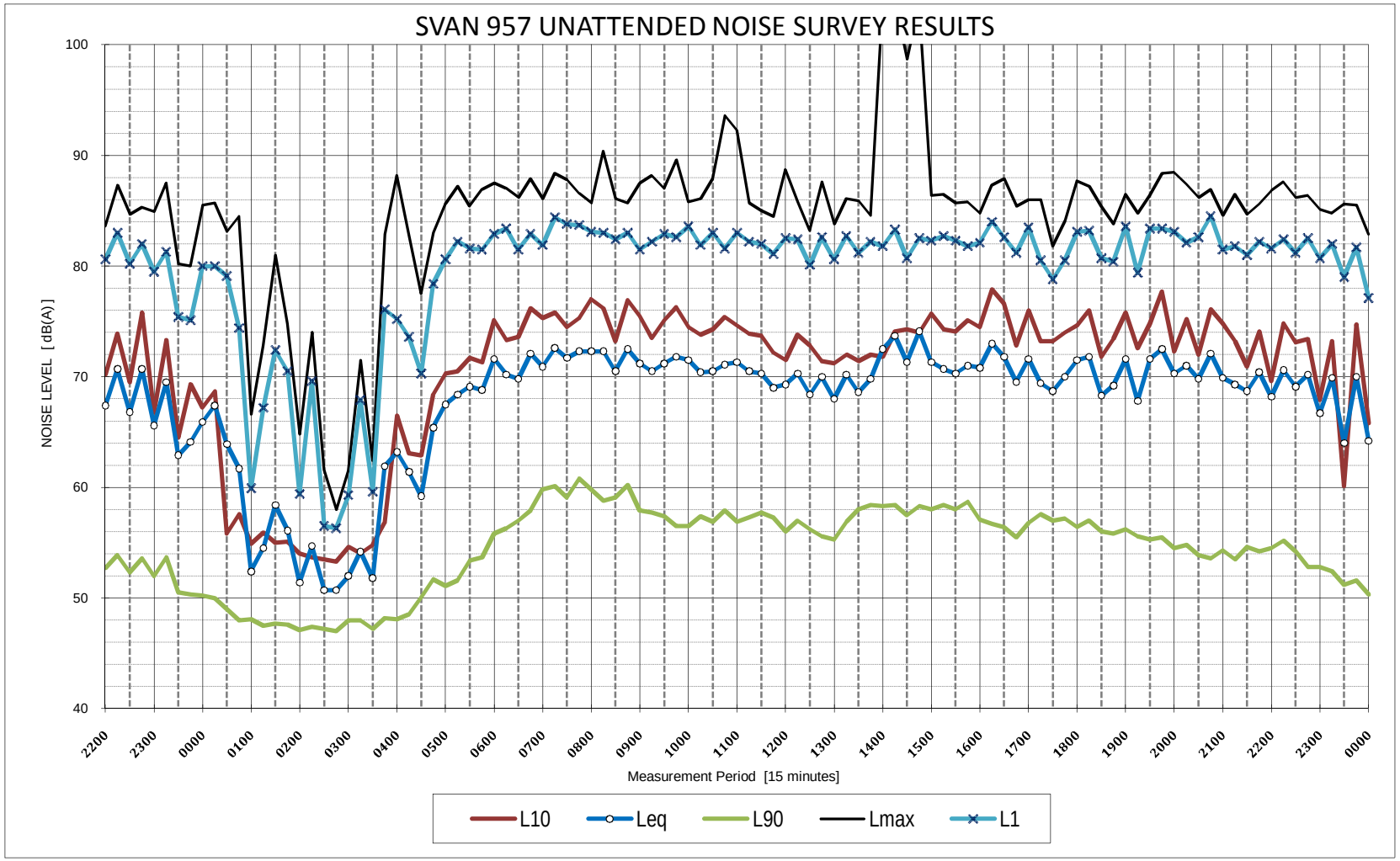
Leq 15 hours	0700-2200	71	dB(A)
Leq 9 hours	2200-0700	67	dB(A)
Leq 24 hours	0000-2400	70	dB(A)
L10 18 hours	0600-2400	74	dB(A)
max Leq 1 hour	0700-2200	72	dB(A)
max Leq 1 hour	2200-0700	70	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	30

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	23	35	42	46	49	52	50	39	24	56
10% min L90 Evening	1800-2200	20	34	39	43	47	49	45	33	18	53
10% min L90 Night	2200-0700	14	29	33	37	40	42	39	28	17	47
10% min L90 Period	0000-0700	14	29	33	37	40	42	39	28	16	46
10% min L90 Period	0700-0000	20	33	39	43	46	49	46	33	18	53
Leq 15 hours	0700-2200	33	45	55	64	66	65	62	57	47	71
Leq 9 hours	2200-0700	30	41	52	60	62	62	58	54	44	67

DAY 3 ADDRESS: Location 3 - Eveleigh St, Redfern DATE: Friday, 17 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	56	dB(A)
L90 Evening	1800-2200	54	dB(A)
L90 Nighttime	2200-0700	47	dB(A)
Leq Daytime	0700-1800	71	dB(A)
Leq Evening	1800-2200	71	dB(A)
Leq Nighttime	2200-0700	66	dB(A)

TRAFFIC & MISC. NOISE METRICS

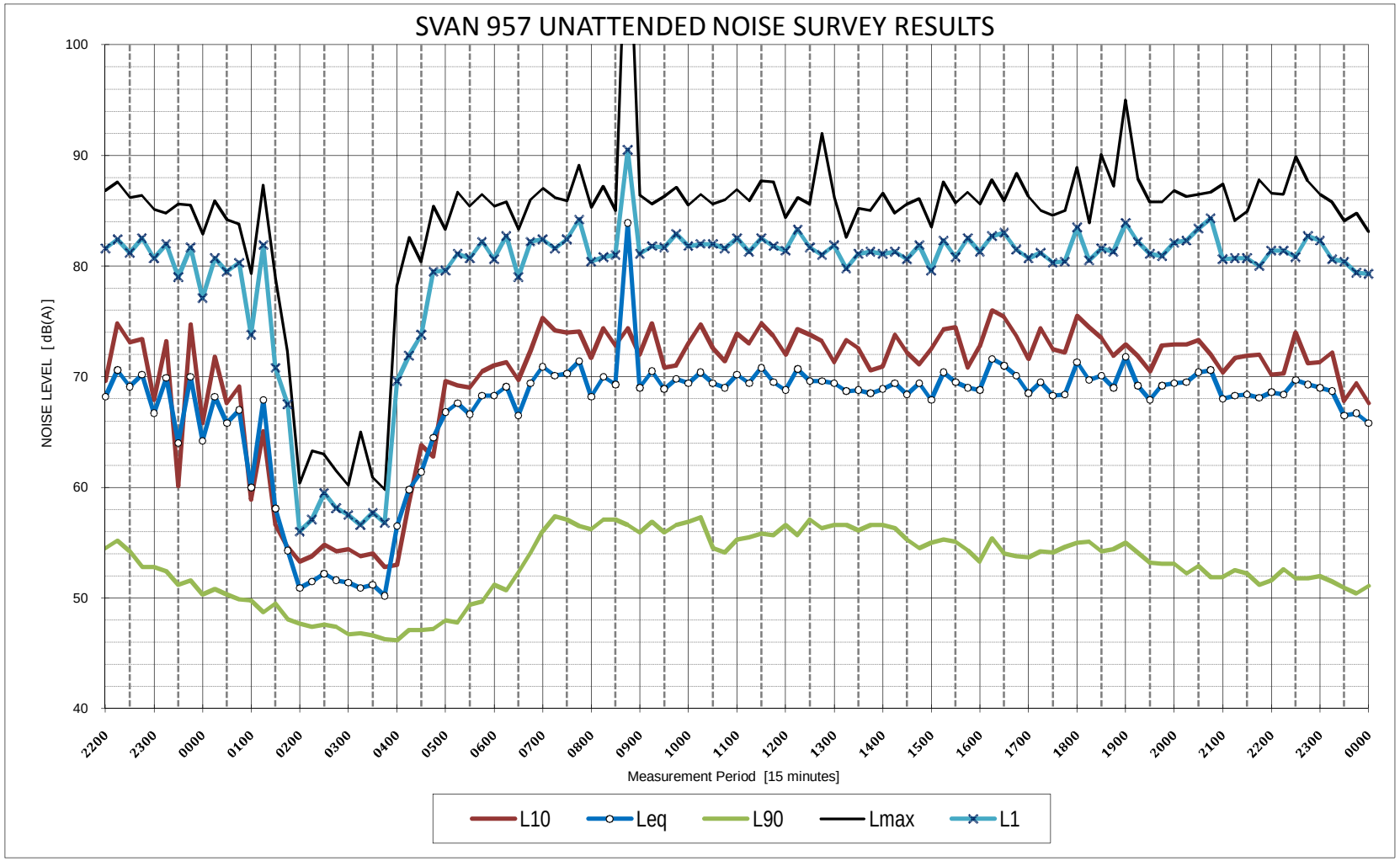
Leq 15 hours	0700-2200	71	dB(A)
Leq 9 hours	2200-0700	66	dB(A)
Leq 24 hours	0000-2400	70	dB(A)
L10 18 hours	0600-2400	74	dB(A)
max Leq 1 hour	0700-2200	72	dB(A)
max Leq 1 hour	2200-0700	70	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	29

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	22	34	41	46	49	52	48	38	23	56
10% min L90 Evening	1800-2200	20	33	40	44	47	49	46	35	24	54
10% min L90 Night	2200-0700	13	26	33	38	41	43	39	25	14	47
10% min L90 Period	0000-0700	13	26	33	38	41	43	38	25	14	47
10% min L90 Period	0700-0000	20	33	40	44	47	49	46	35	22	54
Leq 15 hours	0700-2200	34	45	55	64	66	65	62	57	46	71
Leq 9 hours	2200-0700	29	40	51	59	62	61	58	53	42	66

DAY 4 ADDRESS: Location 3 - Eveleigh St, Redfern DATE: Saturday, 18 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	54	dB(A)
L90 Evening	1800-2200	52	dB(A)
L90 Nighttime	2200-0700	47	dB(A)
Leq Daytime	0700-1800	72	dB(A)
Leq Evening	1800-2200	70	dB(A)
Leq Nighttime	2200-0700	66	dB(A)

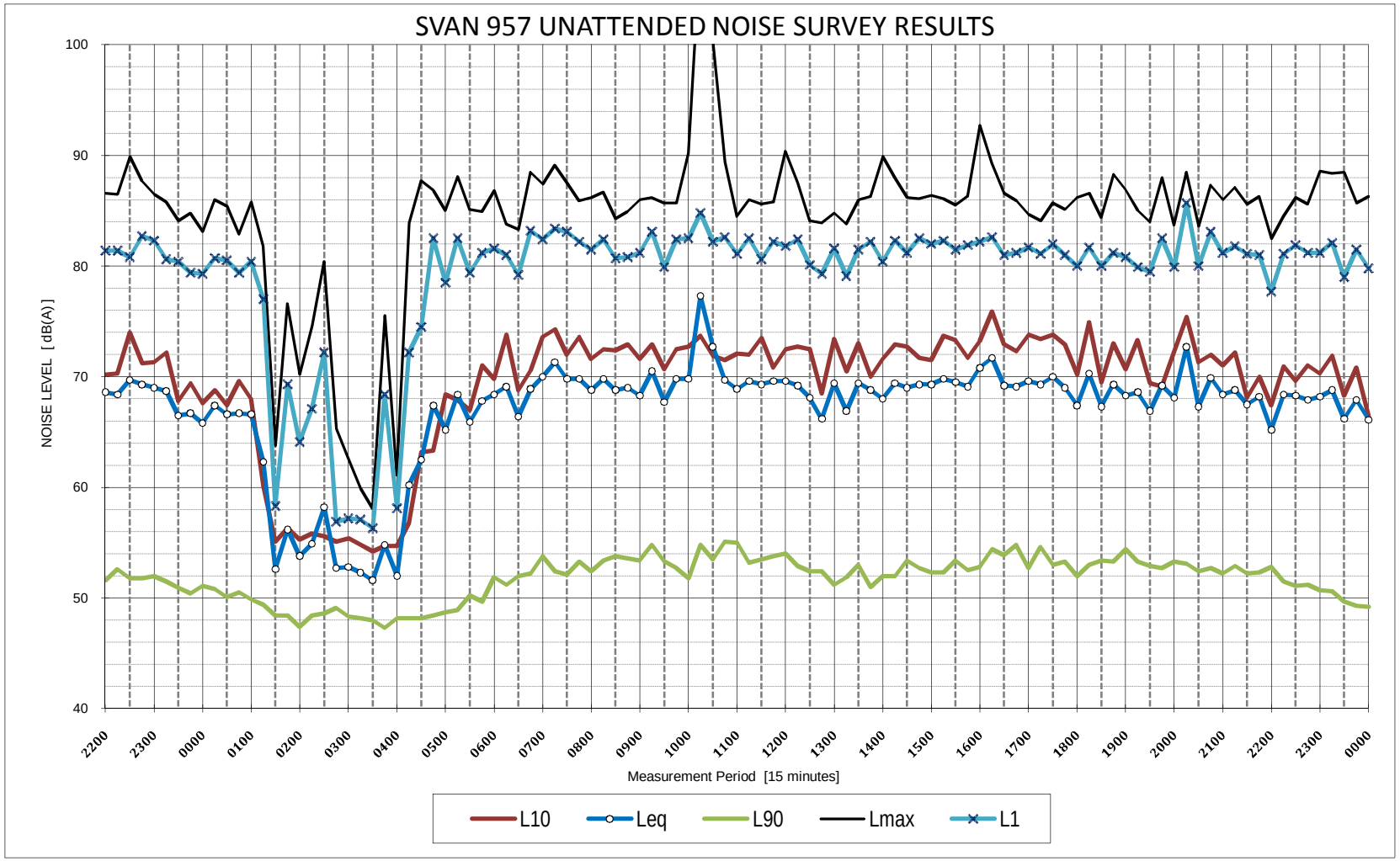
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	71	dB(A)
Leq 9 hours	2200-0700	66	dB(A)
Leq 24 hours	0000-2400	70	dB(A)
L10 18 hours	0600-2400	73	dB(A)
max Leq 1 hour	0700-2200	71	dB(A)
max Leq 1 hour	2200-0700	69	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	27

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	20	33	40	44	47	50	46	35	20	54
10% min L90 Evening	1800-2200	18	31	38	42	45	48	43	30	16	52
10% min L90 Night	2200-0700	13	25	33	38	41	43	38	24	13	47
10% min L90 Period	0000-0700	13	25	33	38	41	43	37	24	13	47
10% min L90 Period	0700-0000	18	31	38	42	45	48	44	31	16	52
Leq 15 hours	0700-2200	32	45	55	63	67	66	62	57	47	71
Leq 9 hours	2200-0700	29	40	50	59	62	61	57	52	42	66

DAY 5 ADDRESS: Location 3 - Eveleigh St, Redfern DATE: Sunday, 19 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0800-1800	52	dB(A)
L90 Evening	1800-2200	52	dB(A)
L90 Nighttime	2200-0800	48	dB(A)
Leq Daytime	0800-1800	70	dB(A)
Leq Evening	1800-2200	69	dB(A)
Leq Nighttime	2200-0800	67	dB(A)

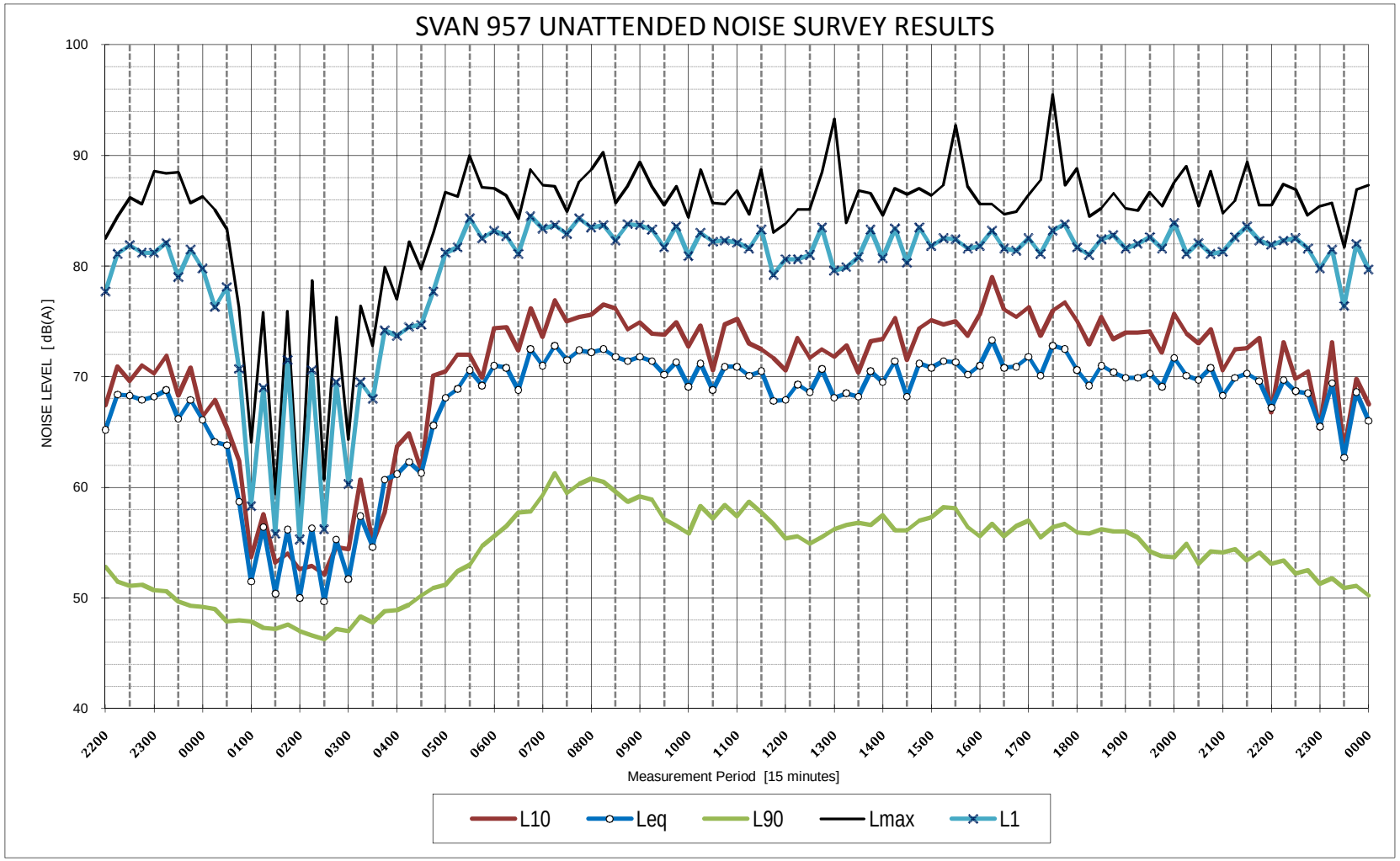
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	70	dB(A)
Leq 9 hours	2200-0700	66	dB(A)
Leq 24 hours	0000-2400	69	dB(A)
L10 18 hours	0600-2400	72	dB(A)
max Leq 1 hour	0700-2200	70	dB(A)
max Leq 1 hour	2200-0700	68	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	29

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0800-1800	18	30	37	42	45	48	44	31	16	52
10% min L90 Evening	1800-2200	17	31	38	43	46	48	44	30	14	52
10% min L90 Night	2200-0800	13	25	34	38	42	44	39	25	13	48
10% min L90 Period	0000-0700	13	25	34	38	42	44	39	25	13	48
10% min L90 Period	0700-0000	17	30	36	41	45	47	43	29	14	51
Leq 15 hours	0700-2200	31	44	54	62	65	64	61	56	45	70
Leq 9 hours	2200-0700	28	39	50	59	61	60	57	54	41	66

DAY 6 ADDRESS: Location 3 - Eveleigh St, Redfern DATE: Monday, 20 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	56	dB(A)
L90 Evening	1800-2200	54	dB(A)
L90 Nighttime	2200-0700	47	dB(A)
Leq Daytime	0700-1800	71	dB(A)
Leq Evening	1800-2200	70	dB(A)
Leq Nighttime	2200-0700	66	dB(A)

TRAFFIC & MISC. NOISE METRICS

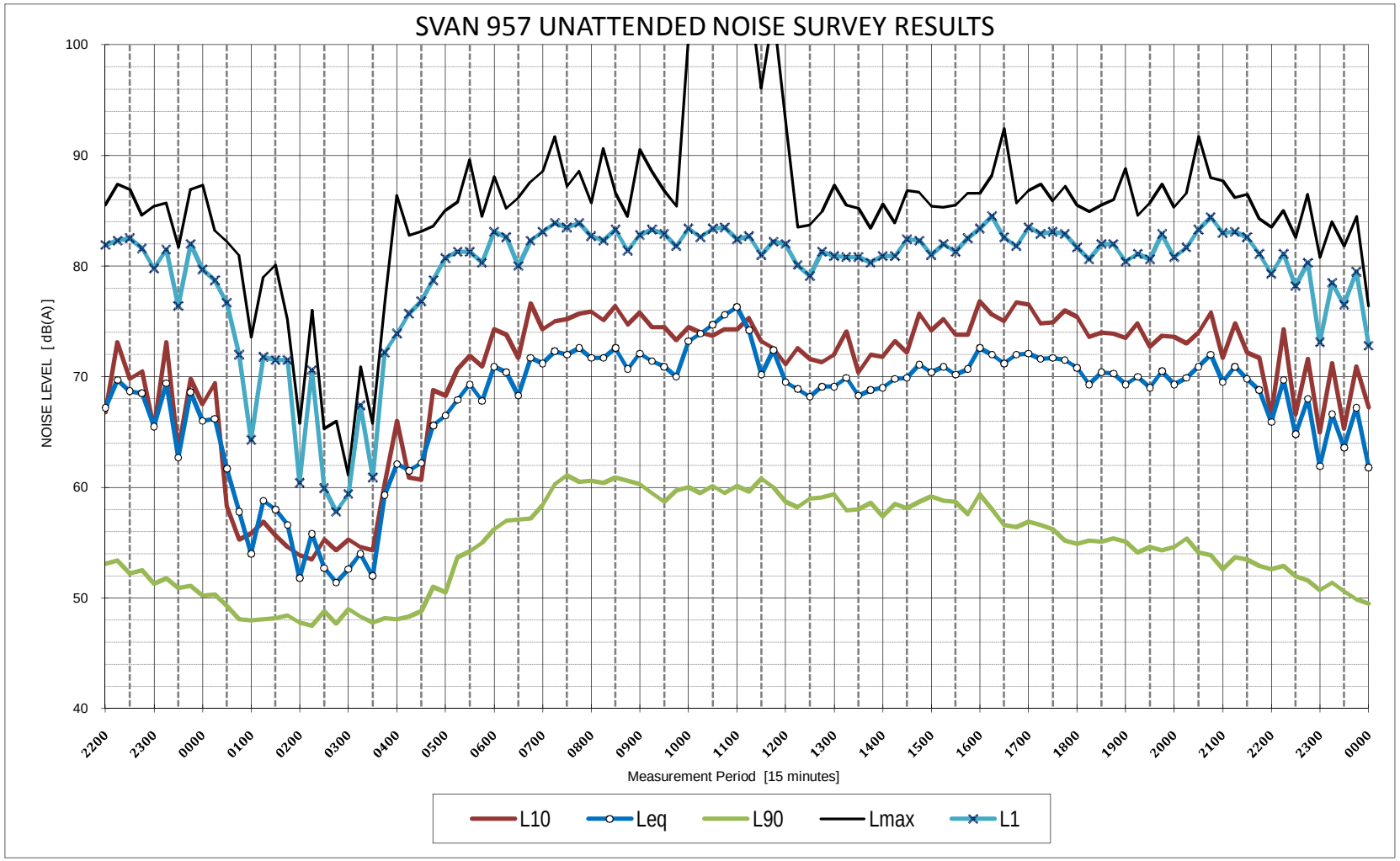
Leq 15 hours	0700-2200	71	dB(A)
Leq 9 hours	2200-0700	66	dB(A)
Leq 24 hours	0000-2400	70	dB(A)
L10 18 hours	0600-2400	73	dB(A)
max Leq 1 hour	0700-2200	72	dB(A)
max Leq 1 hour	2200-0700	70	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	31

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	22	34	41	46	49	51	48	36	21	56
10% min L90 Evening	1800-2200	19	33	39	44	47	49	45	31	16	54
10% min L90 Night	2200-0700	13	26	33	39	41	43	37	23	13	47
10% min L90 Period	0000-0700	13	26	33	38	41	42	37	23	13	47
10% min L90 Period	0700-0000	19	32	39	43	47	49	44	31	17	53
Leq 15 hours	0700-2200	33	45	55	64	66	65	62	58	45	71
Leq 9 hours	2200-0700	28	40	50	59	62	61	57	55	41	66

DAY 7 ADDRESS: Location 3 - Eveleigh St, Redfern DATE: Tuesday, 21 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	57	dB(A)
L90 Evening	1800-2200	53	dB(A)
L90 Nighttime	2200-0700	48	dB(A)
Leq Daytime	0700-1800	72	dB(A)
Leq Evening	1800-2200	70	dB(A)
Leq Nighttime	2200-0700	66	dB(A)

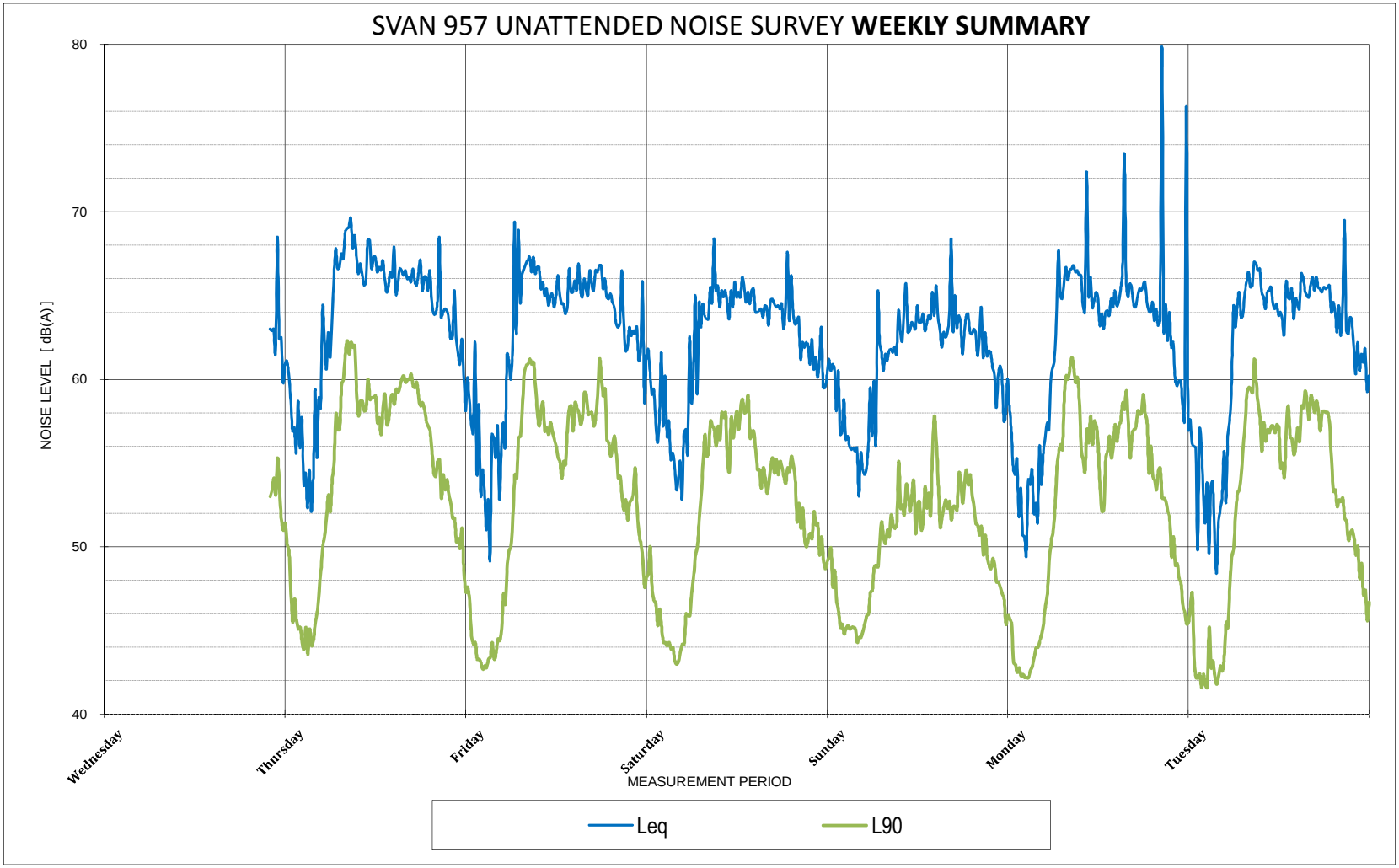
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	71	dB(A)
Leq 9 hours	2200-0700	66	dB(A)
Leq 24 hours	0000-2400	70	dB(A)
L10 18 hours	0600-2400	73	dB(A)
max Leq 1 hour	0700-2200	73	dB(A)
max Leq 1 hour	2200-0700	69	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	30

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	24	36	42	47	50	52	49	39	26	57
10% min L90 Evening	1800-2200	20	32	39	44	47	49	45	33	19	53
10% min L90 Night	2200-0700	13	27	34	39	42	43	38	27	16	48
10% min L90 Period	0000-0700	13	27	34	39	42	43	38	27	16	48
10% min L90 Period	0700-0000	19	32	38	43	46	48	44	32	20	53
Leq 15 hours	0700-2200	35	46	55	64	66	66	63	58	47	71
Leq 9 hours	2200-0700	28	40	50	59	61	60	57	54	42	66

WEEKLY SUMMARY ADDRESS: Location 1 - Lawson St, Redfern PERIOD: 15th to the 21st June 2011



SUMMARY OF AMBIENT NOISE LEVELS

	L90 Daytime	*L90* Evening	*L90* Nighttime
Day 1			
Day 2	57	53	44
Day 3	55	52	43
Day 4	54	50	44
Day 5	51	49	45
Day 6	55	52	42
Day 7	55	51	42
RBL	55	51	43

	Leq Daytime	*Leq* Evening	*Leq* Nighttime
Day 1			
Day 2	67	65	62
Day 3	66	65	61
Day 4	65	64	60
Day 5	64	63	60
Day 6	66	69	59
Day 7	65	65	63
Average	66	66	61

SUMMARY OF TRAFFIC & MISC. NOISE LEVELS

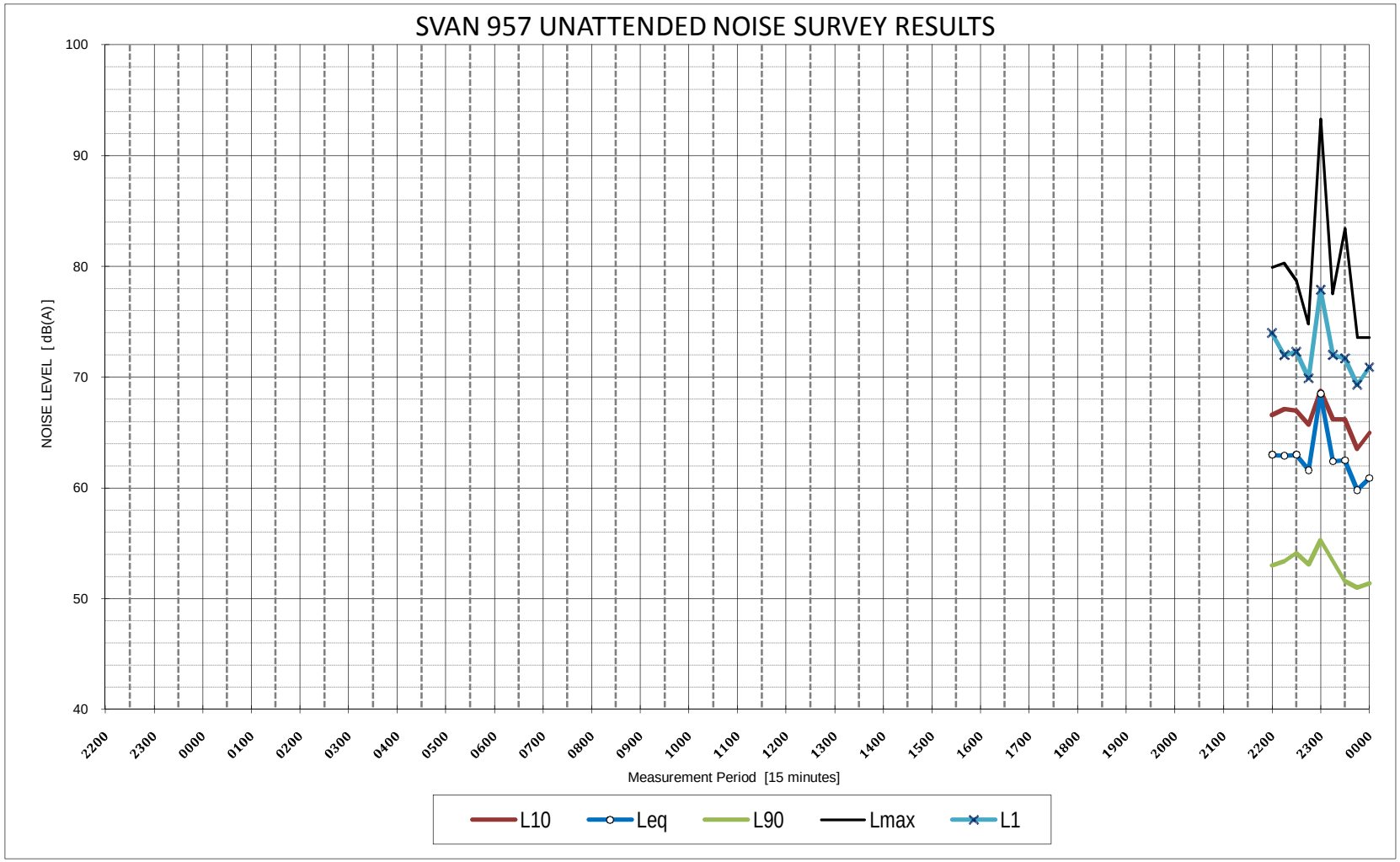
Leq 15 hrs	0700-2200	66	dB(A)
Leq 9 hrs	2200-0700	61	dB(A)
Leq 24 hrs	0000-2400	64	dB(A)
L10 18 hrs	0600-2400	68	dB(A)
max Leq 1 hr	0700-2200	67	dB(A)
max Leq 1 hr	2200-0700	63	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual 7 day average - [Lmax - Leq ≥ 15]	31

WEEKKLY SUMMARY

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	23	31	38	44	48	51	48	40	29	55
10% min L90 Evening	1800-2200	20	29	36	41	45	47	43	35	24	51
10% min L90 Night	2200-0700	14	21	31	35	37	39	33	23	16	43
10% min L90 Period	0000-0700	14	21	31	35	37	39	33	23	16	43
10% min L90 Period	0700-0000	20	28	35	41	44	46	42	33	22	50
Leq 15 hours	0700-2200	34	44	49	54	57	62	60	55	47	66
Leq 9 hours	2200-0700	28	38	43	48	52	57	55	50	43	61

DAY 1 ADDRESS: Location 1 - Lawson St, Redfern DATE: Wednesday, 15 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

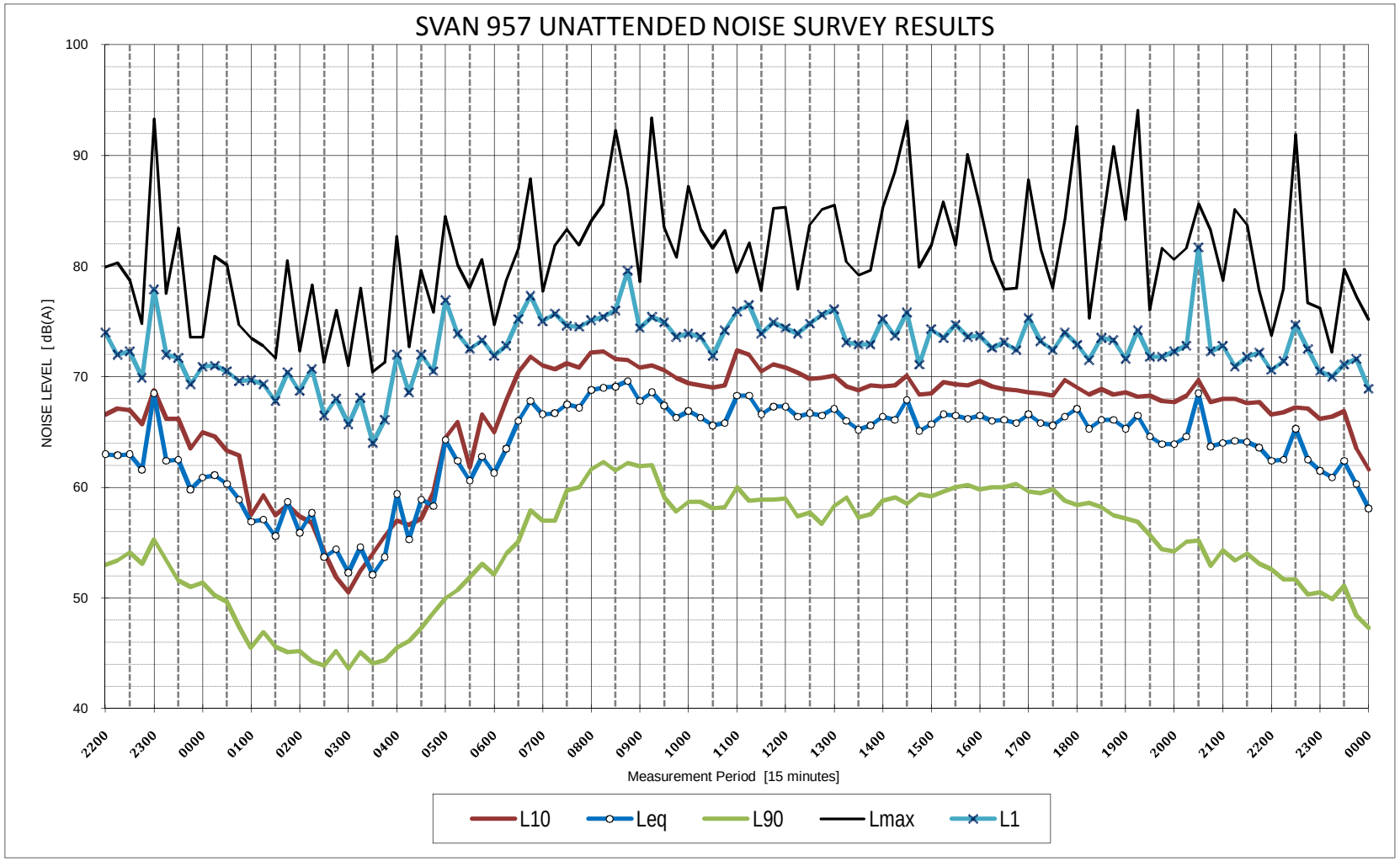
Leq 15 hours	0700-2200		dB(A)
Leq 9 hours	2200-0700		dB(A)
Leq 24 hours	0000-2400		dB(A)
L10 18 hours	0600-2400		dB(A)
max Leq 1 hour	0700-2200		dB(A)
max Leq 1 hour	2200-0700		dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										

DAY 2 ADDRESS: Location 1 - Lawson St, Redfern DATE: Thursday, 16 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	57	dB(A)
L90 Evening	1800-2200	53	dB(A)
L90 Nighttime	2200-0700	44	dB(A)
Leq Daytime	0700-1800	67	dB(A)
Leq Evening	1800-2200	65	dB(A)
Leq Nighttime	2200-0700	62	dB(A)

TRAFFIC & MISC. NOISE METRICS

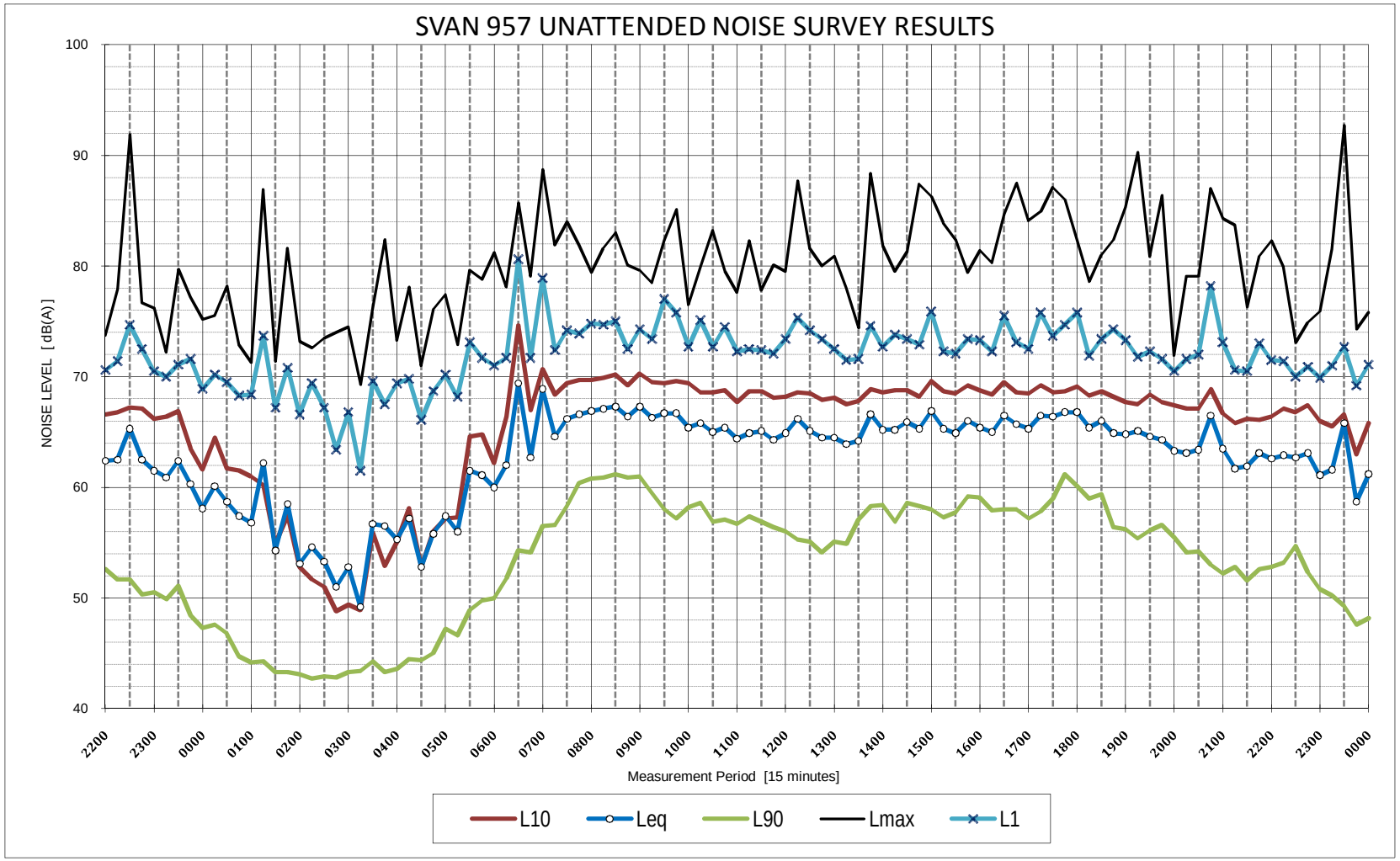
Leq 15 hours	0700-2200	67	dB(A)
Leq 9 hours	2200-0700	62	dB(A)
Leq 24 hours	0000-2400	65	dB(A)
L10 18 hours	0600-2400	69	dB(A)
max Leq 1 hour	0700-2200	68	dB(A)
max Leq 1 hour	2200-0700	65	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	32

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	24	32	40	46	50	53	51	44	33	57
10% min L90 Evening	1800-2200	22	30	38	43	46	49	45	37	27	53
10% min L90 Night	2200-0700	13	21	31	35	37	40	36	28	19	44
10% min L90 Period	0000-0700	13	21	31	35	37	40	36	28	19	44
10% min L90 Period	0700-0000	22	30	38	42	46	48	44	36	25	52
Leq 15 hours	0700-2200	35	45	50	54	58	62	61	58	50	67
Leq 9 hours	2200-0700	28	39	43	48	53	57	56	53	46	62

DAY 3 ADDRESS: Location 1 - Lawson St, Redfern DATE: Friday, 17 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	55	dB(A)
L90 Evening	1800-2200	52	dB(A)
L90 Nighttime	2200-0700	43	dB(A)
Leq Daytime	0700-1800	66	dB(A)
Leq Evening	1800-2200	65	dB(A)
Leq Nighttime	2200-0700	61	dB(A)

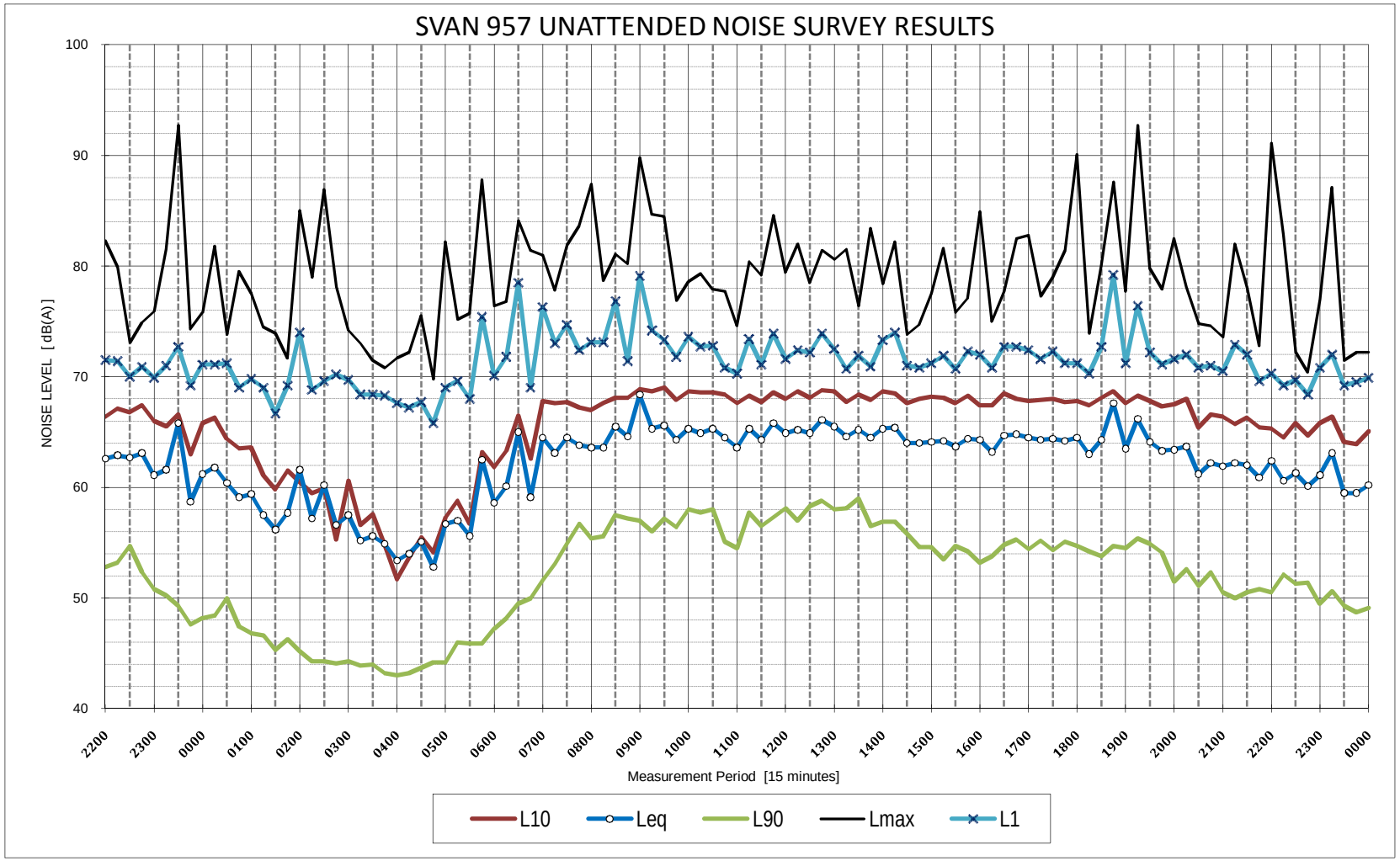
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	66	dB(A)
Leq 9 hours	2200-0700	61	dB(A)
Leq 24 hours	0000-2400	64	dB(A)
L10 18 hours	0600-2400	68	dB(A)
max Leq 1 hour	0700-2200	67	dB(A)
max Leq 1 hour	2200-0700	64	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	31

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	23	32	38	44	49	51	48	40	29	55
10% min L90 Evening	1800-2200	21	29	38	43	46	47	43	36	25	52
10% min L90 Night	2200-0700	15	21	31	35	36	39	33	23	16	43
10% min L90 Period	0000-0700	15	21	31	35	36	39	33	23	16	43
10% min L90 Period	0700-0000	21	29	38	43	46	47	44	36	26	52
Leq 15 hours	0700-2200	35	45	50	54	58	61	60	55	48	66
Leq 9 hours	2200-0700	29	38	44	49	53	56	55	50	42	61

DAY 4 ADDRESS: Location 1 - Lawson St, Redfern DATE: Saturday, 18 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	54	dB(A)
L90 Evening	1800-2200	50	dB(A)
L90 Nighttime	2200-0700	44	dB(A)
Leq Daytime	0700-1800	65	dB(A)
Leq Evening	1800-2200	64	dB(A)
Leq Nighttime	2200-0700	60	dB(A)

TRAFFIC & MISC. NOISE METRICS

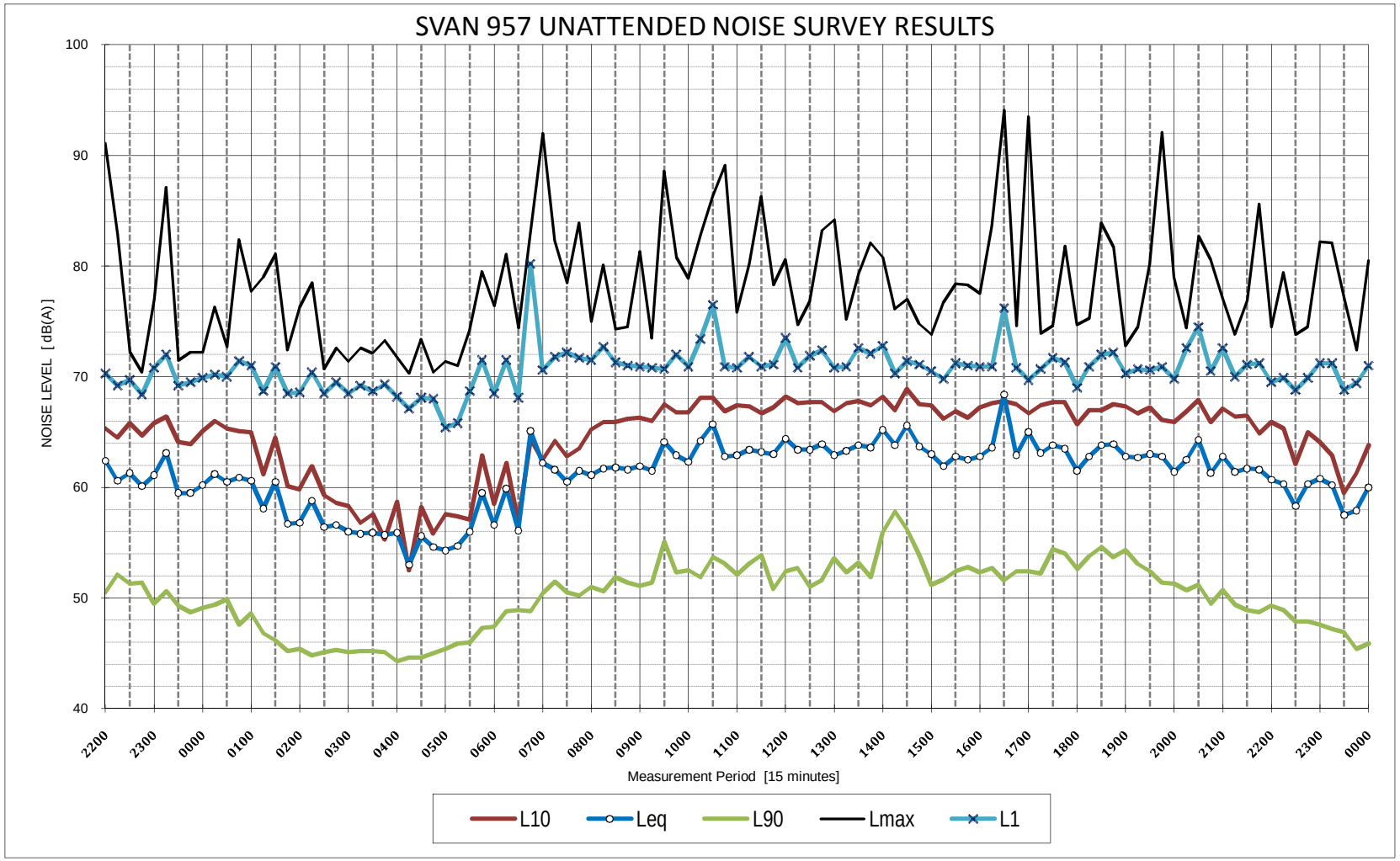
Leq 15 hours	0700-2200	65	dB(A)
Leq 9 hours	2200-0700	60	dB(A)
Leq 24 hours	0000-2400	63	dB(A)
L10 18 hours	0600-2400	67	dB(A)
max Leq 1 hour	0700-2200	65	dB(A)
max Leq 1 hour	2200-0700	63	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	30

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	22	30	37	43	47	49	46	38	27	54
10% min L90 Evening	1800-2200	20	28	36	41	44	46	42	33	22	50
10% min L90 Night	2200-0700	15	22	31	35	37	39	33	23	16	44
10% min L90 Period	0000-0700	15	22	31	35	37	39	33	23	16	44
10% min L90 Period	0700-0000	21	28	36	41	44	46	42	33	22	50
Leq 15 hours	0700-2200	34	44	49	53	57	61	59	53	45	65
Leq 9 hours	2200-0700	28	38	44	49	53	56	54	49	42	60

DAY 5 ADDRESS: Location 1 - Lawson St, Redfern DATE: Sunday, 19 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0800-1800	51	dB(A)
L90 Evening	1800-2200	49	dB(A)
L90 Nighttime	2200-0800	45	dB(A)
Leq Daytime	0800-1800	64	dB(A)
Leq Evening	1800-2200	63	dB(A)
Leq Nighttime	2200-0800	60	dB(A)

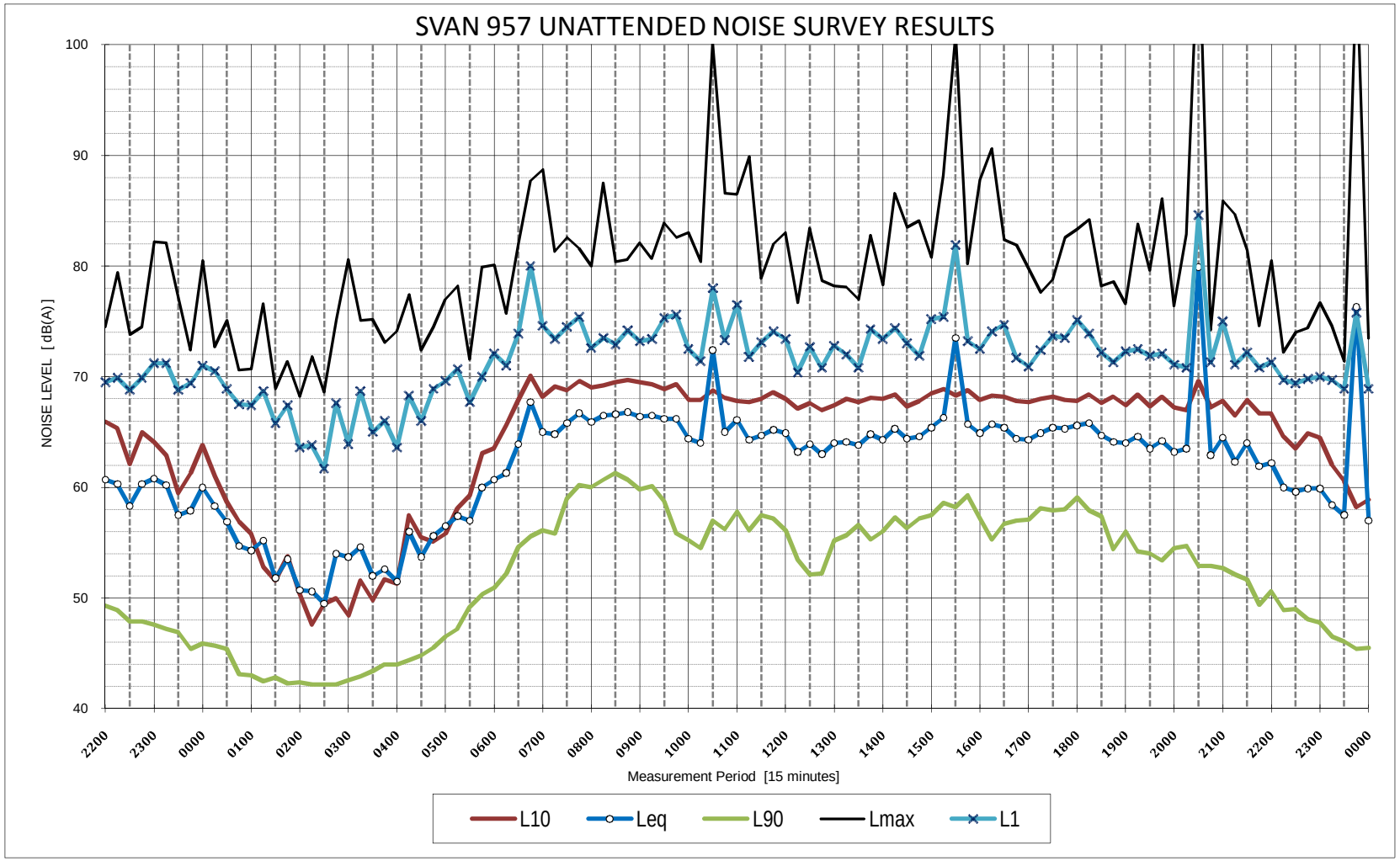
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	63	dB(A)
Leq 9 hours	2200-0700	59	dB(A)
Leq 24 hours	0000-2400	62	dB(A)
L10 18 hours	0600-2400	66	dB(A)
max Leq 1 hour	0700-2200	64	dB(A)
max Leq 1 hour	2200-0700	61	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	29

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0800-1800	20	27	35	41	44	46	42	33	21	51
10% min L90 Evening	1800-2200	19	28	35	40	42	45	41	30	19	49
10% min L90 Night	2200-0800	16	23	32	36	38	41	35	24	16	45
10% min L90 Period	0000-0700	16	22	32	36	38	41	34	24	16	45
10% min L90 Period	0700-0000	18	27	34	40	42	44	40	30	19	49
Leq 15 hours	0700-2200	32	42	47	52	55	59	57	53	43	63
Leq 9 hours	2200-0700	29	37	42	47	52	55	54	48	42	59

DAY 6 ADDRESS: Location 1 - Lawson St, Redfern DATE: Monday, 20 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	55	dB(A)
L90 Evening	1800-2200	52	dB(A)
L90 Nighttime	2200-0700	42	dB(A)
Leq Daytime	0700-1800	66	dB(A)
Leq Evening	1800-2200	69	dB(A)
Leq Nighttime	2200-0700	59	dB(A)

TRAFFIC & MISC. NOISE METRICS

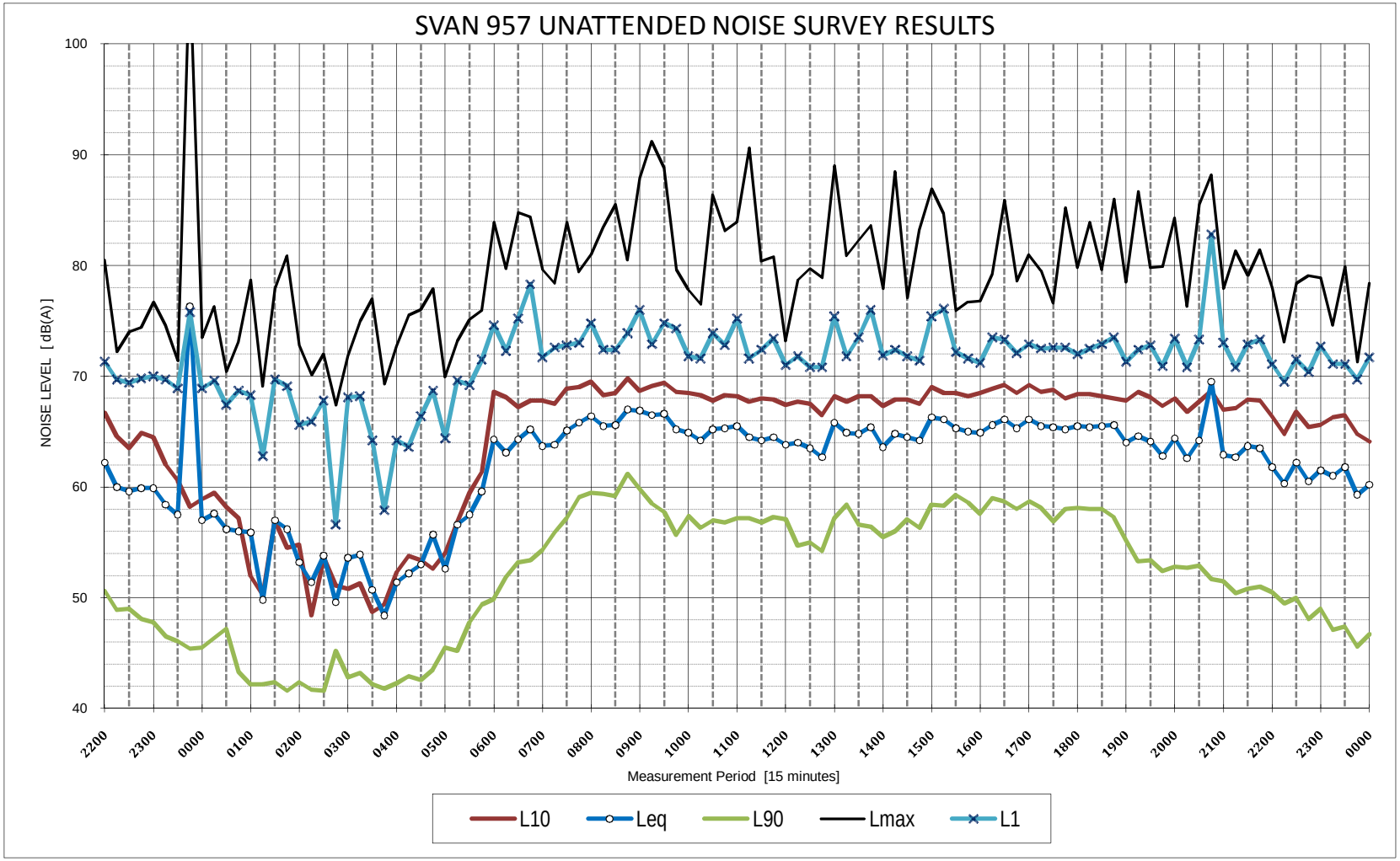
Leq 15 hours	0700-2200	67	dB(A)
Leq 9 hours	2200-0700	59	dB(A)
Leq 24 hours	0000-2400	66	dB(A)
L10 18 hours	0600-2400	68	dB(A)
max Leq 1 hour	0700-2200	69	dB(A)
max Leq 1 hour	2200-0700	61	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	30

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	23	31	38	44	48	51	47	40	29	55
10% min L90 Evening	1800-2200	20	29	35	42	45	47	44	35	23	52
10% min L90 Night	2200-0700	14	21	29	34	36	38	32	22	16	42
10% min L90 Period	0000-0700	14	21	29	34	36	38	32	22	16	42
10% min L90 Period	0700-0000	20	28	34	39	42	45	41	32	22	49
Leq 15 hours	0700-2200	34	44	49	54	58	65	61	55	47	67
Leq 9 hours	2200-0700	27	36	42	47	51	55	53	48	40	59

DAY 7 ADDRESS: Location 1 - Lawson St, Redfern DATE: Tuesday, 21 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	55	dB(A)
L90 Evening	1800-2200	51	dB(A)
L90 Nighttime	2200-0700	42	dB(A)
Leq Daytime	0700-1800	65	dB(A)
Leq Evening	1800-2200	65	dB(A)
Leq Nighttime	2200-0700	63	dB(A)

TRAFFIC & MISC. NOISE METRICS

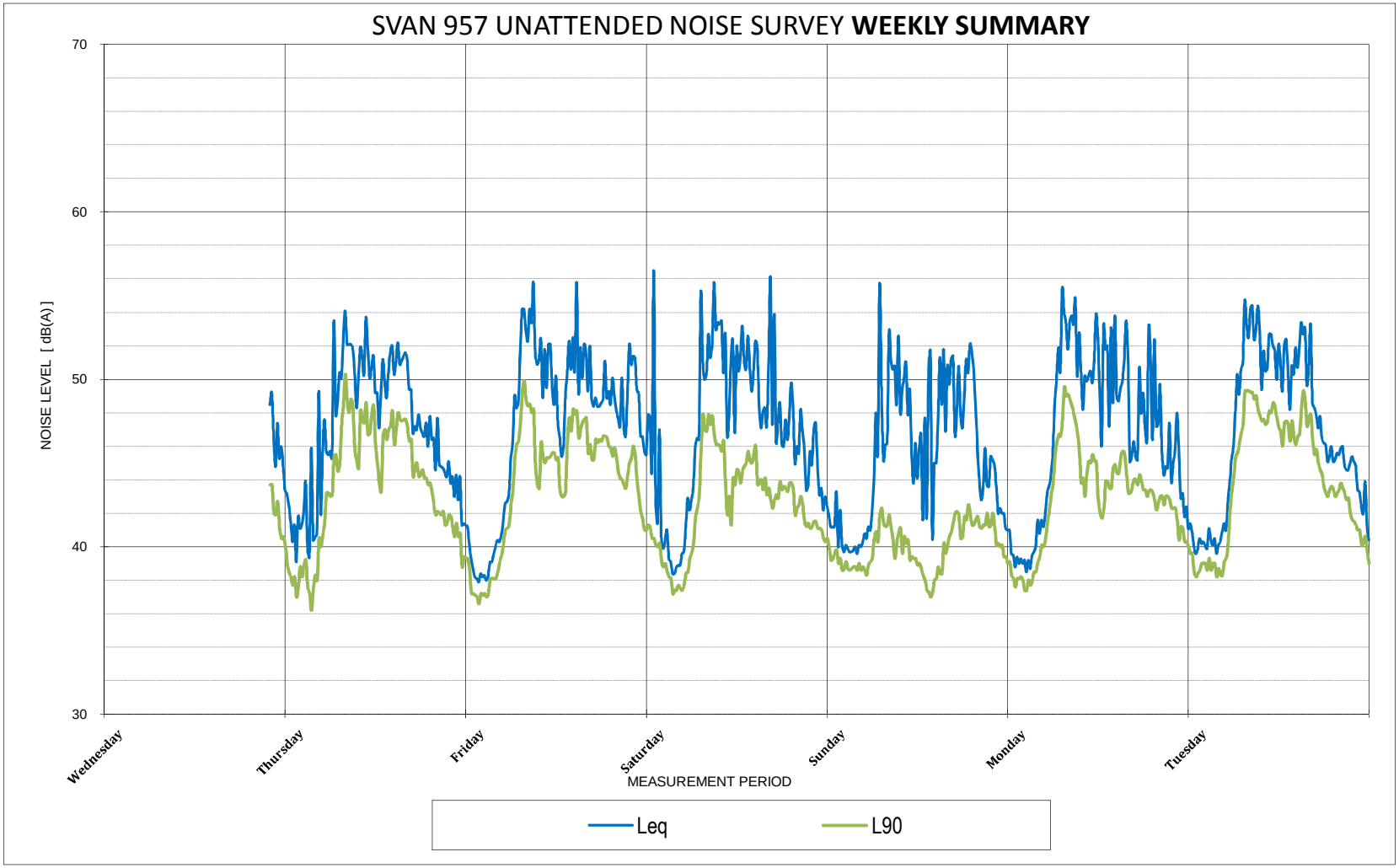
Leq 15 hours	0700-2200	65	dB(A)
Leq 9 hours	2200-0700	63	dB(A)
Leq 24 hours	0000-2400	64	dB(A)
L10 18 hours	0600-2400	68	dB(A)
max Leq 1 hour	0700-2200	66	dB(A)
max Leq 1 hour	2200-0700	66	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	31

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	23	32	38	44	48	51	48	41	30	55
10% min L90 Evening	1800-2200	21	29	35	41	44	46	43	34	24	51
10% min L90 Night	2200-0700	12	20	28	33	36	38	32	24	17	42
10% min L90 Period	0000-0700	12	20	28	33	35	38	32	24	17	42
10% min L90 Period	0700-0000	20	28	35	41	44	45	42	33	22	50
Leq 15 hours	0700-2200	35	44	49	54	57	61	59	54	47	65
Leq 9 hours	2200-0700	27	37	41	47	51	61	56	48	40	63

WEEKLY SUMMARY ADDRESS: Location 2 - Vine St, Redfern PERIOD: 15th to the 21st June 2011



SUMMARY OF AMBIENT NOISE LEVELS

	L90 Daytime	*L90* Evening	*L90* Nighttime
Day 1			
Day 2	45	42	37
Day 3	43	44	37
Day 4	43	41	37
Day 5	38	41	38
Day 6	43	42	38
Day 7	46	42	38
RBL	43	42	38

	Leq Daytime	*Leq* Evening	*Leq* Nighttime
Day 1			
Day 2	51	46	46
Day 3	51	49	42
Day 4	51	47	47
Day 5	49	48	45
Day 6	51	48	44
Day 7	52	45	44
Average	51	48	45

SUMMARY OF TRAFFIC & MISC. NOISE LEVELS

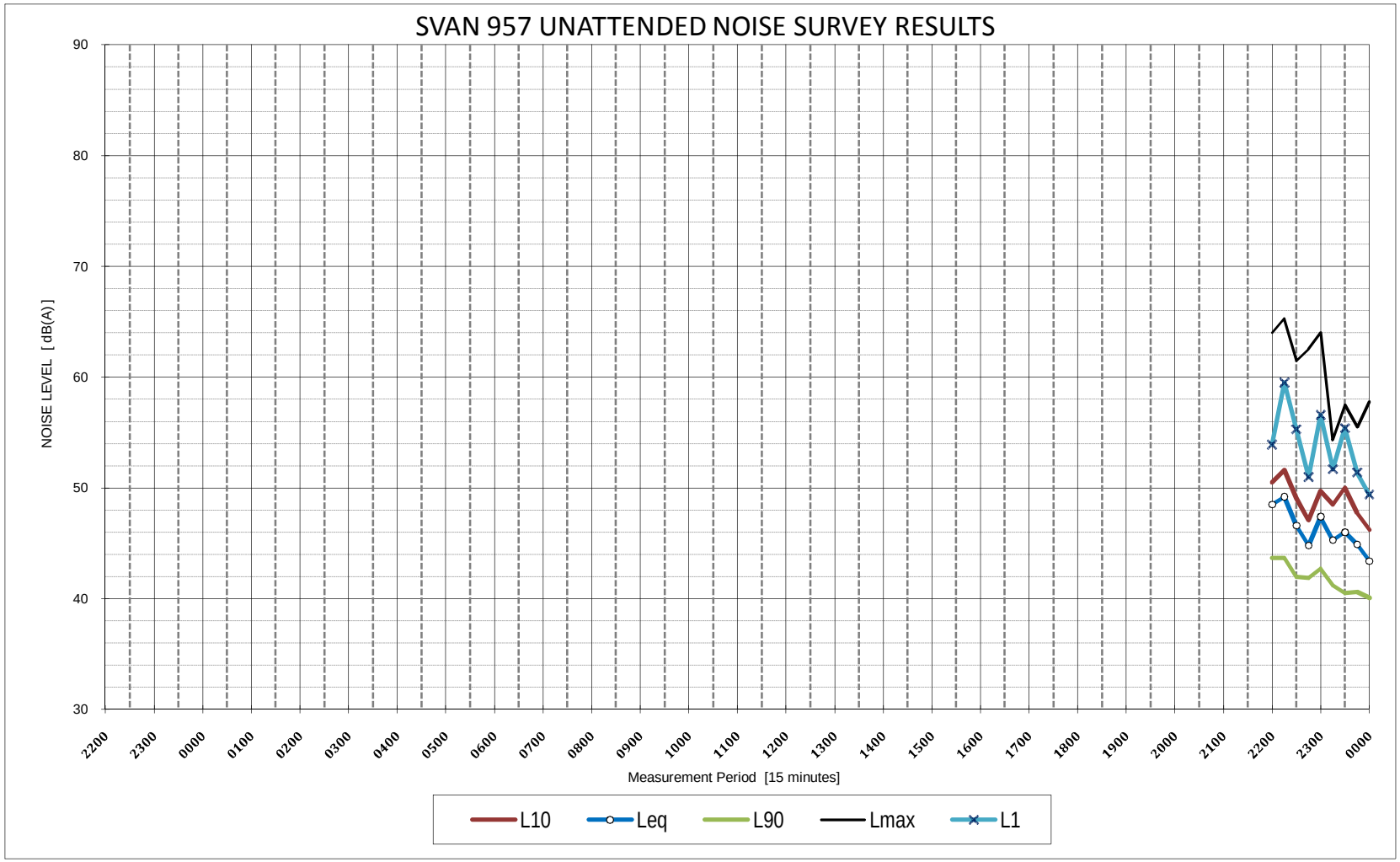
Leq 15 hrs	0700-2200	50	dB(A)
Leq 9 hrs	2200-0700	44	dB(A)
Leq 24 hrs	0000-2400	49	dB(A)
L10 18 hrs	0600-2400	51	dB(A)
max Leq 1 hr	0700-2200	52	dB(A)
max Leq 1 hr	2200-0700	47	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual 7 day average - [Lmax - Leq ≥ 15]	12

WEEKKLY SUMMARY

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	14	20	29	35	38	39	33	23	16	43
10% min L90 Evening	1800-2200	11	20	28	34	36	37	31	20	16	42
10% min L90 Night	2200-0700	8	15	24	31	32	33	26	18	16	38
10% min L90 Period	0000-0700	8	15	24	30	32	33	26	18	16	37
10% min L90 Period	0700-0000	12	19	28	34	36	37	30	20	16	41
Leq 15 hours	0700-2200	21	31	38	42	45	46	41	37	29	50
Leq 9 hours	2200-0700	17	23	32	37	39	40	35	31	24	44

DAY 1 ADDRESS: Location 2 - Vine St, Redfern DATE: Wednesday, 15 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800		dB(A)
L90 Evening	1800-2200		dB(A)
L90 Nighttime	2200-0700		dB(A)
Leq Daytime	0700-1800		dB(A)
Leq Evening	1800-2200		dB(A)
Leq Nighttime	2200-0700		dB(A)

TRAFFIC & MISC. NOISE METRICS

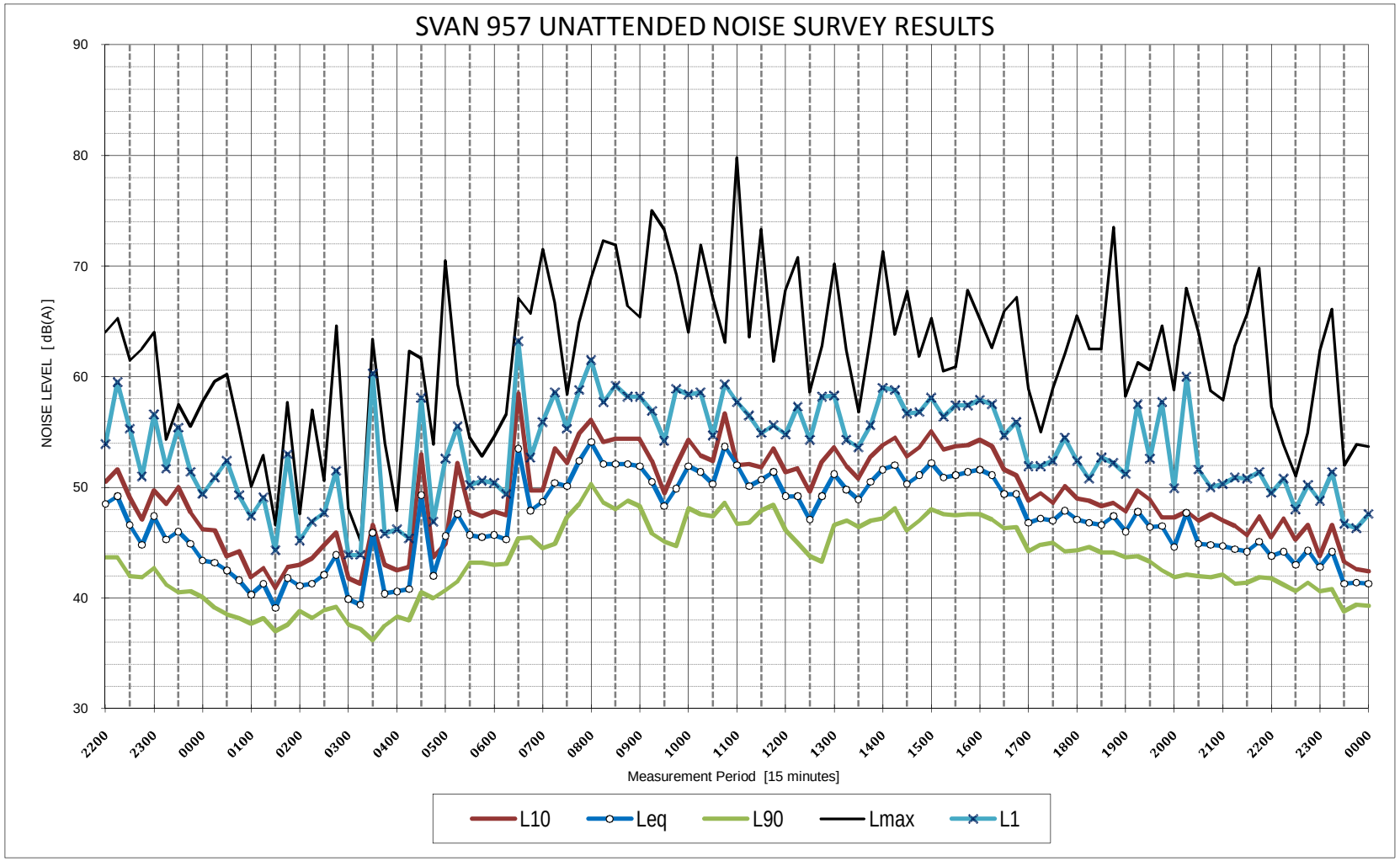
Leq 15 hours	0700-2200		dB(A)
Leq 9 hours	2200-0700		dB(A)
Leq 24 hours	0000-2400		dB(A)
L10 18 hours	0600-2400		dB(A)
max Leq 1 hour	0700-2200		dB(A)
max Leq 1 hour	2200-0700		dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800										
10% min L90 Evening	1800-2200										
10% min L90 Night	2200-0700										
10% min L90 Period	0000-0700										
10% min L90 Period	0700-0000										
Leq 15 hours	0700-2200										
Leq 9 hours	2200-0700										

DAY 2 ADDRESS: Location 2 - Vine St, Redfern DATE: Thursday, 16 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	45	dB(A)
L90 Evening	1800-2200	42	dB(A)
L90 Nighttime	2200-0700	37	dB(A)
Leq Daytime	0700-1800	51	dB(A)
Leq Evening	1800-2200	46	dB(A)
Leq Nighttime	2200-0700	46	dB(A)

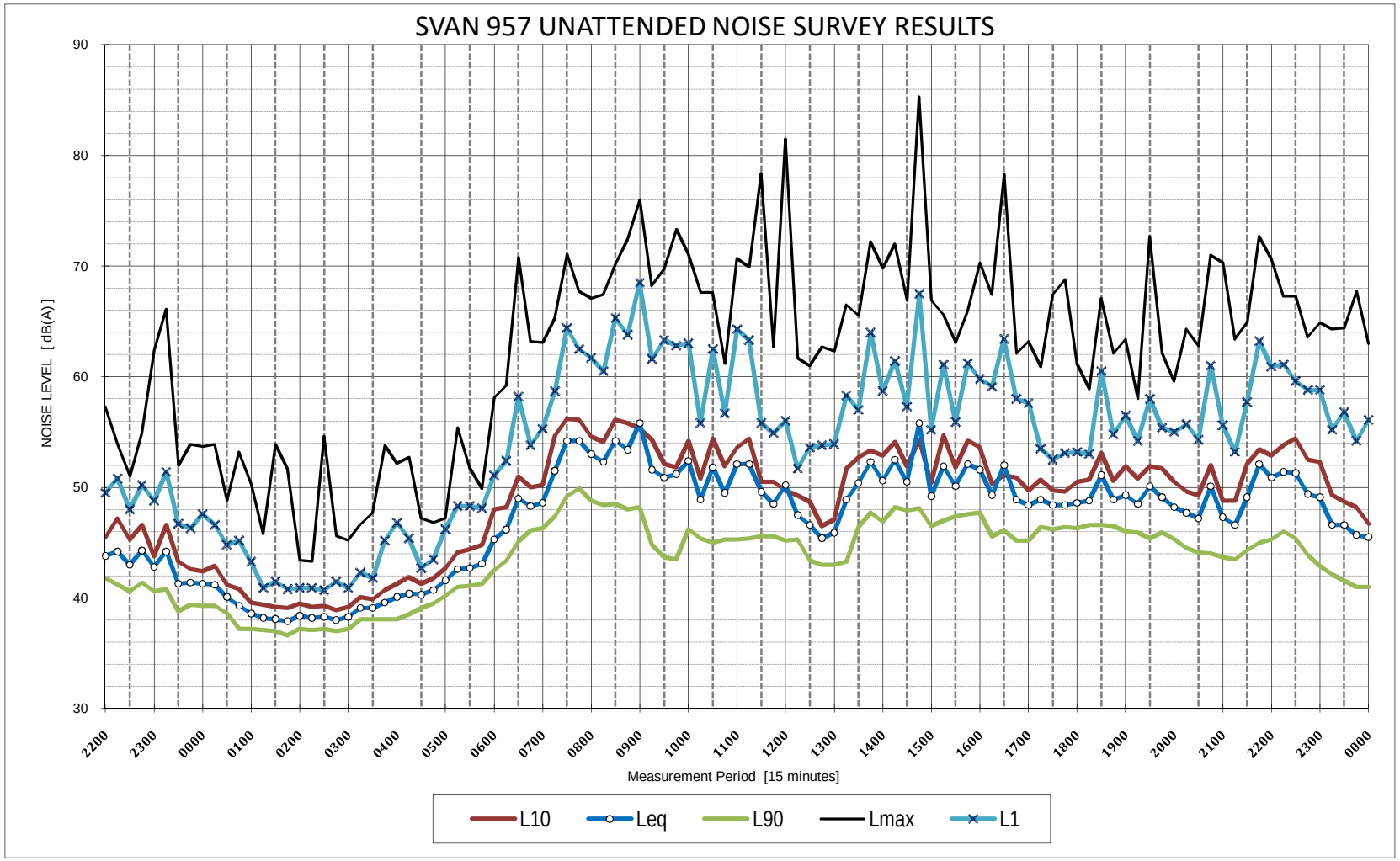
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	50	dB(A)
Leq 9 hours	2200-0700	46	dB(A)
Leq 24 hours	0000-2400	49	dB(A)
L10 18 hours	0600-2400	51	dB(A)
max Leq 1 hour	0700-2200	52	dB(A)
max Leq 1 hour	2200-0700	48	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	13

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	15	22	31	36	38	40	35	26	17	45
10% min L90 Evening	1800-2200	13	20	29	34	36	37	30	20	16	42
10% min L90 Night	2200-0700	8	15	23	30	31	32	28	21	16	37
10% min L90 Period	0000-0700	8	15	23	30	30	32	28	21	16	37
10% min L90 Period	0700-0000	13	20	30	34	35	36	30	20	16	41
Leq 15 hours	0700-2200	22	29	36	41	43	46	43	38	31	50
Leq 9 hours	2200-0700	17	23	30	36	38	41	39	36	30	46

DAY 3 ADDRESS: Location 2 - Vine St, Redfern DATE: Friday, 17 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	43	dB(A)
L90 Evening	1800-2200	44	dB(A)
L90 Nighttime	2200-0700	37	dB(A)
Leq Daytime	0700-1800	51	dB(A)
Leq Evening	1800-2200	49	dB(A)
Leq Nighttime	2200-0700	42	dB(A)

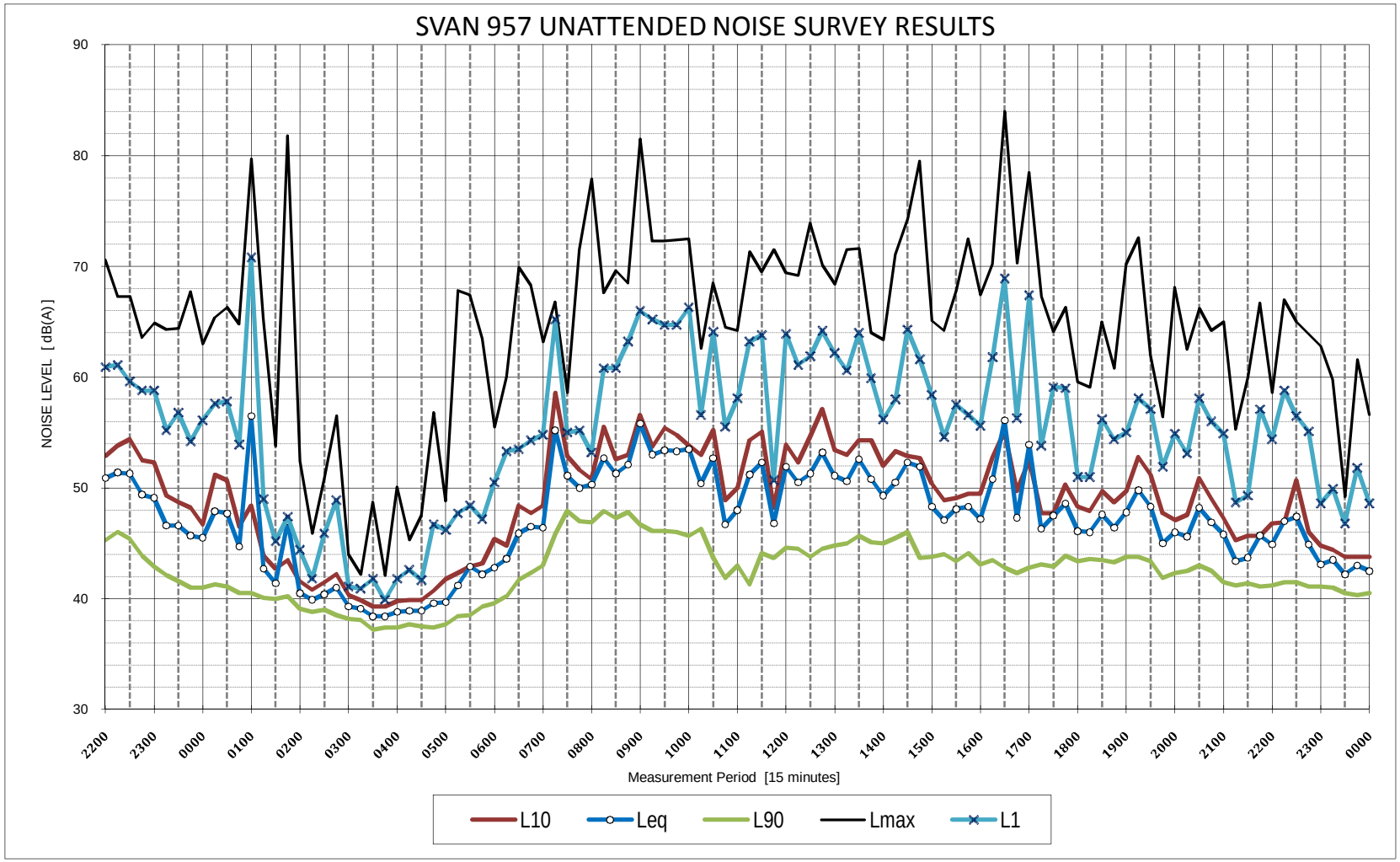
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	51	dB(A)
Leq 9 hours	2200-0700	42	dB(A)
Leq 24 hours	0000-2400	49	dB(A)
L10 18 hours	0600-2400	52	dB(A)
max Leq 1 hour	0700-2200	53	dB(A)
max Leq 1 hour	2200-0700	45	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	5

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	14	21	30	35	38	39	33	24	16	43
10% min L90 Evening	1800-2200	13	21	30	36	38	39	32	23	17	44
10% min L90 Night	2200-0700	8	16	23	30	31	32	26	18	16	37
10% min L90 Period	0000-0700	8	15	23	29	31	32	26	18	16	37
10% min L90 Period	0700-0000	13	21	29	35	38	38	32	23	16	43
Leq 15 hours	0700-2200	22	32	39	43	45	46	41	37	29	51
Leq 9 hours	2200-0700	18	24	31	35	37	38	33	29	21	43

DAY 4 ADDRESS: Location 2 - Vine St, Redfern DATE: Saturday, 18 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	43	dB(A)
L90 Evening	1800-2200	41	dB(A)
L90 Nighttime	2200-0700	37	dB(A)
Leq Daytime	0700-1800	51	dB(A)
Leq Evening	1800-2200	47	dB(A)
Leq Nighttime	2200-0700	47	dB(A)

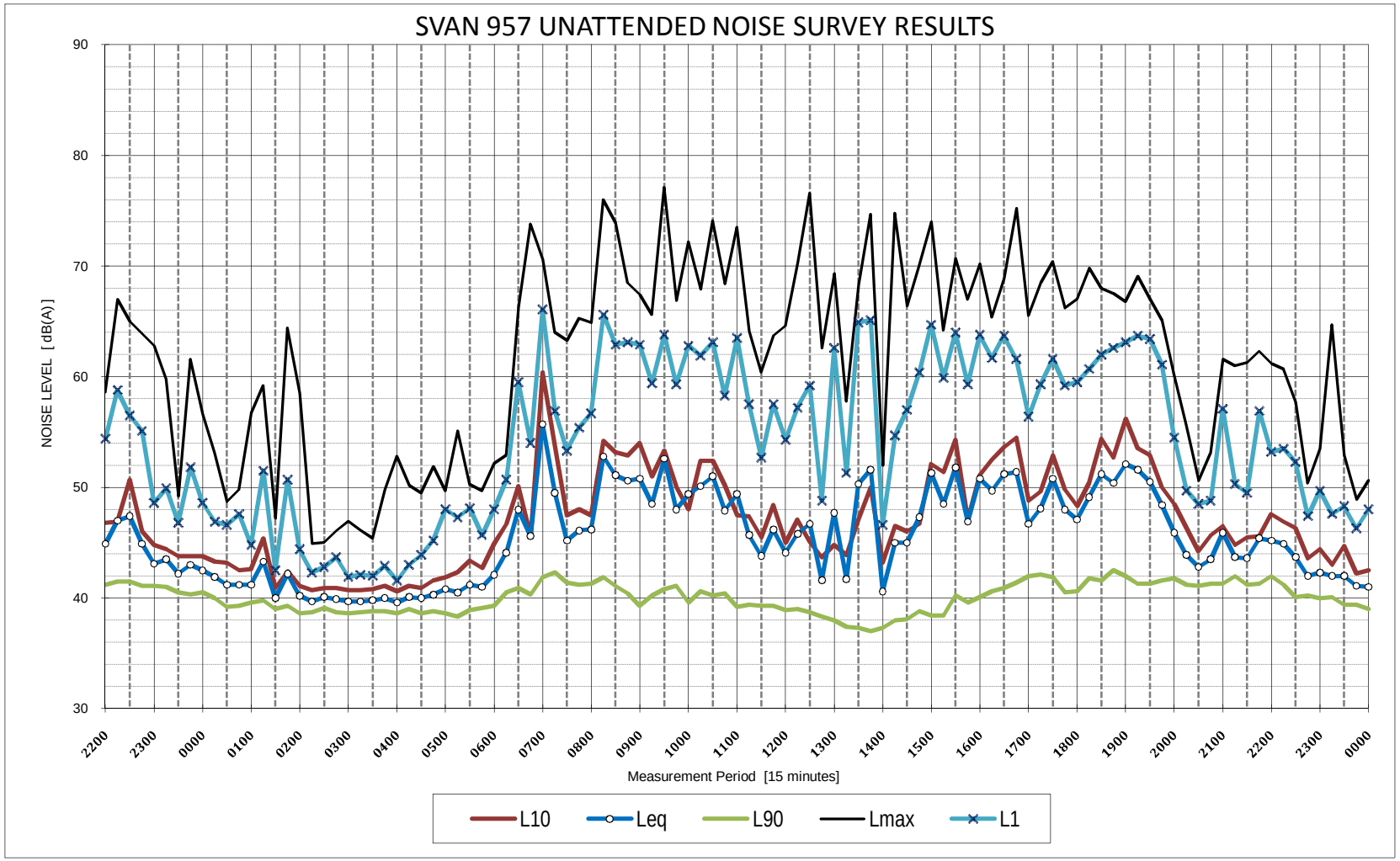
TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	51	dB(A)
Leq 9 hours	2200-0700	47	dB(A)
Leq 24 hours	0000-2400	49	dB(A)
L10 18 hours	0600-2400	51	dB(A)
max Leq 1 hour	0700-2200	52	dB(A)
max Leq 1 hour	2200-0700	51	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	22

		Frequency [Hz]									
Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	13	20	28	34	37	38	32	23	16	43
10% min L90 Evening	1800-2200	11	20	28	34	35	36	29	19	16	41
10% min L90 Night	2200-0700	8	16	24	31	32	32	25	18	16	37
10% min L90 Period	0000-0700	8	16	24	31	32	32	25	18	16	37
10% min L90 Period	0700-0000	12	20	28	34	35	37	29	19	16	41
Leq 15 hours	0700-2200	21	30	38	43	45	46	41	36	28	51
Leq 9 hours	2200-0700	18	24	34	40	42	41	36	31	22	47

DAY 5 ADDRESS: Location 2 - Vine St, Redfern DATE: Sunday, 19 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0800-1800	38	dB(A)
L90 Evening	1800-2200	41	dB(A)
L90 Nighttime	2200-0800	38	dB(A)
Leq Daytime	0800-1800	49	dB(A)
Leq Evening	1800-2200	48	dB(A)
Leq Nighttime	2200-0800	45	dB(A)

TRAFFIC & MISC. NOISE METRICS

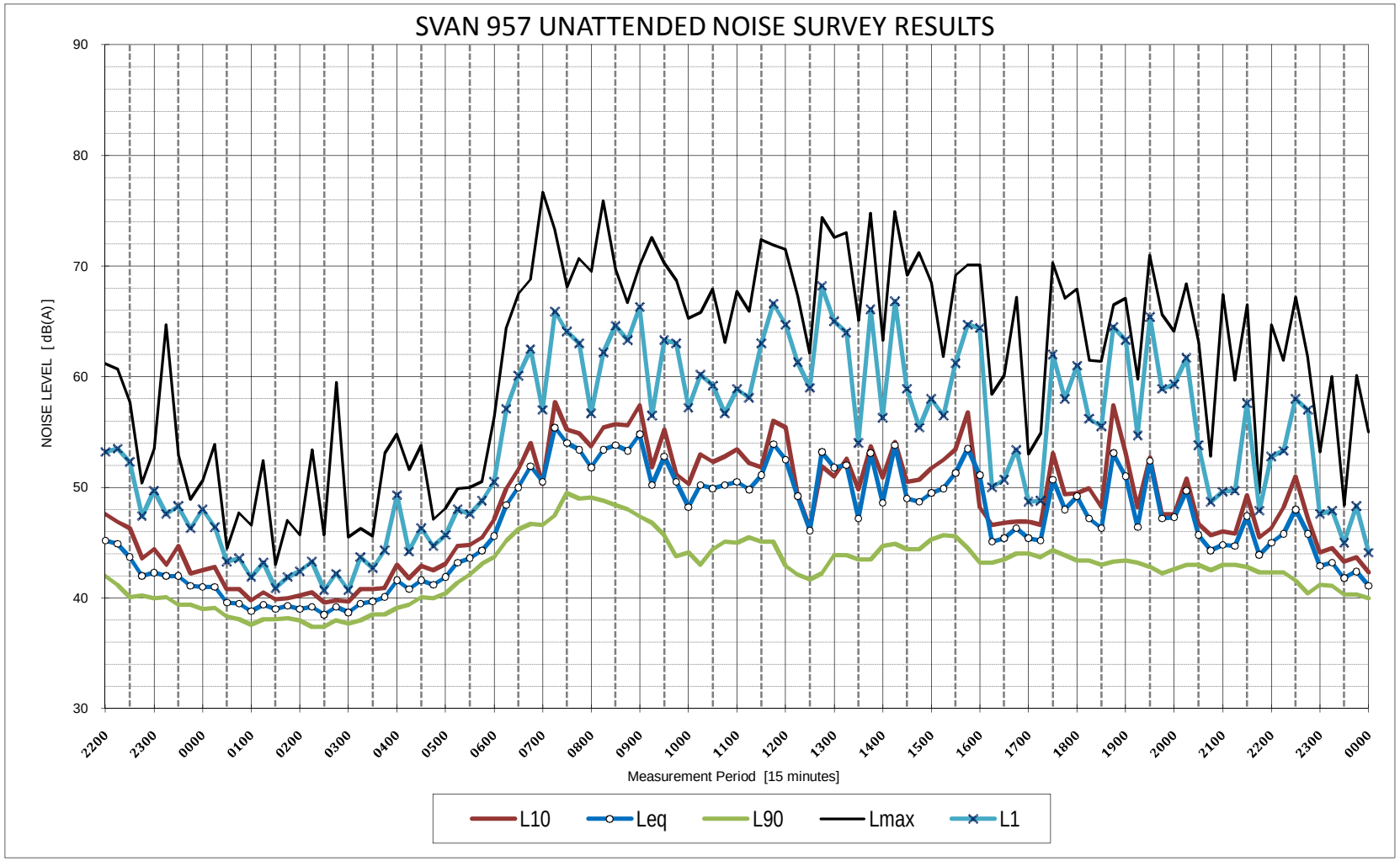
Leq 15 hours	0700-2200	49	dB(A)
Leq 9 hours	2200-0700	43	dB(A)
Leq 24 hours	0000-2400	48	dB(A)
L10 18 hours	0600-2400	49	dB(A)
max Leq 1 hour	0700-2200	51	dB(A)
max Leq 1 hour	2200-0700	46	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	12

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0800-1800	11	17	24	30	32	33	27	19	16	38
10% min L90 Evening	1800-2200	10	19	27	33	35	36	29	19	16	41
10% min L90 Night	2200-0800	8	16	25	31	33	34	27	18	16	38
10% min L90 Period	0000-0700	8	16	25	31	33	34	27	18	16	38
10% min L90 Period	0700-0000	10	17	24	31	32	33	28	19	16	38
Leq 15 hours	0700-2200	19	30	38	42	44	44	39	36	26	49
Leq 9 hours	2200-0700	18	23	31	36	37	38	32	28	20	43

DAY 6 ADDRESS: Location 2 - Vine St, Redfern DATE: Monday, 20 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	43	dB(A)
L90 Evening	1800-2200	42	dB(A)
L90 Nighttime	2200-0700	38	dB(A)
Leq Daytime	0700-1800	51	dB(A)
Leq Evening	1800-2200	48	dB(A)
Leq Nighttime	2200-0700	44	dB(A)

TRAFFIC & MISC. NOISE METRICS

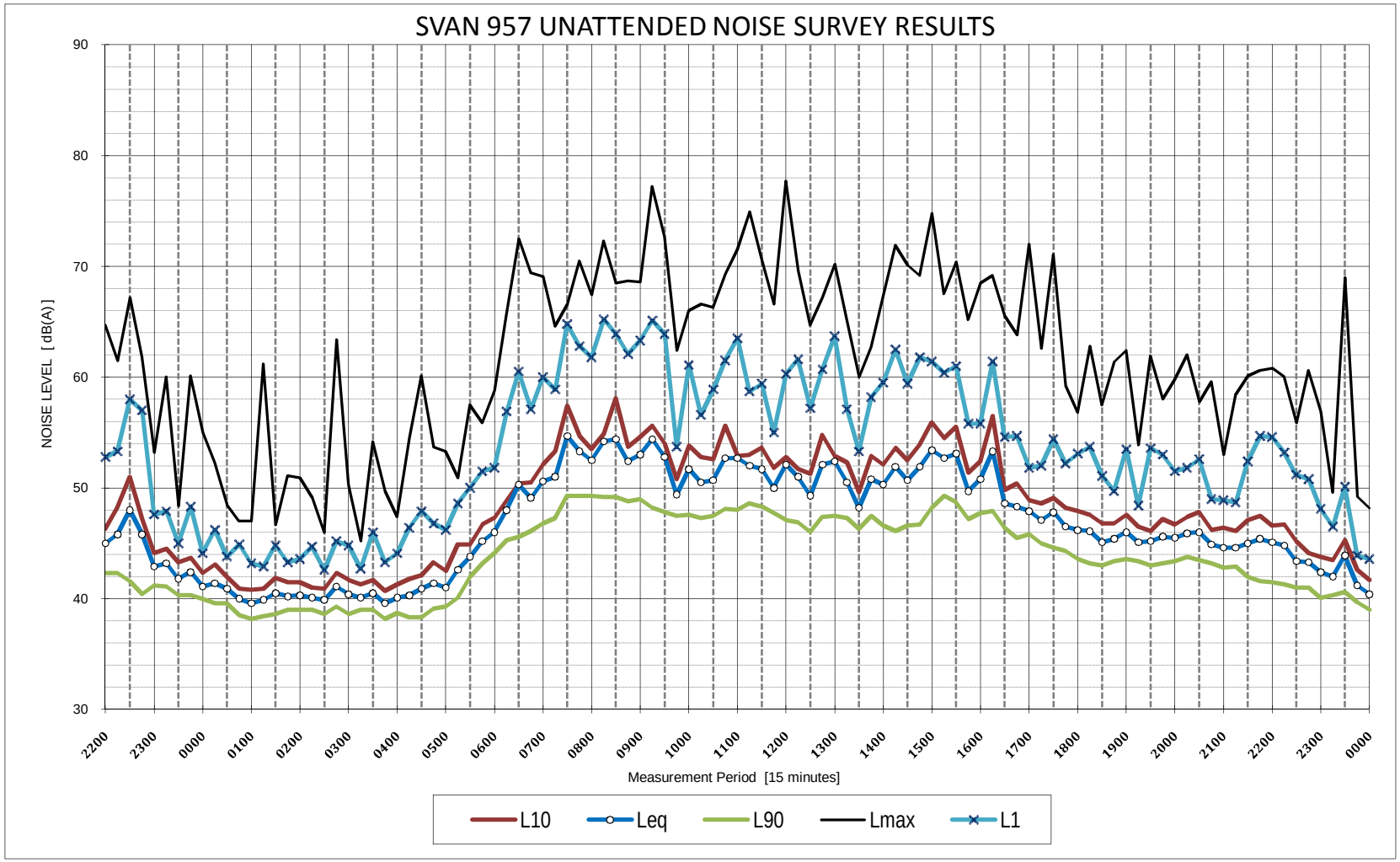
Leq 15 hours	0700-2200	51	dB(A)
Leq 9 hours	2200-0700	44	dB(A)
Leq 24 hours	0000-2400	49	dB(A)
L10 18 hours	0600-2400	51	dB(A)
max Leq 1 hour	0700-2200	53	dB(A)
max Leq 1 hour	2200-0700	45	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	7

Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	13	20	28	34	37	39	33	23	17	43
10% min L90 Evening	1800-2200	11	19	28	34	37	38	31	20	16	42
10% min L90 Night	2200-0700	8	15	24	30	32	33	26	18	16	38
10% min L90 Period	0000-0700	8	15	24	30	32	33	26	18	16	38
10% min L90 Period	0700-0000	11	19	28	33	36	37	31	20	16	42
Leq 15 hours	0700-2200	21	31	39	43	45	46	41	36	27	51
Leq 9 hours	2200-0700	17	23	31	37	39	39	31	26	18	44

DAY 7 ADDRESS: Location 2 - Vine St, Redfern DATE: Tuesday, 21 June 2011



AMBIENT NOISE METRICS

Descriptor	Period	Level	Units
L90 Daytime	0700-1800	46	dB(A)
L90 Evening	1800-2200	42	dB(A)
L90 Nighttime	2200-0700	38	dB(A)
Leq Daytime	0700-1800	52	dB(A)
Leq Evening	1800-2200	45	dB(A)
Leq Nighttime	2200-0700	44	dB(A)

TRAFFIC & MISC. NOISE METRICS

Leq 15 hours	0700-2200	51	dB(A)
Leq 9 hours	2200-0700	44	dB(A)
Leq 24 hours	0000-2400	49	dB(A)
L10 18 hours	0600-2400	51	dB(A)
max Leq 1 hour	0700-2200	53	dB(A)
max Leq 1 hour	2200-0700	47	dB(A)

Maximum noise events as defined in the Envirnmental Noise Management Manual [Lmax - Leq ≥ 15]	12

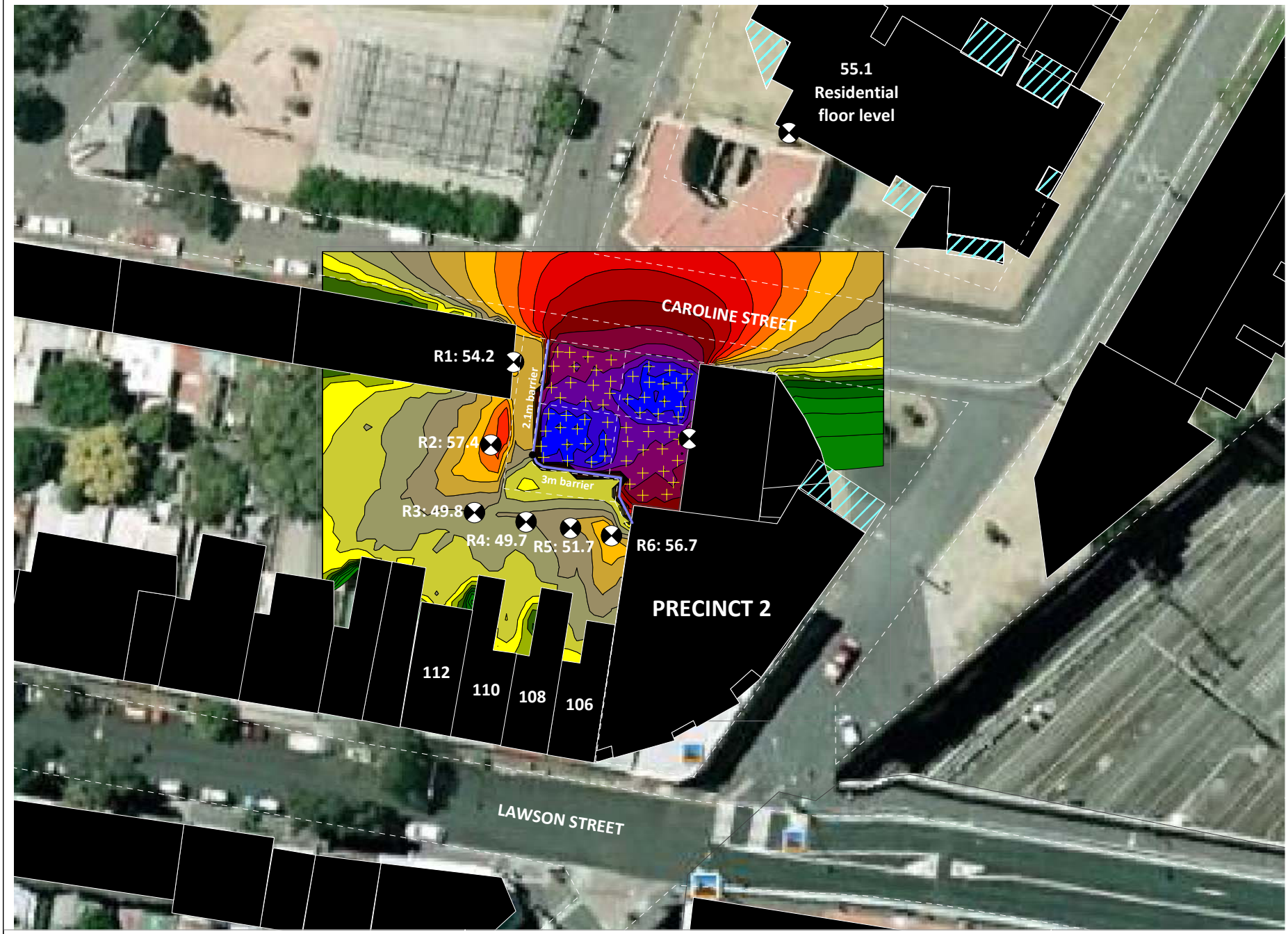
Frequency [Hz]

Descritpor	Period	31.5	63	125	250	500	1000	2000	4000	8000	Total A
10% min L90 Daytime	0700-1800	15	22	31	37	40	41	36	26	18	46
10% min L90 Evening	1800-2200	12	20	28	34	37	38	31	21	16	42
10% min L90 Night	2200-0700	8	15	25	31	33	34	26	19	16	38
10% min L90 Period	0000-0700	8	15	25	31	33	33	26	19	16	38
10% min L90 Period	0700-0000	11	19	28	34	36	37	30	21	16	41
Leq 15 hours	0700-2200	22	31	39	43	45	46	42	37	29	51
Leq 9 hours	2200-0700	17	23	31	37	38	39	33	28	21	44

APPENDIX C

APPENDIX C

APPENDIX C



**** NOISE SOURCES ****

~ 30 children aged 0-2 in outdoor playground area

~ 30 children aged 3-5 in outdoor playground area

NOTES:

1/ 3m high noise barrier to south property boundary

2/ 2.1m high noise barrier to west property boundary

3/ Noise levels shown are Leq 15 mins

4/ Noise contours at 1.5m above ground

PRINT DATE: 9th December 2011

VERSION: 2075 CCC v1

- Point Source
- Building
- Barrier
- 3D-Reflector
- Bridge
- Ground Absorption
- Contour Line
- Receiver
- Calculation Area

- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

KOIKAS ACOUSTICS PTY LTD
CONSULTANTS IN NOISE & VIBRATION
ABN 12 058 524 771 Commercial 1 (Unit 27), 637 - 645 Forest Road, Bexley 2207
E- mail Nick@KoikasAcoustics.com F (02) 9587 5337 P (02) 9587 9702

JOB NUMBER: 2075
CLIENT: DeiCorp Construction Pty Ltd
SITE ADDRESS: Pemulwuy Project, Redfern
ASSESSED TO: NSW EPA Industrial Noise Policy
LIMITING CRITERIA: 60dB(A) Daytime

N
W E
S

**** NOISE SOURCES ****

~ Noise egress through building facade of 170 patrons to each floor level of the Gallery / Multi-function Room

~ Noise egress of music / amplified speech from a PA system. Max indoor noise level of 80dB(A) at glazed facade.

NOTES:

1/ All windows/doors assumed closed

2/ 6.38mm laminated glass (minimum)

3/ Noise levels shown are L10 15 mins

4/ Noise contours at Level 3 height

PRINT DATE: 13th December 2011

VERSION: 2075 LAB v1

- vert. Area Source
- Building
- Barrier
- 3D-Reflector
- Bridge
- Ground Absorption
- Contour Line
- Receiver
- Calculation Area

- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

KOIKAS ACOUSTICS PTY LTD
CONSULTANTS IN NOISE & VIBRATION
ABN 12 058 524 771 Commercial 1 (Unit 27), 637 - 645 Forest Road, Bexley 2207
E- mail Nick@KoikasAcoustics.com F (02) 9587 5337 P (02) 9587 9702

JOB NUMBER: 2075
CLIENT: DeiCorp Construction Pty Ltd
SITE ADDRESS: Pemulwuy Project, Redfern
ASSESSED TO: Standard LAB noise conditions
LIMITING CRITERIA: Background + 5 (Daytime)
Background + 0 & Inaudibility (Night)

N
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APPENDIX D

APPENDIX D

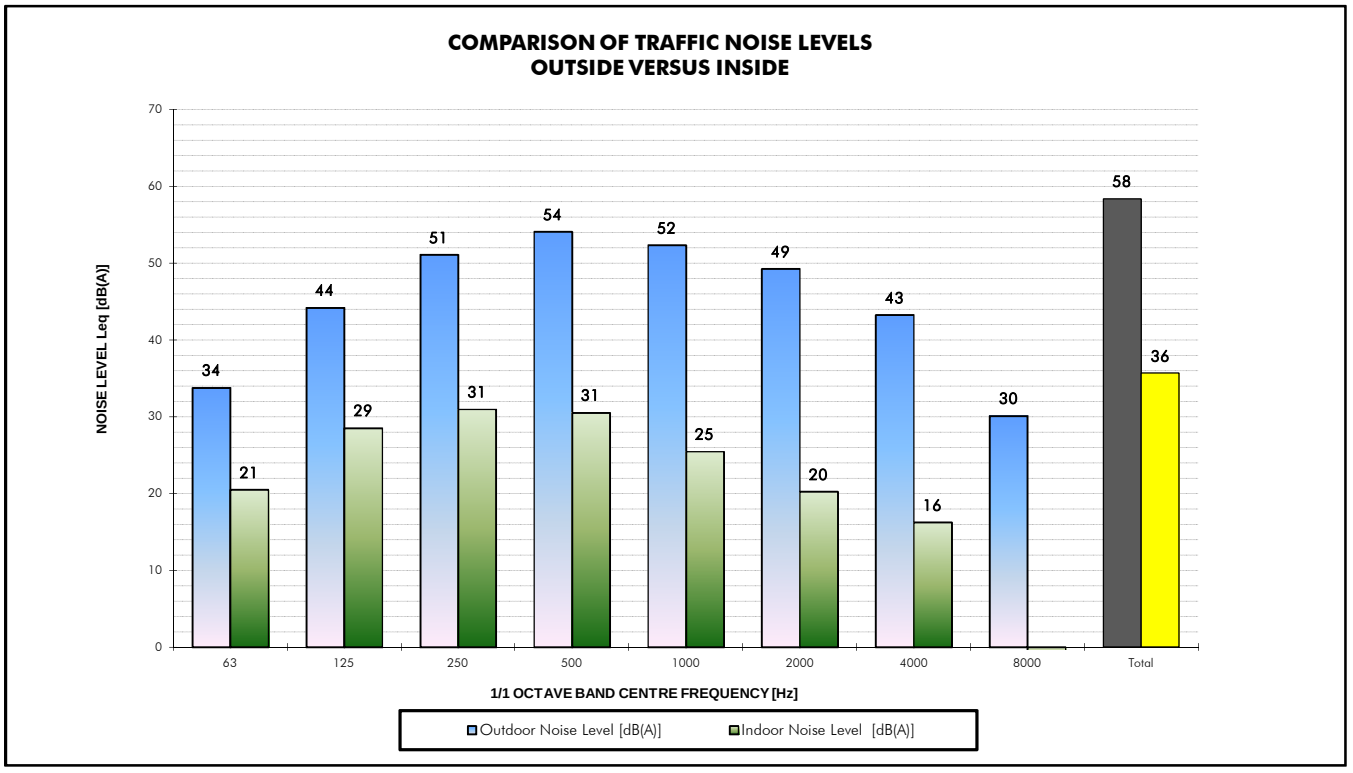
APPENDIX D

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 1 Living								
ROOM DIMENSIONS	Height	3	Width	5.4	Length	6.9	Surface	148.3	Volume	111.8	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	19	21	24	27	30	33	36	36		

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	2.7
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	13.5
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.8***	***20.8***	***24.8***	***27.8***	***31.8***	***32.8***	***29.8***	***33.8***	***16.2***
Noise Level Spectrum for THIS Facade		0	34	44	51	54	52	49	43	30	58.4
Noise Transmitted Through Facade			20.2	28.3	30.6	30.1	23.9	19.4	16.0	-1.1	35.2
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	1.2
Standard door + Raven RP47 Perimeter Seal + RP38 Drop Seal rebated	416	**26**	22	25	27	29	27	31	34	36	2.4
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***23.7***	***26.7***	***28.7***	***30.7***	***28.8***	***32.8***	***35.7***	***37.7***	***3.6***
Noise Level Spectrum for THIS Facade		0	34	44	51	54	52	49	43	30	58.4
Noise Transmitted Through Facade			8.8	15.9	20.1	20.6	20.4	12.9	3.6	-11.6	26.0
Facade Description - E	*ID*	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0

Total Surface Area Exposed to Noise.....	.....								19.8
Composite Transmission Loss	19.3	21.4	25.3	28.2	31.1	32.8	30.4	34.3	
Indoor Noise Level	**20.5**	**28.5**	**31.0**	**30.5**	**25.5**	**20.3**	**16.3**	**-0.7**	**35.7**



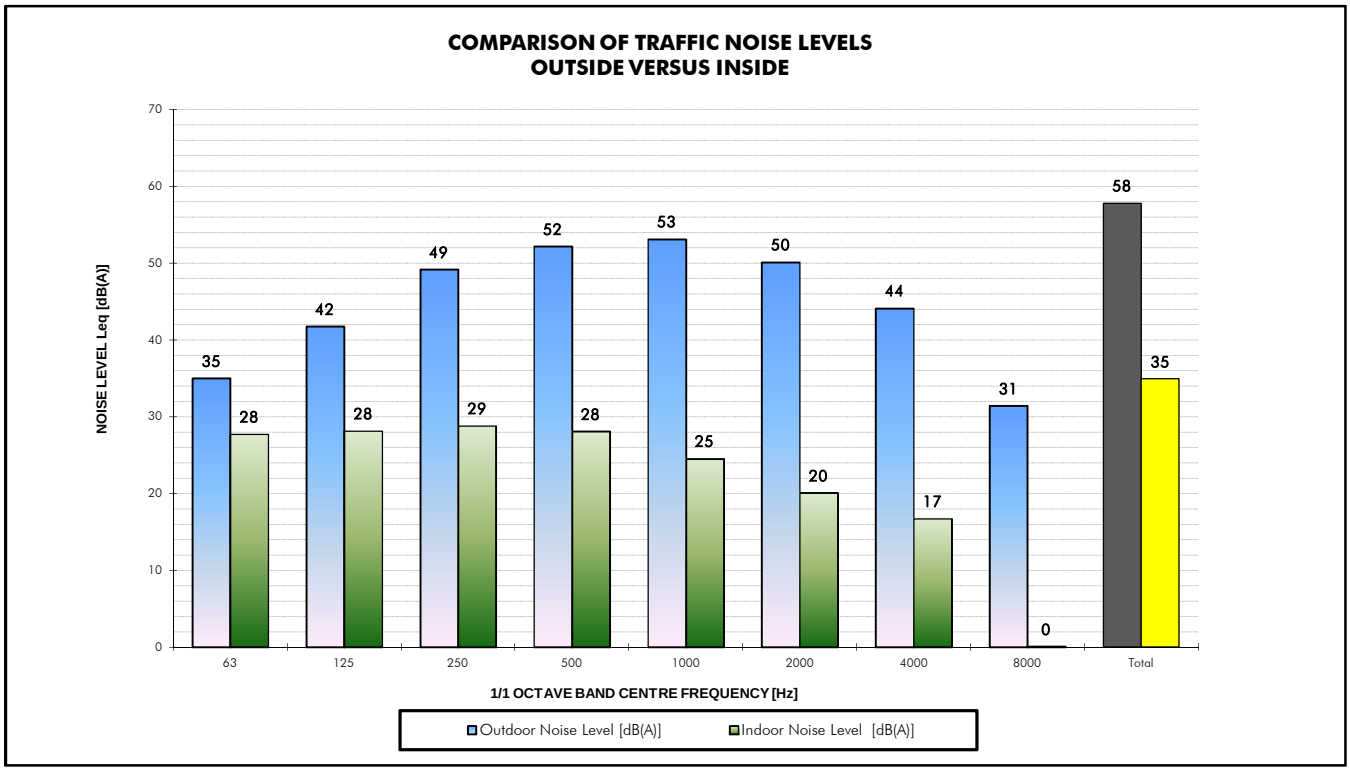
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 1 Apartment Living								
ROOM DIMENSIONS	Height	3	Width	5.16	Length	8.6	Surface	171.3	Volume	133.1	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	23	25	29	32	36	39	43	43		

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	15
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***15***
Noise Level Spectrum for THIS Facade		0	35	42	49	52	53	50	44	31	57.8
Noise Transmitted Through Facade			4.1	5.5	5.4	4.9	2.4	-2.1	-4.4	-21.1	11.9
Facade Description - B	*ID*	**south facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	15.48
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***15.48***
Noise Level Spectrum for THIS Facade		0	35	42	49	52	53	50	44	31	57.8
Noise Transmitted Through Facade			21.2	25.7	28.5	28.0	24.5	20.1	16.7	0.0	33.6
Facade Description - C	*ID*	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	
Standard door + Raven RP47 Perimeter Seal + RP38 Drop Seal rebated	416	**26**	22	25	27	29	27	31	34	36	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	*ID*	**Roof**									
0.45 mm Steel Roof, 250 AG + 100 f/g + 13 PB	39	**43**	12	21	34	41	47	50	47	50	44.376
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***12.0***	***21.0***	***34.0***	***41.0***	***47.0***	***50.0***	***47.0***	***50.0***	***44.376***
Noise Level Spectrum for THIS Facade		0	30	37	43	44	43	38	30	10	48.7
Noise Transmitted Through Facade			26.6	24.5	16.6	10.4	2.6	-6.0	-11.0	-33.8	29.0

Total Surface Area Exposed to Noise.....	.....								74.9
Composite Transmission Loss	13.9	21.7	29.7	33.4	37.5	38.6	35.6	39.6	
Indoor Noise Level	**27.7**	**28.2**	**28.8**	**28.1**	**24.5**	**20.1**	**16.7**	**0.1**	**34.9**



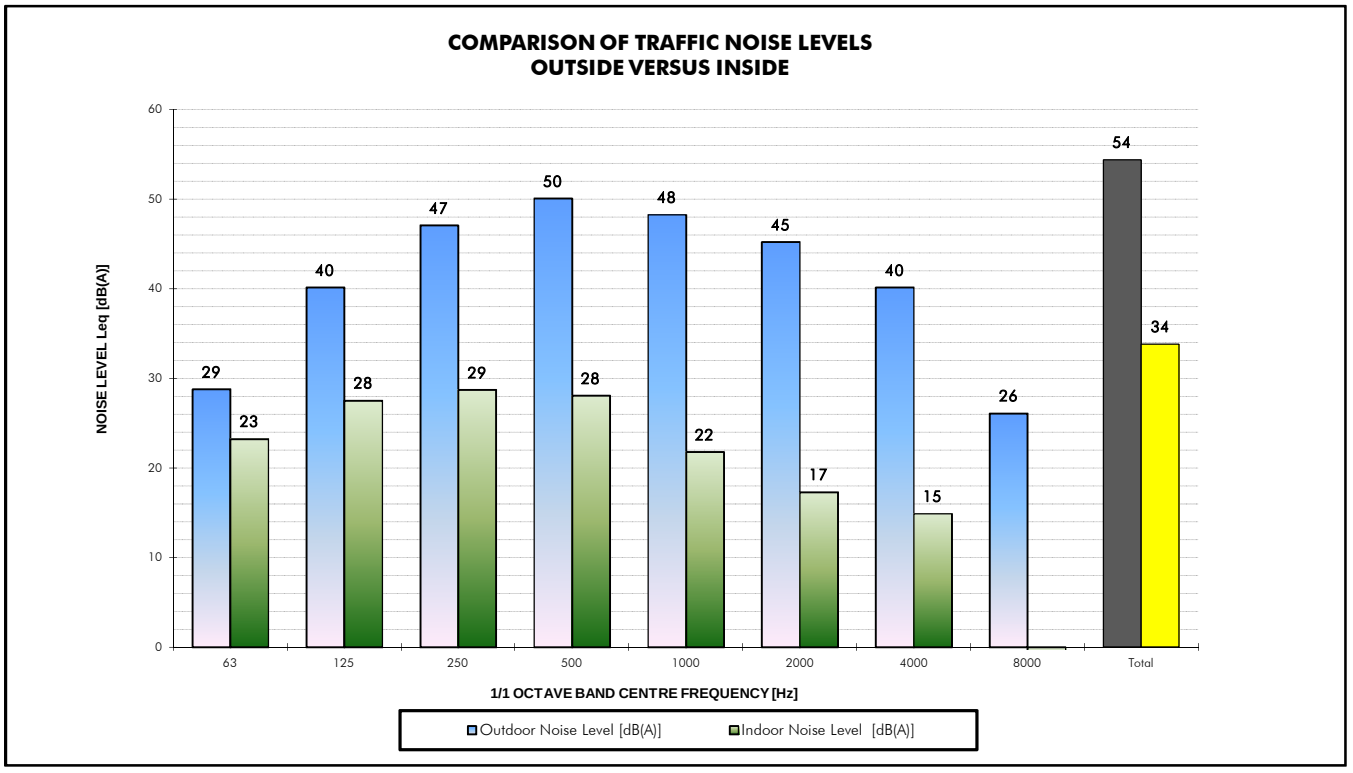
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 1 Bedroom								
ROOM DIMENSIONS	Height	3	Width	3	Length	3.5	Surface	60.0	Volume	31.5	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.4 SEC	*0.4*	8	9	10	11	13	14	15	15		

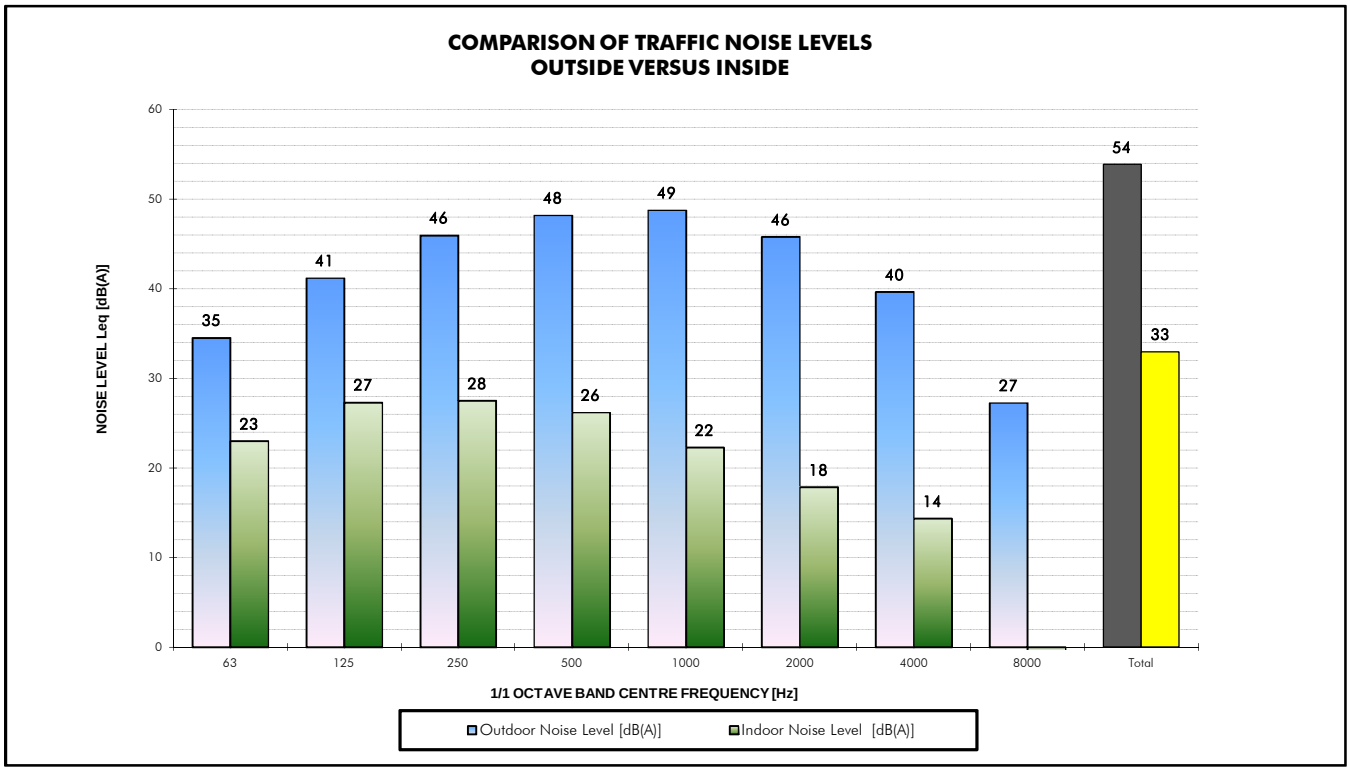
EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	0
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	9
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***9***
Noise Level Spectrum for THIS Facade		0	29	40	47	50	48	45	40	26	54.4
Noise Transmitted Through Facade			17.2	26.2	28.6	28.0	21.8	17.3	14.9	-3.2	33.1
Facade Description - D	*ID*	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	*ID*	**Roof**									
0.45 mm Steel Roof, 250 AG + 100 f/g + 13 PB	39	**43**	12	21	34	41	47	50	47	50	10.2
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***12.0***	***21.0***	***34.0***	***41.0***	***47.0***	***50.0***	***47.0***	***50.0***	***10.2***
Noise Level Spectrum for THIS Facade		0	27	36	43	45	44	40	34	17	49.5
Noise Transmitted Through Facade			22.0	21.7	14.7	9.6	1.7	-5.9	-9.2	-28.7	25.4

Total Surface Area Exposed to Noise.....	.....								19.2
Composite Transmission Loss	13.9	20.5	26.8	30.1	34.2	35.2	32.2	36.2	
Indoor Noise Level	**23.3**	**27.5**	**28.7**	**28.1**	**21.8**	**17.3**	**14.9**	**-3.2**	**33.8**



DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 2 Retail 4								
ROOM DIMENSIONS	Height	5.8	Width	17.2	Length	9.7	Surface	645.7	Volume	967.7	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.7 SEC	***0.7***	145	156	178	200	223	245	267	267		
EXTERNAL ELEMENTS	**STC/Rw**				**TRANSMISSION LOSS [dB]**						**Area [m2]**
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	47.56
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***47.56***
Noise Level Spectrum for THIS Facade		0	35	41	46	48	49	46	40	27	53.9
Noise Transmitted Through Facade			17.7	22.0	22.2	20.9	17.1	12.7	9.1	-7.2	27.7
Facade Description - C	*ID*	**east facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	110.2
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***110.2***
Noise Level Spectrum for THIS Facade		0	35	41	46	48	49	46	40	27	53.9
Noise Transmitted Through Facade			21.4	25.7	25.9	24.6	20.7	16.3	12.8	-3.6	31.3
Facade Description - D	*ID*	**north facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	19.14
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***19.14***
Noise Level Spectrum for THIS Facade		0	27	33	37	37	34	28	20	4	42.1
Noise Transmitted Through Facade			6.0	9.5	9.6	6.1	-1.7	-9.1	-14.5	-34.3	14.3
Facade Description - E	*ID*	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Total Surface Area Exposed to Noise.....											176.9
Composite Transmission Loss			18.0	20.0	24.0	27.0	31.0	32.0	29.0	33.0	
Indoor Noise Level			**23.0**	**27.3**	**27.5**	**26.2**	**22.3**	**17.9**	**14.4**	**-2.0**	**33.0**



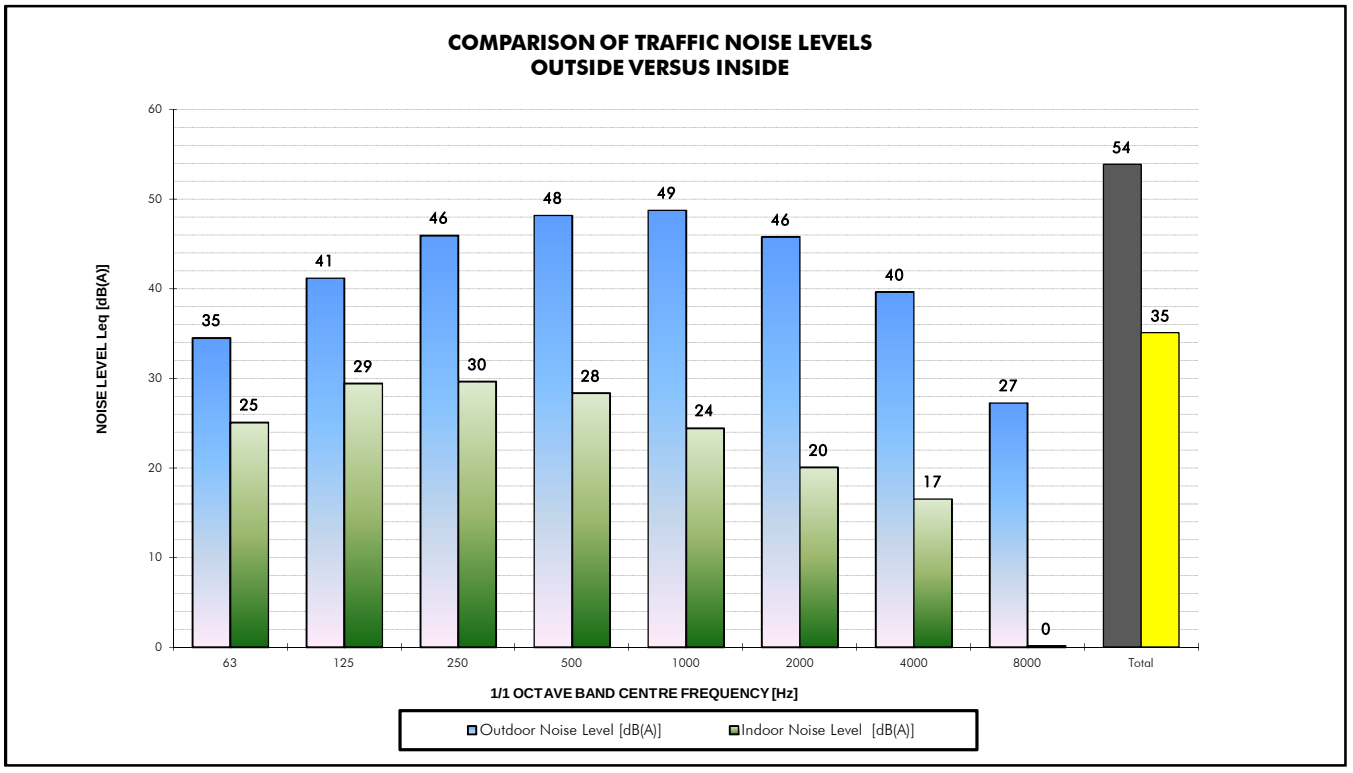
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 2 CCC Staff Room								
ROOM DIMENSIONS	Height	3	Width	6.5	Length	3.3	Surface	101.7	Volume	64.4
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	Leq	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.7 SEC	***0.7***	10	10	12	13	15	16	18	18	

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	ID	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	ID	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	ID	**east facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	17.4
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***17.4***
Noise Level Spectrum for THIS Facade		0	35	41	46	48	49	46	40	27	53.9
Noise Transmitted Through Facade			25.1	29.4	29.6	28.4	24.5	20.1	16.5	0.2	35.1
Facade Description - D	ID	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	ID	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0

Total Surface Area Exposed to Noise.....	.....								17.4
Composite Transmission Loss	18.0	20.0	24.0	27.0	31.0	32.0	29.0	33.0	
Indoor Noise Level	**25.1**	**29.4**	**29.6**	**28.4**	**24.5**	**20.1**	**16.5**	**0.2**	**35.1**



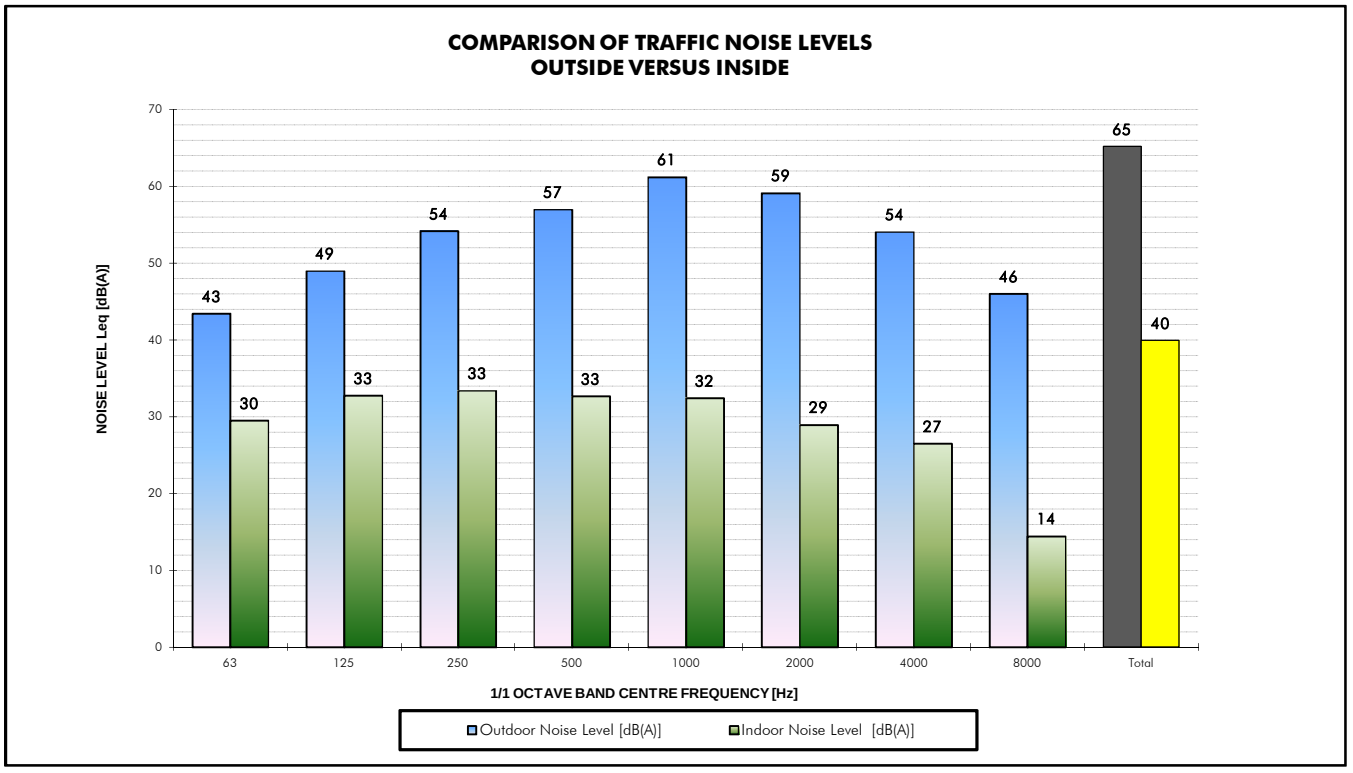
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 2 Retail 1								
ROOM DIMENSIONS	Height	4	Width	6.5	Length	20.5	Surface	482.5	Volume	533.0
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.7 SEC	***0.7***	80	86	98	110	123	135	147	147	

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	51.6
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***51.6***
Noise Level Spectrum for THIS Facade		0	43	49	54	57	61	59	54	46	65.2
Noise Transmitted Through Facade			29.5	32.8	33.4	32.7	32.5	29.0	26.5	14.5	39.9
Facade Description - C	*ID*	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - D	*ID*	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	*ID*	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0

Total Surface Area Exposed to Noise.....	.....								51.6
Composite Transmission Loss	18.0	20.0	24.0	27.0	31.0	32.0	29.0	33.0	
Indoor Noise Level	**29.5**	**32.8**	**33.4**	**32.7**	**32.5**	**29.0**	**26.5**	**14.5**	**39.9**

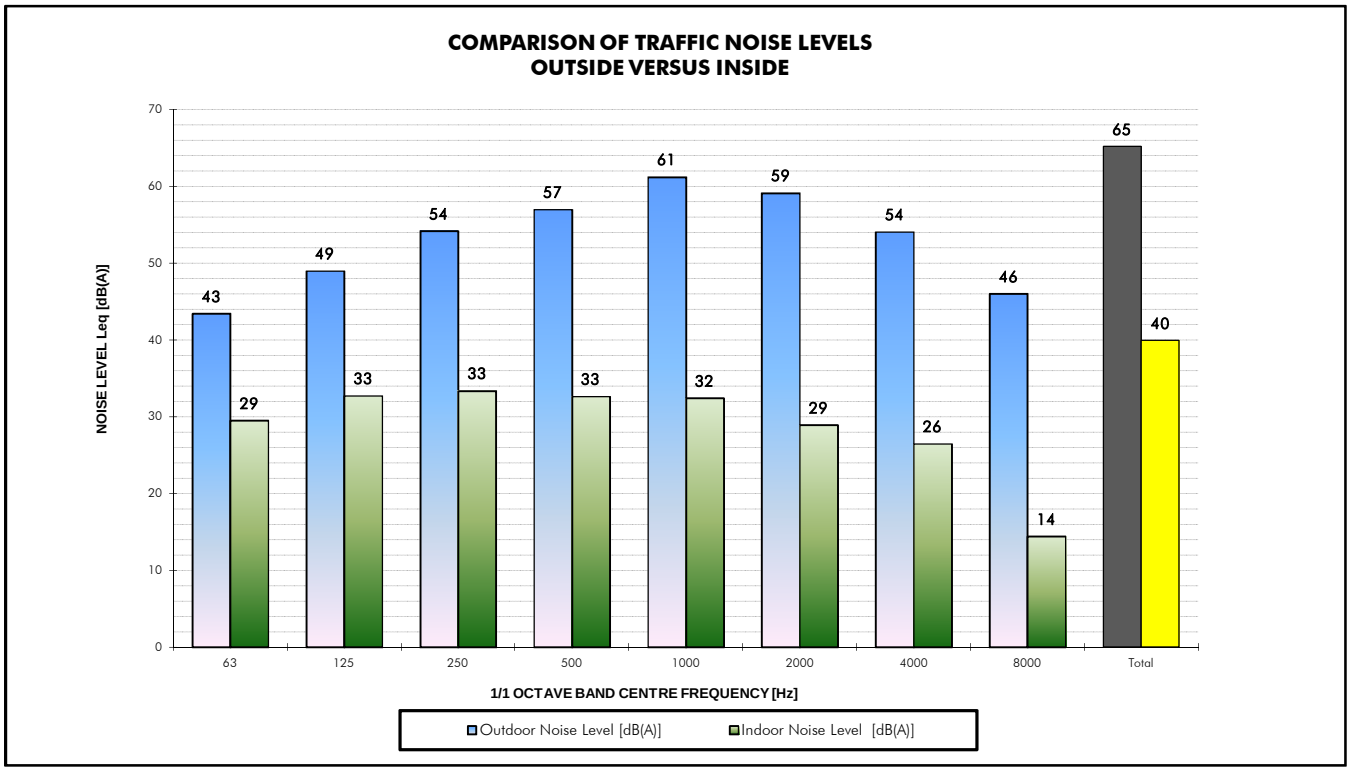


DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 2 Retail 2								
ROOM DIMENSIONS	Height	4.5	Width	11.8	Length	10.1	Surface	435.5	Volume	536.3
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	Leq	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.7 SEC	*0.7*	80	86	99	111	123	136	148	148	

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	ID	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	ID	**south facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	51.6
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***51.6***
Noise Level Spectrum for THIS Facade		0	43	49	54	57	61	59	54	46	65.2
Noise Transmitted Through Facade			29.5	32.7	33.4	32.6	32.4	28.9	26.5	14.4	39.9
Facade Description - C	ID	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - D	ID	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	ID	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0

Total Surface Area Exposed to Noise.....	.....								51.6
Composite Transmission Loss	18.0	20.0	24.0	27.0	31.0	32.0	29.0	33.0	
Indoor Noise Level	**29.5**	**32.7**	**33.4**	**32.6**	**32.4**	**28.9**	**26.5**	**14.4**	**39.9**

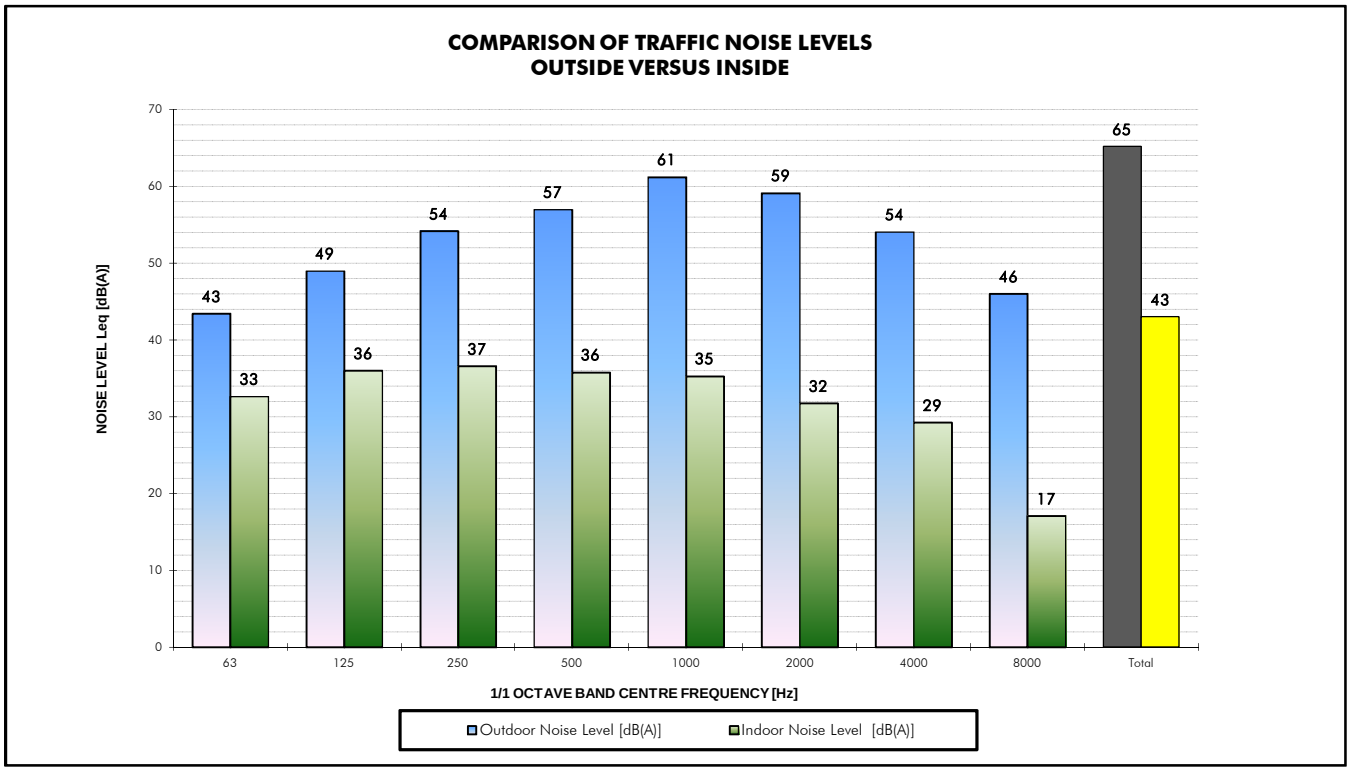


DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 2 Retail 3								
ROOM DIMENSIONS	Height	5	Width	6.5	Length	7.5	Surface	237.5	Volume	243.8
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	Leq	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.7 SEC	***0.7***	36	39	45	50	56	62	67	67	

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	ID	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	ID	**south facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	43
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***43***
Noise Level Spectrum for THIS Facade		0	43	49	54	57	61	59	54	46	65.2
Noise Transmitted Through Facade			32.1	35.4	36.0	35.3	35.1	31.6	29.1	17.1	42.5
Facade Description - C	ID	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - D	ID	**north facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	41
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***41***
Noise Level Spectrum for THIS Facade		0	35	41	46	48	49	46	40	27	53.9
Noise Transmitted Through Facade			23.1	27.4	27.6	26.3	22.4	18.0	14.5	-1.9	33.0
Facade Description - E	ID	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0

Total Surface Area Exposed to Noise.....	.....								84.0
Composite Transmission Loss	18.0	20.0	24.0	27.0	31.0	32.0	29.0	33.0	
Indoor Noise Level	**32.6**	**36.0**	**36.6**	**35.8**	**35.3**	**31.8**	**29.3**	**17.1**	**43.0**



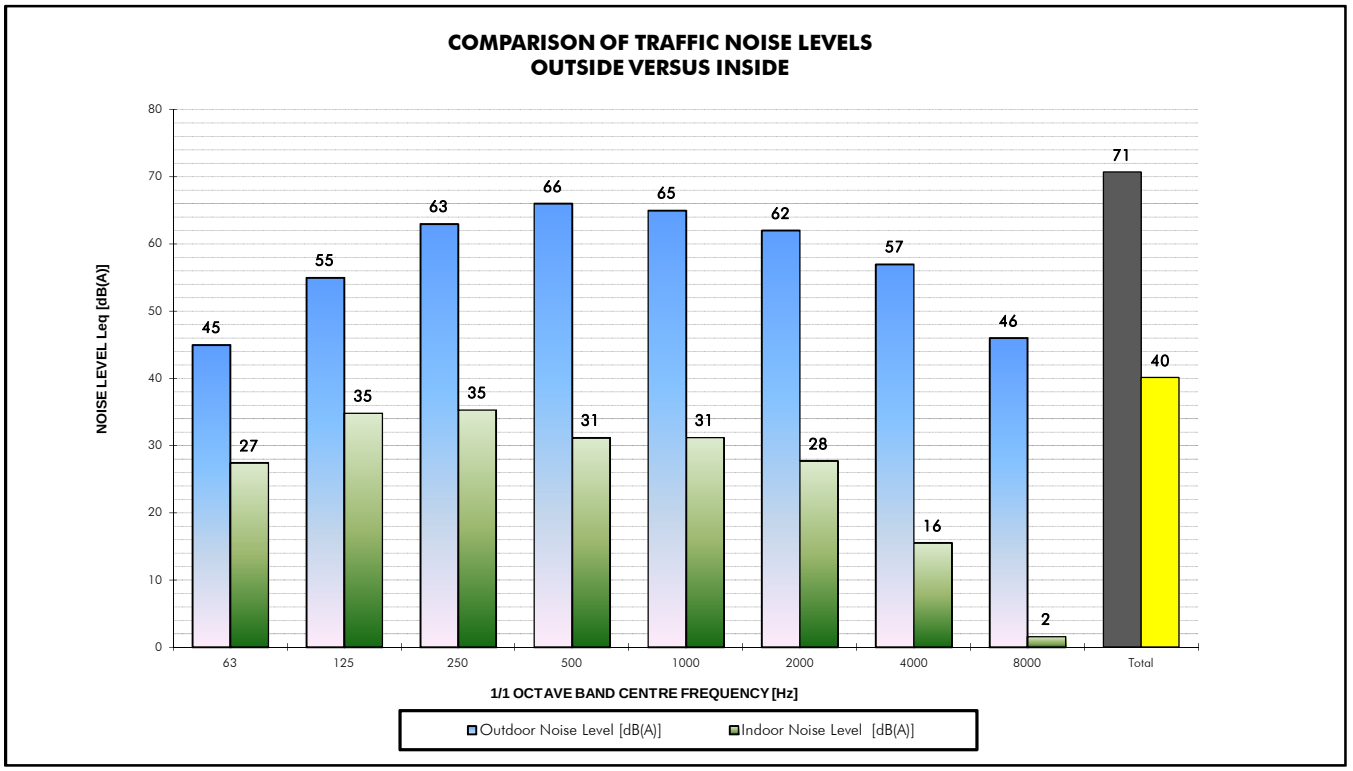
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 Level 4 Living								
ROOM DIMENSIONS	Height	3	Width	6	Length	4.3	Surface	113.4	Volume	77.4	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	13	15	17	19	21	23	25	25		

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	11.5
10.38 mm lam awning Al window - Architectural Window Systems P/L	274	**36**	21	23	30	37	35	35	45	47	6.5
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***25.1***	***27.3***	***34.3***	***41.1***	***39.3***	***39.3***	***47.5***	***50.1***	***18***
Noise Level Spectrum for THIS Facade		0	45	55	63	66	65	62	57	46	70.6
Noise Transmitted Through Facade			27.1	34.7	35.1	30.8	31.1	27.6	14.1	0.5	39.9
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	12.9
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***12.9***
Noise Level Spectrum for THIS Facade		0	45	55	63	66	65	62	57	46	70.6
Noise Transmitted Through Facade			15.8	20.5	20.9	20.4	15.9	11.5	10.1	-4.9	26.5
Facade Description - E	*ID*	**Roof**									
150 mm thick concrete ceiling/roof	20	**55**	42	41	42	50	58	65	71	74	25.8
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***42.0***	***41.0***	***42.0***	***50.0***	***58.0***	***65.0***	***71.0***	***74.0***	***25.8***
Noise Level Spectrum for THIS Facade		0	38	46	52	53	52	47	38	23	57.9
Noise Transmitted Through Facade			4.8	13.5	17.9	10.4	0.9	-11.5	-26.8	-44.8	20.0

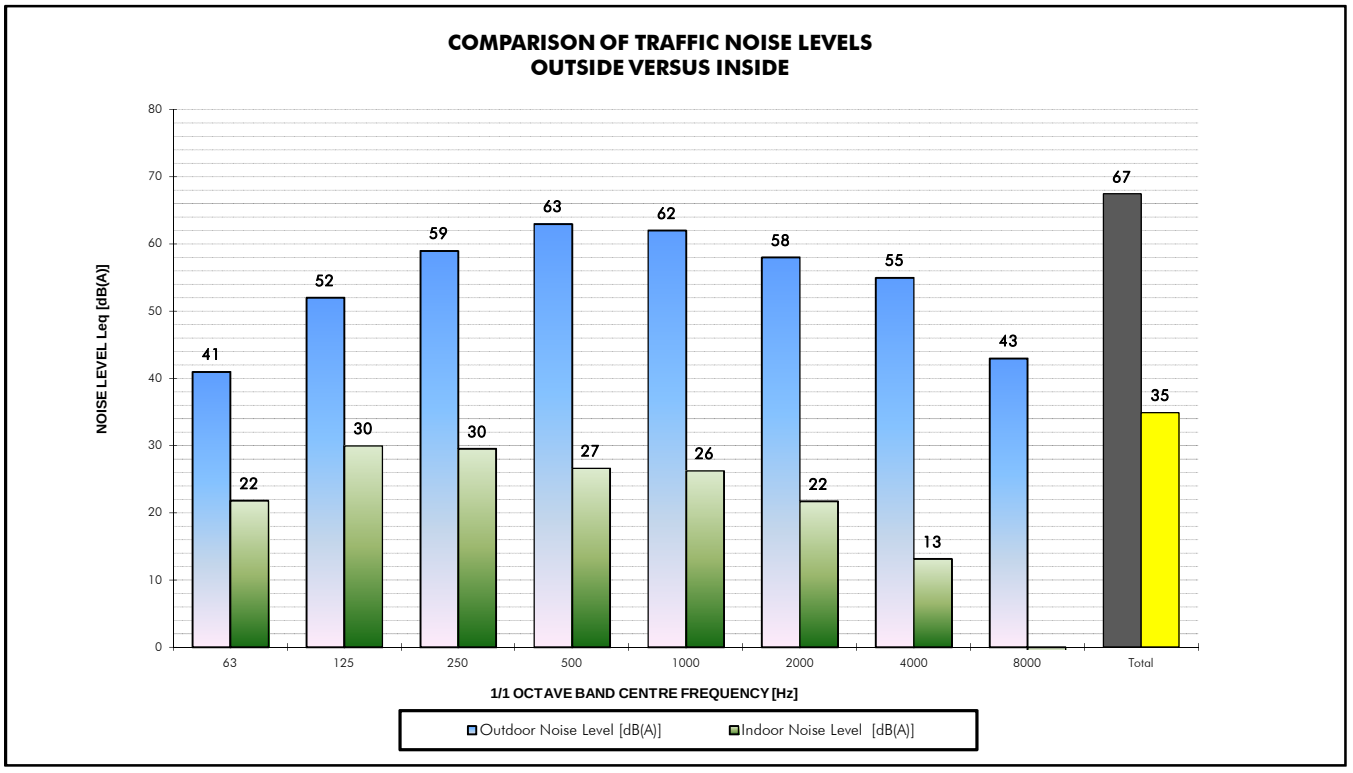
Total Surface Area Exposed to Noise.....	.....								56.7
Composite Transmission Loss	29.7	31.8	38.2	45.0	44.1	44.2	51.0	54.0	
Indoor Noise Level	**27.5**	**34.8**	**35.3**	**31.2**	**31.2**	**27.7**	**15.6**	**1.6**	**40.1**



KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

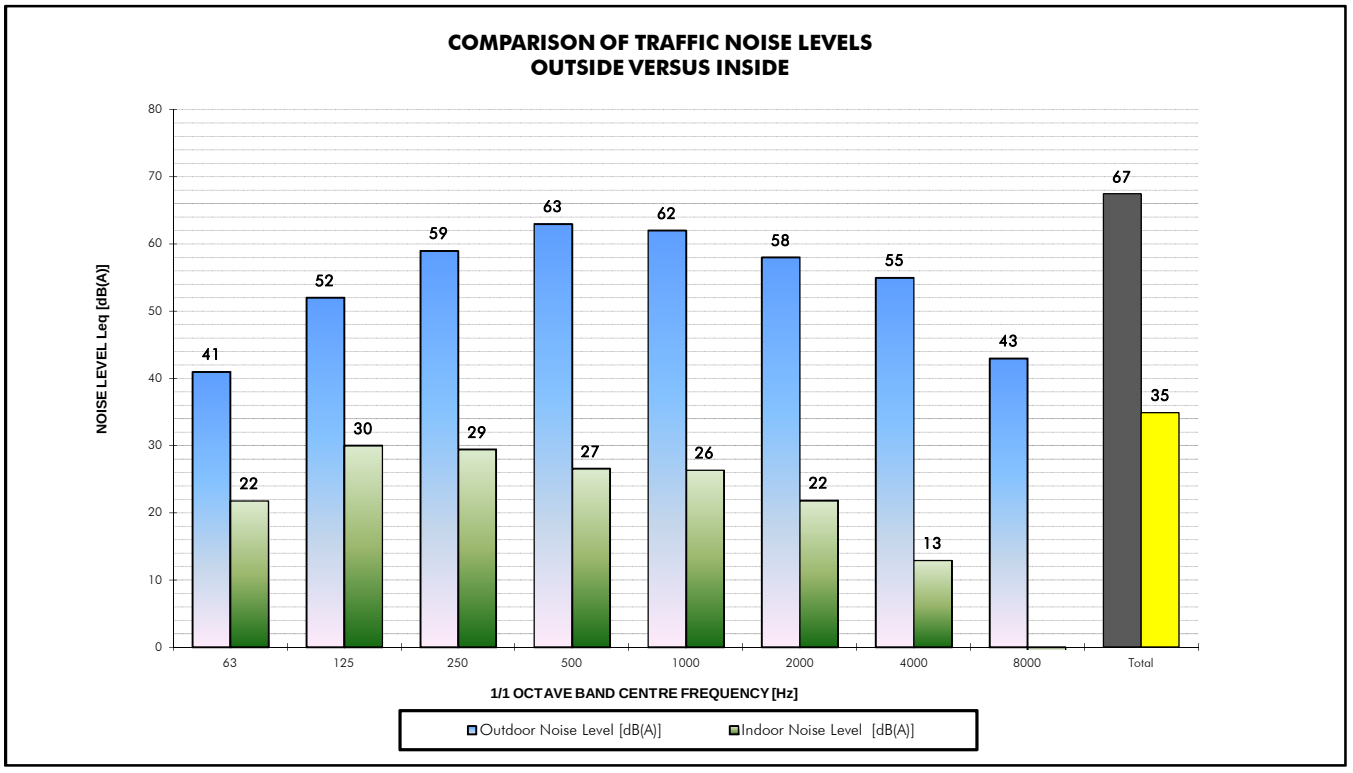
DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 Level 4 Bed								
ROOM DIMENSIONS	Height	3	Width	3.4	Length	3	Surface	58.8	Volume	30.6	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.4 SEC	*0.4*	8	9	10	11	12	14	15	15		
EXTERNAL ELEMENTS	**STC/Rw**	**TRANSMISSION LOSS [dB]**									**Area [m2]**
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	7.86
10.38 mm lam awning Al window - Architectural Window Systems P/L	274	**36**	21	23	30	37	35	35	45	47	2.34
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***26.8***	***29.1***	***36.1***	***42.7***	***41.2***	***41.2***	***48.3***	***51.2***	***10.2***
Noise Level Spectrum for THIS Facade		0	41	52	59	63	62	58	55	43	67.4
Noise Transmitted Through Facade			21.2	29.6	29.0	25.9	26.0	21.6	11.1	-3.8	34.5
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	9
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***9***
Noise Level Spectrum for THIS Facade		0	41	52	59	63	62	58	55	43	67.4
Noise Transmitted Through Facade			12.5	18.2	17.6	18.1	13.6	8.2	8.8	-7.2	23.9
Facade Description - E	*ID*	**Roof**									
150 mm thick concrete ceiling/roof	20	**55**	42	41	42	50	58	65	71	74	10.2
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***42.0***	***41.0***	***42.0***	***50.0***	***58.0***	***65.0***	***71.0***	***74.0***	***10.2***
Noise Level Spectrum for THIS Facade		0	38	46	52	53	52	47	38	23	57.9
Noise Transmitted Through Facade			3.1	11.7	16.2	8.6	-0.8	-13.2	-28.6	-46.6	18.2
Total Surface Area Exposed to Noise.....											29.4
Composite Transmission Loss			30.8	33.2	39.5	46.0	45.4	45.6	50.8	54.1	
Indoor Noise Level			**21.8**	**30.0**	**29.5**	**26.7**	**26.3**	**21.8**	**13.2**	**-2.1**	**34.9**



KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 Level 3 Bed								
ROOM DIMENSIONS	Height	3	Width	3	Length	4	Surface	66.0	Volume	36.0	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.4 SEC	*0.4*	9	10	12	13	14	16	17	17		
EXTERNAL ELEMENTS	**STC/Rw**				**TRANSMISSION LOSS [dB]**						**Area [m2]**
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	6.14
10.38 mm lam awning Al window - Architectural Window Systems P/L	274	**36**	21	23	30	37	35	35	45	47	2.86
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***25.6***	***27.8***	***34.8***	***41.5***	***39.8***	***39.9***	***47.7***	***50.4***	***9***
Noise Level Spectrum for THIS Facade		0	41	52	59	63	62	58	55	43	67.4
Noise Transmitted Through Facade			21.2	29.7	29.1	25.9	26.1	21.7	10.4	-4.3	34.5
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	12
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***12***
Noise Level Spectrum for THIS Facade		0	41	52	59	63	62	58	55	43	67.4
Noise Transmitted Through Facade			13.1	18.7	18.2	18.6	14.2	8.8	9.4	-6.6	24.4
Facade Description - E	*ID*	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0	30	37	43	44	43	38	30	10	48.7
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Total Surface Area Exposed to Noise.....											21.0
Composite Transmission Loss			28.7	31.1	38.1	44.5	43.2	43.3	48.9	52.1	
Indoor Noise Level			**21.8**	**30.0**	**29.4**	**26.6**	**26.4**	**21.9**	**12.9**	**-2.3**	**34.9**



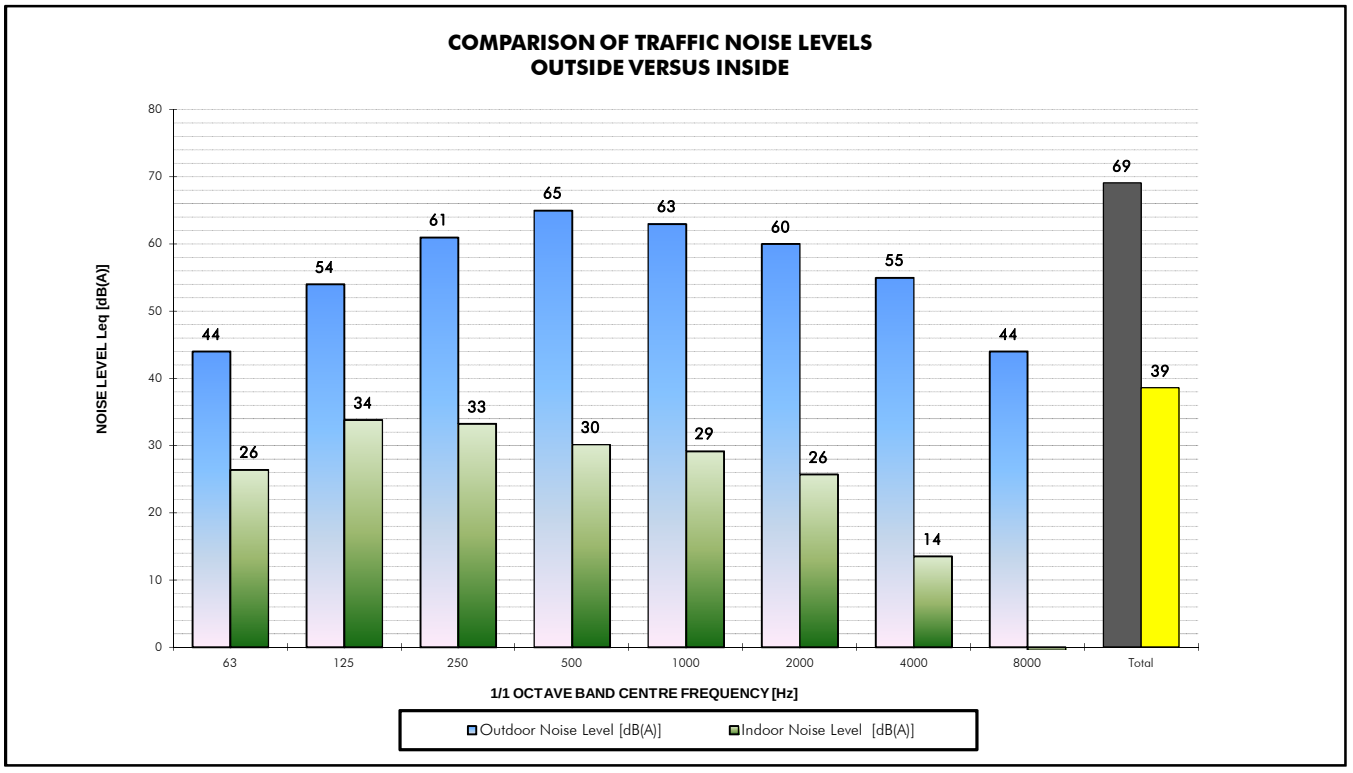
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 Level 2 Living								
ROOM DIMENSIONS	Height	3	Width	6	Length	4.3	Surface	113.4	Volume	77.4	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	13	15	17	19	21	23	25	25		

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	11.5
10.38 mm lam awning Al window - Architectural Window Systems P/L	274	**36**	21	23	30	37	35	35	45	47	6.5
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***25.1***	***27.3***	***34.3***	***41.1***	***39.3***	***39.3***	***47.5***	***50.1***	***18***
Noise Level Spectrum for THIS Facade		0	44	54	61	65	63	60	55	44	69.0
Noise Transmitted Through Facade			26.1	33.7	33.1	29.8	29.1	25.6	12.1	-1.5	38.4
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	12.9
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***12.9***
Noise Level Spectrum for THIS Facade		0	44	54	61	65	63	60	55	44	69.0
Noise Transmitted Through Facade			14.8	19.5	18.9	19.4	13.9	9.5	8.1	-6.9	25.1
Facade Description - E	*ID*	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0	30	37	43	44	43	38	30	10	48.7
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0

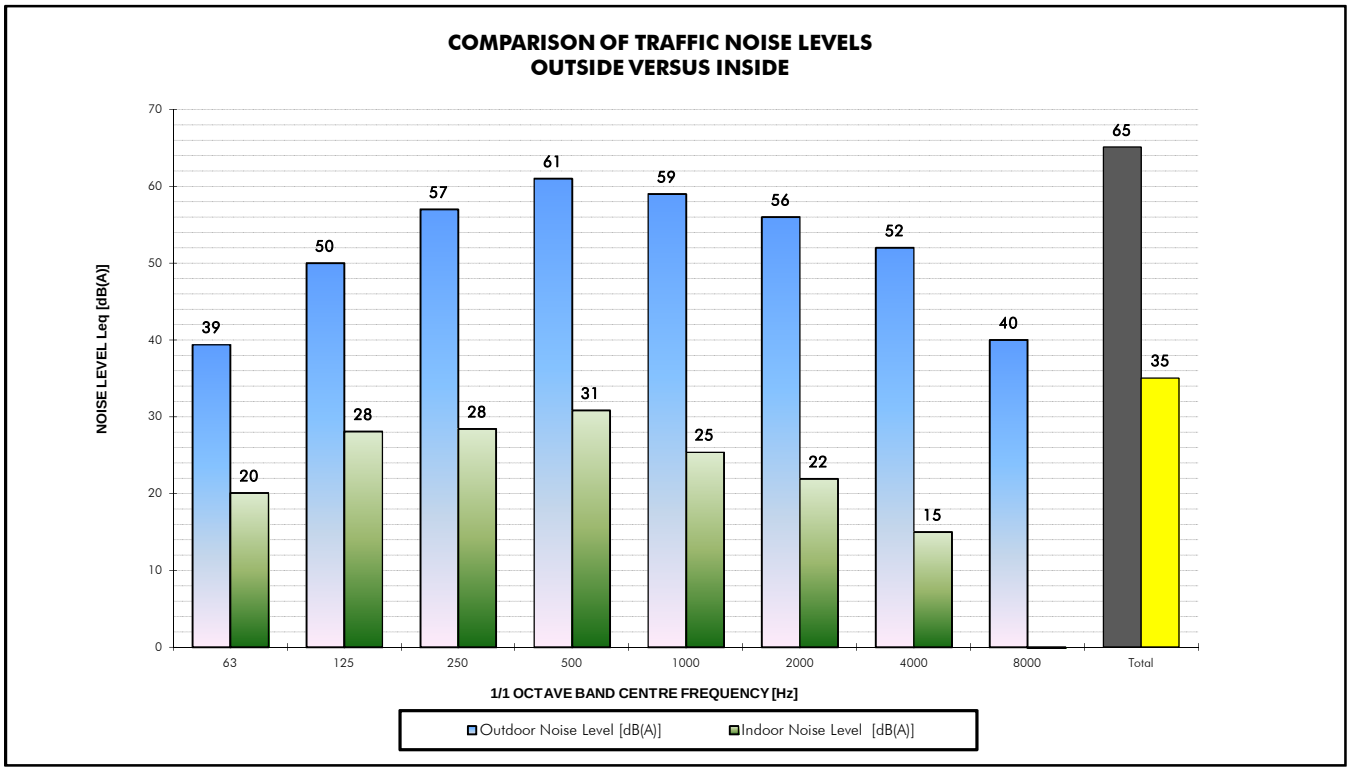
Total Surface Area Exposed to Noise.....	.....									30.9
Composite Transmission Loss	27.2	29.5	36.5	43.0	41.5	41.6	48.4	51.3		
Indoor Noise Level	**26.4**	**33.8**	**33.2**	**30.2**	**29.2**	**25.7**	**13.6**	**-0.4**	**38.6**	



KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 Level 2 Bed								
ROOM DIMENSIONS	Height	3	Width	3.4	Length	3.4	Surface	63.9	Volume	34.7	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.4 SEC	*0.4*	9	10	11	13	14	15	17	17		
EXTERNAL ELEMENTS	**STC/Rw**		**TRANSMISSION LOSS [dB]**								**Area [m2]**
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	2.34
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	0.36
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***20.6***	***22.6***	***28.6***	***29.6***	***32.6***	***32.6***	***35.6***	***38.6***	***2.7***
Noise Level Spectrum for THIS Facade		0	39	50	57	61	59	56	52	40	65.1
Noise Transmitted Through Facade			19.5	27.8	28.2	30.7	25.2	21.8	14.5	-0.5	34.8
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	10.2
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***10.2***
Noise Level Spectrum for THIS Facade		0	39	50	57	61	59	56	52	40	65.1
Noise Transmitted Through Facade			10.9	16.2	15.6	16.1	10.6	6.2	5.8	-10.2	21.8
Facade Description - E	*ID*	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0	30	37	43	44	43	38	30	10	48.7
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Total Surface Area Exposed to Noise.....											12.9
Composite Transmission Loss			26.8	29.1	35.2	36.3	39.3	39.3	41.8	44.9	
Indoor Noise Level			**20.1**	**28.1**	**28.5**	**30.9**	**25.4**	**22.0**	**15.0**	**-0.1**	**35.1**



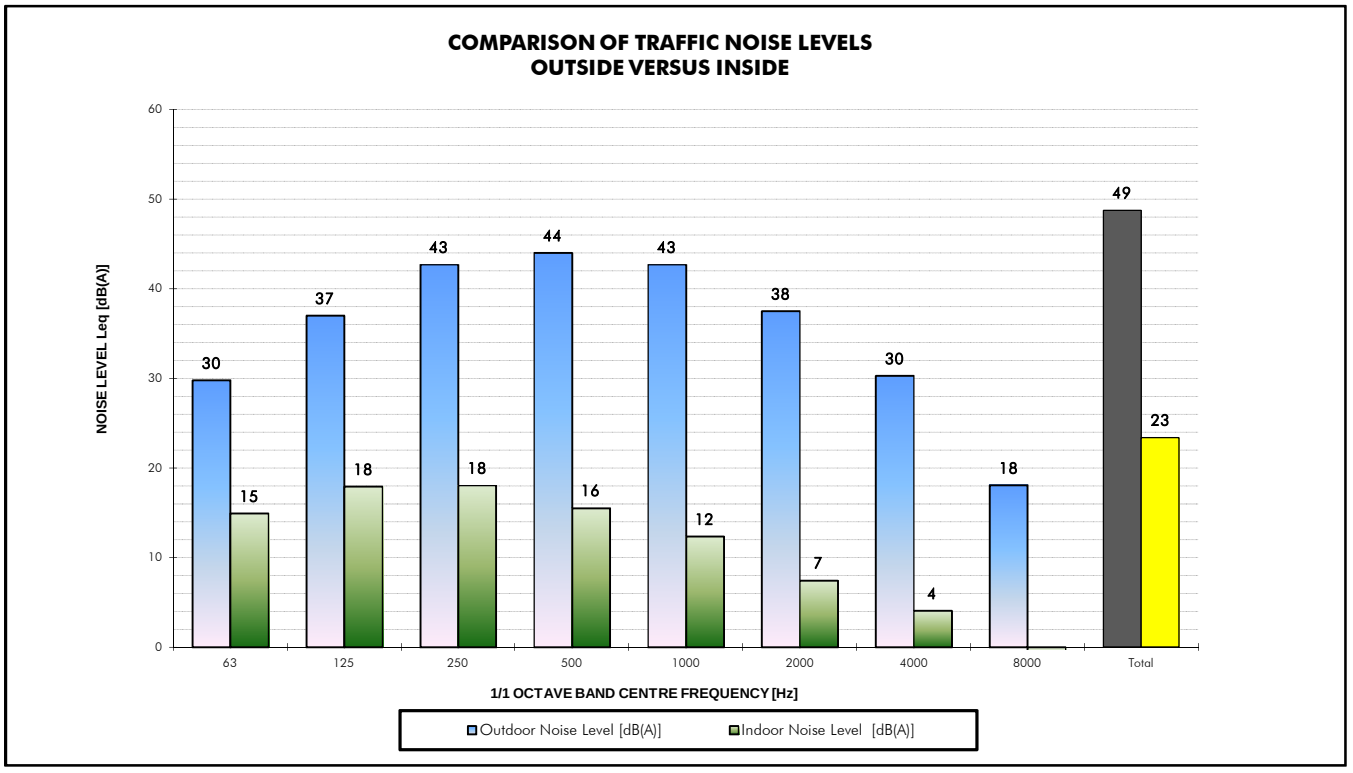
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 3 Level 1 Living								
ROOM DIMENSIONS	Height	3	Width	7.7	Length	6.5	Surface	185.3	Volume	150.2
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	Leq	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	26	28	32	36	40	44	48	48	

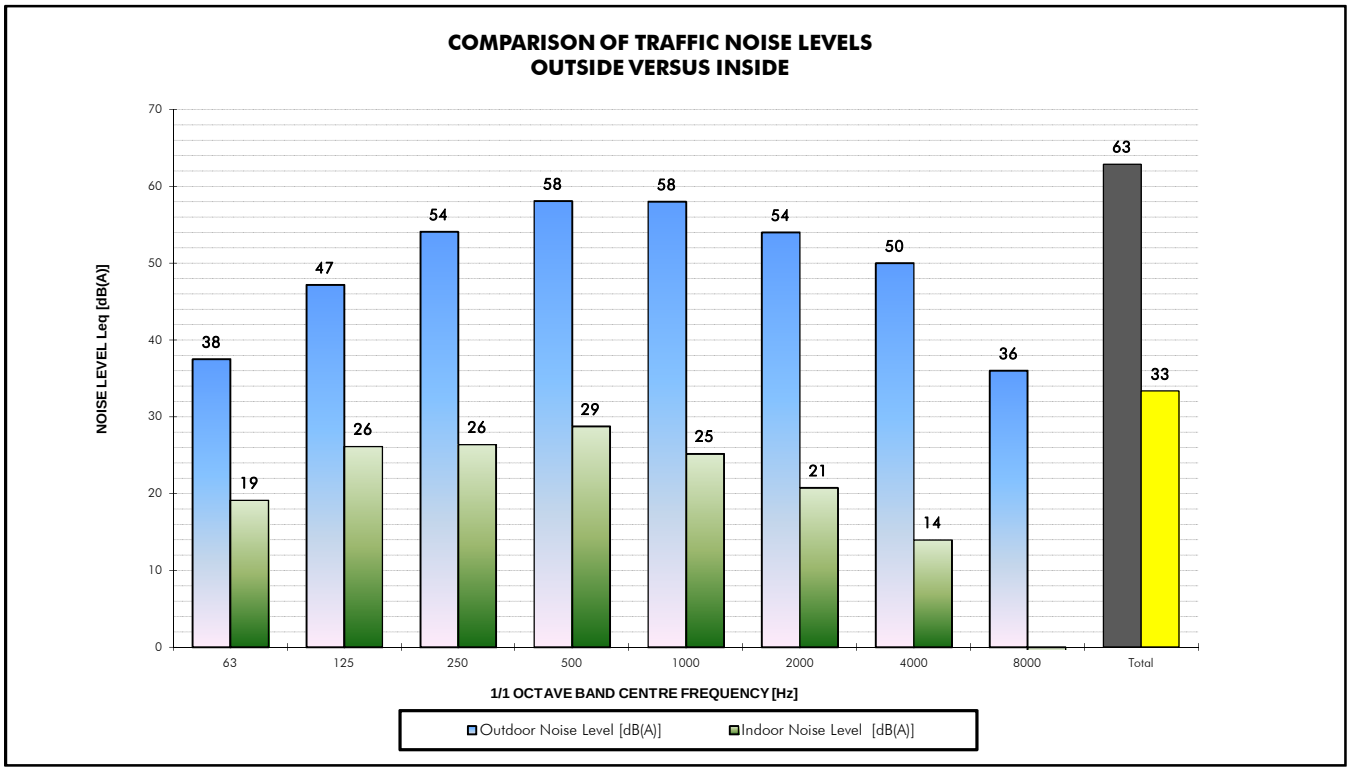
EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	ID	**west facade**									
4 mm float Al sliding window 131 series Two-Lite Aska Aluminium	230	**29**	18	20	24	27	31	32	29	33	23.1
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***18.0***	***20.0***	***24.0***	***27.0***	***31.0***	***32.0***	***29.0***	***33.0***	***23.1***
Noise Level Spectrum for THIS Facade		0	28	33	38	39	40	36	30	18	44.8
Noise Transmitted Through Facade			15.0	17.9	18.1	15.5	12.4	7.5	4.1	-12.1	23.4
Facade Description - B	ID	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	ID	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - D	ID	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	ID	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0	30	37	43	44	43	38	30	10	48.7
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0

Total Surface Area Exposed to Noise.....	.....								23.1
Composite Transmission Loss	18.0	20.0	24.0	27.0	31.0	32.0	29.0	33.0	
Indoor Noise Level	**15.0**	**17.9**	**18.1**	**15.5**	**12.4**	**7.5**	**4.1**	**-12.1**	**23.4**



DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

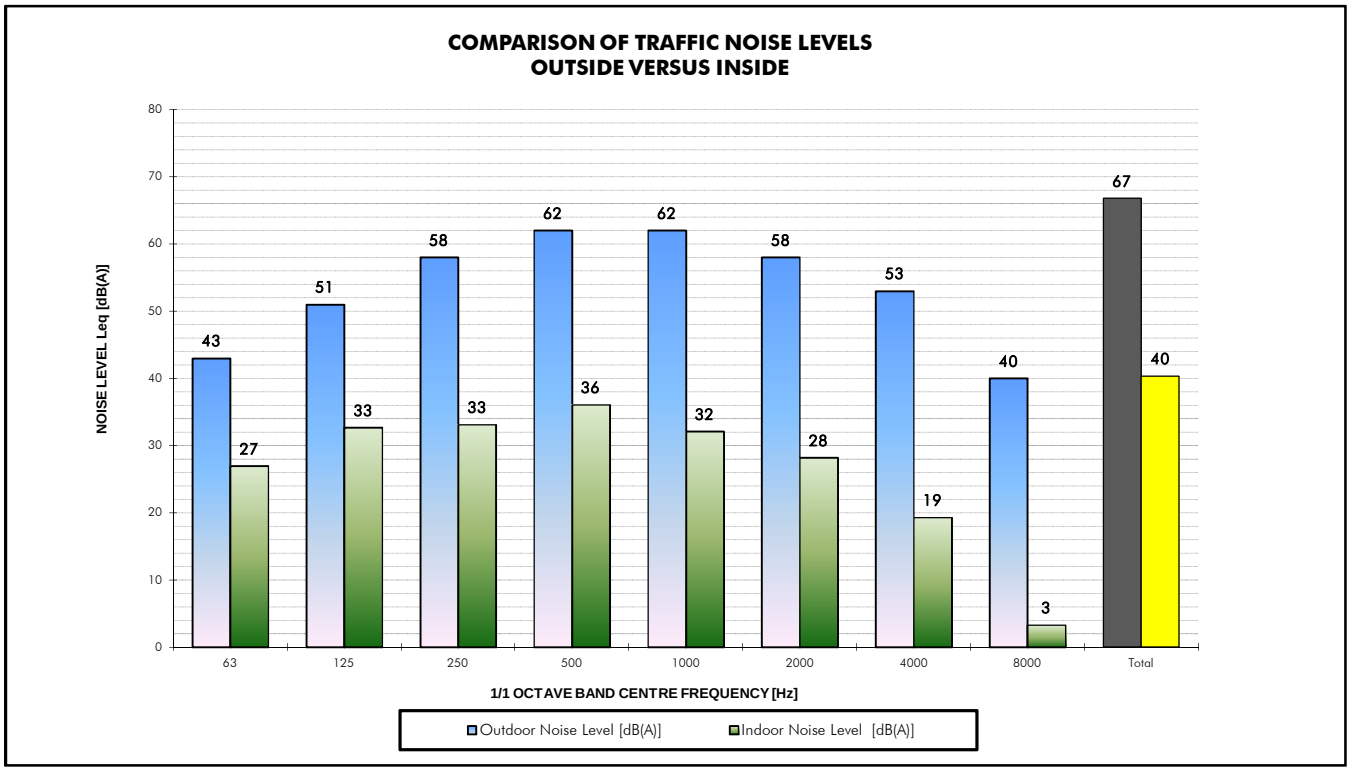
DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 Level 1 Bed								
ROOM DIMENSIONS	Height	3	Width	3	Length	4.3	Surface	69.6	Volume	38.7	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.4 SEC	*0.4*	10	11	12	14	16	17	19	19		
EXTERNAL ELEMENTS	**STC/Rw**				**TRANSMISSION LOSS [dB]**						**Area [m2]**
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	3.12
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	5.88
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***24.3***	***26.5***	***32.5***	***33.5***	***36.5***	***36.5***	***39.3***	***42.4***	***9***
Noise Level Spectrum for THIS Facade		0	38	47	54	58	58	54	50	36	62.9
Noise Transmitted Through Facade			18.6	25.9	26.2	28.6	25.1	20.7	13.5	-3.6	33.2
Facade Description - D	*ID*	**north facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	12.9
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***12.9***
Noise Level Spectrum for THIS Facade		0	38	47	54	58	58	54	50	36	62.9
Noise Transmitted Through Facade			9.6	13.9	13.3	13.7	10.2	4.8	4.4	-13.6	19.8
Facade Description - E	*ID*	**Roof**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0	30	37	43	44	43	38	30	10	48.7
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Total Surface Area Exposed to Noise.....											21.9
Composite Transmission Loss			27.7	30.1	36.1	37.3	40.3	40.3	42.7	45.9	
Indoor Noise Level			**19.1**	**26.2**	**26.4**	**28.8**	**25.2**	**20.8**	**14.0**	**-3.2**	**33.4**



DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 3 Ground Floor Student Lounge								
ROOM DIMENSIONS	Height	4	Width	5.2	Length	17.2	Surface	358.1	Volume	357.8
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	Leq	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	62	67	77	86	96	106	115	115	

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	ID	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	ID	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	ID	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	20.8
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***20.0***	***22.0***	***28.0***	***29.0***	***32.0***	***32.0***	***35.0***	***38.0***	***20.8***
Noise Level Spectrum for THIS Facade		0	43	51	58	62	62	58	53	40	66.8
Noise Transmitted Through Facade			24.2	29.9	30.3	32.8	29.4	24.9	16.6	0.6	37.4
Facade Description - D	ID	**north facade**									
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	46.4
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***20.0***	***22.0***	***28.0***	***29.0***	***32.0***	***32.0***	***35.0***	***38.0***	***46.4***
Noise Level Spectrum for THIS Facade		0	39	47	54	59	58	55	49	36	63.3
Noise Transmitted Through Facade			23.7	29.4	29.8	33.3	28.8	25.4	16.1	0.1	37.3
Facade Description - E	ID	**Roof**									
150 mm thick concrete ceiling/roof	20	**55**	42	41	42	50	58	65	71	74	25.8
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***42.0***	***41.0***	***42.0***	***50.0***	***58.0***	***65.0***	***71.0***	***74.0***	***25.8***
Noise Level Spectrum for THIS Facade		0	38	46	52	53	52	47	38	23	57.9
Noise Transmitted Through Facade			-1.8	6.8	11.3	3.8	-5.7	-18.1	-33.5	-51.5	13.3
Total Surface Area Exposed to Noise.....											93.0
Composite Transmission Loss			21.4	23.4	29.3	30.4	33.4	33.4	36.4	39.4	
Indoor Noise Level			**27.0**	**32.7**	**33.1**	**36.1**	**32.1**	**28.2**	**19.3**	**3.3**	**40.3**



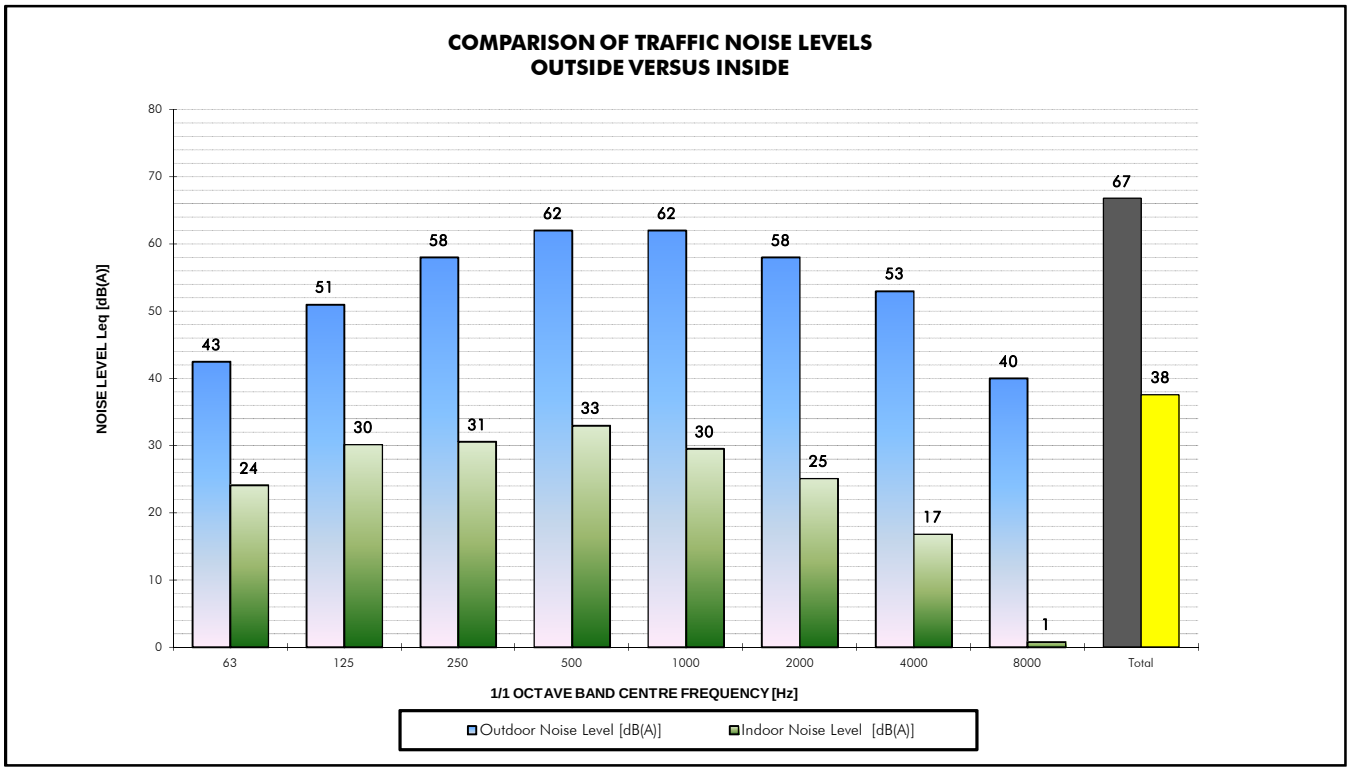
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 Ground Floor Gallery/Commercial								
ROOM DIMENSIONS	Height	4	Width	25.4	Length	19.4	Surface	1343.9	Volume	1971.0	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.7 SEC	***0.7***	295	317	363	408	453	499	544	544		

EXTERNAL ELEMENTS	ID	STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	101.6
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***20.0***	***22.0***	***28.0***	***29.0***	***32.0***	***32.0***	***35.0***	***38.0***	***101.6***
Noise Level Spectrum for THIS Facade		0	28	33	38	39	40	36	30	18	45.0
Noise Transmitted Through Facade			9.4	12.1	10.5	10.0	7.5	3.1	-6.3	-21.3	17.3
Facade Description - B	*ID*	**south facade**									
Double Brick + Render on inside wall	155	**51**	35	40	47	50	53	54	50	54	77.6
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***35.0***	***40.0***	***47.0***	***50.0***	***53.0***	***54.0***	***50.0***	***54.0***	***77.6***
Noise Level Spectrum for THIS Facade		0	43	51	58	62	62	58	53	40	66.8
Noise Transmitted Through Facade			7.7	10.9	10.3	10.8	7.3	1.9	0.5	-16.5	16.9
Facade Description - C	*ID*	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	101.6
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***20.0***	***22.0***	***28.0***	***29.0***	***32.0***	***32.0***	***35.0***	***38.0***	***101.6***
Noise Level Spectrum for THIS Facade		0	43	51	58	62	62	58	53	40	66.8
Noise Transmitted Through Facade			23.9	30.1	30.5	33.0	29.5	25.1	16.7	0.7	37.5
Facade Description - D	*ID*	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	*ID*	**Roof**									
150 mm thick concrete ceiling/roof	20	**55**	42	41	42	50	58	65	71	74	25.8
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***42.0***	***41.0***	***42.0***	***50.0***	***58.0***	***65.0***	***71.0***	***74.0***	***25.8***
Noise Level Spectrum for THIS Facade		0	38	46	52	53	52	47	38	23	57.9
Noise Transmitted Through Facade			-8.6	0.1	4.5	-3.0	-12.4	-24.9	-40.2	-58.2	-99.0

Total Surface Area Exposed to Noise.....	.....								306.6
Composite Transmission Loss	21.7	23.8	29.7	30.8	33.8	33.8	36.7	39.7	
Indoor Noise Level	**24.1**	**30.2**	**30.6**	**33.0**	**29.6**	**25.1**	**16.8**	**0.8**	**37.6**



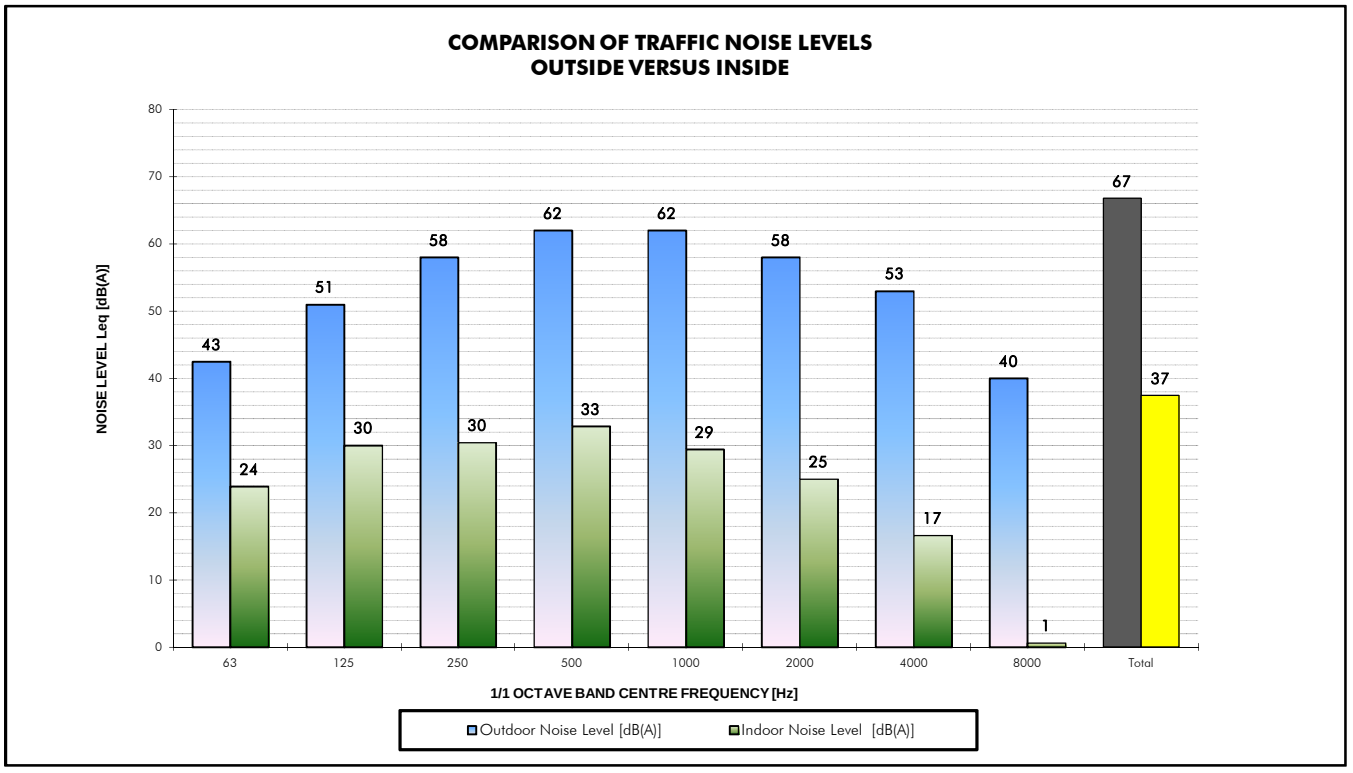
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 3 Ground Floor Commercial								
ROOM DIMENSIONS	Height	4	Width	8.2	Length	19.8	Surface	548.7	Volume	649.4
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	Leq	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.7 SEC	***0.7***	97	105	119	134	149	164	179	179	

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	ID	**west facade**									
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	32.8
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***20.0***	***22.0***	***28.0***	***29.0***	***32.0***	***32.0***	***35.0***	***38.0***	***32.8***
Noise Level Spectrum for THIS Facade		0	28	33	38	39	40	36	30	18	45.0
Noise Transmitted Through Facade			9.3	12.0	10.4	9.9	7.4	3.0	-6.4	-21.4	17.2
Facade Description - B	ID	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	ID	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
6.38 mm lam Al sliding window Q-lon & fur/fin weatherpile seals - Architectural Window Systems P/L	247	**31**	20	22	28	29	32	32	35	38	32.8
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***20.0***	***22.0***	***28.0***	***29.0***	***32.0***	***32.0***	***35.0***	***38.0***	***32.8***
Noise Level Spectrum for THIS Facade		0	43	51	58	62	62	58	53	40	66.8
Noise Transmitted Through Facade			23.8	30.0	30.4	32.9	29.4	25.0	16.6	0.6	37.4
Facade Description - D	ID	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	ID	**Roof**									
150 mm thick concrete ceiling/roof	20	**55**	42	41	42	50	58	65	71	74	25.8
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***42.0***	***41.0***	***42.0***	***50.0***	***58.0***	***65.0***	***71.0***	***74.0***	***25.8***
Noise Level Spectrum for THIS Facade		0	38	46	52	53	52	47	38	23	57.9
Noise Transmitted Through Facade			-3.8	4.9	9.3	1.8	-7.6	-20.0	-35.4	-53.4	11.4

Total Surface Area Exposed to Noise.....	.....								91.4
Composite Transmission Loss	21.4	23.4	29.4	30.4	33.4	33.4	36.4	39.4	
Indoor Noise Level	**23.9**	**30.0**	**30.5**	**32.9**	**29.4**	**25.0**	**16.6**	**0.7**	**37.5**

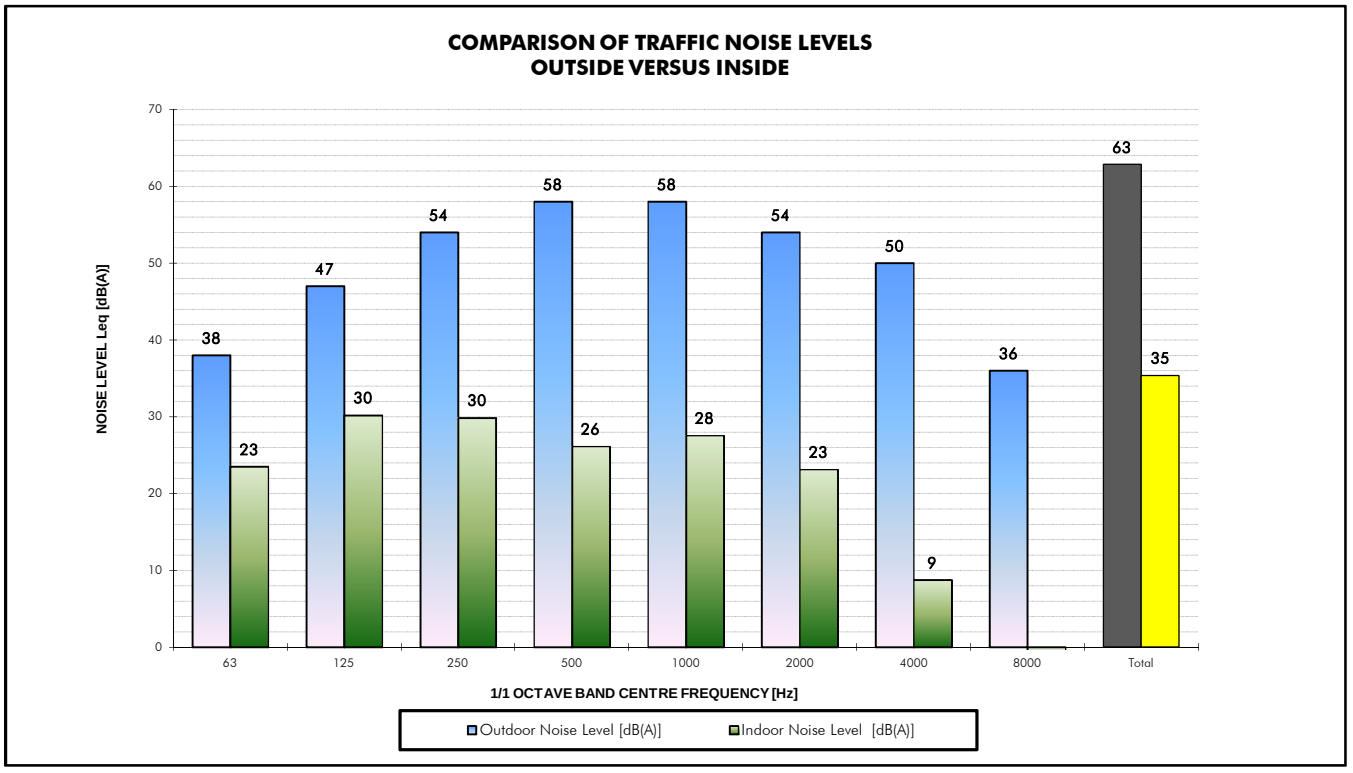


DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION		Pemulwuy Project Redfern - Precinct 3 Ground Floor Caretakers								
ROOM DIMENSIONS	Height	4	Width	3	Length	5.2	Surface	96.8	Volume	62.4
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	11	12	13	15	17	18	20	20	

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - B	*ID*	**south facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - C	*ID*	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
10.38 mm lam awning Al window - Architectural Window Systems P/L	274	**36**	21	23	30	37	35	35	45	47	12
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***21.0***	***23.0***	***30.0***	***37.0***	***35.0***	***35.0***	***45.0***	***47.0***	***12***
Noise Level Spectrum for THIS Facade		0	38	47	54	58	58	54	50	36	62.8
Noise Transmitted Through Facade			23.4	30.1	29.5	26.0	27.6	23.1	8.8	-7.2	35.2
Facade Description - D	*ID*	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	*ID*	**Roof**									
150 mm thick concrete ceiling/roof	20	**55**	42	41	42	50	58	65	71	74	25.8
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***42.0***	***41.0***	***42.0***	***50.0***	***58.0***	***65.0***	***71.0***	***74.0***	***25.8***
Noise Level Spectrum for THIS Facade		0	38	46	52	53	52	47	38	23	57.9
Noise Transmitted Through Facade			5.7	14.4	18.8	11.3	1.9	-10.5	-25.9	-43.9	20.9

Total Surface Area Exposed to Noise.....	.....								37.8
Composite Transmission Loss	25.9	27.8	34.4	41.5	39.9	40.0	50.0	52.0	
Indoor Noise Level	**23.5**	**30.2**	**29.9**	**26.2**	**27.6**	**23.1**	**8.8**	**-7.2**	**35.4**



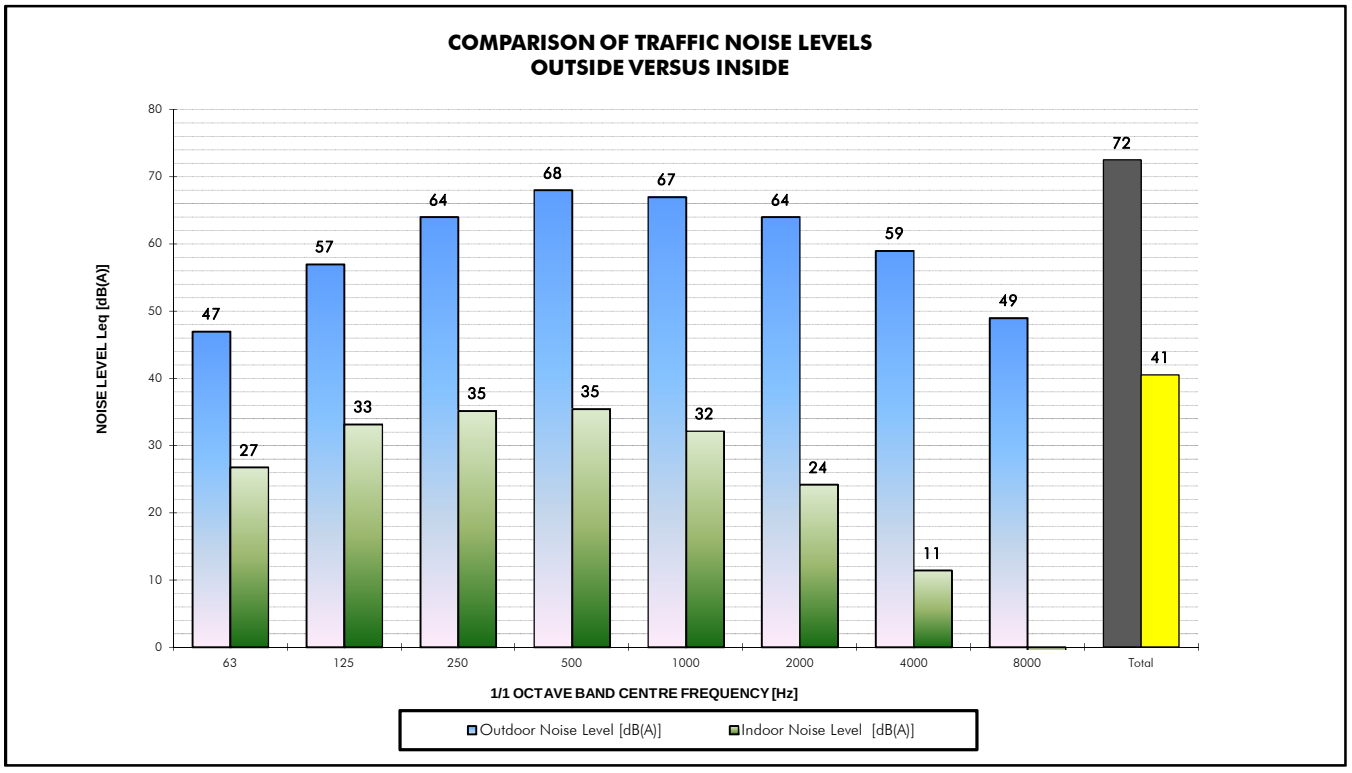
KOIKAS ACOUSTICS PTY LTD

DETAILS OF THE EXTERNAL TRAFFIC NOISE LEVELS, THE CALCULATED COMPOSITE T.L. AND THE INTERNAL NOISE LEVELS

DESCRIPTION			Pemulwuy Project Redfern - Precinct 3 1F Gallery								
ROOM DIMENSIONS	Height	4	Width	15.9	Length	14.2	Surface	692.4	Volume	903.1	
FREQUENCY	STC/Level	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*	
TYPICAL OUTDOOR SPECTRUM NOISE LEVEL Lp,A	*Leq*	55	56	56	61	66	64	62	52	70.3	
ROOMS WITH TYPICAL REVERBERATION OF 0.6 SEC	*0.6*	158	170	194	218	242	267	291	291		

EXTERNAL ELEMENTS		STC/Rw	TRANSMISSION LOSS [dB]								Area [m2]
Facade Description - A	*ID*	**west facade**									
10.38 mm lam awning Al window - Architectural Window Systems P/L	274	**36**	21	23	30	37	35	35	45	47	62
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***21.0***	***23.0***	***30.0***	***37.0***	***35.0***	***35.0***	***45.0***	***47.0***	***62***
Noise Level Spectrum for THIS Facade		0	33	39	44	46	47	44	38	28	52.0
Noise Transmitted Through Facade			14.0	17.6	15.0	9.5	12.1	8.7	-7.7	-19.7	21.7
Facade Description - B	*ID*	**south facade**									
10.38 mm lam awning Al window - Architectural Window Systems P/L	274	**36**	21	23	30	37	35	35	45	47	34.4
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***21.0***	***23.0***	***30.0***	***37.0***	***35.0***	***35.0***	***45.0***	***47.0***	***34.4***
Noise Level Spectrum for THIS Facade		0	40	48	54	57	56	53	47	37	61.7
Noise Transmitted Through Facade			18.4	24.1	22.5	18.0	18.5	15.1	-1.3	-13.3	28.3
Facade Description - C	*ID*	**east facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
12 mm laminated glazing perfect sealing	277	**37**	24	27	31	34	36	41	48	50	75.6
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***24.0***	***27.0***	***31.0***	***34.0***	***36.0***	***41.0***	***48.0***	***50.0***	***75.6***
Noise Level Spectrum for THIS Facade		0	47	57	64	68	67	64	59	49	72.5
Noise Transmitted Through Facade			25.8	32.5	34.9	35.4	31.9	23.5	11.1	-0.9	40.2
Facade Description - D	*ID*	**north facade**									
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0***
Noise Level Spectrum for THIS Facade		0									9.0
Noise Transmitted Through Facade			-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0	-99.0
Facade Description - E	*ID*	**Roof**									
150 mm thick concrete ceiling/roof	20	**55**	42	41	42	50	58	65	71	74	25.8
----------	632	**0**	0	0	0	0	0	0	0	0	
----------	632	**0**	0	0	0	0	0	0	0	0	
Composite Transmission Loss - A			***42.0***	***41.0***	***42.0***	***50.0***	***58.0***	***65.0***	***71.0***	***74.0***	***25.8***
Noise Level Spectrum for THIS Facade		0	38	46	52	53	52	47	38	23	57.9
Noise Transmitted Through Facade			-5.9	2.8	7.2	-0.3	-9.7	-22.1	-37.5	-55.5	-99.0

Total Surface Area Exposed to Noise.....	.....								197.8
Composite Transmission Loss	22.7	24.9	31.0	36.0	36.0	37.3	46.7	48.7	
Indoor Noise Level	**26.8**	**33.2**	**35.2**	**35.5**	**32.2**	**24.2**	**11.4**	**-0.6**	**40.5**



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APPENDIX E

APPENDIX E

APPENDIX E

NOISE INTRUSION FROM OUTSIDE TO INSIDE RESIDENTIAL RECEIVER R4 Level 3 (Precinct 1)

Windows Closed

FREQUENCY	*Hz*	*31.5*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
Typical absorption area (A) in receiving room	*m²*	*7.8*	*8.5*	*9.1*	*10.4*	*11.7*	*13.0*	*14.3*	*15.6*	*15.6*	
Wall	STL_1	45.0	28.0	31.0	32.0	45.0	52.0	53.0	55.0	55.0	7.2
Window	STL_2	15.0	17.0	19.0	23.0	24.0	27.0	29.0	26.0	30.0	4.2
Ceiling/Roof	STL_3										0.0
Façade - Sound Transmission Loss	$STL_{Façade}$	19.3	20.8	22.9	26.5	28.3	31.3	33.3	30.3	34.3	11.4
L90 noise level outside most affected residence	$L_{A90\ Outdoor}$	13.0	26.0	33.0	38.0	41.0	43.0	38.0	25.0	14.0	46.8
Calculated indoor L90 noise level	$L_{A90\ Indoor}$	-4.7	6.5	11.1	11.9	12.6	11.1	3.7	-6.7	-21.7	18.2
Typical indoor household noise levels	$L_{A90\ House}$	3.0	8.0	12.0	15.0	15.0	14.0	12.0	10.0	8.0	21.6
Resultant indoor L90 noise level	$L_{A90\ Result}$	3.7	10.3	14.6	16.7	17.0	15.8	12.6	10.1	8.0	23.3
Noise level from licensed premise at residence	L_{A10}		16.0	23.0	28.0	31.0	26.0	22.0	18.0	4.0	34.4
Development noise transmitted through façade	L_{A10}	-17.7	-3.5	1.1	1.9	2.6	-5.9	-12.3	-13.7	-31.7	7.4
Criteria for inaudibility including threshold of hearing	dB_{SPL}	18.0	10.0	5.0	6.7	7.0	5.8	2.6	0.1	13.0	-
Is inaudibility achieved indoors at the residential receiver?		YES	YES	YES	YES	YES	YES	YES	YES	YES	-
Inaudibility exceeded by	*dB*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	-

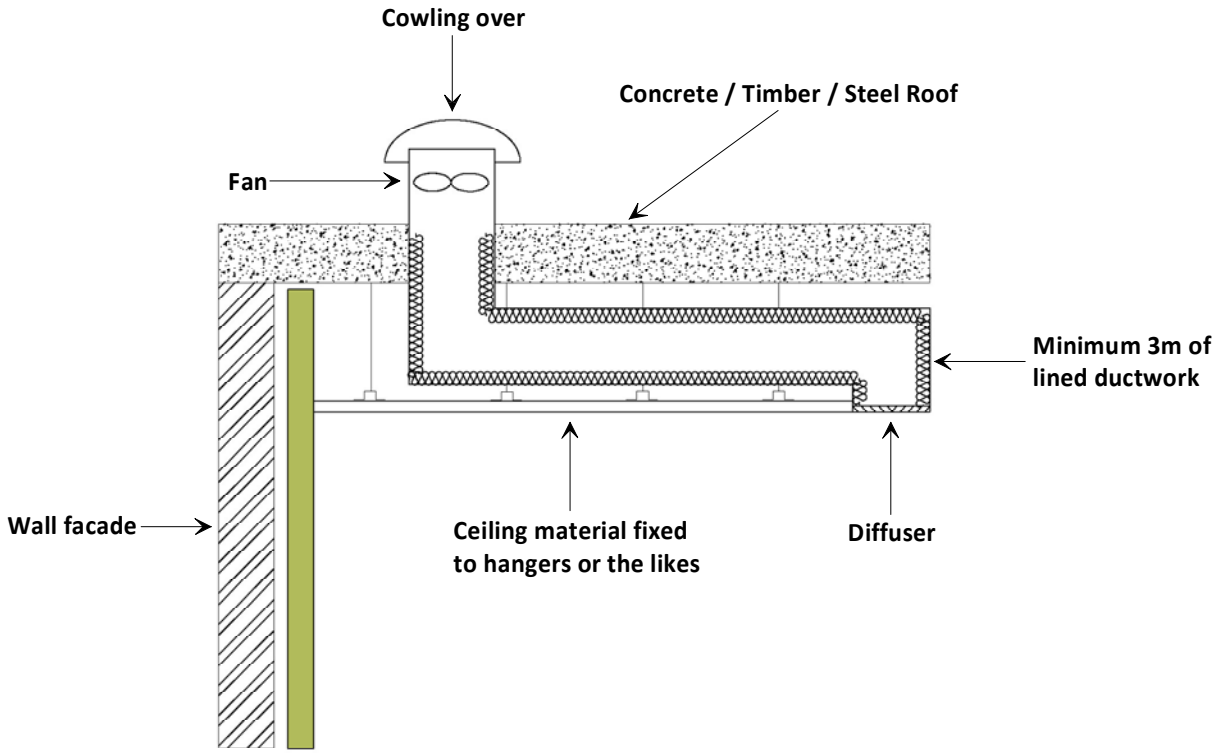
Windows Open

FREQUENCY	*Hz*	*31.5*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*	*Total*
Typical absorption area (A) in receiving room	*m²*	*7.8*	*8.5*	*9.1*	*10.4*	*11.7*	*13.0*	*14.3*	*15.6*	*15.6*	
Façade - Sound Transmission Loss *(Typical)*	$STL_{Façade}$	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	11.4
L90 noise level outside most affected residence	$L_{A90\ Outdoor}$	13.0	26.0	33.0	38.0	41.0	43.0	38.0	25.0	14.0	46.8
Calculated indoor L90 noise level	$L_{A90\ Indoor}$	3.0	16.0	23.0	28.0	31.0	33.0	28.0	15.0	4.0	36.8
Typical indoor household noise levels	$L_{A90\ House}$	3.0	8.0	12.0	15.0	15.0	14.0	12.0	10.0	8.0	21.6
Resultant indoor L90 noise level	$L_{A90\ Result}$	6.0	16.6	23.3	28.2	31.1	33.1	28.1	16.2	9.5	36.9
Noise level from licensed premise at residence	L_{A10}		16.0	23.0	28.0	31.0	26.0	22.0	18.0	4.0	34.4
Development noise transmitted through façade	L_{A10}	-10.0	6.0	13.0	18.0	21.0	16.0	12.0	8.0	-6.0	24.4
Criteria for inaudibility including threshold of hearing	dB_{SPL}	18.0	10.0	13.3	18.2	21.1	23.1	18.1	6.2	13.0	-
Is inaudibility achieved indoors at the residential receiver?		YES	YES	YES	YES	YES	YES	YES	NO	YES	-
Inaudibility exceeded by	*dB*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*1.8*	*NA*	-

APPENDIX F

APPENDIX F

APPENDIX F



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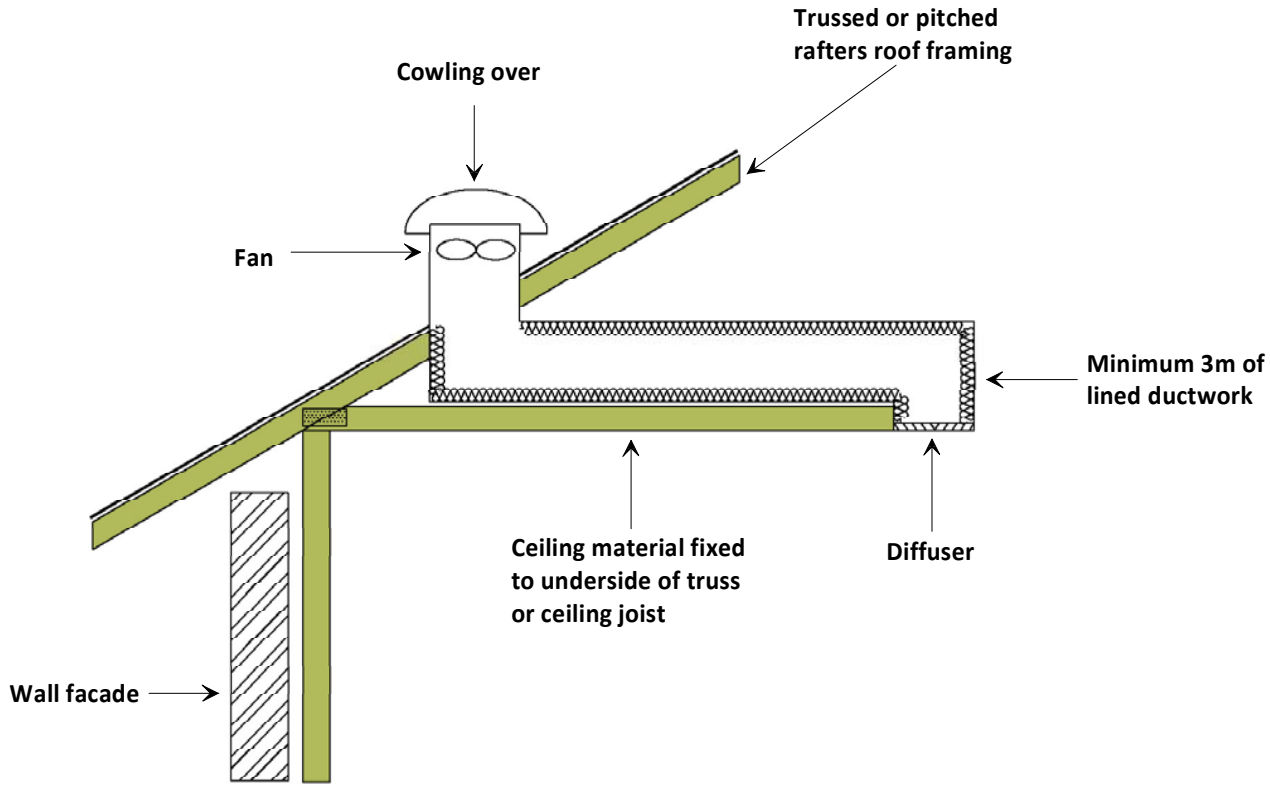
Project	Drawn by	Checked	File
ACOUSTIC DESIGN DETAIL	AS	N/A	Mech Vent Detail Flat.srf
Title	**Drawing Number**	**Revision**	**Scale**
Mechanical Ventilation Flat type roof	1 of 1	V1	NOT TO SCALE
			Date 19th April 2011



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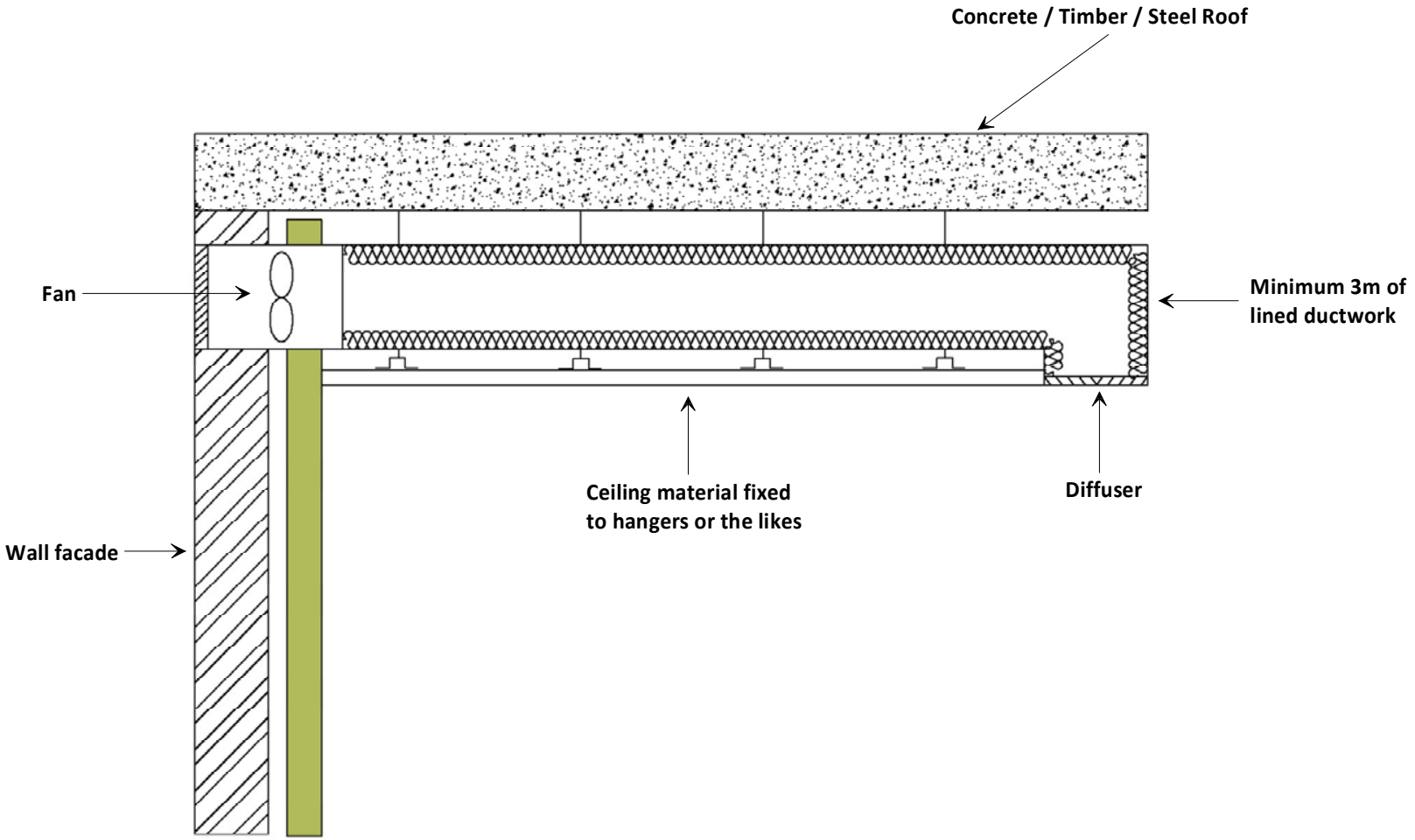
Project	Drawn by	Checked	File
ACOUSTIC DESIGN DETAIL	AS	N/A	Mech Vent Detail Pitched.srf
Title	**Drawing Number**	**Revision**	**Scale**
Mechanical Ventilation Pitched type roof	1 of 1	V1	NOT TO SCALE
			Date 19th April 2011



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Project	Drawn by	Checked	File
ACOUSTIC DESIGN DETAIL	AS	N/A	Mech Vent Detail Wall.srf
Title	**Drawing Number**	**Revision**	**Scale**
Mechanical Ventilation Wall penetration	1 of 1	V1	NOT TO SCALE
			Date 19th April 2011

APPENDIX G

APPENDIX G

APPENDIX G

How can something so **simple** help **your brickwork** stand the **test of time**?

NI-TIES™

Economic, non corrosive
and safer masonry wall ties

What if, for once, **cheaper** actually meant **better**?

Would the 30% cost saving alone sway you from conventional stainless steel ties? Here are 6 more reasons why you should start using Ni-Ties:

- Ni-Ties will not corrode in areas near the sea or industrial zones because they are chemically resistant, unlike galvanised ties that corrode and become ineffective.
- Ni-Ties have rounded edges and are light-weight. This makes handling much safer and quicker. Less accidents - no cuts from sharp edges.
- Ni-Ties comply with existing fire ratings for low and medium density housing.
- Ni-Ties high strength and stiffness make them ideal for areas subject to intense natural conditions such as high wind, earthquakes and cyclones.
- Ni-Ties eliminate the problem of electrolysis in steel framed houses when using dissimilar metals.
- Ni-Ties have acoustic properties greater than metal ties and the Ni Tie Acoustic Cavity Tie provides even further reduction of noise and vibration transference.

This simple, inexpensive product has been standing the test of time for quality builders around Australia since 1996. Now you can benefit from its improved strength, durability, safer handling and of course the enormous cost savings against conventional stainless steel ties.

Use Ni-Ties on your next building project and experience them for yourself.

NI-TIES™

Heavy Duty Cavity

100mm Cavity Tie in Heavy Duty (red) to cater for the larger cavities. More than twice the strength and stiffness required by AS/NZ 2699-2000.

Packaged in bags of 100 (UV treated) and boxes of 900.

Medium Duty Cavity

50mm Cavity Ties in Medium duty (white) to satisfy AS/NZ 2699-2000. Rounded ends to prevent injury and central hole to assist bond in mortar.

Packaged in bags of 100 (UV treated) and boxes of 1000.

Medium Duty Veneer

50mm side fixed Veneer Ties in Medium duty (white) to satisfy AS/NZ 2699-2000. Use 2 fixings to prevent rotation whilst in service. Colour coded to assist in identifying classification in the wall. Ideal for steel and timber stud, brick veneer homes and buildings.

Packaged in bags of 100 (UV treated) and boxes of 1000.

When fixing to timber, use 2 x 10-12 x 25mm (type 17)
When fixing to steel, use 2 x 10-16 x 25mm (Tec)

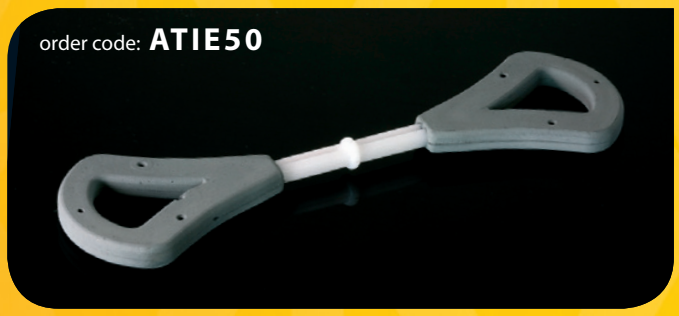
Light Duty Stubbie

50mm face fixed Stubbie Ties in Light duty (white) to satisfy AS/NZ 2699-2000. Ideal for plywood braced and insulated walls. Every tie is chemically inert.

Packaged in bags of 100 (UV treated) and boxes of 900.

When fixing to timber, use 1 x 10-12 x 45mm (type 17)
When fixing to steel, use 1 x 10-16 x 25mm (Tec)

Medium Duty Acoustic Cavity



50mm Acoustic Cavity tie is the standard medium duty Ni-Tie with each end over moulded with a resilient material. The resilience substantially reduces air and structure borne noises. Also reduces impact and vibration in masonry walls.
Patent Appld.

Packaged in bags of 100 (UV treated) and boxes of 1000.

Applications

Reduce Sound and Vibration

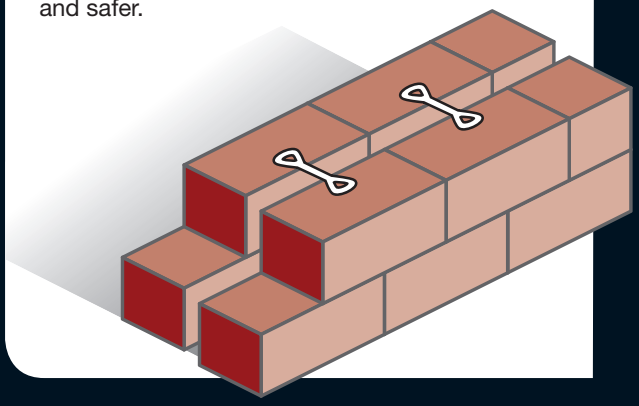
This newly developed Acoustic Ni-Tie is capable of maintaining the structural strength and integrity of the original plastic tie which has been modified with a flexible material covering.

Simple analysis of dynamic force transmission through the brick ties has shown that such reduction in stiffness reduces the noise and vibration transmission through two brick walls by 17dB when compared with the standard Ni-Tie being used in the same wall at the same frequency.

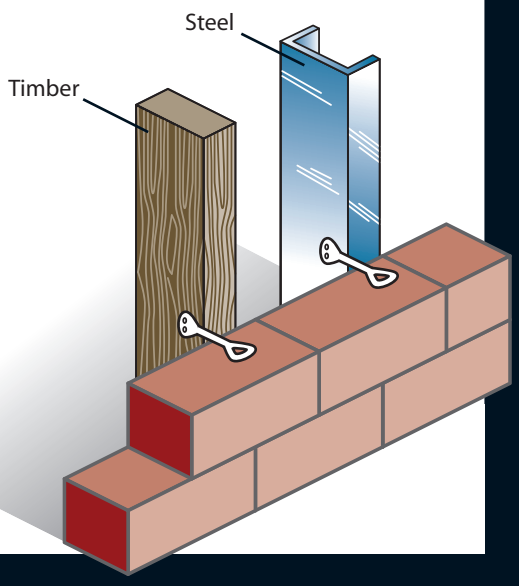
Double Brick Cavity

Large and small cavities are catered for with more than twice the strength and stiffness required by AS/NZ 2699-2000.

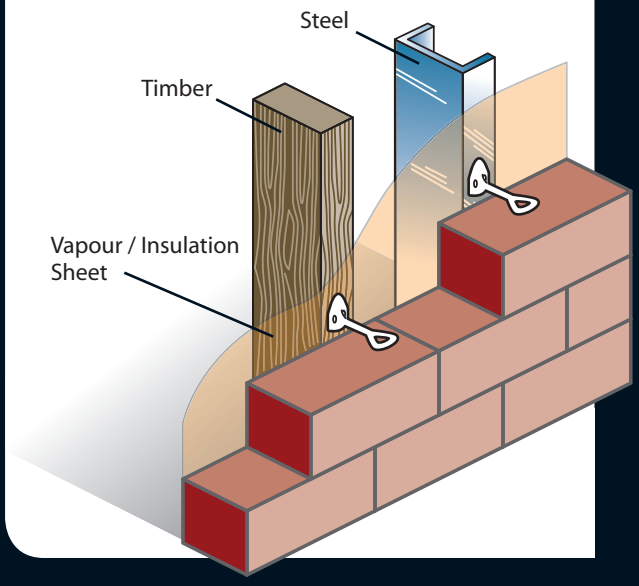
Rounded ends to prevent injury and central hole to assist bond in mortar make working easier and safer.



Side Fix Veneer



Face Fix Stubbie Veneer



NI-TIES™

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