SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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11 South End Road, London

Fan relocation impact assessment

Introduction

Sandy Brown Associates LLP (SBA) has been commissioned by Chris Marigold to provide acoustic advice in relation to the proposed extension at 11 South End Road, London, NW3 2PT.

As part of the refurbishment, it is proposed to extend level 1 of the building by adding another storey on top of the existing ground floor. As part of the works, the existing kitchen extract fan on the ground floor roof will be moved onto the new first floor roof.

SBA has undertaken noise measurements upon the roof of 11 South End Road (11 SER).

This memo sets out an assessment that has been carried out in order to determine the potential impact of relocating the fan on the nearest residential premises.

Measurement method

Survey method

On 4 August 2014 SBA visited site to conduct noise measurements of the 11 SER extract fan running in different configurations:

- With extract fan operating at maximum load
- With the extract fan switched off.

In addition to the above, measurements of the extract fan on the adjacent roof of 9 South End Road (9 SER) were also conducted.

All the measurements were conducted over a 30 second period in 1/3 octave bands.

The microphone was positioned approximately 1.5 m above the floor level and at least 1 m from any other reflective surfaces.

Equipment

A Brüel & Kjær type 2250 sound level meter was used to undertake the measurements.

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

Summary of measurement results and observations

A series of noise measurements were conducted on the first floor roof of 11 SER on 4 August 2014. The most dominant noise source was the 9 SER extract fan associated with the neighbouring building. The sound pressure levels recorded during these measurements are summarised in Table 1.

Table 1 Measurement results

Plant item	$L_{Aeq,30sec}$ (dB)
1 m from 11 SER extract fan (11 SER extract fan on, 9 SER extract fan on)	60
1 m from 11 SER extract fan (11 SER extract fan off, 9 SER extract fan on)	56
1 m from 9 SER extract fan (11 SER extract fan off, 9 SER extract fan on)	61

The measurements conducted without the 11 SER extract fan in operation were used to correct for background. As such, the background corrected noise level from the 11 SER extract fan at 1 m was calculated to be 58 dBA.

Assessment

Current scenario

Currently, the nearest noise sensitive window is located at first floor level, approximately 1 m away from the existing 11 SER extract fan. Following the extension works, the nearest sensitive receptor will be the level 2 window of 11 SER located roughly 2.5 m above the extract fan's current location.

Based on the noise measurements conducted, the noise level from the 11 SER extract fan, when assessed at the level 2 window is 50 dBA[1]. The cumulative noise, including noise contribution from the 9 SER extract fan (the dominant noise source in the area) is 53 dBA[2].

[1] 58 – 20*log (2.5/1) = 50 dBA

[2] 50 + (61 – 20*log (4/1)) = 53 dBA

Future scenario

In the future scenario the 11 SER extract fan will be closer to the level 2 window resulting in an increase in noise at that point. The noise level from the 11 SER extract fan is expected to be 58 dBA outside the level 2 window[3]. The noise emission from the 9 SER extract fan will be lower than it currently is due to screening provided by the new structure[4].

Calculations indicate that with the both fans operating, the noise level outside the level 2 window is predicted to be 5 dBA greater than it is at the moment. With the 9 SER fan switched off (operation hours unknown), the future noise levels will increase by 8 dBA compared to the current scenario. As such, the noise level at the worst affected window is expected to be 5 – 8 dB higher than it is now (depending on operation hours of the 9 SER fan). This increase in noise level would typically be considered to be significant and could potentially lead to complaints (dependent on the underlying background noise levels).

It is therefore recommended that steps are taken to reduce the case radiated break-out from the extract fan. Providing a fan jacket around the fan or housing it in a solid enclosure formed of sheet material (minimum density of 10 kg/m^2)[5] should reduce the noise level outside the level 2 window to a similar/lower level than it is now[6].

[3] 58 – 20*log (1/1) = 58 dBA

[4] 61 – 20*log (4/1) – barrier attenuation (path difference 0.486 m) = 36 dBA

[5] Sound insulation expected to be limited at low frequency to around 10 dB

[6] 58 – 10 (expected SRI at 63 Hz) = 48 dBA (actual noise emission expected to be lower)