

NOISE IMPACT ASSESSMENT REPORT

HOT FOOD TAKEAWAY, 189 BURNAGE LANE, MANCHESTER

REPORT REFERENCE NO. J003691-5442-ECE-01

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This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.



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1.0 SUMMARY

At the request of Adal Bashir a noise impact assessment has been undertaken for the Hot Food Takeaway located at 189 Burnage Lane, Manchester. This assessment has been undertaken following the guidance contained within Conditions 9 and Condition 10 of planning consent 126882/FO/2020.

Condition 9 indicates that the development is required to be acoustically insulated to the limit of noise breakout. It is noted that the nearest residential receiver to the takeaway is the flat on the floor above. We have therefore undertaken an assessment of the sound transfer between the ground floor use and the residential use above.

Using typical noise levels previously measured within a Hot Food Takeaway we have assessed the noise breakout from the ground floor to the residential above. It is noted that there is no entertainment noise proposed for the scheme. We have therefore compared the noise breakout with the resultant noise limits contained within BS8233:2014 "Guidance on sound insulation and noise reduction for buildings".

The results of this assessment have indicated that the noise level is well below the guidance level contained within BS8233 and is an indication that the floor construction will adequately control the sound transfer

Condition 10 requires that externally mounted ancillary plant, equipment and servicing shall be acoustically treated so that the noise emission are adequately controlled as the nearest noise sensitive location

A noise survey has been conducted at the nearest noise sensitive property to the development. The results of the survey have been used to assess the background sound at the nearest sensitive receptors and specify appropriate noise limits for the new plant and equipment. It is noted that the external plant associated with the development is the cooking hood extract fan.

This is ducted to the outside and terminates at the roof level. Measurements have been undertaken at 1m from the outlet of the duct and further prediction have been undertaken to determine the plant noise level at the window of the nearest residential receiver. This was determined as a first floor bedroom for the residential flat directly above the development.

The results of these measurements have indicated that the noise level at the nearest residential window is 41dB L_{Aeq} . The typical background sound was measured at 36dB L_{A90} . The results of these calculations have indicated that the extract plant is 5dB above the background and therefore does not comply with the requirements of the condition.

We have provided recommendations that an additional silencer is fitted to the extract duct. With this additional silencer the noise level at the receptor will reduce to 31dB L_{Aeq} . This is therefore 5dB below the background sound level and is compliant with the requirements of the Condition.

2.0 SITE DETAILS

The development site is 189 Burnage Lane, Manchester. The development is the conversion of a ground floor retail into a Hot Food Takeaway called Chicken Triple. The opening hours for the development will be between 8.00am and 23.00pm.

The ground floor of the unit consists of a room containing the customer serving area at the front and the cooking equipment and food preparation at the rear. Dividing these areas is a customer service counter however the room is open plan with no partitions between the customer serving area and the food preparation area. To the rear of the property is a storage area.

The nearest residential use to the proposed scheme is the first floor flat directly above the development. The proposed site location is highlighted within the Figure below.

Figure 1. Proposed Site Location



3.0 NOISE ASSESSMENT CRITERIA

3.1 Planning Conditions

Within planning consent 126882/FO/2020 it provides the following planning conditions:

3.1.1 Condition 9

The premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and

approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 10dB below the LA90 (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.

Upon completion of the development a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

3.1.2 Condition 10

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 (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority.

3.2 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

It should be noted that we have been informed that the use of the development is a Hot Food Takeaway only will not include any entertainment noise. Whilst Condition 10 indicates a criteria for entertainment noise it does not a recommendation for a criteria when the proposed use does not contain entertainment noise. We would therefore propose utilise the guidance contained within British Standard 8233:2014, *Guidance on Sound Insulation and noise reduction for buildings*.

This standard gives guidance on internal noise levels within dwellings, flats and rooms in residential use when unoccupied. The following criteria are for Living and Dining Rooms for daytime use and Bedrooms for night time.

Table 1. BS8233 recommended indoor ambient noise levels

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 LAeq,16hour	–
Dining	Dining room/area	40 LAeq,16hour	–
Sleeping (daytime resting)	Bedrooms	35 LAeq,16hour	30 LAeq,8hour

Please note that BS8233 indicates that the noise limits detailed above are with reference to sources without specific character. BS8233 further states:

“Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low frequency content, in which case lower noise limits might be appropriate.”

It would be our opinion that whilst the noise associated with the takeaway would not be tonal or have strong frequency content, it is likely to have some intermittency. We would therefore consider that it would be appropriate to apply a 5dB feature correction to the noise limits.

Therefore as the takeaway is only open during daytime hours, we would consider that a limit of 30dB L_{Aeq} would be appropriate.

4.0 NOISE BREAKOUT

In order to show compliance with the requirements of Condition 9 we have undertaken an assessment of the sound insulation between the development and the residential use above.

4.1 Test Details

The tests were conducted on the 18th January 2022. All measurements were made by Mr Edmund Evenden of PDA Ltd.

The sound level meter was calibrated before and after the tests, during which time no significant calibration deviation was observed. The sound level meter, acoustic calibrator and microphone are all covered by current calibration certificates.

The testing methods for sound insulation were undertaken accordance with the suggested methods presented in BS EN ISO 140:1998. It should be noted however that as the residential receiver rooms were fully furnished and occupied there was no requirements to correct for the reverberation time.

Please note that two sets of measurements have been undertaken and have assessed the sound transfer between the ground floor food preparation area to the first floor kitchen and the ground floor customer serving area and the first floor lounge. The rooms on the first floor have been selected as the entire floor area of each room was directly above the takeaway.

4.2 Test Procedures

The field testing of structures for airborne sound insulation involves generating a controlled level of noise in one room (the source room) and measuring the resulting noise in the other room (the receiving room), separated from the source room by the element under test.

A single sound source is used and is operated in two separate positions. Spatial and temporal averaging of the noise level in both rooms is carried out by manually sweeping the microphone through a predetermined circular path of travel in a plane not within 10° of any room surface plane. The sweeps are completed over a 30-second period, with two separate measurement cycles being completed in both the source and receiving rooms. Corrections are applied to the measured levels for the effects of background noise. The corrected, measured source room and receiving room levels are used to derive the in situ level difference between the spaces.

4.3 Test Results

Based upon the measurements the resultant sound reduction between the ground floor and the upper floors are as follows:

Table 2. Sound Insulation Between Ground Floor and First Floor

Test Details	Octave Band Frequencies (Hz) Sound Insulation (dB)						
	63	125	250	500	1000	2000	4000
Ground Floor Prep Area – First Floor Kitchen	23	30	38	47	53	55	63
Ground Floor Customer Serving Area – First Floor Lounge	23	31	36	48	60	63	73

4.4 Assessment of Sound Transfer

It is noted that the development has not yet opened. Therefore in order to assess the sound transfer between the hot food takeaway use and the residential use above, we have utilised previous measurements undertaken in a takeaway and applied the measured sound insulation performance between as described within Table 2 above.

Table 3. Resultant noise level due to takeaway use

Location	Octave Band Frequencies (Hz) Sound Insulation (dB)							Broadband L _{Aeq} dB
	63	125	250	500	1000	2000	4000	
Takeaway Measured Noise Levels	65	61	61	59	55	52	46	61
Resultant Level with First Floor Kitchen	42	31	23	12	2	-3	-17	20
Resultant Level with First Floor Lounge	42	30	25	11	-5	-11	-27	20

The results within Table 3 above indicate the resultant sound level within the first floor residential use have been determined as 20dB L_{Aeq}.

If comparison is made with the limiting level described within Section 3.2 it can be seen that the above levels comfortable comply with the requirements.

5.0 ASSESSMENT OF PLANT NOISE LEVELS

5.1 Background Survey Details

The ambient sound measurements were made between 19:00 – 23:00, 25 January 2022, with all measurements being made by Mr Edmund Evenden of PDA Ltd. This time period was selected as being the typical lowest background sound levels during the opening hours of the takeaway.

Throughout the survey measurements were undertaken with precision grade Class 1 sound level meter (as per BS EN 61672-1: 2002) for which current calibration certificates are held. The meter was set to A-Weighted and fast response. The meter was calibrated directly before any measurement took place and immediately afterwards and no significant drift was observed.

5.2 Weather

25 January 2022

Temperature: 4 - 6°C
Wind Speed: 0m/s
Wind Direction: Still conditions no specific wind direction observed
Precipitation: No precipitation

5.3 Background Measurement Positions

Measurements were undertaken at one position at the site. The microphone was mounted 1.5m above ground and 1m from façade of the existing building. A range of statistical noise indicators were

measured, including L_{Aeq} and L_{A90} . Measurements were setup to log every 15 -minutes. Please note that this measured was undertaken directly below the first floor window of the residential property on the first floor above the property

The measurement location is highlighted within the following figure:

Figure 2. Background Sound Measurement Location



5.4 Measurement Results

A summary of the noise level measurements is given below. The levels presented in the tables have been rounded to the nearest decibel. The L_{Aeq} levels are the logarithmic average of all the measured noise levels. The L_{A90} levels have been shown as a minimum to maximum range. The typical L_{A90} has been based upon the modal level during the period of interest.

Table 4. Summary of ambient sound measurements

Time Period	$L_{Aeq,T}$ (dB)	Range of $L_{A90,15mins}$ (dB)	Typical $L_{A90,15mins}$ (dB)
Evening (1900 - 2300)	59	34 – 44	36

5.5 Description of Background Noise

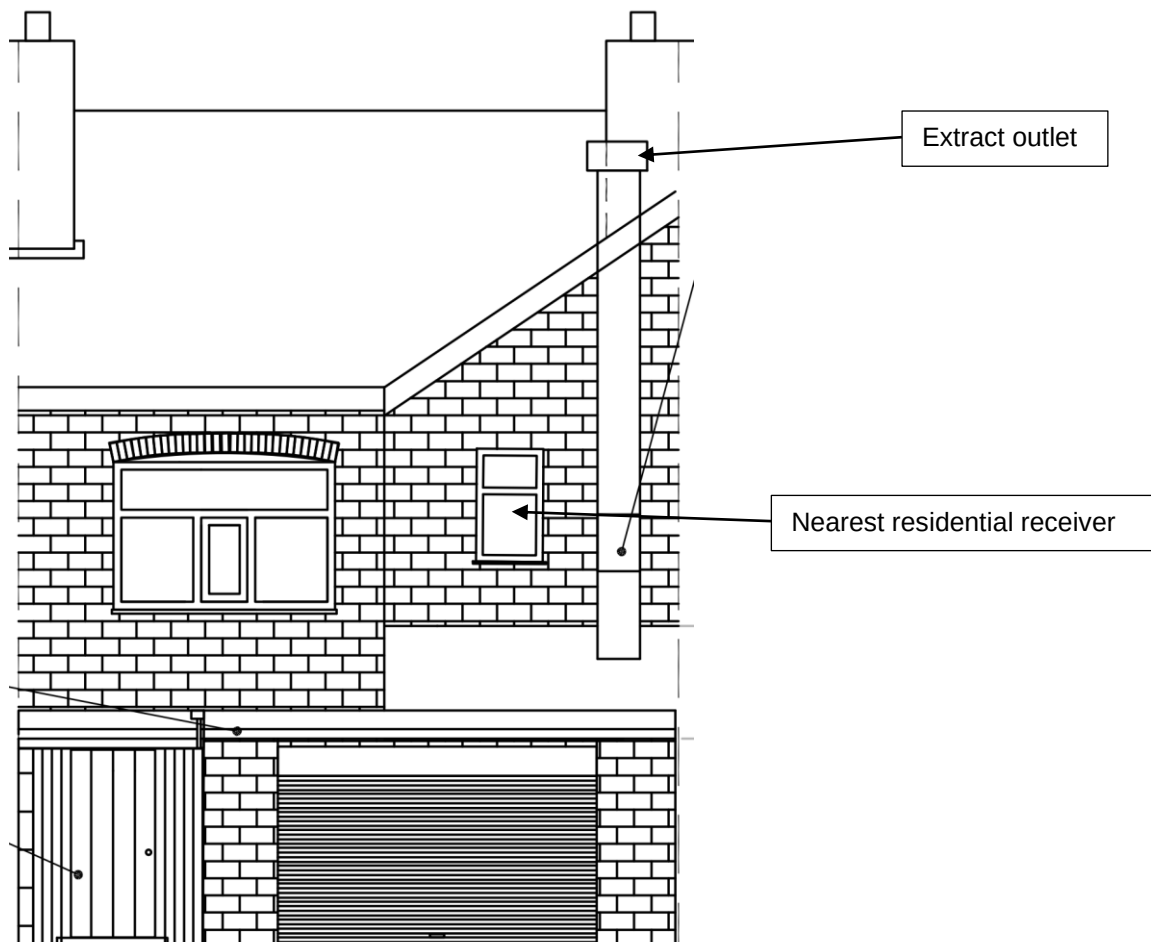
It was observed that the dominant noise source was due to traffic noise in the surrounding road network, though it is noted that some of the measurements positions were significantly affected by plant noise from an adjacent commercial use. When this was observed the ambient sound levels increased to 48dB L_{Aeq} .

5.6 Specific Noise Level Measurement

It is noted that the extract fan has now been installed. Measurements were therefore undertaken of the noise emissions from the extract outlet to assess the noise generated at the nearest residential receiver.

Details of the location of the fan extract and the nearest residential receiver window is highlighted within the following figure:

Figure 3. Extract fan location



In order to assess the noise emissions from the extract fan and to minimise the influence of the existing noise climate, measurements of the extract fan have been undertaken at 1m from the outlet by mounting the sound level meter on an extension pole.

The extract fan was turned on at the required duty. We were informed onsite that this was with the fan speed dial set at 40%. The survey was repeated with the extract fan turned off in order to assess the residual sound climate.

The results of these measurements have indicated with the fan operating the sound level was measured at 54dB L_{Aeq} and the residual sound was 48dB L_{Aeq} . Correcting the sound level of the fan operating for the residual sound would result in a sound level from the fan in isolation at 53dB(A) L_{Aeq} .

It is noted that the measurements were undertaken at 1m from fan extract, however it is noted that the nearest residential window is 4m from the fan outlet.

We have therefore correct the measured level for the noise level at the residential window using the following standard calculation methodology:

$$L_{p1} = L_{p2} + 20 \cdot \log(R_2/R_1)$$

Where:

L_{p1} = Noise level at residential receiver window
 L_{p2} = Measured Noise level in close proximity to the source
 R_1 = Distance between source and receiver (4m)
 R_2 = Distance between source and measurement (1m)

Based upon this assessment method we would estimate the noise level at the receiver is 41dB L_{Aeq} .

It should also be noted that our observation regarding the noise character from the site was that it was not tonal, impulsive or intermittent.

5.7 Comparison with background

As indicated within Section 5.4 the typical background was measured at 36dB L_{A90} . The results of the measurement from the extract fan has indicated that this is therefore 5dB above the typical background sound level.

It is noted that condition 10 indicates that the rating level associated with the plant should be 5dB below the typical background level.

This is therefore an indication that the plant is 10dB in excess of the planning condition requirements. It will therefore be necessary to implement mitigation measures to reduce the noise breakout.

5.8 Proposed Mitigation Measures

In order to reduce the noise emissions we would recommend an additional silencer is fitted to the extract outlet. It is recommended that the silencer provides the following attenuation levels:

Table 5. Additional silencer attenuation values

Attenuator			Octave Band Frequencies (Hz)						Insertion Loss (dB)
			63	125	250	500	1000	2000	
Standard	Circular	Silencer	8	11	16	30	35	31	29
CDAP.2D									

Please note that the data provided above have been based upon the silencer information previously provided with the planning application.

Based upon this attenuation loss we would estimate the noise level at the residential receiver will be 31dB L_{Aeq} .

These calculations would therefore indicate with the implementation of these mitigation measures the extract plant will comply with the planning condition requirements.

6.0 CONCLUSION

At the request of Adal Bashir a noise impact assessment has been undertaken for the Hot Food Takeaway located at 189 Burnage Lane, Manchester. This assessment has been undertaken following the guidance contained within Conditions 9 and Condition 10 of planning consent 126882/FO/2020.



The results of this assessment have indicated that the noise breakout from the ground floor use to the nearest residential use above are well below the guidance level contained within BS8233 and is an indication that the floor construction will adequately control the sound transfer. We would therefore consider that the proposed floor has complied with the requirements of Condition 9.

The results of the assessment of plant noise emissions have indicated that the noise level at the nearest residential window is 41dB L_{Aeq} . The typical background sound was measured at 36dB L_{A90} . The results of these calculations have indicated that the extract plant is 5dB above the background and therefore does not comply with the requirements of the Condition 10.

We have provided recommendations that an additional silencer is fitted to the extract duct. With this additional silencer the noise level at the receptor will reduce to 31dB L_{Aeq} . This is therefore 5dB below the background sound level and is compliant with the requirements of the Condition.

APPENDIX A – DEFINITION OF ACOUSTIC TERMS

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB L_{Aeq} . Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} or, for A-weighted figures dB(A) L_{eq} or dB L_{Aeq} . It can also be expressed in terms of frequency analysis (see later). $L_{eq(s)}$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n or, for A-weighted figures dB(A) L_n or dB L_{An} . It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically, it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) L_{max} , dB L_{Amax} , etc. It can also be expressed in terms of frequency analysis.

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq} , L_{90} , L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.

APPENDIX B – MEASURED LEVELS

Background Sound Level:

Date / Time (DD/MM/YYYY HH:MM)	dB LAeq	dB LA90
25/01/2022 19:44	48	44
25/01/2022 19:59	48	44
25/01/2022 20:14	44	38
25/01/2022 20:29	44	36
25/01/2022 20:44	44	37
25/01/2022 20:59	45	38
25/01/2022 21:14	43	36
25/01/2022 21:29	44	38
25/01/2022 21:44	44	35
25/01/2022 21:59	44	36
25/01/2022 22:14	43	36
25/01/2022 22:29	45	34
25/01/2022 22:44	43	35

Source Measurements:

Measurement Conditions	dB, LAeq	dB Leq, Octave Band Centre Frequencies (Hz)							
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Extract fan measured at 1m	54	63	69	57	47	46	43	34	25
Residual sound level with fan off	48	55	51	46	44	44	40	30	19