SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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High Holborn House

Plant noise assessment report

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Summary

Sandy Brown Associates LLP (SBA) has been appointed to carry out an environmental noise survey at High Holborn House in support of a planning application for the installation of new building services plant. The survey was performed with a view of determining the existing background noise levels in the area and setting appropriate plant noise limits in line with the requirements of the London Borough of Camden.

Unattended noise monitoring has been performed on the north side of High Holborn House in June-July 2013.

The lowest background noise levels measured during the June-July 2013 survey were $L_{A90,5min}$ 44 dB during the daytime and $L_{A90,5min}$ 41 dB at night. These background noise levels are considered to be representative of the noise sensitive receivers located at the rear of High Holborn House.

Based on the requirements of the London Borough of Camden, the relevant plant noise limits at the worst affected existing noise sensitive premises to the rear of High Holborn House would be L_{Aeq} 39 dB during the day and L_{Aeq} 36 dB at night. These limits are cumulative and apply with all plant operating under normal conditions.

Fifteen new items of plant have been assessed against these criteria along with previously assessed plant. The above plant noise limits can be achieved at all times at the worst affected noise sensitive receivers.

Contents

1 Introduction

Sandy Brown Associates LLP (SBA) has been commissioned by Prestbury Investment Holdings Ltd on behalf of MPG Holborn LLP to undertake a noise survey at High Holborn House, High Holborn, in support of a planning application for the installation of new items of plant in the building.

The purpose of the survey was to establish the existing background noise levels in the vicinity of nearby noise sensitive premises. The background noise levels measured enable appropriate limits to be set regarding noise emission from proposed building services plant. These limits are to be set in accordance with the requirements of the London Borough of Camden.

This report presents the survey method, the results of the environmental noise survey, and a discussion of acceptable limits for noise emission from building services plant. Noise levels from the operation of the proposed new items of plant are also assessed in this report and compared with the established limits.

2 Site description

2.1 The site and its surroundings

High Holborn House is located to the north of High Holborn and is surrounded by existing commercial premises to the west, north and east, and residential properties to the west.

The site location in relation to its surroundings is shown in Figure 1, where High Holborn House is indicated in red, the nearest residences are shown in blue and the proposed location of the new plant units is indicated in green. The unattended noise monitoring location is also shown in Figure 1 as position A.

Unattended noise monitoring has been performed on the south side of High Holborn House. The environmental noise survey at position A was performed at rooftop level in June-July 2013.

2.2 Adjacent premises

The nearest residential noise sensitive premises to High Holborn House are located at 22 – 23 Hand Court at approximately 7 m to the west of the site.

Figure 1 Aerial photo showing the site location (courtesy of Google Earth Pro)

3 Development proposals

New building services plant are proposed to be installed at High Holborn House, serving the refurbished level 1 to 6 offices. The proposed locations of the new plant are shown in Figure 1 as positions 1 to 6.

Further details on the proposed items of plant and their locations are given in section 6.4 of this report.

4 Method

4.1 Unattended measurements

A 5 day unattended continuous noise monitoring survey was undertaken at High Holborn House to determine the existing background noise levels in the vicinity of nearby residences screened from High Holborn.

The unattended measurements were performed over 5 minute periods between 27 June 2013 and 1 July 2013.

The microphone was mounted on a tripod at approximately 2 m above the roof of High Holborn House, directly overlooking the existing residences at 22 – 23 Hand Court, and at least 2 m from any other reflective surface. The measurement position used during the unattended noise survey is indicated in Figure 1, denoted by the letter 'A'. A photograph showing the measurement location is provided in Figure 2. The locations of nearby noise sensitive premises are also indicated in Figure 2. This monitoring location was chosen to be reasonably representative of the noise levels experienced by the nearest noise sensitive premises at the rear of High Holborn House.

Figure 2 Photograph showing unattended noise measurement location (facing northwest)

4.2 Equipment

A Rion NL-52 Sound Level Meter was used to undertake the unattended measurements at location A. The calibration data for the equipment used during the survey is provided in Appendix A of this report.

The sound level meter and microphone were calibrated at the beginning and end of the measurements using their sound level calibrator. No significant deviations in calibration occurred.

4.3 Noise indices

The equipment was set to record a continuous series of broadband sound pressure levels. Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background noise level.

The L_{A90} is considered most representative of the background noise level for the purposes of complying with any local authority requirements.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS 7445-1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

4.4 Weather Conditions

The temperatures during the unattended noise measurements between 27 June 2013 and 1 July 2013 at location A varied between 13°C at night and 26°C during the day. The average wind speed was less than 4 m/s.

Light rain occurred on 28 June 2013. However, it is considered that sufficient dry periods occurred during the survey in order to obtain representative measurements.

The above weather conditions are considered suitable to obtain representative measurements.

5 Measurement results

5.1 Observations

The dominant noise sources observed during the survey at location A consisted of distant road traffic on High Holborn, distant construction works and plant serving the buildings surrounding the site. Less significant noise sources included occasional aircraft flying over the site.

5.2 Unattended measurement results

The results of the unattended noise measurements performed at location A are summarised in the following tables. Graphs showing the results of the unattended measurements are provided in Appendix B of this report.

The day and night time ambient noise levels measured during the unattended survey at location B are presented in Table 1.

Table 1 Ambient noise levels measured during the survey at location A

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 27 June 2013	-	50
Friday 28 June 2013	55	50
Saturday 29 June 2013	54	49
Sunday 30 June 2013	53	49
Average	54	50

The minimum background noise levels measured during the unattended survey at location A are given in Table 2.

Table 2 Minimum background noise levels measured during the survey at location A

Date	Daytime (07:00 – 23:00) $L_{A90,5min}$ (dB)	Night (23:00 – 07:00) $L_{A90,5min}$ (dB)
Thursday 27 June 2013	48*	43
Friday 28 June 2013	48	44
Saturday 29 June 2013	45	43
Sunday 30 June 2013	44	41
Monday 1 July 2013	52*	-

* Measurement not made over full period due to monitoring start and end time

The lowest background noise levels measured during the survey at location A were $L_{A90,5min}$ 44 dB during the daytime and $L_{A90,5min}$ 41 dB at night.

6 Noise egress assessment

6.1 Standard guidance

Standard guidance for noise emission from proposed new items of building services plant is given in BS 4142: 1997 *Method for rating industrial noise affecting mixed residential and industrial areas*.

BS 4142 suggests that if the rating noise level is 10 dB or more higher than the existing background noise level, complaints are likely. If the rating level is 5 dB above the existing background noise level, it is considered of marginal significance. If the rating level is 10 dB or more below the existing background noise level, this is considered a positive indication that complaints are unlikely.

If the noise contains 'attention catching features' such as tones, bangs etc., these limits should be reduced by a further 5 dB.

6.2 Local authority's criteria

The London Borough of Camden planning policy DP28 *Noise and vibration* requires that the noise levels from the operation of all new proposed building services plant does not exceed a level of 5 dB below the lowest background noise level measured during the day and at night at 1 m from the worst affected noise sensitive facade.

If the noise from the new plant and machinery has a distinguishable discrete continuous note (whine, hiss, screech, hum) or if it has distinct impulses (bangs, clicks, clatters, thumps), the noise levels from all plant should not exceed a level of 10 dB below the lowest background noise level measured during the day and night at 1 m from the worst affected noise sensitive facade.

6.3 Plant noise limits

Based on the above criteria and the measurement results, the total noise level resulting from the operation of all new plant at 1 m from the most affected windows of the nearest noise sensitive premises should not exceed 5 dB below the lowest background noise level measured. These limits are set out in Table 3.

For the residences at 22 – 23 Hand Court, the plant noise limits given in Table 3 were based on the noise levels measured at location A, on the roof of High Holborn House overlooking Hand Court. The noise limits used are based on the lowest background levels measured during the night-time period (23:00 – 07:00).

Table 3 Plant noise limits at 1 m from the existing noise sensitive receivers

Location	Maximum sound pressure level at 1 m from noise sensitive premises (dB)	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Residences at 22 – 23 Hand Court	39	36

6.4 Proposed plant

Eight new Mitsubishi condenser units and seven new Mitsubishi power inverter heat pumps are proposed to be installed at High Holborn House.

The proposed locations of the new plant, indicated in Figure 1 as positions '1' to '6', are:

Base of southern lightwell – 1st floor level: (Fig 1 ref. '1')

- 3 No Mitsubishi PURY-P450YSJM-A condenser units, serving 1st, 3rd and 4th floor south.

Base of northern lightwell – basement floor level: (Fig 1 ref. '2')

- 2 No Mitsubishi PUHZ-RP140VKA power inverter heat pumps, serving 2nd floor north.

Area adjacent to reception – ground floor level: (Fig 1 ref. '3')

- 2 No Mitsubishi PURY-P450YSJM-A condenser units, serving 2nd floor east & west.

Base of northern lightwell – basement floor level: (Fig 1 ref. '4')

- 2 No Mitsubishi PURY-P600YSJM-A condenser units, serving 3rd floor north, east & west.

Flat roof of 5th floor: (Fig 1 ref. '5')

- 1 No Mitsubishi PURY-P650YSJM-A condenser unit, serving 4th floor north & east;
- 2 No Mitsubishi PUHZ-RP140VKA power inverter heat pumps; and
- 1 No Mitsubishi PUHZ-RP250YKA power inverter heat pump, serving 5th floor west.

Flat roof of 7th floor: (Fig 1 ref. '6')

- 1 No Mitsubishi PUHZ-RP140VKA power inverter heat pump; and
- 1 No Mitsubishi PUHZ-RP250YKA power inverter heat pump, serving 6th floor west.

The sound pressure levels at 1 m from each plant item are presented in Table 4 based on the manufacturer's data.

Table 4 Sound pressure levels at 1 m from each plant item

Plant		Octave band centre frequency (Hz)								Overall level dB(A)
		63	125	250	500	1k	2k	4k	8k	
PURY-P450YSJM-A	Standard mode	66	66	66	59	55	51	48	40	62
	Low noise mode	66	58	55	49	46	43	44	35	53
PURY-P600YSJM-A	Standard mode	68	67	64	59	56	52	48	46	62
	Low noise mode	64	63	52	48	45	42	43	41	53
PURY-P650YSJM-A	Standard mode	73	68	65	60	57	53	49	45	63
	Low noise mode	62	60	51	47	45	45	44	41	53
PUHZ-RP140VKA	Heating	63	55	53	50	47	42	38	30	52
	Cooling	53	55	50	48	45	41	35	27	50
PUHZ-RP250YKA	Heating	64	64	59	57	54	50	45	37	59
	Cooling	61	63	59	57	53	50	44	36	59

6.5 Hours of operation

The proposed plant items to be installed at High Holborn House have the potential of operating both throughout the day and night. Therefore, the 'worst case' noise levels from the new plant, namely the 'standard mode' and 'heating' noise levels from Table 4, were assessed against the night-time noise limits as given in Table 3.

6.6 Assessment

The noise levels from the simultaneous operation of the new plant items described in section 6.4 have been assessed at the most affected noise sensitive receivers. These have been considered to be the residences at 22 – 23 Hand Court, based on the heights of the buildings and their respective distance to the proposed plant location.

Based on the proposed plant layout shown in Figure 1, noise from the new plant will benefit from distance and barrier attenuation from the building edge.

The resultant noise levels at the worst affected noise sensitive receivers from the simultaneous operation of the fifteen new plant items are given in Table 5.

Table 5 Predicted noise levels from new plant at the worst affected sensitive receivers

Worst affected noise sensitive receiver	Distance from plant to receiver (m)						Predicted noise level, L_{Aeq} (dB)	Plant noise limit, $L_{Aeq,5min}$ (dB)
	1	2	3	4	5	6		
Residences at 22 – 23 Hand Court	40	21	25	25	29	28	34	36

The resultant noise level from the simultaneous operation of the five new Panasonic U-6LE1E8 condenser units to be installed on the rooftops of levels 5 and 7 have been previously assessed at the most affected noise sensitive receivers, and are given in our plant noise assessment report 13332-R01-B dated 19 November 2013 – approved by Camden as of 29 January 2014.

Further, the resultant noise level from the simultaneous operation of the three new Mitsubishi condenser units to be installed on the bottom of a lightwell on the west of High Holborn House and the new electrical transformer to be installed internally in a plant room at the east of High Holborn House have been previously assessed at the most affected noise sensitive receivers, and are given in our plant noise assessment reports 14067-R01-A dated 11 February 2014 and 14067-R02-A dated 25 March 2014.

The cumulative noise levels at the worst affected noise sensitive receivers from the simultaneous operation of all new plant items are given in Table 6.

Table 6 Predicted cumulative noise levels from all new plant at the worst affected sensitive receivers

Worst affected noise sensitive receiver	Predicted noise level from all new plant, L_{Aeq} (dB)	Plant noise limit, $L_{Aeq,5min}$ (dB)
Residences at 22 – 23 Hand Court	35	36

The predicted noise levels given in Table 6 are compliant with the plant noise limits required by the London Borough of Camden.

7 Conclusion

A noise survey has been carried out at High Holborn House to determine the existing background noise levels in the vicinity of the site and surrounding noise sensitive premises.

The lowest background noise levels measured to the rear of the building were $L_{A90,5min}$ 44 dB during the daytime and $L_{A90,5min}$ 41 dB at night.

Based on the requirements of the London Borough of Camden, the relevant plant noise limits at the worst affected existing noise sensitive premises to the rear of High Holborn House would be L_{Aeq} 39 dB during the day and L_{Aeq} 36 dB at night. These limits are cumulative and apply with all plant operating under normal conditions.

The noise levels from all new plant have been predicted at the most affected sensitive receiver. It is considered that the requirements of the London Borough of Camden will be achieved at all times.

Appendix A

Equipment calibration information

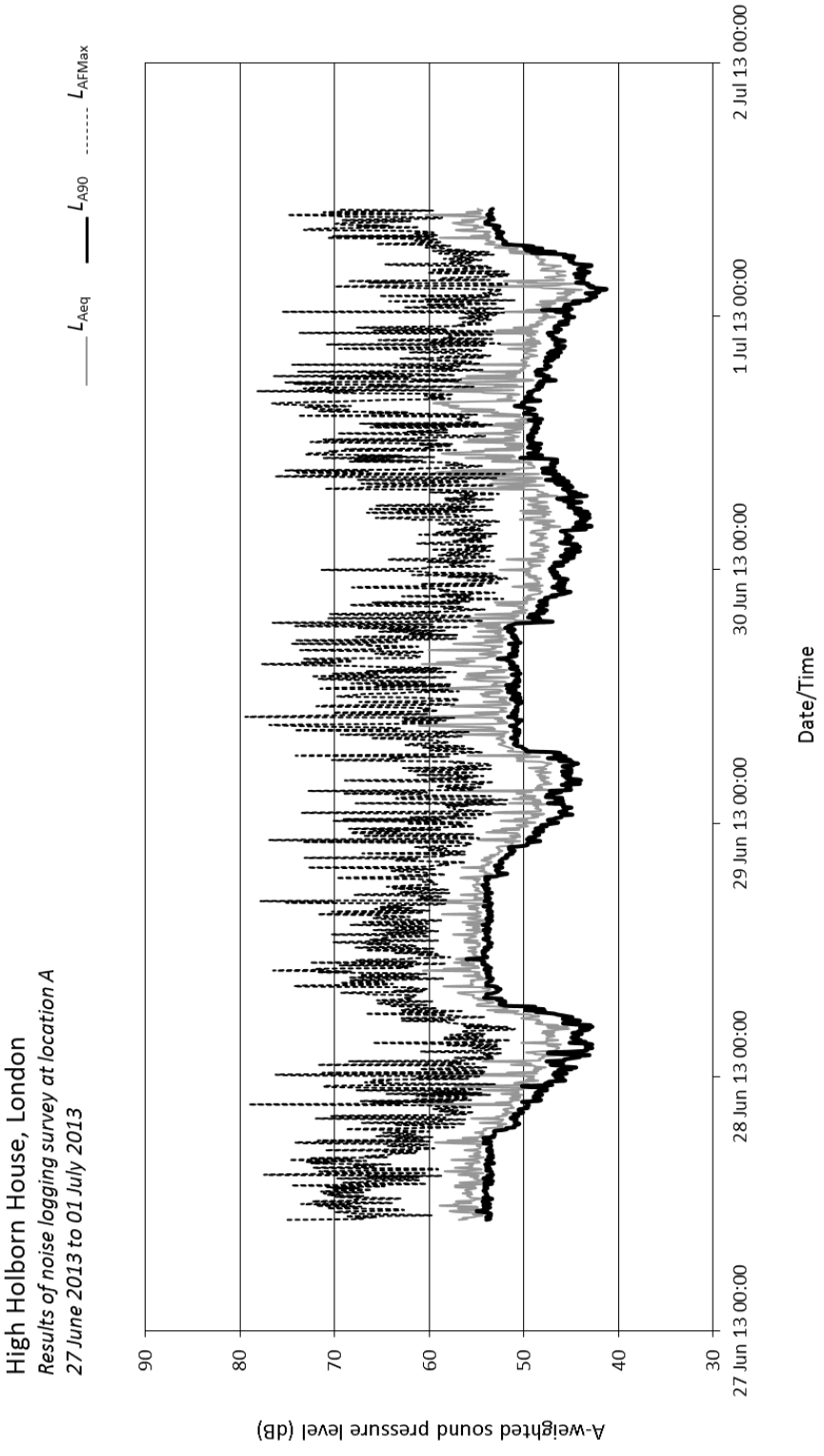
Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00320633	Rion	12 Apr 14	1204155
Microphone	UC-59/03382	Rion	12 Apr 14	1204155
Calibrator	N7-74/34125430	Rion	12 Apr 14	1204151

Calibration of the sound level meter used for the unattended noise measurements is traceable to national standards. The calibration certificate for the sound level meter used in this survey is available upon request.

Appendix B

Results of unattended measurements at location A


High Holborn House, London
Results of noise logging survey at location A
27 June 2013 to 01 July 2013
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
90
80
70
60
50
40
30
27 Jun 13 00:00
28 Jun 13 00:00
29 Jun 13 00:00
30 Jun 13 00:00
1 Jul 13 00:00
2 Jul 13 00:00
Date/Time