

## **29 Hatton Garden, London EC1 8DA**

Environmental Noise Survey and Noise Impact Assessment Report 1100.02

Prepared for

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1 June 2018

By

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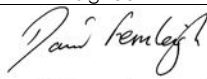
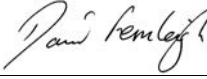
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CONTENTS	Page
1.0 INTRODUCTION.....	2
2.0 EXECUTIVE SUMMARY .....	2
3.0 SITE CONDITIONS .....	2
4.0 MEASUREMENT METHODOLOGY .....	4
5.0 MEASUREMENT RESULTS .....	5
6.0 CRITERIA .....	5
7.0 PLANT NOISE ASSESSMENT.....	6
8.0 CONCLUSION .....	8

APPENDICIES:

- Time History Graphs
- Definition of Terms

Report	Signed	Name and Position	Relevant Qualification
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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

New air conditioning plant is proposed for installation at the rear of 29 Hatton Garden, London, EC1 8DA. This report details a revised assessment for a VRV unit.

The London Borough of Camden stipulates noise emission criteria to which new items of building services plant should comply.

dBA Acoustics have been commissioned to undertake an environmental noise survey and plant noise impact assessment in order to determine if the proposed plant meets the requirements of the Local Authority, and provide mitigation guidance, as/where necessary.

## 2.0 EXECUTIVE SUMMARY

An automated 96hour environmental noise survey has been undertaken. The representative  $L_{A90}$  background noise level has been established for the operational times of the proposed plant.

The assessment undertaken indicates that provided the unit is operated in quiet mode the plant noise emissions comply with the requirements of the London Borough of Camden for non-tonal, non-impulsive plant.

## 3.0 THE SITE

29 Hatton Garden is located on the east side of the road. The map below indicates the site boundary in red:



Map data © Google 2018 (North to the top of the page)

The 3D detail below indicates the rear of the property and adjacent buildings:



Imagery © Google 2018 (West to the top of the page)

The 3D detail below indicates the nearest noise sensitive windows on the rear elevation of no 28, and the automated noise monitoring location:



Imagery © Google 2018 (West to the top of the page)

The measurement position was within a few meters of the nearest noise sensitive receptor and was deemed suitable for establishing representative background sound levels.

#### 4.0 MEASUREMENT METHODOLOGY

96hour environmental noise monitoring was undertaken commencing 2pm on Thursday 5 April to Monday 9 April 2018. The prevailing  $L_{A90}$  levels were logged at 15minute intervals throughout the survey period. The following sound level meter and calibrator was used:

Old	SLM	Preamplifier	Microphone	Calibrator
Manufacturer	Norsonic AS	Norsonic AS	Gras	B&K
Type	140	1209	40AF	4231
Serial No.	1403413	12821	207390	1839133
Latest Calibration	16/01/2017			20/11/2017
Certificate No.	U24457			U27132

The UKAS accredited calibration of the sound level meter used complies with IEC 61672-1:2003 class 1.

A sound level meter was installed with the microphone attached to a pole and fixed to a fire escape railing at the rear of the site. The microphone was located approximately at first floor roof level.

A proprietary windshield and extension cable was deployed. The entire signal path was checked for calibration pre and post survey. The calibration reference level used was 114dB. The calibrated meter reading pre and post survey indicated no shift greater than 0.1dB.

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

Condition	Start	End
Wind Speed $ms^{-1}$	<1.0	<3.0
Wind Direction (from)	indistinct	west
Precipitation or Fog	none	light drizzle
Wet Ground	none	damp conditions
Frozen Ground or Snow	none	none
Temperature $^{\circ}C$	12	9
Cloud Cover %	100	100

It is understood the weather for the first few days of the survey period was fine turning to rain over the weekend, with moderate wind speeds. The survey spanned significant periods with no rain and hence dry road surfaces.

During the manned periods at the beginning and end of the survey the prevailing ambient sound was noted to be intermittent construction noise, general plant noise emissions from building services, and to a lesser degree residual traffic noise.

It is understood that the construction site working hours over the survey period were as follows:

Construction site working hours	
Weekday	08:00 – 05:00
Saturday	08:00 – 03:00
Sunday	08:00 – 01:00

The lowest  $L_{A90}$  noise levels not affected by construction noise are therefore outside of these hours.

The conditions measured or noted above were deemed acceptable for obtaining representative measurements.

## 5.0 MEASUREMENT RESULTS

Time history graphs showing the  $L_{A90\ 15min}$  measurements for the entire survey period are shown in the appendix.

The following table presents a summary of the lowest measured  $L_{A90\ 15min}$  over the survey period during the operational times of the proposed plant:

Lowest measured $L_{A90\ 15min}$		
Sound Level (ref : 20 $\mu$ Pa)	Daytime 07:00-23:00hrs	Night time 23:00-07:00hrs
$L_{A90\ 15min}$ (lowest measured)	45 dB	45 dB

## 6.0 CRITERIA

The London Borough of Camden have confirmed the following maximum noise emission criteria for new items of building services plant:

“Policy A4 of Camden Local Plan (2017), requires plant noise (façade level) to be 10dB below the background noise level at the nearest residential receptor. This is considered to be the Lowest Observed Adverse Effect Level (LOAEL).”

Based on the survey results and the Local Authority requirements detailed above the following table presents the maximum allowable plant noise emissions:

Plant noise emission limit $L_{Aeq,T}$		
Sound Level (ref : 20 $\mu$ Pa)	Daytime 07:00-23:00hrs	Night time 23:00-07:00hrs
Maximum plant noise emissions at nearest noise sensitive receptor facade	35 dB	35 dB

## 7.0 PLANT NOISE ASSESSMENT

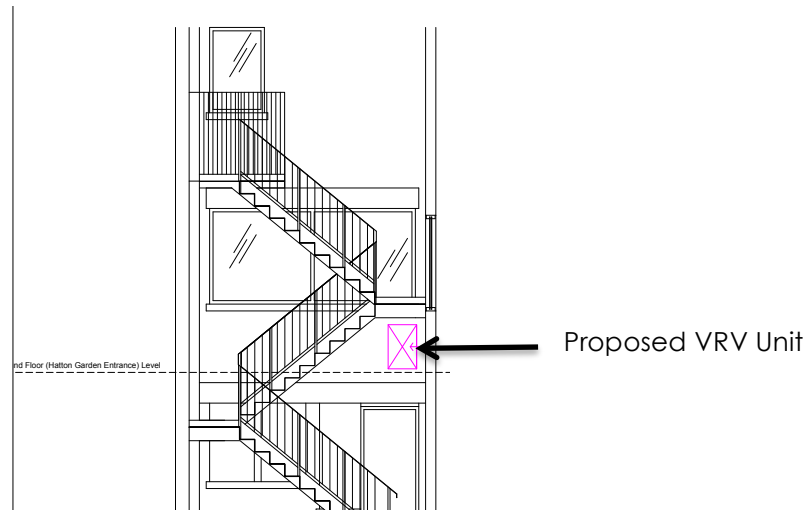
A revised VRV unit has been proposed. The Daikin VRV outdoor unit is proposed for installation at the rear of the property and for daytime use only. The manufactures noise data for the proposed unit gives the following maximum noise levels for normal and quiet modes:

Use	Unit	Operation	Sound Level dBA (ref: 2x10 <sup>-5</sup> Pa) at 1m freefield	
			Normal	Quiet Mode
Air Conditioning	Daikin RXYSCQ4-TV1	Daytime only	51	41-47

The quiet mode is in three steps 41dB, 44dB and 47dB. Excerpts from the manufacturers brochure and relevant data can be found in the appendix.

Analysis of the manufacturers octave band centre frequency data does not indicate tonality. Provided the unit is properly installed distinguishing impulsive sound characteristics are not anticipated.

The sketch below indicates the rear elevation of No.29 Hatton Garden, with the proposed location of the VRV unit indicated at the back of the building.



The overlooking windows in the rear elevation of No 29 Hatton Garden all belong to the Client.

The lightwell to the rear of 29 Hatton Garden is shared with the fire escape of what is understood to be a workshop building. The windows of this building are boarded up on the inside and are not considered to be noise sensitive, see photos below:



The next nearest windows are the rear first floor windows of 28 Hatton Garden adjacent, approximately 6m from the proposed plant location. These can be seen in the Google image on page 3 of this report. These windows are in a façade that is adjacent but set back from the rear of No 29. As a result they are screened from the proposed plant location by the building edge, these windows are considered to be the nearest noise sensitive receptor and are adopted for the following assessment.

The table below shows the distance loss, reflections and screening corrections that have been applied to the manufacturers noise data in order to estimate the likely noise emissions at the receptor:

<b>Estimated plant noise level at nearest noise sensitive windows</b>		
	Normal	Quiet
Maximum air condenser noise emissions at 1m dBA	51	47
6m propagation	-16	-16
Reflections at source position	+6	+6
Line of sight screening <sup>1</sup>	-5	-5
Façade reflection at receptor position <sup>2</sup>	0	0
Estimated level at receptor	36	32
Criteria L <sub>Aeq,T</sub>	35	35
Excess over criteria	+1	-3

<sup>1</sup> conservative estimate of screening at facade, most of the façade should have a greater degree of screening than this

<sup>2</sup> façade reflection at receptor considered negligible as source position 120 degrees off axis behind building edge

From the table above it can be seen that the proposed VRV unit is no more than 1dB over the Local Authorities criteria in normal mode; but at least 3dB below the Local Authorities criteria when in quiet mode. Provided the unit is only operated in quiet mode the proposed plant is deemed to comply with the requirements of the London Borough of Camden for non-tonal, non-impulsive plant.

## 8.0 CONCLUSION

An automated 96hour environmental noise survey has been undertaken. The representative L<sub>A90</sub> background noise level has been established.

The subsequent assessment undertaken indicates that noise emissions from the proposed plant comply with the requirements of London Borough of Camden provided the unit is only operated in quiet mode.

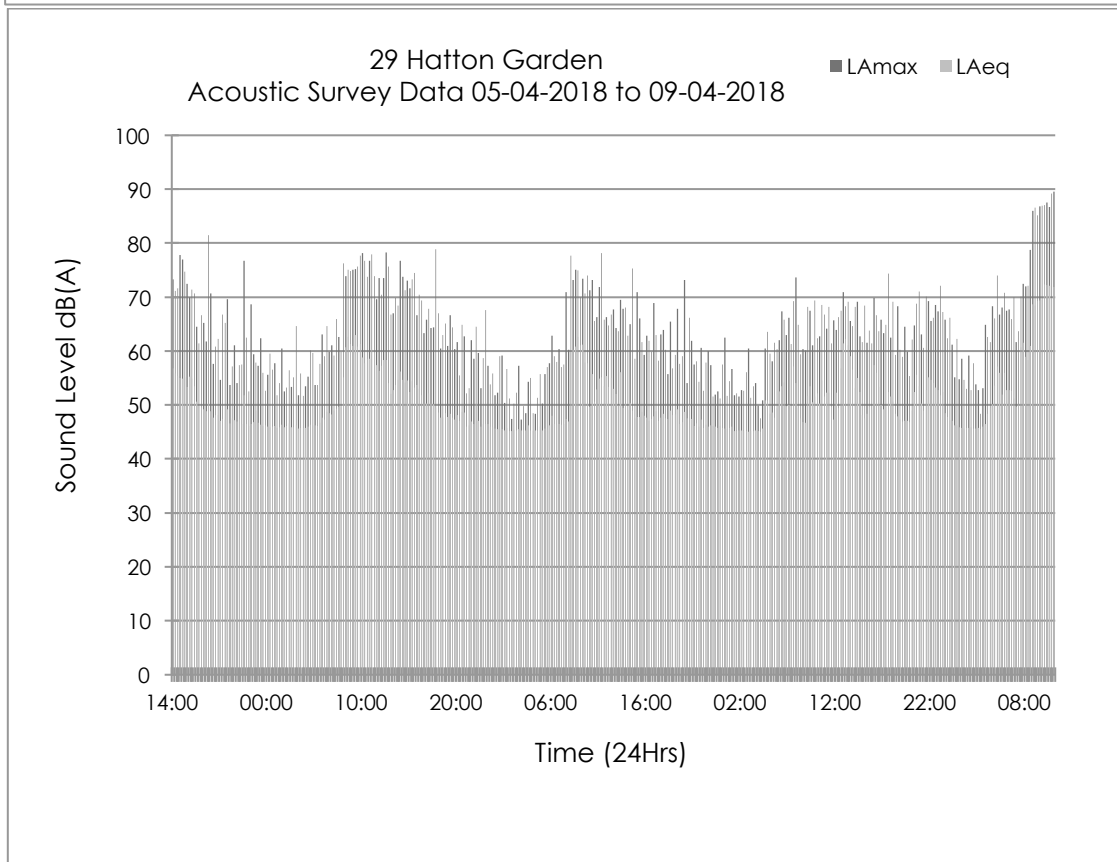
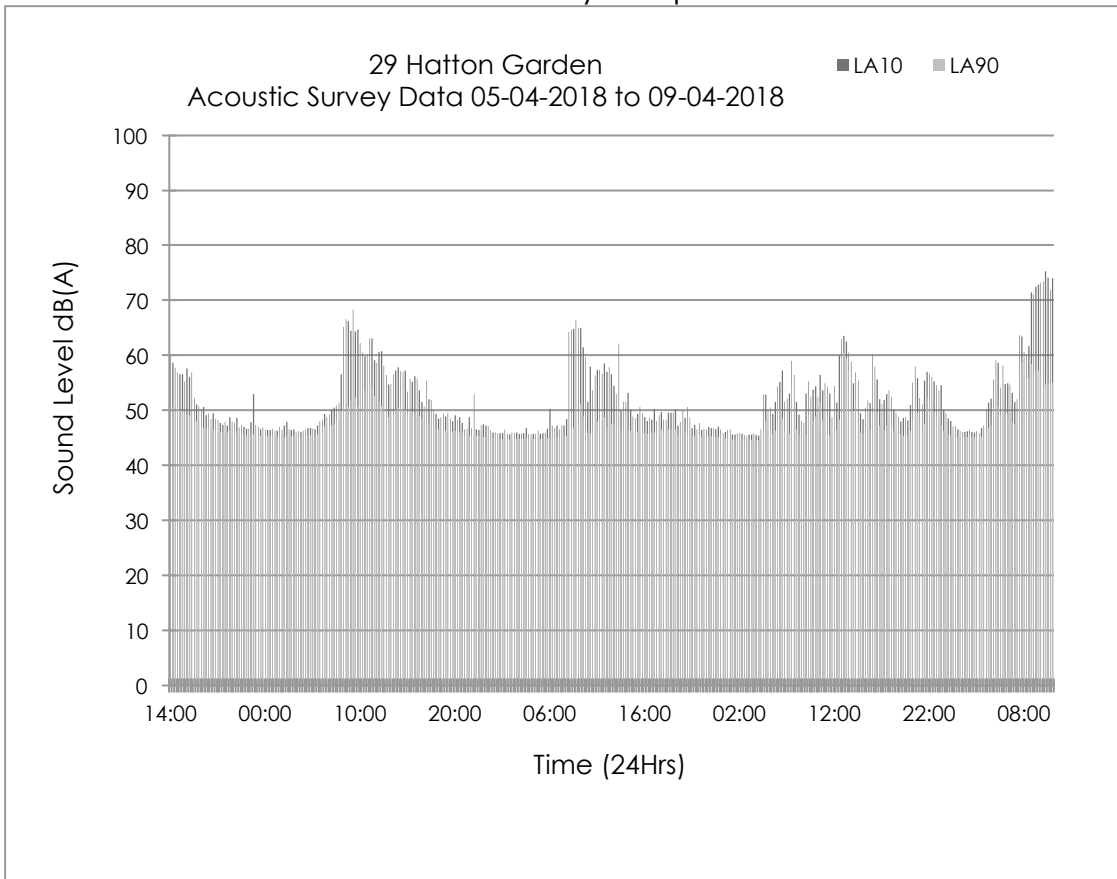
The proposals are subject to the final planning approval of The London Borough of Camden.



## APPENDIX

Time History Graph  
Plant Data  
Definition of Terms

# Time History Graphs



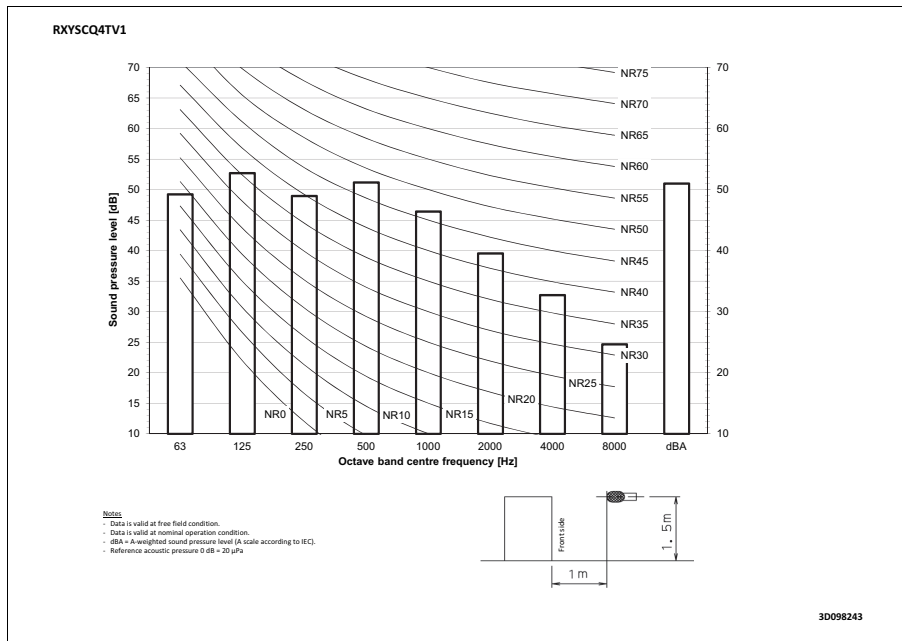
# PLANT DATA

DAIKIN • Outdoor Unit • RXYSCQ-TV1

## 1 Features

### The most compact VRV

- Compact & lightweight single fan design makes the unit almost unnoticeable
- Covers all thermal needs of a building via a single point of contact: accurate temperature control, ventilation, air handling units and Biddle air curtains
- Wide range of indoor units: either connect VRV or stylish indoor units such as Daikin Emura, Nexura ...
- Incorporates VRV IV standards & technologies: Variable Refrigerant Temperature and full inverter compressors
- Customize your VRV for best seasonal efficiency & comfort with the weather dependant Variable Refrigerant Temperature function. Increased seasonal efficiency with up to 28%. No more cold draft by supply of high outlow temperatures
- VRV configurator software for the fastest and most accurate commissioning, configuration and customisation
- Outdoor unit display for quick on-site settings and easy read out of errors together with the indication of service parameters for checking basic functions.
- 3 steps in night quiet mode: step 1: 47dBA, step 2: 44 dBA, step 3: 41 dBA
- Simplified installation & guaranteed optimal efficiency with automatic charging & testing
- Easy compliance with F-gas regulation thanks to automated refrigerant containment check
- Possibility to limit peak power consumption between 30 and 80%, for example during periods with high power demand
- Connectable to all VRV control systems
- Keep your system in top condition via our i-Net service: 24/7 monitoring for maximum efficiency, extended lifetime, immediate service support thanks to failure prediction and a clear understanding of operability and usage



## DEFINITION OF TERMS

**$L_{Aeq,T}$**  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.

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

**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.

**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 Organisation.