hepworth acoustics

THE ROCKET, EUSTON ROAD

KITCHEN EXTRACT NOISE IMPACT ASSESSMENT

On behalf of:

Mitchells & Butlers Leisure Retail Ltd

Report No P18-140-R01
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THE ROCKET, EUSTON ROAD

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Mitchells & Butlers Leisure Retail Ltd to carry out a noise impact assessment of the proposed new kitchen extract duct to be installed at The Rocket public house, 120 Euston Road, London NW1 2AL.

1.2 The assessment has been commissioned in connection with the planning application for the proposed development. The aim of this report is to assess whether the proposed new kitchen extract duct will meet suitable limits for noise, and to make recommendations for noise mitigation where required.

1.3 The site is bounded by Euston Road to the south east and Chalton Street to the north east. To the west and north are a mix of offices, restaurants, and shops. The nearest residences, as far as we are aware, are the flats above the shop at 3 Chalton Street. A location plan is shown in Figure 1.

1.4 The proposal is to extend the existing kitchen extract duct up to roof level. A drawing is shown in Figure 2. The kitchen extract system typically operates from 07:30 to 00:00 daily.

1.5 This assessment is based on the following drawings:

- 2331/01 from Pembrook Design, dated September 2009.
- 2331/02 from Pembrook Design, dated September 2009.
- JTS/7132/01 from JTS Partnership, dated July 2010.
- 001-491-01 from Chapman Ventilation, dated July 2017.

1.6 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 ACOUSTIC DESIGN CRITERIA

2.1 Camden Council has the following guidance in *Camden Planning Guidance: Amenity*, dated March 2018:

> *Developments proposing plant, ventilation, air extraction or conditioning equipment and flues will need to provide the system's technical specifications to the Council accompanying any acoustic report. 'BS4142 Method for rating Industrial and Commercial Sound'* [SIC] *contains guidance and standards which should also be considered within the acoustic report.*

2.2 The following additional guidance is included for industrial and commercial noise sources in *Appendix 3: Noise Thresholds* of the *Camden Local Plan 2017:*

> *A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15 dB if tonal components are present) should be considered as the design criterion.*

2.3 BS 4142: 2014 '*Methods for rating and assessing industrial and commercial sound'* provides methods for rating and assessing sound of an industrial and/or commercial nature.

2.4 BS 4142 requires the 'rating' noise level for the operation to be compared with the background (L_{A90}) noise level in the absence of the operational noise being assessed.

2.5 The 'rating' level is derived based on the 'specific' L_{Aeq} noise level attributable to the operation with an *'acoustic feature'* penalty added for any noise sources which give rise to tonal, impulsive, intermittent, or other characteristics readily distinctive against the residual acoustic environment.

2.6 Camden's Development Policy 28 (Noise and Vibration) recommends that noise levels from plant and machinery at 1 metre external to a sensitive façade should be < 5 dB(A) below background noise levels, or < 10 dB(A) below if the noise has a distinguishable discrete continuous note or distinct impulses.

2.7 In the context of this development, we consider the guidance in BS 4142: 2014 to be appropriate so this will be adopted, along with Camden Council's 'Rating Level' criteria stated in Paragraph 2.2 above.

3.0 ENVIRONMENTAL NOISE SURVEY

Survey Details and Results

3.1 Environmental noise measurements were carried out at the site at Location 1 marked on Figure 1, which is the bedroom window on the 3rd floor of the property, facing north west.

3.2 The description and measurement of environmental noise has been carried out in accordance with the guidance in BS 7445 *Description and measurement of environmental noise*, as stipulated in the *Camden Local Plan 2017*.

3.3 Noise measurements were taken between 19:50 on Tuesday 24th April and 19:50 on Wednesday 25th April 2018.

3.4 The weather conditions throughout the noise survey were dry and overcast, with wind speeds below 5 m/s. Wind was from the south and east. Temperatures were between 14°C and 22°C. These were considered suitable conditions for the survey.

3.1 The measurement microphone was extended approximately 1 metre from the existing building façade via the partially open 3rd floor window. Hence, the measurement microphone was not in free-field conditions and a -3 dB correction is applicable to the measured noise levels to derive the equivalent free-field levels.

3.2 Measurements were taken in 15-minute samples for the duration of the survey.

3.3 All 'as measured' noise levels (i.e. before the application of façade correction) are presented in Appendix II. The façade-corrected noise levels are summarised numerically in Table 1. The lowest measured $L_{A90,15mins}$ occurred at 00.50 on Wednesday 25th April.

Table 1: Background noise levels summary (dBA)

Location	Daytime (07:00 to 23:00)		Night-time (23:00 to 07:00)	
	Lowest $L_{A90,15mins}$	Modal $L_{A90,15mins}$	Lowest $L_{A90,15mins}$	Modal $L_{A90,15mins}$
1	54	59	51	52

Noise Sources

3.4 The dominant noise source included road traffic on the surrounding roads, and noise from the existing mechanical plant located to the rear of the premises. Existing mechanical plant includes the kitchen

extract fan itself, and several condensers serving the adjacent commercial premises. At the time of the measurements, the existing kitchen extract fan had no duct fitted.

3.5 There was some sporadic noise from local construction work between 15:05 and 17:20 on 25th April, but this did not have a significant effect on the L_{90} background noise levels

Sound Level Meter Details

3.6 The noise monitoring was carried out using a Rion NL-31 Type 1 sound level meter (serial no. 01120844). The calibration level of the meter was checked before and after the survey with a Brüel & Kjær Type 4203 sound calibrator (serial no. 2412667). No significant calibration deviation was observed.

4.0 ASSESSMENT

4.1 The manufacturer's sound power level data by octave band of the kitchen extract fan is shown in Table 2.

Table 2: Kitchen Extract Fan Octave Band Sound Power Level Data, dB L_w

Equipment	Type	Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Kitchen Extract	Systemair MUBT 062 560 D4 outlet	67	69	73	75	74	71	66	59
	Systemair MUBT 062 560 D4 surroundings	50	52	56	58	57	54	49	42

4.2 Based on our experience of this type of equipment and the data in Table 2, we do not expect the equipment to feature tonal or impulsive characteristics readily distinctive against the residual acoustic environment. Therefore, the Rating Level ($L_{Aeq,15min}$) is required not to exceed 10 dB(A) below the minimum external $L_{A90,15min}$ background noise at the nearest noise sensitive properties in accordance with the guidance in Appendix 3 of the *Camden Local Plan 2017*.

4.3 The assessment predicting the noise emission level for the revised kitchen extract system to compare to the corresponding background noise level at the window of the nearest residence is summarised in Table 3. The detailed calculation is in Appendix III.

Table 3: Total Predicted Noise Levels 1 Metre Outside Nearest Residential Window

Description	dB(A)
Resultant equipment noise level 1 metre outside nearest residential window (dB $L_{Aeq,15mins}$)	37
Lowest background noise level (dB $L_{A90,15mins}$)	51
Comparison ($L_{Aeq,15mins} – L_{A90,15mins}$)	-14

4.4 As can be seen from Table 3, the emissions level is calculated to be 14 dB(A) below the lowest measured background noise level outside the window of the nearest noise-sensitive premises. This will therefore be compliant with the Local Authority's criteria, and no special noise mitigation measures are required.

5.0 CONCLUSION

5.1 Mitchells & Butlers Leisure Retail Ltd appointed Hepworth Acoustics to assess the impact of noise on the neighbouring noise-sensitive premises from the proposed revised kitchen extract system to be installed at The Rocket, 120 Euston Road, London NW1 2AL.

5.2 A noise survey has been undertaken at the site and the background noise levels have been determined in accordance with the requirements of the *Camden Local Plan 2017*.

5.3 Using the noise data for the equipment, the levels for the noise emissions at the nearest noise-sensitive premises has been predicted using the guidance in BS 4142: 2014. The predicted levels are in compliance with the noise requirements of the Local Authority, so no special noise mitigation measures are necessary.

Figure 1 – Location Plan

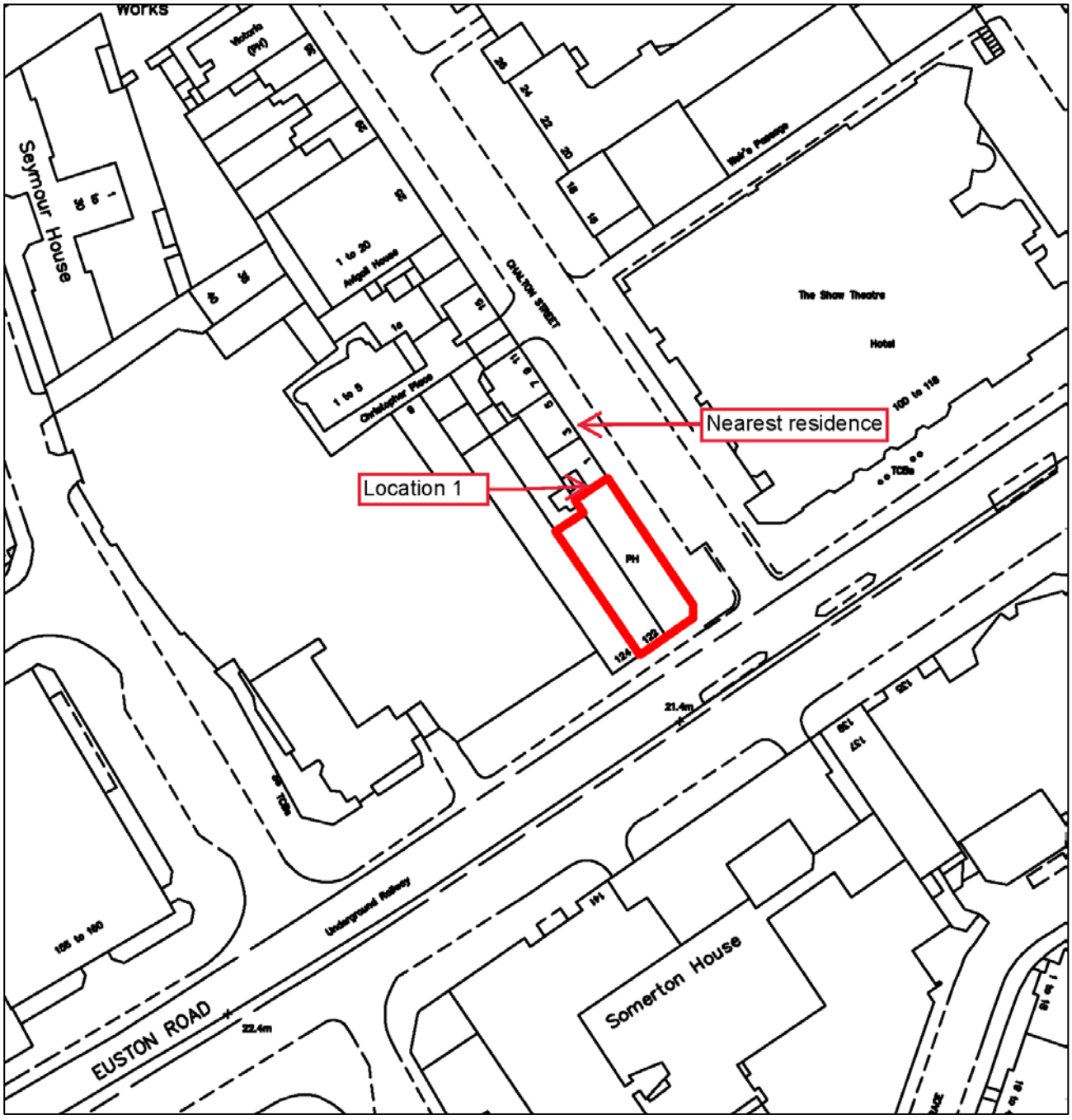
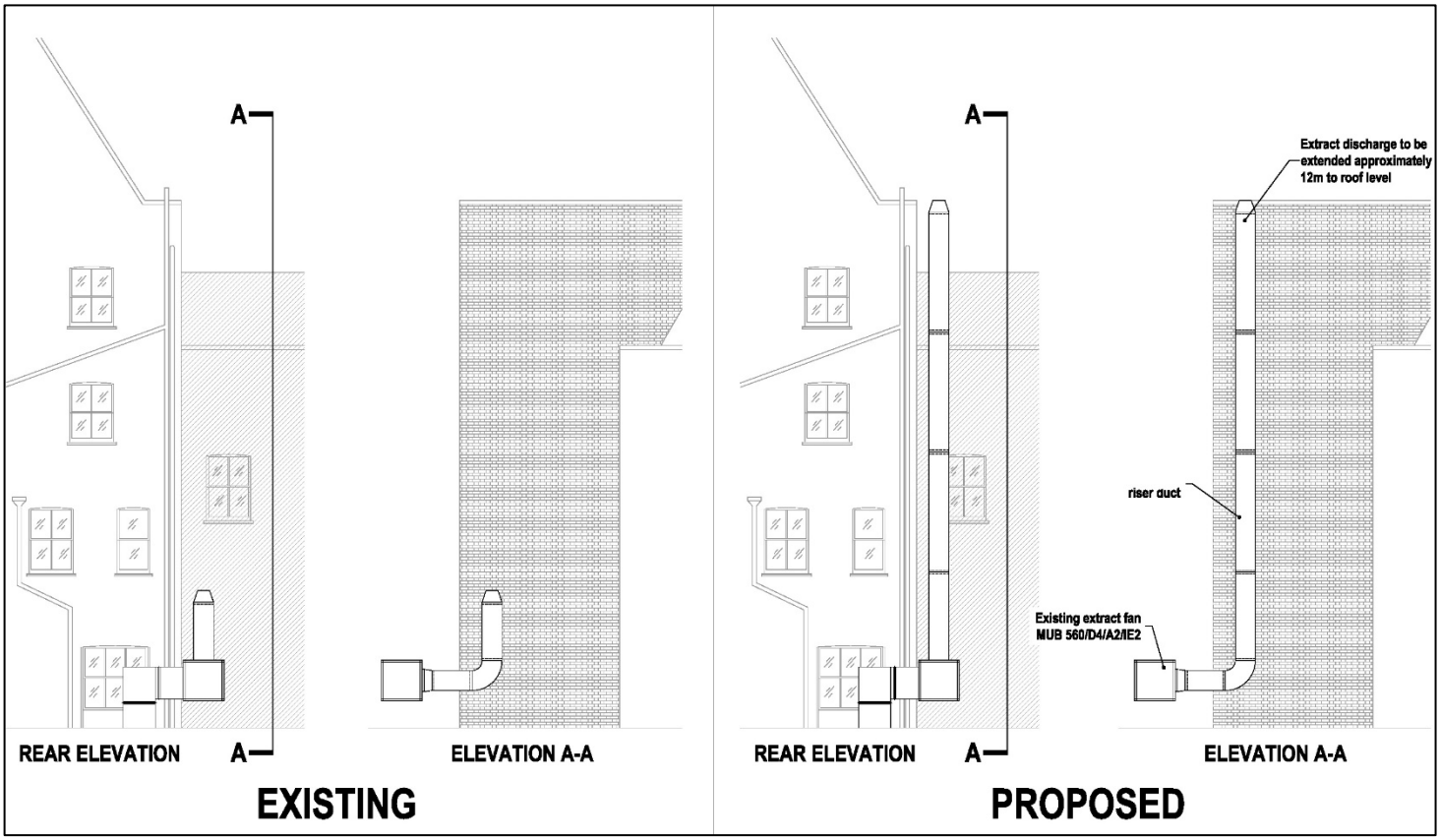


Figure 2 – Existing and Proposed Rear Elevation



Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq,T}$ This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period, T. In other words, LAeq is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_W This is the sound power level of a sound source, in decibels, which is 10 times the logarithm to the base 10 of the ratio of sound power radiated by the source to a reference power. The reference power is 1 picowatt (1×10^{-12} watt). The sound power level is the fundamental measure of the total sound energy radiated by a source per unit time.

$L_{Amax,f}$ This is the maximum A-weighted noise level that was recorded during each sample period, with the meter set to the 'fast' setting.

$L_{A10,T}$ This is the A-weighted noise level exceeded for 10% of the time period, T. L_{A10} is used as a measure of road traffic noise.

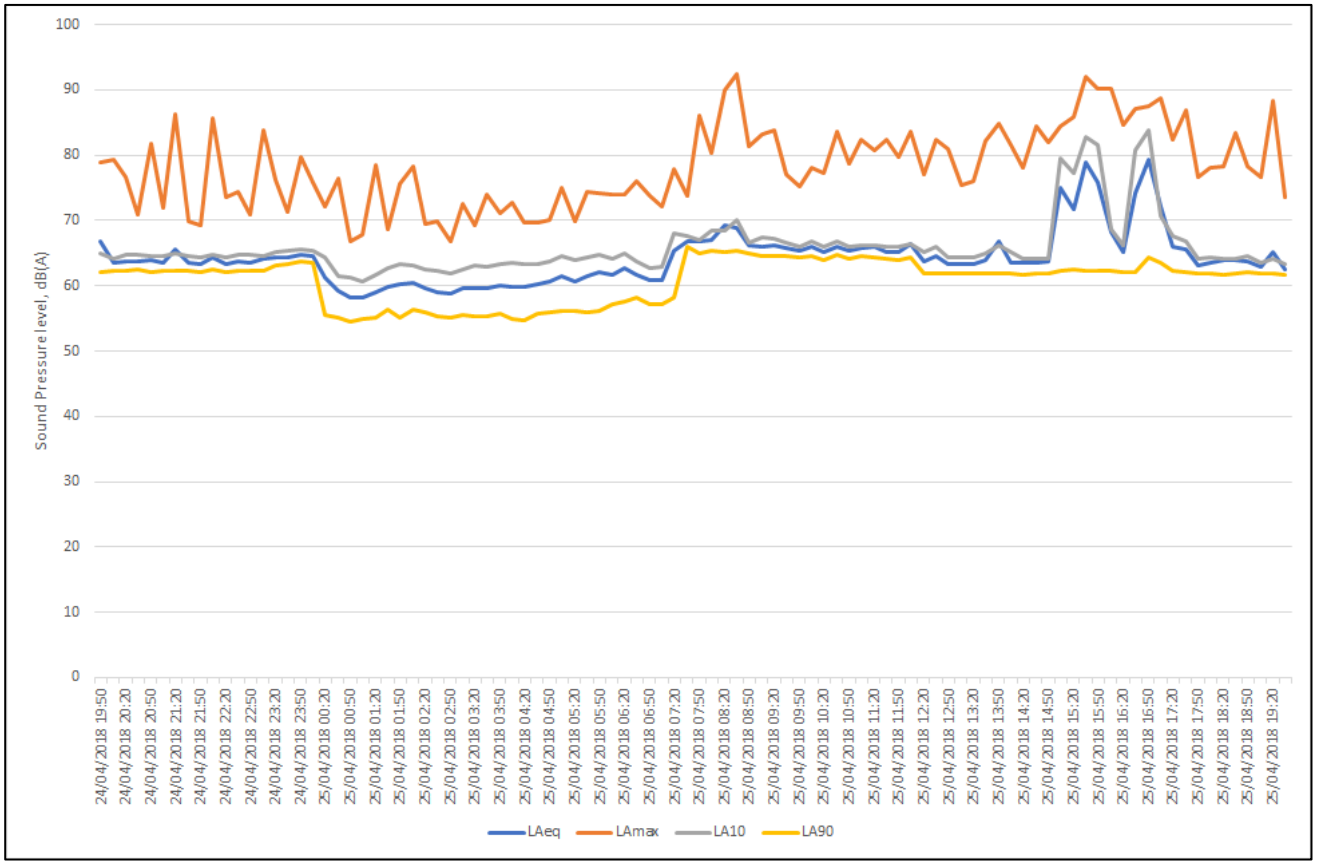
$L_{A90,T}$ This is the A-weighted noise level exceeded for 90% of the time period, T. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Location 1

Equipment:	Rion NL-31 'Type 1' sound level meter (serial no. 01120844) with tripod and windshield
Weather:	Dry, wind speed below 5 m/s

All levels in dB(A)



Appendix III: Noise Calculations

KITCHEN EXTRACT - termination

Description	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A**	**Notes**
MUBT 062 560 D4	67	69	73	75	74	71	66	59		Manufacturer's data - Lw outlet
1 x duct bend	0	0	-6	-8	-4	-3	-3	-3		Trox manual
Duct run	-7.2	-7.2	-3.6	-1.8	-1.8	-1.8	-1.8	-1.8		Trox manual
Termination area correction (0.43mx0.43m)	-10	-6	-2.5	0	0	0	0	0		Woods Practical Guide to Noise Control fig 5.7
Termination directivity at 100deg	1	1	1	0.5	-0.5	-2	-15	-15		SRL - Noise Control in Industry - Fig 11.2 (bottom table)
Distance attenuation	-32	-32	-32	-32	-32	-32	-32	-32		16 m, hemispherical, no ground attenuation
Screening	-3	-4	-5	-5	-6	-6	-7	-7		Due to building edge
Resulting	16	21	25	29	30	26	7	0	33	

KITCHEN EXTRACT - external ductwork

Description	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A**	**Notes**
MUBT 062 560 D4	67	69	73	75	74	71	66	59		Manufacturer's data - Lw outlet
SRI of duct	3	8	14	20	23	26	27	35		22g steel sheet - adopted from Woods Practical Guide to Noise Control - Appendix B
Duct surface area (m^2)	31.2	31.2	31.2	31.2	31.2	31.2	31.2	31.2		12m length of duct, with 0.65mx0.65m cross section
Cross sectional area of duct (m^2)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4		0.65mx0.65m
Lw of duct break-out	64	66	70	72	70	64	58	43		Woods Practical Guide to Noise Control eqn. 5.11, subject to upper limit of in-duct Lw - 3dB
Distance attenuation	-29	-29	-29	-29	-29	-29	-29	-29		16 m, quarter-spherical, no ground attenuation
Screening	-9	-11	-14	-17	-20	-23	-25	-28		Due to building edge
Resulting	26	26	27	26	21	12	3	-15	26	

KITCHEN EXTRACT - casing

Description	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A**	**Notes**
MUBT 062 560 D4	50	52	56	58	57	54	49	42		Manufacturer's data - Lw surroundings
Distance attenuation	-29	-29	-29	-29	-29	-29	-29	-29		16 m, quarter-spherical, no ground attenuation
Screening	-9	-11	-14	-17	-20	-23	-25	-28		Due to building edge
Resulting	12	12	13	12	8	2	-5	-15	13	

Summary	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A**	**Notes**
KITCHEN EXTRACT - termination	16	21	25	29	30	26	7	0	33	
KITCHEN EXTRACT - external ductwork	26	26	27	26	21	12	3	-15	26	
KITCHEN EXTRACT - casing	12	12	13	12	8	2	-5	-15	13	
Overall resulting levels at nearest flat	**26**	**27**	**29**	**31**	**30**	**26**	**9**	**0**	**34**	**Free field**
	29	**30**	**32**	**34**	**33**	**29**	**12**	**3**	**37**	**+3 façade correction**