

**269 Camden High Street, London, NW1 7BX**

Environmental Noise Survey and Noise Impact Assessment Report  
1265.00.PNA

Prepared for

ABC House Ltd  
Arches 47-49 & Yard Castle Mews,  
Off Prince of Wales Road,  
London NW5 3LL

29 June 2020

By

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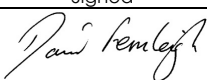
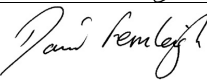
Time History Graphs

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Report	Signed	Name and Position	Relevant Qualification
Undertaken and Prepared By		David Fernleigh Principal	MIOA
Checked By		David Fernleigh Principal	MIOA

This report has been prepared with all reasonable skill and care by dBA Acoustics for the Client named. The information contained herein is the property of, and confidential to, the Client. Any third party information required and/or provided for the completion of this report should not be considered as verified by dBA Acoustics, unless otherwise stated.

## **1.0 Introduction**

1.1 Existing commercial air conditioning plant is proposed for relocation to roof level.

1.2 The site is located in a busy mixed commercial and residential area.

1.3 dBA Acoustics have been commissioned to undertake a noise impact assessment of the proposed plant in accordance with the Local Authority requirements.

1.4 This report concerns the assessment and/or control of atmospheric noise and/or vibration affecting neighboring noise sensitive property for the purposes of planning. Detailed mechanical, structural, H, S&E and conservation considerations are beyond the expertise of this practice and should be dealt with by the relevant professional service providers.

1.5 Where sound pressure levels are quoted, they are in decibels ref:  $2 \times 10^{-5}$  Pa. Where sound power levels are quoted, they are in decibels ref:  $1 \times 10^{-12}$  W, unless otherwise indicated.

## **2.0 Summary**

2.1 A two-day environmental noise survey has been undertaken over a weekday period and the prevailing background noise climate has been determined.

2.2 The noise impact assessment undertaken indicates that, unmitigated, the plant proposals should be commensurate with the requirements of the London Borough of Camden at adjacent properties.

2.3 Notwithstanding the above, recommendations for the control of structure-borne vibration have also been detailed.

### 3.0 Site

3.1 The map below shows the location of the development site, as indicated:



Map Data © OpenStreetMap 2020 (north top of the page)

3.2 The image below shows the approximate location of the proposed plant and acoustic survey monitoring positions 1 and 2:



Imagery © 2020 Google (north top of the page)

### 4.0 Survey

4.1 An automated environmental noise survey was undertaken over a 48hour period at the site.

4.2 The full methodology and results of the environmental noise survey are contained within the appendix.

## 5.0 Results

5.1 Time history graphs presenting the automated environmental survey measurements can be found in the appendix. Full raw data is available upon request.

5.2 The following table provides a summary of the prevailing lowest  $L_{Aeq,5min}$  ambient sound levels along with the lowest  $L_{A90}$  background sound levels measured over the survey period at the monitoring positions.

Table 1

Prevailing lowest ambient sound level		
Position	Time	Lowest $L_{Aeq,5min}$
1	Daytime 8 hour (07:00 – 19:00)	51.2
	Evening 4 hour (19:00 - 07:00)	50.9
	Night time 8 hour (23:00 – 07:00)	49.6
2	Daytime 8 hour (07:00 – 19:00)	53.9
	Evening 4 hour (19:00 - 07:00)	51.6
	Night time 8 hour (23:00 – 07:00)	50.0

Table 2

Prevailing lowest background sound level during proposed plant operational hours		
Position	Time	Lowest $L_{A90,15min}$
1	10:00 – 18:00	50.5
2		48.3

## 6.0 Criteria

6.1 With regards to commercial plant noise impacting noise sensitive receptors Camden Local Plan 2017 states:

*“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 (15dB if tonal components are present) should be considered as the design criterion).”*

6.2 It is understood the plant is intended for operation during the following daytime hours 10:00 – 18:00hrs only.

6.3 Therefore, based on the prevailing noise levels and the requirements of the London Borough of Camden, noise emissions from the proposed plant should not exceed the following levels outside living, dining or bedroom windows:

Table 3

Plant noise emission limits		
Position	Time	Lowest $L_{A90,15min}$
1	10:00 – 18:00	41
2		38

6.4 Should the noise emissions exhibit tonal or other noise characteristics sufficient to attract attention then the above noise limits should be reduced by 5dB.

## 7.0 Assessment

### Plant Noise Assessment

7.1 There are 3 outdoor units proposed for relocation to the upper flat roof. The identification label on the Daikin is clear, however, the 2 Hitachi units could not be identified as the ID label has faded. Nor could the sound pressure level of the units be measured at this time as they are not currently operational. Hitachi Technical Support have suggested that the units are from the RAS-HRNE range based upon photographs sent. Therefore, in the absence of firm identification the assumed sound pressure level adopted for this assessment has been taken from the loudest unit available in the HVRNE series: RAS-6HVRNE. The manufacturers published octave band centre frequency noise data for the proposed plant is shown in the appendix and detailed in the following table:

Table 4

Manufacturers Sound Pressure Levels dB at 1m at Octave Band Centre Frequency Hz (cooling)									
	63	125	250	500	1k	2k	4k	8k	dB(A)
Daikin RZQSG100L9V1	58	55	55	52	47	43	38	31	53
Hitachi RAS-6HVRNE	54	49	46	45	42	36	25	28	47
Hitachi RAS-6HVRNE	54	49	46	45	42	36	25	28	47

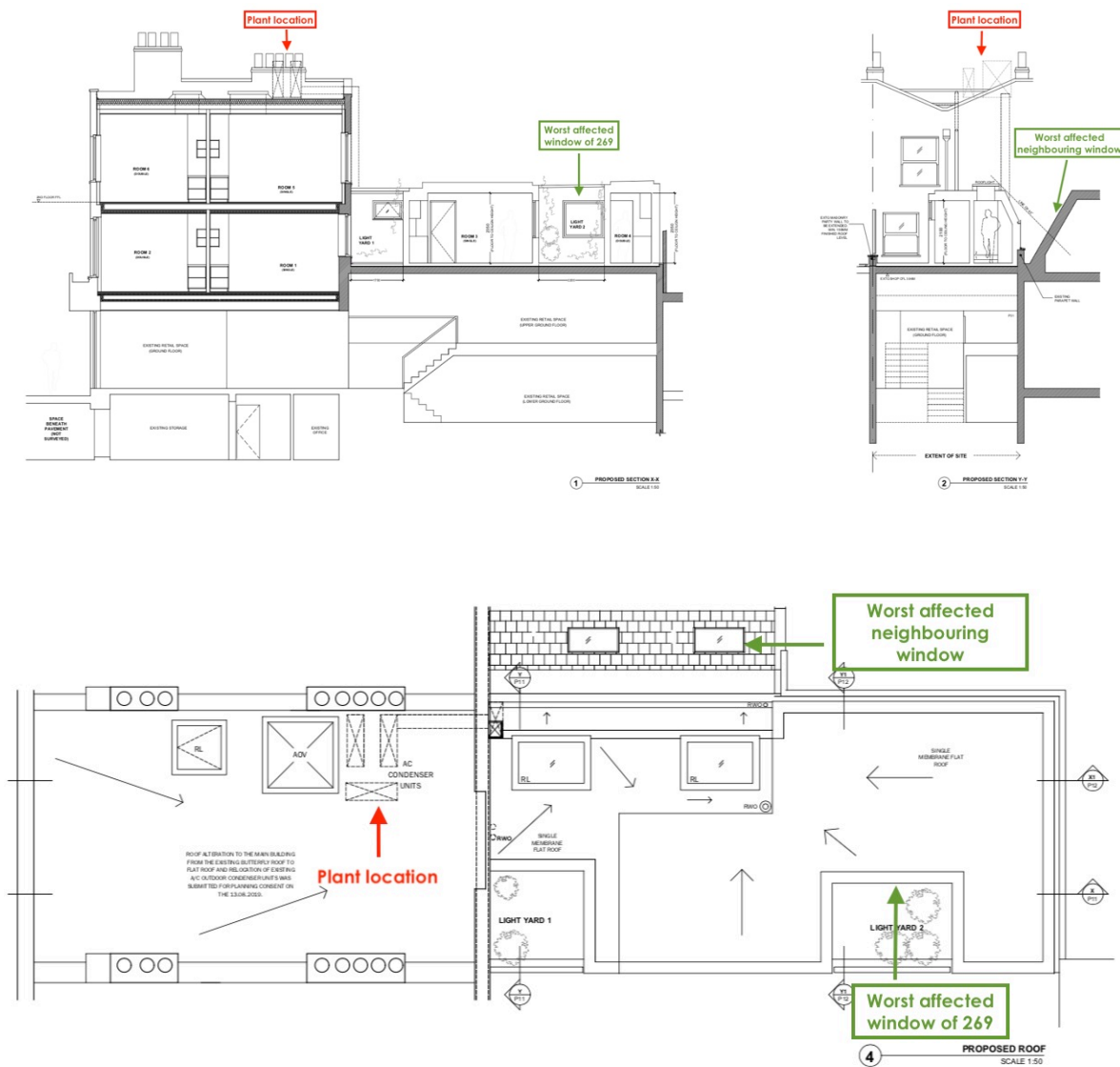
7.2 The manufacturers noise data above does not indicate the presence of significant tonality characteristics.

7.3 It is understood the plant is required for cooling purposes only.

7.4 The worst-case receptor is considered to be an adjacent first floor window in the mansard roof of 267 Camden High Street. The distance from the proposed installation to the neighboring window is estimated as approximately 8m with line-of-sight to the top of the nearest/highest plant item and no line-of-sight to the furthest/lowest units.

7.5 An assessment has also been undertaken to the potential worst affected receptor at 269 Camden High Street.

7.6 The equipment is proposed for relocation to the upper flat roof, as shown in the following Rich Architecture section (549-P11-B) and plan (549-P12-B) drawing excerpts:



7.7 The following table shows the predicted plant noise emissions at the given receptor:

Table 5

BS4142 Predicted plant noise emissions without mitigation dBA		
	To 269 ( Light yard 2)	Nearest neighbouring window
Combined Sound Pressure Level at 1m	55	55
Q (hemispherical radiation included in measurement)	0	0
-20LOG(r) (11m and 8m respectively))	-21	-18
Screening	0	-4*
Reflections at receiver	+4	+4
Specific level at receptor	38	37
Acoustic Character Correction	0	0
Rating level	38	37
Criteria (day time)	38	38
Excess above Criteria	0	0

\*composite reduction two units screened and one unit just visible

7.8 From the above table it can be seen that, without mitigation, the atmospheric noise emissions from the relocated units have been predicted to meet the criteria, mitigation is therefore not required.

7.9 There is likely to be a degree of plant noise break-in via the two roof lights located near to the plant location. However, one is over the communal bathroom and the other at the top of the stairs, neither of which is a habitable room. With internal sound insulation sufficient for Building regulations (including doors) the habitable rooms should not be negatively affected.

## **8.0 Mitigation**

8.1 As demonstrated above, no mitigation to control airborne emissions should be required. However, the relocated plant units are proposed for installation on a flat roof that is structurally linked to the residential areas below and indirectly to adjacent property. It is therefore recommended that the units are suitably vibration isolated on anti-vibration mounts.

8.2 As a preliminary guide, captive spring type vibration isolation mounts with a static deflection of 15mm are recommended. The proposal being for a warm roof, the vibration isolated units should be placed upon a suitable weight spreader to avoid any damage. All services to and from the units should be flexibly connected such that there is no directly fixed connection between the units and the surrounding structure. Please see suitable suppliers contact details in the appendix.

## **9.0 Conclusion**

9.1 Environmental noise monitoring has been undertaken including during a weekday period and the prevailing background noise levels at site have been determined. Although the data obtained are likely to be atypical due to the effects of the coronavirus lockdown, they are considered to be worst case.

9.2 The plant noise impact assessment undertaken indicates that the estimated atmospheric plant noise emissions should achieve the Local Authority requirements. In order to control structure-borne noise preliminary mitigation advice for anti vibration mounts has been specified.

9.3 The proposals are subject to final approval by the London Borough of Camden.



# Appendix

Survey Methodology

Time History Graphs

Manufacturers Plant Noise Data

Plant Noise Calculations

Suitable Suppliers

Glossary of Acoustic Terminology

## Environmental Survey Methodology

Environmental noise monitoring was undertaken for approximately 48 hours commencing approximately 12:00 on Monday 15 June 2020. The prevailing  $L_{Aeq}$ ,  $L_{Amax}$ ,  $L_{A10}$  and  $L_{A90}$  levels were logged at 15minute intervals for the first 24 hours and at 5minute intervals for the subsequent 24hour period. The following sound level meters and calibrator was deployed:

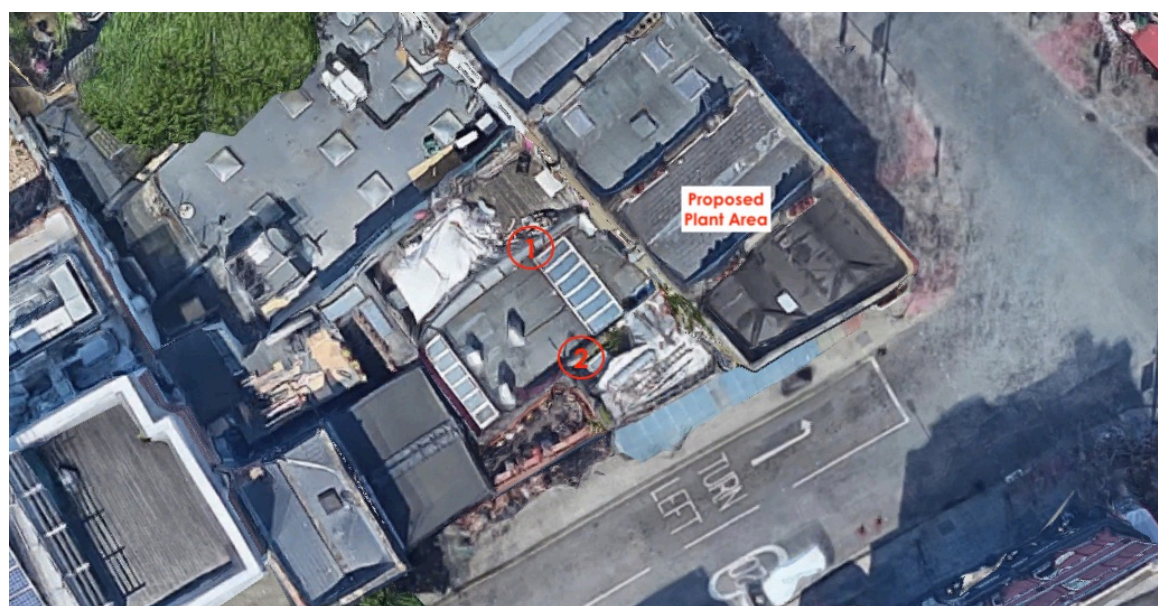
### Automated Equipment:

Position 1	SLM	Preamplifier	Microphone	Calibrator
Manufacturer	Norsonic AS	Norsonic AS	Gras	B&K
Type	140	1209	40AF	4231
Serial No.	1403413	15806	207390	1839133
Latest Calibration	09/03/2018			13/11/2019
Certificate No.	27991			U33334

Position 2	SLM	Preamplifier	Microphone	Calibrator
Manufacturer	Norsonic AS	Norsonic AS	Norsonic AS	B&K
Type	140	1209	1227	4231
Serial No.	1406112	20299	151737	1839133
Latest Calibration	08/11/2018			13/11/2019
Certificate No.	U30036			U33334

The calibration of the sound level meter used complies with IEC 61672-3:2006 class 1.

The sound level meters were installed on a rear first floor roof at a height of approximately 1.5m above roof level. The microphones were pole mounted. The monitoring locations were as far as possible away from existing plant, traffic noise exposure and significant reflecting surfaces. The monitoring positions were approximately as shown in the aerial photo below:



Imagery © 2020 Google (north top of the page)

Proprietary windshields and extension cables were deployed. The entire signal path was checked for calibration pre and post survey. The calibrated meter readings pre and post survey indicated no calibration shift greater than 0.1 dB.

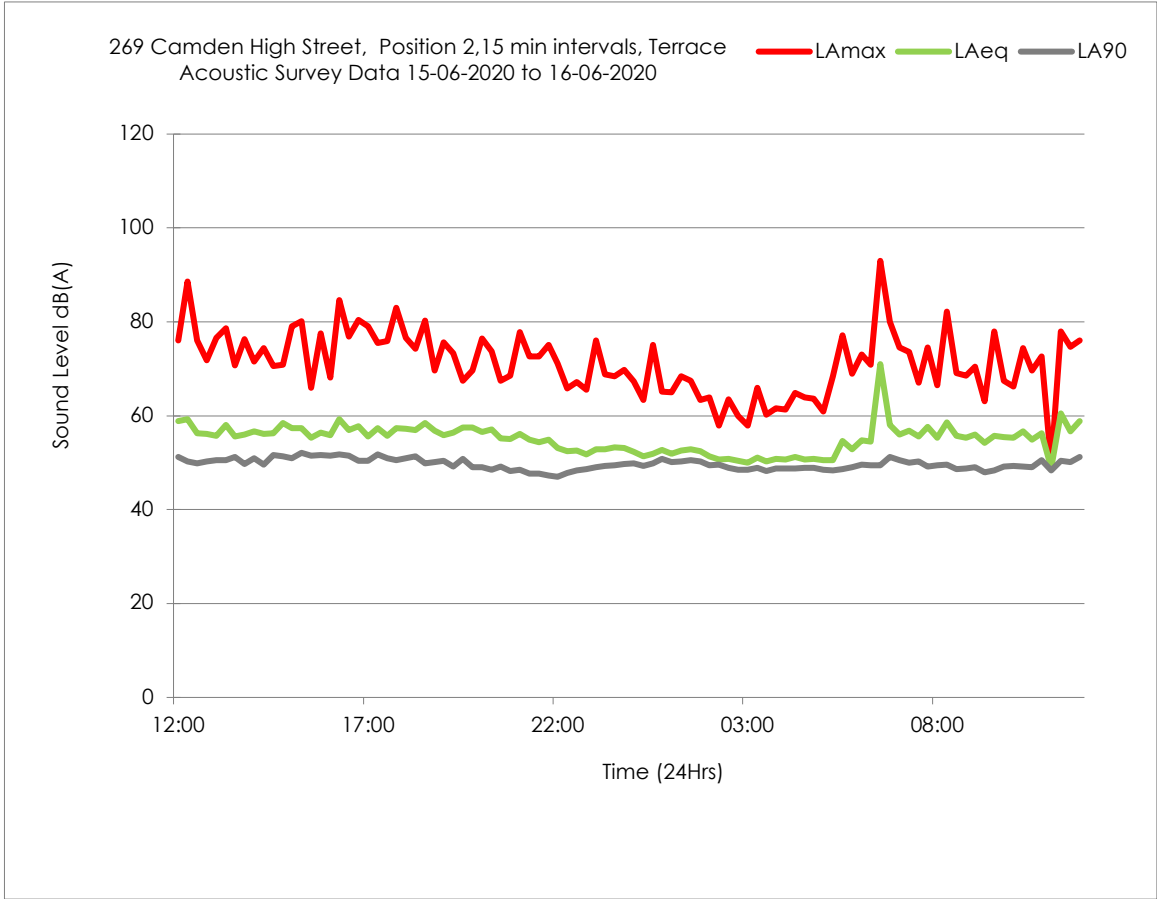
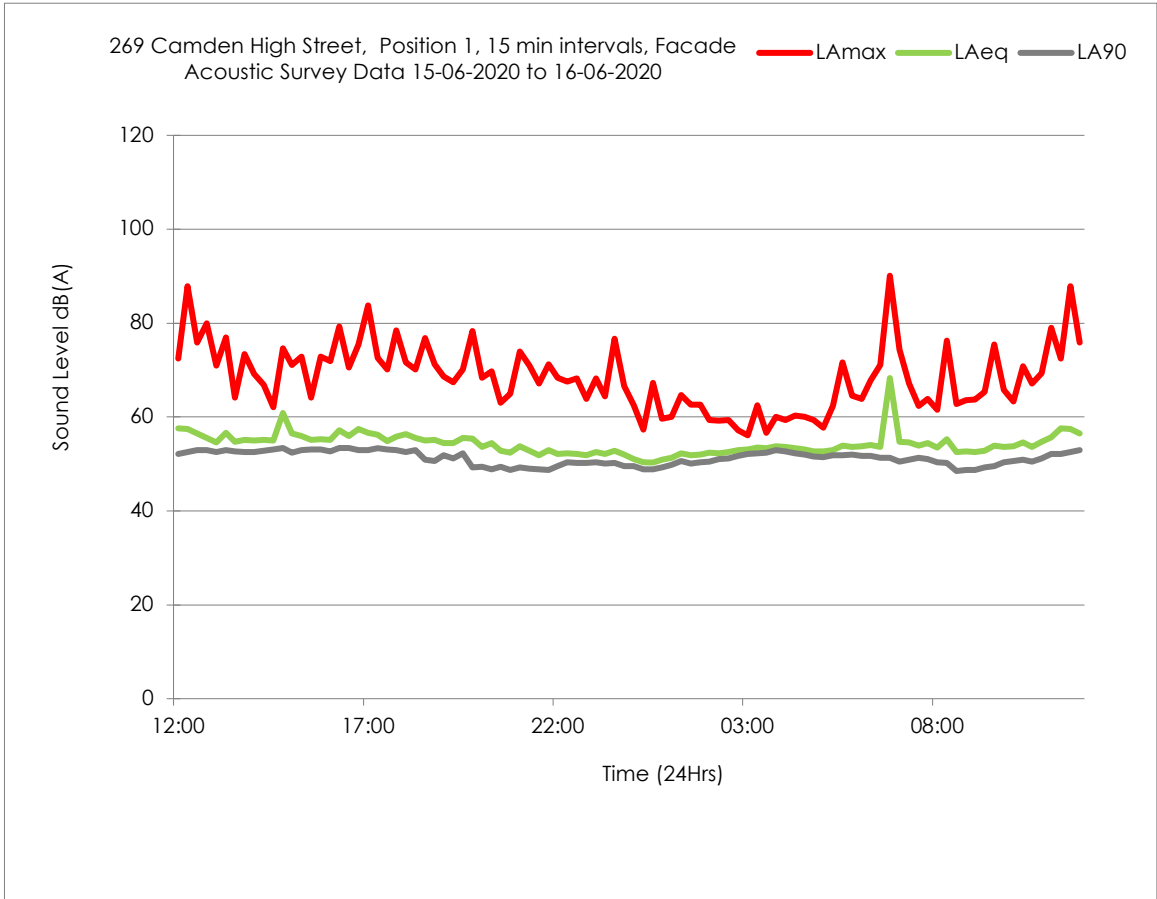
The following table details the weather conditions at the beginning and end of the survey period:

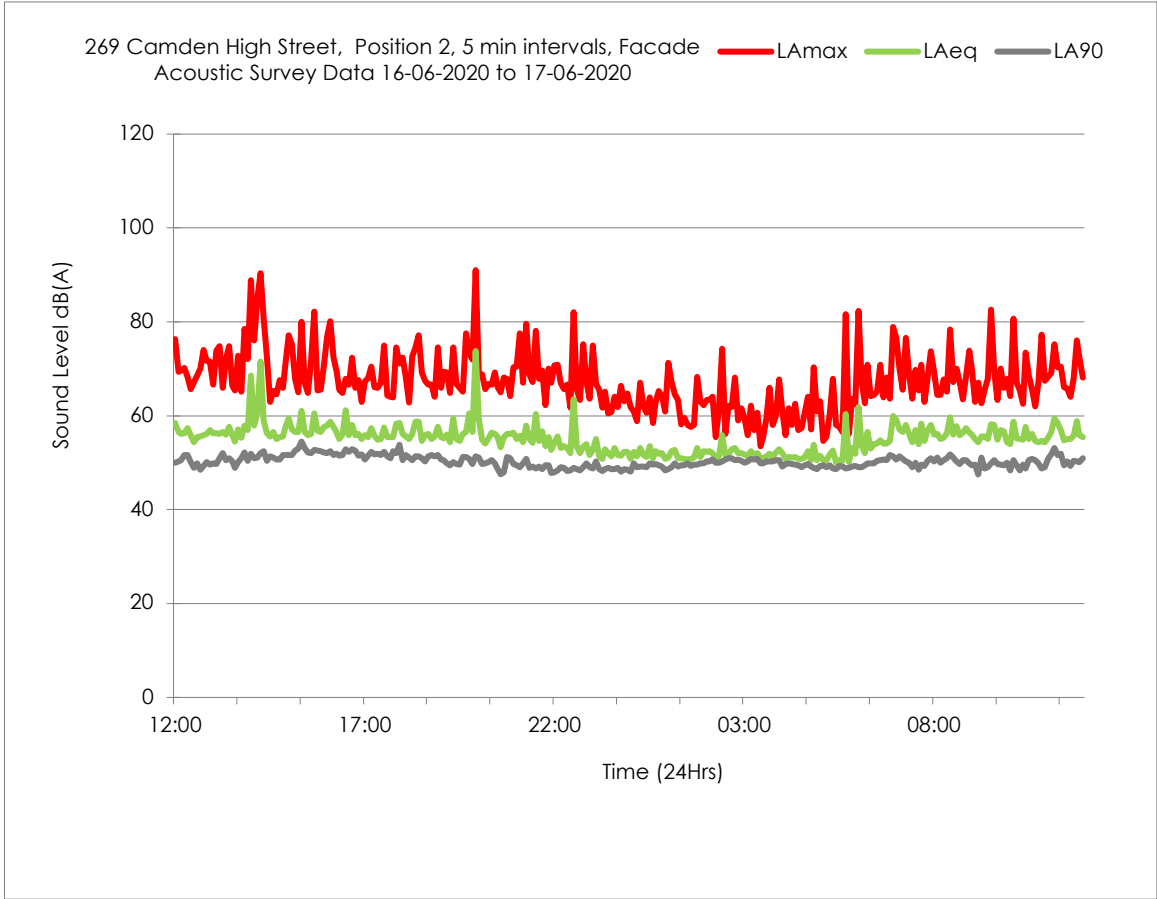
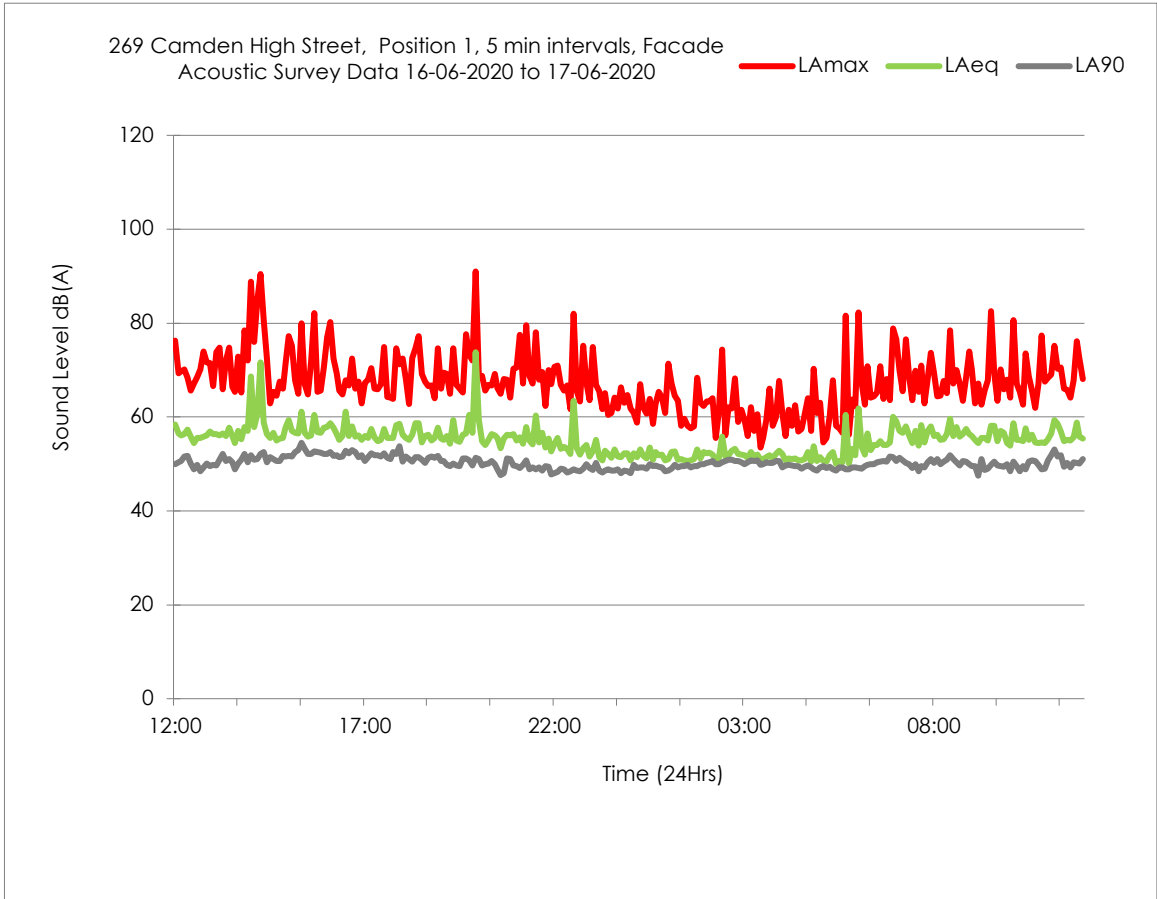
Condition	Start	End
Wind Speed $\text{ms}^{-1}$	<1.5	<2.0
Wind Direction (from)	northwest	northeast
Precipitation or Fog	no	no
Wet Ground	no	no
Frozen Ground or Snow	no	no
Temperature $^{\circ}\text{C}$	23	20
Cloud Cover %	10	100

It is understood the weather over the survey period was fine with no significant rain or high winds.

During the manned periods at the beginning and end of the automated survey the prevailing ambient sound was noted to be comprised of nearby building services plant, general road noise and construction activity.

The conditions measured or noted above were deemed acceptable for obtaining suitably representative measurements of the currently prevailing noise levels. However, due to reduced activity as a result of the coronavirus lockdown the levels obtained are likely to be lower than those that might be typical in the future. For assessment of plant noise this is considered an acceptable worst case.

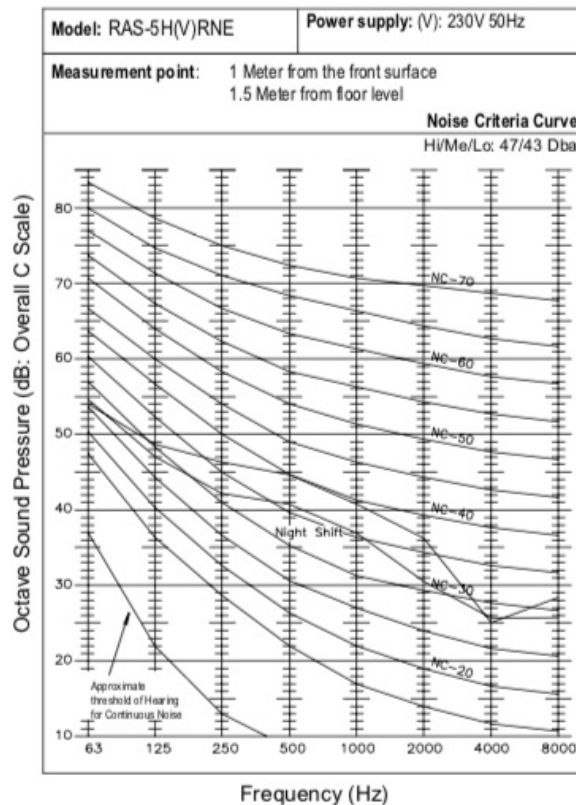


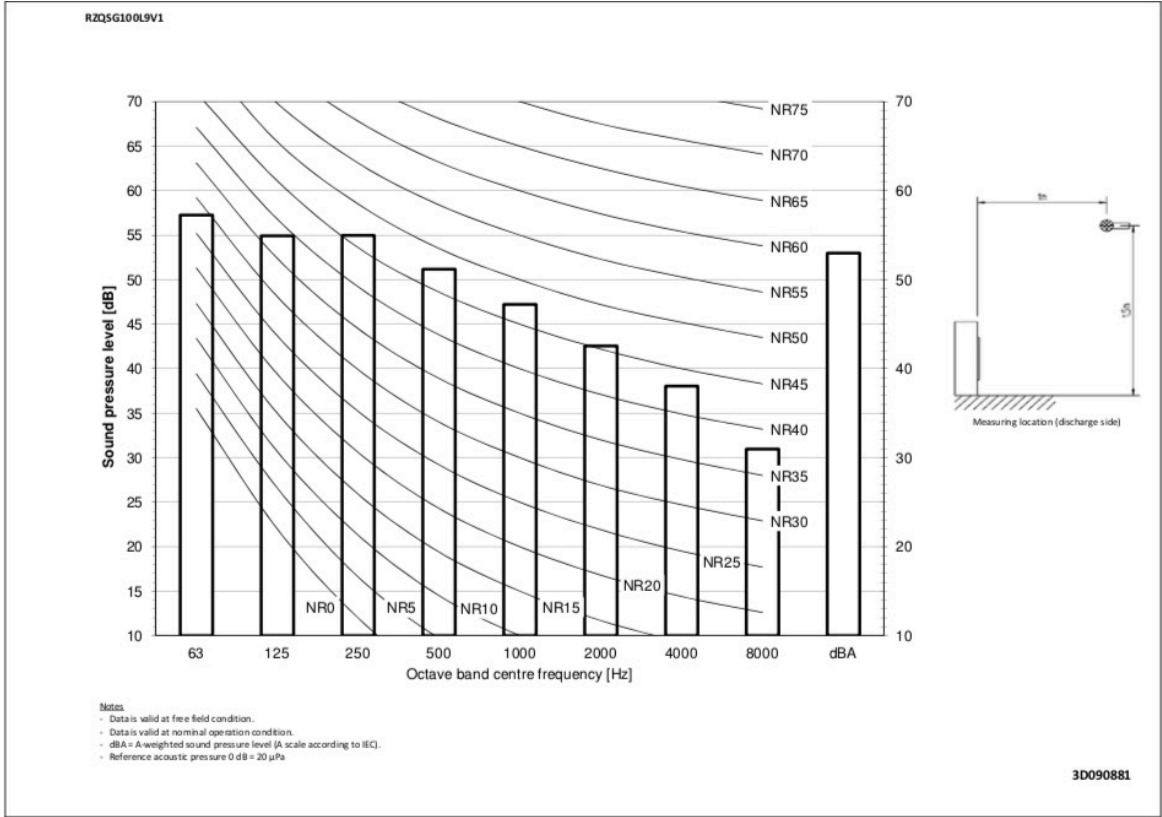


## Manufacturers Plant Noise Data

## 2.2.1. RAS - OUTDOOR UNITS HVRNE

MODEL RAS			RAS-2HVRNE	RAS-2.5HVRNE	RAS-3HVRNE	RAS-4HVRNE	RAS-5HVRNE
Power Supply			AC 1 $\phi$ 220-240V, 50Hz				
Nominal Cooling Capacity (Max/Nom/Min)	kW		5.6/5.0/2.0	7.1/6.3/2.7	8.00/7.10/3.90	11.20/10.00/4.90	14.00/12.50/6.70
Nominal Heating Capacity (Max/Nom/Min)	kW		7.1/5.6/2.1	8.0/7.0/3.1	10.00/8.00/4.00	14.00/11.20/5.70	18.00/14.00/7.00
Cabinet Color (MunsellCode)	-		Natural Grey (1.0Y8.570.5)				
Sound Pressure Level (Night Shift)	dB (A)		41/(38)	42/(38)	43/(39)	45/(41)	47/(43)
Outer Dimensions	Height	mm	800	800	800	1240	1240
	Width	mm	850	850	850	950	950
	Depth	mm	315	315	315	315	315
Net Weight	kg		57	60	60	95	97
Refrigerant	-		R410A				
Flow Control	-		Micro-Computer Control Expansion Valve				
Compressor Model	-		Hermetic (Rotary)	Hermetic (Rotary)	Hermetic (Rotary)	Hermetic (Scroll)	Hermetic (Scroll)
Quantity	-		2YC32GXD	2YC45BXD	2YC45BXD	E305AHD	E405AHD
Motor Output (Pole)	kW		1	1	1	1	1
Heat Exchanger	-		0.98 (4)	1.38 (4)	1.38 (4)	2.2 (4)	3.0 (4)
Condenser Fan	-		Multi-Pass Cross-Finned Tube				
Quantity	-		Propeller Fan				
Air Flow Rate	m <sup>3</sup> /min		1	1	1	2	2
Motor Output (Pole)	W		35	42	45	80	90
Connections	-		Flare-Nut Connection (Factory supplied)				
Refrigerant Liquid Line	mm (in.)		Ø6.35 (1/4)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)	Ø9.53 (3/8)
Piping Gas Line	mm (in.)		Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)	Ø15.88 (5/8)
Refrigerant Charge	kg		1.9	2.5	2.4	3.6	3.6
Wiring Power Supply	mm		Ø26.5	Ø26.5	Ø26.5	Ø26.5	Ø26.5
Holes Control Circuit	mm		Ø26.5	Ø26.5	Ø26.5	Ø26.5	Ø26.5
Connecting Wire between Indoor and Outdoor Unit	-		2	2	2	2	2
Packing Measurement	m <sup>3</sup>		0.34	0.34	0.34	0.55	0.55





## Calculations

To light yard 2, room 2:

1	Daikin	63	125	250	500	1	2	4	8	A
	Lp at 1m	58	55	55	52	47	43	38	31	53
	Divergence									
11	Distance	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	
	Atmos Abs									
	Ground Abs									
	Barrier									
0	Misc Atts	0	0	0	0	0	0	0	0	
4	Reflections	4	4	4	4	4	4	4	4	
	Sub Tot	41.2	38.2	38.2	35.2	30.2	26.2	21.2	14.2	36.5

2	Hitach 1	63	125	250	500	1	2	4	8	A
	Lp at 1m	54	49	46	45	42	36	25	28	47
	Divergence									
11	Distance	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	
	Atmos Abs									
	Ground Abs									
	Barrier	0	0	0	0	0	0	0	0	
0	Misc Atts	0	0	0	0	0	0	0	0	
4	Reflections	4	4	4	4	4	4	4	4	
	Sub Tot	37.2	32.2	29.2	28.2	25.2	19.2	8.2	11.2	29.7

3	Hitachi 2	63	125	250	500	1	2	4	8	A
	Lp at 1m	54	49	46	45	42	36	25	28	47
	Divergence									
11	Distance	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	
	Atmos Abs									
	Ground Abs									
	Barrier									
0	Misc Atts	0	0	0	0	0	0	0	0	
4	Reflections	4	4	4	4	4	4	4	4	
	Sub Tot	37.2	32.2	29.2	28.2	25.2	19.2	8.2	11.2	29.7

Total Noise Level	43.7	39.9	39.1	36.6	32.3	27.6	21.6	17.2	38.0
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Total Noise Level	44.0	40.0	39.0	37.0	32.0	28.0	22.0	17.0	38.0
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Criteria	38
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Excess	0.0
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\*Assumes non tonal emissions



Adjacent property (267) mansard roof light at rear:

1	Daikin	63	125	250	500	1	2	4	8	A	Limit
	Lp at 1m	58	55	55	52	47	43	38	31	53	54.3
	Divergence										
8	Distance	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1		
	Atmos Abs										
	Ground Abs										
	Barrier	-5	-5	-5	-5	-5	-5	-5	-5		
0	Misc Atts	0	0	0	0	0	0	0	0		
4	Reflections	4	4	4	4	4	4	4	4		
	Sub Tot	38.9	35.9	35.9	32.9	27.9	23.9	18.9	11.9		34.2

2	Hitach 1	63	125	250	500	1	2	4	8	A	Limit
	Lp at 1m	54	49	46	45	42	36	25	28	47	47.6
	Divergence										
8	Distance	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1		
	Atmos Abs										
	Ground Abs										
	Barrier	0	0	0	0	0	0	0	0		
0	Misc Atts	0	0	0	0	0	0	0	0		
4	Reflections	4	4	4	4	4	4	4	4		
	Sub Tot	39.9	34.9	31.9	30.9	27.9	21.9	10.9	13.9		32.5

3	Hitachi 2	63	125	250	500	1	2	4	8	A	Limit
	Lp at 1m	54	49	46	45	42	36	25	28	47	47.6
	Divergence										
8	Distance	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1		
	Atmos Abs										
	Ground Abs										
	Barrier	-5	-5	-5	-5	-5	-5	-5	-5		
0	Misc Atts										
4	Reflections	4	4	4	4	4	4	4	4		
	Sub Tot	34.9	29.9	26.9	25.9	22.9	16.9	5.9	8.9		27.5

Total Noise Level	43.2	39.0	37.8	35.6	31.6	26.6	19.8	16.8		37.0
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Total Noise Level	43.0	39.0	38.0	36.0	32.0	27.0	20.0	17.0		37.0
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Criteria	38
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Excess	-1.0
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\*Assumes non tonal emissions

## Suitable Suppliers

## Secondary Glazing

Selectaglaze Ltd Alban Park  
Hatfield Road  
St. Albans  
Hertfordshire  
AL4 0JJ  
Tel: 01727 837271  
Web: <https://www.selectaglaze.co.uk>

## Absorbent Reveals

SIDERISE INSULATION LIMITED  
Forge Industrial Estate,  
Maesteg, Bridgend, CF34 0AY, UK  
Tel: 01656 730833  
Web: <https://www.siderise.com>

## Acoustic Enclosures

Environmental Equipment Corporation Ltd  
Richmond House, Churchfield Road  
Walton-on-Thames, Surrey  
KT12 2TP  
Tel: +44 (0) 1932 230940  
Email: [info@eecnoisecontrol.co.uk](mailto:info@eecnoisecontrol.co.uk)  
Web: <http://eec.co.uk>

Environ Technologies Ltd  
Regus House,  
1010 Cambourne Business Park,  
Cambourne,  
Cambridgeshire, UK. CB23 6DP  
Tel: 0870 383 3344  
[www.environ.co.uk](http://www.environ.co.uk)

## Vibration Isolation hardware

Environmental Equipment Corporation Ltd  
Richmond House, Churchfield Road  
Walton-on-Thames, Surrey  
KT12 2TP  
Tel: +44 (0) 1932 230940  
Email: [info@eecnoisecontrol.co.uk](mailto:info@eecnoisecontrol.co.uk)  
Web: <http://eec.co.uk>

Noise Solutions Ltd  
Unit 6, LDL Business Centre,  
Station Road West,  
Ash Vale,  
Aldershot GU12 5RT  
Tel: 01252 519881  
[www.noisesolutions.co.uk](http://www.noisesolutions.co.uk)

## Acoustic Screening

Graham Barrier Systems Ltd  
The Stables  
Codham Hall  
Great Warley  
Brentwood  
Essex  
CM13 3JT  
<https://www.grammbarriers.com>  
01323 872243

ETS Ltd (Green barrier)  
Newton Brae  
Foulden  
Berwick Upon Tweed  
TD15 1UL  
[http://etsluk.com/acoustic\\_green\\_barriers.html](http://etsluk.com/acoustic_green_barriers.html)  
01289 386664

## Glossary of Acoustic Terminology

**$L_{Aeq,T}$**  is the equivalent continuous A-weighted sound pressure level defined IN BS4142:2014 as the value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval,  $T = t_2 - t_1$ , has the same mean-squared sound pressure as a sound that varies with time.

**$L_{A90}$**  is the background sound level as defined in BS4142:2014 as the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval,  $T$ , measured using time weighting F and quoted to the nearest whole number of decibels.

**$L_{A1}$**  is the background sound level as defined in BS4142:2014 as the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 1% of a given time interval,  $T$ , measured using time weighting F and quoted to the nearest whole number of decibels.

**Background Sound Level** is the  $L_{A90}$ , see above.

**BB93** is Building Bulletin 93 "Acoustic Design of Schools: Performance standards" and sets out the minimum performance standards for the acoustics of school buildings.

**IANL** as defined in BB93 is the indoor ambient noise level within teaching accommodation and is comprised of a 30minute  $L_{Aeq}$ .

**Ambient Sound** as defined by BS4142:2014 is the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.

**Specific Sound** as defined by BS4142:2014 is the sound source being assessed.

**Residual Sound** as defined by BS4142:2014 is the ambient sound remaining at the assessment location when the specific sound is suppressed to such a degree that it does not contribute to the ambient sound.

**Rating Level** as defined by BS4142:2014 is the specific sound level plus any adjustment for the characteristic features of the sound.

**Tonal Characteristic** as defined by BS4142:2014 Annex C: For a prominent, discrete tone to be identified as present, the time-averaged  $L_{Zeq,T}$  sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged  $L_{Zeq,T}$  sound pressure levels of both adjacent one-third-octave bands by some constant level difference.

The level differences between adjacent one-third-octave bands that identify a tone are:

- 15 dB in the low-frequency one-third-octave bands (25 Hz to 125 Hz);
- 8 dB in the middle-frequency one-third-octave bands (160 Hz to 400 Hz); and
- 5 dB in the high-frequency one-third-octave bands (500 Hz to 10 000 Hz).

**WHO** refers to the World Health Organization.