Cole Jarman

Fast Food Takeaway, Kentish Town

Plant Noise Assessment

Report 16/0318/R1-0

Fast Food Takeaway, Kentish Town

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Report 16/0318/R1-0

DPP UK Ltd.

1 Thornbury
West Ashland
Milton Keynes
MK6 4BB

Issue	Description	Date	Prepared by	Checked by
0	1st Issue	24 June 2016	Tony James	Richard Masey

Prepared by

Checked by

Cole Jarman Limited Reg. in England and Wales No. 7102436
t +44 (0)1932 829007 **f** +44 (0)1932 829003
John Cree House, 24B High Street, Addlestone, Surrey, KT15 1TN
e info@colejarman.com **w** www.colejarman.com

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Plant Noise Assessment 24 June 2016

1 Introduction

1.1 Planning permission is being sought for the development of 194 Kentish Town Road, London, NW5 2AE for fast food takeaway (A5) use. It is proposed that the premises be used as a hot food takeaway and delivery outlet.

1.2 Cole Jarman has been appointed to carry out a noise survey at the site in order to quantify the existing noise levels, representative of nearest key noise sensitive receivers. An assessment of the proposed mechanical plant items to be installed is also required.

1.3 This report presents the results of the noise survey and sets out plant noise limit criteria in accordance with local guidance from the London Borough of Camden. This report also details the assessment of the proposed mechanical plant items to be installed on site, proposing mitigations measures where necessary.

2 Site Description

2.1 The site address is 194, Kentish Town Road, London, NW5 2AE and is shown on the attached site plan 16/0318/F1.

2.2 The unit was previously used as a Mediterranean Grill & Meza Bar however it is currently unoccupied.

2.3 The unit is part of a three storey block, with commercial premises on the ground floor and private flats on floors 1 and 2. The residential premises are separate to the commercial ground floor and have a separate entrance and exit access at the rear of site just off Patshull Road.

2.4 Kentish Town Road at the front of site is a busy high-street with retail units lining both sides of the street on the ground floors. At the rear of site is parking allocated to the block, with no through traffic and very little general activity.

2.5 The closest noise sensitive receivers are located above the ground floor retail unit on the 1st and 2nd floor, and across the rear area available for parking to the north east.

2.6 Key contributions to the noise climate on site were from distant and local road traffic, aircraft noise and railway noise.

2.7 The takeaway unit is proposed to open from 11h00 until 23h00 daily.

3 London Borough of Camden Policy

3.1 The *Camden Local Development Framework – Adoption version 2010* includes guidance for Noise and vibration in section DP28.

3.2 Section 28.1 of the *Camden Local Development Framework* states

Noise and vibration can have a major effect on amenity and health and therefore quality of life. Camden's high density and mixed-use nature means that disturbance from noise and vibration is a particularly important issue in the borough. Camden's Core Strategy recognises the importance of this issue for Camden's residents and policy DP28 contributes to implementing a number of Core Strategy policies

3.3 With relevance to noise from plant equipment in section 29.1 it states:

The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds.

3.4 In section 28.4 guidance on acceptable maximum noise levels from plant and machinery is given. This information have been summarised in the table below:

Noise Description	**Noise Level**
Noise at 1 metre external to a sensitive façade	L_{A90} - 5dB
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	L_{A90} - 10dB
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	L_{A90} - 10dB
Noise at 1 metre external to sensitive façade where L_{A90}>60dB	55dB L_{Aeq}

T1 Summary of 28.11, Table E: Noise levels from plant and machinery at which planning permission will not be granted

3.5 It is noted that the criteria in the table above applies to daytime, evening and night time periods (for a 24hour period). Where the background noise level (L_{A90}) is used, this refers to the minimum background noise level during a relevant assessment time period.

4 Environmental Noise survey

4.1 Methodology and Instrumentation

4.1.1 An attended noise survey was undertaken on site commencing at 22h15 hours on Wednesday the 15th of June at 02h00 hours on Thursday 16th June 2016. This period was selected to quantify background noise levels over what is generally accepted to be the quietest period of the day (07h00 to 23h00) and night time (23h00 to 07h00).

4.1.2 Noise measurements were undertaken at one position chosen to be representative of the nearest noise sensitive residential windows. This is shown on the attached site plan 16/0318/F1 and described below:

• MP1 – Free field measurement position at 2.5 metres above local ground level, to the rear of site at the boundary closest to the resident with greatest potential for noise exposure.

4.1.3 Measurements of the L_{Aeq}, L_{Amax}, and L_{A90} indices were taken over consecutive 15 minute periods (see Glossary of Acoustic Terms for an explanation of the noise units used).

4.1.4 Noise measurements were made using the equipment listed in table T2 below:

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

T2 Equipment used during attended noise survey.

4.1.5 The microphone was fitted with a windshield and was calibrated before and after the survey to ensure a consistent and acceptable level of accuracy was maintained throughout.

4.1.6 The weather conditions over the survey period were mild and dry with moderate cloud cover and a light breeze.

4.2 Survey Results

4.2.1 The noise levels measured during the survey are presented in the following table:

Period	$L_{Aeq, 15min}$	$L_{Amax,fast}$	$L_{A90, 15min}$
22h15-22h30	51	68	47
22h30-22h45	54	77	45
22h45-23h00	49	65	45
23h00-23h15	50	71	44
23h15-23h30	47	63	44
23h30-23h45	51	74	44
23h45-00h00	46	61	43
00h00-00h15	47	63	44
00h15-00h30	-	-	-
00h30-00h45	47	66	43
00h45-01h00	46	63	43
01h00-01h15	45	63	42
01h15-01h30	45	60	40
01h30-01h45	45	55	41
01h45-02h00	45	52	42

T3 Results from attended survey

4.2.2 There is no data available between 00h15 and 00h30 due the sound level meter not properly saving during this period.

4.2.3 The noise climate on site was primarily controlled by road traffic on Kentish Town Road however the measurement and assessment positions were significantly screened from this noise source.

4.2.4 Other contributions to the noise climate came from local traffic on Patshull Road and Gaisford Street which are mostly screened from the site. Less significant contributions to the noise climate were noted from air traffic and distant rail noise.

4.2.5 The minimum background noise levels measured during the survey are shown in table T4:

Location	Measured Minimum Background Noise Level, dB L_{A90}	
	Day (07h00-23h00)	Night (23h00-07h00 or 24 Hours)
MP1	45	40

T4 Minimum background noise level measured during attended survey

5 Plant Noise Emission Limit

5.1 Requirements with regard to noise from mechanical services plant, set by the London Borough of Camden, are described section 3.

5.2 Based on the results of the noise survey and the London Borough of Camden policy, plant noise limits for the site have been devised as shown in table T5 below:

Location	Plant Noise Emission Limit, dB	
	Day 07h00-23h00	Night 23h00-07h00
Residences at the rear of site	40	35

T5 Plant noise emission limits at the nearest residential properties.

5.3 The plant noise limits apply to the combined effect of all plant items running during any particular time period at 1m from the nearest residential window.

5.4 The hot food takeaway unit and all associated plant would operate between 11h00 and 23h00 each day with only the external cold store condenser operating 24 hours.

5.5 Plant that has a distinctive tonal or intermittent nature shall be subject to a 5dB correction to the rating level.

6 External Plant Noise Assessment

6.1 Details

6.1.1 The proposed plant installation will consist of one cold room condenser, one kitchen extract fan, a fresh air supply system and an extract system. The plant items, with their associated noise data are presented in the attached schedule 16/0318/PNS1.

6.1.2 The assessment is based on information and drawings provided by *HATTRELL DS One Architects LLP*.

6.1.3 Noise Levels have been calculated to two assessment points which represent the nearest noise sensitive receivers. The assessment positions are shown in the attached site plan 16/0318/F1.

- AP1 Approximately 1m from rear window of flat above 194 Kentish Town Road.
- AP2 Approximately 1m from rear 1st floor windows of residential house on Gaisford Street

6.1.4 The assessment has taken into account duct losses, end reflection, radiation distance, and losses between the various plant items and the assessment positions as appropriate.

6.1.5 None of the plant equipment was judged to show signs of tonality, intermittency, or impulsivity therefore no corrections were applied to the rating level.

6.1.6 Full calculation sheets have been provided in the appendix as 16/0318/CS1-14.

6.2 Required mitigation measures

6.2.1 The kitchen supply and extract fans will require atmospheric side attenuators; these attenuators must meet the insertion losses in each octave band as defined in table T6 below:

Unit	Insertion Loss (dB) @ Octave Band Centred Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
FA Supply Unit	4	9	17	26	31	30	23	16
Kitchen Extract Fan Silencer	6	11	21	25	28	18	11	8

T6 Attenuator insertion loss requirements (atmospheric side)

6.2.2 The fresh air supply unit attenuation should be achievable with a 1200mm long 40% free area attenuator. The kitchen extract attenuator should be Melinex faced. The performance figures for the kitchen extract should be achievable with a 1200mm long 43% free area attenuator. Any pressure drops should be limited to 40 Pa.

6.2.3 The supply silencer should be within the Fast Food Takeaway demise, close to the fan so that noise breakout from the duct is also attenuated.

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

6.2.5 The wall surface behind the cold store and air conditioning units must be treated with an acoustically absorbent material. A typical material for this application is 50mm thick mineral wool slab. Consideration should be given to the protection of the performance and structure of the panel placed externally. An acoustically transparent covering such as perforated or expanded metal should be considered.

6.3 Calculated Noise Emission

6.3.1 With the mitigation measures in place we have calculated the following noise levels at the assessment positions:

Receiver	Combined Rating Levels, dB(A) (Emission Limit)	
	Day 0700-23h00	Night 23h00-07h00
AP1 – Rear of flat above	28(40)	24(35)
AP2 – Rear of adjacent house	39(40)	35(35)

T7 Plant noise emission limits at the nearest residential receivers

6.3.2 It can be seen that with the specified mitigation measures in place the plant noise emission limits will be within the specified criteria.

6.3.3 Full details of the calculations can be found in the attached calculations sheets 16/0318/CS1-14.

7 Conclusions

7.1 Planning permission is being sought for the development of 194 Kentish Town Road, London, NW5 2AE for a Fast Food takeaway (A5) use. It is proposed that the premises be used as a hot food takeaway and delivery outlet.

7.2 Cole Jarman has undertaken a noise survey on site to quantify the existing noise climate. From this data plant noise emission limits have been set in accordance with the requirements of The London Borough of Camden Local Development Framework.

7.3 It has been found that in order to meet plant noise emission limits, acoustic mitigation measures are required. The fresh air supply and extract systems require atmospheric side silencers. The kitchen extract silencer should be Melinex faced. The cold store and air conditioning units require absorbent material to be placed against the walls behind the units. Full details of the required mitigation measures can be found in section 6.2 and should be read in full.

7.4 With the specified mitigation measures in place the plant equipment proposed to be installed on site will meet the requirements of London Borough of Camden.

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).

Cole Jarman Limited Reg. in England and Wales No. 7102436
t +44 (0)1932 829007 **f** +44 (0)1932 829003

John Cree House, 24B High Street, Addlestone, Surrey, KT15 1TN
e info@colejarman.com **w** www.colejarman.com

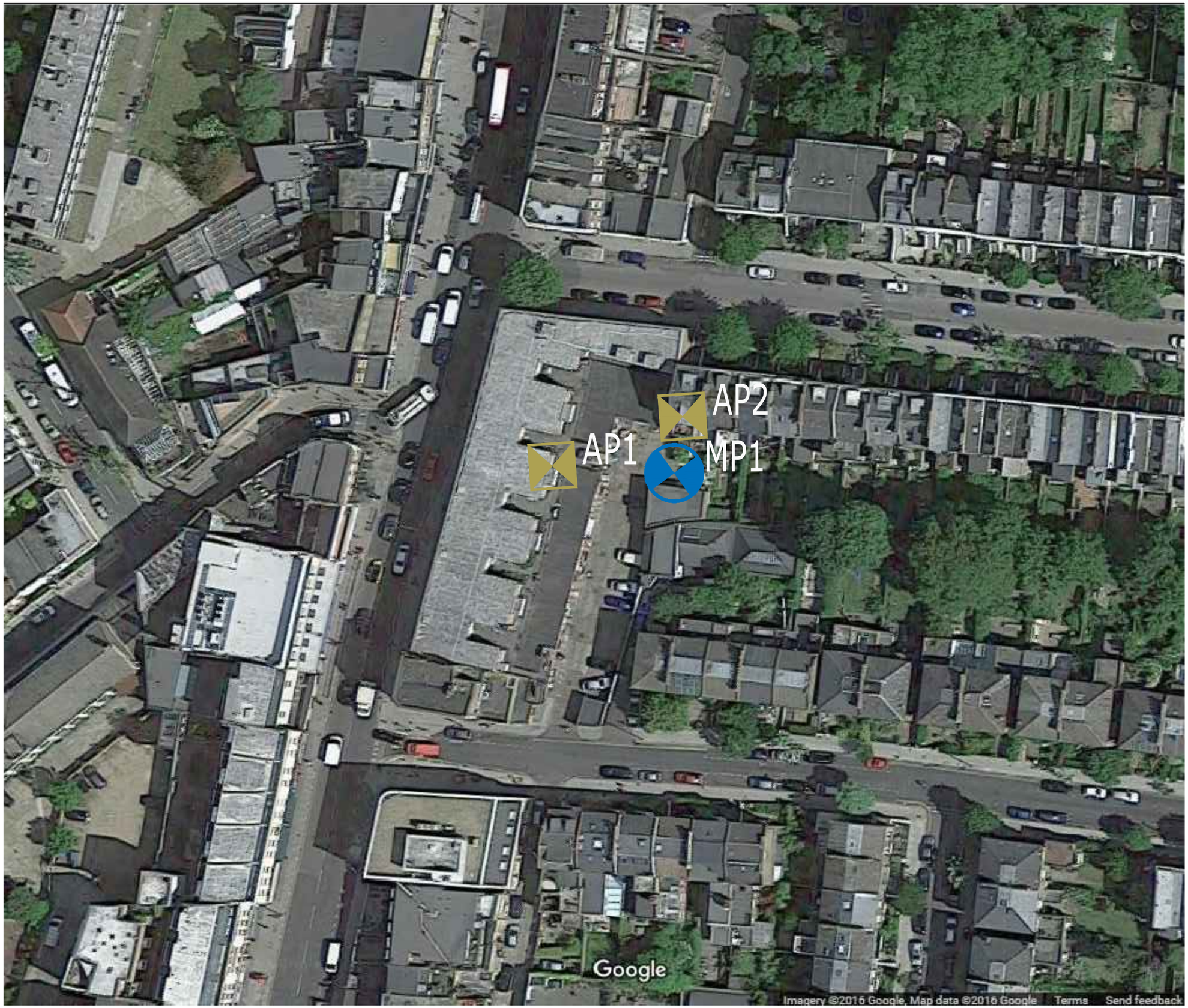

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Figure 16/0318/F1

Title:

Site plan illustrating location of Measurement and assessment positions

Project:

Fast Food Takeaway, Kentish Town

Date:

June 2016

Revision:

-

Scale:

Not to scale

Cole Jarman Limited
t +44 (0)1932 829007 **f** +44 (0)1932 829003

John Cree House, 24B High Street, Addlestone, Surrey KT15 1TN
e info@colejarman.com **w** www.colejarman.com

Schedule of Plant and Air Handling Equipment Sound Levels, dB

Reference	Description	Volume (m3/s)	Data Source[1]	Noise Level Type	Noise Levels (dB)							
					63	125	250	500	1k	2k	4k	8k
A/C	Mitsubishi Heavy Industries FDC100VNX		Man	Sound Power, Lw	49	56	60	62	59	56	52	44
Cold Store	Karbox 2464		Man	Sound Power, Lw	64	61.5	61.5	63	59.4	57.3	54.1	46.9
Extract	Vent Axia Black Sabre BSC500/4		Man	Sound Power, Lw	80	79	76	72	75	75	68	61
Fresh Air	Air Vent Tech		Man	Sound Power, Lw	77	79	73	74	77	77	74	69

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

A/C to AP1 - Day

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - A/C									
Sound Power Levels		**49.0**	**56.0**	**60.0**	**62.0**	**59.0**	**56.0**	**52.0**	**44.0**
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	7.8								
		-17.8	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*
Maekawa Screening Loss									
Path Difference (m)	0.6								
		-8.7	*-10.7*	*-13.1*	*-15.8*	*-18.6*	*-21.6*	*-24.5*	*-27.5*
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
External Receiver									
External Receiver - AP1 - Day									
Sound Pressure, Lp		**17.5**	**22.5**	**24.1**	**23.4**	**17.5**	**11.6**	**4.7**	**-6.3**

Cold Store to AP1 - Day

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Cold Store									
Sound Power Levels		**64.0**	**61.5**	**61.5**	**63.0**	**59.4**	**57.3**	**54.1**	**46.9**
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	7.8								
		-17.8	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*
Maekawa Screening Loss									
Path Difference (m)	0.7								
		-9.1	*-11.2*	*-13.7*	*-16.4*	*-19.3*	*-22.2*	*-25.2*	*-28.2*
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
External Receiver									
External Receiver - AP1 - Day									
Sound Pressure, Lp		**32.1**	**27.5**	**25.0**	**23.8**	**17.3**	**12.3**	**6.1**	**-4.1**

Extract to AP1 - Day

		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Noise Source									
Noise Source - Extract									
Sound Power Levels		**80.0**	**79.0**	**76.0**	**72.0**	**75.0**	**75.0**	**68.0**	**61.0**
Circular Unlined Duct Losses CJ									
Diameter (mm)	500.0								
Length (m)	12.9								
		-0.8	*-0.8*	*-0.8*	*-1.3*	*-1.9*	*-1.9*	*-1.9*	*-1.9*
Coil and Filter Losses									
		-3.0	*-3.0*	*-3.0*	*-3.0*	*-3.0*	*-3.0*	*-3.0*	*-3.0*
End Reflection									
Width/Diameter (m)	0.5								
Length (m)	0.2								
Rec or Circ - Circular									
Free or Flush - Flush									
		-9.2	*-4.7*	*-0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
External Grille Directivity									
Width (m)	0.8								
Height (m)	0.6								
Vertical (°)	90.0								
Horizontal (°)	0.0								
		0.0	*0.2*	*0.2*	*0.0*	*-4.0*	*-7.0*	*-7.0*	*-7.0*
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	7.8								
		-17.8	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Maekawa Screening Loss									
Path Difference (m)	0.4								
		-7.7	*-9.5*	*-11.7*	*-14.2*	*-17.0*	*-19.8*	*-22.8*	*-25.8*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Silencer									
Silencer - Extract									
		-6.0	*-11.0*	*-21.0*	*-25.0*	*-28.0*	*-18.0*	*-11.0*	*-8.0*
External Receiver									
External Receiver - AP1 - Day									
Sound Pressure, Lp		**30.5**	**27.4**	**16.8**	**5.7**	**-1.7**	**2.4**	**-0.5**	**-7.5**

Fresh Air to AP1 - Day

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Fresh Air									
Sound Power Levels		**77.0**	**79.0**	**73.0**	**74.0**	**77.0**	**77.0**	**74.0**	**69.0**
Circular Unlined Duct Losses CJ									
Diameter (mm)	400.0								
Length (m)	2.4								
		-0.1	*-0.1*	*-0.1*	*-0.2*	*-0.4*	*-0.4*	*-0.4*	*-0.4*
End Reflection									
Width/Diameter (m)	0.4								
Length (m)	0.2								
Rec or Circ - Circular									
Free or Flush - Flush									
		-10.7	*-6.2*	*-1.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
External Grille Directivity									
Width (m)	0.6								
Height (m)	0.6								
Vertical (°)	90.0								
Horizontal (°)	0.0								
		0.0	*0.2*	*0.2*	*0.0*	*-4.0*	*-7.0*	*-7.0*	*-7.0*
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	7.8								
		-17.8	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Maekawa Screening Loss									
Path Difference (m)	0.4								
		-7.7	*-9.5*	*-11.7*	*-14.2*	*-17.0*	*-19.8*	*-22.8*	*-25.8*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Silencer									
Silencer - Fresh Air									
		-4.0	*-9.0*	*-17.0*	*-26.0*	*-31.0*	*-30.0*	*-23.0*	*-16.0*
External Receiver									
External Receiver - AP1 - Day									
Sound Pressure, Lp		**31.6**	**31.6**	**19.9**	**10.7**	**1.9**	**-3.0**	**-2.0**	**-2.9**

Calculation Sheet 16-0318-CS1

A/C to AP2 - Day

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - A/C									
Sound Power Levels		**49.0**	**56.0**	**60.0**	**62.0**	**59.0**	**56.0**	**52.0**	**44.0**
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	17.0								
		-24.6	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
External Receiver									
External Receiver - AP2 - Day									
Sound Pressure, Lp		**19.4**	**26.4**	**30.4**	**32.4**	**29.4**	**26.4**	**22.4**	**14.4**

Calculation Sheet 16-0318-CS2

Cold Store to AP2 - Day

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Cold Store									
Sound Power Levels		**64.0**	**61.5**	**61.5**	**63.0**	**59.4**	**57.3**	**54.1**	**46.9**
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	17.0								
		-24.6	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
External Receiver									
External Receiver - AP2 - Day									
Sound Pressure, Lp		**34.4**	**31.9**	**31.9**	**33.4**	**29.8**	**27.7**	**24.5**	**17.3**

Extract to AP2 - Day

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Extract									
Sound Power Levels		**80.0**	**79.0**	**76.0**	**72.0**	**75.0**	**75.0**	**68.0**	**61.0**
Circular Unlined Duct Losses CJ									
Diameter (mm)	500.0								
Length (m)	12.9								
		-0.8	*-0.8*	*-0.8*	*-1.3*	*-1.9*	*-1.9*	*-1.9*	*-1.9*
Coil and Filter Losses									
		-3.0	*-3.0*	*-3.0*	*-3.0*	*-3.0*	*-3.0*	*-3.0*	*-3.0*
End Reflection									
Width/Diameter (m)	0.5								
Length (m)	0.2								
Rec or Circ - Circular									
Free or Flush - Flush									
		-9.2	*-4.7*	*-0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
External Grille Directivity									
Width (m)	0.8								
Height (m)	0.6								
Vertical (°)	0.0								
Horizontal (°)	45.0								
		0.5	*1.5*	*2.0*	*2.8*	*3.2*	*4.0*	*4.0*	*4.0*
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	17.0								
		-24.6	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Silencer									
Silencer - Extract									
		-6.0	*-11.0*	*-21.0*	*-25.0*	*-28.0*	*-18.0*	*-11.0*	*-8.0*
External Receiver									
External Receiver - AP2 - Day									
Sound Pressure, Lp		**31.9**	**31.4**	**23.4**	**15.9**	**15.7**	**26.5**	**26.5**	**22.5**

Fresh Air to AP2 - Day

		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Noise Source									
Noise Source - Fresh Air									
Sound Power Levels		**77.0**	**79.0**	**73.0**	**74.0**	**77.0**	**77.0**	**74.0**	**69.0**
Circular Unlined Duct Losses CJ									
Diameter (mm)	400.0								
Length (m)	2.4								
		-0.1	*-0.1*	*-0.1*	*-0.2*	*-0.4*	*-0.4*	*-0.4*	*-0.4*
End Reflection									
Width/Diameter (m)	0.4								
Length (m)	0.2								
Rec or Circ - Circular									
Free or Flush - Flush									
		-10.7	*-6.2*	*-1.7*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
External Grille Directivity									
Width (m)	0.6								
Height (m)	0.6								
Vertical (°)	0.0								
Horizontal (°)	45.0								
		0.5	*1.5*	*2.0*	*2.8*	*3.2*	*4.0*	*4.0*	*4.0*
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	17.0								
		-24.6	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Silencer									
Silencer - Fresh Air									
		-4.0	*-9.0*	*-17.0*	*-26.0*	*-31.0*	*-30.0*	*-23.0*	*-16.0*
External Receiver									
External Receiver - AP2 - Day									
Sound Pressure, Lp		**33.1**	**35.6**	**26.6**	**20.9**	**19.3**	**21.0**	**25.0**	**27.0**

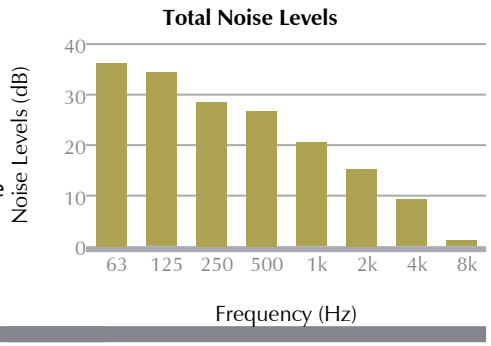
Cold Store to AP1 - Night

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Cold Store									
Sound Power Levels		**64.0**	**61.5**	**61.5**	**63.0**	**59.4**	**57.3**	**54.1**	**46.9**
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	7.8								
		-17.8	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*	*-17.8*
Maekawa Screening Loss									
Path Difference (m)	0.7								
		-9.1	*-11.2*	*-13.7*	*-16.4*	*-19.3*	*-22.2*	*-25.2*	*-28.2*
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
External Receiver									
External Receiver - AP1 - Night									
Sound Pressure, Lp		**32.1**	**27.5**	**25.0**	**23.8**	**17.3**	**12.3**	**6.1**	**-4.1**

Cold Store to AP2 - Night

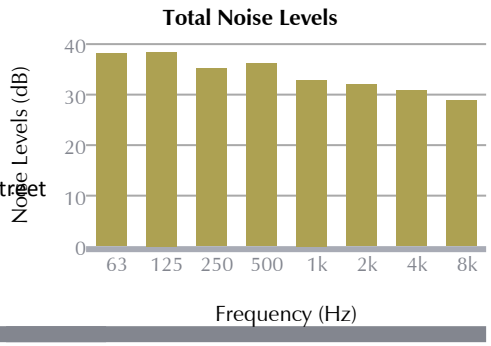
		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Cold Store									
Sound Power Levels		**64.0**	**61.5**	**61.5**	**63.0**	**59.4**	**57.3**	**54.1**	**46.9**
Point Source Distance Loss									
Start Distance (m)	1.0								
End Distance (m)	17.0								
		-24.6	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*	*-24.6*
Point Source Radiation Loss									
Radiation - Hemispherical									
		-8.0	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*	*-8.0*
Facade Reflection									
Reflection (dB)	3.0								
		3.0	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
External Receiver									
External Receiver - AP2 - Night									
Sound Pressure, Lp		**34.4**	**31.9**	**31.9**	**33.4**	**29.8**	**27.7**	**24.5**	**17.3**

Project Name	Fast food Takeaway, Kentish Town
Project Reference	16-0318
Receiver Reference	AP1 - Day
Description	Rear window of flat above proposed site
Noise Limit	40
dBA	27.6



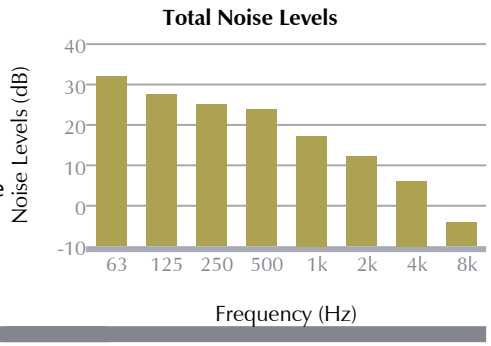
Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Extract	30.5	27.4	16.8	5.7	-1.7	2.4	-0.5	-7.5
A/C	17.5	22.5	24.1	23.4	17.5	11.6	4.7	-6.3
Cold Store	32.1	27.5	25	23.8	17.3	12.3	6.1	-4.1
Fresh Air	31.6	31.6	19.9	10.7	1.9	-3	-2	-2.9

Project Name	Fast food Takeaway, Kentish Town
Project Reference	16-0318
Receiver Reference	AP2 - Day
Description	Rear window of residence on Gaisford Street
Noise Limit	40
dBA	39.4



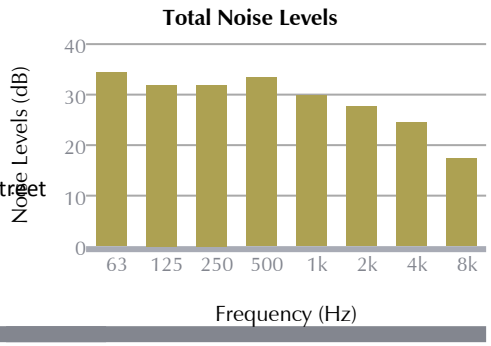
Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
A/C	19.4	26.4	30.4	32.4	29.4	26.4	22.4	14.4
Cold Store	34.4	31.9	31.9	33.4	29.8	27.7	24.5	17.3
Extract	31.9	31.4	23.4	15.9	15.7	26.5	26.5	22.5
Fresh Air	33.1	35.6	26.6	20.9	19.3	21	25	27

Project Name	Fast food Takeaway, Kentish Town
Project Reference	16-0318
Receiver Reference	AP1 - Night
Description	Rear window of flat above proposed site
Noise Limit	35
dBA	24.1



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Cold Store	32.1	27.5	25	23.8	17.3	12.3	6.1	-4.1

Project Name	Fast food Takeaway, Kentish Town
Project Reference	16-0318
Receiver Reference	AP2 - Night
Description	Rear window of residence on Gaisford Street
Noise Limit	35
dBA	35.4



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Cold Store	34.4	31.9	31.9	33.4	29.8	27.7	24.5	17.3