Post Office Relocation, 39-41 Farringdon Road

ENVIRONMENTAL NOISE SURVEY
& PLANT NOISE ASSESSMENT
REPORT 16481/PNA1

For:
The Livemore Partnership LLP
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28 June 2010

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REPORT 16481

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1.0 INTRODUCTION

New items of building services plant is proposed at 39-41 Farringdon Road, London, EC1. As part of the planning process the Local Authority has requested a environmental noise survey is undertaken along with a noise impact assessment of the proposed building services plant.

This report presents the survey methodology and findings. The survey data has been used as the basis for various acoustic assessment purposes.

2.0 OBJECTIVES

To establish the existing noise levels by means of fully automated noise monitoring over a period of approximately 72 hours at one secure and accessible position thought to be representative of the nearest effected property.

To measure L_{eq}, L_{90} and L_{max} octave band spectra noise levels for typical daytime and night time periods at each measurement position in order to obtain a more detailed description of the noise climate.

Based on the results of the noise survey, and in conjunction with the Local Authority, to recommend suitable plant noise emission criteria.

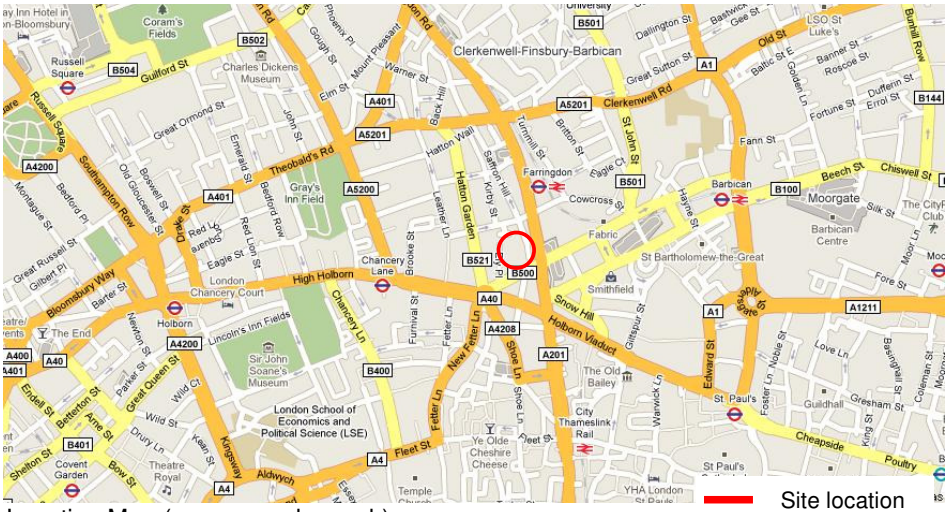
To assess the proposed plant and comment on its acceptability.

These objectives are as set out in our letter dated 12 May 2010 and written instructions received on 19 May 2010.

3.0 SITE DESCRIPTION

3.1 Location

The site is located at 39-41 Farringdon Road, London, EC1 and falls within the London Borough of Camden jurisdiction. See Location Map below.

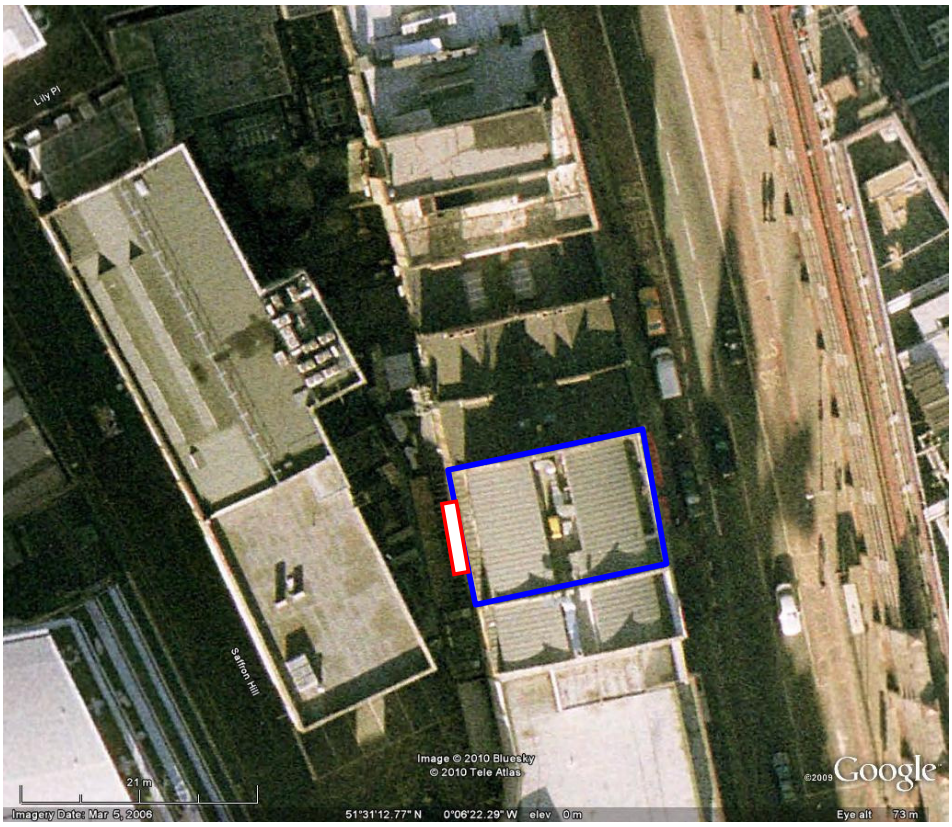


Location Map (maps.google.co.uk)

3.2 Description

39-41 Farringdon Road is a residential block currently above commercial premises. It is just North of the junction of Farringdon Road and Greville Street. The rear of the property overlooks Saffron Hill.

The nearest noise sensitive properties are part of the building at first floor level. See Site Plan below.



Site Plan (maps.google.co.uk)

39-41 Farringdon Road

Noise Sensitive Properties

4.0 ACOUSTIC TERMINOLOGY

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 METHODOLOGY

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 12:00 hours on 11 June 2010 to 12.00 hours on 14 June 2010.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period.

However at the beginning and end of the survey period the wind conditions were calm from approximately a Northerly direction. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar to those above. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Position

The noise level measurements were undertaken at a single measurement position at the development site. The microphone was located on a boom approximately 1.5 m from the floor at the rear of the property. It was connected to the wall at the first floor level in the approximate location of the new units. This position was deemed suitable for establishing the background noise levels at the nearest noise sensitive window.

5.3 Instrumentation

The instrumentation used during the survey is presented in the Table below:

Description	Manufacturer	Type	Serial Number	Latest Verification
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3053	LD calibration on 25/02/2010
Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 08/01/2010

The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.01 dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. The microphone was fitted with a Larson Davis windshield.

6.0 RESULTS

The results have been plotted on Time History Graphs 16481/TH1 to 16481/TH2 enclosed, presenting the 15 minute A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

The lowest measured $L_{A90(15min)}$ noise levels are recorded in the following table. As the microphone was installed close to reflective surfaces, these figures have been corrected for façade reflections.

Lowest Measured $L_{A90\ 15min}$ dB(A)	
Daytime (07:00-23:00 hours)	**Night Time (23:00 –07:00 hours)**
45	44

7.0 DISCUSSION OF NOISE CLIMATE

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be road traffic noise from the surrounding area.

8.0 PLANT NOISE EMISSION CRITERIA

We understand that the requirements of Camden Council are as follows:

> *''Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment are in operation. Where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10dB(A) below the LA90, expressed in dB(A).''*

On the basis of the above and the survey results we thus propose the following plant noise emission limits to be achieved at 1m from the façades of the nearest neighbouring buildings:

Plant Noise Emission Criteria (dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
40	39

It should be noted that the above plant noise emission limits are subject to approval from Camden Council.

9.0 NOISE IMPACT ASSESSMENT

We understand that the following items of plant are to be installed at 39-41 Farringdon Road, London.

Plant Description	Location	Qty	Plant Make	Model Number
Condenser	Rooftop	1	Daikin	RXS20-25G
Condenser	Rooftop	1	Daikin	RXYSQ6PV

9.1 Plant Noise Emissions

We understand the manufacturer's noise data for the equipment to be as follows:

Plant Description	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
RXS20-25G Heating Mode	40	45	43	41	38	32	28	19	43
RXS20-25G Cooling Mode	42	42	43	40	38	31	24	19	42
RXYSQ6PV Heating Mode	64	57	57	53	50	45	38	33	55
RXYSQ6PV Cooling Mode	62	55	54	52	48	42	35	28	53

9.2 Location of Plant

The above plant is to be located in the areas detailed within the attached drawing from The Livemore Partnership reference 10406-05 dated March 2010. It is to replace existing extract air plant and is approximately 3 metres from the residential windows at the rear of the property at first floor level.

9.3 Plant Noise Impact Assessment

The following tables present our calculations relating to the proposed plant installation. In assessing the units we have taken the worst case noise level for each octave band frequency from the two sets of data for heating and cooling mode.

9.3.1 Condenser Type RXS20-25G

	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Worst case Unit SPL	42	45	43	41	38	32	28	19	43
Distance Loss(3m)	-10	-10	-10	-10	-10	-10	-10	-10	
Reflective surface	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Window	35	38	36	34	31	25	21	12	36

We understand that the proposed unit could operate continuously. Our calculations indicate that the proposed plant should be capable of achieving the requirements of the Local Authority outlined in Section 8.0.

9.3.2 Condenser Type RXYSQ6PV

	Sound Pressure Level (dB re $2x10^{-5}$ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
Worst case Unit SPL(Heating Mode)	64	57	57	53	50	45	38	33	55
Distance Loss(3m)	-10	-10	-10	-10	-10	-10	-10	-10	
Reflective surface	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Window	57	50	50	46	43	38	31	26	48

We understand that the proposed unit could operate continuously. Our calculations indicate that the proposed plant exceeds the requirements of the Local Authority outlined in Section 8.0. We do not see the other unit in section 9.3.1 as being additive to the above noise levels.

10.0 PROPOSED MITIGATION MEASURES

We would recommend that the condenser type RXYSQ6PV is installed in an acoustic enclosure providing as detailed in our enclosed specification reference HT16481/ES. The performance specified for this condenser enclosure is such that when installed the resultant noise level at the nearest noise sensitive window should not exceed 33dBA. When combined with the noise from the other unit the resultant noise level at the nearest noise sensitive window should not exceed 38dBA. This level meets the plant noise emission criteria in section 8.0 above.

11.0 CONCLUSIONS

A detailed 72 hour daytime and night time fully automated environmental noise survey has been undertaken in order to establish the currently prevailing roof level environmental noise climate around the site.

Plant noise emission criteria have been recommended based on the results of the noise survey and in conjunction with the Local Authority.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window.

The assessment indicates that the noise levels from one of the two new condensers proposed exceeds the requirements of the Local Authority at the nearest noise sensitive window.

Amelioration measures have therefore been proposed for the relevant unit and with these measures implemented we can see no acoustic reason why this scheme should not be granted planning permission.

Prepared by
Nick Russell
Senior Acoustic Consultant
HANN TUCKER ASSOCIATES

Appendix A

The acoustic terms used in this report are as follows:

dB : Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.

dB(A) : The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level.

Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.

L_{10} & L_{90}: If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.

It is common practice to use the L_{10} index to describe traffic noise, as being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic noise.

L_{eq} : The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 1 hour).

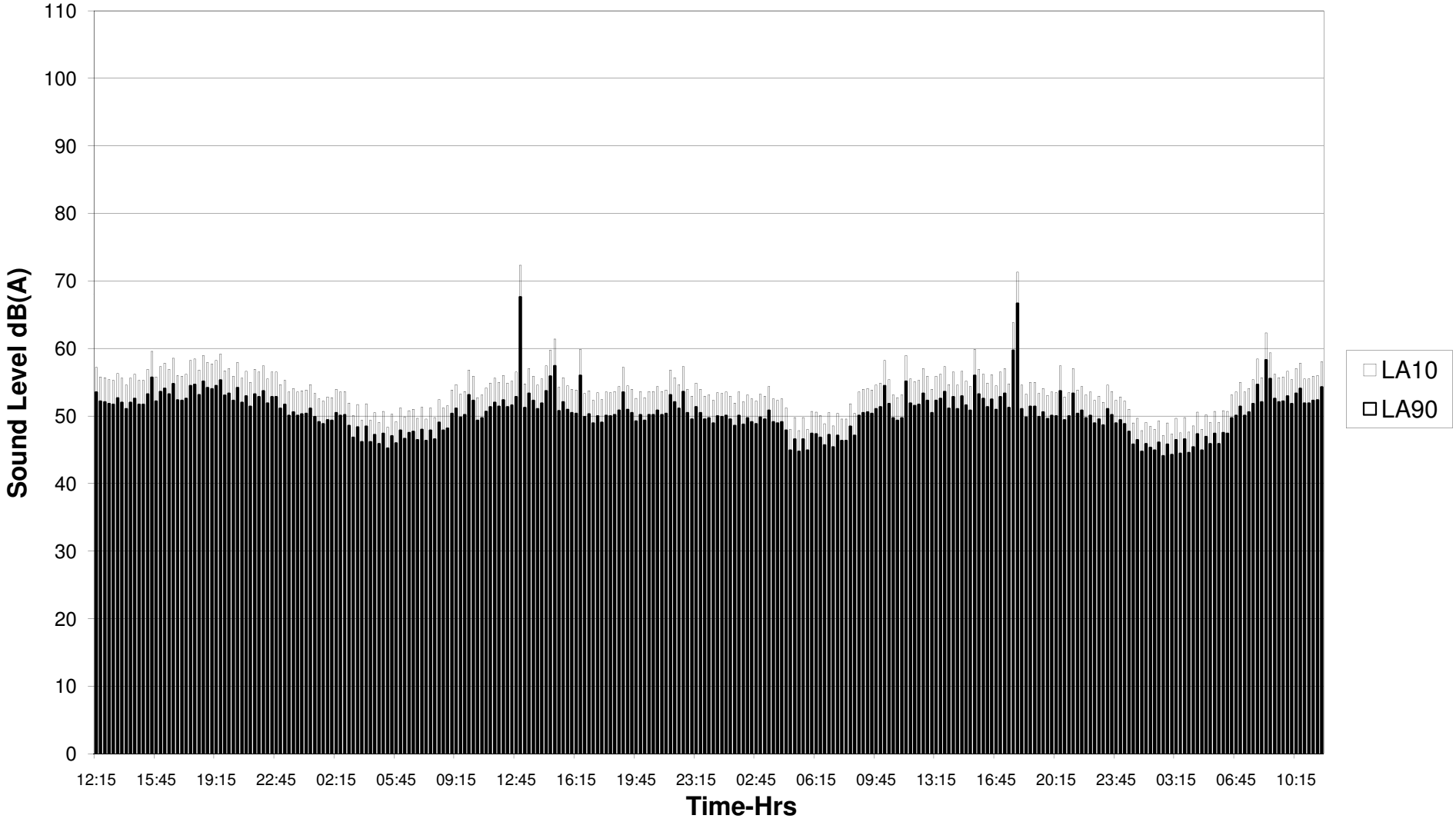
The use of digital technology in sound level meters now makes the measurement of L_{eq} very straightforward.

L_{max} : L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

39-41 Farringdon Street

L_{A10} and L_{A90} Noise Levels

Friday 18/06/2010 - Monday 21/06/2010

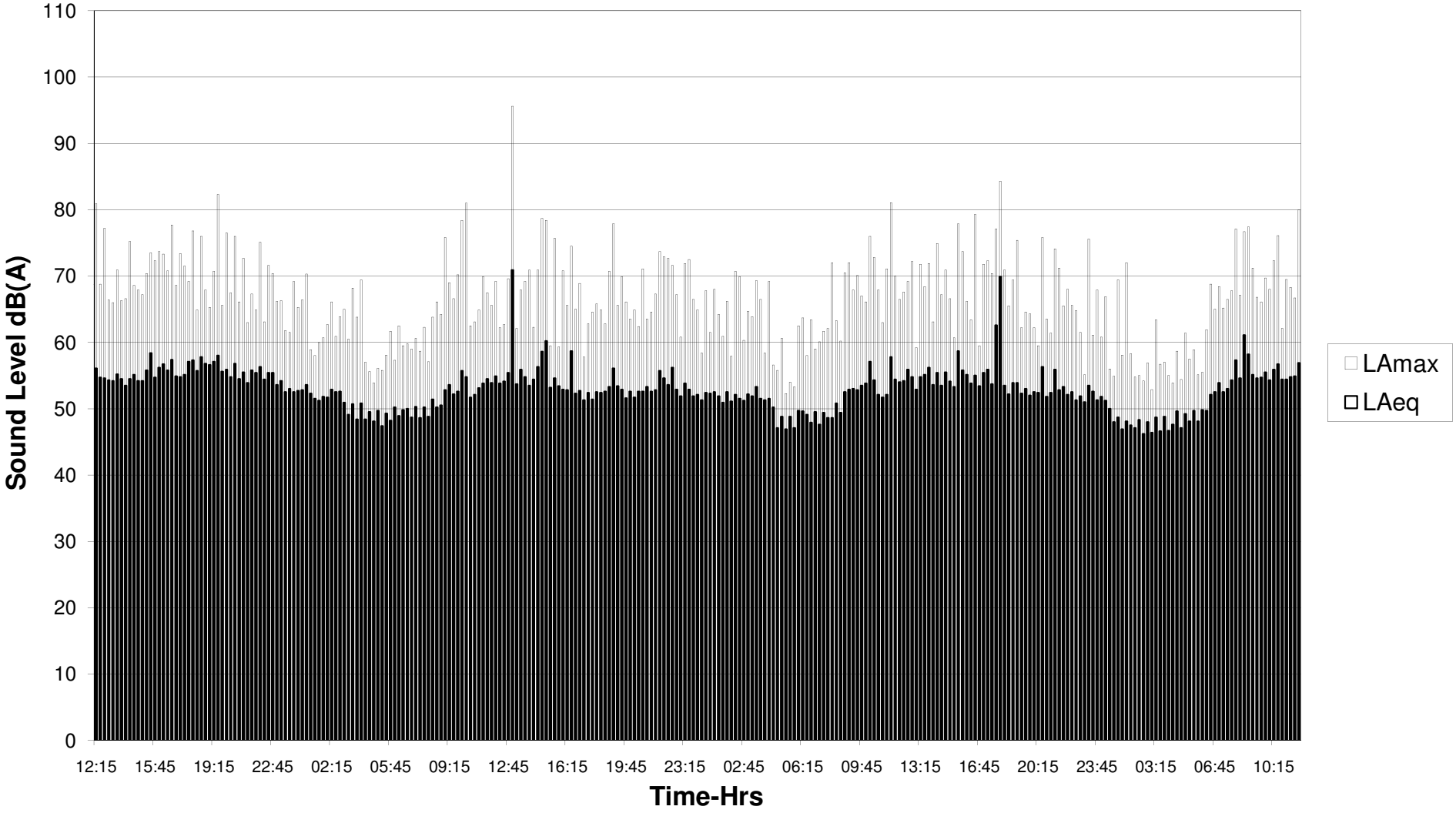


Time History Graph 15988/TH1

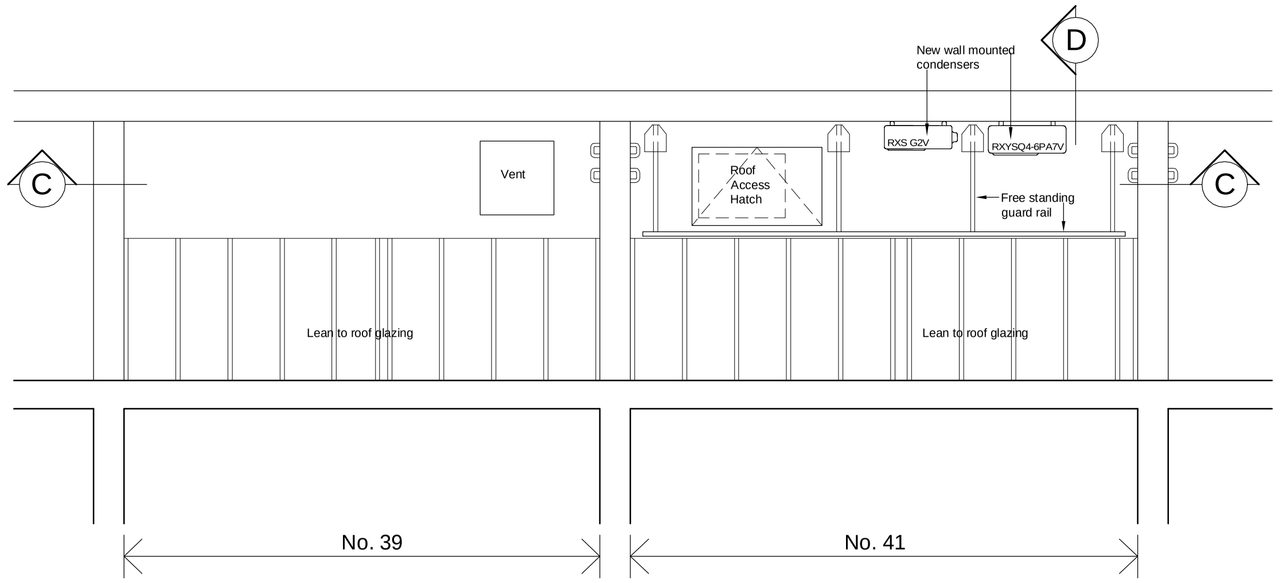
39-41 Farringdon Street

L_{Aeq} and L_{Amax} Noise Levels

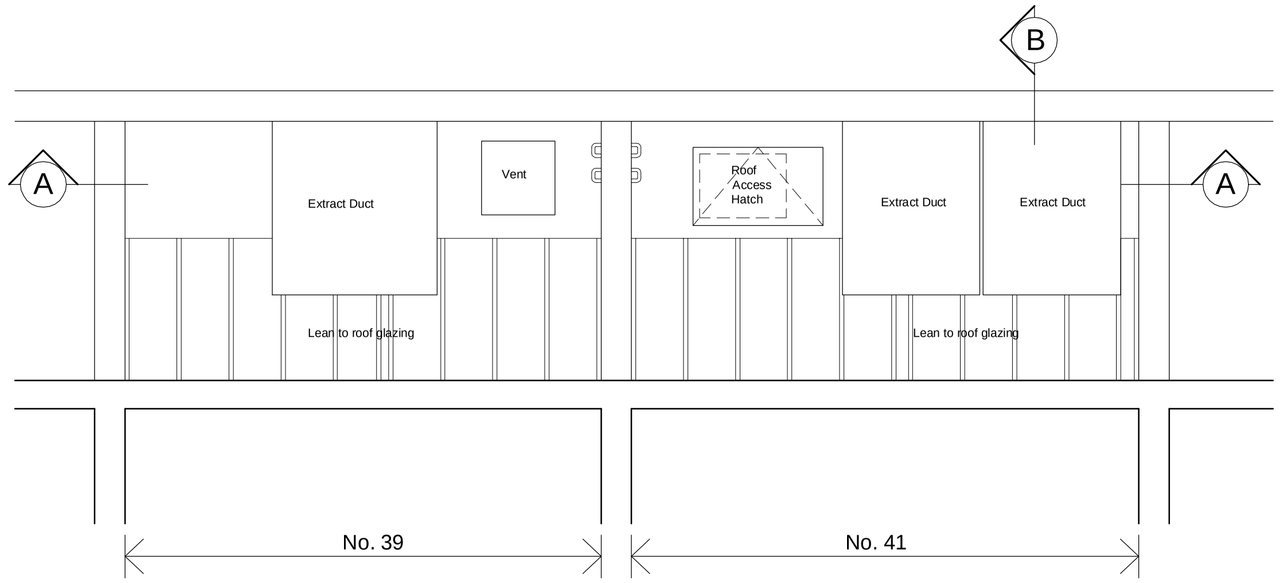
Friday 18/06/2010 - Monday 21/06/2010



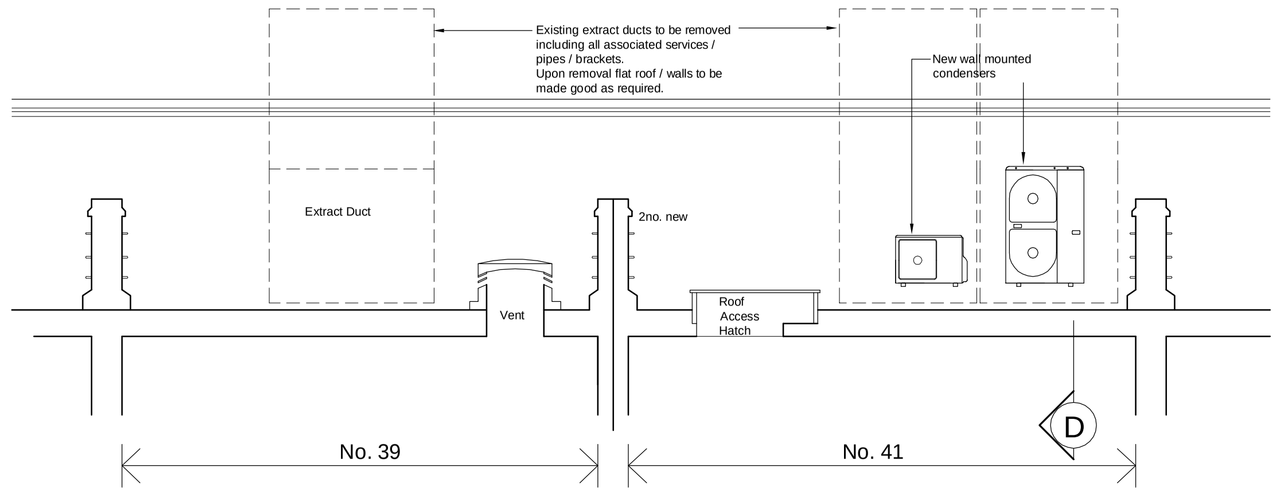
Time History Graph 15988/TH2



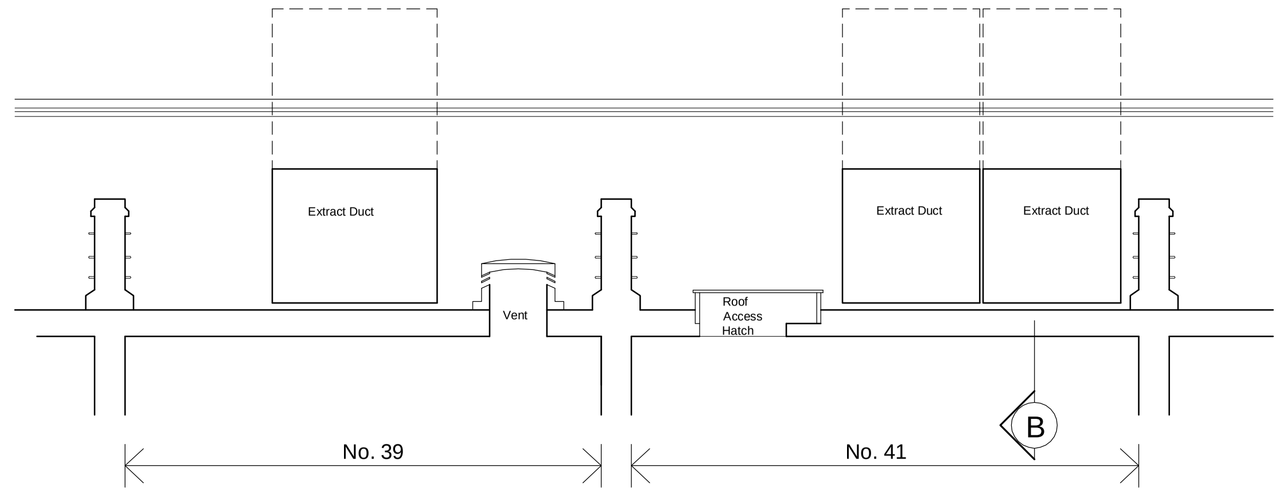
PROPOSED PART 1st FLOOR PLAN (External Rear Flat Roof Area)



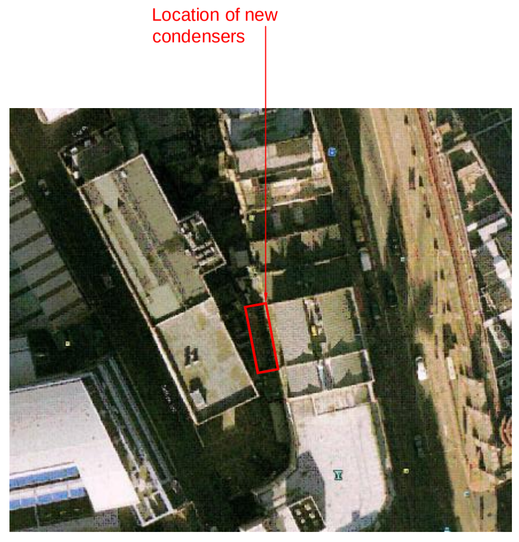
EXISTING PART 1st FLOOR PLAN (External Rear Flat Roof Area)



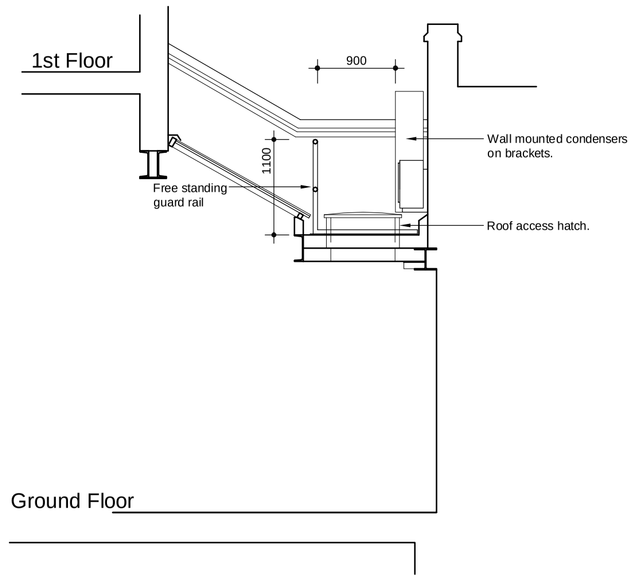
PROPOSED PART 1st FLOOR ELEVATION C-C (External Rear Flat Roof Area)



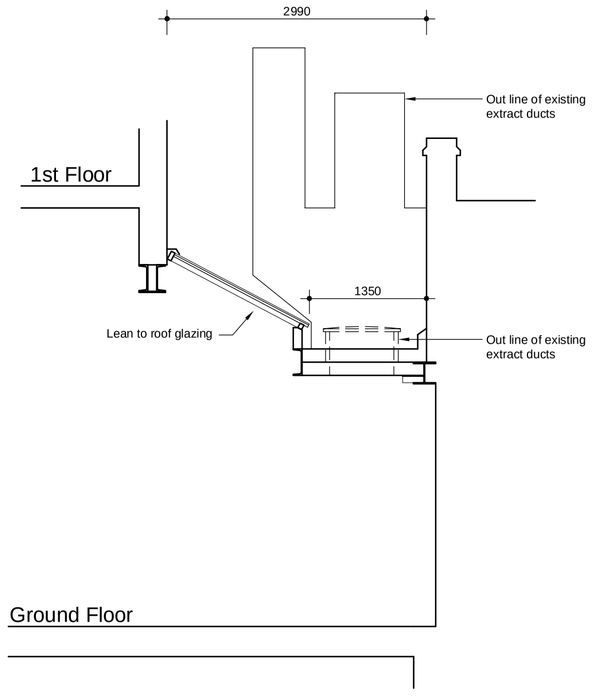
EXISTING PART 1st FLOOR ELEVATION A-A (External Rear Flat Roof Area)



LOCATION PLAN



PROPOSED PART SECTION D-D



EXISTING PART SECTION B-B

Photo's of existing extract plant to be removed

THE LIVEMORE PARTNERSHIP LLP

0 A1 SHEET 10

SHEET SIZE CHECK. WHEN PRINTED TO THE CORRECT SIZE THIS LINE SHOULD BE 10cm LONG (A1 SIZE DRAWING)

Rev:	Amendment:	Date:
-	-	-

Client: POST OFFICE LIMITED

Project: POST OFFICE RELOCATION
39-41 FARRINGDON ROAD
LONDON EC1

Title: NEW EXTERNAL CONDENSER'S / FREE STANDING BARRIER EXISTING PLANS & ELEVATIONS

Drawn by:

Date: MARCH 10

Checked by:

Scale @ A1: 1:50

Drg. No.: 10406-05

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HT 16481/ES **28 June 2010**

39-41 FARRINGDON ROAD

SPECIFICATION FOR ACOUSTIC ENCLOSURES

1.1 Performance

1.1.1 The acoustic enclosure shall provide in its as-installed condition an overall sound reduction index (SRI) of not less than:

Frequency (Hz)	125	250	500	1k	2k	4k
Minimum Sound Reduction Indices	12	16	17	20	22	18

Full allowance shall be taken of any loss of insulation due to doors, windows, ventilation openings and panel joints.

1.1.2 The manufacturer or supplier shall guarantee the specified SRI, and ensure that the method of installation does not detract from the guaranteed performance.

1.1.3 The internal surfaces of the enclosure panels shall be designed to give the following minimum average absorption coefficients (ISO) when tested in accordance with BS.EN 20354.

Frequency (Hz)	125	250	500	1k	2k	4k
Minimum average absorption coefficient	0.5	0.5	0.8	0.95	0.95	0.95

1.2 Construction

1.2.1 The enclosed outer panels shall be constructed from galvanized sheet steel having a minimum thickness of 1.6mm and fixed at 300mm (max) centres. The enclosure inner panels shall be constructed from punch-perforated (round-hole) galvanised sheet steel facing, having a minimum thickness of 0.7mm fixed at 300mm (max) centres. Flattened-expanded ("Expamet") sheet shall not be used, unless all edges of the sheet are mechanically fixed to the panel casing and galvanised steel cover strips are used to prevent rivet heads pulling through the perforated sheet (trapping the Expamet between two solid steel layers).

1.2.2 The inert, rot and vermin proof, non-hygroscopic and non-combustible mineral wool or glass fibre acoustic medium shall be packed to a density of not less than 48kg/$m^{3.}$ This shall be faced with a glass fibre cloth, or other approved infill protection membrane. Panels shall be constructed and assembled so that no egress of the acoustic medium will occur under the operating conditions.

1.2.3 Doors, access panels, windows and ventilation ducts or electrical cable penetrations hall be treated so as to maintain the specified acoustic insulation of the assembled enclosure.

1.2.4 Demountable sections shall be designed to allow easy disassembly and reassembly by unskilled personnel without affecting the acoustic performance.

1.2.5 The supplier shall ensure that the assembled enclosure is designed and constructed to withstand site operating conditions such as wind and snow loads, roof mounted plant, etc., as appropriate, and if outside, to be suitably weatherproofed.

1.2.6 The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.