

Proposed Installation of Mechanical Plant

> 6 Cambridge Gate, London, NW1

Environmental Noise Assessment

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Environmental Noise Assessment Proposed Installation of Mechanical Plant

Project Address:	6 Cambridge Gate London NW1
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Author:	Alift .	Phil Huffer	Principal Consultant	29/05/2014
Reviewer:	Hodd.	Andy Dodd	Consultant	29/05/2014

1. INTRODUCTION

- 1.1 Acoustics Plus Ltd (APL) is an independent firm of multi-disciplinary acoustic engineers. APL is engaged by both private and public sector clients. APL is a registered member of The Association of Noise Consultants (ANC) and the author is a corporate member of The Institute of Acoustics (IOA).
- 1.2 APL has been instructed by the Applicant, Mrs Carla Cash, to consider and advise upon the noise implications of a proposed installation of mechanical plant.
- 1.3 It is understood that the property will feature a climate control system. The external condenser units associated with this system will be located in a remodelled rear courtyard at ground floor level.
- 1.4 It is understood the Local Planning Authority (LPA) require further information on noise levels from the proposed installation in order to fully assess the noise impact upon the surrounding neighbourhood. This report provides the response to the LPA, on behalf of the Applicant.

2. BASELINE SITUATION

- 2.1 The Application Site (the "site") is situated at 6 Cambridge Gate. The proposed location for the condenser units and the surroundings can be seen in Figures 1 to 8.
- 2.2 It is understood that it is the intention to extensively refurbish the site. It is proposed to install a climate control system within the house which will require the installation of 2No. external condenser units.
- 2.3 The external condenser units associated with this system will be located in the remodelled rear courtyard and wall mounted at ground floor level (see Diagram 1 overleaf). The condenser units will be located in proprietary acoustic enclosures manufactured by Environ. These enclosures will be concealed by a louvred screening system.
- 2.4 The nearest noise sensitive façade to the proposed location of plant will be the first floor window of the house adjacent at 7 Cambridge Gate (see Figure 2).
- 2.5 The operational hours of the proposed mechanical plant for the property will be on a demand basis during residential use (at any time).
- 2.6 The distance from the nearest noise sensitive façade to the location of the condenser units was determined from measurements obtained on site and scaled drawings.



Diagram 1

- 2.7 Information in regard of the noise levels from the proposed mechanical plant and acoustic attenuation has been provided by Daikin and Environ (a copy of the data sheets are provided in Appendix A). The units are itemised below:
 - (a) 2No. Daikin RXYSQ5P7V L_p 51dBA @ 1m
 - (b) Environ acoustic enclosure

3. NOISE OUTLINE

- 3.1 In order to produce an environmental noise assessment, consideration must be given to the locality of the installation.
- 3.2 Measurements of background noise were obtained over a 24 hour period at a location deemed representative of background noise levels experienced at the nearest noise sensitive façade. Measurements were obtained at lower ground floor level in the rear courtyard of 6 Cambridge Gate.
- 3.3 The particulars of the measurement exercise are recorded below:

Date:	13 th – 14 th May 2014
Location:	Lower ground floor level at rear of 6 Cambridge Gate
Weather:	Light wind, light precipitation

3.4 The measurements carried out during the exercise are recorded below:

 L_{90} percentile level (dB re $20\mu Pa)$ at 15 minute intervals

- 3.5 The measurements obtained during the exercise are presented in Appendix B.
- 3.6 For the sake of clarity, the lowest measured background noise over the anticipated operational hours of the mechanical plant is highlighted. As the mechanical plant will be utilised by residential accommodation, it is anticipated that the operational hours will be on a demand basis during any given 24hr period.
- 3.7 Information regarding the noise levels not to be exceeded by the installation was extracted from the LPA (London Borough of Camden) Local Development Framework 2010-2025 Section DP28 Noise and Vibration:

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) <la90< td=""></la90<>
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <la90< td=""></la90<>
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <la90< td=""></la90<>
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dBL _{Aeq} ,

4. EQUIPMENT

- 4.1 All measurements were obtained using the following equipment:
 - Norsonic Precision Sound Level Meter Type NOR140 Serial No. 1403466
 - Rion Calibrator Type NC-74 Class 1 Serial No. 00410215
- 4.2 The relevant equipment carries full and current traceable calibration. The equipment, where necessary, was calibrated prior to and after the measurements were carried out.

5. CALCULATIONS

- 5.1 In order to predict the noise impact of the climate control system, consideration has been given to noise egress from the condenser units to the nearest noise sensitive façade.
- 5.2 In considering the propagation of noise from the condensers, consideration was given to the following equation.

 $L_{p2} = L_{p1} - R - 6$

- Where L_{p1} is the sound pressure level on the source side of the enclosure L_{p2} is the sound pressure level close to the enclosure on the outside R is the sound reduction index of the acoustic enclosure
- 5.3 Noise leaving the condenser units was propagated over 2m to the nearest noise sensitive façade using point source propagation. The output level of the condensers was first corrected by +3dB to account for the reflections behind the wall mounted units.
- 5.4 The sound reduction index of the acoustic enclosures was extracted from manufacturer's data as follows (see Appendix A). Alternative manufacturers are available and their published data should be checked to ensure they provide an adequate level of sound attenuation.

Enclosure type	Trar	Transmission Loss Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k	ава
Environ enclosure	-12	-13	-20	-29	-36	-37	-39	-39	
Table 1									

- 5 -

- 5.5 A further correction to account for building edge diffraction of -5dB was assumed. This was extracted from the Department of Energy and Climate Change Planning Standard MCS020.
- 5.6 The planning standard MCS020 states the following (Note 5):

"Note 5: Barriers between the heat pump and the assessment position (STEP 5) A correction should be made for attenuation due to barriers between the air source heat pump and an assessment position. A correction will be necessary if an installer is unable to see an assessment position from the top edge of the air source heat pump. Use the following instructions to determine whether a correction is appropriate:

- For a solid barrier (e.g. a brick wall or a fence) that completely obscures an installer's vision of an assessment position from the top edge of the air source heat pump attenuation of -10 dB may be assumed.
- Where a solid barrier completely obscures an installer's vision of an assessment position from the top or side edges of the air source heat pump, but moving a maximum distance of 25 cm in any direction to the air source heat pump allows an assessment position to be seen, attenuation of -5 dB may be assumed.
- If it is possible for an installer to see any part of an assessment position from the top or side edges of the air source heat pump no attenuation may be assumed. "
- 5.7 The calculation exercise provided the following results (based on 1No. condensing unit).

	Octave Band Centre Frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	ива
1No. Daikin RXYSQ5	60	53	52	50	46	40	34	26	51
Distance Attenuation	-6	-6	-6	-6	-6	-6	-6	-6	
Reflecting planes	3	3	3	3	3	3	3	3	
Acoustic enclosure	-12	-13	-20	-29	-36	-37	-39	-39	
Building edge diffraction	-5	-5	-5	-5	-5	-5	-5	-5	
SPL at Façade	34	26	18	7	0	0	0	0	15

Table 2

5.8 Given there are 2No. condensers radiating sound into the courtyard, there will be a cumulative increase in noise level of 3dB [10Log₁₀(2)]. The calculated noise impact at the nearest noise sensitive façade can be calculated as follows:

SPL at noise sensitive façade (from 1No. condenser unit)15dBASPL at noise sensitive façade (from 2No. condenser units)18dBA

- 5.9 In order to comply with the requirements of the LPA, any noise from the proposed installation of the mechanical plant should not exceed a level of 30 dBA (10dB below the lowest measured background noise over the operational hours of the units).
- 5.10 The lowest measured background noise was L_{A90,15min} 40dB that occurred during a number of periods between 02:15 and 05:30hrs on 14th May 2014. The proposed installation meets the LPA requirements by 12dBA.

6. CONCLUSION AND MITIGATION MEASURES

6.1 The foregoing assessment indicates that the proposed installation will meet the requirements imposed by the LPA. Further mitigation measures other than those detailed will not be required.

Figures

6 Cambridge Gate, London, NW1 and surrounding area



Figure 1



Figure 3



Figure 5



Figure 7



Nearest noise sensitive façade

Figure 2



Proposed location of condensers

Figure 4



Figure 6



Figure 8

Appendix A

7 Sound data

7 - 1 Sound pressure spectrum



7



Acoustic Enclosure Systems for Air Conditioning and Refrigeration Plan

environlite 1.2.25AC SPLIT

Versatile yet cost effective noise control solutions for small and medium sized Split Air Conditioning and Heat Pump systems that have horizontal air flow characteristics.

This attractive range of units combines superior noise reduction characteristics and application versatility with a user friendly design for ease of assembly.



An introduction:

environlite is not only physically compact and discrete; its flexibility allows for a wide range of AC applications and is particularly suited to 'difficult to access' locations. Available as a new build or retrofit solution, environlite is supplied to the user palletised as a simple on-site self build kit.

All Environ products are a proven solution for the elimination of noise where commercial establishments coexist with domestic neighbours and environ**lite** is especially suited to the ever growing domestic AC market.

By design, environ**lite** applies its patented noise control features to best advantage, ensuring maximum acoustic performance.

With advanced noise control technology underpinned by quality engineering and manufacturing standards, environ**lite** solutions help alleviate local authority approval issues, whilst eliminating the air conditioning noise problem for the user.

With almost infinite plant application compatibility and deriving its name from its design, environ**lite** is matched to provide unparalleled acoustic performance to light commercial and domestic AC applications. The range is available in a variety of sizes, allowing it to by tailored to meet specific applications for new build or retro-fit noise abatement.

The integrated airways are sized to suit the requirements of the enclosed plant and full service and maintenance access is provided by the provision of removable and hinged access panels.

environ**lite** is secure and gives greater flexibility regarding the positioning of plant and machinery, especially where space is at a premium. Being 'Visually Quiet', no moving parts are visible - so the enclosed plant remains out of sight and out of mind.....





STEPS 5-6 - Air In Grilles

STEPS 1-4 - Structure





STEP 8 - Fit RH Airway

STEP 7 - Locate AC unit



STEP 9 - Fit LH Airway



STEPS 11-12 - Complete Assembly

The Environ Integra, Modula and Lite acoustic designs are protected under patent

environlite 1.2.25AC SPLIT

environ

Product features at a glance:

- Superior sound engineering characteristics with certified Transmission Loss performance
- Satisfies the most stringent local authority noise requirements as part of the planning or noise enforcement process
- Effective noise control solution for Air Conditioning plant with horizontal air flow requirements
- Optimised airways and grilles maximise airflow efficiencies
- Full enclosure design protects plant from the elements, virtually eliminates the effect of solar gain on the operating plant and reduces the need for condenser coil cleaning
- Ultra small footprint, quality build, strong and durable design
- A visually quiet, 'good neighbour' with a choice of external finishes to allow plant to blend into the surroundings



User Benefits:

- Effectively eliminates plant noise on New Build a Retro-fit projects
- Local authority endorsed 'Best Practical Means' solution for large Air Conditioning and Heat Pump units
- No noise nuisance enhances neighbour relations
- Secure, robust and vandal proof—no additional security required
- Reduces installation time and cost compared to other acoustic solutions

Installer Benefits:

- Supplied as a 'Flat Pack' accessory for on-site assembly
- Quick and Easy to assemble No specialised tools necessary
- Modular sub-assemblies for ease of installation
- Floor or Wall Mount
- Integrated Services and Electrical access points.
- Commissioning, Service and Maintenance access through lockable access panels
- Noise attenuation under installation contractor control

The Environ Integra, Modula and Lite acoustic designs are protected under patent

DISTRIBUTED BY:



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environite Technical Information (May 2006)

DYNAMIC ACOUSTIC TECHNOLOGY

Noise Measurement Information:

Test: Environ Lite Acoustic Enclosure—1470mm W x 1045mm D x 1755mm H

Test Standard:

ISO 717/1 Acoustics - Rating of Sound Insulation in Buildings and of Building Elements - Part 1: Airborne Sound Insulation

Sound Level Measuring Equipment:

CEL 593 C1R Precision Sound Analyser - Type 1 CEL 284/2 Acoustic Calibrator Type 1 JBL Loudspeaker driven by CEL White Noise Source

Transmission Loss Data:

Transmission Loss—Environ Lite								
Octave Frequency in Hertz (dB ref 2 x 10 ⁻⁵ Pascal's)								
63 125 250 500 1K 2K 4K 8K								
12	13	20	29	36	37	39	39	
Summary								
Transmission Loss Equates to an Overall Reduction of 25 dB(A)								

Support Information:

Monitoring was carried out using the BS₃₇₄0 technique, insofar as measurements were taken in each quadrant and the results averaged. Internal Test Room: $6m W \times 12m L \times 4m H$. Background noise in the semi-reverberant test room was such as not to interfere with the practical measurements

Appendix B

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NOR140_8183105_140514_0032.NBF	(2014/05/14 07:45:00.00)	(0:14:59.0)	N/A	48	()	41	43
NOR140_8183105_140514_0033.NBF	(2014/05/14 08:00:00:00)	(0:14:59.0)	N/A	49	50	42	44
NOR140_8183105_140514_0034.NBF	(2014/05/14 08:15:00.00)	(0:14:59.0)	N/A	46	50	41	43
NOR140_8183105_140514_0035.NBF	(2014/05/14 08:30:00.00)	(0:14:59.0)	N/A	50	78	41	43
NOR140_8183105_140514_0036.NBF	(2014/05/14 08:45:00.00)	(0:14:59.0)	N/A	50	/0	42	44
NOR140_8183105_140514_0037.NBF	(2014/05/14 09:00:00.00)	(0:14:59.0)	N/A	48	65	41	43
NOR140_8183105_140514_0038.NBF	(2014/05/14 09:15:00.00)	(0:14:59.0)	N/A	50	69	41	44
NOR140_8183105_140514_0039.NBF	(2014/05/14 09:30:00.00)	(0:14:59.0)	N/A	51	69	42	44
NOR140_8183105_140514_0040.NBF	(2014/05/14 09:45:00.00)	(0:14:59.0)	N/A	53	75	41	43
NOR140_8183105_140514_0041.NBF	(2014/05/14 10:00:00.00)	(0:14:59.0)	N/A	47	65	41	43
NOR140_8183105_140514_0042.NBF	(2014/05/14 10:15:00.00)	(0:14:59.0)	N/A	47	58	41	43
NOR140_8183105_140514_0043.NBF	(2014/05/14 10:30:00.00)	(0:14:59.0)	N/A	50	68	41	46
NOR140_8183105_140514_0044.NBF	(2014/05/14 10:45:01.00)	(0:14:58.0)	N/A	57	78	41	45
NOR140_8183105_140514_0045.NBF	(2014/05/14 11:00:01.00)	(0:14:58.0)	N/A	47	53	41	44
NOR140_8183105_140514_0046.NBF	(2014/05/14 11:15:00.00)	(0:14:59.0)	N/A	53	65	41	43
NOR140_8183105_140514_0047.NBF	(2014/05/14 11:30:00.00)	(0:14:59.0)	N/A	47	57	41	44
NOR140_8183105_140514_0048.NBF	(2014/05/14 11:45:01.00)	(0:14:58.0)	N/A	47	68	41	44
NOR140_8183105_140514_0049.NBF	(2014/05/14 12:00:00.00)	(0:14:59.0)	N/A	47	64	40	44
NOR140_8183105_140514_0050.NBF	(2014/05/14 12:15:01.00)	(0:14:58.0)	N/A	47	62	40	43
NOR140_8183105_140514_0051.NBF	(2014/05/14 12:30:01.00)	(0:14:58.0)	N/A	50	69	40	42
NOR140_8183105_140514_0052.NBF	(2014/05/14 12:45:00.00)	(0:14:59.0)	N/A	47	74	39	41
NOR140_8183105_140514_0053.NBF	(2014/05/14 13:00:00.00)	(0:14:59.0)	N/A	45	55	40	42
NOR140_8183105_140514_0054.NBF	(2014/05/14 13:15:00.00)	(0:14:59.0)	N/A	46	57	40	42
NOR140_8183105_140514_0055.NBF	(2014/05/14 13:30:00.00)	(0:4:50.0)	N/A	53	76	41	43