SHARPS REDMORE

ACOUSTIC CONSULTANTS

Report

21 – 22 Chalk Farm Road, Camden, London, NW1 8AG

Environmental Noise Report

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Appendices

1.0 Introduction

1.1 Sharps Redmore have been instructed to undertake a noise assessment for a new kitchen extract system at 21 – 22 Chalk Farm Road, Camden.

1.2 Planning permission has been granted for change of use of the basement and ground floor from Class A1 to Class A3. Trading hours are restricted to between 0900 – 2400 hours Monday to Saturday and 0900 – 2300 on Sundays and Bank Holidays. To facilitate the A3 use it is proposed to install a ventilation extract system which will be ducted up the rear façade of the building.

1.3 The objective of this report is to determine the noise impact from the installation of the ventilation extract system on the existing residential properties which are located at first floor and second floor level above the proposed A3 use.

1.4 In determining the noise impact SR have considered the existing background noise levels along with national and local planning policy objectives.

1.5 Section 2.0 contains a discussion of the available methods of assessment and assessment criteria.

1.6 Section 3.0 of this report contains details of the environmental noise survey.

1.7 An assessment of the impact from the proposed ventilation system based on manufacturer's data and drawings is included in Section 4.0.

1.8 A guide to the acoustic terminology used within the report is included in Appendix A.

2.0 Assessment Methodology and Criteria

National Policy

3.1 The National Planning Policy Framework (NPPF), March 2012, sets out the Government's planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 123 of the NPPF state the following:

"Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

2.2 Guidance on the interpretation of the policy aims contained within the NPPF is contained within National Planning Policy Guidance (NPPG). The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

Table 2.1: Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.3 The NPPF and NPPG reinforce the March 2010 DEFRA publication, "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

2.4 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"… all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

Local Policy

2.5 With regard to local policy, consideration is given to the London Borough of Camden Core Strategy. In terms of noise Policy DP28 'Noise and Vibration' states the following:

"The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:

a) development likely to generate noise pollution; or

b) development sensitive to noise in locations with noise pollution unless appropriate attenuation measures are provided."

In relation to plant or machinery, Policy DP 28 continues as follows:

"The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed out noise threshold."

Details of the thresholds for planning permission will not be granted are shown below.

2.6 Taking an overview of National Policy it is clear that when considering the impact of noise one must consider the significance of any impact. The presence of an adverse impact in itself is not sufficient to refuse permission.

2.7 It is possible to apply objective standards to the assessment of noise and the effect produced by the introduction of a certain noise source may be determined by several methods, as follows:

i. The effect may be determined by reference to guideline noise values. British Standard (BS) 8233:1999 and World Health Organisation "Guidelines for Community Noise" contain such guidelines.

ii. Alternatively, the impact may be determined by considering the change in noise level that would result from the proposal, in an appropriate noise index for the characteristic of the noise in question. There are various criteria linking change in noise level to effect. This is the method that is suited to, for example, the assessment of noise from road traffic because it is capable of displaying impact to all properties adjacent to a road link irrespective of their distance from the road.

iii. Another method is to compare the resultant noise level against the background noise level (L_{A90}) of the area. This is the method employed by BS 4142:1997 to determine the likelihood of complaint from noise of an industrial or industrial type nature. It is best suited to the assessment of steady or pseudo-steady noise and is commonly used for the assessment of mechanical plant. The use of this standard is considered appropriate in this case.

BS 4142:2014

2.8 This BS described a method for rating and assessing sound of industrial and/or commercial nature according to the following summary process:

i) Determine the background sound levels, in terms of $L_{A90,}$ at the receptor locations of interest.

ii) Determine the specific sound level of the source being assessed, in terms of L_{AeqT} level (T = 1 hour for day or 15 minutes at night), at the receptor locations.

iii) Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent or other characteristic which attract attention.

iv) Compare the rating sound level against the background noise level; the greater the difference between the two, the higher the likelihood of complaints of the noise.

i) Differences (rating – background) of around +10 dB is likely to be an indication of significant adverse impact (SOAEL) depending on context; a difference of +5 dB is likely to be an indication of adverse impact, depending on context. 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 upon context.

2.9 The general intent of the planning system is to ensure that a development does not result in 'significant adverse impacts on health and quality of life' (NPPF para 123). BS 4142:2014 considers that the threshold of 'significant adverse impact' is likely to be around 10 dB or more… depending on upon the context.

2.10 As can been seen above the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound exceeds the background sound level and the context in which it is placed.

2.11 As discussed in paragraph 2.5 above, Camden Council's development policy DP28 contains thresholds for plant and machinery at which planning permission will not be granted. These thresholds are based on the requirements of the previous version of BS 4142:1997 which assessed the 'likelihood of complaint' rather than the significance of impact. The noise thresholds contained within Camden Council's development policy DP 28 are shown below:

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dB$L_{Aeq'}$

Table 2.2 – Extract from Camden Development Policy DP 28

3.0 Survey Details

3.1 A series of noise measurements were taken at location at the rear of 21 – 22 Chalk Farm Road as shown in Fig 1 below. The measurements were taken externally at first floor level and selected to be representative of the nearest existing residential properties to the proposed kitchen extract.

Fig 1: Monitoring Locations

3.2 Noise measurements were taken continuously from 1345 hrs on Friday 23rd January 2015 to 1300 hours on Monday 26th January 2015. The measurement period was chosen to include both a weekday and weekend. Weather conditions during the survey were cold and dry with slight winds (<5m/second) and satisfied the requirements of BS 4142:1997.

3.3 The measurements were taken using a Norsonic 118 sound level meters fitted with an environmental microphone kit. The sound level meter was calibrated at the start and end of the survey and no variation in level noted. The sound level measurements were set up to continuously store 15 minute samples over the duration of the survey. All measurements were taken in free field conditions.

3.4 The steady noise level dB $L_{Aeq(5min),}$ non-steady noise level dB L_{Amax} and background noise levels dB, $L_{A90(5min)}$ were recorded during the survey. Table 3.1 below is a summary of the noise results recorded. Full details of the survey are shown in Appendix B.

Table 3.1 Summary of survey results

	Evening (1900-2300hours)		Night time (2300 –2400 hours)	
	$L_{Aeq15mins}$	$L_{A90,15min}$	$L_{Aeq15min}$	$L_{A90,15min}$
23.1.15	57 – 64 dB	54 -55 dB	55 – 62 dB	51 – 55 dB
24.1.15	57 – 61 dB	54 – 55 dB	53 – 58 dB	49 – 55 dB
25.1.15	51 – 60 dB	46 – 55 dB	50 – 52 dB	45 – 47 dB

3.5 Up to 2300 hours the existing noise climate is dominated by noise from the extract system which serves the Silks and Spice Yum Cha restaurant at 28 Chalk Farm Road. After the restaurant closes noise levels are dominated by road traffic and general street activity on Chalk Farm Road.

3.6 Based on survey data measured up to 2400 hrs on Friday and Saturday and 2300 hours on Sunday the typical background noise level for the purposes of the assessment is considered to be 51 dB $L_{A90,15mins}$. Therefore in line with the guidance contained within Camden Council Development Policy DP 28 the rating noise level (the specific noise plus any correction for character as defined in Table E of Camden Council DP28) should not exceed 46 dB.

4.0 Noise Assessment

4.1 The proposed system will be fitted with an AR SILEO 500E4 Axial Fan which will be housed internally within the building. For the purposes of the assessment it has been assumed that the fan will be isolated from the rest of the ductwork and building by means of anti-vibration mounts. The ductwork will ventilate above ridge height of the building and the main noise source affecting the residential buildings will be noise break out through the ductwork.

4.2 Based on manufacturers data the Sound Power Level on the outlet of the fan during typical operation will be as follows:

Frequency Hz						
63	125	250	500	1k	2k	4k
64	71	57	54	58	54	44

4.3 Using the data the noise break out from the ductwork at the nearest noise sensitive properties has been calculated as 43 dB L_{AeqT}. Full details of the calculation are shown in Appendix C to this report.

4.4 Table E requires that where the noise has a discrete continuous note (whine, hiss, screech, hum) then a +5 dB character correction should apply. Based on our experience and taking into account the manufacturers noise data this type of equipment tends to be bland in nature and does not contain any distinguishable tones which would mean the application of a character correction.

4.5 The predicted noise level from the operation of the kitchen extract at 21-22 Chalk Farm Road, in line with the current trading hours, will be 8 dB below the existing background noise levels measured during the noise survey. This level is within the threshold limits as defined within Camden Council's Development Policy DP28 and significantly below the 'low impact' criteria as defined in BS 4142:2014.

4.6 Therefore if granted the proposed development will not compromise the Government's noise policy vision, as stated in the NPPF and NPSE.

APPENDIX A

ACOUSTIC TERMINOLOGY

Acoustic Terminology

A1 Noise, defined as unwanted sound, is measured in units of decibels, dB. The range of audible sounds is from 0 dB to 140 dB. Two equal sources of sound, if added together will result in an increase in level of 3 dB, i.e. 50 dB + 50 dB = 53 dB. Increases in continuous sound are perceived in the following manner:

1 dB increase - barely perceptible

3 dB increase - just noticeable

10 dB increase - perceived as twice as loud

A2 Frequency (or pitch) of sound is measured in units of Hertz. 1 Hertz (Hz) = 1 cycle/second. The range of frequencies audible to the human ear is around 20Hz to 18000Hz (or 18kHz). The capability of a person to hear higher frequencies will reduce with age. The ear is more sensitive to medium frequency than high or low frequencies.

A3 To take account of the varying sensitivity of people to different frequencies a weighting scale has been universally adopted called "A-weighting". The measuring equipment has the ability automatically to weight (or filter) a sound to this A scale so that the sound level it measures best correlates to the subjective response of a person. The unit of measurement thus becomes dBA (decibel, A-weighted).

A4 The second important characteristic of sound is amplitude or level. Two units are used to express level, a) sound power level - L_w and b) sound pressure level - L_p. Sound power level is an inherent property of a source whilst sound pressure level is dependent on surroundings/distance/directivity, etc. The sound level that is measured on a meter is the sound pressure level, L_p.

A5 External sound levels are rarely steady but rise or fall in response to the activity in the area - cars, voices, planes, birdsong, etc. A person's subjective response to different noises has been found to vary dependent on the type and temporal distribution of a particular type of noise. A set of statistical indices have been developed for the subjective response to these different noise sources.

A6 The main noise indices in use in the UK are:

L_{A90}: The sound level (in dBA) exceeded for 90% of the time. This level gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background sound level" of an area.

L_{Aeq}: The equivalent continuous sound level in dBA. This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the intermittent noise". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as aircraft and trains.

L_{A10}: The sound level (in dBA) exceeded for 10% of the time. This level gives an indication of the sound level during the noisier periods of time in any given sample. It has been used over many years to measure and assess road traffic noise.

L_{AMAX} The maximum level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

A7 The sound energy of a transient event may be described by a term SEL - Sound Exposure Level. This is the L_{Aeq} level normalised to one second. That is the constant level in dBA which lasting for one second has the same amount of acoustic energy as a given A weighted noise event lasting for a period of time. The use of this unit allows the prediction of the L_{Aeq} level over any period and for any number of events using the equation;

$$L_{AeqT} = SEL + 10 \log n - 10 \log T \text{ dB}.$$

Where

n = Number of events in time period T.

T = Total sample period in seconds.

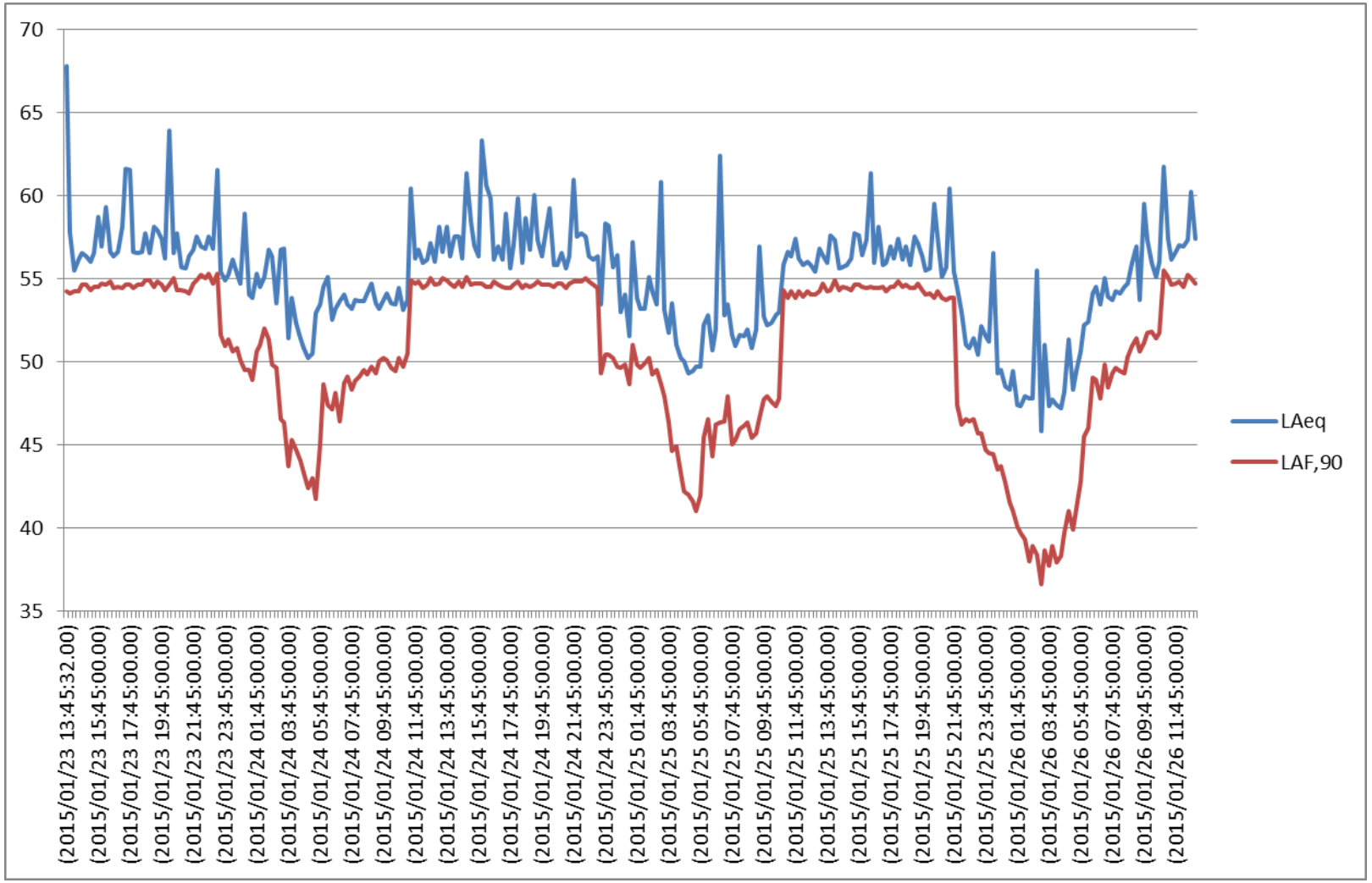
A8 In the open, known as free field, sound attenuates at a rate of 6 dB per each doubling of distance. This is known as geometric spreading or sometimes referred to as the Inverse Square Law. As noise is measured on a Logarithmic scale, this attenuation in distance = 20 Log (ratio of distances), e.g. for a noise level of 60 dB at ten metres, the corresponding level at 160 metres is:

$$60 - 20 \text{ Log } {}^{160}/_{10} = 60 - 24 = 36 \text{ dB}.$$

APPENDIX B

SURVEY RESULTS

Appendix B - Survey Results



APPENDIX C

CALCULATIONS

Appendix C – Noise breakout calculations

Noise breakout from cylindrical ductwork

Instructions:
1. Copy appropriate transmission loss from tables on right
2. Enter data in cells with bold border

Reference/title	121-122 Chalk Farm Road, Camden
Diameter (mm)	500
Length of ducting (m)	3.0

		Octave band centre frequency (Hz)						
		63	125	250	500	1k	2k	4k
Enter Lw_{in}		64	71	57	54	58	54	44
+10 log(S/A)		14	14	14	14	14	14	14
Enter '-TL_{out}		45	50	26	26	25	22	36
=Lw_{out}		33	35	45	42	47	46	22
Sound reduction		31	36	12	12	11	8	22

Breakout Calculation									
Lw_{out}		33	35	45	42	47	46	22	
Distance listener (m)	1	-11	-11	-11	-11	-11	-11	-11	
Directivity	1	3	3	3	3	3	3	3	
Direct Lp		**25**	**27**	**37**	**34**	**39**	**38**	**14**	
Awgt		-25.5	-16	-8.5	-3	0	1	1	
Resultant Level		**-0.5**	**11.5**	**28.5**	**31**	**39**	**39**	**15**	**42.5**

thk	**Long seamed ducts TL_{out}**			Octave band centre frequency (Hz)						
mm	Diameter	Length (m)	Gage	63	125	250	500	1k	2k	4k
0.6	205	4.6	26	45	53	55	52	44	35	34
0.8	355	4.6	24	50	60	54	36	34	31	25
0.9	560	4.6	22	47	53	37	33	33	27	25
0.9	815	4.6	22	51	46	26	26	24	22	38

thk	**Spiral wound ducts TL_{out}**			Octave band centre frequency (Hz)						
mm	Diameter	Length (m)	Gage	63	125	250	500	1k	2k	4k
0.6	205	3	26	48	64	75	72	56	56	46
0.6	355	3	26	43	53	55	33	34	35	25
0.8	660	3	24	45	50	26	26	25	22	36
1.6	660	3	16	48	53	36	32	32	28	41
0.9	815	3	22	43	42	28	25	26	24	40