Enterprise House, Blyth Road, Hayes, Middx. UB3 1DD

Telephone: 020 8848 3031 Fax: 020 8573 3605

24 HOUR NOISE LEVEL SURVEY CARRIED OUT ON THE ROOF OF THE OFFICE PREMISES AT 51-53 HATTON GARDENS, LONDON EC1 AND A REPORT ON THE NOISE CONTROL MEASURES REQUIRED TO MINIMISE THE NOISE IMPACT OF THE PROPOSED NEW AIR CONDITIONING PLANT

Test Engineer : M G Roberts

Report Author : M G Roberts

Authorised for Release by : I J Marchant

Client	:	Peter Deer and Associates
Project	:	51-53 Hatton Gardens, London EC1
Emtec Ref.	:	QF6416/PF4012/RP1 (A)
Date	:	18th June 2010

24 HOUR NOISE LEVEL SURVEY CARRIED OUT ON THE ROOF OF THE OFFICE PREMISES AT 51-53 HATTON GARDENS, LONDON EC1 AND A REPORT ON THE NOISE CONTROL MEASURES REQUIRED TO MINIMISE THE NOISE IMPACT OF THE PROPOSED NEW AIR CONDITIONING PLANT

1.0. INTRODUCTION

This report details the results of a 24 hour noise survey carried out on the roof above the office building at 51-53 Hatton Gardens, London EC1.

The objectives of this survey were as follows:

- To establish the existing background noise level on the roof of the building.
- To assess the proposed new Air Conditioning Plant that is to be mounted on the roof and to recommend areas that may require particular treatment to ensure that the operation of the new plant does not disturb the occupants of the neighbouring properties.

This report has been divided into the following sections for ease of analysis:

2.0. TEST INSTRUMENTATION

All measurement equipment used during the survey complied with the requirements of BS4142:1990 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". Details of the equipment are as follows:

Integrating Sound Level Meters	:	Bruel & Kjaer type 2231 fitted with a Bruel & Kjaer type 4155 ½ inch condenser microphone.
Statistical Analysis Modules	:	Bruel & Kjaer type BZ 7115 capable of computing the percentile levels L1, L10, L50, L90 and L99 and also the Leq level.
Acoustic Calibrator	:	Bruel & Kjaer type 4231 electronic calibrator.

Calibration was performed before and after the surveys and found to be, in all cases, +/- 0.1 dB from the reference source.

3.0. TEST PROCEDURE

The survey was conducted during a continuous 24 hour period from 17.09pm on Thursday the 27th of May 2010 to 16.49pm on Friday the 28th of May 2010.

Data was continuously acquired throughout the measurement period with the individual averaging time for statistical noise data set to 20 minutes. The following statistical measurements were recorded concurrently:

LA1 - The Sound Pressure Level exceeded for 1% of the measurement period.

LA10 - The Sound Pressure Level exceeded for 10% of the measurement period.

LA50 - The Sound Pressure Level exceeded for 50% of the measurement period.

LA90 - The Sound Pressure Level exceeded for 90% of the measurement period. LA90 is considered to represent the "background noise level" during the measurement period and is used for the assessment of noise to determine the likelihood of complaints (See BS 4142).

LA99 - The Sound Pressure Level exceeded for 99% of the measurement period.

LAeq - The continuous steady state Sound Pressure Level that has the same acoustic energy as the real fluctuating level.

All noise levels recorded were filtered using a standard 'A' Weighting filter.

3.1. Measurement Position

The noise levels were measured at a position on the roof of the building adjacent to the next door roof terrace as shown in Photo A. Photo B shows the microphone location relative to the existing Van Spall condenser on the roof of No. 51-53.

The microphone was positioned so that it was pointing away from the condenser and towards the adjacent roof terrace.

The microphone was approximately 1.2 metres above the roof level. The rest of the measurement equipment was located in a weatherproof enclosure with a low impedance cable running from the microphone to the instrumentation.

3.2. Weather Conditions

The weather conditions prevailing during the measurement period were generally in line with those recommended in BS 4142:1990 with no precipitation and no wind. The weather was bright and clear throughout the daytime and nightime period.

The microphone was protected throughout the tests by an acoustically transparent wind balloon.

4.0. RESULTS

The raw test data, gathered during the 24 hour noise survey, is given in Appendix 'A 'of this report.

The 'A' Weighted Leq levels measured over each 20 minute interval throughout the 24 hour periods (denoted by LAeq, (20 mins)) are displayed as bar graphs on the attached Sketch No. QF/6416/T1 at the back of this report.

The 'A' Weighted percentile levels measured over each 20 minute interval denoted by LA10 (20 mins), LA50 (20 mins) and LA90 (20 mins) are displayed as line graphs on the attached Sketch No. QF/6416/T2 at the back of this report.

4.1. Summary of Results

The table QF/6416/D1 below summarises the noise levels taken over the 24 hour period in terms of the maximum and minimum Sound Pressure Levels recorded.

Table QF/6416/D1 – Summary of Maximum and Minimum Noise Levels

	LA1	**LA10**	**LA50**	**LA90**	**LA99**	**Laeq**
Min.	51.5 dBA	49.5 dBA	49 dBA	48 dBA	47.5 dBA	49 dBA
Max.	71.5 dBA	64 dBA	55.5 dBA	54 dBA	53 dBA	60.3 dBA

5.0. DISCUSSION OF RESULTS

The lowest recorded LA_{90} background noise level measured during the 24 hour noise monitoring exercise was 48 dBA. This was measured during one time period ending at 2.49am.

The LA_{90} background noise level did not vary greatly as the maximum recorded LA_{90} level was 54 dBA which again occurred during only one time period ending at 10.29am. The LA_{90} level was therefore generally between 53.5 dBA and 48.5 dBA throughout the 24 hour monitoring exercise.

The existing air cooled condenser units which were switched off from 7.00pm to 7.00am did not significantly alter the LA_{90} background noise level, the LA_{90} level varying from 52 dBA to 48 dBA during the night time period whilst the condensers were switched off.

The existing Van Spall condenser, which can be seen in Photos B and C is to be replaced by two Colt 3024/8SN heat pump units. The sound power levels of these units are given below:-

Unit	Sound Power Level (db ref 10^{-12} watts) 63	125	250	500	1k	2k	4k
Colt 3024/8SN Heat Pump	72	80	84	79	76	72	64

Note: The above sound power levels were taken from Colt's email dated the 1st of June 2010. Individual readings are corrected to the nearest decibel.

In line with the Camden Replacement Unitary Development Plan (2006) the maximum LAeq level from any new plant should not exceed a level 5dB below the lowest recorded LA_{90} background noise level so long as there is no tonal quality or the noise level is likely to be intermittent in nature. If the noise level is likely to contain tones or be intermittent in nature then the LAeq level from the new plant must not exceed a level 10dB below the minimum LA_{90} background noise level. This level to apply at 1 metre from the nearest noise sensitive (residential) windows.

With no noise control measures the new plant is likely to be intermittent in nature and contain specific tones associated with the fans and compressors within the units. The new installation should therefore be designed to achieve a noise level 10dB below the lowest LA_{90} level. This would require an LAeq level of (48 – 10) = 38 dBA at 1 metre from the nearest residential window.

The nearest window to the new plant will be approximately 12 metres away and will enjoy a degree of acoustic shielding from the roof of the building as shown on the attached sketch No QF/6416/T5.

Based upon these parameters we list below the resultant noise level at 1 metre from the nearest sensitive window:-

Sound power level of Colt chiller	72	80	84	79	76	72	64
2 machines operating	+3	+3	+3	+3	+3	+3	+3
10 log A correction to 11 metres	33	33	33	33	33	33	33
Shielding of edge of roof (500mm)	10	12	14	17	19	20	22
Unsilenced SPL @ 1 metre from window	32	38	40	32	27	22	12

The above is equivalent to LAeq: 34.7dB and is therefore 3.3dB below the required noise level of LAeq: 38dB.

It should therefore be possible to run the two Colt Heat Pumps on a 24 hour basis without any likelyhood of complaints under the guidelines of BS4142.

We believe that the two Heat Pumps will be placed onto a control system which will only allow operation of the Units between the hours of 7am and 11pm (ie during extended office hours). The lowest LA90 recorded during this period was LAeq: 50.5dBA which occurred during one time period ending at 16.49pm. The units are therefore 15.8dB below the lowest LA_{90} level during this period.

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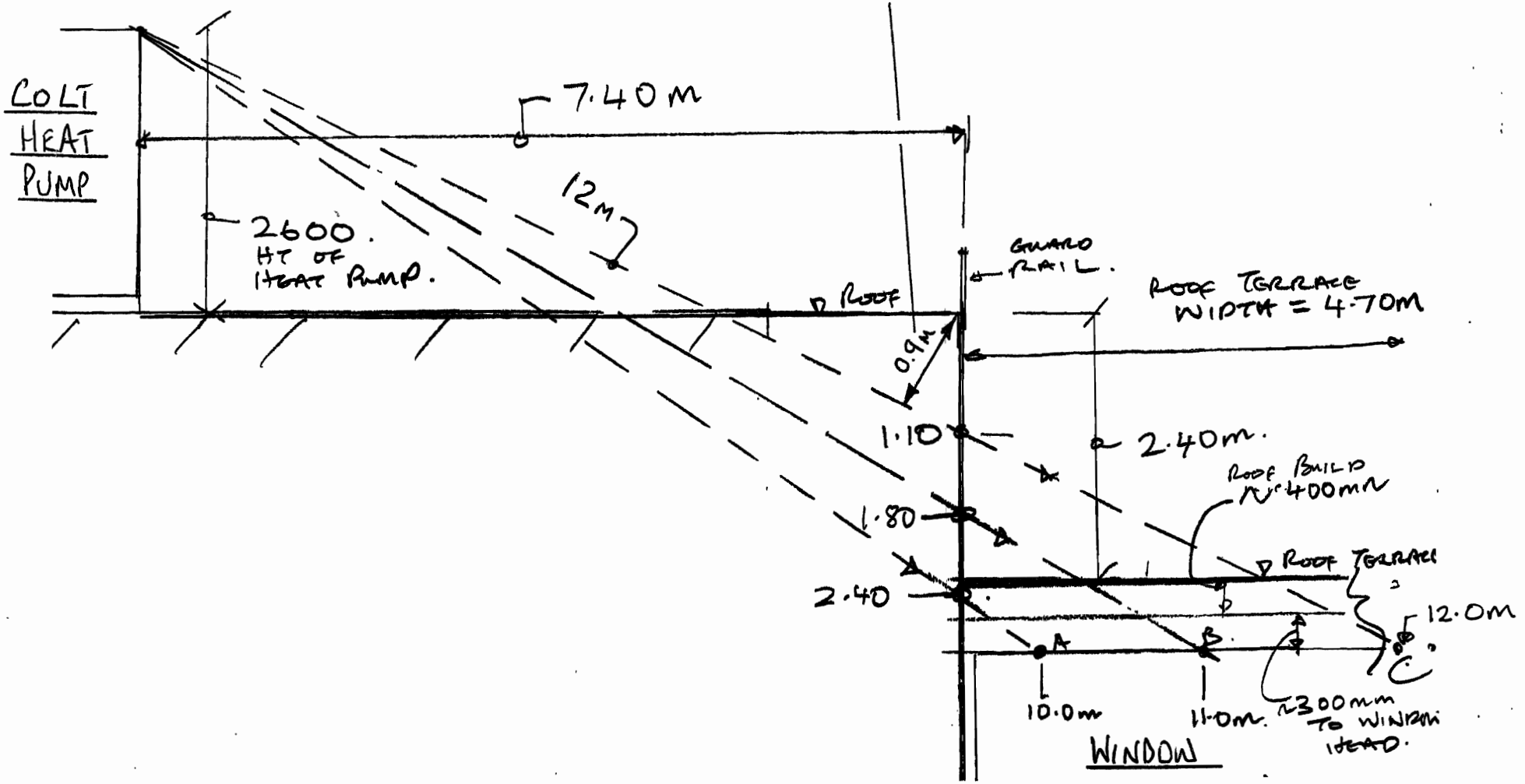
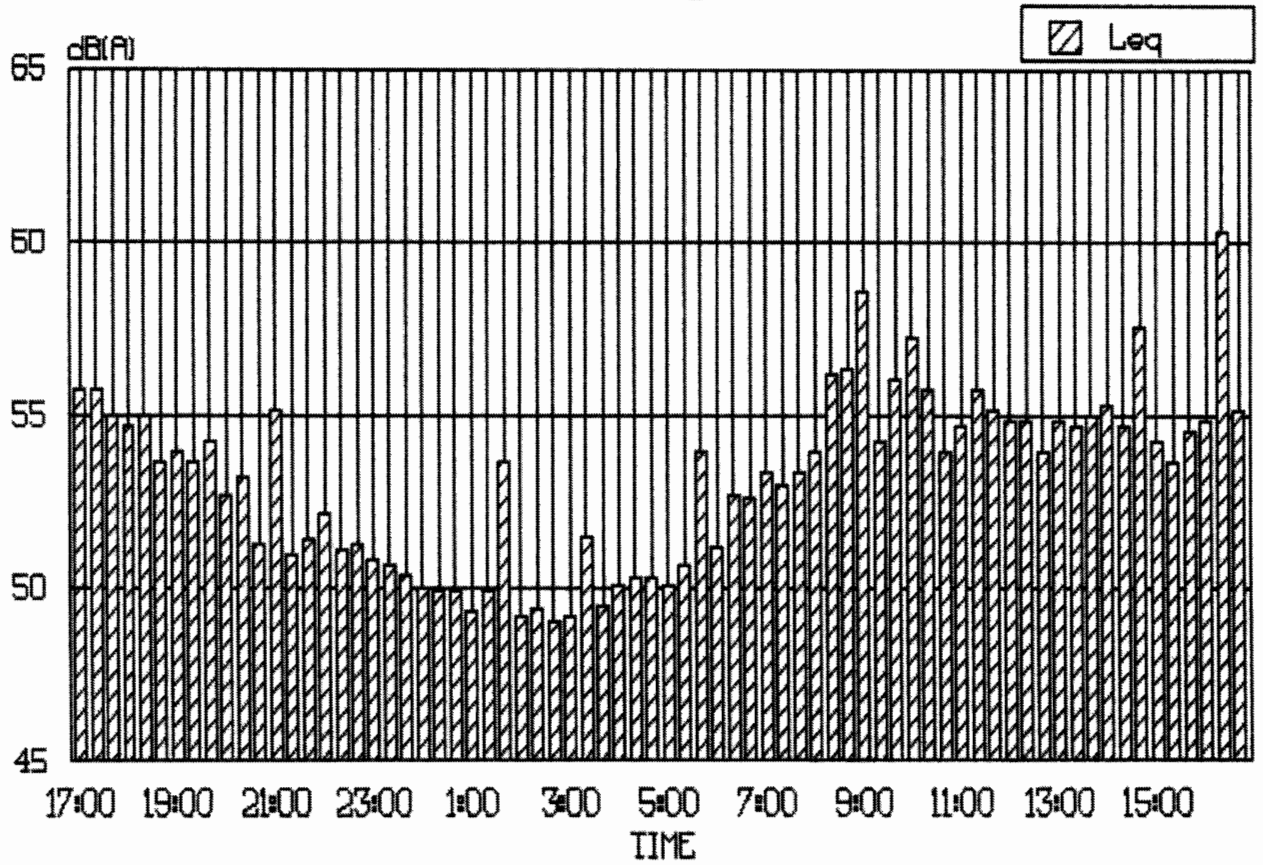
MINIMUM SHIELDING EFFECT OF EDGE OF BUILDING.



TITLE: SHIELDING EFFECT OF BUILDING	ISSUE DATE: 18/6/2010	DRAWN BY: MGR	A B C D E F G H	EMTEC	
CLIENT: PETER DEER & ASSOCIATES	PF No. PF4012	APPROVED BY:	REVISION:	Emtec Products Ltd., Enterprise House, Blyth Road, Hayes, Middx. UB3 1DD. Tel: 0181-848 3031 Fax: 0181-573 3605	
PROJECT: 51-53 HATTON GARDENS.	STATUS: Q A M I	DESIGN AUTH: MGR	SK No. QF/6416/TS		

51-53 Hatton Gardens, London EC1.
27th May to 28th May 2010



TITLE: LAeq Levels	*ISSUE DATE:* 4/6/10				*DRAWN BY:* MGR	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
CLIENT: Peter Deer & Associates	*PF No: 4012*				*APPROVED BY:* MGR	*REVISION*							
PROJECT: 51-53 Hatton Gardens, London	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* MGR	*SKETCH No. QF/6416/T1*							

EMTEC
Enterprise House, 133 Blyth Road
Hayes, Middlesex UB3 1DD
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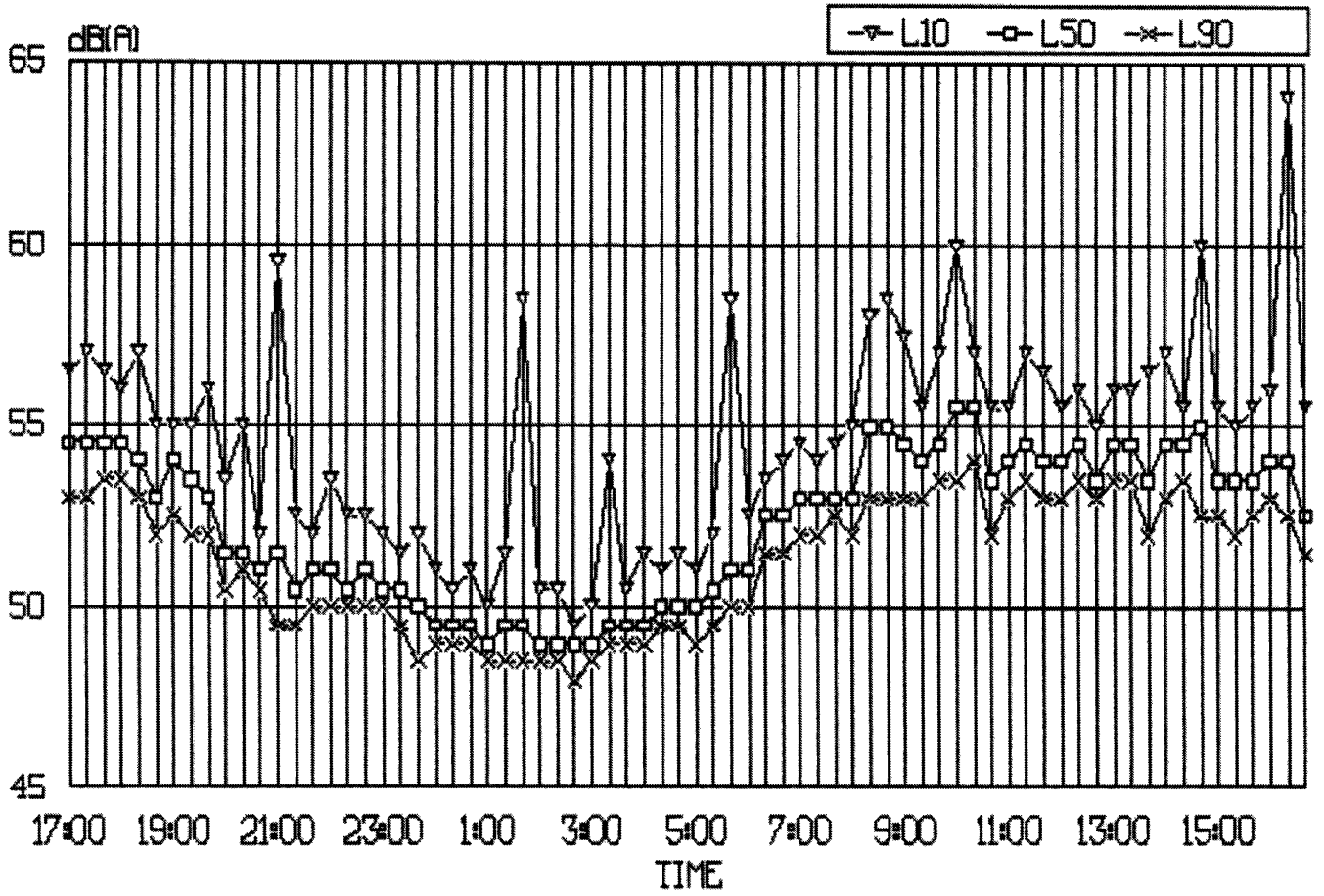
51-53 Hatton Gardens, London EC1.
27th May to 28th May 2010



TITLE: LA10; LA50 & LA90 Levels	*ISSUE DATE:* 4/6/10				*DRAWN BY:* MGR	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
CLIENT: Peter Deer & Associates	*PF No: 4012*				*APPROVED BY:* MGR	*REVISION*							
PROJECT: 51-53 Hatton Gardens, London	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* MGR	*SKETCH No. QF/6416/T2*							

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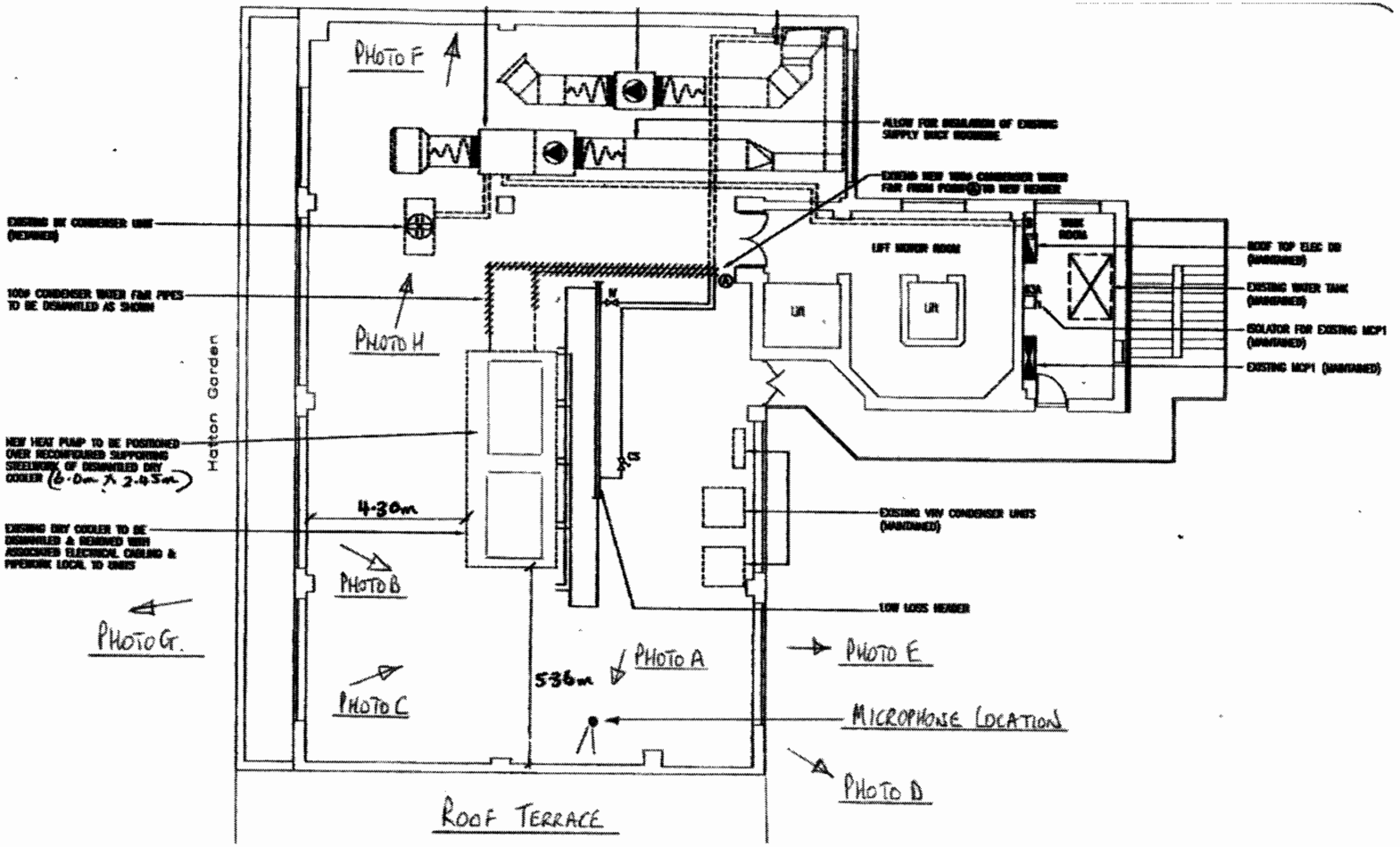
Hayes, Middlesex UB3 1DD
Tel: 020 8848 3031 Fax: 020 8573 3605



TITLE: Location of new condensers	*ISSUE DATE:* 4/6/10				*DRAWN BY:* MGR	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
CLIENT: Peter Deer & Associates	*PF No:* 4012				*APPROVED BY:* MGR	*REVISION*							
PROJECT: 51-53 Hatton Gardens, London	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* MGR	*SKETCH No.* QF/6416/T3							

EMTEC
Enterprise House, 133 Blyth Road
Hayes, Middlesex UB3 1DD
Tel: 020 8848 3031 Fax: 020 8573 3605

APPENDIX A

Raw Data – Noise Survey

27th to 28th of May 2010

NOISE SURVEY DATA FROM BACKGROUND NOISE TEST ON THE ROOF OF 51-53 HATTON GARDENS, LONDON EC1.

Project :	51-53 Hatton Gardens, London EC1.
Client :	Peter Deer and Associates
Ref :	QF6416
Date :	27th May to 28th May 2010

Measure No.	Finish Time	MaxP (dBA)	L1 (dBA)	L10 (dBA)	L50 (dBA)	L90 (dBA)	L99 (dBA)	Leq (dBA)
1	17:09	93	63.5	58.5	54.5	53	52.5	55.7
2	17:29	99.5	63	57	54.5	53	52	55.8
3	17:49	80.8	60.5	56.5	54.5	53.5	52	55
4	18:09	77.7	59.5	56	54.5	53.5	52.5	54.7
5	18:29	79.1	61.5	57	54	53	52	55
6	18:49	81	59.5	55	53	52	51.5	53.7
7	19:09	76.7	57	55	54	52.5	51.5	53.9
8	19:29	76.7	57.5	55	53.5	52	51.5	53.7
9	19:49	80.4	62	56	53	52	51	54.2
10	20:09	77.8	60.5	53.5	51.5	50.5	50	52.7
11	20:29	81.1	61	55	51.5	51	50.5	53.2
12	20:49	77.3	54	52	51	50.5	50	51.3
13	21:09	78.6	62.5	59.5	51.5	49.5	48.5	55.2
14	21:29	70.6	55.5	52.5	50.5	49.5	48.5	51
15	21:49	77.4	56	52	51	50	50	51.4
16	22:09	82.6	58.5	53.5	51	50	49.5	52.2
17	22:29	76.6	55	52.5	50.5	50	49.5	51.1
18	22:49	75.8	55.5	52.5	51	50	49.5	51.3
19	23:09	77.6	55.5	52	50.5	50	49.5	50.8
20	23:29	77.4	54	51.5	50.5	49.5	49.5	50.7
21	23:49	78.6	55.5	52	50	48.5	47.5	50.4
22	00:09	74.2	54.5	51	49.5	49	48.5	50
23	00:29	76.8	53	50.5	49.5	49	48.5	49.9
24	00:49	73	53.5	51	49.5	49	48.5	49.9
25	01:09	75.8	53.5	50	49	48.5	47.5	49.3
26	01:29	73	54.5	51.5	49.5	48.5	48	49.9
27	01:49	75.4	60.5	58.5	49.5	48.5	48	53.6
28	02:09	71	51.5	50.5	49	48.5	48	49.2
29	02:29	74.8	52	50.5	49	48.5	48	49.4
30	02:49	74.2	51.5	49.5	49	48	47.5	49
31	03:09	74.5	52	50	49	48.5	48	49.2
32	03:29	76.1	57	54	49.5	49	48.5	51.5
33	03:49	72.8	52	50.5	49.5	49	48.5	49.5
34	04:09	73.2	54	51.5	49.5	49	48.5	50.1
35	04:29	73.4	55	51	50	49.5	49	50.3
36	04:49	74.1	53.5	51.5	50	49.5	49	50.3
37	05:09	74.1	53.5	51	50	49	49	50.1
38	05:29	73.8	54	52	50.5	49.5	49.5	50.7
39	05:49	76.2	60.5	58.5	51	50	49.5	54
40	06:09	71	53.5	52.5	51	50	50	51.2
41	06:29	74	56	53.5	52.5	51.5	51	52.7
42	06:49	74.1	56	54	52.5	51.5	51	52.6
43	07:09	81.5	59	54.5	53	52	51	53.4
44	07:29	72.9	56.5	54	53	52	51.5	53
45	07:49	76.4	57.5	54.5	53	52.5	51.5	53.4
46	08:09	79.3	60.5	55	53	52	51.5	53.9
47	08:29	77.2	63	58	55	53	52.5	56.2
48	08:49	88.4	65.5	58.5	55	53	52	56.4
49	09:09	95.8	70.5	57.5	54.5	53	52	58.6
50	09:29	77.8	57.5	55.5	54	53	52.5	54.2
51	09:49	83.1	66	57	54.5	53.5	52.5	56.1
52	10:09	81.1	64	60	55.5	53.5	52.5	57.2
53	10:29	77.8	60	57	55.5	54	53	55.7
54	10:49	80	58	55.5	53.5	52	51.5	53.9
55	11:09	89.4	60.5	55.5	54	53	52.5	54.7
56	11:29	82.5	64	57	54.5	53.5	52.5	55.8
57	11:49	79.4	63	56.5	54	53	52	55.2
58	12:09	86	58.5	55.5	54	53	52	54.8
59	12:29	79.7	58.5	56	54.5	53.5	52.5	54.8
60	12:49	78.5	57.5	55	53.5	53	52	54
61	13:09	77.6	59.5	56	54.5	53.5	52.5	54.9
62	13:29	78.8	59	56	54.5	53.5	52.5	54.7
63	13:49	79.3	63.5	56.5	53.5	52	51.5	55
64	14:09	83	62	57	54.5	53	52.5	55.3
65	14:29	78.7	58.5	55.5	54.5	53.5	52.5	54.7
66	14:49	88.8	65.5	60	55	52.5	52	57.5
67	15:09	84.4	60	55.5	53.5	52.5	52	54.2
68	15:29	80.4	58	55	53.5	52	51	53.7
69	15:49	79.3	62	55.5	53.5	52.5	51	54.5
70	16:09	83.7	61.5	58	54	53	51.5	54.9
71	16:29	96	71.5	64	54	52.5	52	60.3
72	16:49	85	66.5	55.5	52.5	51.5	50.5	55.1

PHOTO A: Microphone location adjacent to railing between roof of 51-53 Hatton Gardens and adjacent roof terrace.

PHOTO B: Microphone location adjacent to railings and showing location of existing condenser unit behind.

PHOTO C: Roof view showing the Van Spall condenser and two smaller Daikin condensers.