SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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From:	Jake Woolley	**Reviewer:**	Bob Albon

Arthur Stanley House
Building services review – noise egress (smoke ventilation plant)

Smoke extract and supply plant

A smoke extract and make-up system has been required to be provided for the Arthur Stanley House development. Sandy Brown have been appointed to review the proposals and determine the mitigation measures required for the system.

Criteria

Plant noise limits were previously set out in our report titled '*17177-R01-E Planning noise report'* for all building services plant associated with the development, based on the requirements of Camden Council set out in the *Camden Local Plan Adopted version June 2017* (ie, 10 dB below the background level).

The plant noise limits for the development are reproduced in Table 1.

The limits are presented as facade noise levels.

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

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)
Daytime (07:00-23:00)	37
Night-time (23:00-07:00)	33

The limits set out in Table 1 do not include any attention catching features.

With regard to emergency plant, the *Camden Local Plan Adopted version June 2017* document provides objective criteria in relation to noise egress from emergency plant. The wording from the relevant section is reproduced below.

> '*Emergency equipment such as generators which are only to be used for short periods of time will be required to meet the noise criteria of no more than 10 dB above the background level (L_{90} 15 minutes). During standby periods, emergency equipment will be required to meet the usual criteria for plant and machinery. Conditions to this effect may be imposed in instances where emergency equipment forms part of the application.*'

For noise from emergency plant (ie, smoke extract and supply fans), the plant noise limits given above can therefore be relaxed by 20 dB.

Proposed mechanical building services

The locations of the proposed smoke ventilation plant have been taken from the drawings provided by 21 Construction and are highlighted in red Figure 1 for reference.

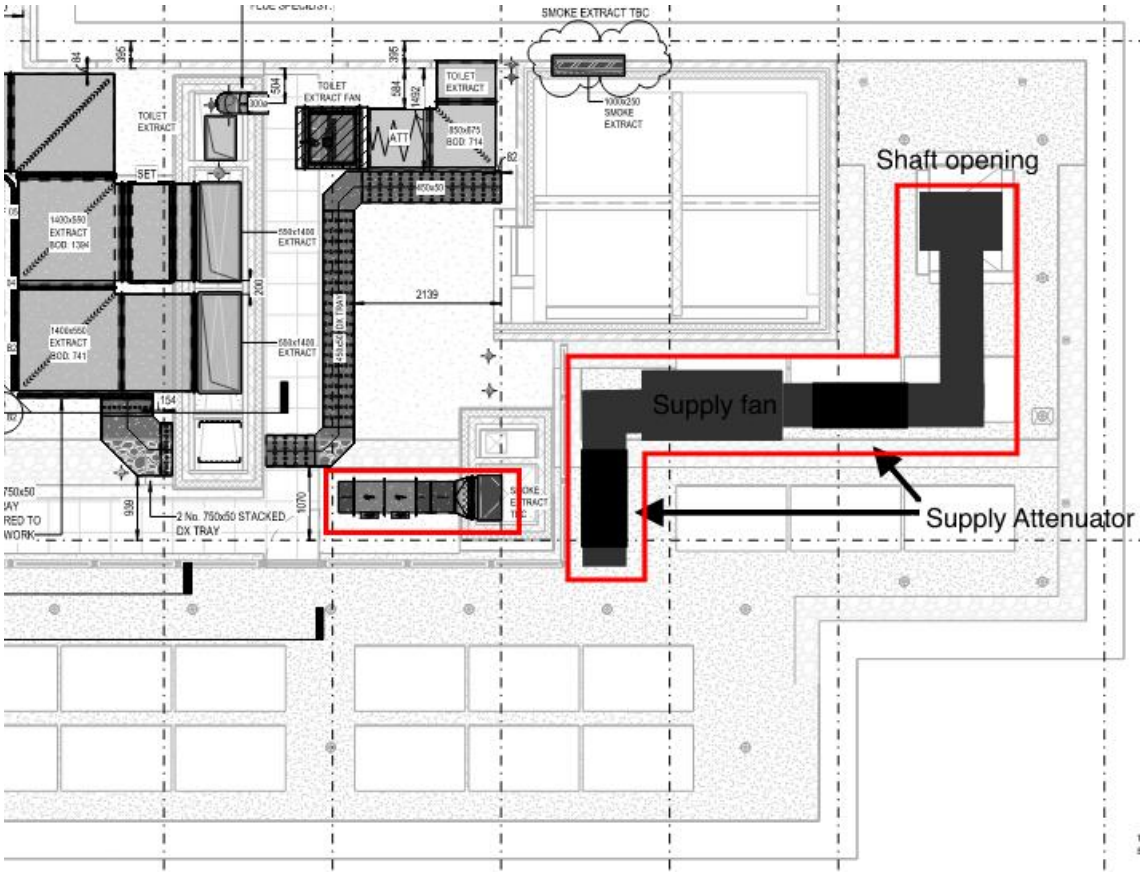

Figure 1 Rooftop plant layout

Manufacturers' noise data for the proposed items of plant has been provided by 21 Construction and is summarised in Table 2.

Table 2 Proposed mechanical building services – manufacturers' octave band noise data (dB)

	Octave band centre frequency (Hz)								
Item	63	125	250	500	1k	2k	4k	8k	dBA
Smoke extract fan – AXT80AZ-66S8+1G									
Open outlet sound power levels (dB)	92	101	96	94	90	87	82	77	96
Breakout sound power levels (dB)	76	81	82	70	62	69	64	52	77
Smoke supply fan – AXT10DG*4EAE+1R									
Open inlet sound power levels (dB)	99	116	110	107	99	91	85	77	96
Breakout sound power levels (dB)	86	97	96	84	72	73	67	53	89

Proposed operational times

21 Construction have confirmed that the smoke extract / supply plant should operate during emergencies only, excluding the following required testing times.

- Internal system testing (fire alarm interfaces and lobby dampers / actuators) – tested weekly
- Complete system testing (including external fans) – tested every 6 months.

21 Construction have indicated that the duration of any testing *'would be to suit the building management team and the function of the building'.*

Furthermore, Sandford Development Management have confirmed that testing would be undertaken from 10:00 on weekdays only.

Receptor location

The worst affected noise sensitive receptor has been identified to be the residential premises at Level 4 of 37 Tottenham Street, highlighted in blue in Figure 2.

37 Tottenham Street is located approximately 14 m south of the site at its closest point, and approximately 18-20 m away from the smoke ventilation fans.

Although residential receptors located to the east of site on Tottenham Mews are located closer to the development, they are located further away from the proposed rooftop plant area. In addition to this, residential receptors on Tottenham Mews benefit from additional screening by the building itself.

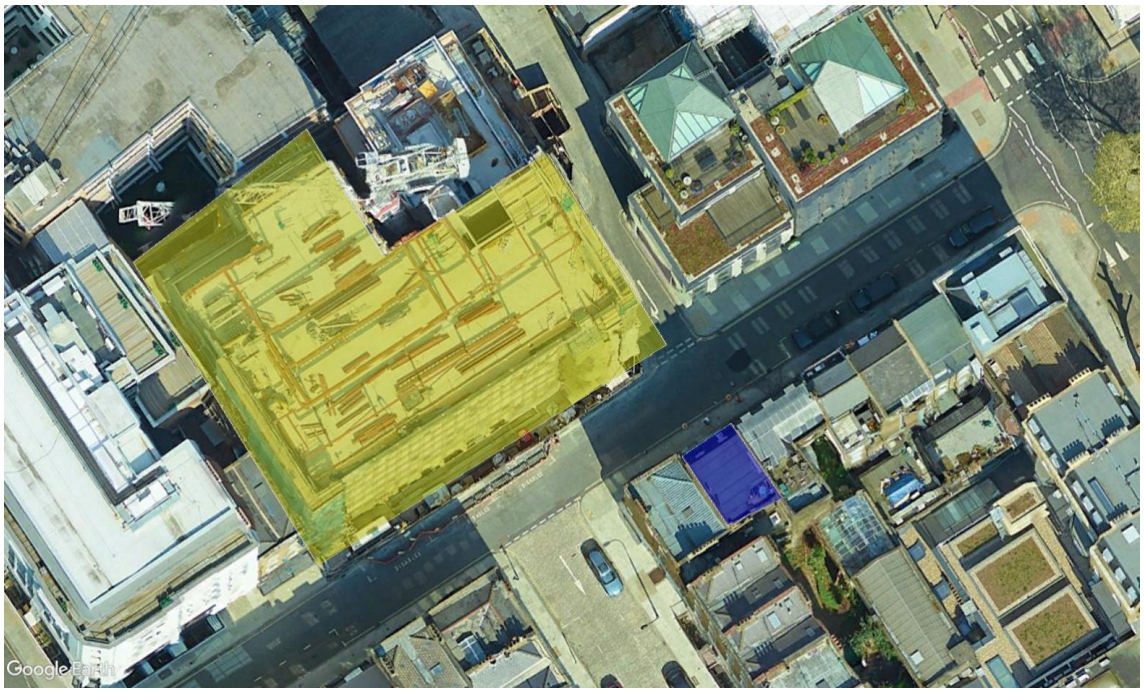

Figure 2 Worst affected noise sensitive receptor

Calculations

Calculations have been undertaken to predict noise levels at the worst affected noise sensitive receptor resulting from the cumulative operation of all new proposed smoke ventilation plant.

Distance attenuation has been based on the geometric spreading of sound power. Barrier attenuation has been determined using Maekawa's method.

Attention is required to both the supply and extract fans to achieve the emergency plant noise limits.

Mitigation guidance

To achieve the plant noise limits outlined in Table 1, in-duct attenuators are required to the outlet of the smoke extract fan and inlet of the smoke supply fan. The minimum octave band insertion losses and maximum regenerated sound power levels (SWLs) for the required attenuators are given in Table 3.

Table 3 Noise mitigation requirements (attenuators) - insertion losses and maximum regenerated SWLs

Item	Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Smoke extract fan – outlet attenuator								
Minimum insertion loss (dB)	4	7	12	19	23	23	18	11
Maximum regenerated SWL (dB)	78	84	74	65	57	56	57	56
Smoke supply fan – inlet attenuator								
Minimum insertion loss (dB)	11	21	25	43	47	44	39	22
Maximum regenerated SWL (dB)	78	85	75	61	59	61	60	55

The above performances can be achieved by attenuators 900 mm – 1500 mm in length. Suitable attenuators are available from IAC (www.iacacoustics.global).

With the provision of attenuators that meet the minimum requirements set out in Table 3 the noise from the smoke extract plant will achieve the emergency plant noise criteria.