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NOISE IMPACT ASSESSMENT REPORT - KITCHEN EXTRACTION SYSTEM

74 MARCHMONT STREET, LONDON WC1N 1AB

FOR

ATLAS LICENSING LTD

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1. EXECUTIVE SUMMARY

The Client intends to seek planning approval for the installation of mechanical plant (Kitchen Extraction System) to service the premises at 74 Marchmont Street, London WC1N 1AB.

Sound Licensing has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive properties, which have been identified as the first-floor residential premises directly above the site at 74 Marchmont Street, WC1N.

The results of the noise survey are considered reasonable given the location of the measurement position and the existing noise sources in the local vicinity.

Noise calculations of the mechanical plant have been undertaken using all available details and plans provided by the client and obtaining manufacturers' specifications wherever possible. The data and information form the basis of the assessment.

Noise break-out limits for the mechanical plant have been proposed based on the methodologies of British Standard (BS) 4142:2014+A1:2019 and in accordance to Local Authority policy. A robust, worst-case assessment of the noise levels associated to the proposed mechanical plant has been undertaken.

In accordance with BS 4142:2014+A1:2019 guidance, the predicted noise impact due to the operation of the mechanical plant ***"is an indication of the specific sound source having a low impact"***. The predicted noise level of the mechanical plant at the nearest noise sensitive properties is considered to comply with the London Borough of Camden Council's policy.

2. INTRODUCTION

The client is proposing to install a new kitchen extraction system at the rear of 74 Marchmont Street, London WC1N 1AB, the noise from which could have the potential to affect existing noise sensitive properties nearby.

The purposes of this report are:

- To determine prevailing environmental noise levels affecting surrounding properties due to nearby noise sources (e.g. road traffic, aircraft etc);
- Based on the above, to present noise emission limits in accordance with the requirements of BS 4142:2014+A1:2019 and Local Authority policy, and
- To undertake an assessment to demonstrate compliance with the Local Authority noise requirements.

3. SITE DESCRIPTION

Planning permission is being sought for the installation of a kitchen extraction system at 74 Marchmont Street, London WC1N 1AB (hereafter referred to as 'the site'). The property is a traditionally built five-storey end of terrace building in the London Borough of Camden. It is located in a mixed area comprising predominantly of commercial units at ground floor level with residential accommodation on the floors above.

The nearest sensitive residential receptors were noted to be the first-floor windows located on the rear façade of 74 Marchmont Street at an approximate distance of 1.5m from the discharge point of the flue.

The nearest sensitive receptors are identified in figure 3.1. If the noise impact assessment details that there is an indication of the specific sound source having a low impact at these premises then it can be safely assumed it will be met at other properties of equal distance and/or those further away.

Figure 3.1 shows the site highlighted in **blue** with the nearest noise sensitive premises highlighted in **red**.

Figure 3.1 Site Location and Surrounding Land Use

Source: Google Maps

4. ENVIRONMENTAL NOISE SURVEY METHODOLOGY

An unmanned environmental noise survey was undertaken at a single measurement location at first floor level to the rear of the site. The survey was undertaken between 13:00 hours on the 7th January and 13:00 hours on the 9th January 2025. A survey at this time covers the most sensitive period of time in which the mechanical plant system may be operational.

Ambient, background and maximum noise levels (L_{Aeq}, L_{A90} and L_{Amax} respectively) were measured throughout the noise survey in continuous 15-minute periods. The approximate measurement position is indicated in **orange** on Figure 4.1 below.

Figure 4.1 Site Plan Showing Approximate Location of Measurement Position

Source: Google Maps

The sound level meter microphone was positioned on a tripod at a height of 1.5 metres, 1 metre from the rear façade of the building at first floor level. The position is not considered to be in free-field and therefore a 3dB façade correction will be applied. The monitoring position is considered representative of background noise levels at the nearest identified noise sensitive properties. The monitoring position was chosen for equipment security reasons also.

The equipment used for the noise survey is summarised in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Equipment	Description	Quantity	Serial Number
Larson Davis Sound Expert LxT	Type 1 automated logging sound level meter	1	0004702
Larson Davis 377B02	½" microphone	1	319670
Larson Davis	Pre-amplifier	1	069941
Larson Davis CAL200	Class 1 Calibrator	1	12245

The noise survey and measurements were conducted in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures'*.

Weather conditions throughout the entire noise survey period were noted to be cold (approx. -2 - 6° Celsius), clear skies (0 to 30% cloud cover approximately) with a light wind (<5m/s). These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were maintained throughout the majority of the survey period and are considered reasonable for undertaking environmental noise measurements.

The noise monitoring equipment was field calibrated before and after the noise survey period. No significant drift was recorded (±0.3 dB). Equipment calibration certificates can be provided upon request.

5. NOISE SURVEY RESULTS AND OBSERVATIONS

5.1 Results

A summary of the measured ambient and typical background noise levels during the proposed operational hours are shown in Table 5.1 below (full monitoring data can be found in Appendix C).

Table 5.1 Measured Ambient and Typical Background Sound Pressure Levels

Date / Period (hours)	Ambient Sound Pressure Level, dB $L_{Aeq,T}$*	Typical Background Sound Pressure Level, dB $L_{A90,T}$*
07/01/2025(13:00 to 23:00)	**51-61**	**48**
08/01/2025(06:30 to 23:00)	**50-62**	**48**
09/01/2025(06:30 to 13:00)	**51-57**	**50**

*Façade correction -3dB. Day Time 1-hour measurements and Night Time 15-minute measurements

The typical background noise level at the measurement position during the survey, at the time in which the plant could be operational, is **48dB** $L_{A90,T.}$

5.2 Observations

Given that the noise survey was unmanned, noise sources could not be identified. However, at the beginning and end of the survey background noise was dominated by noise from the vehicles on the local road network and nearby existing mechanical plant. After analysis of the data no significant abnormal noise source(s) were identifiable. It is considered that the measured noise levels are reasonable given the location of the measurement position.

6. EXTERNAL NOISE EMISSION LIMITS

6.1 Local Authority Requirements

The site lies within the jurisdiction of the London Borough of Camden Council. The following criteria is stated within the Council's Local Plan (2017):

"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 (15dB if tonal components are present) should be considered as the design criterion)."

For the purposes of this report, an assessment has been undertaken in line with BS 4142:2014+A1:2019. A design criterion of achieving a minimum 10dB(A) below the typical background noise level has been adopted in line with the Local Authorities policy. Taking the noise monitoring data in Section 5 and Local Authority requirements above, the following design target has been adopted for mechanical plant as provided in Table 6.1.

Table 6.1 Maximum Noise Emission Design Target at Residential Premises

Date / Period (hours)	Typical Background Sound Pressure Level, dB $L_{A90,T}$*	Rating Noise Level at Nearest Residential Facade, dB $L_{Ar,T}$
07/01/2025(13:00 to 23:00)	**48**	**38**
08/01/2025(06:30 to 23:00)	**48**	
09/01/2025(06:30 to 13:00)	**50**	

* Façade correction -3dB. Day Time 1-hour measurements and Night Time 15-minute measurements

6.2 BS 4142:2014+A1:2019

BS 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound" presents a method for assessing the significance and possible adverse impact due to an industrial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property.

The specific noise level due to the source is determined, with a series of corrections for tonality, impulsivity, intermittency or other unusual characteristic. The rating level is then compared to the background noise level and the significance of the new noise source likelihood of any adverse impact is determined in accordance with the following advice:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occur. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

7. PROPOSED KITCHEN EXTRACTION SYSTEM AND ASSOCIATED NOISE LEVELS

It is proposed to install the following items of plant at the rear of the premises.

Table 7.0 Proposed Kitchen Extraction Fan Motor

External Plant Item	Make	Model	Reference Noise Level* $L_{w(A)}$
Kitchen Extract Fan Motor	Helios	GigaBox 400/4	Outlet 73dB

*Reference sound power levels. Manufacturer's specifications are provided in Appendix B.

The ducting will be 350mm standard rectangular duct work. The extraction fan motor will be located internally and therefore only noise from the duct terminus has been considered.

In reference to section 6 of this report, no penalty addition has been applied for intermittency as the system will remain on throughout the entire service period. Penalty additions have not been applied for tonality as manufacturers' data shows no significant characteristics, or for impulsiveness as it is considered that these characteristics will not be perceptible sufficient to attract attention at the noise receptors. Penalty additions have not been applied for any other sound characteristics as mechanical plant of this type generally do not demonstrate such features.

7.1 Silencer

The extraction system will be fitted with an R02-4-600 Acoustica silencer on the atmosphere side of the fan. The silencer provides the attenuation shown in Table 7.1. All silencers should be Melinex lined.

Table 7.1 Silencer Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
8	12	23	30	30	23	18

7.2 Directivity

A directivity correction should be applied as the extract fan duct aperture is to terminate approximately 90˚ to the nearest residential windows. A duct opening of 350mm has been used. The levels of attenuation (dB) at each octave frequency band (Hz) is provided in table 7.2 below.

Table 7.2 Directivity Attenuation

125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
0	2	5	7	12	15	18

Corrections have also been applied for the attenuation from duct bends (2)* and length of the ductwork (4m)**.

* Reference: Improving Ductwork, EU project, Brussls 1999. Also same as CIBSE.
** Reference data taken from CIBSE Guide B4 2016 b Ventilation Services Noise

8. NOISE IMPACT ASSESSMENT

This section presents calculations to predict the noise impact of the proposed kitchen extraction system, located at the site, at the nearest noise sensitive properties.

8.1 Proposed Operational Hours and Background Noise Levels

The kitchen extraction system will operate during the opening hours of the business. The opening hours are from 06:30 - 23:00 hours 7 days a week.

The typical background noise level at the measurement position during the survey is **48dB** $L_{A90,T.}$ The design range is **38dB** $L_{Ar,T}$ at the façade of the nearest residential premises.

8.2 Nearest Noise Sensitive Properties

The nearest sensitive residential receptors were noted to be the first-floor windows located on the rear façade of 74 Marchmont Street at an approximate distance of 1.5m from the discharge point of the flue.

8.3 Description of Calculation Process

In accordance with the methodologies of BS 4142:2014+A1:2019, calculations have been undertaken to predict noise levels in which the kitchen extraction system could be operational at its maximum level. Given the distances between the noise sources and the noise sensitive receptors, point source calculations have been used.

8.4 Noise Level Predictions

Calculations to predict the noise of the kitchen extraction system operating at the facade of the residential property is given below. Full calculations are provided in Appendix D.

The rating noise level at the nearest sensitive receptor, with the mechanical plant operating, is predicted to be **36dB $L_{Ar,T}$** which is **12dB(A) below** the typical background noise level (48dB $L_{A90,T}$).

In accordance with BS 4142:2014+A1:2019 guidance, noise from the mechanical plant ***"is an indication of the specific sound source having a low impact"***. *The lower the rating level is relative to the measured background level, the less likely it is that the specific sound source will have an adverse impact.*

8.5 Vibration

In addition to the control of airborne noise transfer, it is important to consider the transfer of noise as vibration to adjacent properties as well as any sensitive areas of the same building. Vibration from the system is not expected, however, as a precaution plant should wherever possible be installed on suitable type isolators. The fan should be installed with flexible connections to adjacent structures.

Uncertainty

The levels of uncertainty in the data and calculations are considered to be low given the robust exercise undertaken in noise monitoring and the confidence in the data statistical analysis. Manufacturers' data for the plant is highly likely to be robust. Detailed calculations and resultant noise levels at the residential location are considered to be confidently predicted.

9. CONCLUSION

Sound Licensing has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive properties. The operation of the kitchen extraction system, in accordance with BS 4142:2014+A1:2019 guidance, indicates to creating a low impact. All worst-case scenarios have been applied to the assessment. The predicted operating noise level of the kitchen extraction system is demonstrated to comply with the London Borough of Camden Council's policy.

APPENDIX A – Acoustic Terminology

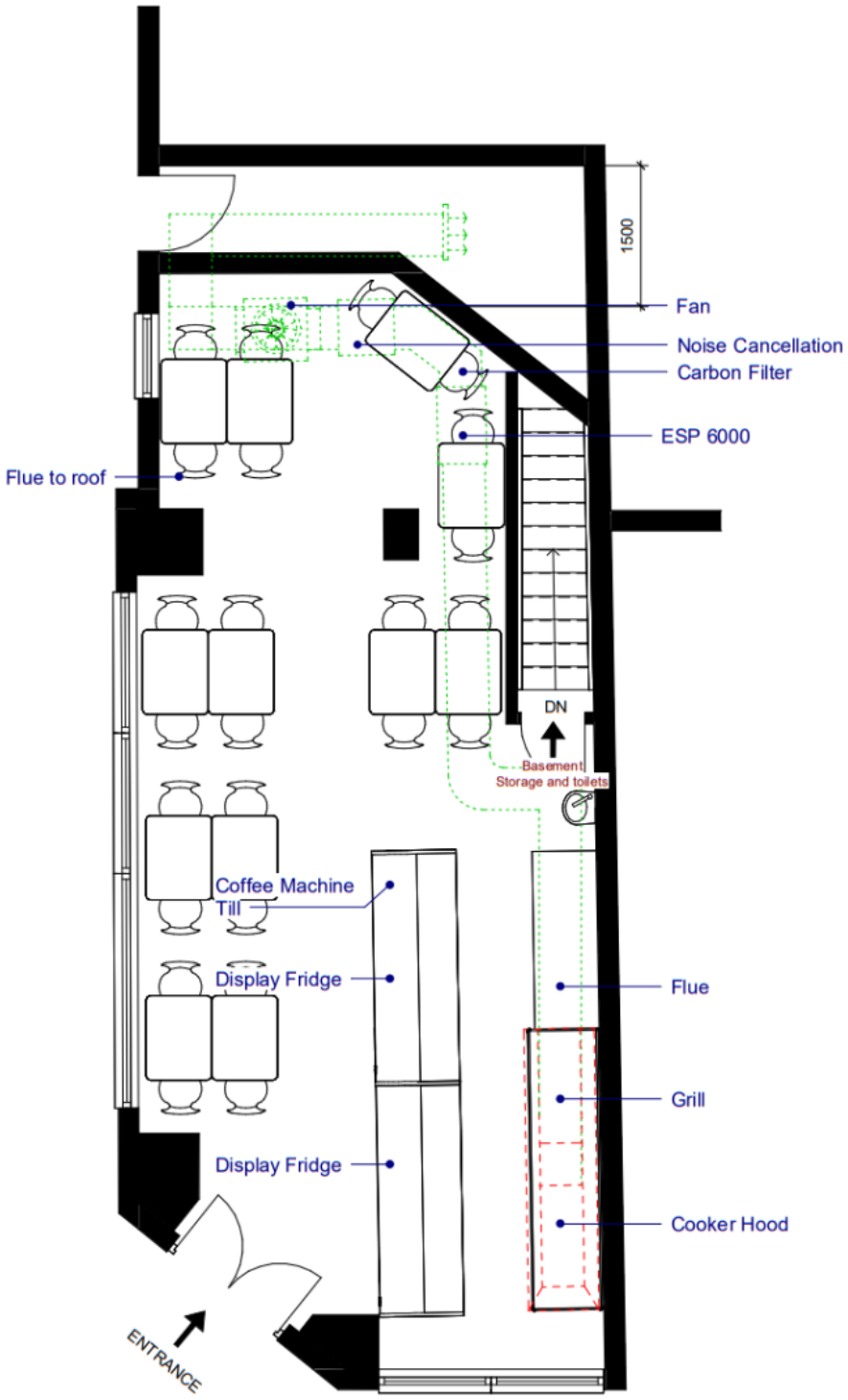
Parameter	Description
Acoustic environment	Sound from all sound sources as modified by the environment
Ambient sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far
Ambient sound level, La = LAeq,T	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T
Background sound level, LA90,T	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Equivalent continuous A-weighted sound pressure level, LAeq,T	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time
Measurement time interval, Tm	Total time over which measurements are taken
Rating level, LAr,Tr	Specific sound level plus any adjustment for the characteristic features of the sound
Reference time interval, Tr	Specified interval over which the specific sound level is determined
Residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound
Residual sound level, Lr = LAeq,T	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T
Specific sound level, Ls = LAeq,Tr	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr
Specific sound source	Sound source being assessed

References:

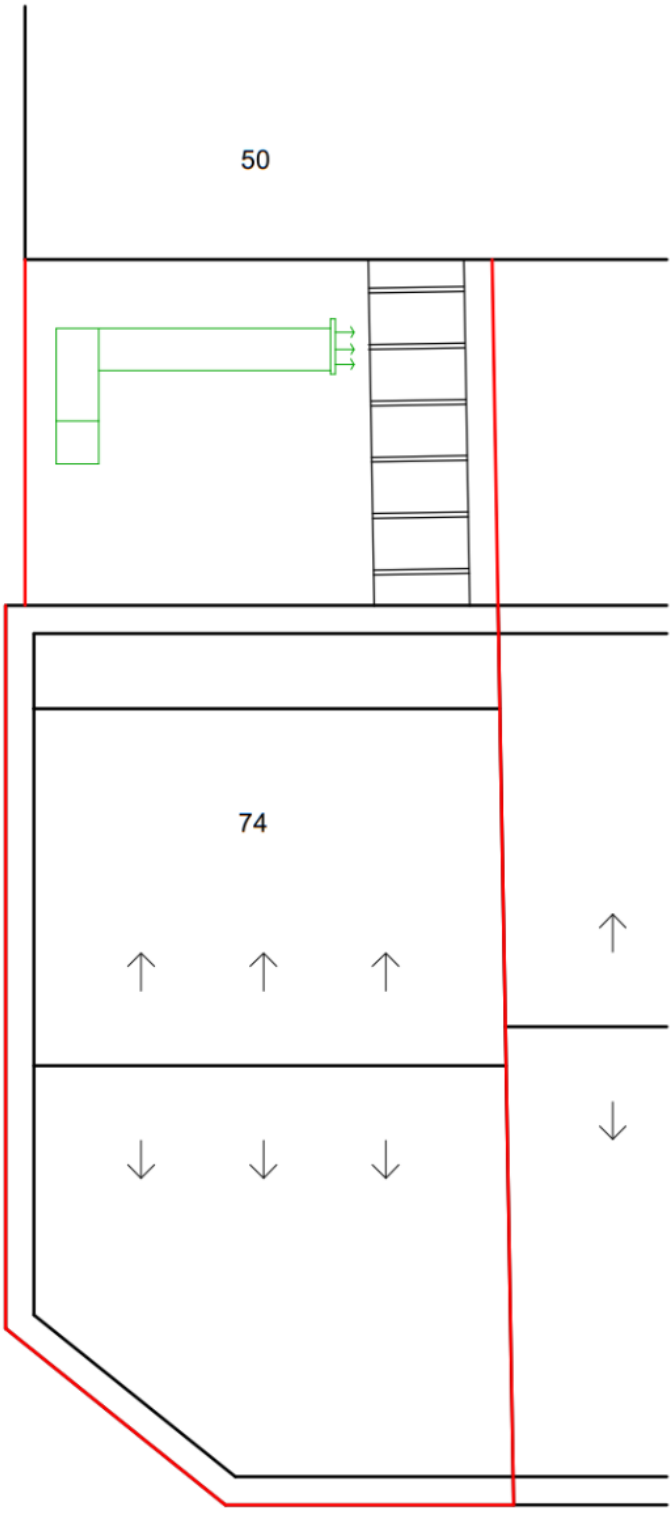
BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'
London Borough of Camden Council (2017) 'Local Plan'

APPENDIX B – Data Sheets and Figures

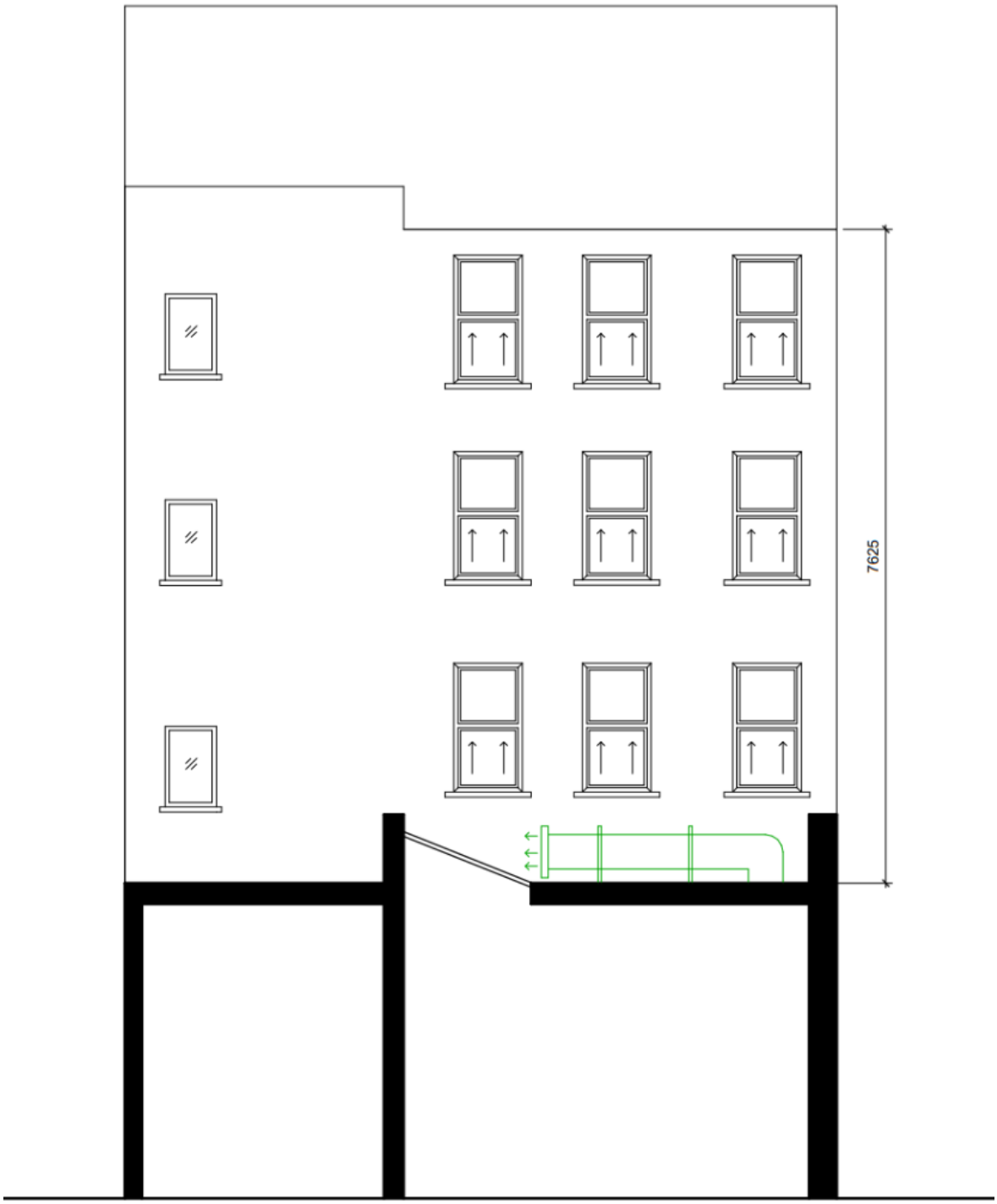
Proposed Ground Floor Plan



Proposed Flat Roof Plan



Proposed Rear Elevation



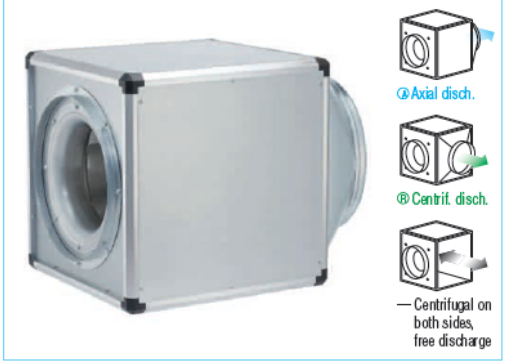
Helios Gigabox 400/4 Data Sheet – Proposed Kitchen Extraction Fan Motor

400 mm ø GigaBox centrifugal fan

Helios

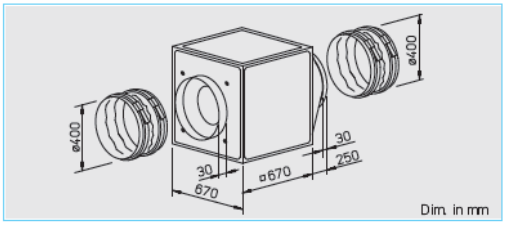
GB

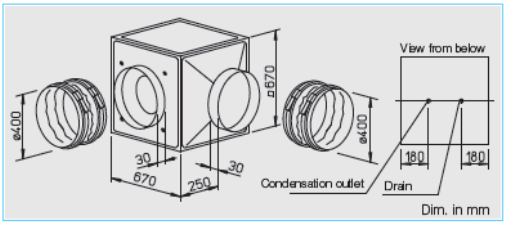
Arbitrary installation position and flexible assembly by five possible discharge directions.



GB T120

Designed for moving dirty, humid and hot air up to max. 120° C.
Motor located outside the air flow.





■ **Special features of types GB T120**
- Designed for moving dirty, humid and hot air volumes up to max. 120° C.
- Motor located outside of air flow.
- Temperature insulated partition panel between motor and impeller, lined with 20 mm thick, flame-retardant mineral wool.
- Easily accessible motor and impeller unit, removable without disassembling the system components.
- Inspection cover with handle, simply remove for cleaning and maintenance.
- Condensate collector with condensate spigot included in delivery. Drill hole for rain drainage (accessories) for outdoor installation is prepared.

□ **Assembly GB T120**
Installation must be carried out with condensation discharge showing downward. Flexible assembly by three possible centrifugal discharge directions via the discharge adapter.
Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ **Feature**

□ **Assembly of types GB**
Arbitrary installation position and flexible assembly by five possible discharge directions via the discharge adapter.
For wall mounting the wall bracket (accessories) have to be used. Outdoor installation is possible using outdoor cover hood and external weather louvers (accessories).

■ **Specification of both types**

□ **Casing**
Self-supporting frame construction from aluminium hollow profiles. Double-walled side panels from galvanised sheet steel, lined with 20 mm thick temperature insulating and flame-retardant mineral wool. Intake cone for ideal inflow as well as spigot and flexible sleeve (for the respective max. permissible air flow temperature) for duct connection. With discharge adapter (from square to circular) on the pressure side for low-loss discharge and flexible sleeve to reduce vibration transmission. Simple positioning by standard crane hooks.

□ **Impeller**
Smooth running backward curved centrifugal impeller highly efficient with polymer blades on galvanised steel disc (with GB T120 aluminium impeller), direct driven. Energy efficient with a low noise development. Dynamically balanced together with the motor to DIN ISO 1940 Pt.1 – class 6.3.

□ **Motor**
Maintenance-free external rotor motor or IEC-standard motor protected to IP 54. With ball bearings and interference-free as standard.

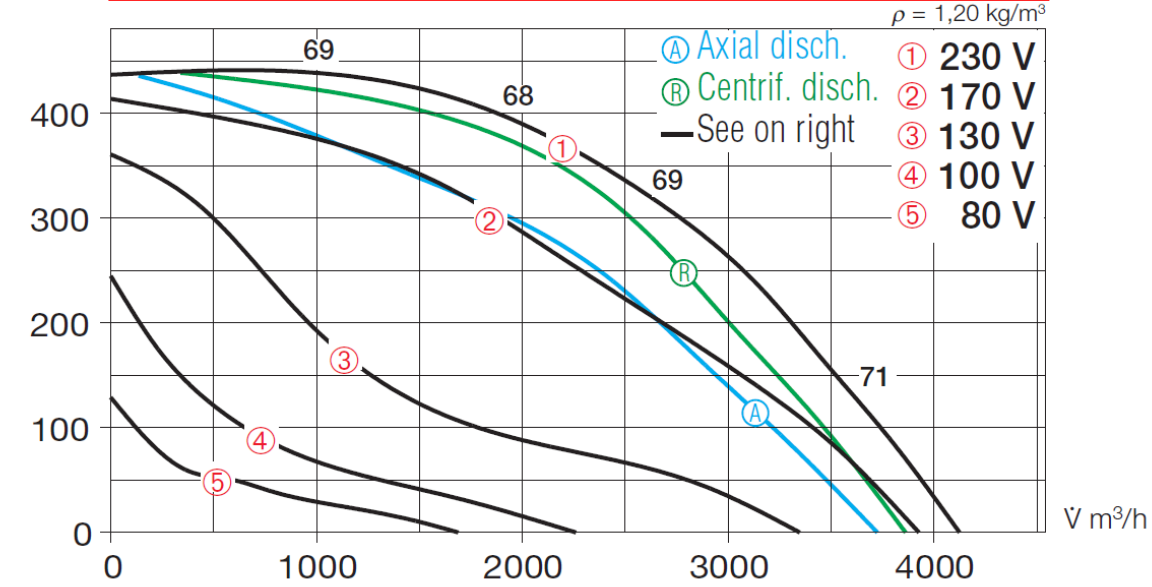
Type	Ref. no.	Air flow volume (FID)	R.P.M.	Sound press. case breakout	Motor power (nominal)	Current full load	Current speed controlled	Wiring diagram	Maximum air flow temperature Full load	Maximum air flow temperature controlled	Weight (net) kg	5 step transformer controller with mot. protect. unit Type	Ref. no.	5 step transformer controller without mot. protect. unit Type	Ref. no.	Full motor protection unit using the thermal contacts Type	Ref. no.
		V m³/h	min⁻¹	dB(A) in 4 m	kW	A	A	No.	+°C	+°C	kg						
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54																	
GBW 400/4	5513	4300	1360	38	0.53	2.40	2.80	864	50	50	52.0	**MWS 5**	1949	**TSW 5,0**	1497	**MW** [1]	1579
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△ wiring, protection to IP 54																	
GBD 400/4/4	5514	3700/4100	1193/1390	38	0.38/0.49	0.61/1.05	1.08	857	50	45	52.0	**RDS 2**	1315	**TSD 1,5**	1501	**MD**	5849
1 Phase motor, 230 V / 1 ph. / 50 Hz, capacitor motor, protection to IP 54																	
GBW 400/4 T120	5772	4930	1280	40	0.54	2.50	2.50	935	120	100	62.0	**MWS 3**	1948	**TSW 3,0**	1496	**MW** [1]	1579
2 speed motor, 3 Phase motor, 400 V / 3 ph. / 50 Hz, Y/△ wiring, protection to IP 54																	
GBD 400/4/4 T120	5773	4010/4870	975/1255	40	0.29/0.48	0.50/1.10	1.10	947	120	120	62.0	**RDS 1**	1314	**TSD 1,5**	1501	**MD**	5849

1) incl. operation switch

Helios Gigabox 400/4 Acoustic Data

GBW 400/4

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	58	54	54	49	45	42	37	29
L_{WA}	Intake	dB(A)	70	60	61	63	66	61	56	47
L_{WA}	Exhaust	dB(A)	73	58	67	69	65	63	60	53



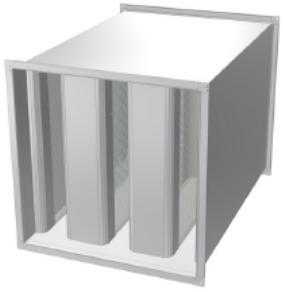
Acoustica R02-4-600 Silencer Data Sheet

R02
Rectangular Silencers

ACOUSTICA

R02 - 4 - Attenuator

Available in seven standard lengths R02 4 Rectangular Duct Mounted Silencers have excellent attenuation properties, achieved with sound absorbing infill splitters, retained in the attenuator casing by a perforated liner. The resistance to airflow is a function of the face velocity and length. It is not recommended to select the R02 4 Silencers with a face velocity above 3.5 metres per second without asking advice regarding re-generated self noise. We can advise on the selections and can perform system analysis to ensure the correct unit is specified.



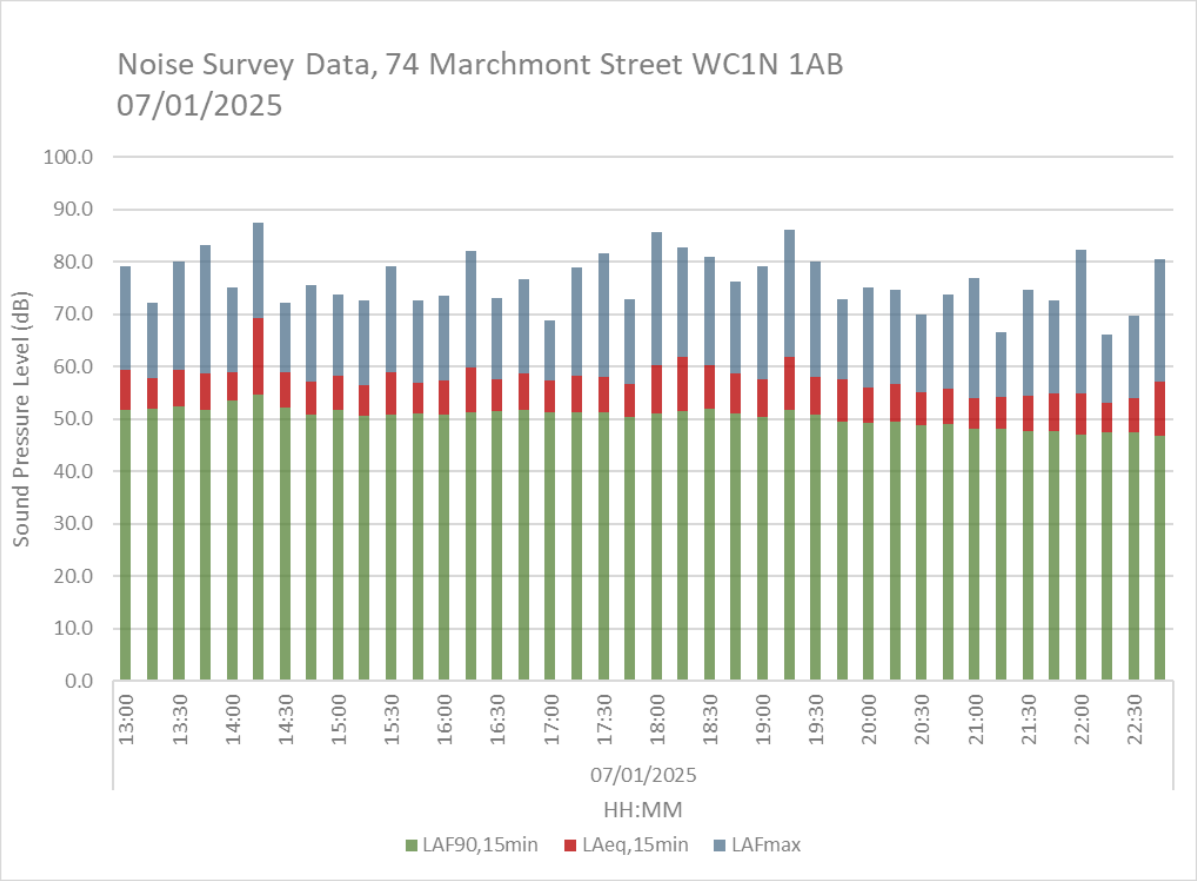
- High performance rectangular duct silencer
- Seven standard lengths
- Many connection options
- Cross section dimensions in 1mm increments
- System pressure within ducted systems to 1500 Pa
- Special lengths on request

Insertion Loss (dB) - Centre Band Frequency

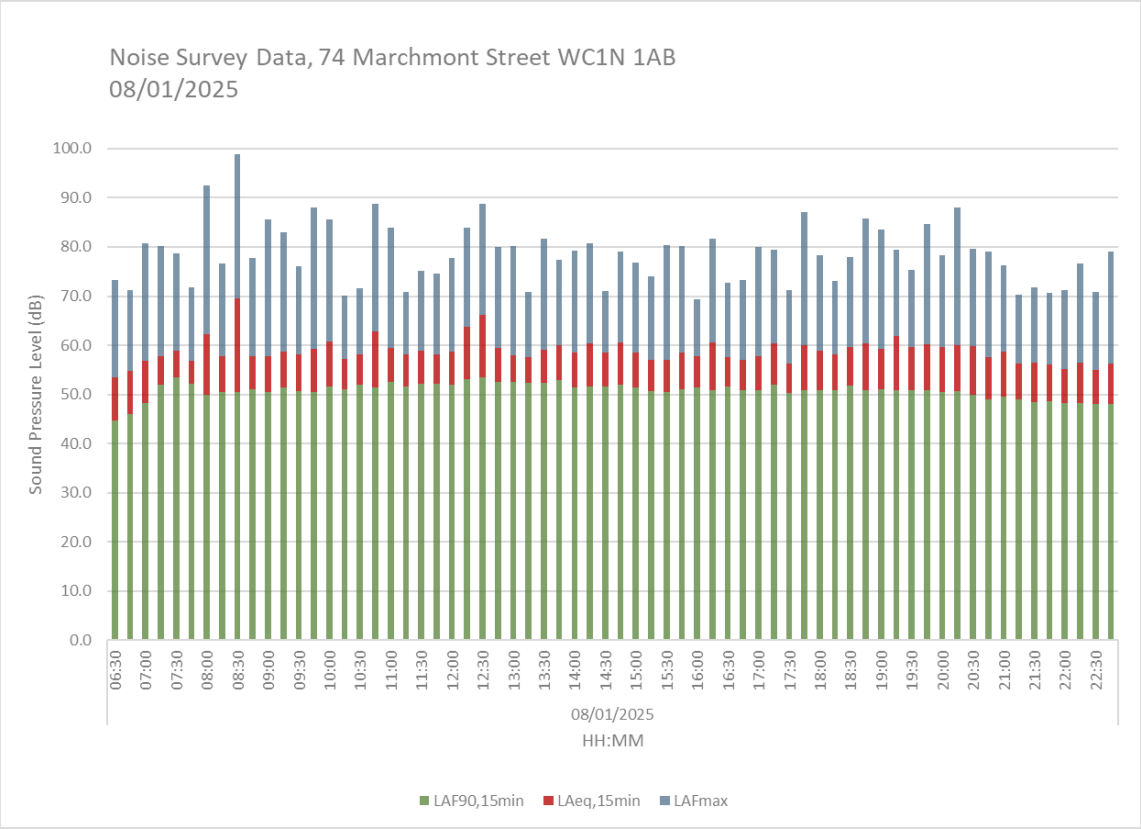
Product Code	Length (mm)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R02 - 4 - 600	600	5	8	12	23	30	30	23	18
R02 - 4 - 900	900	6	10	16	30	37	37	30	24
R02 - 4 - 1200	1200	7	13	22	38	47	47	40	29
R02 - 4 - 1500	1500	8	16	26	42	49	49	45	32
R02 - 4 - 1800	1800	9	18	31	46	50	49	47	34
R02 - 4 - 2100	2100	11	20	36	50	50	50	50	41
R02 - 4 - 2400	2400	12	22	40	50	50	50	50	47

Insertion loss data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated or self noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

APPENDIX C – Noise Monitoring Data

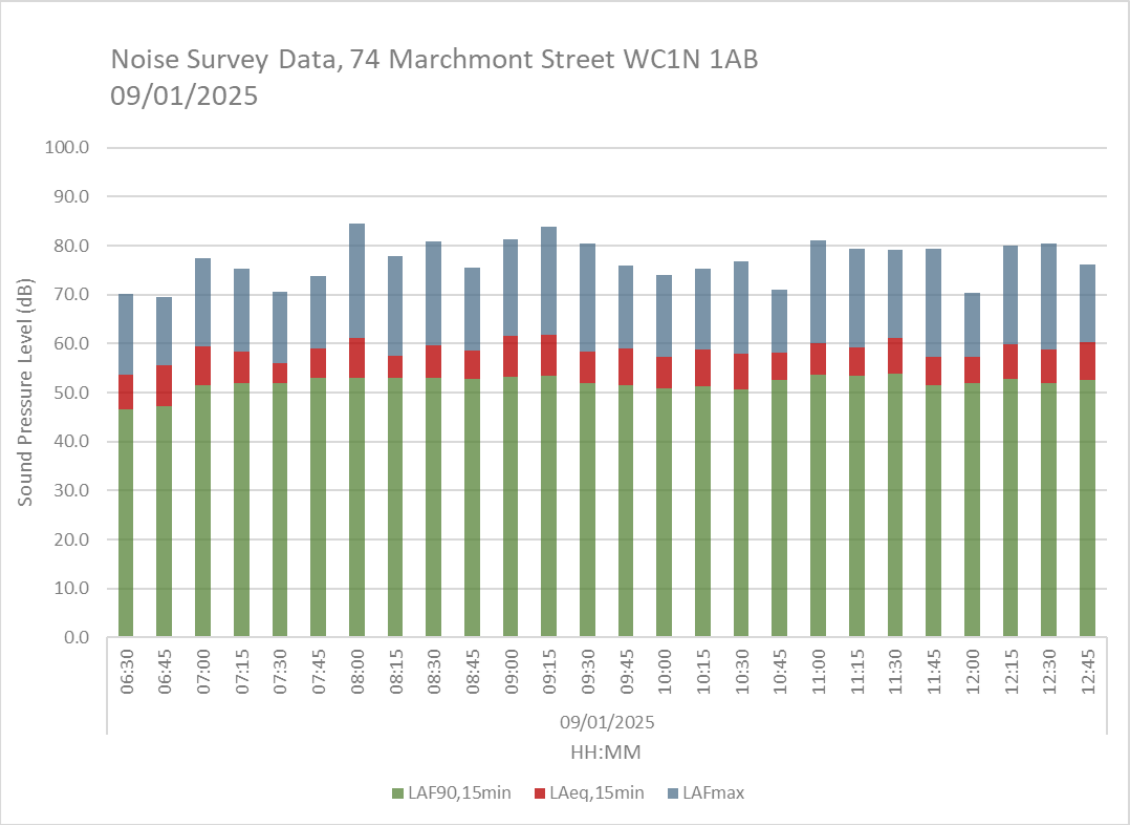


Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$	Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
07/01/2025	13:00	59.5	79.1	51.8	58.9	52.0	07/01/2025	18:00	60.3	85.6	51.0	60.5	51.4
	13:15	57.9	72.3	51.9				18:15	61.8	82.9	51.5		
	13:30	59.4	80.0	52.4				18:30	60.4	80.9	52.0		
	13:45	58.8	83.2	51.7				18:45	58.8	76.2	51.1		
	14:00	59.0	75.2	53.5	64.2	53.1		19:00	57.7	79.1	50.5	59.2	50.7
	14:15	69.2	87.5	54.7				19:15	61.8	86.2	51.8		
	14:30	58.9	72.2	52.3				19:30	58.1	80.0	50.8		
	14:45	57.1	75.7	50.8				19:45	57.6	72.8	49.6		
	15:00	58.2	73.7	51.8	57.7	51.1		20:00	56.0	75.1	49.2	55.9	49.1
	15:15	56.4	72.7	50.7				20:15	56.6	74.7	49.5		
	15:30	58.9	79.1	50.9				20:30	55.1	69.9	48.8		
	15:45	57.0	72.7	51.0				20:45	55.9	73.8	49.0		
	16:00	57.3	73.6	50.9	58.5	51.4		21:00	53.9	76.9	48.1	54.4	47.9
	16:15	59.9	82.1	51.3				21:15	54.3	66.5	48.1		
	16:30	57.6	73.2	51.5				21:30	54.5	74.6	47.8		
	16:45	58.8	76.8	51.8				21:45	55.0	72.6	47.6		
	17:00	57.3	68.9	51.4	57.6	51.1		22:00	54.9	82.4	47.1	55.1	47.2
	17:15	58.2	79.0	51.2				22:15	53.2	66.2	47.5		
	17:30	58.1	81.6	51.2				22:30	54.0	69.8	47.4		
	17:45	56.7	73.0	50.5				22:45	57.1	80.6	46.7		



Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
08/01/2025	06:30	53.4	73.3	44.7		
	06:45	54.8	71.2	46.0		
	07:00	56.9	80.7	48.2	57.7	51.8
	07:15	57.8	80.1	52.0		
	07:30	58.9	78.6	53.5		
	07:45	56.9	71.7	52.1		
	08:00	62.3	92.5	49.9	64.7	50.5
	08:15	57.7	76.7	50.4		
	08:30	69.5	98.8	50.5		
	08:45	57.8	77.7	51.0		
	09:00	57.7	85.6	50.4	58.5	50.7
	09:15	58.7	82.9	51.4		
	09:30	58.1	76.0	50.6		
	09:45	59.3	88.0	50.5		
	10:00	60.8	85.5	51.6	60.3	51.5
	10:15	57.3	70.1	51.1		
	10:30	58.1	71.5	51.9		
	10:45	62.8	88.7	51.5		
	11:00	59.4	83.9	52.5	58.7	52.1
	11:15	58.2	70.9	51.7		
	11:30	58.8	75.2	52.2		
	11:45	58.1	74.5	52.1		
	12:00	58.7	77.7	51.9	63.1	52.8
	12:15	63.8	83.9	53.1		
	12:30	66.2	88.7	53.5		
	12:45	59.4	80.0	52.5		
	13:00	57.9	80.1	52.5	58.7	52.5
	13:15	57.5	70.9	52.3		
	13:30	59.1	81.6	52.3		
	13:45	60.0	77.3	52.9		
	14:00	58.5	79.3	51.5	59.6	51.7
	14:15	60.3	80.7	51.6		
	14:30	58.5	71.1	51.6		
	14:45	60.5	79.1	52.0		

Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
08/01/2025	15:00	58.5	76.9	51.4	57.8	50.9
	15:15	57.0	74.1	50.6		
	15:30	57.0	80.4	50.5		
	15:45	58.6	80.1	51.0		
	16:00	57.7	69.3	51.5	58.4	51.2
	16:15	60.5	81.7	50.8		
	16:30	57.5	72.8	51.7		
	16:45	57.1	73.2	50.9		
	17:00	57.8	79.9	50.8	59.0	51.0
	17:15	60.4	79.5	52.0		
	17:30	56.3	71.2	50.3		
	17:45	60.1	87.0	50.9		
	18:00	58.8	78.4	50.8	59.3	51.1
	18:15	58.1	73.0	50.9		
	18:30	59.7	78.0	51.8		
	18:45	60.4	85.8	50.8		
	19:00	59.3	83.6	51.1	60.3	50.9
	19:15	61.8	79.4	50.9		
	19:30	59.6	75.3	50.8		
	19:45	60.2	84.7	50.9		
	20:00	59.6	78.3	50.5	59.4	50.1
	20:15	60.1	88.1	50.7		
	20:30	59.8	79.7	50.0		
	20:45	57.6	79.0	49.0		
	21:00	58.7	76.3	49.5	57.0	48.9
	21:15	56.2	70.3	49.0		
	21:30	56.5	71.7	48.5		
	21:45	56.0	70.7	48.7		
	22:00	55.1	71.2	48.2	55.8	48.1
	22:15	56.5	76.7	48.2		
	22:30	54.9	70.9	48.0		
	22:45	56.3	79.1	48.1		



Date	Time	$L_{Aeq,15min}$	L_{AFmax}	$L_{AF90,15min}$	$L_{Aeq,1hour}$	$L_{AF90,1hour}$
09/01/2025	06:30	53.7	70.1	46.5		
	06:45	55.6	69.6	47.2		
	07:00	59.4	77.4	51.4	58.4	52.1
	07:15	58.3	75.3	52.0		
	07:30	56.0	70.6	51.9		
	07:45	59.1	73.8	53.1		
	08:00	61.1	84.4	52.9	59.4	52.9
	08:15	57.6	77.8	53.0		
	08:30	59.6	80.9	53.1		
	08:45	58.6	75.5	52.7		
	09:00	61.6	81.2	53.2	60.4	52.6
	09:15	61.8	83.9	53.5		
	09:30	58.4	80.5	52.0		
	09:45	58.9	75.9	51.5		
	10:00	57.2	74.1	50.9	58.0	51.4
	10:15	58.7	75.2	51.3		
	10:30	57.9	76.8	50.6		
	10:45	58.1	71.0	52.6		
	11:00	60.0	81.1	53.7	59.7	53.2
	11:15	59.3	79.4	53.5		
	11:30	61.2	79.1	53.8		
	11:45	57.2	79.3	51.6		
	12:00	57.2	70.3	51.9	59.2	52.3
	12:15	59.9	80.1	52.7		
	12:30	58.7	80.5	52.0		
	12:45	60.2	76.2	52.6		

APPENDIX D – Calculations

Attenuation per double distance required = (6dB for LpA recommended)	6	dB			Metres	
		Enter Distance =			1.5	

	Frequency Hz							
	125	**250**	**500**	**1000**	**2000**	**4000**	**8000**	Total
	74.1	75.6	72.2	65	61.8	59	54.1	79.26
Total LW	74.1	75.6	72.2	65.0	61.8	59.0	54.1	79.26
'A' Weight	16.1	8.6	3.2	0	-1.2	-1	1.1	
LWA (Power)	58.0	67.0	69.0	65.0	63.0	60.0	53.0	73.00
LPA at New Dist'	46.49	55.49	57.49	53.49	51.49	48.49	41.49	61.49
SILENCER	8	12	23	30	30	23	18	
DUCT BENDS (2)	2	12	16	8	6	6	6	
DUCT LENGTH, 4m	2	1	0	0	0	0	0	
DIRECTIVITY 90°	0	2	5	7	12	15	18	
LPA After Insert	**34.89**	**28.29**	**13.09**	**8.09**	**3.09**	**4.09**	**-0.91**	**35.79**

Sound Pressure Level @ Nearest Sensitive Receptor = 36dB $L_{Ar,T}$