Emtec Products Ltd, Unit L Turnpike Way,
High Wycombe, Bucks, HP12 3TF

Telephone: 020 8848 3031 Fax: 020 8573 3605
Web: www.emtecproducts.co.uk Email: sales@emtecproducts.co.uk

RESULTS OF A 24-HOUR NOISE LEVEL SURVEY CARRIED OUT ON THE ROOF OF THE COMMUNAL BOILER HOUSE AT CHOLMLEY GARDENS, LONDON NW6 AND A REPORT ON THE NOISE CONTROL MEASURES REQUIRED TO MINIMISE THE NOISE IMPACT OF THE PROPOSED NEW BOILER PLANT

Test Engineer : M G Roberts

Report Author :

M G Roberts

Authorised for Release by :

I J Marchant

Client	:	De Metz Forbes Knight Architects Ltd
Project	:	Cholmley Gardens – Boiler House Refurbishment
Emtec Ref.	:	QF8737/PF5766/RP1
Issue Date	:	22nd July 2016

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1.0. INTRODUCTION

This report details the results of a 24-hour noise survey carried out on the roof of the boiler house located in the centre of the Cholmley Garden Estate, London NW6.

The objectives of this survey were as follows:

- To assess the proposal to install new boiler plant into the existing boiler house.
- To identify the nearest properties that might be affected by plant noise.
- To establish the background noise level outside the nearest affected properties.
- To recommend noise limits and any necessary measures to ensure that the operation of the new boiler plant does not disturb the occupants of the nearest affected properties.

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

1.0. INTRODUCTION
2.0. SITE DESCRIPTION
3.0. TEST INSTRUMENTATION
4.0. TEST PROCEDURE
5.0. RESULTS AND EVALUATION OF NOISE CRITERIA
6.0. DISCUSSION OF RESULTS

2.0. SITE DESCRIPTION

The boiler house, within the Cholmley Garden Estate, is a single storey, flat roofed, building which is located next to the entrance gates off Mill Lane and directly behind the Alpha Building Nursery School. The boiler house is overlooked on both sides by blocks of flats within the Cholmley Gardens Estate. The attached aerial view Photo A shows the position of the boiler room.

3.0. TEST INSTRUMENTATION

All measurement equipment used during the survey complied with the requirements of BS4142:2014 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". Details of the equipment are as follows:

Integrating Sound Level Meter:	Rion type NL-52 class 1 Sound Level Meter fitted with a Rion type UC-59 ½ inch condenser microphone.
Statistical Analysis Modules:	Built in module 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. Serial No.: 1934160

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

3.1. Existing Noise Climate

Road traffic travelling on nearby Mill Lane could be heard during the manned periods at the start and the end of the survey, so the noise levels measured will include contributions from road vehicles.

Commercial jet aircraft were observed at medium and high altitude during the manned periods at the start and the end of the survey, so it is possible that the noise levels measured could include contributions from medium altitude jet aircraft.

There are no overland railways nearby, so the noise levels measured will not include contributions from rail noise.

The existing hot water boiler plant was operating during the survey although it switched on for periods and then was inoperative for other portions of the survey. We judged that the noise of this hot water boiler was the dominant noise source during the survey.

4.0. TEST PROCEDURE

The survey was conducted during a continuous 24-hour period from 10:25am on Monday the 18th of July 2016 to 10:10am on Tuesday the 19th of July 2016.

Data was continuously acquired throughout the measurement period with the individual averaging time for statistical noise data set to 15 minutes. The following 'A' weighted statistical measurements were recorded concurrently: -

LA_1 - The Sound Pressure Level exceeded for 1% of the measurement period.

LA_{10} - The Sound Pressure Level exceeded for 10% of the measurement period.

LA_{50} - The Sound Pressure Level exceeded for 50% of the measurement period.

LA_{90} - 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 4142:2014).

LA_{99} - The Sound Pressure Level exceeded for 99% of the measurement period.

LA_{eq} - The continuous steady state Sound Pressure Level that has the same acoustic energy as the real fluctuating level.

4.1. Measurement Positions

Noise levels were measured at a position on the roof of the boiler house building. The location of the microphone was at the opposite end of the roof from the flue discharge from the hot water boiler. The location of the microphone is show in in the attached Photos A, B & D.

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

4.2. Weather Conditions

The weather conditions prevailing during the measurement period were generally in line with those recommended in BS 4142:2014: -

Weather daytime: -	Warm and Sunny	Weather night time: -	Clear
Wind daytime: -	Dead Calm	Wind night time: -	Calm

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

5.0. RESULTS AND EVALUATION OF NOISE CRITERIA

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

The 'A' Weighted Leq levels measured over each 15 minute interval throughout the 24-hour period (denoted by LA_{eq}, (15 mins)) are displayed as a line graph on the attached Sketch No QF/8737/T1 at the back of this report.

The 'A' Weighted percentile levels measured over each 15 minute interval denoted by LA_{10} (15 mins), LA_{50} (15 mins) and LA_{90} (15 mins) are displayed as line graphs on the attached Sketch No QF/8737/T2 at the back of this report.

5.1. Summary of Results

The table QF/8737/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/8737/D1 – Summary of Maximum and Minimum Noise Levels

	LA_{eq}	LA_1	LA_{10}	LA_{50}	LA_{90}	LA_{99}
Minimum	37.5dBA	43.2dBA	38.7dBA	36.4dBA	35.5dBA	35.3dBA
Maximum	59.4dBA	68.8dBA	59.2dBA	55.7dBA	54.8dBA	54.6dBA

5.2. Summary of the Local Authority's planning requirements regarding noise for noise sensitive properties

Table E of Camden's current replacement Unitary Development Plan states that noise from external plant and machinery must be at least 5dB less than the lowest measured LA90 when measured at 1 metre external to the nearest sensitive façade.

Where the noise has a distinguishable discrete continuous note (whine, hiss, screech, hum) the Development Place states that noise from external plant and machinery must be least 10dB less than then the lowest measured LA90 when measured at 1 metre external to the nearest sensitive façade.

Where the noise has distinct impulses (bang, clicks, clatters, thumps) the Development Plan states that noise from external plant and machinery must be at least 10dB less than the lowest measured LA90 when measured at 1 metre external to the nearest sensitive façade.

5.3. Determination of noise sensitive property design criteria

The new boiler plant will be intermittent but will probably not contain tones. Based on the local authority's planning requirements outlined above, the new plant should be designed to be 10dBA below the minimum existing LA_{90} background noise level during the relevant operational period.

It is proposed to operate the boiler plant on a 24-hour basis.

The lowest recorded LA_{90} level measured during the 24-hour period was 35.5dBA. This occurred during the time period starting at 02:55am.

The new plant should therefore be designed to achieve 25.5dBA at 1 metre from the nearest noise sensitive properties' windows if the externally located equipment is to be operated on a 24-hour basis.

5.4. Summary of external noise criteria

Based upon the results of the survey and the above design criteria we summarise the actual design rating levels to be adopted for this project in table QF/8737/D2: -

Table QF/8737/D2 – recommended design rating levels $L_{Ar,T}$

Type of premises	**$L_{Ar,T}$ (24-hour)**
Noise sensitive	25.5dBA

6.0. DISCUSSION OF RESULTS

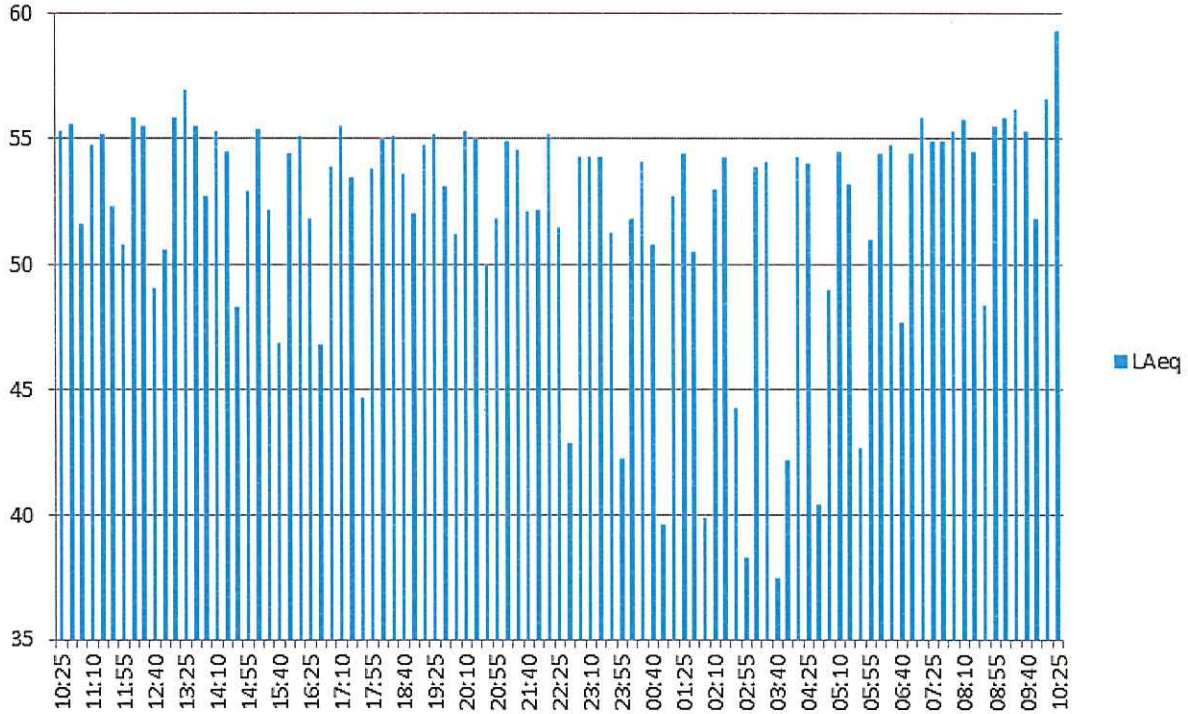
The results of the overnight noise survey show that the background LA90 noise level falls to a lowest level of 35.5dBA but the results also show that the Hot Water boiler plant operates intermittently during the night and when in operation gives an LA_{90} background noise level of about 53dBA. This is the noise level measured at approximately 11 metres from the Hot Water boiler flue outlet and is equivalent to the noise level that can be expected at the nearest residential neighbours windows which are at a similar distance from the flue (see aerial Photo A).

The operation of the existing hot water boiler therefore elevates the LA90 background noise level, at worst, by 18dBA. This is a significant increase under the guidelines of BS4142:2014 and we are surprised that no complaints have been received from local residents.

The new boiler plant will need to have significant acoustic treatment incorporated within its design in order to reduce the noise level, at 1 metre from the nearest neighbours window, to no more than LAeq: 25.5dB.

On receipt of details of the proposed boiler plant and its noise levels we can advise further on the extent of the acoustic treatment required in order to satisfy the limiting noise level criteria of LAeq: 25.5dB.

EMTEC PRODUCTS LTD
21st July 2016



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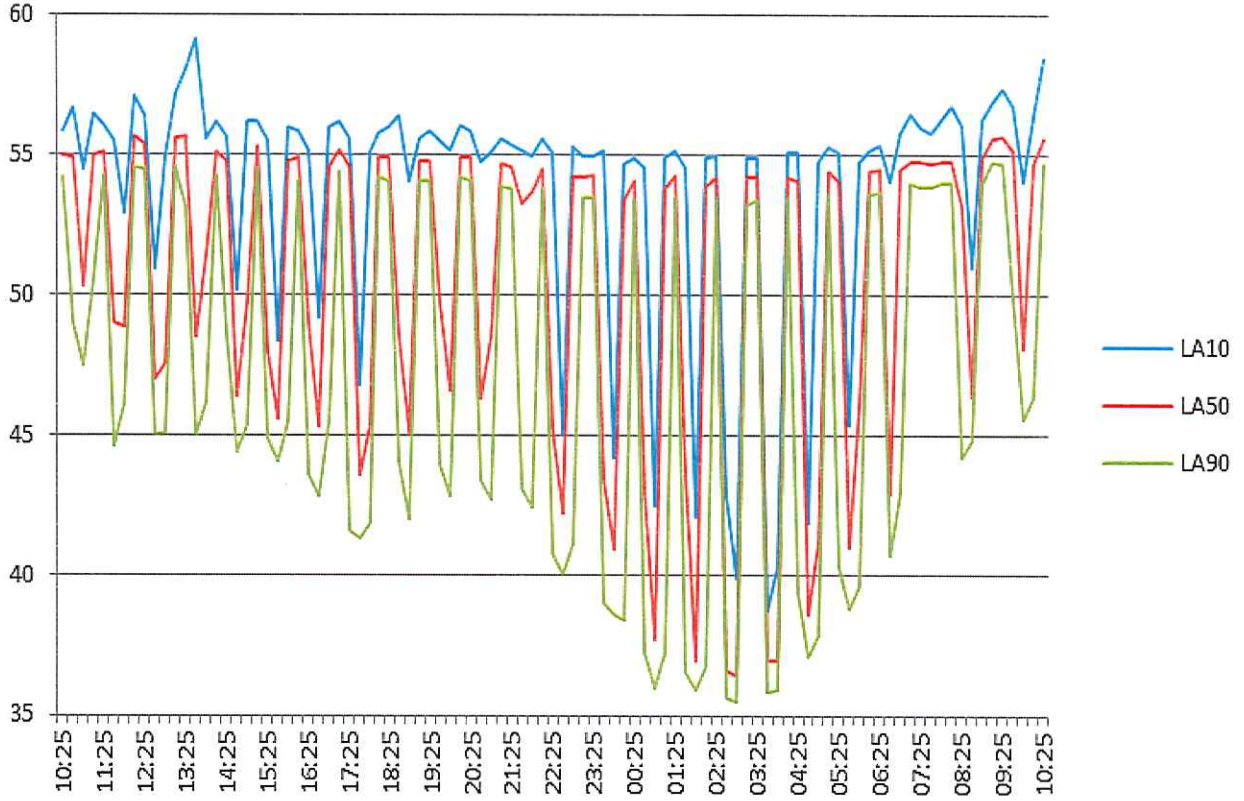
CLIENT: De Metz Forbes Knight	*PF No:* 5766				*APPROVED BY:* MGR	*REVISION*							
PROJECT: Cholmley Gardens, Boiler Room	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* MGR	*SKETCH No.* QF/8737/T1							

EMTEC
Unit L, Turnpike Way, High Wycombe
Bucks HP12 3TF
Tel: 020 8848 3031 Fax: 020 8573 3605



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CLIENT: De Metz Forbes Knight	*PF No: 5766*				*APPROVED BY:* *MGR*	*REVISION*							
PROJECT: Cholmley Gardens, Boiler Room	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* *MGR*	*SKETCH No. QF/8737/T2*							

EMTEC
Unit L, Turnpike Way, High Wycombe
Bucks HP12 3TF
Tel: 020 8848 3031 Fax: 020 8573 3605

APPENDIX 'A'

Raw Data – Noise Survey

18th to 19th of July 2016

RAW NOISE DATA - Cholmley Gardens, Boiler House

Ref: QF8737/PF5766/RP1
Client: De Metz Forbes Knight
Date: 18th to 19th July 2016

Address	Start Time	LAeq	LE	Lmax	Lmin	LA1	LA10	LA50	LA90	LA99
1	10:25	55.3	84.9	68	52.7	59	55.9	55	54.2	54
2	10:40	55.6	85.2	79.7	44.5	62	56.7	54.9	49	47.9
3	10:55	51.6	81.2	63.7	44.3	58.2	54.5	50.3	47.5	46.9
4	11:10	54.8	84.4	63.2	46.6	58.2	56.5	55	50.6	49.7
5	11:25	55.2	84.8	61.7	52.8	57.8	56.1	55.1	54.3	54.1
6	11:40	52.3	81.9	59.3	41.5	56.5	55.5	49	44.6	43.9
7	11:55	50.8	80.4	69.3	42.5	58.5	52.9	48.9	46.1	45.5
8	12:10	55.9	85.5	68.3	44.4	59.9	57.1	55.7	54.6	54.2
9	12:25	55.5	85.1	62.2	52.9	57.8	56.4	55.4	54.5	54.3
10	12:40	49.1	78.7	65.5	42.8	57.2	50.9	47	45	44.6
11	12:55	50.6	80.2	66.7	42.9	58.7	55	47.6	45.1	44.7
12	13:10	55.9	85.5	66.7	52.6	59.7	57.2	55.6	54.6	54.4
13	13:25	57	86.6	81.5	43.9	64.1	58.1	55.7	53.1	47.9
14	13:40	55.5	85.1	72.3	42	67.5	59.2	48.5	45	44.5
15	13:55	52.7	82.3	65.3	43	57.7	55.6	51.4	46.2	45.4
16	14:10	55.3	84.9	71.1	52.5	57.6	56.2	55.1	54.3	54.1
17	14:25	54.5	84.1	59.3	43.5	56.7	55.7	54.8	48.6	46
18	14:40	48.3	77.9	67.9	42.7	56.6	50.2	46.4	44.4	44
19	14:55	52.9	82.5	62	42.7	59.4	56.2	49.8	45.4	44.9
20	15:10	55.4	85	61.5	52.9	57.8	56.2	55.3	54.5	54.3
21	15:25	52.2	81.8	68.3	43.3	57.5	55.5	48	44.9	44.5
22	15:40	46.9	76.5	62.3	42.6	55.7	48.4	45.6	44.1	43.8
23	15:55	54.4	84	64.8	42.5	58.5	56	54.8	45.5	44.7
24	16:10	55.1	84.7	65.2	52.4	58.6	55.9	54.9	54.1	53.9
25	16:25	51.8	81.4	61.4	41.5	56.7	55.2	49	43.6	43.1
26	16:40	46.8	76.4	61.7	40.2	54.4	49.2	45.3	42.8	42.2
27	16:55	53.9	83.5	63.1	42.4	58.3	56	54.6	45.5	44.6
28	17:10	55.5	85.1	65.9	52.7	60.5	56.2	55.2	54.4	54.2
29	17:25	53.5	83.1	58.9	38.9	56.4	55.6	54.6	41.6	40.8
30	17:40	44.7	74.3	61.2	39.6	51.1	46.8	43.6	41.3	40.9
31	17:55	53.8	83.4	73.1	39.1	67.3	55.1	45.4	41.9	41.4
32	18:10	55	84.6	64.4	52.8	57.4	55.8	54.9	54.2	53.9
33	18:25	55.1	84.7	68	51.9	58.3	56	54.9	54.1	53.9
34	18:40	53.6	83.2	72.8	40.9	64.2	56.4	48.5	44	43.1
35	18:55	52	81.6	82.3	38.6	62	54.1	45.1	42	41.3
36	19:10	54.8	84.4	59.9	52.6	56.3	55.6	54.8	54.1	53.9
37	19:25	55.2	84.8	67.8	52.4	59	55.9	54.8	54.1	53.9
38	19:40	53.1	82.7	77.1	40.1	60	55.5	49.7	43.9	43.2
39	19:55	51.2	80.8	74.4	39	59.6	55.2	46.6	42.8	42.1
40	20:10	55.3	84.9	67.9	52.3	59.2	56.1	54.9	54.2	53.9
41	20:25	55	84.6	64.4	52.5	57.6	55.9	54.9	54.1	53.8
42	20:40	50	79.6	70.6	40.3	56.5	54.8	46.3	43.4	42.7
43	20:55	51.8	81.4	60.2	40.5	56.1	55.1	48.5	42.7	42.1
44	21:10	54.9	84.5	66.7	52.2	57.6	55.6	54.7	53.9	53.7
45	21:25	54.6	84.2	59.5	52.2	56.1	55.4	54.6	53.8	53.6
46	21:40	52.1	81.7	58	40	56	55.2	53.3	43.1	42.6
47	21:55	52.2	81.8	57.1	40.5	55.8	55	53.7	42.4	41.9
48	22:10	55.2	84.8	67.9	51.8	62.9	55.6	54.5	53.8	53.6
49	22:25	51.5	81.1	61.7	38.6	56.3	55.1	45.3	40.8	40.4
50	22:40	42.9	72.5	53.1	37.9	48.6	45	42.2	40	39.6
51	22:55	54.3	83.9	68.9	38	65	55.3	54.2	41.1	40.3

52	23:10	54.3	83.9	59.4	52	55.8	55	54.2	53.5	53.3
53	23:25	54.3	83.9	57.1	52	55.7	55	54.3	53.5	53.3
54	23:40	51.3	80.9	60.4	37.1	57	55.2	43.4	39	38.6
55	23:55	42.3	71.9	60.7	36.8	49	44.2	40.9	38.6	38.2
56	00:10	51.8	81.4	58.2	36.5	55.6	54.7	53.4	38.4	38
57	00:25	54.1	83.7	57.6	51.9	55.6	54.9	54.1	53.4	53.2
58	00:40	50.8	80.4	56.7	34.6	55.4	54.6	43	37.2	36.8
59	00:55	39.6	69.2	51.8	34.9	47	42.5	37.7	36	35.8
60	01:10	52.7	82.3	59.7	35.3	56.1	54.9	53.8	37.2	36.7
61	01:25	54.4	84	60.9	51.6	58	55.2	54.3	53.5	53.3
62	01:40	50.5	80.1	56.7	35	55.5	54.6	43.5	36.5	36.2
63	01:55	39.9	69.5	53.4	34.8	50.8	42.1	36.9	35.9	35.7
64	02:10	53	82.6	67.7	35.3	55.8	54.9	53.9	36.7	36.3
65	02:25	54.3	83.9	56.9	51.8	55.7	55	54.2	53.5	53.3
66	02:40	44.3	73.9	56.9	34.3	54.9	42.8	36.6	35.6	35.4
67	02:55	38.3	67.9	53.1	34.1	47.3	39.9	36.4	35.5	35.3
68	03:10	53.9	83.5	56.9	35.3	55.6	54.9	54.2	53.2	39.4
69	03:25	54.1	83.7	57	39.1	55.7	54.9	54.2	53.4	53.1
70	03:40	37.5	67.1	48.6	34.2	43.2	38.7	36.9	35.8	35.5
71	03:55	42.2	71.8	56.4	35	54.7	40.3	36.9	35.9	35.8
72	04:10	54.3	83.9	63.5	51.9	55.9	55.1	54.2	53.5	53.3
73	04:25	54	83.6	69.8	36.6	58.7	55.1	54.1	39.3	38.1
74	04:40	40.4	70	55	35.6	49.4	41.9	38.6	37.1	36.8
75	04:55	49	78.6	58.3	36.4	56	54.8	41.2	37.8	37.6
76	05:10	54.5	84.1	59.1	52.1	56.3	55.3	54.4	53.6	53.4
77	05:25	53.2	82.8	65	37.5	56.1	55.1	54.1	40.3	39.3
78	05:40	42.7	72.3	59.3	36.9	49.3	45.4	41	38.8	38.4
79	05:55	51	80.6	57.7	37.5	55.8	54.8	46.1	39.6	39
80	06:10	54.4	84	61.2	51.6	56.1	55.2	54.4	53.6	53.4
81	06:25	54.8	84.4	64.2	52.2	60.9	55.4	54.5	53.7	53.5
82	06:40	47.7	77.3	64.2	38.6	55.6	54.1	42.9	40.7	40.2
83	06:55	54.4	84	66.3	39.3	62.2	55.8	54.5	43	41.8
84	07:10	55.9	85.5	69.9	52.4	63.6	56.5	54.8	54	53.8
85	07:25	54.9	84.5	62.1	52.3	57.7	56	54.8	53.9	53.7
86	07:40	54.9	84.5	66.2	52.1	58.8	55.8	54.7	53.9	53.6
87	07:55	55.3	84.9	63.5	52.3	60.1	56.3	54.8	54	53.8
88	08:10	55.8	85.4	66.2	52.6	62.8	56.8	54.8	54	53.8
89	08:25	54.5	84.1	69.5	42	66	56.1	53.2	44.2	43.6
90	08:40	48.4	78	63.2	43.2	55.9	51	46.4	44.8	44.5
91	08:55	55.5	85.1	66.5	45.2	62.5	56.3	54.9	54	53.5
92	09:10	55.9	85.5	64	53	59.9	56.9	55.6	54.8	54.6
93	09:25	56.2	85.8	64.9	52.9	61.5	57.4	55.7	54.7	54.4
94	09:40	55.3	84.9	66.8	44.1	60.9	56.8	55.2	49.9	48.4
95	09:55	51.8	81.4	68.6	42.9	63.1	54.1	48.1	45.6	44.9
96	10:10	56.6	86.2	73.2	43.6	68.8	56.4	54.7	46.4	45.7

APPENDIX 'B'

Photos and sketches

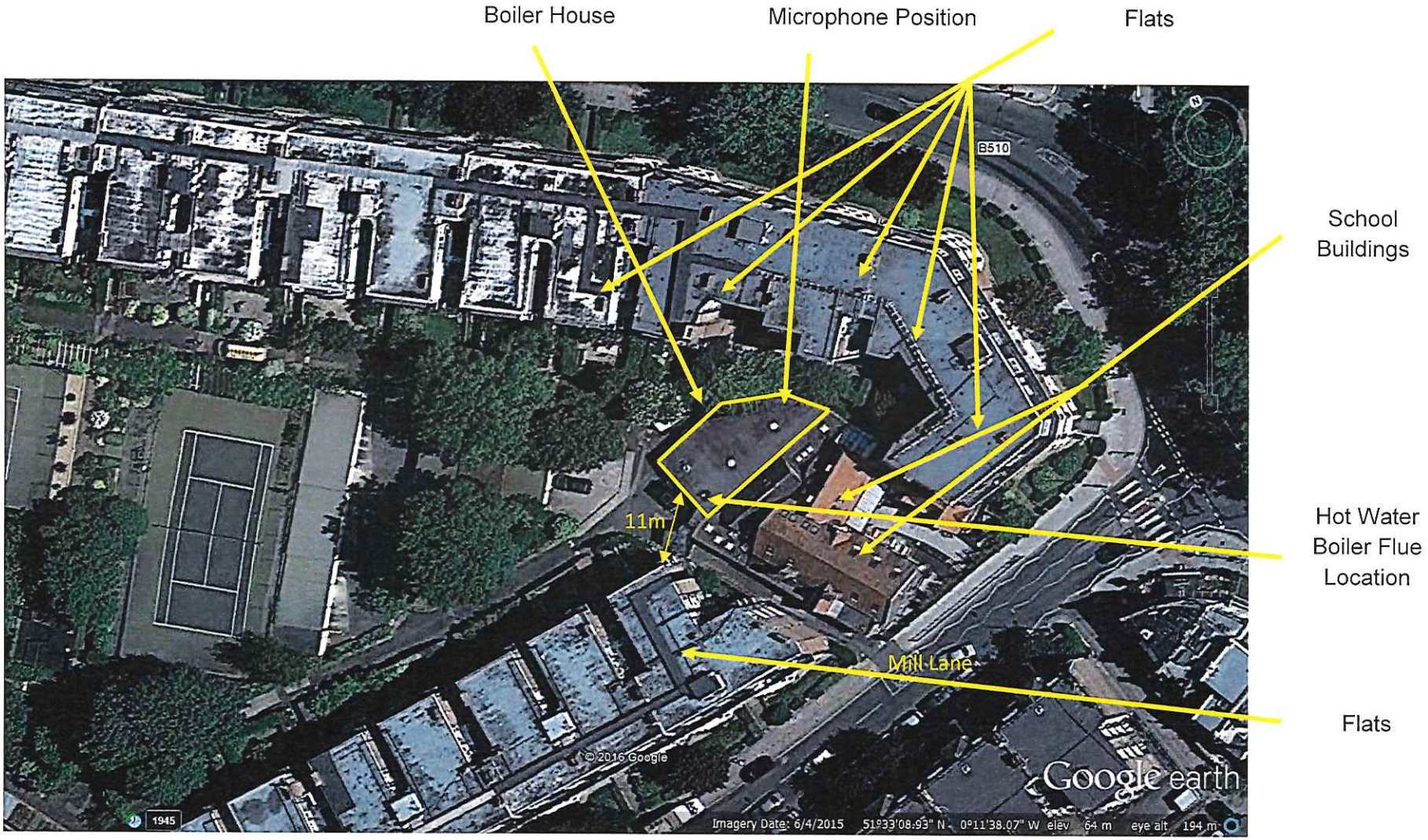

Photo A – Aerial View of Cholmley Garden Estate Showing Boiler House in Centre of Site

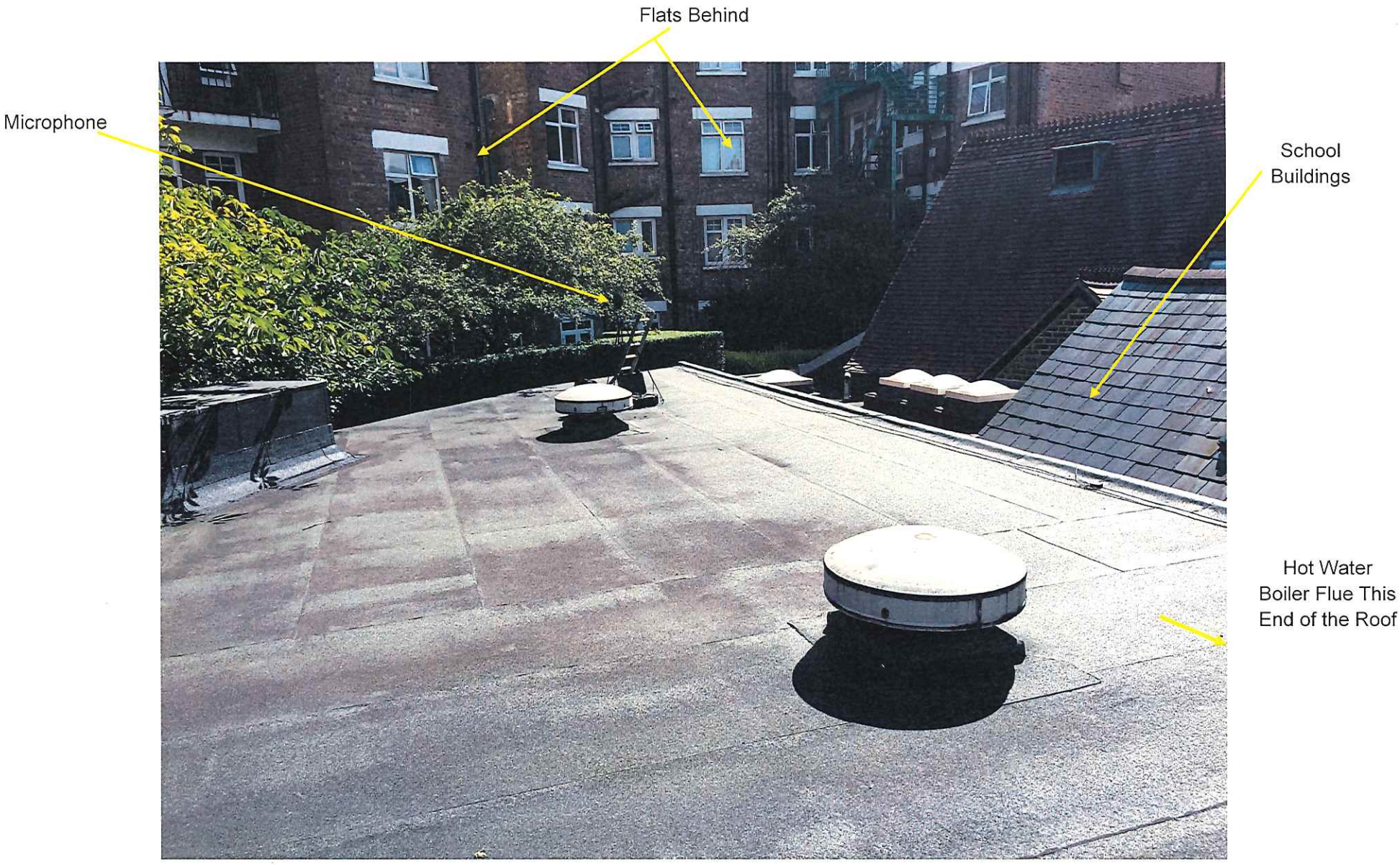

Photo B – Location of Microphone on Roof of the Boiler House

Photo C – Location of Hot Water Boiler Flue at Other End of Boiler House Roof

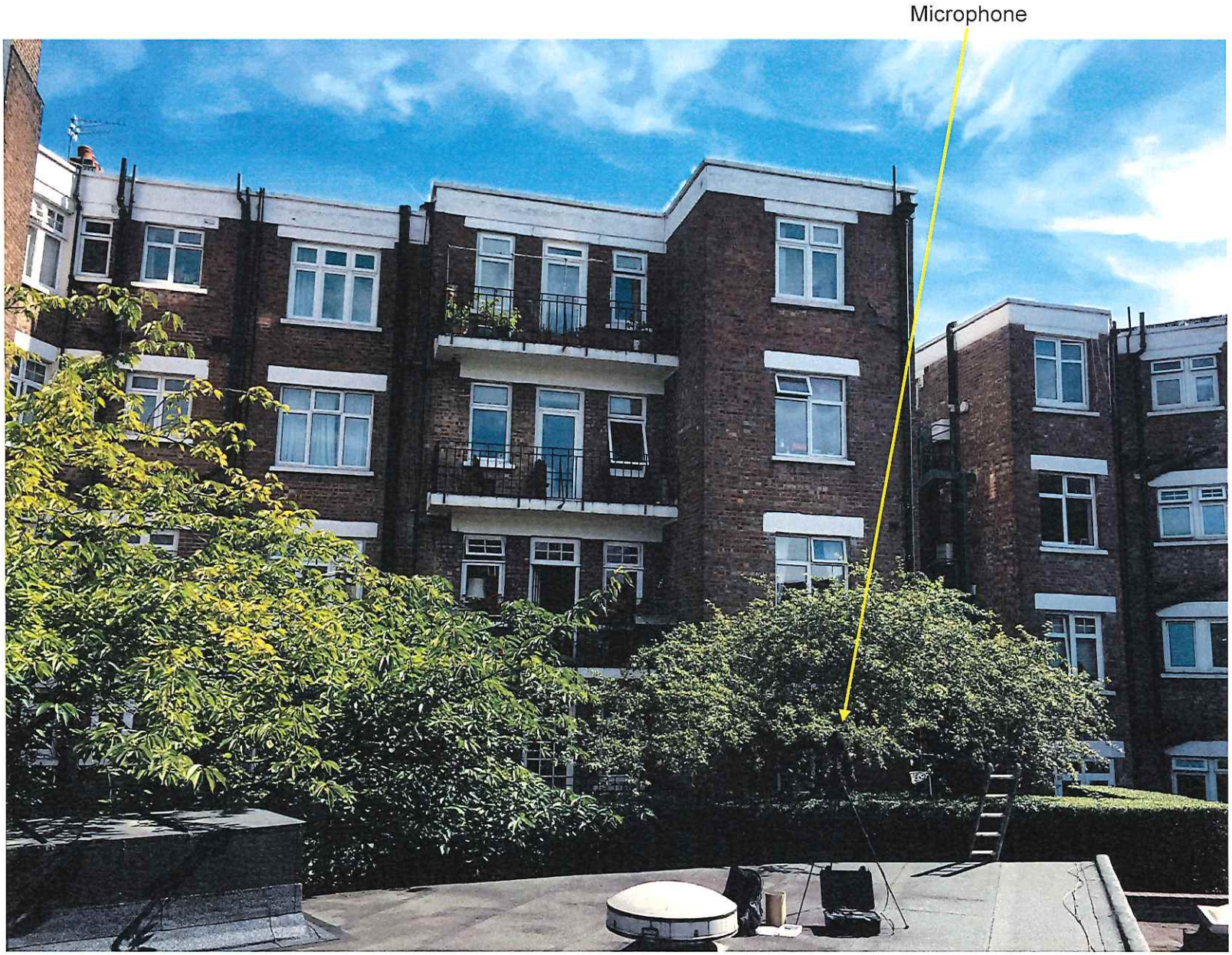

Photo D – Blocks of Flats Overlooking Boiler House Roof

Photo E – Blocks of Flats on North Side of Estate

Photo F – Blocks of Flats on South Side of Estate

Photo G – Roof of Adjacent Primary School Buildings Next to Boiler House