DA ACOUSTIC REPORT – BOARDING HOUSE

Edward Street (3), Kingswood

ID: 11853-3 R01v2

5 August 2020

Prepared For:
Santhosh Rajendran

Signature Group of Companies
6D / 7 Meridian Place, Bella Vista, 2153

Email: santhosh@signaturepropertydevelopers.com.au

DOCUMENT INFORMATION

Author: Sri Harsha Eati **Checked By:** Raguldeep Premrajkumar

[redacted]

Issue: R01

Version: 2

Date	Version	To	Email
18/06/2020	A DRAFT	Santhosh Rajendran	santhosh@signaturepropertydevelopers.com.au
22/06/2020	1	Santhosh Rajendran	santhosh@signaturepropertydevelopers.com.au
5/08/2020	2	Santhosh Rajendran	santhosh@signaturepropertydevelopers.com.au

Prepared By:
PJ Knowland Pty. Ltd.
t/a PKA Acoustic Consulting
PO Box 345, Lane Cove NSW 1595

ABN 87 256 407 546, ACN 621 896 204

T (02) 9460 6824 · **E** admin@pka.com.au

Association of Australian Acoustical Consultants

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

PKA Acoustic Consulting has been commissioned to provide an acoustic report to assess the potential noise impact into and from the proposed residential boarding house development at 3 Edward Street, Kingswood.

As part of the DA approval process, the Penrith City Council requires an acoustic report to assess the noise impact and to provide recommendations where exceedances occur.

2.0 SUMMARY

An acoustic assessment has been conducted in accordance with the acoustic requirements of Penrith City Council and the NSW EPA Noise Policy for Industry (NPfI).

Unattended noise measurements were conducted on site to obtain the existing background noise levels. Noise goals were established for noise breakout from the use of the boarding house to other surrounding sensitive receivers.

Providing our recommendations are implemented as detailed in Section 6.0, the proposed development will comply with the acoustic requirements of the Penrith City Council.

3.0 SITE DESCRIPTION

The proposed development is located at 3 Edward Street, Kingswood. The site is bound by Edward Street to the south and other residential premises on the remaining sides. The site location is shown in Figure 3-1.

Figure 3-1 Site Location

4.0 NOISE CRITERIA

4.1 NSW EPA Noise Policy for Industry (NPfI)

Noise generated from a premises is generally assessed against the requirements of the *NSW EPA Noise Policy for Industry 2017 (NPfI)*. The policy sets out two separate criteria to ensure environmental noise objectives are met. The first criterion considers intrusive noise to residential properties and the second is set to ensure the amenity of the land use is protected. The lower value of both criteria is considered to be the Project noise trigger level, which is the limit of the $L_{Aeq\ 15min}$ noise level that must not be exceeded for the corresponding period of the day.

Amenity Criterion

To limit continuing increases in noise levels, the maximum ambient noise level within an area from commercial noise sources should not normally exceed the levels as specified in Table 2.2 of the policy for the specified time of the day. The NPfI recommends the following Amenity Noise Levels for various receiver premises.

Table 4-1 Noise Criteria - Amenity for Receiver Buildings

Type of receiver	Time of day	Recommended Amenity Noise Level $L_{Aeq\ (period)}$
Residential (Suburban)	Day	55 dB(A)
	Evening	45 dB(A)
	Night	40 dB(A)

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows:

Project amenity noise level for development = recommended amenity noise level **minus 5 dB(A).**

To standardise the time periods for the intrusiveness and amenity noise levels, this policy assumes that the Amenity $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq,\ period}$ **+ 3 decibels (dB).**

Intrusiveness Criterion

The intrusiveness of a stationary noise source may be considered acceptable if the average of the maximum A-weighted levels of noise, $L_{Aeq\ 15\ minute}$ from the source do not exceed by more than 5dB the Rating Background Level (RBL) measured in the absence of the source. This applies during all times of the day and night. There also exists an adjustment factor to be applied as per the character of the noise source. This includes factors such as tonal, fluctuating, low frequency, impulsive, intermittent etc. qualities of noise. The RBL is determined in accordance with Section 2.3 of the NSW EPA NPfI. The intrusiveness criterion is $L_{Aeq\ 15\ minute} < RBL+5$.

4.2 EPA NSW Interim Construction Noise Guidelines (ICNG)

Based on the above council conditions, the NSW EPA *Interim Construction Noise Guideline* (ICNG) is being used in performing this assessment.

The document aims at managing noise from construction works regulated by the EPA. Details of noise limits are presented in the following Table 4-2.

Table 4-2 Noise Levels Residential Receivers (Extract from EPA ICNG)

Time of day	Management level $L_{Aeq\ (15\ min)}$	Application
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	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 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 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 above the noise affected level, the proponent should negotiate with the community.

4.3 General Construction Vibration Criteria

During demolition and excavation there is the potential for vibration impact on the neighbouring buildings' amenity and on structures. The EPA ICNG states that human comfort (amenity) vibration is to be measured and assessed in accordance with *Assessing Vibration – a technical guideline* (DECC 2006).

In general, structural damage due to vibration can be of concern when hammering, blasting, vibration rolling, crushing, piling and other vibration inducing construction works are carried out.

The EPA ICNG does not have specific structural vibration damage criteria however the RTA *Environmental Noise Management Manual* (2001) recommends the use of the following Standards:

- British Standard BS 7385: Part 2: *Evaluation and Measurement for Vibrations in Buildings – Part 2 Guide to Damage Levels from Ground-Borne Vibration*
- AS 2187.2 *Explosives-Storage, transport and use, Part 2: Use of Explosives*
- German Standard DIN 4150, Part 3: *Structural Vibration in Buildings: Effects on Structures*

4.4 BCA Sound Insulation Requirements – Class 3 Buildings

The BCA, in Volume 1 Section F5 "Sound Transmission and Insulation" states that walls and floors separating places of occupancy *"must provide insulation against the transmission of airborne and impact generated sound sufficient to prevent illness or loss of amenity to the occupants"*.

The following summarises the BCA sound insulation requirements, brevity necessitates detail in the BCA taking precedence over the tables below.

Table 4-3 Walls – Deemed-to-Satisfy Provisions

Wall Description	BCA Reference	Airborne	Impact
Separating sole-occupancy units (SOUs) habitable areas	F5.5(a)(i)	$R_w + C_{tr} \geq 50$	
Separating SOUs wet to habitable areas	F5.5(a)(i) F5.5(a)(iii)	$R_w + C_{tr} \geq 50$	Discontinuous Construction
Separating SOUs with corridor, stairway, lobby or different classification	F5.5(a)(ii)	$R_w \geq 50$	
Separating SOUs with plantroom or lift shaft	F5.5(a)(ii) F5.5(a)(iii)	$R_w \geq 50$	Discontinuous Construction
Separating SOU habitable area with services from another SOU	F5.6(a)(i)	$R_w + C_{tr} \geq 40$	
Separating SOU wet area with services from another SOU	F5.6(a)(ii)	$R_w + C_{tr} \geq 25$	
Doors separating SOU with corridor, stairway, lobby	F5.5(b)	$R_w \geq 30$	

Wall Type	Reference	Discontinuous Construction Requirement
Masonry	F5.3(c)(i)	Wall having a minimum 20mm cavity between the 2 separate leaves, with resilient wall ties if necessary
Other than masonry	F5.3(c)(ii)	Wall having a minimum 20mm cavity with no mechanical linkage except at the periphery

Table 4-4 Floors – Deemed-to-Satisfy Provisions

Floor Description	BCA Reference	Airborne	Impact
Separating sole-occupancy units (SOUs)	F5.4(a)(i)	$R_w + C_{tr} \geq 50$	$L_{n,w} \leq 62$
Separating SOUs with plantroom, lift shaft, corridor, stairway, lobby or different classification	F5.4(a)(ii)	$R_w + C_{tr} \geq 50$	$L_{n,w} \leq 62$
Separating SOU habitable area with services from another SOU	F5.6(a)(i)	$R_w + C_{tr} \geq 40$	
Separating SOU wet area with services from another SOU	F5.6(a)(ii)	$R_w + C_{tr} \geq 25$	

Table 4-5 Walls – Verification Methods

Wall Description	BCA Reference	Airborne
Separating sole-occupancy units (SOUs)	FV5.2(a)	$D_{nT,w} + C_{tr} \geq 45$
Separating SOUs with plantroom, lift shaft, corridor, stairway, lobby or different classification	FV5.2(b)	$D_{nT,w} \geq 45$
Doors separating SOUs with corridor, stairway, lobby	FV5.2(c)	$D_{nT,w} \geq 25$

Table 4-6 Floors – Verification Methods

Floor Description	BCA Reference	Airborne	Impact
Separating sole-occupancy units (SOUs)	FV5.1(a) FV5.1(b)	$D_{nT,w} + C_{tr} \geq 45$	$L_{nT,w} \leq 62$

Other BCA Acoustic Issues

The builder must also ensure that the project complies with following BCA acoustic requirements:

Chasing of Masonry Elements

The BCA specifically precludes chasing of services into concrete or masonry elements. (Clause 2. (e)(i)).

Fixing of Water Supply Pipework

Note Clause 2. (iii) (A) and (B).

A water supply pipe must:

(A) Only be installed in the cavity of discontinuous construction; and

(B) In the case of a pipe that serves only one sole occupancy unit, not be fixed to the wall leaf on the side adjoining any other sole-occupancy unit and have a clearance not less than 10mm to the other wall leaf.

(i.e. the cavity must not be bridged by any pipework)

Electrical Outlets

The BCA requires that any electrical outlets must be offset from each other:

(A) in masonry walling, not less than 100 mm; and

(B) in timber or steel framed walling, not less than 300 mm

Ducts

Ducts serving or passing through more than one SOU per F5.6(a) must be separated from another SOU by masonry or plasterboard construction having a minimum $R_w + C_{tr}$ of 40 for habitable rooms and $R_w + C_{tr}$ of 25 for non-habitable rooms.

5.0 NOISE SURVEY AND PROJECT NOISE GOALS

Unattended noise monitoring was conducted on site between 11th and 18th June to measure the existing ambient noise levels. The noise monitor was programmed to store the L_n percentile noise levels for each 15-minute sampling period. Measurements were made of L_{min}, L_{max}, L_{90}, and L_{eq} and were later retrieved for analysis. The position of the noise monitor is shown in Figure 3-1. The results and summary of the noise monitoring are listed in graphical form in Appendix B of this report.

5.1 Instrumentation

Noise measurements were conducted using the following equipment:

- Sound analyser Svantek 877 Serial No. 69594.
- Sound calibrator B&K 4230, Serial number 830447.

The instruments were calibrated before and after the noise measurements and there were no adverse deviations between the two. The analysers are type 1 and comply with AS IEC 61672.2-2004. The instruments carry traceable calibration certificates.

5.2 Project Noise Criteria

The tables below present the results of the ambient noise monitor measurements and noise goals for the proposed boarding house.

The assessment periods are defined by the NSW NPfI are as follows:

- Daytime: 7 am to 6 pm.
- Evening: 6 pm to 10 pm.
- Night: 10 pm to 7 am.

Table 5-1 Project Noise Trigger Levels at Residential Boundaries

All values in dB(A)

Receiver Type	Period	Measured RBL (L_{A90})	Acceptable Noise Levels $L_{Aeq(period)}$	NSW Noise Policy for Industry Criteria		Project Noise Trigger Levels $L_{Aeq15min}$
				Amenity $L_{Aeq15min}$	Intrusiveness $L_{Aeq15min}$	
Residential (Suburban)	Day	33*	55	53	40	**40**
	Evening	33*	45	43	40	**40**
	Night	30	40	38	35	**35**

*The RBL has been considered to be 30dB(A) based on the "A1.2 *Definitions to support mythologies"* section of the *Noise Policy for Industry 2017,* which states that "*where this level (measured background noise) is found to be less than 30dB(A) for the evening and night periods, the rating background noise level is set to 30dB(A); and where it is found to be less than 35dB(A) for daytime period, it is set to 35dB(A)."*

5.2.1 EPA NSW Interim Construction Noise Guidelines – Noise Goals

Based on the construction happening during normal daytime working hours 7am to 6 pm, the noise criteria are presented in the following Table 5-2.

Table 5-2 EPA NSW Interim Construction Noise Guidelines Criteria for Site

Receivers	Daytime Background, dB(A)	Noise affected level (Criterion), dB(A)
Residential	35	45

The “Highly Noise Affected” criterion has a set level of 75 dB(A).

6.0 ASSESMENT AND RECOMMENDATIONS

Communal Areas

Penrith City council provided the following general guidelines in the acoustic assessment modelling of the proposed boarding house.

- *30% - 50% of the residents using the outdoor spaces.*
- *50% of the residents speaking at the same time.*
- *Raised voice levels of at least 72-78dB(A)* for a single person being used.*

(*PKA assuming these to be Power Levels as no distance has been specified).

Based on the above conditions and considering that the proposed boarding house has a total of 18 residents, that would result in 9 residents using the space with approximately 5 people speaking at one time. Considering an average Sound Power Level of 74dB(A), this results in a total spatial Sound Power Level of 81dB(A).

No internal outdoor communal areas were explicitly identified in the provided architectural plans. If any of the outdoor areas were to be used as communal areas, the management will have to restrict the use of the common spaces outside these specified hours (7:30 am and 8:30 pm) to prevent noise disturbance to the adjacent residential premises.

Furthermore, where outdoor areas are proposed to communal areas, to mitigate noise impact from the outdoor private areas and common living rooms to adjacent residential receivers, acoustic fences are required to be installed at the boundary. The fences must have a minimum acoustic performance of R_w of 25 and the barriers must be a minimum height of 1.8 m. The acoustic barrier must be of solid construction (with no air gaps) with materials such as:

- Timber fence with double lapped boards of standard 15 mm thickness, allowing a continuous thickness of 30 mm
- Autoclaved Aerated Concrete (AAC) panels such as Hebel
- Masonry or Precast concrete panels
- Any combination of the above

The extent of this barrier and location must be checked and approved by an acoustic consultant following the decision to use any outdoor area as a communal space.

Façade Treatment

The glazing in the indoor communal areas (Living/Dining/Kitchen) must have a minimum sound insulation rating of R_w 32 to mitigate the noise breakout from the indoor common area.

Bin collection

In general, as bin collections typically occur in the early hours to avoid traffic delays, the noise generated from any bin collection can be intrusive. However, waste removal is a necessary Council service that applies to all dwellings, mid-rise residential, and commercial premises.

We understand that bin collection for this site will be following the typical weekly schedule therefore no additional frequency in bin collections will occur. It is PKA's understanding that the collection of the above bins will not generate more noise than a typical dwelling due to the

proposed number of occupants in the boarding house. We also note that there are no industrial or commercials bins on site.

There are no practical or feasible acoustic treatments that can be applied to curb-side bin collection, and additionally there is no specific noise criteria for boarding house or residential developments. Therefore, we do not consider than any acoustic treatment can or should be applied for this project.

Outdoor Plant and equipment

At the time of preparation of this report, a detailed mechanical schedule was unavailable. The selection of any future outdoor mechanical and plant equipment must be checked so that the rated sound power/pressure levels will comply at the boundary of the sensitive residences with the NSW EPA *Noise Policy for Industry 2017* criteria listed in Table 5-1.

APPENDIX A DRAWINGS USED TO PREPARE REPORT

This report was prepared using drawings provided by Signature Projects Australia Pty Ltd, Job No. 2020-09.

No.	Rev.	Title	Date
SK-02	K	Ground Floor Plan	05/08/2020
SK-03	H	First Floor Plan	05/08/2020
SK-08	C	Proposed Roof Plan	05/08/2020

APPENDIX B NOISE MEASUREMENTS (GRAPHICAL)

11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

		Background Noise Levels L_{A90} dB								Existing Noise Levels L_{Aeq} dB							
		Daytime 07:00 - 18:00		Evening 18:00 - 22:00		Nighttime 22:00 - 07:00				Daytime 07:00 - 18:00		Evening 18:00 - 22:00		Nighttime 22:00 - 07:00			
		Measured	Corrected	Measured	Corrected	Measured	Corrected			Measured	Corrected	Measured	Corrected	Measured	Corrected	Update Public Holidays	
Thursday	11/06/2020			33.1	33.1	30.1	30.1	Thursday	11/06/2020			42.6	42.6	40.3	40.3		
Friday	12/06/2020	33.2	33.2	31.9	31.9	27.0	27.0	Friday	12/06/2020	48.6	48.6	39.9	39.9	39.2	39.2		
Saturday	13/06/2020	34.0	34.0	32.2	32.2	27.9	27.9	Saturday	13/06/2020	47.0	47.0	42.6	42.6	46.5	46.5		
Sunday	14/06/2020	35.5	35.5	34.1	34.1	30.0	30.0	Sunday	14/06/2020	45.5	45.5	39.7	39.7	46.3	46.3	Y	
Monday	15/06/2020	29.6	29.6	35.2	35.2	31.3	31.3	Monday	15/06/2020	48.5	48.5	40.1	40.1	44.5	44.5		
Tuesday	16/06/2020	28.7	28.7	37.3	37.3	31.7	31.7	Tuesday	16/06/2020	46.7	46.7	43.0	43.0	44.4	44.4		
Wednesday	17/06/2020	36.9	36.9	32.8	32.8	30.3	30.3	Wednesday	17/06/2020	48.8	48.8	39.9	39.9	43.9	43.9		
Thursday	18/06/2020	33.3	33.3					Thursday	18/06/2020	46.3	46.3						
Rating Background Level (RBL)		**33**	**33**	**33**	**33**	**30**	**30**	**Average Noise Level (L_{Aeq})**		**48**	**48**	**41**	**41**	**44**	**44**		

11853-3 Edward Street(3), Kingswood

Project Address: 3 Edward Street, Kingswood

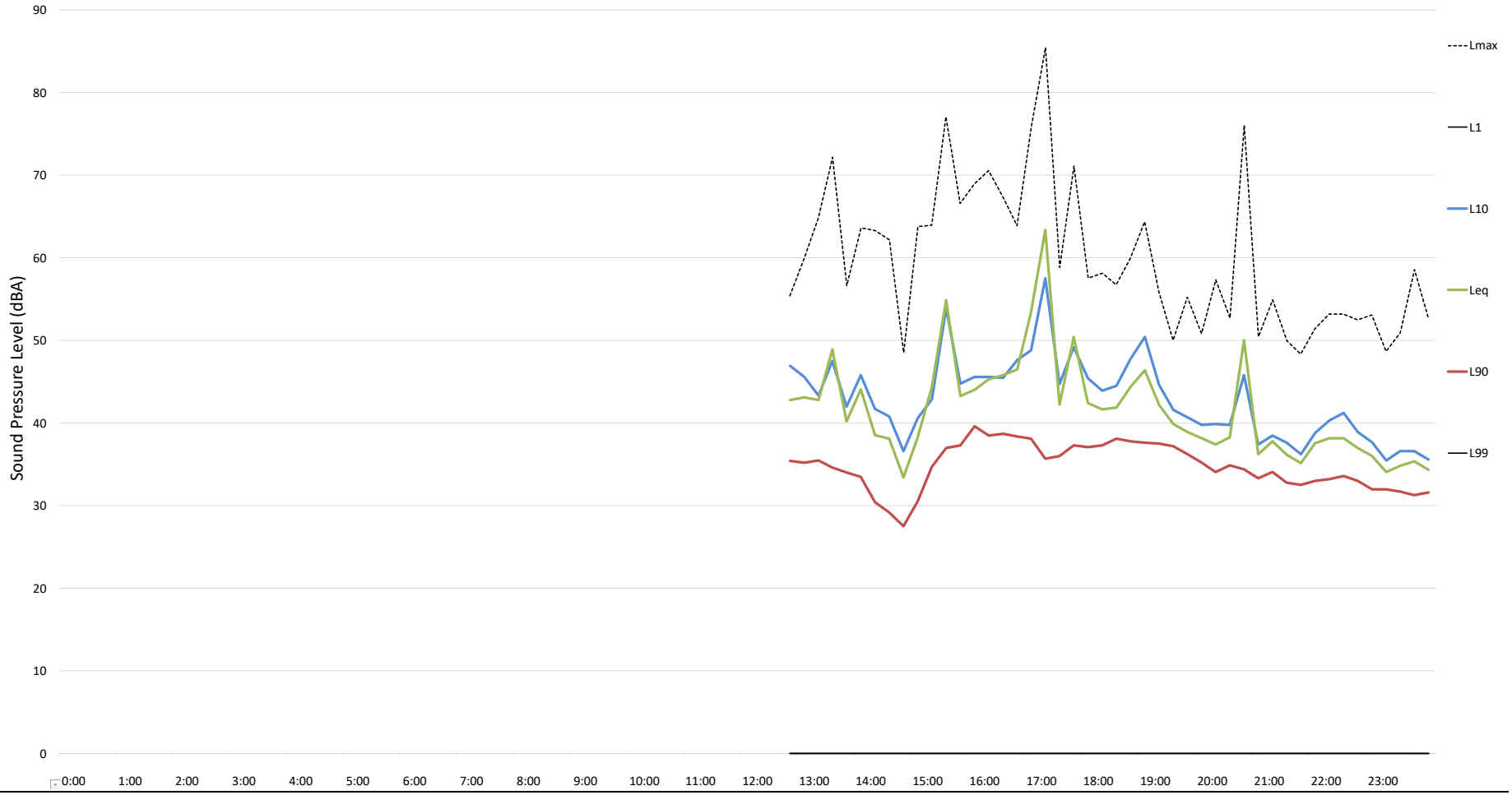
Logger Location: At sensitive residential boundary measuring ambient noise

PKA Acoustic Consulting

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

11/06/2020 Thursday

Existing Ambient Noise Levels (dBA)



11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

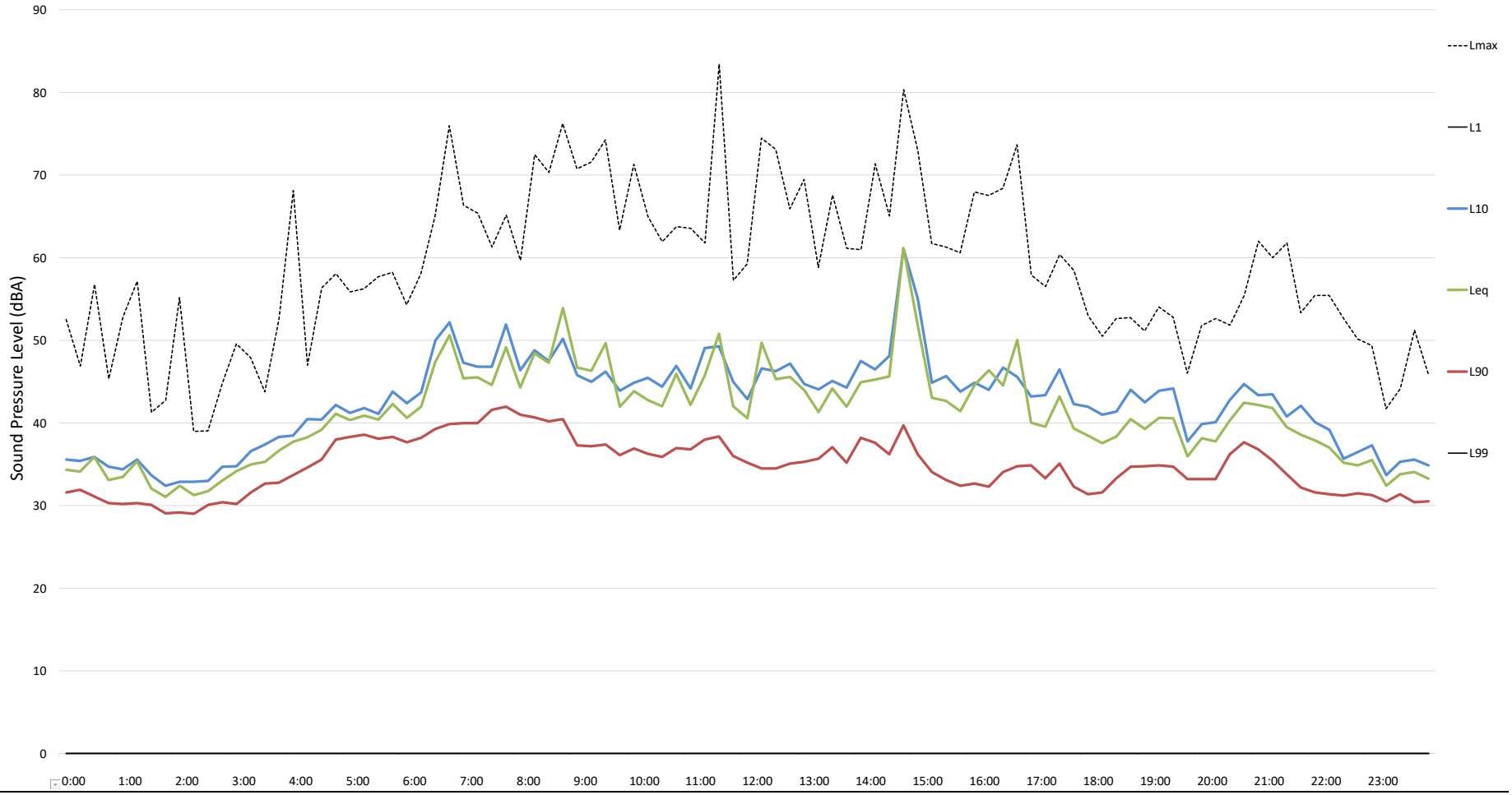
Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

12/06/2020 Friday

Existing Ambient Noise Levels (dBA)



11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

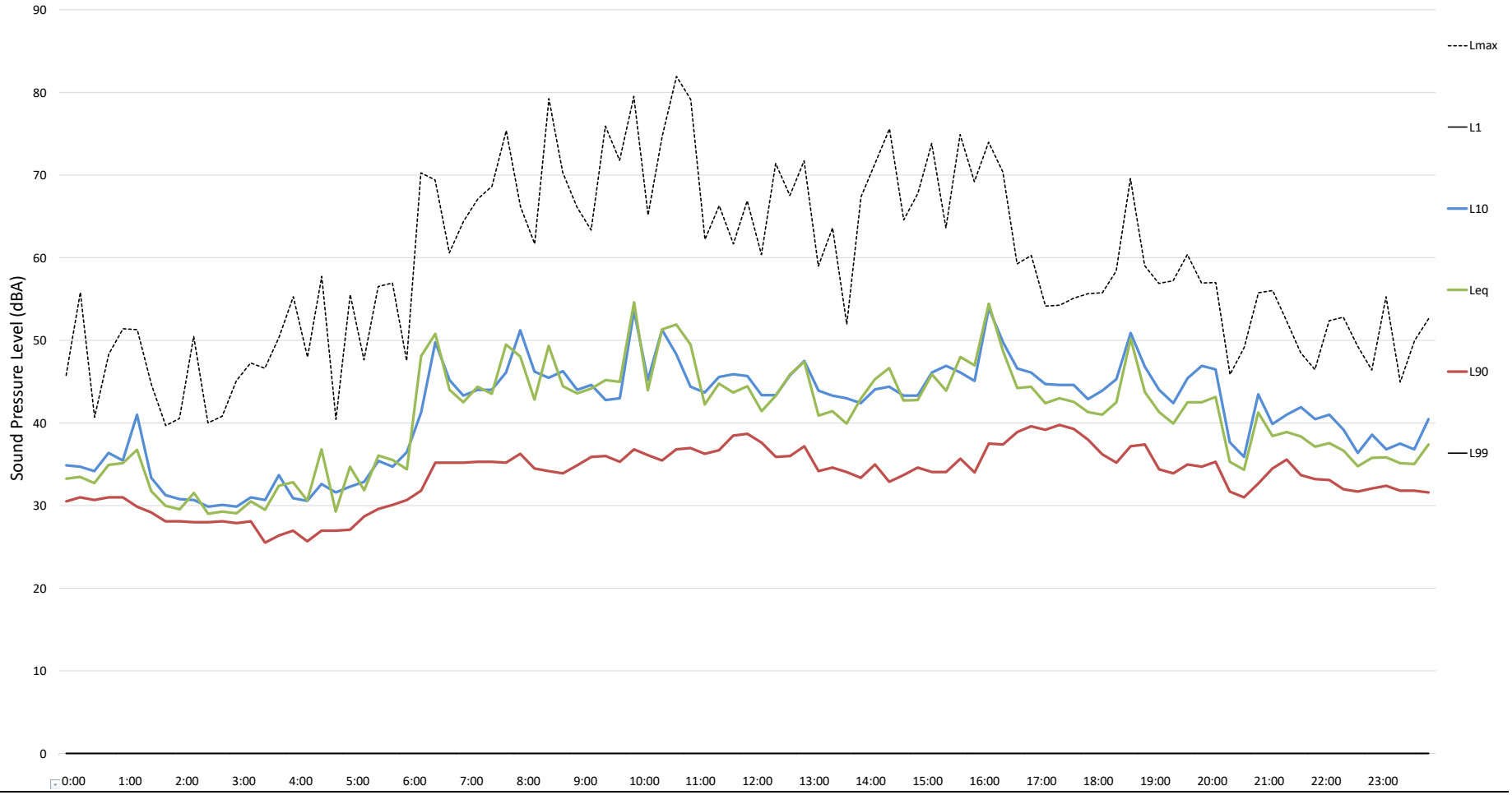
Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

13/06/2020 Saturday

Existing Ambient Noise Levels (dBA)



11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

14/06/2020 Sunday

Existing Ambient Noise Levels (dBA)

11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

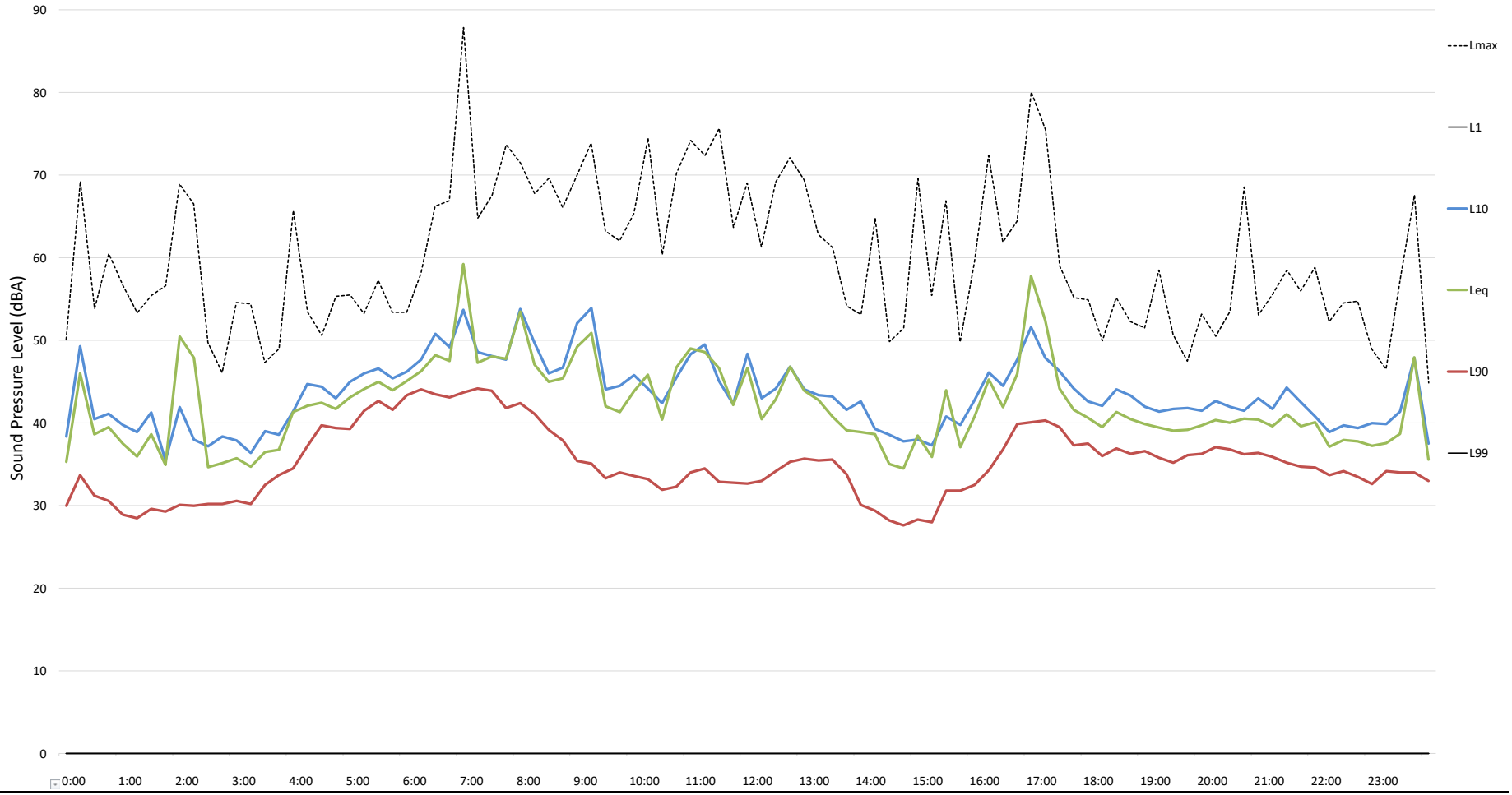
Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

15/06/2020 Monday

Existing Ambient Noise Levels (dBA)



11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

16/06/2020 Tuesday

Existing Ambient Noise Levels (dBA)

11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

17/06/2020 Wednesday

Existing Ambient Noise Levels (dBA)

11853-3 Edward Street(3), Kingswood

PKA Acoustic Consulting

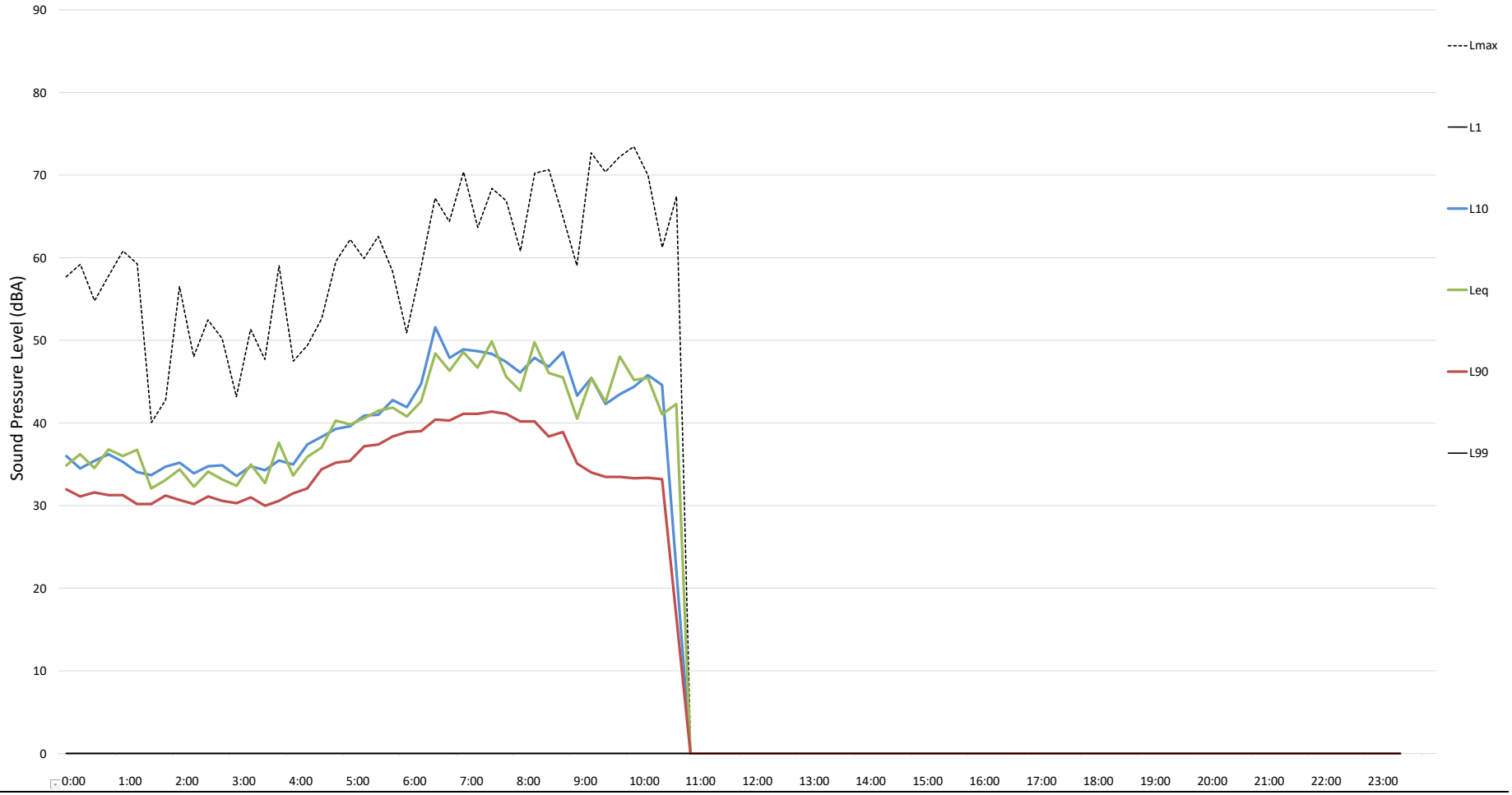
Project Address: 3 Edward Street, Kingswood

Logger Location: At sensitive residential boundary measuring ambient noise

	Daytime 07:00 - 18:00 Measured	Evening 18:00 - 22:00 Measured	Nighttime 22:00 - 07:00 Measured
L_{Aeq} dB		42.6	40.3
L_{A90} dB		33.1	30.1

18/06/2020 Thursday

Existing Ambient Noise Levels (dBA)



PKA ACOUSTIC CONSULTING

PO Box 345, Lane Cove 1595

+612 9460 6824 — admin@pka.com.au