NOISE ASSESSMENT REPORT

Report Ref: 0116CAMDEN

Client: Joanna Marks

Site Location: 117A Kentish Town Road

Camden, London NW1 8PB

Date of Issue: 22nd February 2016

Date of Assessment: 19th February 2016

Summary

The specific noise of 39dBA is below the background level of 46.2dB(A) by -7dB. Assuming a permitted specific noise level of 5dB(A), the predicted specific noise allows for a noise characteristic correction of up to +12dB should one be found to be present once the fan is installed.

The break out noise of 40dB(A) is below the background level of 46dB(A) by -6dB allowing for upto a +11dB correction for any noise characteristic should one be found to be present.

Source under Investigation

The client proposes to convert the ground floor of the existing site known as 117A Kentish Town Road, into a restaurant/take away.

The source of noise under investigation is a Gigabox centrifugal commercial extraction fan model GBD 500/4/4

Proposed Measures to Reduce Noise & Vibration

The fan will be installed using anti vibration mount to reduce vibrations from the fans operation. An acoustic silencer model CP03-C*P-0500-2D will be used to reduce the noise at the fan outlet.

Source Noise Level Outside at the Fan Extract

Frequency Hz	**125**	**250**	**500**	**1K**	**2K**	**4k**	**8K**
LW(A)@ Fan Extract	61	73	74	74	73	69	60
Frequency Wavelength	2.72	1.36	0.68	0.34	0.17	0.085	0.0425
Attenuation							

9m of Straight duct	0.9	0.9	0.9	0.9	0.9	0.9	0.9
x3 round duct bends	6	9	9	9	9	9	9
CP03-C*P0500-20 Silencer	10	16	26	29	29	29	20
Total Attenuation	**16.9**	**25.9**	**35.9**	**38.9**	**38.9**	**38.9**	**29.9**
New Extractor LW(A)	44.1	47.1	38.1	35.1	34.1	30.1	30.1

Total LW(A) at outside duct extract **49.6 Lw(A)**

Table1: Attenuation calculation:

The calculations for the attenuation from the straight steel ducting and round bends is based on guideline data from Table 6.1 and 6.5 of CIBSE 2002 and is based on a sheet metal duct. The post installation attenuation from the ducting and accompanying bends is partly dependent on the skill of workmanship employed and the smoothness of the ducting. The planning applicant and/or restaurant operator warrant that smooth sheet metal ducting will be used and the workmanship will be completed to a professional standard in the fitting of the fan, silencer and ducting.

Please note for the purposes of calculating the length of straight duct 9m has been used, it being the vertical length from the bottom to the top of the ducting.

Table 1 above shows the noise output of the fan under the column name, “Lw(A) @ Fan Extract.” The fan is to be installed inside the building at the kitchen area, at an approximate distance of 10m from the end of the outside duct end. The extract end of the ducting is to terminate outside the building at 1m above the roof height of the building. The total attenuation achieved from the ducting and silencer will reduce the total sound power of the fan at the out side extract point from Lw(A) 80dB to 50dB.

The noise level at the end of the ducting outside, 1m from the noise sensitive wall, assuming free field spreading will be 39dB(A);

$$SPL = Lw - 20\log(r) - 11$$
$$SPL = 50 - 20\log(1) - 11$$
$$SPL = 39dB(A)$$

Duct Break Out Noise

The break out sound power is 65Lw(A) this will be attenuated by the ducting length and the bends in the ducting. It follows that the maximum attenuation will be achieved at the end of the ducting outside and the least attenuation will be at the location of the fan inside the building. Table 2 shows the attenuation of the break out noise by the silencer only and does not include attenuation from the ducting.

Break Out

Frequency Hz	125	250	500	1K	2K	4K	8K
Break Out	59	62	57	56	47	41	33
CP03-C*P0500-20	10	16	26	29	29	29	20

Silencer							
Attenuated Break Out	49	46	31	27	18	12	13
Total Lw(A)	50.8						

Table 2: Attenuated break out noise.

The attenuated break out noise is 40dB from the fan to the end of the ducting outside. This below the L_{90} background level of 46dB(A) discussed below.

$$SPL = Lw - 20\log(r) - 11$$
$$SPL = 51 - 20\log(1) - 11$$
$$SPL = 40dB(A)$$

Background & Residual Noise Level

The noise level was measured on Friday the 19th February 2016. The measurements were taken in two parts. The results were then combined to produce a single L_{Aeq} and the lowest L_{90} was selected for use in this report. The measurements were in two parts because of the need to change batteries in the sound level meter.

Direct Measurements

The restaurant will be open from 07:00 – 23:00 hours only. This is the reason why a 24hour measurement was not taken.

Time of Measurement 07:00 – 15.45 (8 hours and 45min)

$L_{Aeq\ (8hours\ 45min)}$ 52.8 dB $L_{90\ (8\ hours\ 45min)}$ = 46.2 dBA

Time of Measurement 15.50 – 22:57 (7 hours and 7min)

$L_{Aeq\ (7hours\ 7min)}$ 52.4 dB $L_{90\ (7\ hours\ 7min)}$ = 47.7 dBA

The measurements were combined using the following equation;

$$LAeq(16hour) = 10\log\left(\frac{8.45\times10^{5.28} + 7.07\times10^{5.24}}{16}\right)$$
$$LAeq(16hour) = 52.5dB$$

The equivalent 16 hour L_{90} is a statistical measurement so technically cannot be averaged in the same way that the $L_{Aeq(16\ hour)}$ can. In this instance the lowest figure has been adopted for the avoidance of doubt and that is an L_{90} of 46.2dB(A) taken from the early morning reading.

Premises Description

The property is mid terrace building. The building is made up of 3 floors including the ground floor. It is to be comprised of the proposed restaurant on the ground floor and the rest of the floors are used for unknown purposes.

Material to this assessment is the location of the duct extract outlet which is to be positioned 1m above the roof height.

Hours of Operation

The restaurant will be open Monday – Saturday 7AM –11PM.

Receptor Sensitivity

There are residential properties nearby although the distance of the nearest dwelling has not been determined.

Mode of Operation.

The fan is assumed to be in operation continuously during the opening hours.

Noise Characteristics

Irregular: Not Known although the fan is assumed to run continuously.

Impulsive: Not known

Tonal: It is assumed subjectively that there will be a tone produced by the spinning of the fan blades. A +6dB correction is expected and this would bring the rating level to 45dB(A) and a difference over the background level of 0dB(A).

Measurement Location

The measurements were taken at the rear of 117A Kentish Town Road at a distance of 2.6m from the nearest reflective surface. The levels recorded at this location are deemed to be similar to those at the proposed ventilation outlet.

Figure 1: Measuring location. The area marked by a red circle is the measuring position where the sound level meter took measurements. This was from the rear of 117A Kentish Town Road. This site plan has been purchased for the purpose of this report from www.buyaplan.co.uk 23/2/2016 at 09:35. A full PDF site plan is included with this report.

General Noise Sources

The residual noise included some infrequent road traffic noise and railway noise from a nearby underground route. An air conditioning unit positioned at the rear of the neighboring 119 Kentish Town Road contributed to the ambient noise levels.

Measuring Equipment & Calibration

The sound level meter used is a class 1 meter laboratory calibrated traceable to UKAS standards. On the day the meter was calibrated with an acoustic calibrator before and after the measurements with negligible deviation (≤0.2dB). Calibration was verified at 93.9dB @ 1 KHz at the start of the day time measurements and 94.1dB at the battery change over. Calibration was then verified at 93.9dB after the batteries had been changed in the SLM and a final calibration was performed after the last measurement with a reading of 93.9dB. The reference level is 94dB produced by the acoustic calibrator at 1kHz.

Weather Conditions

A wind shield was used on the sound level meter during all measurements.

The maximum wind speed measured was 1.3 m/s and the direction was not discernable during the period of the measurements. Cloud cover was subjectively assessed as 70%. There was light precipitation from 16:00 hours and this was infrequent.

- The temperature was 3.3 ºC at 07:00 at the start of the daytime measurements.
- The temperature was 8.9 ºC at 23:00 at the end of the day time measurements.

The weather conditions were suitable for the taking of measurements.

Date and Time of Measurements

The measurements were taken between 07:00 and 23:00 on 19th of February 2016.

Measurement Process

The restaurant is not operational as of the date of this report. There could be no measurement of the ambient noise.

The residual noise was measured at the rear of the property being closest to the noise sensitive wall and because the extract ducting terminates 1m from the roof height at the rear of the building.

A wind shield was used during all measurements and a tripod was used to keep the meter 1.4m above ground and to reduce human interference. The nearest reflective surface was 2.6m from the sound level meter and it is assessed to not have adversely affected the measurements.

A Noise Rating based on 16hour Measurement

$$L_s = 10\log\left(10^{\frac{L_a}{10}} - 10^{\frac{L_r}{10}}\right)$$

L_a = ambient sound level (all noise including the specific noise) = None available because the restaurant is not operational.

L_s = specific sound level = 39dBA at 1m from the noise sensitive wall.

L_r = residual sound level = $L_{Aeq\ (16\ hour)}$ 52.5 dBA

Background sound level = $L_{A90(16\ hour)}$ 46.2 dBA

Results		Commentary
Measured ambient sound level	N/A	The restaurant is to date not operational
Residual Sound Level	$L_{Aeq,\ (16\ hour)}$ = 53 dBA	Measured when the extractor fan is not in use.
Background sound level	$L_{A90(16\ hour)}$ = 42dBA	Measured in the absence of the specific noise
Assessment made during day time, reference time interval is 16 hour.		
Specific sound level	$L_{Aeq(60\ min)}$ 39dB(A)	$L_s = 10\log\left(10^{\frac{L_a}{10}} - 10^{\frac{L_r}{10}}\right)$
Acoustic feature correction	6dB	Subjectivel assessed tonal component from the spinning of the extractor blades just detectable at the outlet.
Rating Level (specific level plus correction for noise characteristics)	45 dB(A)	
Excess of rating over background level	45 – 46 = -1dB	
This indicates a low likelihood of an adverse impact.		
Uncertainty of the assessment		Instrument uncertainty is estimated at ± 0.3dB

Uncertainty

The noise levels were obtained by direct onsite measurements. The sound level meter was fitted with a wind shield and maintained on a tripod through out the measurement period. Once readings were started, the sound level meter was free from human interference. This was done to minimize uncertainty in the readings. In addition, the readings were taken during suitable weather conditions. Each measurement was conducted for a duration sufficient to provide a representation of the noise during operation of the restaurant.

No account has been made for changing traffic intensity, frequency or configuration. Traffic patterns change on a regular basis. No account has been made for noise from fridges, fryers or the pizza oven although these are generally considered to have a minimal impact on the rating level.

The calibration of the sound level meter at the beginning and end of the readings showed a drift of 0.2 dB.

Laboratory calibration uncertainty of the sound level meter ± 0.1 dB

$$u = \sqrt{a^2 + b^2 + c^2 ...etc}$$

U = ± 0.2 dB

Further, there is uncertainty that arises from a change in the weather conditions affecting the background levels. In addition, the nature of the background noise may vary from time to time depending on but not limited to pedestrian and road traffic noise.

Conclusion
The rating level of -1 dB(A) indicates that there is a low likelihood of adverse impact.

Measuring Equipment

Calibrated Cesva SC310 Class 1 sound level meter serial No. T237608 Laboratory calibrated by Pennine Instrument Services Ltd on 30th June 2015. Cert No. 028298-1

Cesva Acoustic Calibrator 94dB @ 1KHz serial No. 900470 Laboratory calibrated by Pennine Instrument Services Ltd on 29th June 2015. Cert No. 028298-3

Kane May Thermostat model KM330 serial: 723858 calibrated 19/05/2015 by Stroma Technology certificate: 723858-150519

Kaindl Electronic model: Windtronic 2 Anemometer.

Signed:
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Noise Consultant
Noise Survey Ltd
23rd Feb 2016

References
British Standards Institution (2014) BS EN 4142:2014 **Methods for Rating and Assessing Industrial and Commercial Sound.** London. BSI

The Chartered Institution of Building Services Engineers (2002) **Noise and Vibration Control for HVAC CIBSE Guide B5**, London CIBSE