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82 CAMDEN HIGH STREET

ATTENDED BS4142 NOISE ASSESSMENT

19 FEBRUARY 2021

B1031-AF-00001-01

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REVIEW AND AUTHORISATION			
Authored by Ben Groves	**Position** Senior Consultant	**Signature**	**Date** 16/02/2021
Approved by Adrian Finn	**Position** Director	**Signature**	**Date** 19/02/2021

AMENDMENT HISTORY			
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1. INTRODUCTION

1.1.1 Nathan Abel has appointed AF Acoustics Ltd. to undertake a noise assessment at 82 Camden High Street (The Site) to ascertain whether recently installed mechanical extraction equipment is likely to cause a disturbance at the nearest residential receptor.

1.1.2 In order to assess noise emissions from the plant at The Site an assessment has been carried out in accordance with BS 4142: 2014 “Methods for rating and assessing industrial and commercial sound”.

1.2 Brief

1.2.1 Noise emitted by the extraction equipment is to be measured at a location representative of the nearest noise sensitive receptor. These levels are to be rated in accordance with BS4142:2014 and assessed against the prevailing background sound level. The background sound level will be measured in a location at, or representative of, the nearest noise sensitive receptor and any justification for the measurement locations provided.

2. SITE DESCRIPTION

2.1 Location

2.1.1 The Site is located in the London Borough of Camden, on Camden High Street. The street is predominantly commercial at ground floor level with residential units generally at first-floor level and above. The area to the rear of the property, where the extraction flue is situated, is a small area enclosed on all sides by existing commercial buildings. The apartment above 82 Camden High Street overlooks this area.

2.1.2 The noise climate to the rear of The Site is dominated by existing mechanical extraction and air conditioning equipment serving the surrounding commercial units, along with occasional road traffic noise emanating from Camden High Street. Figure 2.1, below shows the location of The Site, the units under assessment, and the nearest residential receptor location.

2.1.3 The nearest residential receptor is approximately 5 meters to the west of the extraction flue.

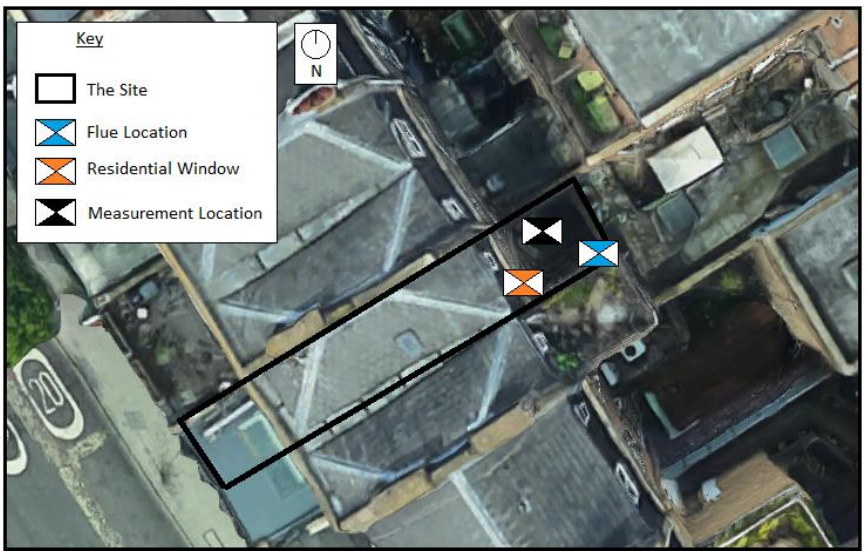

FIGURE 2.1: LOCATION MAP

3. GUIDANCE

3.1 British Standard 4142:2014

3.1.1 BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' describes methods for rating and assessing sound from "fixed installations which comprise mechanical and electrical plant and equipment", amongst other sources of noise.

3.1.2 The methodology contained within BS 4142:2014 uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

3.1.3 A summary of the approach set out within BS 4142:2014 is set out below:

- establish the specific sound level of the source(s);
- measure the representative background sound level, typically by measurement close to the receptor location;
- rate the specific sound level to account for any distinguishing characteristics;
- estimate the impact by subtracting the background sound level from the rating level; and
- consider the initial estimate of impact, in the context of the noise and its environment.

3.1.4 An initial estimate of the impact of the specific sound is obtained by subtracting the background sound level from the rating level. Using this approach, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of impact
A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context
The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

3.1.5 Certain acoustic features can increase the significance of the impact over that expected from a basic comparison between specific sound level and the background sound level. These features include tonality and impulsivity, as well as additional characteristics and intermittency of the sound.

3.1.6 If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor.

3.1.7 The specific sound level is rated to account for distinguishing characteristics by using the penalties below:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible

3.1.8 Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor.

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible

3.1.9 For noise which is equally both impulsive and tonal, then both features can be taken into account by linearly summing the corrections for both characteristics.

3.1.10 If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.If a subjective assessment is not appropriate then an objective assessment can be made. A noise source is deemed to be tonal if the time averaged sound pressure level in a one-third octave band exceeds the level in adjacent one-third octave bands by the level differences given below:

- 15 dB in the low frequency one-third octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency one-third octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency one-third octave bands (500 Hz to 10000 Hz)

3.1.11 If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.

3.2 Camden Local Plan - Policy A4 Noise and vibration

3.2.1 The Camden Local plan seeks to ensure that noise and vibration is controlled and managed. Noise and Vibration thresholds are provided, appended to the local plan documentation. The noise limits relating to industrial and commercial noise sources are reproduced below in Table 3.1.

3.2.2 The Local plan states that planning permission will not be granted for A) development likely to generate unacceptable noise and vibration impacts; or B) development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.

3.2.3 It is also stated that Camden will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB below background	Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings	Outside bedroom window (façade)	Night	Rating level' 10dB below background and no events exceeding 57 dB L_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57 dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88 dB L_{Amax}

TABLE 3.1: CAMDEN LOCAL PLAN INDUSTRIAL AND COMMERCIAL NOISE THRESHOLDS

4. NOISE SURVEY AND MEASUREMENTS

4.1 Attended Noise Survey

4.1.1 An attended noise survey was undertaken by Ben Groves of AF Acoustics.

4.1.2 The duration of the attended survey at the property was between 12:45 and 15:00 on Friday 12 February 2021.

4.1.3 Noise measurements were completed in the open space to the rear of The Site. The sound level meter was located on a roof top ledge in order to position the microphone approximately 1 meter from the nearest noise sensitive window. Both ambient and residual measurements have been completed at this location. Images of the noise source under assessment, the nearest residential window, and the measurement location, can all be seen in Figure A1 of Appendix A.

4.1.4 1-hour residual and background sound measurements were completed before the extraction equipment under assessment was set to normal operating duty. Measurements were then completed for a cumulative period of 1 hour. Specific noise levels have been calculated at the measurement location to establish the resulting specific noise level at the nearest residential receptor, in this case, the neighbouring residential property.

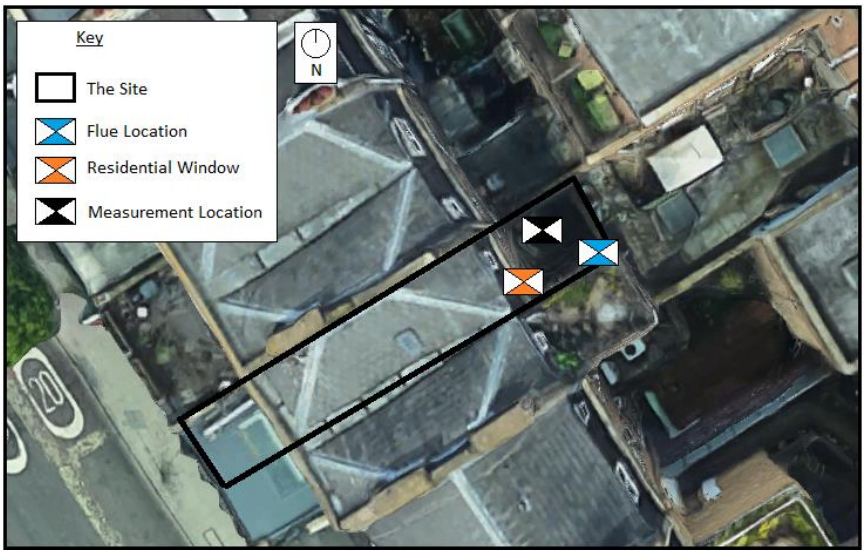

FIGURE 4.1: MEASUREMENT LOCATION

4.1.5 The background sound level was measured at approximately 1 meter from the residential window while the extraction equipment was not in operation.

4.1.6 The sound level meter had calibration checks before and after the measurement surveys to generate a calibration level of 114 dB at 1 kHz. The equipment calibration was verified before and after the survey and no significant calibration drift was observed (<0.5dB). The microphone was fitted with a windshield.

4.1.7 The equipment used is shown in Table 4.1.

Instrument	Name	Serial Number	Last Calibrated
Sound Level Meter	Norsonic 140	1403346	06/04/2020
Microphone	Norsonic 1225	98354	06/04/2020
Preamplifier	Norsonic 1209	12911	06/04/2020
Acoustic Calibrator	Landtek ND-9	N875901	27/05/2020

TABLE 4.1: MEASUREMENT EQUIPMENT

4.2 Measurement Weather Conditions

4.2.1 The weather during the measurements was dry and clear. Conditions were such that the results of the survey would not be adversely affected.

4.3 Results – Kitchen Extraction Equipment

4.3.1 Based on the attended noise survey a BS4142 noise assessment has been undertaken.

4.3.2 Figure A1 of Appendix A shows the location of the flue that is connected to the kitchen extract fan. When running at normal operating duty the extraction fan was barely audible above the existing equipment located to the rear of the commercial premises.

4.3.3 It is understood that air handling equipment serving the units at, and to the rear of, The Property is generally in operation during daytime hours. The extraction flue will also be operational only during daytime hours i.e. 07:00 – 23:00.

4.3.4 As per BS4142, no penalty rating has been applied to the specific noise level. The sound from one unit was audible faintly at the measurement location but was broadband in nature and was not distinctive over the existing acoustic environment.

4.3.5 The assessment and the results are detailed in Table 4.2.

Results		Commentary
Measured ambient sound level	$L_{Aeq,T}$ = 69.3 dB	Extraction fans on
Residual sound level	$L_{Aeq,T}$ = 68.9 dB	Specific sound not active to determine the correction to be made to the measured ambient sound level
Background sound level	$L_{A90,T}$ = 67 dB	Measured when all extraction equipment was off; at the assessment location.
The assessment made during the daytime, so the reference time interval is 1h		
Specific sound level	$L_{Aeq,(60min)}$ = 58.7 dB	
Acoustic feature correction	0 dB	No audible acoustic features
Rating level	58.7 dB	
Background sound level	$L_{A90,T}$ = 67 dB	
Excess of rating level over background sound level	(58.7 – 67) = -8.3 dB	
As the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.		
Uncertainty of the assessment		Residual and ambient sound levels were measured at the assessment location during normal operating conditions. As such the assessment uncertainty is expected to be low.

TABLE 4.2: BS4142 ASSESSMENT – EXTRACTION FLUE

5. DISCUSSION

5.1.1 Noise emission from the extraction flue was calculated to be 8.3 dB below the prevailing background sound level. In accordance with the Camden Local plan, levels that are between 9 dB below, and 5 dB above the background sound level range from the lowest observable adverse effect level (LOAEL) to a significant observable adverse effect level (SOAEL). Given the result is at the lower end of this range, it is considered reasonable that this level be considered as the lowest observable adverse effect level.

5.1.2 Due to the operating periods of the installed extraction equipment, and the acoustic character of the existing environment, it is not expected that the operation of the equipment under assessment will cause a significant adverse effect. Based on a subjective assessment, sound from the flue was not distinctive above the prevailing sound from various other extraction and air handling equipment already in operation.

6. CONCLUSION

6.1.1 Nathan Abel has appointed AF Acoustics Ltd. to undertake a noise assessment at 82 Camden High Street to ascertain whether recently installed mechanical extraction equipment is likely to cause a disturbance at the nearest residential receptor.

6.1.2 To assess noise emissions from the installed equipment an assessment has been carried out in accordance with BS 4142: 2014 “Methods for rating and assessing industrial and commercial sound”. The assessment results have been compared with the guidance provided within BS4142 and have been discussed in the context of Camden’s Local Plan.

6.1.3 1-hour residual and background sound measurements were completed at the assessment location before extraction equipment was set to normal operating duty. Measurements were then completed for an additional period of 1-hour. The specific sound was established at the assessment location and then compared to the measured prevailing background sound level. Specific sound levels were found to be 8.3 dB below the prevailing background sound level.

6.1.4 No acoustical features were audible at the assessment location so no additional correction to the calculated specific sound level was required.

6.1.5 It was shown that in accordance with BS4142 the operation of extraction equipment is expected to result in a low impact on neighbouring residential properties.

6.1.6 Using the guidance provided within the Camden Local Plan, while marginally above the no observable adverse effect level, the results of the assessment fall below those expected to cause a significant adverse effect.

6.1.7 Based on the use of an assessment location at the nearest residential property, the prevailing acoustic character of the area, and the hours of operation i.e. no use during night time hours, it is concluded that the uncertainty of the assessment is low.

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APPENDIX A: FIGURES

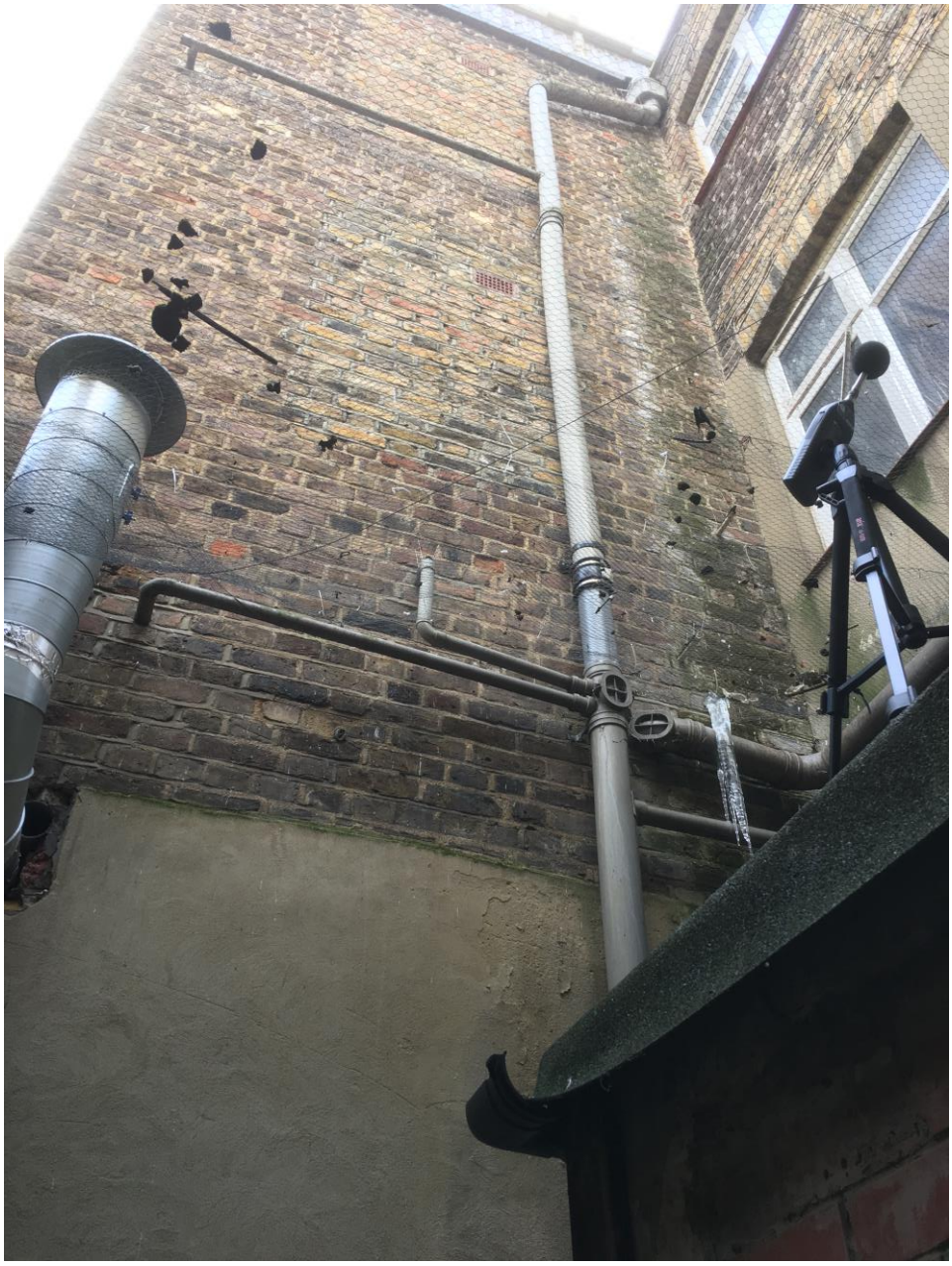

FIGURE A1: EXTRACTION FLUE, RESIDENTIAL WINDOW AND MEASUREMENT LOCATION

APPENDIX B: TERMINOLOGY RELATING TO NOISE

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20_{μ}Pa ($20x10^{-6}$ Pascals) on a decibel scale.
Sound Power Level (Lw)	is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by 20 $\log_{10}$ (s_1 / s_2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20_{μ}Pa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
$L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound
$L_{90,T}$	L_{90} is the noise level exceeded for 90% of the period T (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
Specific Noise	The noise source under investigation for assessing the likelihood of complaints.
Rating Level	The specific noise level plus any adjustment for the characteristic features of the noise.
Free field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.

APPENDIX C: LIMITATIONS TO THE REPORT

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