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Consultants in Acoustics, Noise & Vibration

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Greater London House, 180 Hampstead Road, London NW1

Environmental noise survey and plant noise assessment

Introduction

Sandy Brown Associates LLP (Sandy Brown) has been appointed to provide acoustic advice in relation to the installation of new plant items on the roof of Greater London House, located at 180 Hampstead Road, London NW1.

Attended measurements were carried out on 21 July 2016 around the site to determine the existing background sound levels in the area to aid in the completion of a plant noise assessment.

An assessment of the noise levels from the operation of the proposed items of plant has been undertaken and where necessary the required mitigation measures have been determined.

This memo presents the method and results of the attended measurements, a discussion of acceptable limits for noise emission from new building services plant and an assessment of the noise egress levels.

Site description

The site and its surrounding

Greater London House is located at 180 Hampstead Road, London NW1. The site is bounded by Hampstead Road to the east and Mornington Crescent to the west. The nearest residential premises are terraced houses situated on Mornington Crescent and Dalehead, Gillfoot and Oxenholme towers, which are part of the Ampthill Square estate to the south-east. Train lines serving Euston run to the south-west of the site, behind Mornington Crescent.

The site location in relation to its surroundings is shown in Figure 1.

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Figure 1 Site map (courtesy of Google Earth Pro)

Method

Details of the equipment used and the noise indices are provided in Appendix A.

Attended measurements

Attended sample measurements were performed by Richard Deane at four different roof level locations (S1–S4) on 21 July 2016, over 10 minute periods.

S1 was located towards the south end of the east facade of the building. S2 was located at the southernmost tip of the roof, as this was considered to be representative of the noise levels experienced at the residential towers. A VAM unit nearby however may have affected measurements, and as such, position S1 may be considered more representative of the background noise level experienced at the residential towers.

S3 was located on the west facade of the building, and was thought to represent the noise levels experienced at residences on Mornington Crescent, which the position overlooked.

S4 was located at the northernmost tip of the roof and was considered to be representative of the noise levels experienced at residences at the north of Mornington Crescent.

Photographs showing the measurement locations S1-S4 are provided in Figure 3 and Figure 4.

In each case the microphone was mounted on a tripod approximately 1.5 m above the relative ground level and approximately 1 m from any reflective surface.

The attended measurement positions used during the survey are indicated in Figure 2.

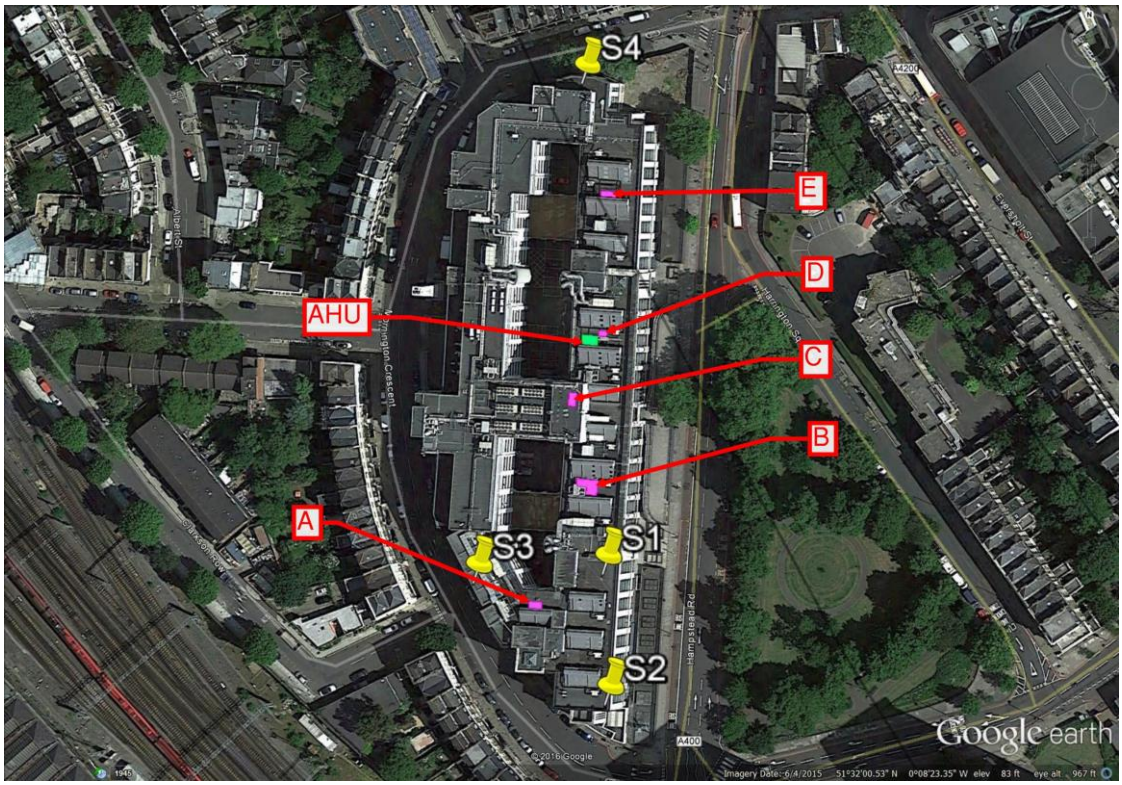

Figure 2 Map showing the attended measurement and proposed plant locations


Figure 3 Photographs showing attended measurement positions S1 and S2


Figure 4 Photographs showing attended measurement positions S3 and S4

Measurement results

Observations

The dominant noise sources observed at S1 consisted of road traffic from Hampstead Road, with other noise sources including distant light construction, faint plant noise and intermittent aircraft.

The dominant noise sources observed at S2 consisted of road traffic from Hampstead Road, rolling stock movement on lines serving Euston Rail Station and rooftop plant with other noise sources including distant light construction and intermittent aircraft movement.

The dominant noise sources observed at S3 consisted of rolling stock movement on lines serving Euston Rail Station, with less dominant noise sources including road traffic from Hampstead Road.

The dominant noise sources observed at S4 consisted of road traffic from Hampstead Road, which included the movement of buses, with minor noise sources including seagulls and intermittent aircraft movement.

Attended measurement results

The sound pressure levels recorded during the attended measurements are summarised in Table 1.

All the attended measurements were performed over 10 minute periods.

Table 1 Summary of attended noise measurements

Measurement position	Start time	$L_{Aeq,10min}$ (dB)	$L_{A90,10min}$ (dB)	$L_{Amax,10min}$ (dB)
S1	12:55	58	55	69
S1	13:07	59	55	72
S2	13:19	64	59	79
S2	13:29	64	59	82
S3	13:48	60	49	74
S3	13:58	61	49	74
S4	14:12	62	55	87
S4	14:22	63	55	85

Development proposal

It is understood as part of works which will be undertaken at Greater London House, additional plant is to be installed at roof level.

Plant to be installed includes one new AHU and seventeen Condenser units. Indicative locations of the proposed plant are shown on GLP drawing *1607-M303_Existing & proposed mechanical services layout – Roof level*.

The proposed plant is to operate during typical office hours only.

Building services noise egress limits

Standard guidance

Guidance for noise emission from proposed new items of building services plant is given in BS 4142: 2014 '*Methods for rating and assessing industrial and commercial sound*'.

BS 4142 provides a method for assessing noise from items such as building services plant against the existing background sound levels at the nearest noise sensitive.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

Local Authority criteria

Environmental noise limits for building services plant are set in order to protect the amenity of nearby noise sensitive premises. London Borough of Camden states that:

- *Noise levels from fixed plant associated with the development 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 (or any part of it) is in operation unless the plant/equipment hereby permitted 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), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the LA90, expressed in dB(A).*

Assessment

Often as part of a planning application, the noise impact from proposed plant on the nearest noise sensitive residences must be assessed and as such an assessment of the impact has been undertaken.

Plant noise limits

Based on the criteria set out above, and the results of the environmental noise survey, the cumulative 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 background noise level. These limits are set out in Table 2.

Table 2 Plant noise limits at 1 m from the nearest noise sensitive premises

Receptor	Time of day	Maximum sound pressure level at 1 m from noise sensitive premises (L_{Aeq} dB)
Ampthill Square	Daytime (07:00-19:00)	50
Mornington Crescent east	Daytime (07:00-19:00)	44
Mornington Crescent north	Daytime (07:00-19:00)	50

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), the plant should be designed to achieve a limit 5 dB below those set out above.

Plant noise assessment

This section presents manufacturer's data for the proposed plant, an assessment of noise egress to the worst affected noise sensitive premises and recommendations for noise mitigation measures where necessary.

Indicative plant selections have been provided by the project building services engineers, GLP. The manufacturer's noise data for the items of plant proposed to be installed was supplied by GLP.

It is considered that the terraced houses situated on Mornington Crescent and Dalehead, Gillfoot and Oxenholme towers to the south-east are the nearest affected sensitive premises.

The noise level resulting from the operation of the proposed plant has been calculated taking into consideration attenuation due to hemi-spherical propagation and screening.

A summary of the assessment and predicted noise egress levels at the receptors at 1m from the most affected windows are given in Table 3, Table 4 and Table 5. Plant locations referred to in the table can be seen in Figure 2.

Table 3 Predicted noise egress to Ampthill Square

Plant item	Plant location	Sound power (dB)	Number of units	Distance (m)	Loss from screening (dB)	Predicted noise level from at 1 m from receptor, L_{Aeq} (dB)
Condensers	A	82	3	90	6	34
Condensers	B	88	3	108	6	38
Condensers	C	82	6	130	6	34
Condensers	D	88	2	145	7	33
AHU supply	D	98	1	145	7	41
AHU extract	D	94	1	145	7	36
Condensers	E	82	3	180	7	27
Total	-	-	-	-	-	**45**

Table 4 Predicted noise egress to Mornington Crescent east

Plant item	Plant location	Sound power (dB)	Number of units	Distance (m)	Loss from screening (dB)	Predicted noise level from at 1 m from receptor, L_{Aeq} (dB)
Condensers	A	82	3	25	12	39
Condensers	B	88	3	55	18	32
Condensers	C	82	6	60	7	39
Condensers	D	88	2	62	18	29
AHU supply	D	98	1	62	18	37
AHU extract	D	94	1	62	18	32
Condensers	E	82	3	55	18	26
Total	-	-	-	-	-	**44**

Table 5 Predicted noise egress to Mornington Crescent north

Plant item	Plant location	Sound power (dB)	Number of units	Distance (m)	Loss from screening (dB)	Predicted noise level from at 1 m from receptor, L_{Aeq} (dB)
Condensers	A	82	3	160	10	25
Condensers	B	88	3	125	10	33
Condensers	C	82	6	105	10	31
Condensers	D	88	2	85	11	33
AHU supply	D	98	1	85	11	41
AHU extract	D	94	1	85	11	36
Condensers	E	82	3	50	11	34
Total	-	-	-	-	-	**44**

Based on these calculations and by comparing the total predicted noise level at 1 m from receptor to the limits set in Table 2, it is considered that noise egress limits at the nearest noise sensitive premises will be met and no mitigation will be required.

Conclusion

A noise survey has been carried out to determine the existing sound levels in the vicinity of the site. Attended measurements were carried out on 21 July 2016.

Based on these levels, the guidance given in BS4142:2014 and from the London Borough of Camden, an assessment has been carried out to determine the noise impact from proposed plant on the nearest noise sensitive residences.

Based on the results of this plant noise assessment, it is considered that noise egress limits at the nearest noise sensitive premises will be met and no mitigation will be required.

Appendix A

Survey details

Equipment

The attended measurements were carried out using a Brüel & Kjær 2250 sound level meter. The calibration details for the equipment used during the survey are provided in Table A1

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	2250/3009283	Bruel & Kjaer	14 July 18	CDK1603872
Microphone	4189/3005042	Bruel & Kjaer	14 July 18	CDK1603872
Pre-amp	ZC0032/23792	Bruel & Kjaer	14 July 18	CDK1603872
Calibrator	4231/3016124	Bruel & Kjaer	14 July 18	CDK1603872

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

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

Noise indices

The equipment was set to record a continuous series of octave band 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 with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

The L_{A90} is considered most representative of the background sound 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 BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*