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Consultants in Acoustics, Noise & Vibration

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Centre Point, Retail Unit R03

Plant noise feasibility assessment

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Version	Date	Comments	Author	Reviewer
A	8 Jun 17		Bob Albon	Jason Swan
B	20 Jul 17	Updated plant arrangement	Tom Bonnert	Bob Albon
C	25 Jul 17	Incorporating comments	Tom Bonnert	Daryl Prasad

Summary

Sandy Brown has been commissioned to provide acoustic advice in relation to a planning application associated with retail unit R03 at Centre Point. The application relates to the introduction of a new opening within the roof of the consented new build kitchen extension. This extension is understood to house any future building services plant required as part of the tenant fit-out works at the retail unit R03.

An environmental noise survey was undertaken as part of the original planning application for the redevelopment of Centre Point and conditions were imposed by Camden Council as part of the original planning permission for the whole scheme.

To ensure that the overall plant noise limits for the scheme are achieved, the limits have been apportioned between the tenanted retail units based on their location and accounting for the contribution of noise from the main development.

An acoustic assessment has been undertaken to assess the feasibility of an indicative plant arrangement against the plant noise limits and determine the possible extent of any noise mitigation measures required to achieve the plant noise limits.

It has been advised that a subsequent application will be made as part of the tenant fit-out for plant equipment which will comprise the introduction of new ventilation and cooling plant.

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1 Introduction

Sandy Brown has been commissioned to provide acoustic advice in relation to a planning application associated with retail unit R03 at Centre Point. The application relates to the introduction of a new opening within the roof of the consented new build kitchen extension. This extension is understood to house any future building services plant required as part of the tenant fit-out works at the retail unit R03.

The noise from indicative plant proposals has been assessed with regard to compliance with plant noise limits determined based on the results of the noise survey for the Centre Point redevelopment and the planning condition imposed on the development. The mitigation measures required to meet the plant noise limits have been determined to establish the feasibility of any future plant proposals.

This report presents the plant noise limits and an assessment of the proposed plant.

2 Site description

Retail unit R03 is located on level 2 of the Centre Point Bridge Link overlooking Oxford High Street to the north and the new public square to the south.

2.1 The site and its surrounding

The site location is shown in Figure 1. Existing residential premises are located on the upper floors of Centre Point House directly to the south of the site and at Mathilda Apartments further to the south on Earnshaw Street. New residences are being introduced within Centre Point Tower immediately to the west of the retail unit.

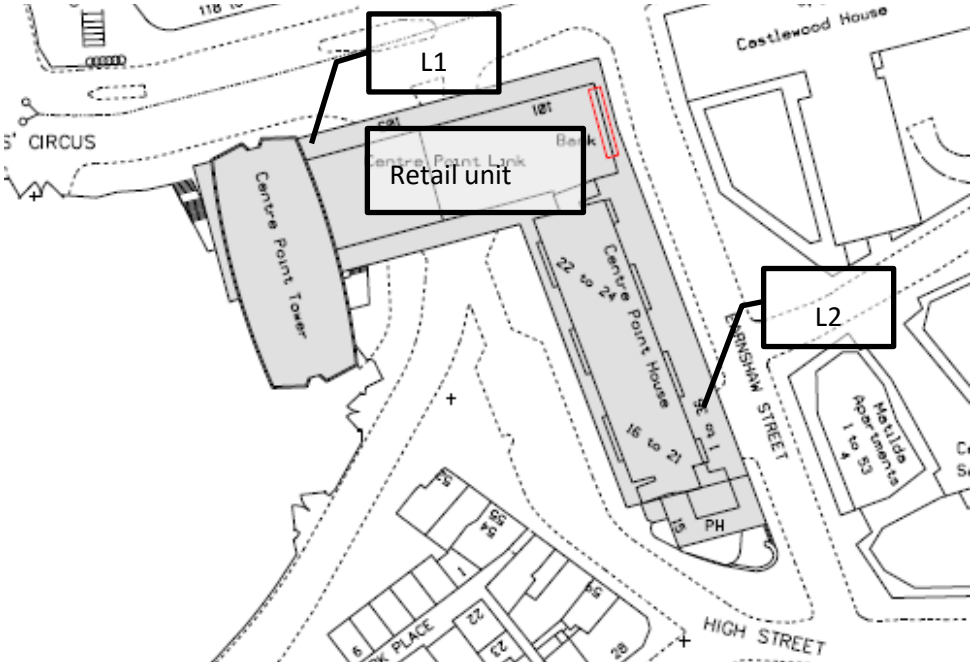

Figure 1 Site plan extract

3 Environmental noise survey

An environmental noise survey was undertaken at the site as part of the original planning application and is described in Sandy Brown's report *Centre Point Planning noise and vibration report 11301-R01-F.* The report was submitted as part of the original planning application for the development.

The noise survey was performed between Thursday 19 January 2012 and Wednesday 25 January 2012. Unattended measurements were performed at measurement positions L1 and L2 as indicated on Figure 1.

The results of the survey are summarized in the following section.

4 Measurement results

4.1 Unattended measurement results

The results of the unattended noise measurements are summarised in the following tables. A more detailed description of the survey results is provided in Sandy Brown's report *Centre Point Planning noise and vibration report 11301-R01-F*.

The day, evening and night time ambient noise levels measured during the unattended survey are presented in Table 1 for logger position L1, 1 m from the facade of Centre Point Tower.

Table 1 Ambient noise levels measured during the survey at logger position L1

Date	Daytime (07:00 – 19:00) $L_{Aeq,12h}$ (dB)	Evening (19:00 – 23:00) $L_{Aeq,4h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 19/01/2012	-	70	69
Friday 20/01/2012	73	72	71
Saturday 21/01/2012	71	70	70
Sunday 22/01/2012	69	69	67
Monday 23/01/2012	71	71	68
Tuesday 24/01/2012	73	71	68

The minimum background noise levels measured during the unattended survey are given in Table 2 for logger position L1, 1 m from the facade of Centre Point Tower.

Table 2 Minimum background noise levels measured during the survey at logger position L1

Date	Daytime (07:00 – 19:00) $L_{A90,15min}$ (dB)	Evening (19:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Thursday 19/01/2012	66 *	64	61
Friday 20/01/2012	65	64	60
Saturday 21/01/2012	62	64	59
Sunday 22/01/2012	59	61	60
Monday 23/01/2012	65	63	60
Tuesday 24/01/2012	65	64	61
Wednesday 25/01/2012	66 *	-	-

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

The lowest background noise levels measured at logger position L1 during the survey were $L_{A90,15min}$ 59 dB during the day, $L_{A90,15min}$ 61 dB during the evening and $L_{A90,15min}$ 59 dB at night.

The day, evening and night time average noise levels measured during the unattended survey are presented in Table 3 for logger position L2, adjacent to Centre Point House overlooking Earnshaw Street.

Table 3 Ambient noise levels measured during the survey at logger position L2

Date	Daytime (07:00 – 19:00) $L_{Aeq,12h}$ (dB)	Evening (19:00 – 23:00) $L_{Aeq,4h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 19/01/2012	-	65	64
Friday 20/01/2012	65	64	63
Saturday 21/01/2012	62	62	62
Sunday 22/01/2012	62	61	62
Monday 23/01/2012	64	61	60
Tuesday 24/01/2012	65	62	61

The minimum background noise levels measured during the unattended survey are given in Table 4 for logger position L2.

Table 4 Minimum background noise levels measured during the survey at logger position L2

Date	Daytime (07:00 – 19:00) $L_{A90,15min}$ (dB)	Evening (19:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Thursday 19/01/2012	60 *	58	54
Friday 20/01/2012	59	57	54
Saturday 21/01/2012	56	56	54
Sunday 22/01/2012	54	54	54
Monday 23/01/2012	57	54	54
Tuesday 24/01/2012	59	55	53
Wednesday 25/01/2012	58 *	-	-

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

The lowest background noise levels measured at logger position L2 during the survey were $L_{A90,15min}$ 54 dB during the day, $L_{A90,15min}$ 54 dB during the evening and $L_{A90,15min}$ 53 dB at night.

5 Building services noise egress limits

5.1 Planning condition

Planning condition 20 for the development relates to the noise from plant and states:

> *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 (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).*

5.2 Overall plant noise limits

Based on the previous noise survey undertaken at the site and Camden's requirement for all plant not to exceed a level 5 dB below the background noise level 1 m from the facade of the nearest noise sensitive receiver the maximum plant noise levels are given in Table 5. The plant noise limit applies to the total noise from all plant associated with the development. The levels are given as free-field sound pressure levels.

Table 5 Maximum cumulative noise egress levels from new plant at 1m from nearest receiver windows

Time	Maximum cumulative noise egress level from plant
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 49 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 48 dB

5.3 Retail unit R03 plant noise limits

Specific plant noise limits for retail unit R03 have been determined at Centre Point House and Mathilda Apartments to ensure that their contribution is compatible with the overall plant noise limits for the Centre Point development. These account for the contribution of plant noise from the main scheme and allowances for contribution from the other tenanted retail units at the location of the receivers that will be worst affected by the proposed plant. These limits are set out in Table 6 and Table 7, respectively and are given as free-field sound pressure levels.

Table 6 Maximum cumulative noise egress levels from retail R03 tenant plant at 1m from Centre Point House (free field)

Time	Maximum cumulative noise egress level from plant
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 44 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 43 dB

Table 7 Maximum cumulative noise egress levels from retail R03 tenant plant at 1m from Mathilda Apartments (free field)

Time	Maximum cumulative noise egress level from plant
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 42 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 41 dB

While the residences within Centre Point Tower are to be introduced as part of the development and will benefit from high performance external glazing and mechanical ventilation systems, the same philosophy has been used to determine plant noise limits at the worst affected location. The limits are 8 dB below the lowest measured background noise levels and are presented in Table 8 as free field sound pressure levels.

Table 8 Maximum cumulative noise egress levels from retail R03 tenant plant at 1m from Centre Point Tower facade levels)

Time	Maximum cumulative noise egress level from plant
Daytime (07:00 to 23:00)	$L_{Aeq,15min}$ 51 dB
Night-time (23:00 to 07:00)	$L_{Aeq,15min}$ 51 dB

6 Indicative plant noise assessment

6.1 Proposed items of building services

It is understood that any future plant items will be installed in two locations. The majority of plant will be installed in the eastern end of the retail unit within the new build kitchen extension. An indicative plant arrangement at the eastern end of the retail unit is shown in Figure 2.

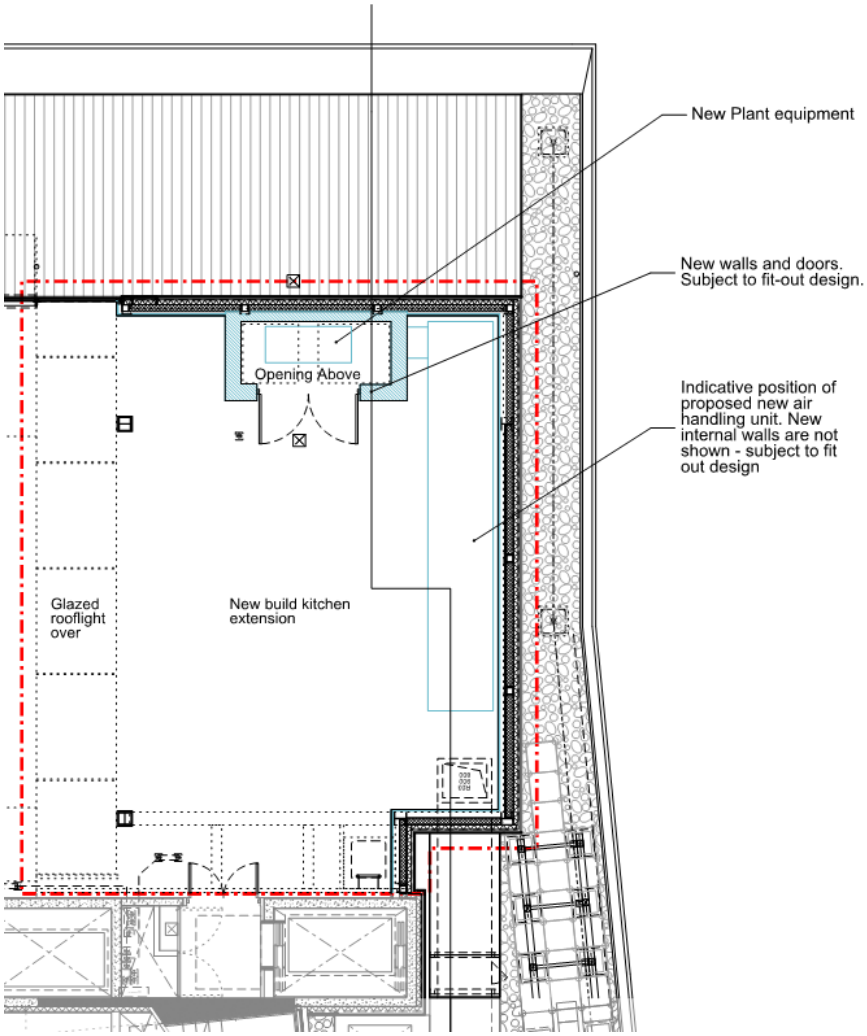

Figure 2 Indicative plant arrangement - east

The indicative plant that will emit noise to atmosphere in the east end of the retail unit comprises:

- 1no. PEU-05 Kitchen extract ecology unit
- 1no. Mitsubishi PURY-EP450YLM-A1(-BS) condensers

Noise data for the indicative plant to be installed at the east end of the retail unit is provided in Table 9 in the form of sound power levels (SWL), or sound pressure levels at a known distance (SPL) where stated.

Table 9 Proposed plant noise data – east, (dB)

	Octave-band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
PEU-05 in-duct outlet SWL	-	85	90	90	89	86	83	77
PURY-EP450YLM-A1(-BS) SPL @ 1m	73	70	65	61	56	51	47	41

In addition, two supply air handling units (AHUs) are proposed to be installed at the west end of the retail unit connected to louvres that are provided under the planning application for the main development.

Noise data for the indicative AHUs to be installed at the west end of the retail unit is provided in Table 10 in the form of sound power levels (SWL).

Table 10 Proposed plant noise data – west, (dB)

	Octave-band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
AEU-05 in-duct inlet SWL	-	80	80	76	78	77	73	70

6.2 Assessment

The noise levels generated as a result of the operation of the above plant have been determined 1 m from the facade of the worst affected residential receivers, as identified above.

For the purposes of the external assessment, it is considered that all normal operating plant has the potential to operate during the night time.

Calculations have been undertaken to predict noise levels at the worst affected noise sensitive receptors. The calculations determine noise levels accounting for attenuating factors based on the geometry of the site, distance attenuation, and mitigation measures such as attenuators, acoustic enclosures and acoustic louvres where proposed.

The calculated noise levels from ducted ventilation systems have been determined using the procedure outlined in *Noise Control in Building Services* by Sound Research Laboratories. Barrier attenuation has been determined using Maekawa's method. Distance attenuation has been based on the geometric spreading of sound power.

Based on the indicative plant arrangement, to achieve the plant noise limits identified in Section 5.3 in-duct attenuators are required to be provided to the kitchen extract ecology unit and the two supply air handling units. The minimum required performances for the attenuators are set out in Table 11.

Table 11 Minimum attenuator insertion losses

	Octave-band centre frequency (Hz)								Typical length (mm)
	63	125	250	500	1k	2k	4k	8k	
PEU-05 – exhaust outlet Minimum insertion losses (dB)	6	7	13	21	29	39	20	14	1500
AEU-05 – fresh air inlet Minimum insertion losses (dB)	7	8	14	23	31	33	17	11	1500

In addition, the internal walls of the open top plant well in which the condenser unit is to be located would be required to be lined with sound absorbent material. The lining should cover 75% of the total wall area. It should be a minimum of 50 mm thick and provide the minimum practical absorption coefficients as set out in Table 12.

Table 12 Plant well lining minimum absorption coefficient

	Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Minimum practical sound absorption coefficient	0.1	0.2	0.5	0.9	0.9	0.9	0.9	0.9

Suitable linings are available from:

- IAC (www.iacacoustics.com)
- Allaway Acoustics (www.allawayacoustics.co.uk)
- Caice (www.caice.co.uk).

7 Conclusion

A plant noise feasibility assessment has been undertaken in support of a planning application relating to retail unit R03 at Centre Point in London. The planning application relates to the introduction a new opening within the roof of the consented new build kitchen extension to house new ventilation and cooling plant which will be subject to a separate future planning application as part of the tenant works at the retail unit.

The plant noise has been assessed against plant noise limits for the retail units that have been determined to ensure that the overall plant noise egress is compatible with the planning requirements for the overall plant noise limits for the Centre Point development.

Based on the indicative plant arrangement, to ensure that these plant noise limits are achieved in-duct attenuators are required for the kitchen ecology unit and the two supply air handling units. A sound absorbent lining should also be provided within the plant well. The required performances have been determined and are presented in this report.