environmental equipment corporation

Richmond House, Churchfield Road, Walton-on-Thames, Surrey KT12 2TP
Tel: 01932 230940 Fax: 01932 230941 email: info@eecnoisecontrol.co.uk

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Project : Southampton Row

BACKGROUND NOISE SURVEY AND PLANT NOISE SPECIFICATION

Client: Fresson & Tee
1 Sandwich Street
London
WC1H 9PF

Report Compiled By:-

Jon Mudd BEng (Hons) MIOA
Consultancy Division

Report Checked By:-

Tim Meed BSc (Hons) MIOA
Consultancy Division

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REPORT

ENVIRONMENTAL EQUIPMENT CORPORATION

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1.00 INTRODUCTION

1.01 Environmental Equipment Corporation Limited have been commissioned by Fresson & Tee on behalf of Henderson to undertake a background noise survey at 114 – 118 Southampton Row, with a view to ascertaining prevailing background noise levels for the immediate vicinity.

1.01 Proposals are being submitted to Camden Council to install new mechanical services plant as part of an application to build a property for A3 usage within the location of the car lift and access way. This report contains design guidelines for noise emanating from any mechanical services plant to ensure compliance with the typical planning conditions of Camden Council.

1.02 This report is prepared solely for Fresson & Tee and Henderson. Environmental Equipment Corporation Ltd accept no responsibility for its use by any third party.

2.00 SITE

2.01 It is proposed to replace the existing car lift and the access way with a new A3 use property. It is likely that this new property will be served by mechanical services whose noise emissions will need to be adequately controlled to ensure compliance with the typical planning conditions of Camden Council. The car lift is at the ground level in a courtyard area at the rear of 114 – 118 Southampton Row. Access is gained to the area via an archway underneath 118 Southampton Row. Appendix A shows a plan of the area and notes indicating properties in the surrounding area.

2.02 The location of the car lift is within a courtyard area formed by the rear of the properties along Southampton Row and Old Gloucester Street. 114 – 118 Southampton Row currently consists of commercial offices, however the other windows overlooking the courtyard serve residential rooms. The following photos show the view of the car lift from the first floor roof level of 114 – 118 Southampton Row and views of the surrounding area.

Photo 1 : View of car lift location.

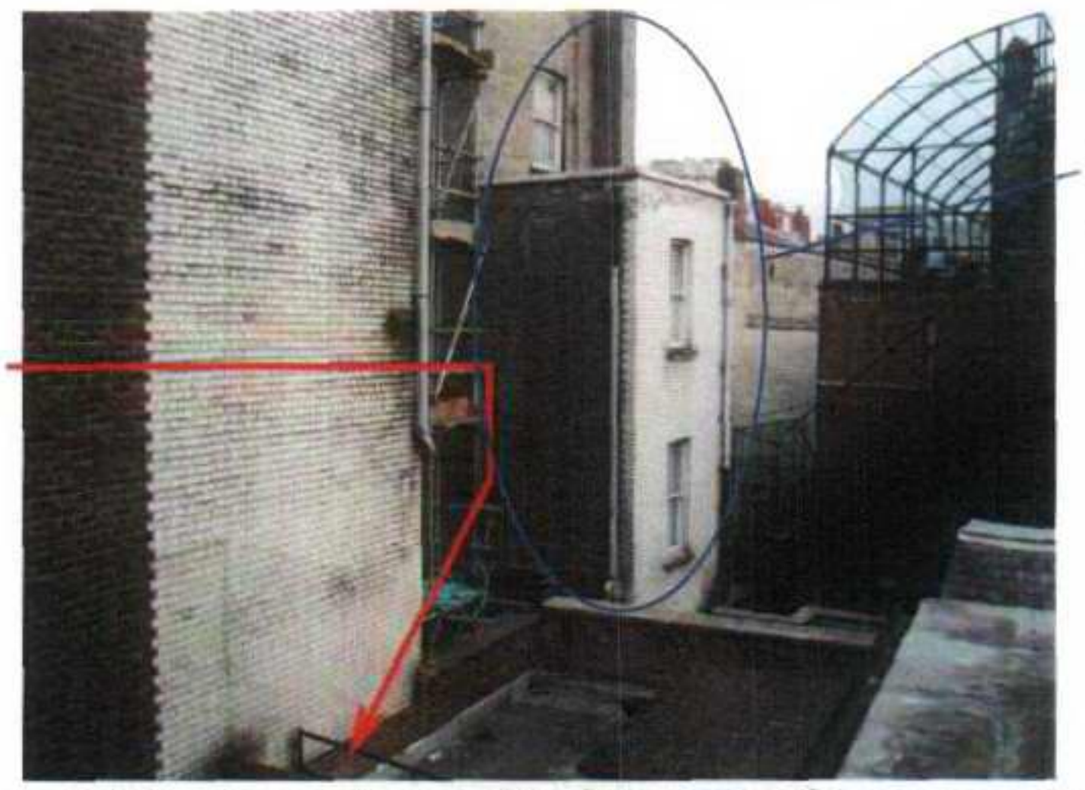

Photo 2: View towards the Old Gloucester Street properties

Photo 3: View of the side of the old Gloucester Street properties

Photo 4: View to the rear of the adjacent Southampton Row properties

2.03 There is no current mechanical and electrical scheme available to make specific comments, however based on an assumption that the new plant will be on the roof the new property the nearest windows will be the residential windows on the rear of the Old Gloucester Street properties shown in Photos 2 & 3.

3.00 MEASUREMENTS

3.01 Background noise levels have been measured over approximately a 19 hour period on the first floor flat roof level at the rear of Southampton Row enabling representative noise levels for the immediate vicinity to be recorded. There was construction noise during the daytime from the adjoining property in Southampton Row as shown in Photo 4, however this did not affect the measurement period.

3.02 The equipment was set up to integrate sound levels over 5 minute intervals for approximately 19 hours between 1410hrs, Thursday 14th December and 0850hrs, Friday 15th December, 2006. Based on the A3 usage of the new property it is not expected that the new plant will operate outside of the hours of 0700 – 0000 hrs.

3.03 Levels were recorded as A-weighted L_{eq}, L_{10} and L_{90}.

3.04 Weather conditions during the survey were dry and cool, with little to no wind in the measurement location.

4.00 EQUIPMENT

4.01 Equipment for the survey was as follows:-

- Brüel & Kjær type 2236 Integrating Sound Level Meter conforming to type 1 BS EN 60804 & BS EN 60651: 1994.
- Brüel & Kjær Condenser Microphone and Connecting Leads.
- Brüel & Kjær Outdoor Microphone Kit, type UA1404.
- Tripod.

4.02 The equipment holds current UKAS accreditation and serial numbers as follows:

Sound Level Meter B&K2236	Serial No.	1764397
	Calibration Date	29th July 2005
	Cal Certificate No.	14135
½" Condenser Mic. B&K4188	Serial No.	2051241
	Calibration Date	29th July 2005
	Cal Certificate No.	14135
Calibrator B&K4231	Serial No.	2389051
	Calibration Date	20 June 2006
	Cal. Certificate No.	15141

N.B. Copies of certificates are available upon request.

4.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

5.00 RESULTS

5.01 A list of the levels measured is included in Appendix B and represented graphically in Appendix C.

5.02 A summary of the lowest measured background levels is shown in Table 5.1, below.

Period	L_{A90} – dB
A3 Operating times (0700-0000hrs)	44
Day time (0700-2300 hrs)	44
Night-time (2300-0700 hrs)	42

Table 5.1: Minimum measured background noise levels

6.00 DISCUSSION

6.01 The lowest background levels were L_{90} of 44 dB(A) during the expecting operating period for any plant serving the A3 usage property, with a lowest background noise level of 42 dB(A) outside of these hours.

6.02 Camden Council require that noise levels generated by mechanical services plant should be designed to a level of 5 dB below the lowest measured background level during the proposed period of operation, unless the plant items could be considered tonal in which case the plant should be designed 10 dB(A) below the background noise level as measured one metre outside the nearest affected residential window.

6.03 With reference to the measured background noise levels and Camden's planning policy any new mechanical services should be designed to ensure that the following noise levels are not exceeded at one metre outside the nearest residential window.

Period	L_{Aeq} – dB
A3 Operating times (0700-0000hrs)	39
Night-time (2300-0700 hrs)	37

Table 6.1: Maximum permissible cumulative noise level for non-tonal plant noise

6.04 The values detailed in Table 6.1 are the maximum permissible noise level that are allowable under the Camden Council planning condition based on the cumulative operation of the plant serving the new property. If there is any plant such as a cooler which could be expected to operate over a 24 hour period then the lower design criterion will need to be satisfied by these plant items.

6.05 The likely nearest affected office windows to the new plant installation will be those of the first floor offices of 114 – 118 Southampton Row. In order to comply with the requirements of the current British Standard BS 8233:1999 "Sound Insulation and noise control for buildings – Code of practice" which states that a desirable internal ambient level ranges between 40 dB(A), described as 'good' upto 50 dB(A) which is described as 'reasonable'. The current glazing to these offices is a single glazed window with a secondary sash mounted nominally 100 mm behind, however both of these windows are openable. BS 8233 states that a noise reduction of 10 – 15 dB(A) can be expected for noise passing from outside to inside via an open window, therefore to ensure that a standard that can be described as 'good' is achieved within the offices the cumulative noise level for any new plant serving the new property should not exceed 50 dB(A) outside the nearest office windows.

APPENDIX A

SITE PLAN
&
MEASUREMENT LOCATION

Site
Location

Measurement
Location

[redacted]

EC 8484 - Southampton Row

Henderson

19 Hour Noise data

Time	L_Aeq	L_A10	L_A90
14:10	66.8	67.5	49 0
14:15	60.4	61.5	48.5
14:20	59.9	59.5	48.5
14:25	56.9	58.5	48.0
14:30	53.6	56.5	49.0
14:35	54.0	54.5	47.5
14:40	50.8	51.5	48.0
14:45	61.0	57.5	48.5
14:50	48.9	50.0	47.0
14:55	49.4	50.5	47 5
15:00	51.1	52.5	48 0
15:05	52.0	54.5	48.0
15:10	49.8	51.0	48.0
15:15	49.8	51.0	47.5
15:20	51.1	52.5	47.5
15:25	48.8	50.0	47.0
15:30	49.5	51.0	47.5
15:35	49.1	50.0	47.5
15:40	50.0	51.5	47.5
15:45	49.6	49.0	46.5
15:50	48.0	49.0	46.5
15:55	48.6	49.5	47.0
16:00	49.7	52.0	47.0
16:05	53.3	55.5	48.0
16:10	49.1	50.5	47.5
16:15	48.2	49.5	46.5
16:20	48.3	49.5	46.5
16:25	48.7	51.0	46.5
16:30	48.1	49.0	46.5
16:35	50.3	50.5	47.0
16:40	48.2	49.0	47.0
16:45	48.7	49.5	47.0
16:50	50.5	53.0	47.0
16:55	50.5	52.0	46.5
17:00	47.4	47 5	46.0
17:05	49.9	53.0	47.0
17:10	48.4	49.0	47 0
17:15	48.7	49.5	47.0
17:20	49.2	51.0	47.0
17:25	51.1	54.0	47.5
17:30	48.2	48.5	47.0
17:35	48.3	49.0	47.5
17:40	48.5	49.5	47.0
17:45	48.7	48.5	47.0
17:50	48.3	49.0	47.0
17:55	50.4	51.5	48.0
18:00	53.7	58.0	47.0
18:05	50.9	54.5	47 5

Time	L_Aeq	L_A10	L_A90
18:10	49.9	49.0	47.0
18:15	48.3	49.0	47.0
18:20	47.8	48.5	47.0
18:25	48.5	49.5	47.0
18:30	47.9	48.5	47.0
18:35	48.8	49.5	47.0
18:40	47.9	48.5	47.0
18:45	47.8	48.5	46.5
18:50	48.3	48.5	47.5
18:55	48.2	49.0	47.0
19:00	47.7	48.0	46.5
19:05	48.4	49.5	47 0
19:10	49.2	50.5	47 5
19:15	48.9	49.5	47.5
19:20	48.6	49.5	47.0
19:25	49.8	51.0	47.5
19:30	50.9	51.5	46.5
19:35	49.6	51.0	47.5
19:40	51.6	54.5	47.5
19:45	49.1	50.5	47.0
19:50	48.5	49.5	47.0
19:55	50.2	52.0	47.0
20:00	47.7	48.0	46.5
20:05	48.6	49.5	47.0
20:10	48.0	48.5	46.5
20:15	47 7	48.5	46.5
20:20	47.7	48.0	46 5
20:25	47.8	48.5	46.5
20:30	48.1	49.0	46.5
20:35	48.1	49.0	46.5
20:40	47.1	47.5	46.0
20:45	47.1	48.0	46.0
20:50	47.1	47 5	46.0
20:55	47.4	48.0	46.0
21:00	48.5	49.5	46.0
21:05	50.5	52.5	47.5
21:10	47.9	49.0	46.5
21:15	49.1	50.5	47 0
21:20	48.3	49.5	46.5
21:25	48.6	49.5	47.0
21:30	47.7	48.5	46.5
21:35	47.7	48.5	46.5
21:40	46.9	47.5	46.0
21:45	50.5	53.0	46.5
21:50	48.6	50.0	46.5
21:55	48 3	50.0	46.5
22:00	46.9	47.5	46.0
22:05	46.9	47.5	46.0

EC 8484 - Southampton Row

Henderson

19 Hour Noise data

Time	L_Aeq	L_A10	L_A90
22:10	46.9	47.5	46.0
22:15	49.6	52.5	46.0
22:20	47.5	48.5	46.0
22:25	50.9	53.5	46.0
22:30	46.9	47.5	45.5
22:35	49.7	50.0	46.0
22:40	47.5	48.5	46.0
22:45	47 1	48.0	46.0
22:50	48.8	50.5	46.0
22:55	49.5	51.0	46.0
23:00	46.7	48.0	45.0
23:05	48.4	50.5	44.5
23:10	47.1	49.0	45.0
23:15	46.0	46.5	44.5
23:20	45.3	46.0	44.0
23:25	46.4	47.0	45.0
23:30	45.6	46.0	44.5
23:35	45.9	46.5	44.5
23:40	45.7	46.5	44.5
23:45	47.9	48.0	44.5
23:50	49 3	50.0	45.5
23:55	45.5	46.0	44.5
00:00	45.6	46.0	44.0
00:05	48.9	50.5	44.5
00:10	45.8	46.5	44.5
00:15	53.0	56.5	44.5
00:20	47.0	46.0	43.5
00:25	45.9	45.5	43.0
00:30	44.7	45.5	43.5
00:35	44.9	46.0	43.0
00:40	44.1	45.0	42.5
00:45	44.7	45.5	43.5
00:50	44.5	45.0	43.5
00:55	48.7	51.5	44.5
01:00	45.0	46.5	43.5
01:05	44.9	46.0	43.5
01:10	44.6	45.5	43.5
01:15	44.7	45.5	43.0
01:20	44.4	45.0	43.0
01:25	45.0	46 5	43.0
01:30	43.9	45.0	42.5
01:35	45.1	47.0	43.0
01:40	44.2	45.0	43.0
01:45	43.6	44.5	42.0
01:50	43.3	44.0	42.0
01:55	47.2	49.0	42.5
02:00	45.0	45.0	42.5
02:05	43.7	44.5	42.0

Time	L_Aeq	L_A10	L_A90
02:10	43.5	44.5	42.0
02:15	43.3	44.0	42.0
02:20	43.1	44.0	42.0
02:25	43.4	44.0	42.0
02:30	43.5	44.0	42.5
02:35	43.7	44.5	42.5
02:40	44.1	45.0	42.5
02:45	44.5	46.5	42.5
02:50	47.2	51.0	42.5
02:55	45.0	47.0	42.5
03:00	43.6	44.5	42 5
03:05	43.8	45.0	42.0
03:10	44.5	46.0	42.5
03:15	43.2	44.0	42.0
03:20	44.5	46.5	42.0
03:25	43.7	44.5	42.0
03:30	43.6	45.0	42.0
03:35	43.1	44 0	41.5
03:40	44.1	45.5	42.0
03:45	44.1	45.0	42.5
03:50	43.9	45.0	42.5
03:55	43.8	44.5	42.5
04:00	51.8	52.5	42.5
04:05	43.8	44.5	42 0
04:10	43.2	44.5	42.0
04:15	43.6	44.5	42.0
04:20	43.8	45.0	42.5
04:25	43.2	44.0	42.0
04:30	43.6	44.5	42.0
04:35	43.3	44.0	42.0
04:40	43.5	44.5	42.0
04:45	44.1	44.5	42.0
04:50	46.3	49.0	42.5
04:55	43.0	44.0	41 5
05:00	44.9	46.0	42.5
05:05	43.6	44.5	42.5
05:10	43.5	44.5	42.0
05:15	44.2	45.5	43.0
05:20	44.0	45.0	42.5
05:25	45.7	47 5	43.0
05:30	44.5	45.5	43.0
05:35	45.4	45.5	43.0
05:40	45.7	47.0	43.0
05:45	47.7	48.0	44.0
05:50	48.8	49.5	45.5
05:55	48.5	50.0	45.0
06:00	47.5	48.5	44.5
06:05	50.6	51 0	45.5

EC 8484 - Southampton Row

Henderson

19 Hour Noise data

Time	L_Aeq	L_A10	L_A90
06:10	*51.4*	*52.5*	*46.0*
06:15	*50.9*	*52.0*	*45.0*
06:20	*51.5*	*53.5*	*45.5*
06:25	*51.9*	*54.0*	*47.5*
06:30	*47.8*	*49.5*	*45.5*
06:35	*46.3*	*47.0*	*44.5*
06:40	*46.2*	*47.0*	*45.0*
06:45	*45.7*	*46.5*	*44.5*
06:50	*48.5*	*49.5*	*44.0*
06:55	*45.6*	*47.0*	*43.5*
07:00	*46.0*	*47.0*	*44.5*
07:05	*45.7*	*46.5*	*44.0*
07:10	*46.4*	*47.5*	*44.0*
07:15	*47.5*	*47.5*	*45.0*
07:20	*48.0*	*50.0*	*45.0*
07:25	*47.5*	*49.0*	*45.0*
07:30	*47.3*	*48.5*	*45.5*
07:35	*46.9*	*48.0*	*45.5*
07:40	*46.9*	*47.5*	*45.5*
07:45	*47.4*	*49.0*	*45.5*
07:50	*46.9*	*47.5*	*45 0*
07:55	*50.1*	*52.5*	*46.0*
08:00	*50.9*	*49.5*	*45.5*
08:05	*47.8*	*48.5*	*46.0*
08:10	*51.1*	*53.5*	*47.0*
08:15	*48.7*	*50.0*	*46.5*
08:20	*49.5*	*51.0*	*47.0*
08:25	*52.9*	*55.5*	*46.5*
08:30	*54.6*	*56.0*	*47.0*
08:35	*48.6*	*50.0*	*46.5*
08:40	*52.9*	*51.5*	*47.0*
08:45	*54.8*	*56.5*	*47.5*
08:50	*71.3*	*73.5*	*48.0*

Time	L_Aeq	L_A10	L_A90

Noise Level Time History

Leq L10 L90

Sound Pressure Level - dB(A)

65
60
55
50
45
40

14:10 14:30 14:50 15:10 15:30 15:50 16:10 16:30 16:50 17:10 17:30 17:50 18:10 18:30 18:50 19:10 19:30 19:50 20:10 20:30 20:50 21:10 21:30 21:50 22:10 22:30 22:50 23:10 23:30 23:50 00:10 00:30 00:50 01:10 01:30 01:50 02:10 02:30 02:50 03:10 03:30 03:50 04:10 04:30 04:50 05:10 05:30 05:50 06:10 06:30 06:50 07:10 07:30 07:50 08:10 08:30 08:50

Time: 14-15 December 2006

APPENDIX D

GLOSSARY OF TECHNICAL TERMS

TECHNICAL TERMS AND UNITS

Decibel (dB) This is the unit used to measure sound. The human ear has an approximately logarithmic response to sound over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). We therefore use a logarithmic scale to describe sound pressure levels, intensities and power levels. The logarithms used are to base 10; hence, an increase of 10 dB in sound pressure level corresponds to a doubling in perceived loudness of the sound

Sound Power Level (PWL) - This is a function of the noise source alone and is independent of its surroundings. It is a measure of the amount of sound power output measured in decibels.

Sound Pressure Level (SPL) - This is a function of the source and its surroundings and is a measure of the sound pressure at a point in space. For example, a sound pressure level measured at 1 metre from a sound source of certain sound power in reverberant room will not be the same as the sound pressure level a 1 metre from the sound source measured in open space

Octave and One-Third Octave Bands The human ear is sensitive to sound over a range of approximately 20 Hz to 20 KHz and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For finer analysis, each octave band may be split into three one-third octave bands.

"A" Weighting A number of frequency weightings have been developed to imitate the ear's varying sensitivity to sound of different frequencies The most commonly used weighting is the "A' weighting The "A" weighted SPL can be measured directly or derived from octave or one-third octave band SPLs. The result is a single figure index which gives some idea of the subjective loudness of the sound, but which contains no information as to its frequency content.

Noise Rating (NR) and Noise Criteria (NC) Curves The "A' weighted sound pressure level cannot be used to define a spectrum or to compare sounds of different frequencies. NR curves convey frequency information in a single-figure index This is done by defining the maximum permissible sound pressure level at each frequency for each curve To measure the noise rating of a given environment, the SPL is measured in octave or one third octave bands and the noise rating is then the highest NR curve touched by the measured levels

Typical NR levels for various environments are shown below

Workshops	NR 60 70
Mechanised Office	NR 50 55
Gymnasium, Sport Halls, Swimming Baths	NR 40-50
Restaurants, Bars, Cafeterias	NR 35-45
Cinemas, Hospitals, Churches, Small Conference Rooms	NR 25 35
Classrooms, TV Studios, Large Conference Rooms	NR 20 30
Concert Halls, Theatres	NR 20-25
Diagnostic Clinics, Audiometric Rooms	NR 10 20
Broadcasting Studios	NR 5-15

NC curves are similar to NR curves and are evaluated in the same way. At low frequencies, NC curves are below the equivalent NR curves. They are often used for setting ventilation noise levels

Intermittency and Time-Weighting The degree of annoyance caused by a noise also depends on its duration and intermittency of a noise. Intermittent, impulsive or repetitive noises tend to be more annoying than continuous noises. Various time-weightings have been derived to measure sounds of differing intermittences and these can be measured directly on modern equipment. The most common time-weightings in use are as follows

L_{90} This is the sound pressure level exceeded for 90% of the measurement period. It is widely used to measure background noise levels

L_{50} this is the sound pressure level exceeded for 50% of the measurement period. It is widely used to measure background noise levels with an element of other intrusive noise. For a given measurement, the L_{50} level is by definition greater than or equal to the L_{90} level.

L_{10} This is the sound pressure level exceeded for 10% of the measurement period. It is widely used to measure traffic noise For a given measurement period, the L_{10} level is by definition greater than or equal to the L_{90} level.

L_{eq} The equivalent continuous noise level is often used to measure intermittent noise. It is defined as the notional steady noise level that would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic, the L_{eq} level tends to be dominated by the higher noise levels measured.