Cole Jarman

Domino's, 38 Camden High Street

Plant Noise Assessment

Report 19/0689/R1

Domino's, 38 Camden High Street

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Domino's Pizza UK & Ireland Limited

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Revision	Description	Date	Prepared	Approved
0	1st Issue	22 January 2020	Alex Stronach James Whiddett	Adam Sharpe

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Plant Noise Assessment

1 Introduction

1.1 It is proposed that a unit at 38 Camden High Street, London be utilised as a Domino's Pizza outlet.

1.2 Cole Jarman have been instructed to undertake a noise survey at the site to quantify the existing background noise levels representative of those at the nearest residential receivers. A plant noise assessment has been undertaken to determine the impact of the proposed mechanical services plant and to advise on any mitigation that is needed to reduce the impact.

1.3 This report documents the methodology used to conduct the noise survey and the calculation of noise emissions from the proposed plant to noise sensitive locations.

2 Site Description

2.1 The site is located at 38 Camden High Street, London. The site has been in use previously as a hot food takeaway outlet.

2.2 The site is on a commercial terrace and neighbours an opticians and a Mexican restaurant. Above each commercial property are residential flats.

2.3 The site is on Camden High Street which is a busy main road. To the north of the site is Plender Street which is another busy road.

2.4 At the rear of the site there are residential dwellings on King's Terrace. This is a quiet road with little traffic.

2.5 The proposed development will include the installation of an extract fan, an AHU intake unit and two condenser units within a light well area to the rear of the site at first floor level. Existing plant items associated with neighbouring units are also located within the light well area.

2.6 Windows of the first floor residential premises are also located within the light well and can be considered the nearest noise sensitive receptors to the proposed plant items. The windows are marked as AP1, AP2 and AP3 and are shown in attached site plan 19/0689/SP1 alongside the site and surrounding area.

3 Background Noise Survey

3.1 **Methodology**

3.1.1 An unattended noise survey was undertaken at the site between 1530 hours on the 17th December 2019 and 1100 hours on 18th December 2019.

3.1.2 Measurements of the noise climate were made in a façade-incident position approximately 1.5m above the rear roof level. The measurement position is indicated as MP1 on the attached site plan 19/0689/SP1. This position was selected to quantify the background noise levels representative of the noise sensitive receptors nearest to the proposed items of mechanical services plant.

3.1.3 Measurements of the L_{Aeq}, L_{Amax} and L_{A90} indices were recorded over consecutive 15-minute periods for the duration of the survey using the equipment listed in table T1 below (see attached Glossary of Acoustic Terms for an explanation of the noise units used).

Item	Manufacturer	Type
Sound Level Analyser	Norsonic	118
Acoustic Calibrator	Norsonic	1251
Weatherproof windshield	Norsonic	1212

T1 Equipment used during unattended noise survey.

3.1.4 The sound level meter was calibrated before and after the survey period in order to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.

3.1.5 The weather conditions when setting up and collecting the noise monitor were cloudy with dry roads and no precipitation noted. Little to no wind was also noted. Publicly available weather data indicates the conditions remained acceptable throughout the duration of the survey.

3.2 Results

3.2.1 The results of the noise measurements are presented in the attached time-history graph 19/0689/TH1.

3.2.2 The noise climate was noted to be dominated by existing plant associated with neighbouring commercial premises, road traffic noise was also audible. We have omitted periods where the plant noise is obvious (shown on the attached time history 19/0689/TH1) from the assessment in order to ensure that if the adjacent plant were ever removed, this proposed installation would not then cause issue.

3.2.3 The representative background noise levels as measured during the noise survey and shown in the time history graph are stated in table T2.

Location	Representative Measured Background Noise Level, dB(A)	
	Store Opening Hours (0700-0100 only)	Night time (24 Hours)
MP1 – Rear Roof	52	42

T2 Measured representative background noise levels, $L_{A90,15min}$.

4 Plant Noise Limits

4.1 Local Authority Criteria

4.1.1 The site falls under the jurisdiction of the London Borough of Camden.

4.1.2 Policy A4 of the London Borough of Camden's *Local Plan 2017* relates specifically to noise:

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.

Planning conditions will be imposed to require that plant and equipment which may be a source of noise is kept working efficiently and within the required noise limits and time restrictions.

Conditions may also be imposed to ensure that attenuation measures are kept in place and are effective throughout the life of the development.

4.1.3 With regard to noise from new mechanical services plant, Appendix 3 of the Local Plan sets out the following:

4.1.4 A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15 dB if tonal components are present) should be considered as the design criterion).

4.2 Noise Emission Limits

4.2.1 Based on the guidance above and the results of the noise survey, the following limits apply to noise emissions from the mechanical services, set out in T4 below:

Location	Plant Noise Limits, dB(A)	
	Store Opening Hours (0700 – 0100)	Night-time (24 Hours)
Any residential receiver	42	32

T3 Plant noise emission limits at the nearest residential properties

4.2.2 The noise limits are to apply at 1m from the outside of nearby residential windows. Any plant with a tonal component would be subject to a further penalty, in line with Camden's requirements. These limits apply to all mechanical services being installed when running at duty with all items running concurrently during the relevant period.

4.2.3 The proposed opening hours of the site are to be 1100 to 0100 hours, 7 days a week. The cold-room condenser is the only plant item to be running on a 24-hour basis and thus is assessed against the night-time limits. The rest of the plant installation is proposed to run during opening hours only and so will be assessed to meet the opening hours limit displayed in table T3 above.

5 Plant Noise Assessment

5.1 Proposed Installation

5.1.1 The proposed plant items to be installed are as follows:

- AHU Intake Fan: *Systemair* RS 70-40 Sileo Fan;
- Extract Fan: *Helios* GBD EC 500;
- A/C Condenser (AC1): *Mitsubishi* FDC125VNX;
- Coldroom Condenser (CP1): *Coolmark* SILAJ4517 or 4519FZ.

5.1.2 It is proposed that the A/C and coldroom condensers are to be mounted on the flat roof to the rear of the site. The AHU intake is ducted to terminate at first-floor level on the flat roof to the rear while the extract fan is ducted through this area to terminate at high level 1m above eaves. The plant locations have been established from the provided roof layout (ref: 11600-AEW-PJ003931-ZZ-DR-PRELIM-0001-[D]).

5.1.3 As can be seen above, the exact specification of the coldroom condenser is currently to be determined. However, for the purposes of our assessment, the manufacturer's quoted single figure sound pressure levels are identical for both units. As such, the determination of the exact model has no bearing on our assessment, providing that one of the two models quoted above are installed.

5.1.4 As discussed within section 4.2, the proposed opening hours of the site are to be 1100 to 0100 hours, 7 days a week. The cold-room condenser is the only plant item to be running on a 24-hour basis and thus is assessed against the night-time limits.

5.1.5 Noise from the proposed plant items has been assessed to the most sensitive positions described below and shown on the attached site plan 19/0689/SP1:

- AP1 – 1st floor rear window of 38 Camden High Street.
- AP2 – 1st floor rear window of 21 King's Terrace.
- AP3 – 2nd floor rear window of 38 Camden High Street.

5.1.6 The noise data from the proposed plant items has been provided by their respective manufacturers and is shown in the attached plant noise schedule 19/0689/PNS1. If the plant items differ from those in the attached schedule, this noise assessment will require updating to ensure the validity of the assessment.

5.1.7 Noise levels generated by the proposed installation have been assessed at each of the receptors described above, based on the manufacturers' noise data. The assessment has taken account of losses resulting from ducting, end reflections, radiation losses, distance losses, external grille directivity, façade reflections and screening, where each is applicable.

5.1.8 Due to a lack of an available octave band spectrum for the cold-room condenser, we have taken that of a similar, representative unit (*Karbox* 2464 condenser) and scaled this to the single-figure sound power level for the Coolmark SILAJ4517 / SILAJ4519 given in the manufacturers' data.

5.2 Mitigation Measures

5.2.1 It is required that mitigation measures be installed to enable compliance with the noise emission limits set out in T3.

5.2.2 It will be necessary to install silencers within the AHU intake and extract fan ductwork. These attenuators must meet the insertion losses in each octave band as defined in table T4 below.

Silencer	Insertion Loss (dB) at Octave Band Centred Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
AS01: Extract Fan	6	11	21	25	28	18	11	8
AS02: AHU Intake Fan	4	9	17	26	31	30	23	16

T4 Silencer insertion loss requirements.

5.2.3 We would expect that the insertion losses required for the silencers set out above to be achievable with the following configurations:

- AS01: Melinex-faced, 1200mm length, 43% free area;
- AS02: 1200mm length, 40% free area

5.2 These configurations are stated for guidance only and the above insertion losses must be achieved in any instance.

5.2.4 Any pressure drops from the attenuators or the atmospheric duct termination grilles should be limited to 40Pa.

5.2.5 The silencers associated with the intake and extract ducts should be located within the Domino's demise, close to the fans so that noise breakout from the duct is also attenuated.

5.2.6 All fans should be mounted on anti-vibration mounts and have flexible ductwork connections to control structure-borne sound transmission. The fresh air intake and extract air discharge louvres should be sized at a face velocity of not more than 2m/s.

5.2.7 It will be necessary to install an enclosure around both the A/C and Coldroom condensing units. This enclosure must meet the insertion losses in each octave band as defined in table T5 below:

Enclosure	**Insertion Loss (dB) at Octave Band Centred Frequency (Hz)**							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
EN01: A/C and Coldroom condensing Units	12	13	20	29	36	37	39	39

T5 Enclosure insertion loss requirements

5.2.8 We would expect the insertion losses required for this enclosure to be achievable with a bespoke enclosure system. Two such companies that can undertake such a construction are *Environ Technologies Ltd*[1] and *Sound Planning Ltd*[2].

5.2.9 It is essential that the silencers and enclosure specified above meet the performance requirements outlined in tables T4 and T5 above, respectively, as a minimum.

[1] http://www.environ.co.uk/
[2] https://soundplanning.co.uk//

5.3 Assessment Results

5.3.1 With the specified mitigation measures in place we have assessed the following noise levels at each assessment position in table T6. Results can also be found in attached calculation summaries 19/0689/CS1-CS6. Full results are available on request.

Location	Rating Noise Level, dB *(Limit)*	
	Store Opening Hours (0700-0100 only)	**Night time (24-hour)**
AP1: 1st floor rear window of 38 Camden High Street	38 *(42)*	32 *(32)*
AP2: 1st floor rear window of 21 King's Terrace	39 *(42)*	28 *(32)*
AP3: 2nd floor rear window of 38 Camden High Street	39 *(42)*	24 *(32)*

T6 Calculated plant noise emissions at the nearest residential properties.

6 Conclusions

6.1 It is proposed that a unit at 38 Camden High Street, London be utilised as a Domino's Pizza outlet. Mechanical services plant equipment will be installed in the light well area at the rear of the site.

6.2 This report has detailed a noise survey undertaken at the site and has established plant noise limits in line with the requirements of the local planning authority and BS 4142:2019+A1. It also details the results of a noise impact assessment from the proposed plant items to the nearest noise-sensitive receivers.

6.3 We propose the extract and extract fan be fitted with a Melinex-faced silencer with a length of 1200mm and 43% free area and the AHU intake fan be fitted with a 1200mm silencer with 40% free area.

6.4 We further propose that the air-conditioning unit and cold-room condenser be fitted within acoustic enclosures.

6.5 With the proposed enclosures and atmospheric-side silencers (of which specifications have been set out in this report) in place, the proposed plant is shown to meet the noise limits set for the site and hence the requirements of the local planning authority.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly, L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_{n}.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section

Cole Jarman

Figure 19/0689/SP1

Title:

Site plan showing measurement and assessment positions

North

Project:

Domino's, 38 Camden High Street

Date: January 2020

Revision: -

Scale:

Not to scale

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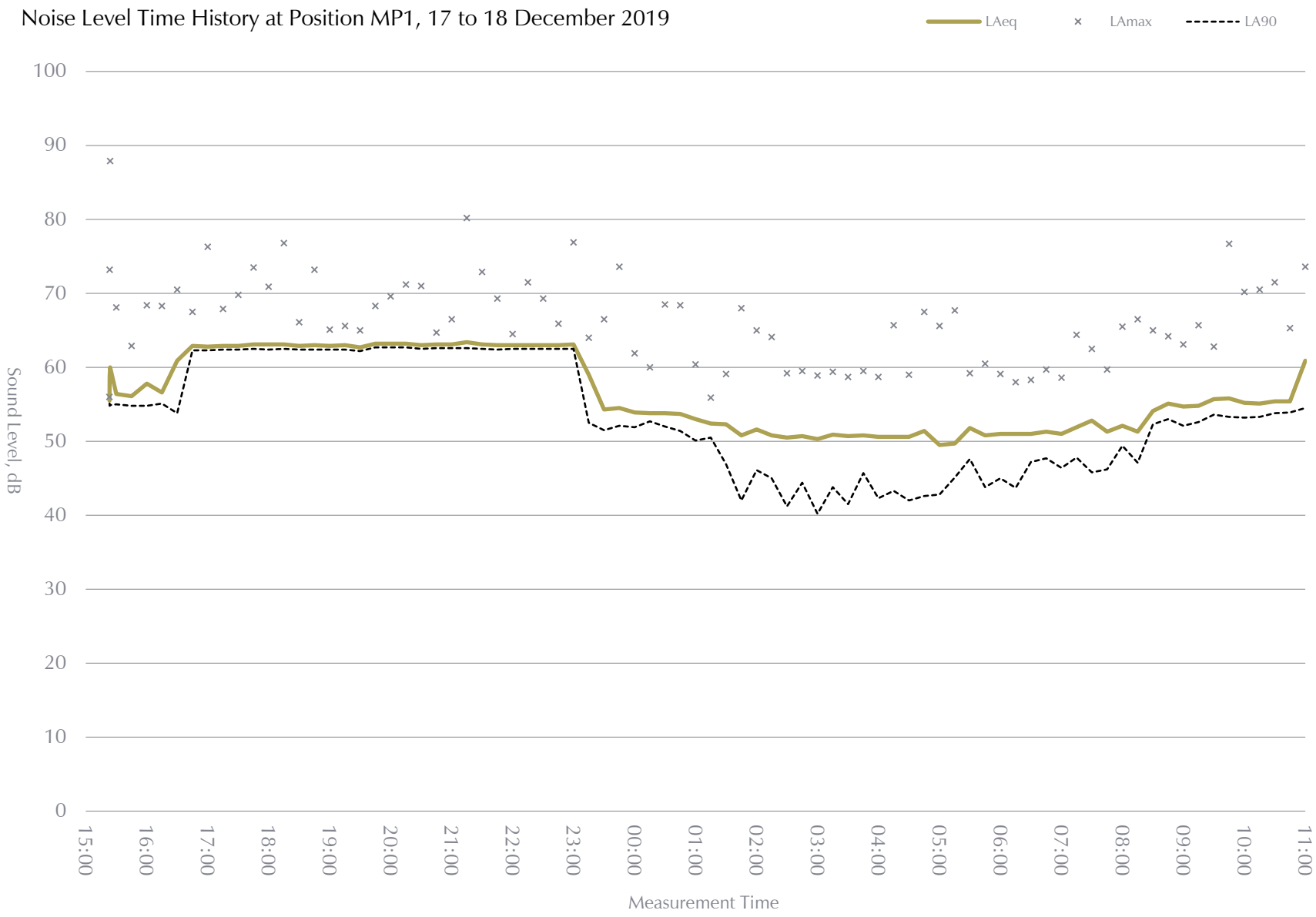


Figure 19/0689/TH01

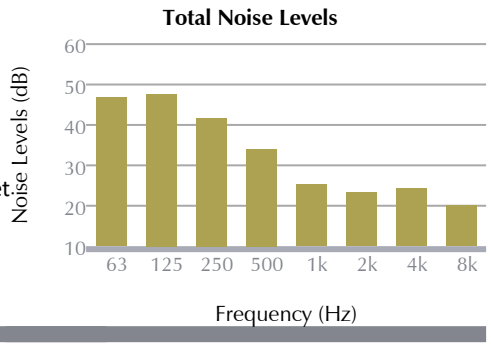
Schedule of Plant and Air Handling Equipment Sound Levels, dB

Reference	Description	Data Source [1]	Noise Level Type	Noise Levels (dB)							
				63	125	250	500	1k	2k	4k	8k
Extract Fan	Helios GB EC 500	Man	Sound Power, Lw	62.0	62.0	73.0	76.0	77.0	75.0	71.0	64.0
AHU Intake Fan	Systemair RS 70-40 EC Sileo Fan	Man	Sound Power, Lw	58.0	69.0	70.0	70.0	70.0	69.0	64.0	56.0
A/C Condenser	A/C Condenser	Man	Sound Pressure, Lp @ 1m	34.0	44.0	44.5	47.5	46.0	41.0	38.5	32.0
Cold Room Condenser	Coolmark SILAJ 4517 or 4519 FZ	Man	Sound Power, Lw	66.0	63.5	63.5	65.0	61.4	59.3	56.1	48.9

Notes

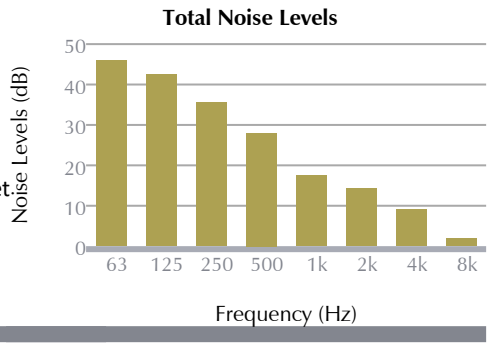
1 - Man refers to data supplied by the equipment manufacturer or supplier, Emp refers to data calculated using empirical formulae, and Meas refers to data measured by Cole Jarman

Project Name	Domino's, 38 Camden High Street
Project Reference	19/0689
Receiver Reference	AP1 Open
Description	1st floor window, 38 Camden High Street.
Noise Limit	42
dBA	37.7



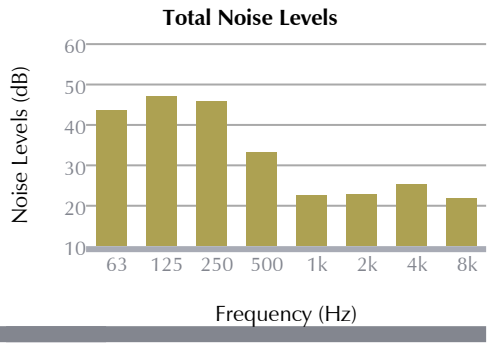
Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Extract Fan	15.7	16.0	21.4	18.1	14.6	20.6	23.6	19.6
Extract Fan Duct Breakout	34.7	26.7	21.7	14.5	3.3	7.3	7.3	3.3
AHU Intake Fan	28.2	39.0	36.0	17.6	3.6	-2.9	-0.9	-1.9
Cold Room Condenser	46.0	42.5	35.5	28.0	17.4	14.3	9.1	1.9
A/C Condenser	36.0	45.0	38.5	32.5	24.0	18.0	13.5	7.0

Project Name	Domino's, 38 Camden High Street
Project Reference	19/0689
Receiver Reference	AP1 Night
Description	1st floor window, 38 Camden High Street.
Noise Limit	32
dBA	31.6



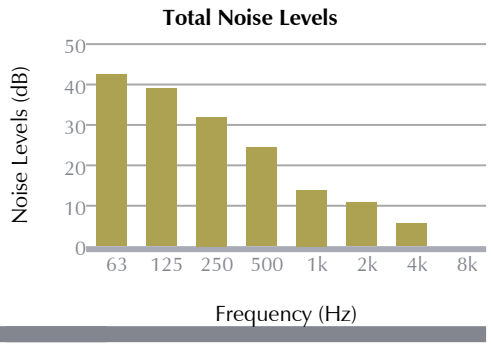
Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Cold Room Condenser	46.0	42.5	35.5	28.0	17.4	14.3	9.1	1.9

Project Name	Domino's, 38 Camden High Street
Project Reference	19/0689
Receiver Reference	AP2 Open
Description	1st floor window, 21 King's Terrace
Noise Limit	42
dBA	39.2



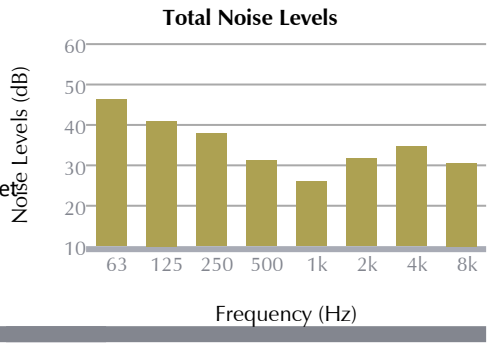
Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Extract Fan	14.5	14.8	20.3	17.9	14.4	21.4	24.4	20.4
Extract Fan Duct Breakout	33.5	25.5	20.5	13.3	2.1	6.1	6.1	2.1
AHU Intake Fan	33.7	46.1	45.5	32.1	20.7	14.7	16.7	15.7
Cold Room Condenser	42.5	39.0	32.0	24.5	13.9	10.8	5.6	-1.6
A/C Condenser	21.4	30.4	23.9	17.9	9.4	3.4	-1.1	-7.6

Project Name	Domino's, 38 Camden High Street
Project Reference	19/0689
Receiver Reference	AP2 Night
Description	1st floor window, 21 King's Terrace
Noise Limit	32
dBA	28



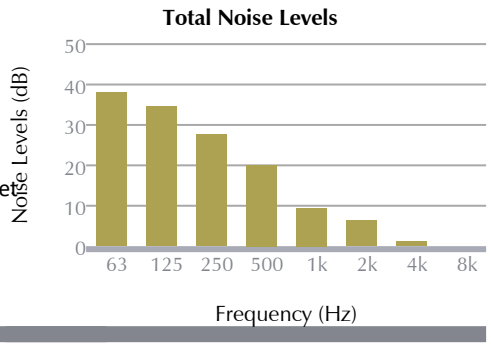
Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Cold Room Condenser	42.5	39.0	32.0	24.5	13.9	10.8	5.6	-1.6

Project Name	Domino's, 38 Camden High Street
Project Reference	19/0689
Receiver Reference	AP3 Open
Description	2nd floor window, 38 Camden High Street
Noise Limit	42
dBA	39.4



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Extract Fan	26.5	26.9	32.3	29.0	25.5	31.5	34.5	30.5
Extract Fan Duct Breakout	45.5	37.5	32.5	25.4	14.2	18.2	18.2	14.2
AHU Intake Fan	22.9	34.5	32.9	17.1	-0.9	-8.9	-6.9	-7.9
Cold Room Condenser	38.1	34.6	27.6	20.1	9.5	6.4	1.2	-6.0
A/C Condenser	19.5	28.5	22.0	16.0	7.5	1.5	-3.0	-9.5

Project Name	Domino's, 38 Camden High Street
Project Reference	19/0689
Receiver Reference	AP3 Night
Description	2nd floor window, 38 Camden High Street
Noise Limit	32
dBA	23.6



Reference	Noise Levels (dB)							
	63	125	250	500	1k	2k	4k	8k
Cold Room Condenser	38.1	34.6	27.6	20.1	9.5	6.4	1.2	-6.0

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