

Our ref: P4969/L01/NRS

26 June 2023

Your ref: -

Mr V Patel
Hungamaa
575 Barlow Moor Road
Chorlton-cum-Hardy
Manchester
M21 8AE

Dear Vipul

Hungamaa, Manchester – Noise From Kitchen Extract System

Acoustic & Engineering Consultants Ltd (AEC) has been instructed by Hungamaa to assess the noise emitted by the kitchen extract system serving the restaurant at 575 Barlow Moor Road, Chorlton, Manchester.

AEC understands that the noise assessment is in relation to the 'Abatement Notice' served by Manchester City Council (MCC) in respect of the likely occurrence of a statutory nuisance (noise) caused by the kitchen extract system.

Acoustic terminology used in this report is provided in Appendix A.

1.0 Introduction and Site Description

- 1.1 The restaurant is bound by Barlow Moor Road to the east, a residential property to the west, and restaurants to the north and south, as indicated in Figure 1.1, below.
- 1.2 It should be noted that there are many restaurants on Barlow Moor Road and Hungamaa is one of six in a row.

Figure 1.1 – Site Plan Showing Location of the Nearest Noise Sensitive Receptor



Imagery ©2023 CNES / Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group. Map data ©2023

- 1.3 It is understood that the restaurant operates during the following daytime (0700-2300h) periods only:
- Tuesday to Thursday – 1700 to 2200h;
 - Friday and Saturday – 1200 to 2300h;
 - Sunday – 1200 to 2200h.
- 1.4 Majority of the restaurants around the site operate till 2200h on all days, however a couple of restaurants (Turkish Delight and Kofta & Shish) operate until 2230h.
- 1.5 The kitchen extract system, which includes an extractor fan along with two silencers, is located on the roof of the kitchen and the chimney duct is located on the western façade of the building as seen in Figure 1.2, below.

Figure 1.2 – Extractor Fan and Chimney



- 1.6 The nearest noise sensitive receptor (NNSR) to the extract system is 3 Silverwood Avenue which is about 5m to the west of the restaurant, as indicated in Figure 1.1 above.

2.0 Basis of Assessment

- 2.1 MCC outline their requirements in relation to noise from building services plant in their document '*Planning and Noise Technical Guidance*' (PNTG) – October 2022. PNTG states that:

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location".

- 2.2 However, it is assumed that the requirement presented in PNTG relates to new items of plant. As the plant has been in operating for a number of years, noise emitted has been assessed using the methodology presented in British Standard 4142: 2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*' (BS4142).

- 2.3 When assessing the potential noise impacts, 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. BS4142 states that:
- A difference of around +10dB or more is likely to be indicative of a significant adverse impact, depending on context.
 - A difference of around +5dB or more is likely to be indicative of an adverse impact, depending on context.
 - The lower the rating level relative to the background level, the less likely it is that the specific sound source will have an 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**
- 2.4 A 'rating' noise level ($\text{dBL}_{A,r,T,r}$) is obtained by applying a character correction to the 'specific' noise level ($\text{dB}_{Aeq,T,r}$) of a noise source (e.g. plant noise). The correction is applied if the noise has a defined acoustic character such as being tonal, impulsive, distinctive or intermittent in nature.
- 2.5 The magnitude of the correction is dependent on the character of the noise source and its level of perceptibility at the receiver. A correction of between 0 to +6dB and 0 to +9dB can be applied if the noise source is tonal or impulsive, respectively. Where the specific sound has characteristics, which are neither tonal nor impulsive but are distinctive against the residual sound climate, a +3dB penalty can be applied. A +3dB penalty can also be applied if the specific sound is intermittent in nature.

3.0 Noise Measurements

- 3.1 Noise levels were measured at Location A, as identified on Figure 1.1 above, between approximately 2200 and 2300h on Tuesday 20 June 2023,. The measurements were undertaken in general accordance with BS4142.
- 3.2 Full details of the measurements are presented in the measurement procedure included in Appendix B and the noise level data are presented in Table B.1. A summary of the measured noise levels is presented below.
- 3.3 The background noise level, without the extract system operating, was typically around $43\text{dBL}_{A90,15 \text{ mins}}$. This was due to plant noise from adjacent restaurants and distant road traffic.
- 3.4 A free-field noise level of around $66\text{dBL}_{Aeq,T}$ was measured at 1m from the kitchen extract system when it was operating under typical operating speeds. This level has been used in the assessment below.
- 3.5 Please note that the operating duty of the extractor fan was noted to be set at the maximum speed (10 on the dial).

4.0 Noise Assessment

- 4.1 The resultant noise level external to the NNSR has been calculated based on the measured noise level from the extract system, distance attenuation and angle of view correction.

- 4.2 Subjectively, as there is other plant noise in the area from adjacent restaurants, the noise from the extract system is perceived to not have any character that is distinct against the background sound climate. Therefore, no acoustic feature correction is considered in the assessment. The resultant rating noise level due to the extract system at the NNSR is presented in Table 4.1, below.

Table 4.1 – Plant Rating Level Calculation at 3 Silverwood Avenue

Reference	Overall dB(A)	Noise Level, dB at Octave Band Centre Frequencies, Hz							
		63	125	250	500	1000	2000	4000	8000
Extract System at 1m, $dB_{Leq,T}$	66	58	64	64	58	60	60	57	47
Distance Attenuation, dB (5 meters)	52	-14	-14	-14	-14	-14	-14	-14	-14
Additional Screening / Angle of View, dB (-3)	49	-3	-3	-3	-3	-3	-3	-3	-3
Rating Noise Level, $dB_{LA,r,Tr}$	49	41	47	47	41	43	43	40	30

- 4.3 Based on the extract system rating levels above, a daytime BS4142 assessment in undertaken external to the NNSR in Tables 4.2, below.

Table 4.2 – Daytime BS4142 Assessment – 3 Silverwood Avenue

Description	Daytime BS4142 Assessment
Rating noise level at NNSR	49 $dB_{LA,r,Tr}$
Background	43 dB_{LA90}
Excess of rating over background	+6
Significance of impact based on BS4142	'adverse impact' due to noise from the extract system – depending on context.

- 4.4 The assessment at the NNSR indicates an adverse impact from the extract system due to close proximity of the receivers and the high noise level from the unit.
- 4.5 However, as required by BS4142 it is important to consider the context of the site, i.e. the restaurant was taken over from another commercial unit operating at the same premises, 18 months ago. It is also understood that the restaurant has not made any changes to the extract system since taking over.
- 4.6 It is recommended that the noise from the extract system is reduced to around 43 $dB_{LAeq,T}$ external to the NNSR. This would be a significant (-6dB) reduction in noise and would control the rating noise level to just meet the background and be similar to the existing (prevailing) ambient noise levels.

5.0 Mitigation Measures

- 5.1 In order to reduce the rating level from the extract system external to the NNSR, mitigation measures would be required.

5.2 The following mitigation measures should be considered in the same order with additional checks being carried out after each of the mitigation measures to understand if further measures are required:

1. Simple solution would be to use the extractor fan at a slightly lower operating speed (currently being used at speed 10 – the maximum level), if that is possible. This would result in slightly lower noise level depending on the amount of reduction in fan speed and the duration the fan is being run at the lower speed;
2. An acoustic blanket/lagging (25mm thick) around fan box and ducting; (Indicative reduction in noise breakout is provided in Table 5.1 below and attached as Appendix C);
3. Independent boxing around the unit consisting of two layers of dense plasterboards and 50-100mm acoustic insulation to reduce the noise breakout from the fan casing and duct break-out. – overheating and access would need to be considered;
4. Having resilient fixings to the duct where required to reduce structure-borne noise / vibration.

Table 5.1 – Indicative Reduction in Noise Breakout
(based on standard data for 25mm thick 10kg/m² MuftiLag A applied on a 200mm circular duct)

Item	Typical Reduction in Noise Breakout (dB) in Each Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
MuftiLag A 25mm thick, 10kg/m ² barrier weight	-10	-18	-22	-26	-26	-29

- 5.3 The acoustic blanket / lagging could provide the majority of the noise reduction and this should be implemented first if turning down the fan speed is not an option. The acoustic blanket / lagging alone could provide a reduction of approximately 6-10dB. Additional checks could then be carried out to see if further measures are required
- 5.5 Please note that the above measures are likely to still result in the rating levels just meeting the background noise level, but considering the context of the site and that the proposed reduction will be significant compared to the existing noise levels, this should be acceptable.

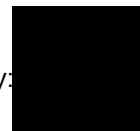
I trust the above is clear and of assistance.

Yours sincerely



Naveen Simha

Checked by:



APPENDIX A – Acoustic Terminology in Brief

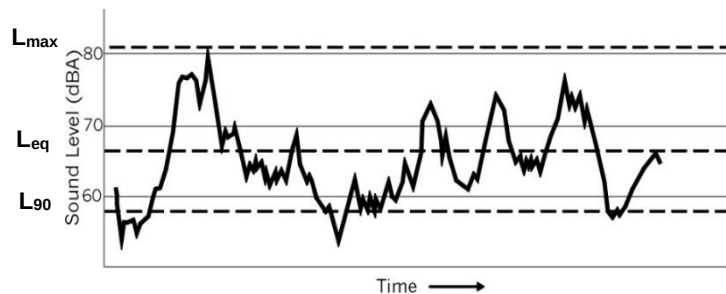
General

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air. The rate at which the pressure fluctuations occur determines the pitch or *frequency* of the sound. The frequency is expressed in Hertz (*Hz*), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hertz to 20,000 Hertz. Although sound can be of one discrete frequency - a 'pure tone' - most noise is made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same subjective way. This is the basis of the A-weighted sound pressure level *dBA*, normally used to assess the effect of noise on people. The *dBA* weighting emphasizes or reduces the importance of certain frequencies within the audible range

Sound / Noise Units

The figure below shows an example of sound level varying with time. Because of this variation over time the same period of noise can be described by several different levels. The most common of these are described below.



Commonly Used Descriptors for Sound / Noise

$L_{Amax,F/S}$	The maximum (A-weighted) sound level measured during a given time. 'Fast' or 'Slow' meter response should be cited.
$L_{Aeq,T}$	The equivalent continuous (A-weighted) sound level. It may be thought of as the "average" sound level over a given time, <i>T</i> . It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises. It can be considered as the "ambient" noise level.
$L_{A90,T}$	The (A-weighted) sound level exceeded for 90% of a measurement period. It is the value often used to describe the "background" noise.
Ambient Sound Level, $L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, <i>T</i> .
Background Sound Level, L_{A90}	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, <i>T</i> , measured using time weighting, <i>F</i> , and quoted to the nearest whole number of decibels.
Rating Level, $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound
Residual Sound, $L_{Aeq,T}$	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Specific Sound Level, $L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, <i>r</i> .

APPENDIX B – Noise Survey Details

Date & Time of Survey:	2200 to 2300h on Tuesday 20 June 2023.					
Personnel:	Naveen Ramesh Simha (AEC).					
Equipment Used:	Cirrus CR:171B Real Time Analyser (AEC Kit 5).					
Calibration:	The sound level analysers, which conforms to BS EN 61672-1: 2013 ' <i>Electroacoustics – Sound level meters - Part 1 Specifications</i> ' for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
	20/06/2023	Day	Dry	18°C	Northerly and 1-2 m/s	90%
Measurement Locations:	Measurements were undertaken at a single location representative of the nearest receptor, identified as A on Figure 1 and described below. A – 1.5m from the western façade of the restaurant.					
Measurement Details:	Measurements were undertaken over various periods in terms of L_{eq} , L_{10} , L_{90} , and L_{max} .					
Façade / Free-Field:	A – free-field.					
	Full results for the attended measurements are given in Table B1.					
Measured Data:	Full 1/3 rd octave band centre frequency data was obtained for all measurements.					

TABLE B1 – Measured Daytime Noise Levels

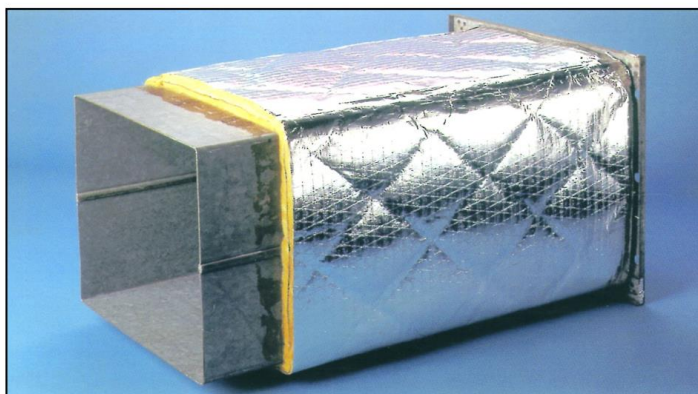
Location	Period, h	Noise Level, dB				Comments
		L_{Aeq}	L_{A10}	L_{A90}	$L_{Amax, F}$	
A	2155 – 2210	53.1	55.6	46.1	74.3	Ambient noise level due to plant noise from adjacent restaurants and distant road traffic.
	2212 – 2227	54.8	56.1	44.2	76.4	
	2230 – 2245	46.1	48.2	42.5	63.5	
	2245 – 2300	44.8	46.2	41.7	59.1	

APPENDIX C – MuftiLag A

MuftiLag

Description

MuftiLag Acoustic Blankets comprise a range of composite products designed to control noise break-out from rectangular or circular ductwork and pipes by isolating noise within the duct or pipe from the outside environment.



Colour

Outer surface finish - Silver

Design and Application

MuftiLag A:

MuftiLag A is manufactured from a heavy lead core faced both sides with sewn glass fibre quilt. The inner quilt is designed to form a spacer layer on the duct or pipe to optimise acoustic performance. The outer quilt is faced with a class 'O' foil to provide a vapour check and improves the product's thermal insulation properties. MuftiLag A is inherently flexible and forms easily around contoured surfaces. It is designed for use in applications requiring both thermal and acoustic insulation.

MuftiLag H:

MuftiLag H is manufactured from a heavy polymeric barrier adhered to MelaTech foam with a black tissue facing to form a spacer layer. The polymeric barrier has a Class 'O' foil surface finish to provide a vapour check. MuftiLag H is designed for use in 'clean rooms' and hygienic areas and is used extensively in the medical, pharmaceutical and food and drinks industries.

MuftiLag P:

MuftiLag P is manufactured from a heavy polymeric barrier with sewn glass fibre quilt on the inner face to form a spacer layer and a Class 'O' foil on the outer surface to provide a vapour check. MuftiLag P is designed for use in applications demanding lead free materials.

Operating Temperature

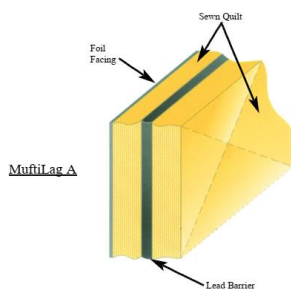
The outer face of MuftiLag Acoustic Blankets can withstand direct contact with temperatures up to 90°C.

Fire Performance

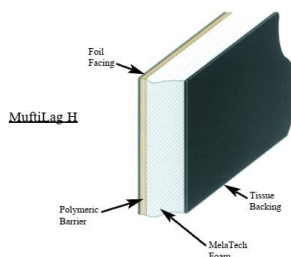
MuftiLag Acoustic Blankets comply with the Class 'O' requirements of the Building Regulations, when tested to BS476: Part 6: 1981 and Part 7: 1987.

Thermal Conductivity

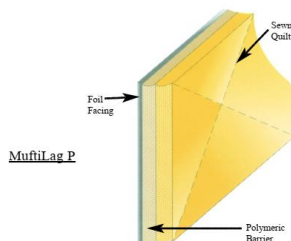
MuftiLag A	0.037 W/mK @ 10°C
MuftiLag H	0.035 W/mK @ 10°C
MuftiLag P	0.037 W/mK @ 10°C



MuftiLag A



MuftiLag H



MuftiLag P

H&H

Group Ltd

Data Sheet
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Acoustic Performance

Noise Breakout:

The Figures below are typical of a cross section of a 200mm circular duct.

Product	Thickness mm	Barrier Weight kg/m ²	Typical Reduction in Noise Breakout dB					
			125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
MuftiLag A	25	5	1	4	12	17	19	21
	50	5	2	6	14	18	20	23
	25	10	4	6	16	20	24	25
	50	10	4	10	18	22	26	29
MuftiLag H	12	5	1	1	8	16	18	20
	25	5	1	4	12	17	19	21
	50	5	2	6	14	18	20	23
	12	10	2	5	12	18	22	23
	25	10	4	6	16	20	24	25
MuftiLag P	15	5	1	1	8	16	18	20
	25	5	1	4	12	17	19	21
	50	5	2	6	14	18	20	23
	15	10	2	5	12	18	22	23
	25	10	4	6	16	20	24	25
	50	10	4	10	18	22	26	29

Sound Reduction Index

Product	Barrier Weight kg/m ²	Typical Sound Reduction Index dB							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
MuftiLag A	5	22	22	22	22	32	43	47	45
	10	26	24	28	35	38	47	57	51
MuftiLag H	5	18	20	21	27	38	48	50	50
	10	19	22	24	32	44	50	50	50
MuftiLag P	5	21	21	22	21	32	45	48	44
	10	24	23	28	32	38	45	57	50

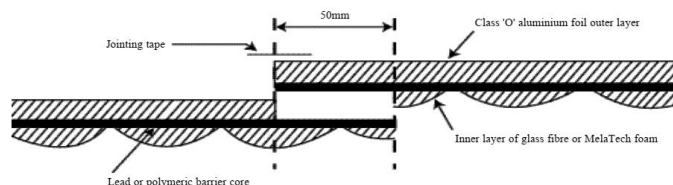
Dimensions, Density and Weight

Product	Nominal Thickness mm	Blanket Size mm	Density of Insulation Layer kg/m ³	Weight of Barrier Core kg/m ²	Ordering Reference
MuftiLag A	25	2000 x 1200	24	5	MA 2505
	50	2000 x 1200	24	5	MA 5005
	25	2000 x 1200	24	10	MA 2510
	50	2000 x 1200	24	10	MA 5010
MuftiLag H	12	2000 x 1200	9.5	5	MH 1205
	25	2000 x 1200	9.5	5	MH 2505
	50	2000 x 1200	9.5	5	MH 5005
	12	2000 x 1200	9.5	10	MH 1210
	25	2000 x 1200	9.5	10	MH 2510
	50	2000 x 1200	9.5	10	MH 5010
MuftiLag P	15	2000 x 1200	24	5	MP 1505
	25	2000 x 1200	24	5	MP 2505
	50	2000 x 1200	24	5	MP 5005
	15	2000 x 1200	24	10	MP 1510
	25	2000 x 1200	24	10	MP 2510
	50	2000 x 1200	24	10	MP 5010

Application and Fixing

To ensure optimum acoustic performance from the application of MuftiLag Acoustic Blankets it is important to follow these instructions:

1. Wrap MuftiLag around the ductwork or pipe taking care to overlap the lead or polymeric barrier core by at least 50mm. This can be achieved by paring back the glass fibre or MelaTech foam and exposing the barrier cores thus enabling them to be overlapped as shown in the diagram below.



2. Seal all joints with MuftiLag joining tape to form an airtight seal.
3. Where more than one MuftiLag blanket is required to cover the area being treated, the lead or polymeric barrier core should be overlapped along all joints as detailed above.
4. Carefully cut around valves, brackets and other penetrations and position MuftiLag tightly around all the obstructions to form an airtight seal. Cover all the joints with MuftiLag joining tape. Failure to form an airtight seal could adversely effect the acoustic performance of the material.
5. Support MuftiLag around ductwork or on pipes by securing non-metallic banding at 500mm spacings or tightly wrap with wire netting.