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Project:

62 Elsworthy Road

Title:

Background Noise Survey and Planning Report

Environmental Equipment Corporation Ltd
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Walton on Thames
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Report Title	62 Elsworthy Road – Background Noise Survey and Planning Report
Reference	TP/EC11014-004
Version	1
Issue Date	17 September 2010
Client	Edward Pearce LLP
Author	Toby Park MEng (Hons) AMIOA Consultant Engineer
Checked	Jon Mudd BEng (Hons) MIOA

CONTENTS:

1 INTRODUCTION

1.01 Environmental Equipment Corporation Limited has been commissioned by Edward Pearce LLP to undertake a background noise survey at 62 Elsworthy Road, with a view to ascertaining prevailing background noise levels for the immediate vicinity.

1.02 Proposals are being submitted to the London Borough of Camden to install mechanical services plant serving a swimming pool at basement level, with the plant installed internally and ducted to atmosphere. Noise levels from the plant need to be assessed as part of the planning application and are therefore addressed in this report.

1.03 This report is prepared solely for Edward Pearce LLP. Environmental Equipment Corporation Ltd accepts no responsibility for its use by any third party.

2 SITE

2.01 62 Elsworthy Road is located on a quiet residential street in Camden, near Swiss Cottage, and backs onto a private area of parkland. The road has very little through traffic and the ambient noise environment is therefore relatively low. Appendix A includes preliminary drawings of the proposed works and notes indicating properties in the surrounding area.

2.02 The proposed mechanical services plant consists of 1 No air handling unit serving a basement swimming pool. The unit is to be located within an internal (basement level) plant room with fresh air inlet and exhaust air discharge systems ducted to atmopshere within a light-well at basement level. The lightwell is overlooked by a window belonging to the adjacent property to the west at a distance of approximately 5m.

2.03 Figure 1 below shows an aerial photograph of the site indicating the location of the proposed light-well and nearby noise sensitive properties. A drawing of the proposed works is included in Appendix A.

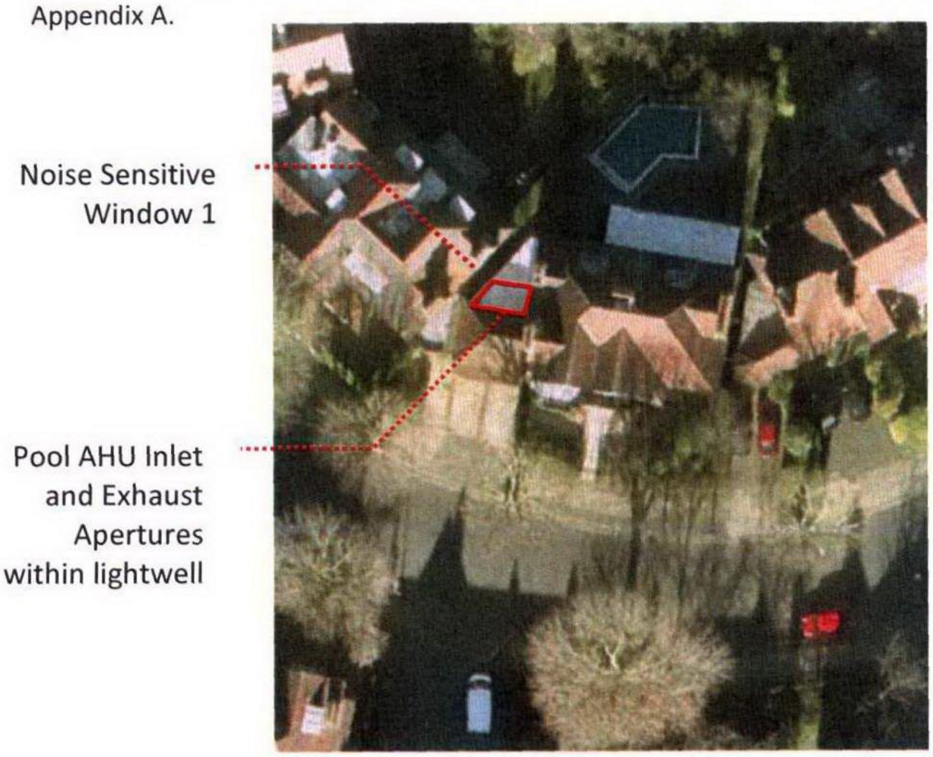


Figure 1: Aerial photo of site

3 MEASUREMENTS

3.01 Background noise levels have been measured over a 26 hour period at a suitable location within the rear garden, representative of the immediate noise environment.

3.02 The equipment was set up to integrate sound levels over 5 minute intervals for 26 hours between 0950hrs, Monday 13 September and 1150hrs, Tuesday 14 September 2010.

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

3.04 Weather conditions during the survey were calm and dry throughout.

4 EQUIPMENT

4.01 Equipment for the survey was as follows:-

- Brüel & Kjær type 2238 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 or equivalent accreditation and serial numbers as follows:

Sound Level Meter B&K2238	Serial No.	262287
	Calibration Date	3rd June 2010
	Cal Certificate No.	AC/10/121/01/R1
½" Condenser Mic. B&K4188	Serial No.	2641221
	Calibration Date	3rd June 2010
	Cal Certificate No.	AC/10/121/01/R1
Calibrator B&K4231	Serial No.	1761563
	Calibration Date	23rd March 2010
	Cal. Certificate No.	AC/10/46/01

N.B. Copies of calibration 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 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 time averaged ambient level and lowest measured background levels are shown in Table 5.1, below.

Period	Average L_Aeq,T – dB	Lowest L_A90 – dB
Day time (0700-1900 hrs)	54.4	38.5
Evening (1900-2300 hrs)	45.4	38.0
Night-time (2300-0700 hrs)	42.0	34.5

Table 5.1: Measured Ambient and Lowest Background Noise Levels

6 DISCUSSION

6.01 The London Borough of Camden Environmental Health Department 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 and as measured at the nearest residential windows.

6.02 Should the noise emissions from the proposed plant be considered tonal or intermittent enough to draw undue attention, a further 5 dB reduction applies to the noise limit. The proposed plant, in accordance with the published noise data, is not tonal and nor shall it be intermittent. Therefore, the applicable criteria for this application will be 5 dB below the lowest background noise levels of 39, 38 and 35 dB(A) for the respective day, evening and night-time periods.

6.03 It is assumed that plant will have the potential to operate at any time throughout the daytime, evening and night-time, therefore, noise emitted from the proposed plant should not exceed 30 dB(A) at 1m external of the nearest residential window.

7 PLANT ASSESSMENT

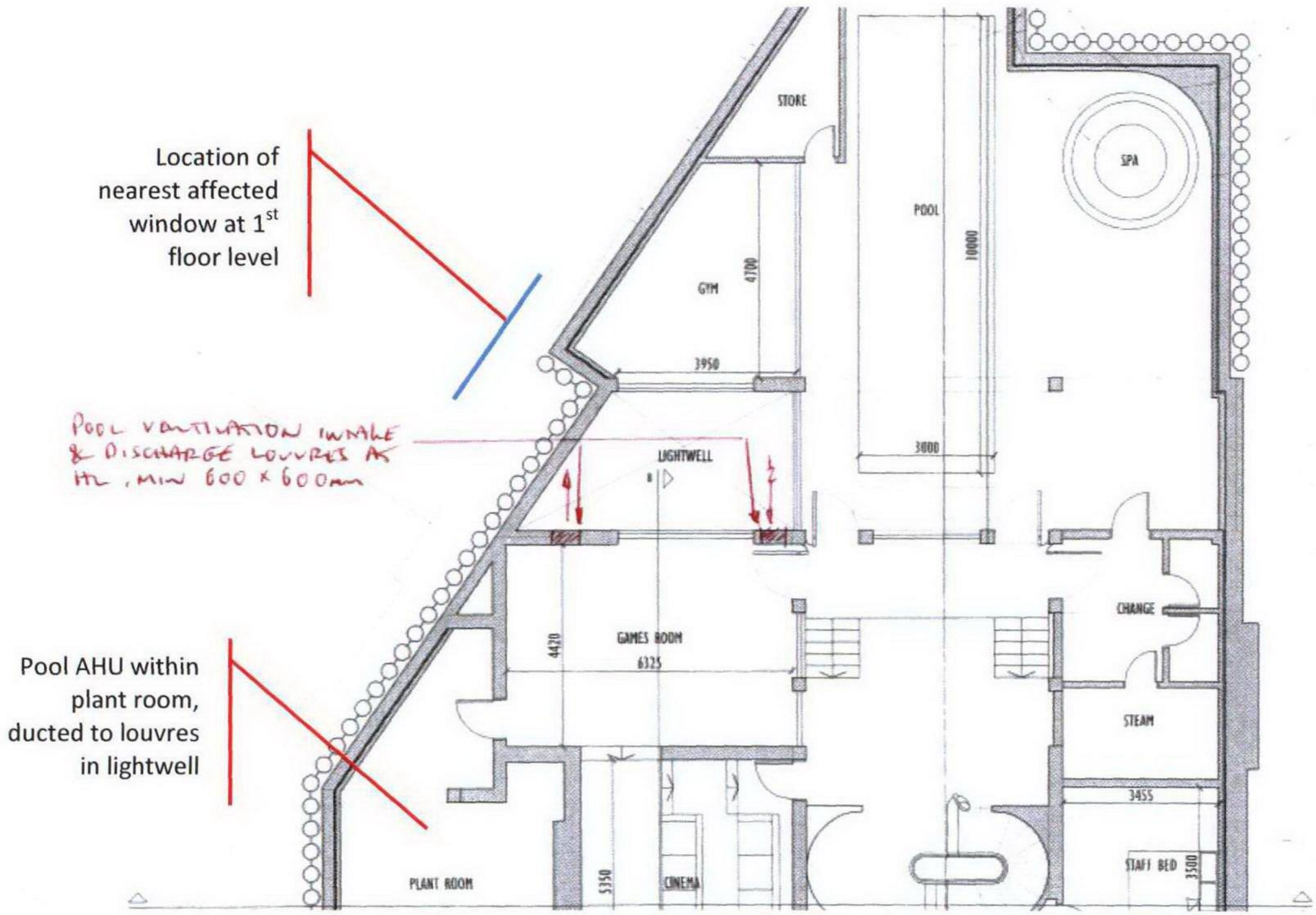
7.01 The proposed plant consists of 1 No Calorex Variheat Air Handling Unit, located within a basement level plant room and ducted to a lightwell. A full acoustic evaluation of the relevant ductwork system has been carried out, accounting for duct losses, directivity, end-reflection and distance losses, and subsequently high performance duct attenuators are proposed to be incorporated, designed to strictly adhere to the cumulative noise limits imposed by the London borough of Camden.

7.02 Full details of the ductwork calculations are included within Appendix D. Each aperture has been designed to a noise level of 20 dB(A) outside the nearest affected window, giving a cumulative noise level of just 23 dB(A).

7.03 As discussed in section 6, the applicable noise level design criterion is 30 dB(A). As such the plant noise levels fall well within the design criterion and therefore fully satisfy the requirements of the London Borough of Camden.

APPENDIX A

SITE PLAN


Location of nearest affected window at 1st floor level
Pool AHU within plant room, ducted to louvres in lightwell
POOL VENTILATION INTAKE & DISCHARGE LOUVRES AT HL, MIN 600 x 600mm
STORE
POOL
10000
SPA
GYM
4700
3950
LIGHTWELL
3000
CHANGE
GAMES ROOM
4420
6325
STEAM
3455
STAFF BED
3500
PLANT ROOM
5350
CINEMA

APPENDIX B

SURVEY RESULTS
(TABULAR)

EC 11014 - 62 Elsworthy Road

Edward Pearce LLP

24 Hour Noise data

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$
09:50	64	57	41
09:55	62	67	41
10:00	59	66	40
10:05	43	46	39
10:10	43	46	39
10:15	42	45	39
10:20	46	50	40
10:25	45	47	40
10:30	47	48	41
10:35	50	48	41
10:40	47	49	41
10:45	49	52	43
10:50	50	53	41
10:55	46	48	41
11:00	51	55	41
11:05	57	58	41
11:10	49	52	41
11:15	48	49	41
11:20	49	51	44
11:25	51	56	42
11:30	52	52	42
11:35	49	51	43
11:40	57	61	43
11:45	60	64	50
11:50	58	64	51
11:55	63	66	59
12:00	58	64	41
12:05	54	52	41
12:10	47	50	41
12:15	46	48	44
12:20	44	46	41
12:25	47	50	42
12:30	47	49	42
12:35	48	54	41
12:40	47	50	41
12:45	47	50	44
12:50	48	51	43
12:55	45	48	42
13:00	47	49	44
13:05	44	46	41
13:10	44	46	40
13:15	47	51	42
13:20	49	52	44
13:25	48	50	42
13:30	48	51	44
13:35	48	50	43
13:40	44	46	42
13:45	49	52	44

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$
13:50	49	52	44
13:55	50	54	42
14:00	62	54	42
14:05	50	53	46
14:10	47	49	43
14:15	48	51	44
14:20	49	52	45
14:25	51	51	42
14:30	47	49	43
14:35	47	50	42
14:40	49	52	45
14:45	49	51	44
14:50	47	49	43
14:55	45	46	42
15:00	67	70	42
15:05	70	74	42
15:10	68	71	45
15:15	47	49	44
15:20	47	51	42
15:25	52	57	43
15:30	48	51	42
15:35	47	51	41
15:40	43	45	41
15:45	49	51	44
15:50	46	48	42
15:55	43	45	41
16:00	44	46	41
16:05	49	52	42
16:10	46	48	41
16:15	46	49	42
16:20	50	52	41
16:25	45	48	42
16:30	46	48	42
16:35	44	47	41
16:40	45	48	41
16:45	46	49	43
16:50	46	48	42
16:55	50	53	43
17:00	46	49	43
17:05	47	50	43
17:10	49	53	43
17:15	47	50	42
17:20	48	50	43
17:25	50	52	43
17:30	46	49	43
17:35	43	46	40
17:40	49	53	42
17:45	55	59	44

EC 11014 - 62 Elsworthy Road

Edward Pearce LLP

24 Hour Noise data Sheet 2 of 4

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$
17:50	*45*	*48*	*42*
17:55	*44*	*47*	*41*
18:00	*44*	*46*	*41*
18:05	*46*	*49*	*42*
18:10	*44*	*46*	*41*
18:15	*43*	*46*	*40*
18:20	*44*	*46*	*42*
18:25	*43*	*45*	*41*
18:30	*44*	*47*	*40*
18:35	*46*	*50*	*41*
18:40	*45*	*47*	*41*
18:45	*50*	*50*	*42*
18:50	*44*	*45*	*42*
18:55	*57*	*54*	*40*
19:00	*44*	*46*	*41*
19:05	*45*	*48*	*41*
19:10	*54*	*58*	*42*
19:15	*44*	*47*	*40*
19:20	*43*	*45*	*41*
19:25	*44*	*46*	*40*
19:30	*44*	*46*	*40*
19:35	*45*	*48*	*40*
19:40	*45*	*47*	*41*
19:45	*46*	*49*	*42*
19:50	*43*	*46*	*40*
19:55	*45*	*47*	*41*
20:00	*46*	*49*	*41*
20:05	*42*	*44*	*39*
20:10	*45*	*48*	*41*
20:15	*46*	*49*	*41*
20:20	*46*	*48*	*42*
20:25	*45*	*47*	*41*
20:30	*45*	*48*	*41*
20:35	*42*	*45*	*39*
20:40	*44*	*47*	*40*
20:45	*44*	*47*	*41*
20:50	*43*	*46*	*40*
20:55	*44*	*47*	*39*
21:00	*45*	*47*	*41*
21:05	*44*	*48*	*40*
21:10	*46*	*48*	*42*
21:15	*44*	*46*	*40*
21:20	*46*	*49*	*40*
21:25	*43*	*46*	*39*
21:30	*46*	*49*	*41*
21:35	*48*	*51*	*43*
21:40	*45*	*47*	*39*
21:45	*42*	*44*	*39*

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$
21:50	*46*	*50*	*41*
21:55	*49*	*52*	*41*
22:00	*41*	*43*	*39*
22:05	*44*	*47*	*39*
22:10	*44*	*47*	*41*
22:15	*48*	*52*	*41*
22:20	*47*	*50*	*41*
22:25	*44*	*47*	*40*
22:30	*45*	*48*	*40*
22:35	*47*	*51*	*42*
22:40	*43*	*45*	*40*
22:45	*44*	*47*	*40*
22:50	*43*	*46*	*40*
22:55	*42*	*44*	*38*
23:00	*44*	*48*	*38*
23:05	*43*	*46*	*39*
23:10	*44*	*47*	*40*
23:15	*44*	*47*	*40*
23:20	*43*	*46*	*40*
23:25	*43*	*46*	*39*
23:30	*44*	*47*	*40*
23:35	*42*	*45*	*39*
23:40	*42*	*46*	*39*
23:45	*45*	*49*	*38*
23:50	*44*	*47*	*39*
23:55	*44*	*47*	*39*
00:00	*42*	*46*	*39*
00:05	*44*	*47*	*40*
00:10	*44*	*45*	*38*
00:15	*43*	*46*	*38*
00:20	*47*	*50*	*41*
00:25	*42*	*44*	*39*
00:30	*44*	*48*	*38*
00:35	*44*	*47*	*39*
00:40	*41*	*44*	*37*
00:45	*42*	*46*	*39*
00:50	*40*	*42*	*38*
00:55	*39*	*41*	*37*
01:00	*42*	*46*	*36*
01:05	*42*	*46*	*37*
01:10	*43*	*47*	*39*
01:15	*43*	*46*	*38*
01:20	*40*	*42*	*37*
01:25	*39*	*42*	*36*
01:30	*42*	*45*	*37*
01:35	*41*	*42*	*37*
01:40	*40*	*42*	*36*
01:45	*38*	*41*	*36*

EC 11014 - 62 Elsworthy Road

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24 Hour Noise data Sheet 3 of 4

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$
01:50	43	46	38
01:55	40	42	36
02:00	41	45	37
02:05	39	41	36
02:10	42	45	37
02:15	44	49	38
02:20	42	45	39
02:25	46	48	38
02:30	44	47	38
02:35	42	45	36
02:40	43	47	37
02:45	45	50	39
02:50	42	45	36
02:55	42	45	36
03:00	42	46	38
03:05	43	47	37
03:10	40	42	37
03:15	41	43	38
03:20	43	45	38
03:25	39	41	37
03:30	42	46	36
03:35	42	45	36
03:40	42	45	38
03:45	42	46	37
03:50	41	43	37
03:55	38	41	35
04:00	39	42	36
04:05	40	43	37
04:10	39	42	35
04:15	38	41	35
04:20	39	41	35
04:25	38	40	35
04:30	39	42	37
04:35	39	42	35
04:40	39	41	36
04:45	39	42	37
04:50	39	42	36
04:55	38	39	35
05:00	39	40	37
05:05	39	43	36
05:10	39	42	35
05:15	40	43	36
05:20	41	44	37
05:25	39	42	36
05:30	41	44	36
05:35	42	45	37
05:40	40	42	37
05:45	45	48	38

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$
05:50	41	44	38
05:55	43	45	39
06:00	42	45	38
06:05	39	41	37
06:10	44	47	39
06:15	42	45	38
06:20	42	44	39
06:25	41	43	40
06:30	41	43	38
06:35	44	47	41
06:40	41	43	39
06:45	42	44	40
06:50	45	48	40
06:55	44	46	40
07:00	42	44	40
07:05	43	45	40
07:10	43	46	41
07:15	44	46	41
07:20	45	47	42
07:25	48	50	41
07:30	46	49	41
07:35	46	47	41
07:40	50	54	40
07:45	44	46	40
07:50	46	49	41
07:55	44	46	41
08:00	47	47	41
08:05	46	48	42
08:10	45	48	42
08:15	44	46	42
08:20	45	48	42
08:25	46	49	43
08:30	45	48	42
08:35	45	47	43
08:40	47	50	44
08:45	46	48	44
08:50	47	50	44
08:55	47	48	44
09:00	44	47	42
09:05	45	47	42
09:10	45	47	43
09:15	46	48	43
09:20	46	48	44
09:25	46	48	43
09:30	48	50	44
09:35	43	45	41
09:40	45	47	42
09:45	46	49	41

EC 11014 - 62 Elsworthy Road

Edward Pearce LLP

24 Hour Noise data

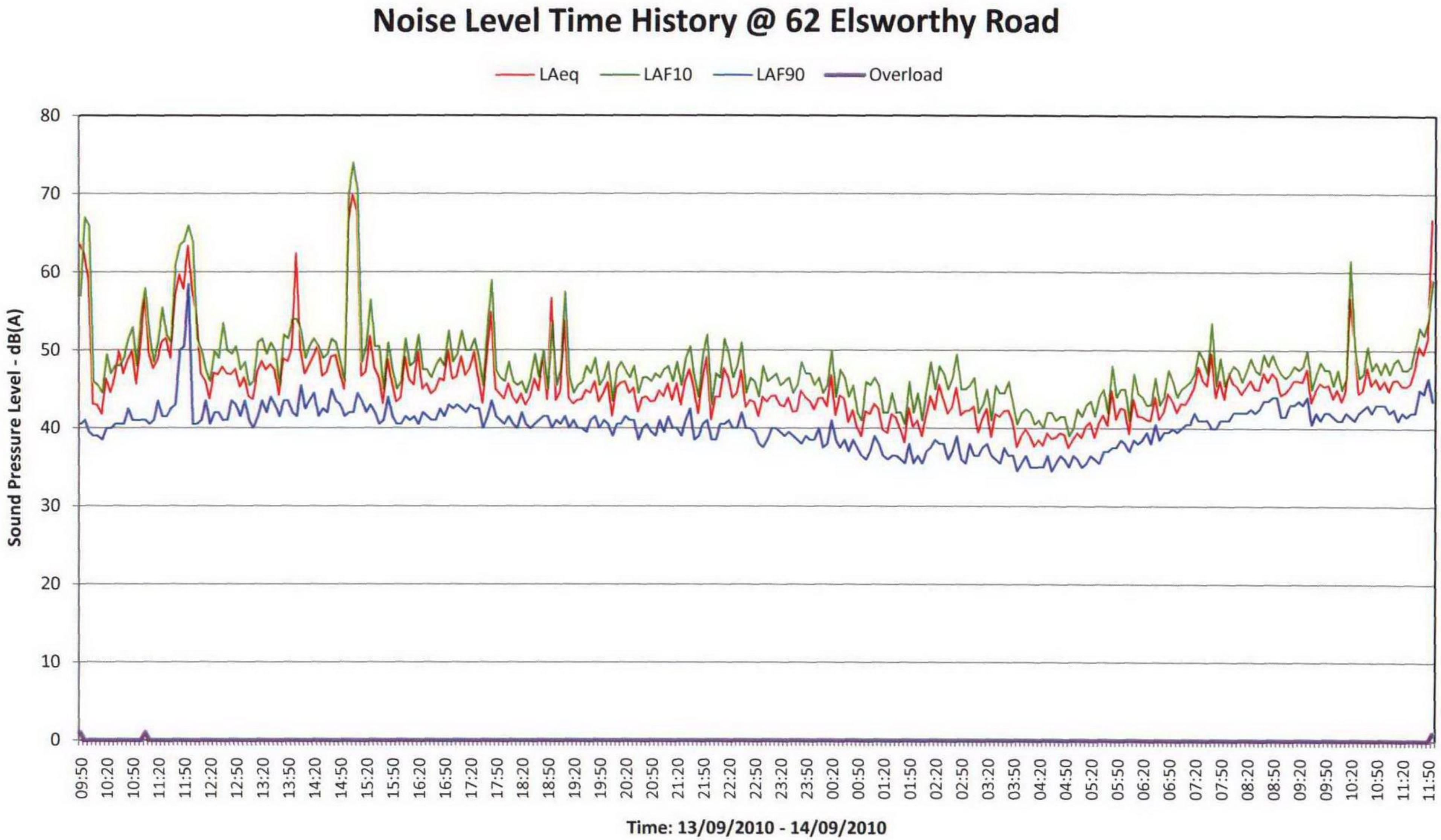
Sheet 4 of 4

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$
09:50	45	48	42
09:55	46	48	42
10:00	44	46	42
10:05	45	48	41
10:10	44	45	41
10:15	45	47	42
10:20	57	62	42
10:25	51	51	41
10:30	45	47	42
10:35	45	47	43
10:40	48	51	43
10:45	46	48	42
10:50	46	49	43
10:55	45	47	43
11:00	46	49	43
11:05	45	47	42
11:10	46	49	43
11:15	46	49	41
11:20	46	48	42
11:25	45	48	42
11:30	46	48	42
11:35	48	51	42
11:40	51	53	45
11:45	50	52	45
11:50	52	54	47
11:55	67	59	44

Time	$L_{A}eq$	$L_{A}10$	$L_{A}90$

APPENDIX C

SURVEY RESULTS
(GRAPHICAL)


Noise Level Time History @ 62 Elsworthy Road
LAeq
LAF10
LAF90
Overload
Sound Pressure Level - dB(A)
0
10
20
30
40
50
60
70
80
09:50 10:20 10:50 11:20 11:50 12:20 12:50 13:20 13:50 14:20 14:50 15:20 15:50 16:20 16:50 17:20 17:50 18:20 18:50 19:20 19:50 20:20 20:50 21:20 21:50 22:20 22:50 23:20 23:50 00:20 00:50 01:20 01:50 02:20 02:50 03:20 03:50 04:20 04:50 05:20 05:50 06:20 06:50 07:20 07:50 08:20 08:50 09:20 09:50 10:20 10:50 11:20 11:50
Time: 13/09/2010 - 14/09/2010

APPENDIX D

ACOUSTIC DUCT CALCULATIONS

EC11014-003 62 Elsworthy Road
Edward Pearce LLP
ATT 1: Pool AHU Exhaust

17/09/10				63	125	250	500	1k	2k	4k	8k
SWL				82	78	75	71	68	65	63	61
outlet dims	W or (dia)	H									
	400	400									
area	0.16										
surfaces 0-3	3										
System Losses			ı/no. off								
Duct	300	300	5	5	7	5	3	2	2	2	2
	0		0	0	0	0	0	0	0	0	0
	0		0	0	0	0	0	0	0	0	0
	0		0	0	0	0	0	0	0	0	0
Bend m/r/mtv/lb											
r	300		1	0	0	0	0	1	2	3	3
0	0		0	0	0	0	0	0	0	0	0
0	0		0	0	0	0	0	0	0	0	0
0	0		0	0	0	0	0	0	0	0	0
Split	% to outlet										
	100	%		0	0	0	0	0	0	0	0
Additional attenuation		AS 20/06		10	14	22	34	42	48	37	30
Other: filter-bag/abs,co			0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0
End Reflection				11	6	2	1	0	0	0	0
Total System attenuatioı				-26	-27	-29	-38	-45	-52	-42	-35
SWL at outlet				56	51	46	33	23	13	21	26
Direct Contribution											
dist. to ear	6	m		-27	-27	-27	-27	-27	-27	-27	-27
directivity	45	degrees		6	6	6	6	6	6	6	6
SPLdir				36	31	26	12	2	-8	0	5
Criteria	27	dBA		48	36	27	20	16	13	10	8
Required DIL				**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		19.9	dBA	9.5	14.8	16.5	9.1	2.1	-6.9	1.1	4.1

EC11014-003 62 Elsworthy Road
Edward Pearce LLP
ATT 2: Pool AHU Inlet

17/09/10				63	125	250	500	1k	2k	4k	8k
SWL				83	79	74	72	67	63	60	61
outlet dims	W or (dia)	H									
	400	400									
area	0.16										
surfaces 0-3	3										
System Losses			l/no. off								
Duct	300	300	5	5	7	5	3	2	2	2	2
	0		0	0	0	0	0	0	0	0	0
	0		0	0	0	0	0	0	0	0	0
	0		0	0	0	0	0	0	0	0	0
Bend m/r/mtv/lb											
r	300		1	0	0	0	0	1	2	3	3
0	0		0	0	0	0	0	0	0	0	0
0	0		0	0	0	0	0	0	0	0	0
0	0		0	0	0	0	0	0	0	0	0
Split	% to outlet										
	100	%		0	0	0	0	0	0	0	0
Additional attenuation		AS 20/06		10	14	22	34	42	48	37	30
Other: filter-bag/abs,co			0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0
End Reflection				11	6	2	1	0	0	0	0
Total System attenuatio				-26	-27	-29	-38	-45	-52	-42	-35
SWL at outlet				57	52	45	34	22	11	18	26
Direct Contribution											
dist. to ear	6	m		-27	-27	-27	-27	-27	-27	-27	-27
directivity	45	degrees		6	6	6	6	6	6	6	6
SPLdir				37	32	25	13	1	-10	-3	5
Criteria	27	dBA		48	36	27	20	16	13	10	8
Required DIL				**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		20.0	**dBA**	10.5	15.8	15.5	10.1	1.1	-8.9	-1.9	4.1

APPENDIX E

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 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) 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.

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_{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.