

**DOUX CHATON, 265-267 DEANS GATE TERRACE – KITCHEN EXTRACT EQUIPMENT
NOISE IMPACT ASSESSMENT**

**On behalf of:
Doux Chaton Vietnamese Kitchen Ltd**

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Doux Chaton Vietnamese Kitchen Ltd to carry out a noise impact assessment in connection with a proposed planning application for Doux Chaton restaurant at 265-267 Deansgate Terrace, Manchester.
- 1.2 Specifically, the assessment is for the proposed kitchen extract associated with the proposed restaurant. The restaurant is proposing to trade from 09:00 to 22:00 hours Monday to Saturday and 09:00 to 21:00 hours on Sunday.
- 1.3 The site location is indicated in Figure 1. The building is three storeys in height with the lower floor fronting onto Deansgate, however the second floor is level with Deansgate Terrace (i.e. to the rear of Deansgate) and the first floor is below the level of Deansgate Terrace, with the rear external wall fronting onto the underground car park area. The Great Northern retail and leisure complex is directly behind.
- 1.4 The nearest dwellings to the site are upper floor apartments on Deansgate, with the closest being approximately 50 metres away. There are other apartments and hotel bedrooms that overlook the site, however these are much further away at greater than 100 metres. All of these dwellings would be screened from the premises by intervening buildings.
- 1.5 The proposed kitchen ventilation equipment is to be located on a first floor external wall to the rear, however given the split levels between Deansgate and Deansgate Terrace this means that all the equipment will ventilate into an enclosed car park area. As such, any potential noise from the equipment would need to break out via the solid concrete slab of Deansgate Terrace walkway. Nevertheless it is understood that Manchester City Council require a fixed plant noise impact assessment. The location of the proposed equipment is indicated in Figure 2.
- 1.6 The noise assessment has included:
- An inspection of the site and surrounding area;
 - Measurement of noise levels during the proposed trading hours;
 - Assessment of potential noise impact from kitchen extract equipment.
- 1.7 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 GUIDANCE

NPPF:2023

- 2.1 Paragraph 191 of the National Planning Policy Framework (NPPF), December 2023, states that *“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;”*

NPSE:2010

- 2.2 The Noise Policy Statement for England (NPSE) 2010, which is referred to in NPPF, includes three aims:
- i. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - ii. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - iii. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Local Policy

- 2.3 Manchester’s Local Development Framework, Core Strategy, Development Plan was adopted in July 2012, where Policy DM1 Development Management, states that *“all development should have regard to the following specific issues... effects on amenity, including... noise”*.
- 2.4 A Core Development Principle stated within the Framework is *“creating well designed places”* which for this restaurant would be to allow development of the night-time economy while protecting residential amenity.

- 2.5 Locating kitchen ventilation equipment within an underground car parking space away from and effectively screened from the nearest dwellings can be considered “*well designed*”.

Manchester City Council Planning & Noise Technical Guidance 2022

- 2.6 Manchester City Council Planning & Noise Technical Guidance 2022 provides guidance for assessing the potential impact from fixed plant and equipment which states:

“The development should be 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.”

- 2.7 This design criterion has been derived to prevent ‘noise creep’, contribute to the enhancement of the area, improvement of people’s health and quality of life. Where this criterion can not be achieved the various noise control measures and the achievable noise level should be stated.

BS 4142:2014+A1:2019

- 2.8 BS 4142 requires a ‘rating’ level ($L_{Ar,Tr}$) calculated from the operation of the noise source to be compared with the background sound level ($L_{A90,T}$) which is measured in the absence of the noise source. The noise is evaluated over a 1-hour period for daytime operations (i.e. 07:00 - 23:00 hours) and 15-minute period for night-time operations (i.e. 23:00 - 07:00 hours).
- 2.9 The rating level ($L_{Ar,Tr}$) is based on the ‘specific’ sound level ($L_{Aeq,Tr}$) attributed to the operating noise source, with ‘character corrections’ added for sound sources where “*certain acoustic features can increase the significance of impact*” when present at residential locations.
- 2.10 The acoustic character correction, where necessary, is applied to the specific sound level in order to obtain the rating level and can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.
- 2.11 An initial estimate of the potential noise impact from the operating noise source is determined by comparing the difference between the rating level and the background sound level.
- 2.12 Regarding the outcome of the initial estimate, BS 4142 states that:
- Typically, the greater this difference, the greater the magnitude of impact;
 - A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;

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

2.13 BS 4142 also states in respect of background sound levels that *“it is important to ensure that values are reliable and suitably represent the particular circumstances and periods of interest... the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”*.

2.14 BS 4142 states that all pertinent factors must be taken into account regarding the context in which the noise occurs, including but not limited to:

- The absolute level of sound.
- The character and level of the residual sound compared to the character of the specific sound; and,
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will incorporate design measures that ensure good internal and/or outdoor acoustic conditions such as acoustic screening.

2.15 The initial numerical assessment and the context are then both taken into account when determining the potential noise impact. It is noted that fixed plant design criterion as set out in the Council’s guidance is based solely on the initial estimate and does not consider context which is an important part of the BS4142 assessment.

3.0 ENVIRONMENTAL NOISE SURVEY

- 3.1 A noise measurement survey was undertaken with a microphone fitted to a boom and extended to outside via a first floor window overlooking Deansgate.
- 3.2 The noise survey location is shown in Figure 1. The purpose of the noise survey was to establish the existing noise climate of the area for the proposed trading hours (i.e. up to 22:00 hours).
- 3.3 The noise measurements were carried out in terms of a series of consecutive 15-minute measurements from approximately 12:00 hours on Wednesday 6 until 11:00 hours on Thursday 7 November 2024. The noise measurements were taken in ‘facade’ conditions and at a microphone height of approximately 4.5m above the ground and 1m from the building facade. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. Frequency analysis and audio recording (for the identification of noise sources) was also carried out.
- 3.4 The weather conditions during the noise survey were suitable for the purposes of the survey and subsequent assessment.
- 3.5 The results of the noise survey for the relevant noise assessment periods are summarised in Table 1, and the full results along with details of the equipment used, and the weather conditions during the survey periods, are shown in Appendix II.

Table 1: Summary of Measured Baseline Noise Levels (dB)

Period	<i>L</i> _{Aeq,15 min}	<i>L</i> _{A90,15 min}
17:00 – 22:00 hours	62 – 67	60 – 62

- 3.6 The noise levels measured during the survey were due to road traffic, pedestrians and other nearby fixed plant.
- 3.7 The mode of the background sound levels over the survey period at the nearest dwellings was 60 dB *L*_{A90,T}, which was also the lowest measured value. This value has been adopted as an appropriate noise design limit in our assessment described in Section 4.0.

4.0 NOISE ASSESSMENT

- 4.1 The manufacturer's (MaXfan Compac) noise output data for the proposed kitchen extract fan, in octave band sound power levels, are as follows:

Table 2: Kitchen Extract Fan Sound Power Levels (dB L_w)

Description	Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Outlet	81	82	91	86	87	87	85

- 4.2 No details are available of the construction of the existing walkway, however it is assumed to be solid concrete and capable of achieving 47-54 dB R_w sound insulation performance. The following octave band sound insulation performance has been considered in the calculations, shown in Table 3.

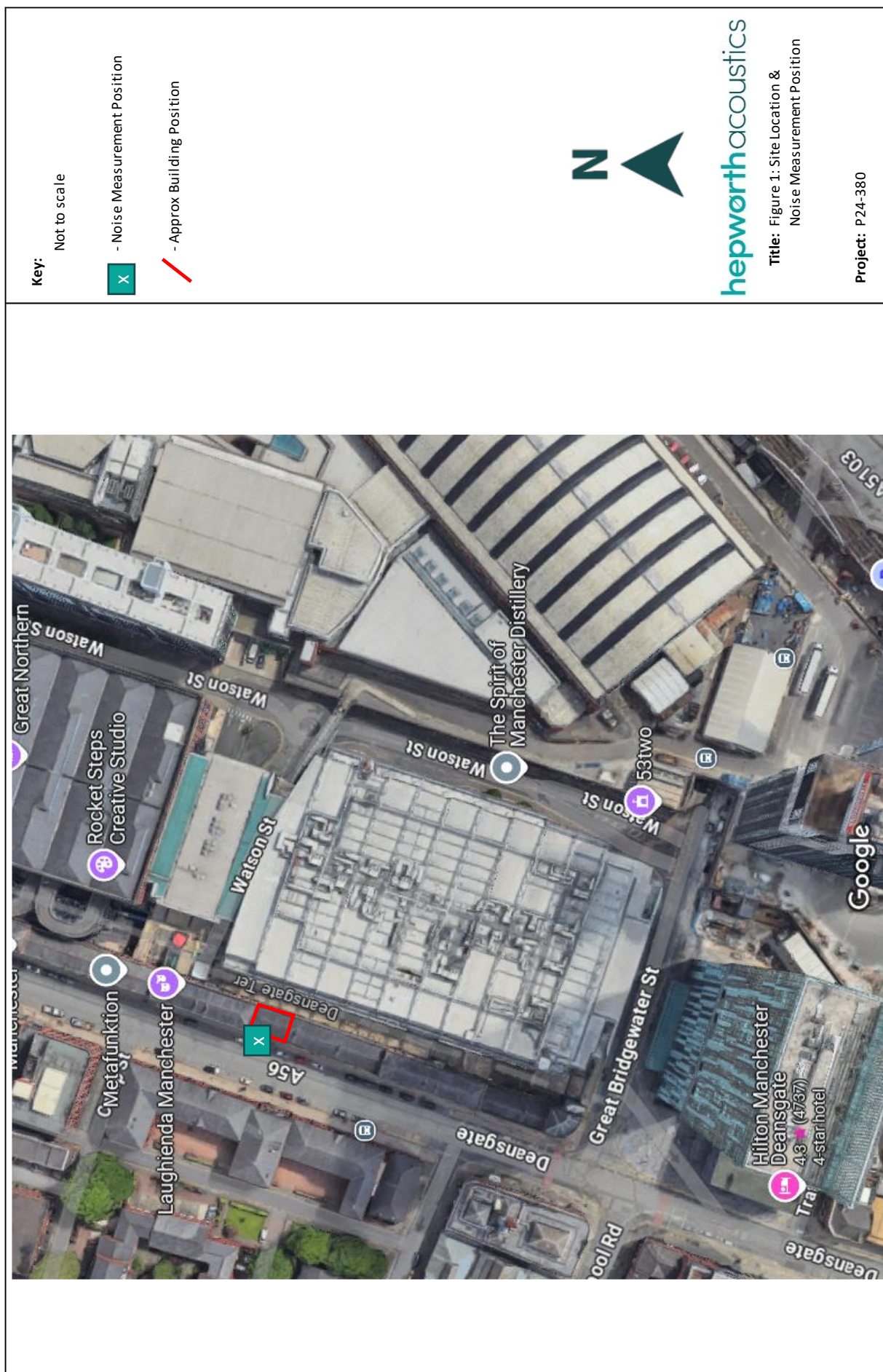
Table 3: Concrete Octave Band Sound Insulation Performance (dB R_w)

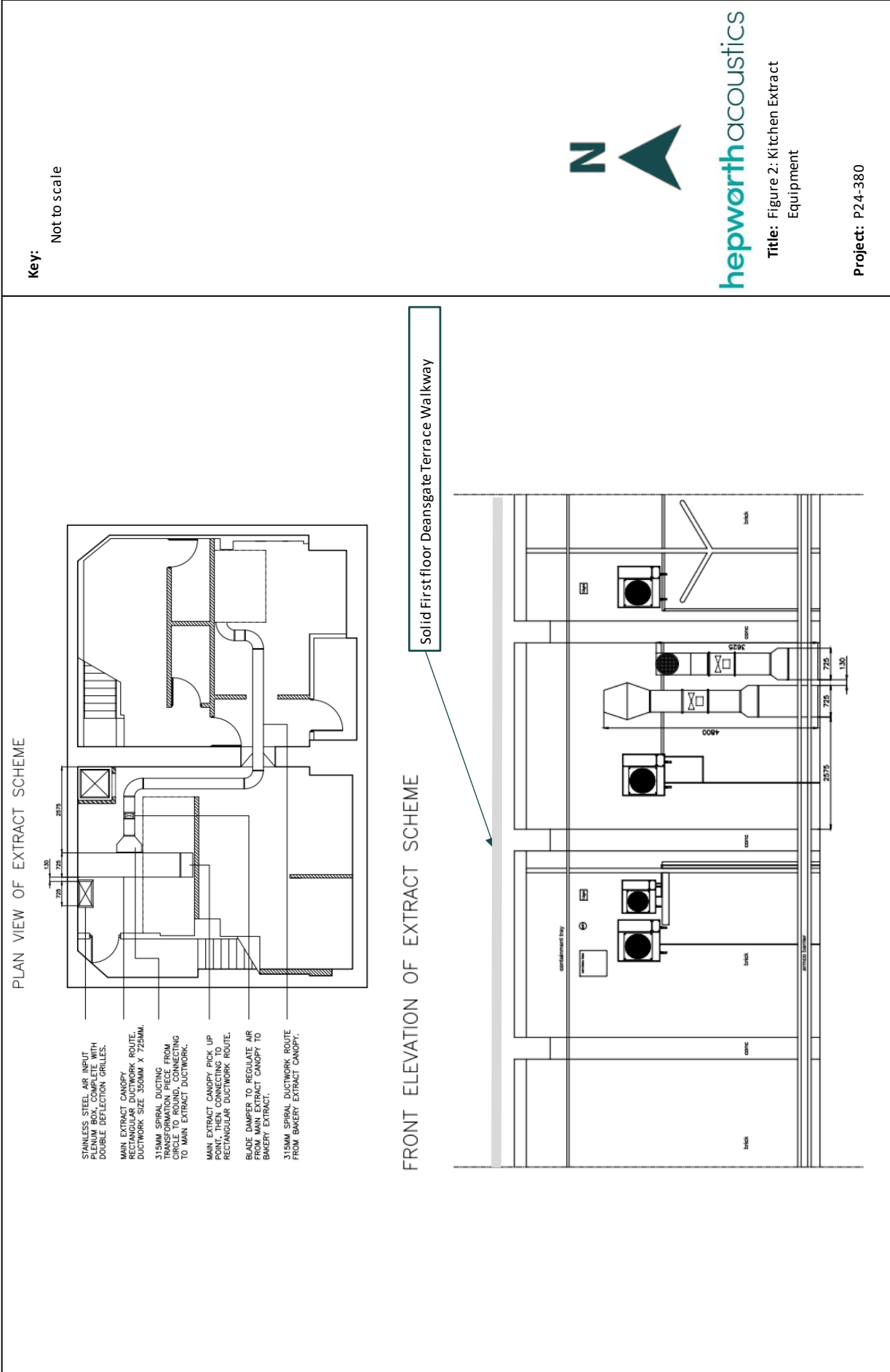
Description	Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
125mm reinforced concrete topped with 50mm screed	29	35	37	42	49	58	63

- 4.3 The character of the noise from the new equipment is generally steady/continuous in nature when it is operating.
- 4.4 The likely resulting plant noise level outside the upper floor windows of these dwellings has been calculated, with appropriate allowances for duct terminations, screening, distance attenuation and the considerable reduction provided by the solid concrete walkway. The resulting noise level will be exceptionally low at the nearest dwelling likely to be less than 5 dBA. This is well below the existing background or the Manchester City Council guidance criteria.
- 4.5 Even considering that background noise levels maybe lower at any dwellings away from Deansgate, it is inconceivable that there will be any impact to residential amenity from the proposed new kitchen extract equipment and no noise mitigation measures are warranted.

5.0 SUMMARY

- 5.1 Hepworth Acoustics Ltd has carried out a noise impact assessment in connection with proposed kitchen extract equipment for the proposed restaurant at 265-267 Deansgate Terrace, Manchester.
- 5.2 The results of a background noise survey have been used to assess the noise impact of the kitchen extract with respect to BS 4142.
- 5.3 The initial BS 4142 assessment indicates that there will be no adverse impact from the proposed new kitchen ventilation equipment.





Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq,T}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, $L_{Aeq,T}$ is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

$L_{A90,T}$ This is the A-weighted noise level exceeded for 90% of the time period. $L_{A90,T}$ is used as a measure of background noise.

L_W This is the Sound Power Level and is a Logarithmic measure of the sound power as a relation to the threshold of hearing.

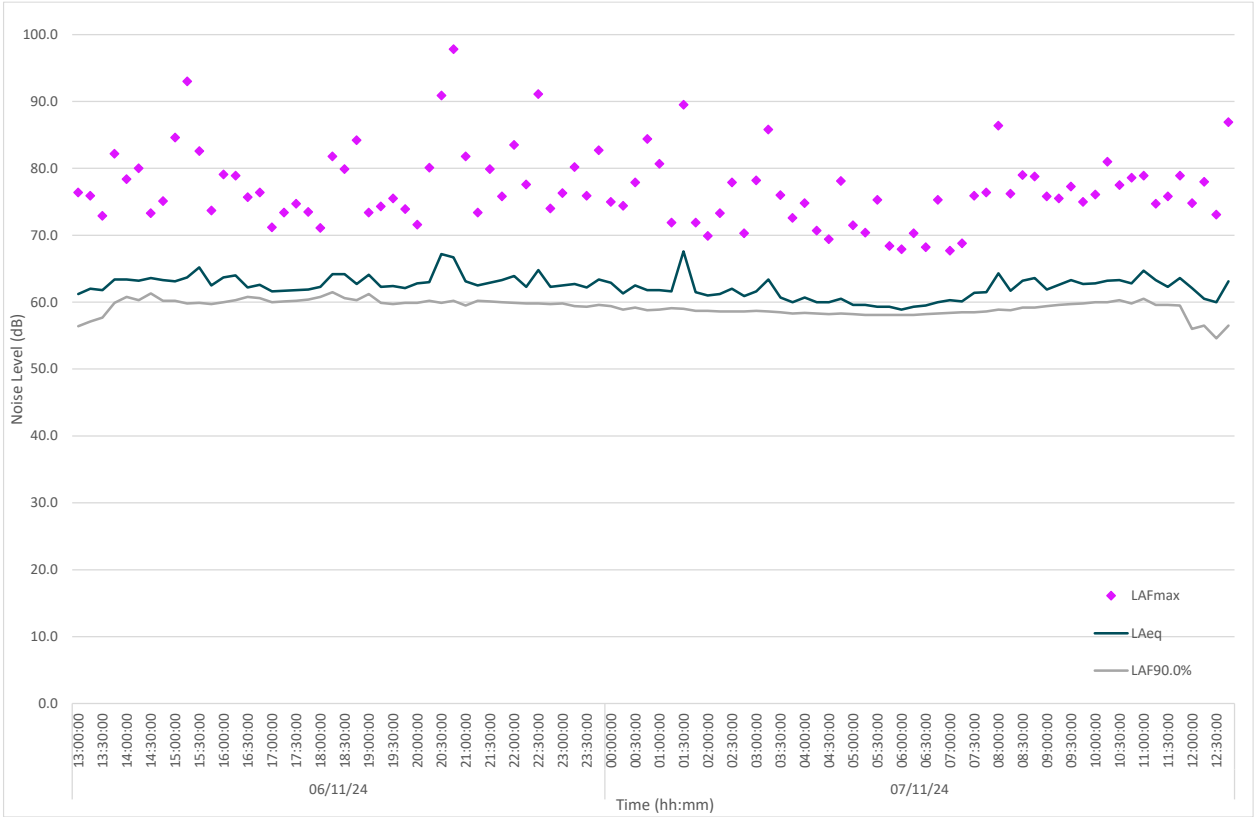
L_{WA} This is the A-weighted 'Sound Power Level' and is a Logarithmic measure of the sound power as a relation to the threshold of hearing.

Appendix II: Noise Survey Results

Date(s):	Wednesday/Thursday 6/7 November 2024
Equipment	NTi XL2 'Class 1' sound level meters (s/n: A2A-20361-E0) with associated calibrator and environmental outdoor monitoring kit
Weather	Dry, ~9-12°C, clear skies and calm <3 m/s

All levels in dB(A)

Location :



Appendix III: Calculation

P24-380



KITCHEN EXTRACT - termination

Description	63	125	250	500	1k	2k	4k	8k	A	Notes
Extract Fan - MaXfan Compac (outlet)	81	82	91	86	87	87	85	81	93	Manufacturer's data - Lw outlet
Attenuator										standard 2D silencer TL values
Resulting in-duct after attenuator	81	82	91	86	87	87	85	81	93	
Duct bends										
Duct run	-1	-1	0	0	0	0	0	0		Trox manual, minial distance
Termination area correction (400mm dia)	-7.5	-3	-1	0	0	0	0	0		Woods Practical Guide to Noise Control fig 5.7
Distance attenuation	-8	-8	-8	-8	-8	-8	-8	-8		Distance to nearest receptor is 1m approx.
Screening										Theoretical screening if ducting to the open
Resulting	65	70	82	78	79	79	77	73	85	

KITCHEN EXTRACT - casing

Description	63	125	250	500	1k	2k	4k	8k	A	Notes
Extract Fan - MaXfan Compac	71	64	69	63	62	59	63	57	69	Manufacturer's data - Lw casing
Lagging										No lagging
Resulting after lagging	71	64	69	63	62	59	63	57	69	
Distance attenuation	-8	-8	-8	-8	-8	-8	-8	-8		Distance to nearest receptor is 1m approx.
Screening										Theoretical screening if ducting to the open
Resulting	63	56	61	55	54	51	55	49	61	

KITCHEN EXTRACT - combined

Description	63	125	250	500	1k	2k	4k	8k	A	Notes
Combined Noise Level	67.1	70.6	81.7	77.9	78.9	78.9	76.9	72.9	85	

KITCHEN EXTRACT - outside nearest dwelling

125mm reinforced concrete topped with 50mm screed	29	35	37	42	49	58	63	66		
break out onto walkway	38.1	35.6	44.7	35.9	29.9	20.9	13.9	6.9	39	
Distance attenuation	-42	-42	-42	-42	-42	-42	-42	-42		Distance to nearest receptor is 50m approx.
Resulting	-3.9	-6.4	2.8	-6.1	-12.1	-21.1	-28.1	-35.1	<5	