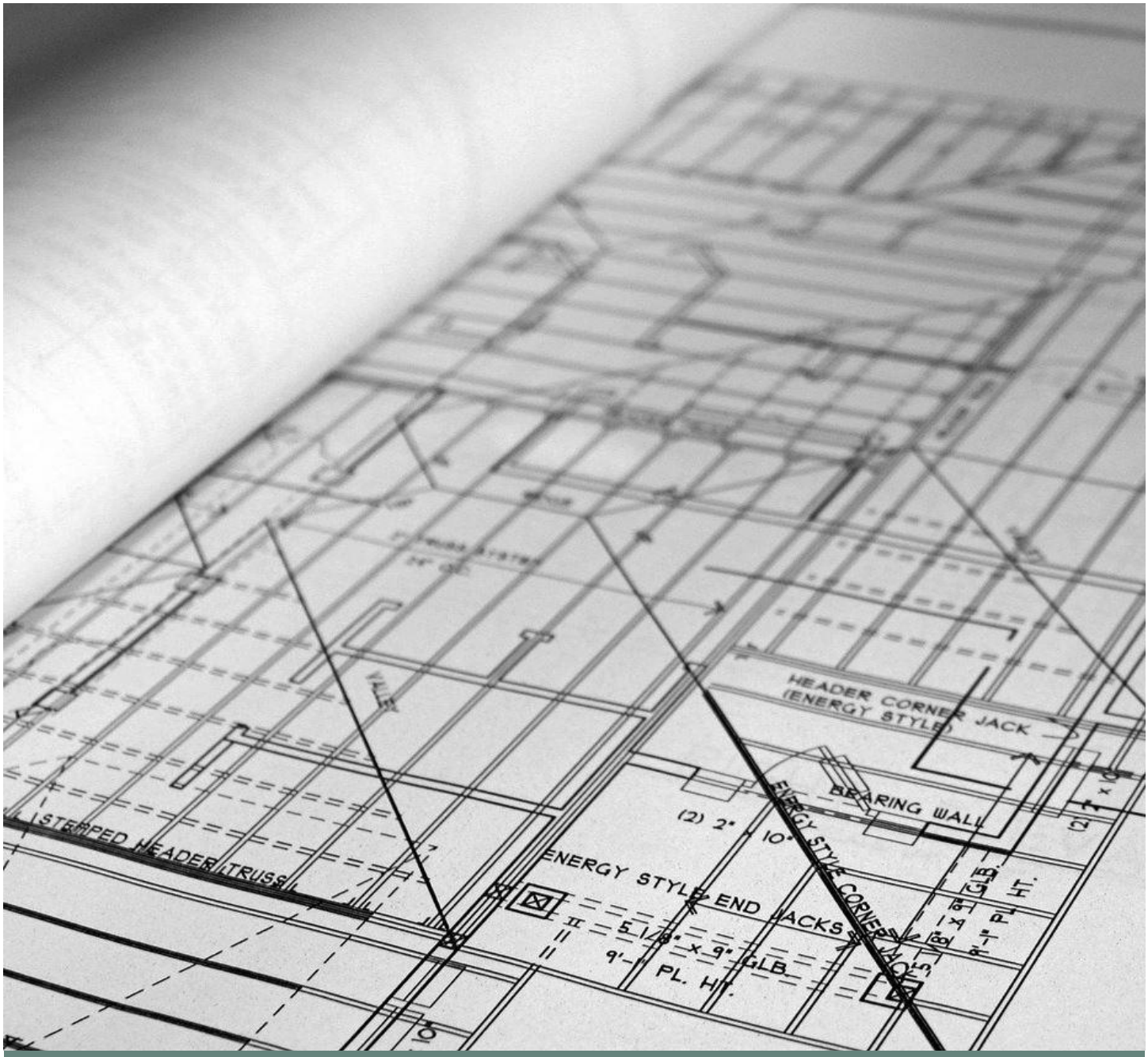

Second City Bar

Unit 1 Cotton Square – Discharge of Condition 12

Noise Impact Assessment

Client: Second City Ltd

Project Number: 053221

Date: 07/05/2021

REPORT ISSUE & STATUS LOG

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1 INTRODUCTION

1.1 OVERVIEW

1.1.1 JPM Acoustics Ltd has been appointed by Second City Ltd to undertake a noise impact assessment to discharge a planning condition associated with Unit 1 Cotton Square at 15-17 Blossom Street in Manchester.

1.1.2 Unit 1 Cotton Square is a vacant ground floor commercial unit with planning approval for A3/A4 use, subject to several Planning Conditions (application reference 122649/JO/2019).

1.1.3 The unit forms part of a wider mixed-use development which comprises commercial units at ground level and residential accommodation above. Planning Condition 12 requires that a scheme of acoustic treatment to the ground floor commercial unit is implemented, and that a noise study is submitted to the local authority for approval prior to the unit being brought into use.

1.1.4 This assessment draws on the results of a sound insulation test between the ground floor unit and the first-floor apartments. The assessment also draws on representative noise levels during typical operational periods measured within the former Second City bar site at 37 Blossom Street in December 2019, and baseline noise monitoring undertaken at nearby noise sensitive receptor locations in April 2021.

1.1.5 This report contains some technical terminology where necessary and appropriate. To assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

1.2 SITE DESCRIPTION

1.2.1 Unit 1 Cotton Square forms part of a wider mixed-use development at 15-17 Blossom Street which comprises commercial units at ground level with residential accommodation above. The horizontal adjacency to Unit 1 is non-habitable space associated with the residential units located above (i.e. foyer, plant room etc).

1.2.2 The development site is surrounded by bars and restaurants at ground floor level on Blossom Street, with residential dwellings above. **Figure 1-1** and **Figure 1-2** show the location of the unit subject to assessment.

Figure 1-1: Site Location Plan

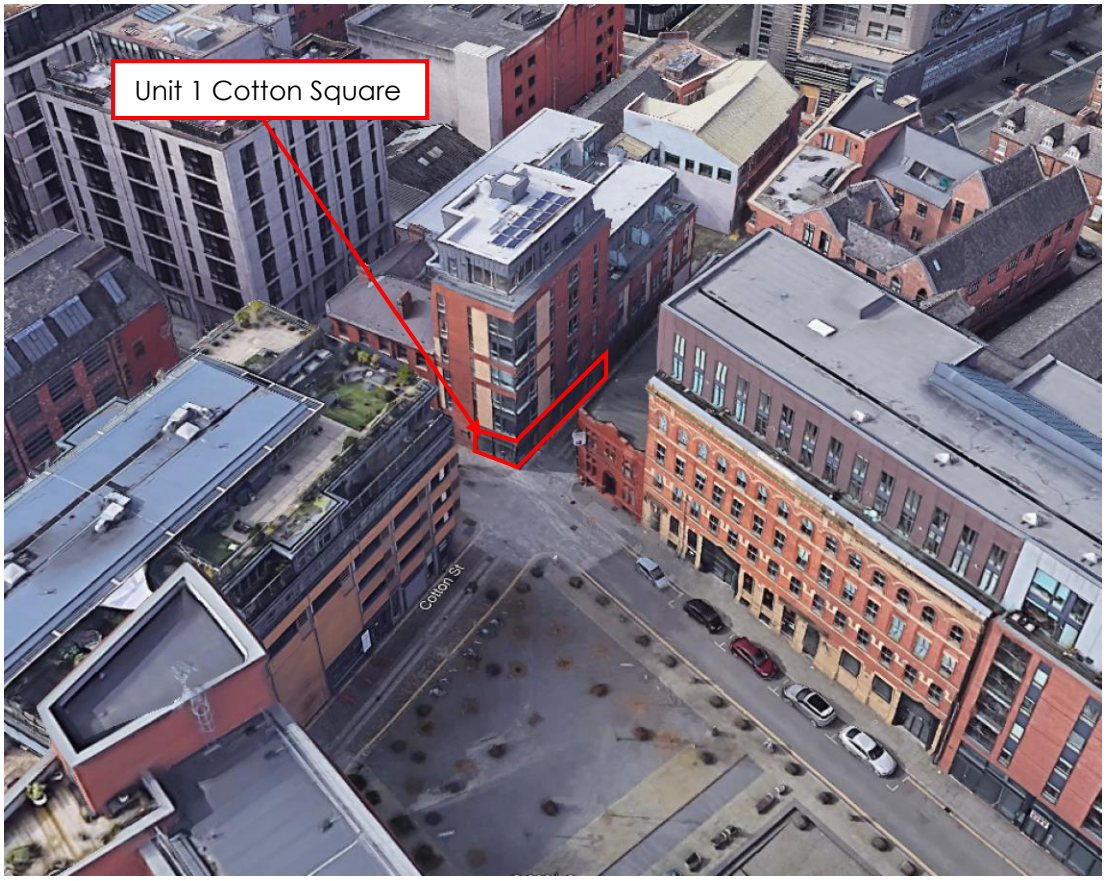
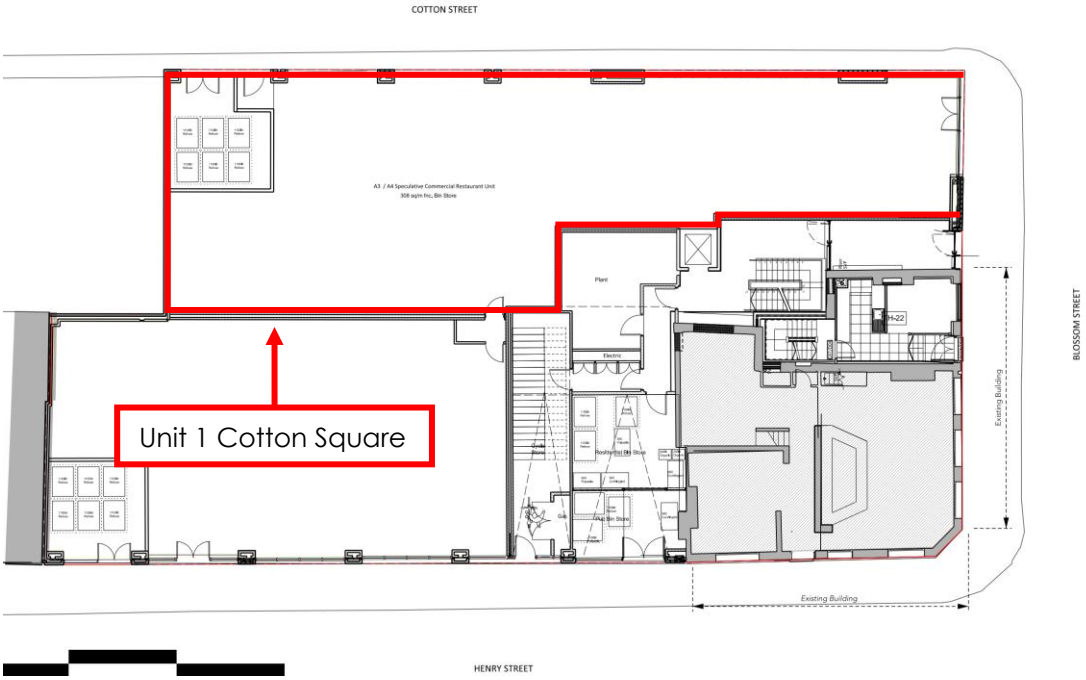


Figure 1-2: Unit 1 Cotton Square Layout



1.3 DESCRIPTION OF PROPOSED USE

1.3.1 Unit 1 Cotton Square is proposed to be brought into use as an A3/A4 premises. The operator, Second City Ltd, are proposing a contemporary "sports bar" featuring televised sports events and American style bar-food. The bar will include an internal speaker system for amplified ambient music. The bar operator is relocating from their existing premises at 37 Blossom Street to Unit 1 Cotton Square.

2 LEGISLATION AND GUIDANCE

2.1 PLANNING CONDITION 12

2.1.1 The wording of Planning Condition 12 is as follows:

> "*12) Notwithstanding noise assessment prepared by Hepworth Acoustics (ref. P15-360-R01v1) stamped as received by the City Council, as Local Planning Authority, on the 24 July 2015, prior to the first occupation of the commercial units, as indicated on drawing (04) 501 Rev P4 stamped as received by the City Council, as Local Planning Authority, on the 8th February 2019, a scheme of the acoustic treatment of the commercial unit along with a noise study shall be submitted for approval in writing by the City Council, as Local Planning Authority. The approved scheme shall then be implemented prior to the first use of the premises.*"

2.2 MANCHESTER CITY COUNCIL PLANNING & NOISE TECHNICAL GUIDANCE – DECEMBER 2015

Entertainment Noise

2.2.1 MCC's Planning & Noise Technical Guidance document provides guidance and suggested criteria for the assessment of noise from a range of sources including entertainment venues.

2.2.2 Below is a summary of the guidance outlined in the document, which relates to entertainment noise:

> "*…a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be:*
>
> ***'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq), respectively'.***
>
> *This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue.*"

Fixed Plant & Equipment

"Noise from fixed plant, equipment or machinery can be very annoying and disruptive to people living nearby particularly where the item involved emits a noise with impulsive or tonal characteristics.

Many of the noise complaints Environmental Health receive about noise from plant, equipment and machinery specifically concern the character of the noise emitted. Any noise assessment needs to consider not only the overall level of noise emitted but also its particular characteristics.

The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'."

2.3 BRITISH STANDARD 4142: 2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND (BS 4142)

2.3.1 The BS 4142 Standard describes methods for rating and assessing the following:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

2.3.2 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

2.3.3 If appropriate, the specific sound level of the source (L_s) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.

2.3.4 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.

2.3.5 Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of impact.

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."

2.4 BS 8233:2014: GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS (BS 8233)

2.4.1 BS 8233 provides guidance for the control of noise in and around buildings and details recommended internal and external noise level criteria for residential dwellings.

2.4.2 It is stated in BS 8233 that it is desirable that internal ambient noise levels do not exceed the guideline values set out in **Table 2-1**.

Table 2-1: Internal Desirable Guideline Values from BS 8233

Activity	Location	Period	
		07:00 to 23:00 Hours, i.e. Daytime	23:00 to 07:00 Hours, i.e. Night-time
Resting	Living Room	35 dB $L_{Aeq, 16\ Hour}$	-
Dining	Dining Room/area	40 dB $L_{Aeq, 16\ Hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16\ Hour}$	30 dB $L_{Aeq, 8\ Hour}$

3 BASELINE NOISE SURVEY

3.1 OVERVIEW

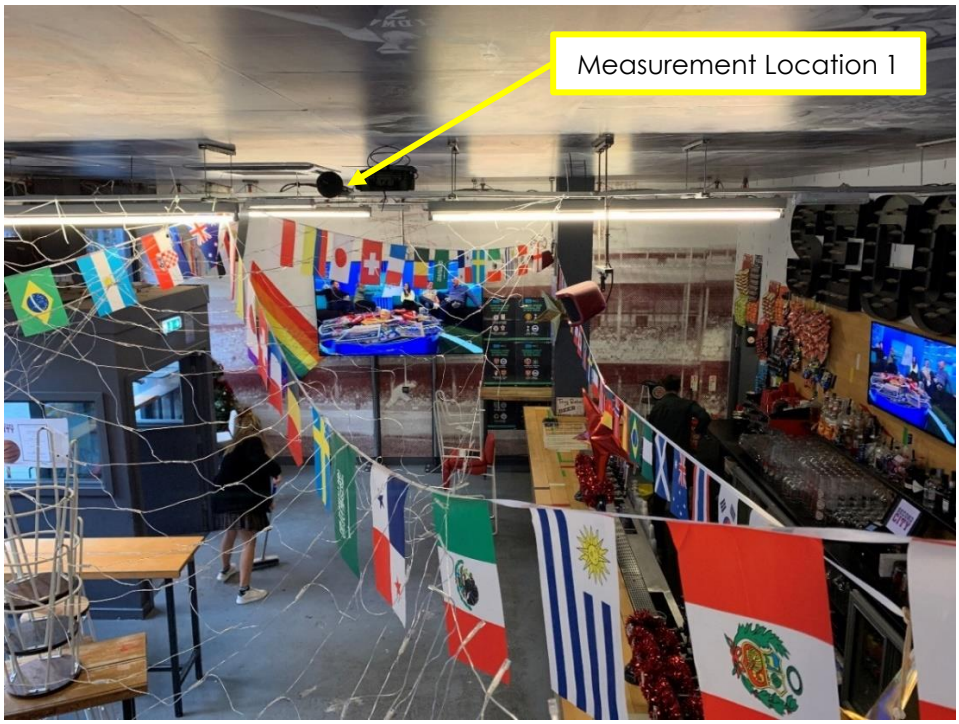
3.1.1 A baseline noise survey was undertaken in December 2019 to determine noise levels generated within the former Second City bar premises at 37 Blossom Street during a typical service period on a busy Saturday, which included amplified music and a live televised Premier League football match. The noise levels measured during the 2019 survey are considered representative of typical noise levels in the proposed bar.

3.1.2 In addition, noise monitoring was undertaken in April 2021 to determine the prevailing noise climate at a location representative of the closest noise sensitive receptors to external plant items associated with the proposed bar.

3.2 MEASUREMENT LOCATIONS

3.2.1 To determine typical noise levels incident on the soffit of the bar, noise monitoring during the 2019 survey was undertaken at high level (circa. 25 cm from the ceiling) during a typical Saturday operating period. The measurement location is identified in **Figure 3-1**.

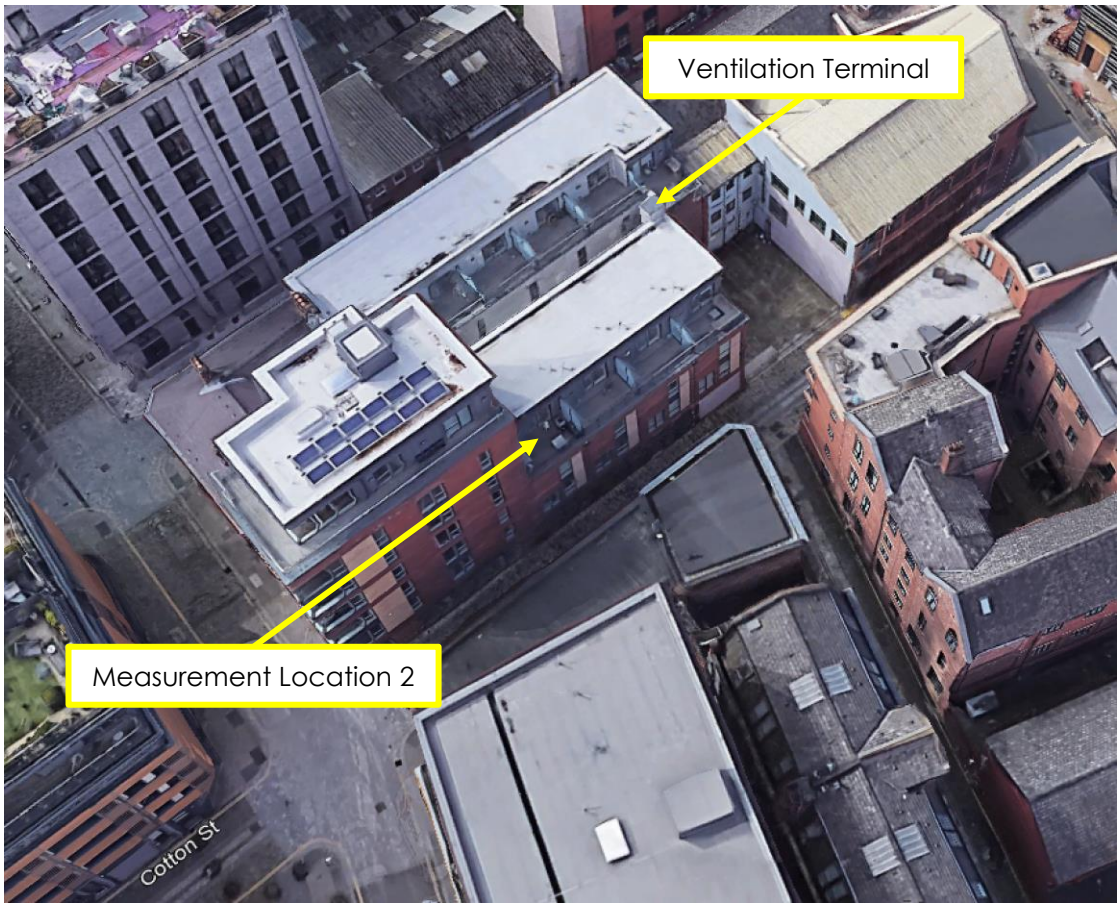
Figure 3-1: Measurement Location 1



3.2.2 Monitoring was undertaken over a 24-hour period commencing at 11:15 on the 21st December 2019. The measurement period therefore included a full day of operations (i.e. 12:00 – 00:00).

3.2.3 In addition, noise monitoring was undertaken from 12:00 on Friday 23rd April until 12:00 on Wednesday 28th April 2021 on the roof terrace of an apartment close to the ventilation extract terminal associated with the proposed bar. Monitoring was undertaken at a height of 1.5 m above the terrace. Measurement equipment was established at the location identified in **Figure 3-2**. The location of the ventilation extract terminal is also identified in **Figure 3-2**.

Figure 3-2: Baseline Noise Survey Measurement Location



3.3 EQUIPMENT

3.3.1 Noise monitoring was undertaken using the Class 1 specification equipment detailed in **Table 3-1**. Measurement equipment was calibrated using a portable calibrator immediately before and after the surveys with no significant drift observed. The sound level meter, pre-amplifier and microphone were calibrated to traceable standards within the 24 months prior to the survey. The portable calibrator was calibrated within 12 months prior to the date of the survey.

Table 3-1: Survey Equipment Details, Dates Reflect Calibration When Survey was Completed

Measurement Location	Equipment	Make & Model	Serial Number	Calibration Due
1	Sound Level Meter	Svantek 971	80344	March 2020
	Pre-Amplifier	Svantek SV18	71577	
	Microphone	ACO Pacific 7052E	69566	
	Calibrator	01 dB CAL21	34675335	Dec 2020
2	Sound Level Meter	01 dB Fusion	11327	May 2021
	Microphone	Grass 40CE	259479	
	Pre-amp	01 dB PRE 22	1605201	
	Calibrator	01 dB CAL21	34675335	Dec 2020

3.4 RESULTS

3.4.1 The L_{eq} noise levels measured at Measurement Location 1 during opening hours (12:00 – 00:00) on the 21st December 2019 are shown in **Table 3-2**. The daytime measurement period included a Premier League football match featuring local team Manchester City, and can therefore be considered worst-case. $L_{eq,1h}$ time history results are included in **Appendix B**.

Table 3-2: Measured Sound Pressure Levels During Opening Hours, L_{eq}, dB

Period	Octave Band Sound Pressure Levels (L_{eq} dB)							dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Daytime 12:00 – 23:00	68	80	80	84	85	80	74	88
Night-time 23:00 – 00:00	68	79	77	79	81	75	69	83

3.4.2 **Table 3-3** presents a summary of measured sound pressure levels at Measurement Location 2 during periods when the bar is proposed to operate. Full survey results are presented in **Appendix B**.

Table 3-3: Measured Sound Pressure Levels at Measurement Location 2 When the Proposed Bar Will Be Operational

Day	Start Time	Period (T)	dB $L_{Aeq,T}$	dB $L_{A90,T}$
Friday 23rd April	12:00 (midday)	12-hours	59	54
Saturday 24th April	12:00 (midday)	12-hours	60	56
Sunday 25th April	12:00 (midday)	12-hours	56	49
Monday 26th April	12:00 (midday)	12-hours	51	46
Tuesday 27th April	12:00 (midday)	12-hours	52	47

3.5 SOUND INSULATION TESTING

3.5.1 An airborne sound insulation test has been undertaken to determine the sound insulation performance of the existing separating floor between the proposed bar and dwellings above. The measured sound insulation performance of the separating floor is shown in **Table 3-4** (presented in terms of standardised level difference, D_{nT}).

Table 3-4: Measured Sound Insulation Performance of Separating Floor

$D_{nT,w}$ (C_{tr}) dB	Octave Band Sound Standardised Level Difference (D_{nT} dB)						
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz
60 (-7)	33	42	43	56	64	70	76

3.5.2 The sound insulation test was undertaken in accordance with BS EN ISO 140-4:1998 '*Acoustics – Measurement of sound insulation in buildings and of building elements – Part 4: Field measurements of airborne sound insulation between rooms*'.

3.5.3 The sound insulation testing was undertaken on the 22nd April 2021 using the equipment detailed in **Table 3-5**.

Table 3-5: Sound Insulation Testing Equipment Details

Item	Make & Model	Serial Number	Calibration Due
Sound Level Meter	Svantek 971	80344	March 2022
Pre-Amplifier	Svantek SV18	71577	
Microphone	ACO Pacific 7052E	69566	
Calibrator	01 dB CAL21	34675335	November 2021

4 ASSESSMENT

4.1 INTERNAL NOISE TRANSFER

4.1.1 The current floor construction on which the sound insulation test was undertaken did not include a suspended ceiling. The existing separating floor is understood to comprise the following construction:

- Ceramic floor tile in first floor living space
- Concrete floor on trapezoidal steel deck
- 100 mm Celotex thermal insulation to the underside of the separating floor
- 200 mm deep timber frame connected to the structural deck with no linings

4.1.2 The sound insulation performance of the existing separating floor construction was modelled using industry standard software Insul©, assuming ceramic tiles on a 200 mm composite concrete slab, on a trapezoidal deck.

4.1.3 The model was used to determine the increase in performance that would be anticipated with the addition of a suitable suspended ceiling within the bar. The proposed complete construction that was modelled is as follows:

- Structural slab (existing)
- Thermal insulation (already installed)
- Timber frame with 200mm void depth (already installed)
- 100 mm mineral wool insulation installed within the void
- GTEC Resilient Bars
- 2 x 15mm GTEC dB plasterboard

4.1.4 The modelling suggests that the airborne sound insulation performance of the separating floor will increase by at least 9 dB across the frequency range of interest. **Table 4-1** details the predicted noise levels in the bar, the sound insulation performance of the floor assuming a 9 dB increase in performance from the values in **Table 3-3**, and the predicted resultant noise levels in first-floor apartments.

Table 4-1: Predicted Noise Levels in First-floor Flats Due to Airborne Noise Transfer from Bar, dB

Description	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	dB(A)
Daytime noise level in bar, L_{eq} [A]	68	80	80	84	85	80	74	88
Night-time noise level in bar, L_{eq} [B]	68	79	77	79	81	75	69	83
Predicted sound insulation performance of ceiling, D_{nT} [C]	42	51	52	65	73	79	85	-
Predicted Daytime Noise Level in Flat [A]-[C]=[D]	26	29	28	19	12	1	-11	22
Predicted Night-time Noise Level in Flat [B]-[C]=[E]	26	28	25	14	8	-4	-16	19

4.1.5 It can be seen from **Table 4-1** that the predicted noise levels in the first-floor apartments are below the MCC low frequency noise criteria, as detailed in Paragraph 2.2.2, and the desirable guideline values from BS 8233, as detailed in **Table 2-1**. Therefore, the proposed ceiling construction is considered appropriate in controlling noise transfer from the ground floor commercial unit to dwellings above.

4.1.6 Notwithstanding the above, to prevent flanking noise transfer through the walls of the building from degrading the performance of the floor, a resiliently mounted wall lining system has been proposed. The following wall lining is proposed to be installed:

- Timber frame built off existing blockwork walls (already installed)
- Timber frame cavity filled with mineral wool insulation
- GTEC Resilient Bars
- 2 x 15mm GTEC dB plasterboard layers.

4.1.7 Accounting for the above wall linings, it is not anticipated that flanking noise through the walls will significantly degrade the performance of the separating floor.

4.2 NOISE FROM FIXED PLANT AND EQUIPMENT

4.2.1 To achieve compliance with MCC criteria for noise emissions from fixed plant and equipment, noise from any externally mounted plant associated with the proposed bar should not exceed 41 dB $L_{Aeq,T}$ at the closest noise sensitive receptors (i.e. 5 dB below the representative background noise levels from **Table 3-3**).

4.2.2 Externally mounted fixed plant associated with the proposed bar is limited to a louvered ventilation intake terminal at circa. 3 m above ground level on Cotton Street, and a kitchen exhaust terminal located at roof level of the wider development. The proposed ventilation system layout is presented in **Appendix C** together with details of the proposed fans serving the two systems. It should be noted that the intake and exhaust systems are proposed to operate between 12:00 – 22:00 only.

4.2.3 The closest noise sensitive receptors to the louvered supply air terminal on Cotton Street are windows to residential dwellings located immediately above. To control noise emissions to satisfy MCC criteria an acoustic attenuator which achieves the minimum insertion loss performance presented in **Table 4-2** should be installed between the supply air fan and the louvered terminal on Cotton Street.

Table 4-2: Minimum Insertion Loss Performance Requirements for Kitchen Supply Air Intake System Attenuator (Atmospheric Side)

Minimum Insertion Loss (dB), per Octave Band (Hz)						
63 Hz	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**
5	10	20	30	35	35	24

4.2.4 The closest noise sensitive receptor to the kitchen exhaust terminal at roof level is a roof terrace located circa. 6 m away, as identified in **Figure 4-1** overleaf. To control noise emissions to satisfy MCC criteria, an acoustic attenuator which achieves the minimum insertion loss performance presented in **Table 4-3** should be installed between the kitchen extract fan and the roof terminal.

Table 4-3: Minimum Insertion Loss Performance Requirements for Kitchen Extract System Attenuator (Atmospheric Side)

Minimum Insertion Loss (dB), per Octave Band (Hz)						
63 Hz	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**
2	6	11	20	23	19	12

Figure 4-1: Location of Closest Noise Sensitive Receptors to the Proposed Kitchen Extract Terminal

4.2.5 With the inclusion of the mitigation measures outlined in **Table 4-2** and **Table 4-3**, noise from fixed plant and equipment associated with the proposed bar is predicted to comply with MCC criteria.

5 CONCLUSION

5.1.1 JPM Acoustics Ltd has been appointed by Second City Ltd to undertake a noise impact assessment to discharge Planning Condition 12 associated with Unit 1 Cotton Square, at 15-17 Blossom Street, Ancoats.

5.1.2 Unit 1 Cotton Square is a ground level commercial unit with planning approval for A3/A4 use. Planning Condition 12 requires that a scheme of acoustic treatment to the ground floor commercial unit is implemented, and that a noise study is submitted to the local authority for approval prior to the unit being brought into use.

5.1.3 To support the discharge of Condition 12 a sound insulation test of the existing separating floor between the ground floor unit and first floor residential dwellings has been undertaken. The assessment also draws on noise levels measured in the former Second City bar site at 37 Blossom Street in December 2019, and noise levels measured at a location representative of noise sensitive receptors in proximity to fixed plant associated with the unit.

5.1.4 The results of the sound insulation test have been used to inform the design of a ceiling system to control noise transfer from the ground floor unit to dwellings above. The proposed ceiling system (details of which are provided in this report) together with additional mitigation measures applied to flanking paths such as external walls, is predicted to control noise transfer such MCC criteria relating to the transfer of noise from entertainment premises to structurally connected noise sensitive receptors will be achieved.

5.1.5 In addition, details of mitigation measures suitable to control noise emissions from fixed plant associated with the proposed bar has been provided. The mitigation measures are designed to ensure compliance with MCC criteria relating to noise emissions from fixed plant and equipment.

5.1.6 Therefore, it is considered that an appropriate scheme of acoustic treatment has been proposed, as required by Planning Condition 12. Given the findings of this assessment, it is considered that Planning Condition 12 should be discharged without delay.

APPENDIX A: TECHNICAL GLOSSARY

The table below provides definitions for several commonly used technical terms in this assessment.

Terminology	Descriptions
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20 µPa ($20x10^{-6}$ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds S1 and S2 is given by 20log10(S1/S2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast/Slow Time Weighting	Averaging times used in sound level metres.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit.

APPENDIX B: SURVEY RESULTS

Table B1: Measured Sound Pressure Levels at measurement Location 1 During Service Periods at Second City (37 Blossom Street)

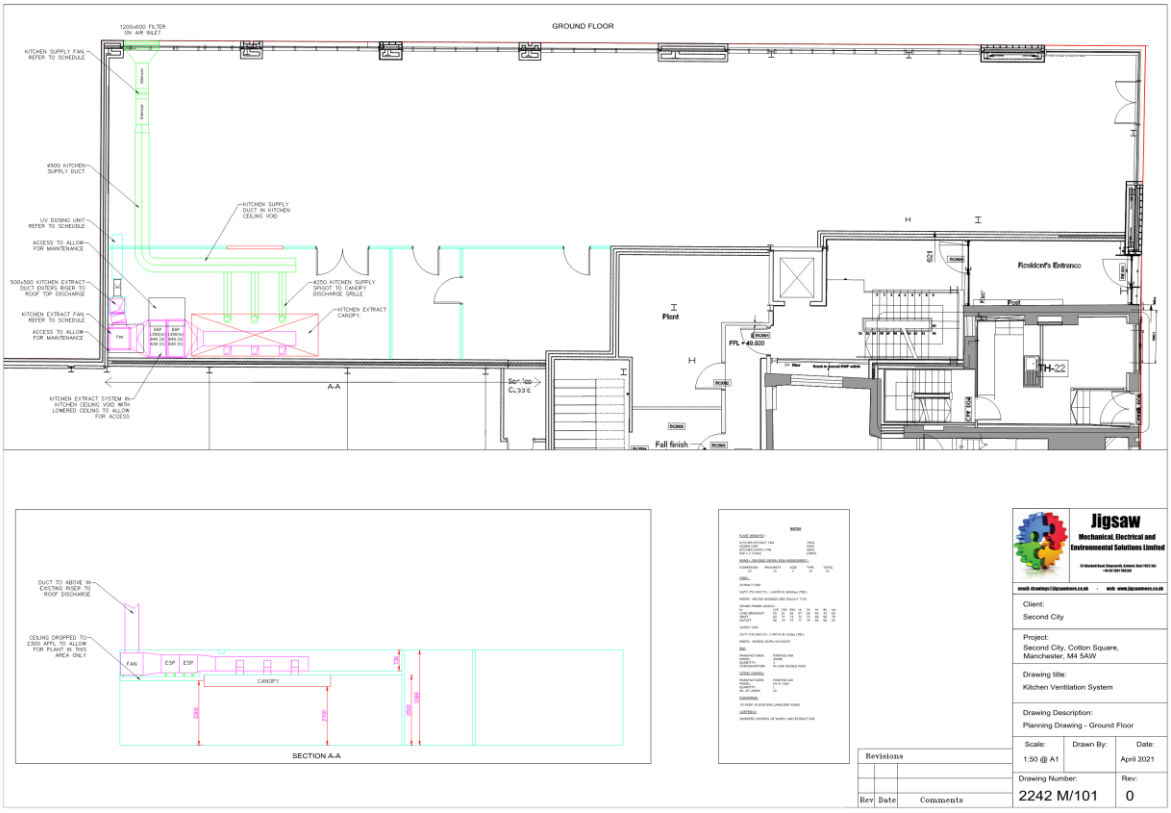
Start Date and Time	Duration	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)
21/12/2019 12:00	1-hour	60	69	69	72	72	65	61	54	75
21/12/2019 13:00	1-hour	62	72	72	76	76	69	65	57	79
21/12/2019 14:00	1-hour	67	79	78	82	82	76	72	63	85
21/12/2019 15:00	1-hour	70	81	80	83	83	78	73	65	86
21/12/2019 16:00	1-hour	72	83	81	84	85	80	75	67	88
21/12/2019 17:00	1-hour	68	81	82	86	87	81	76	66	89
21/12/2019 18:00	1-hour	69	84	84	88	89	83	78	68	92
21/12/2019 19:00	1-hour	66	81	83	88	88	83	77	67	91
21/12/2019 20:00	1-hour	70	82	82	86	87	81	76	67	90
21/12/2019 21:00	1-hour	70	80	77	81	82	77	72	65	85
21/12/2019 22:00	1-hour	69	78	77	81	85	77	71	63	86
21/12/2019 23:00	1-hour	68	79	77	79	81	75	69	62	83

Table B2: Measured Sound Pressure Levels During Baseline Noise Survey at Measurement Location 2, dB

Day	Start Time	dB $L_{Aeq,T}$	dB $L_{A90,T}$	dB L_{AFMax}
Friday	23/04/2021 12:00	53	47	76
	23/04/2021 13:00	53	50	69
	23/04/2021 14:00	53	49	75
	23/04/2021 15:00	53	50	75
	23/04/2021 16:00	54	51	82
	23/04/2021 17:00	58	54	82
	23/04/2021 18:00	60	57	76
	23/04/2021 19:00	61	58	83
	23/04/2021 20:00	60	59	84
	23/04/2021 21:00	62	60	80
	23/04/2021 22:00	62	59	81
	23/04/2021 23:00	60	57	76
Saturday	24/04/2021 12:00	52	48	77
	24/04/2021 13:00	55	52	85
	24/04/2021 14:00	57	54	75
	24/04/2021 15:00	58	56	71
	24/04/2021 16:00	60	58	70
	24/04/2021 17:00	60	58	73
	24/04/2021 18:00	61	59	82
	24/04/2021 19:00	62	59	86
	24/04/2021 20:00	62	60	80
	24/04/2021 21:00	63	60	85
	24/04/2021 22:00	65	58	93
	24/04/2021 23:00	58	49	80
Sunday	25/04/2021 12:00	63	47	97
	25/04/2021 13:00	56	50	81
	25/04/2021 14:00	54	51	78
	25/04/2021 15:00	55	52	72
	25/04/2021 16:00	55	52	75
	25/04/2021 17:00	56	52	90
	25/04/2021 18:00	58	52	91
	25/04/2021 19:00	54	52	73
	25/04/2021 20:00	55	50	78
	25/04/2021 21:00	52	48	67
	25/04/2021 22:00	50	43	72
	25/04/2021 23:00	48	42	58
Monday	26/04/2021 12:00	52	44	72
	26/04/2021 13:00	51	45	78
	26/04/2021 14:00	50	46	69
	26/04/2021 15:00	52	46	87
	26/04/2021 16:00	51	46	76
	26/04/2021 17:00	51	48	69

Day	Start Time	dB $L_{Aeq,T}$	dB $L_{A90,T}$	dB L_{AFMax}
	26/04/2021 18:00	51	48	73
	26/04/2021 19:00	52	49	71
	26/04/2021 20:00	50	48	64
	26/04/2021 21:00	49	47	67
	26/04/2021 22:00	48	42	71
	26/04/2021 23:00	46	42	69
Tuesday	27/04/2021 12:00	52	45	75
	27/04/2021 13:00	50	45	73
	27/04/2021 14:00	51	45	76
	27/04/2021 15:00	51	46	72
	27/04/2021 16:00	54	47	74
	27/04/2021 17:00	52	48	72
	27/04/2021 18:00	52	49	68
	27/04/2021 19:00	52	50	66
	27/04/2021 20:00	53	50	76
	27/04/2021 21:00	54	51	70
	27/04/2021 22:00	51	47	71
	27/04/2021 23:00	46	42	64

APPENDIX C: VENTILATION SYSTEM DETAILS


GROUND FLOOR
Plant
Resident's Entrance
TH-22
SECTION A-A
Jigsaw
Mechanical, Electrical and Environmental Solutions Limited
Client:
Second City
Project:
Second City, Cotton Square, Manchester, M4 5AW
Drawing title:
Kitchen Ventilation System
Drawing Description:
Planning Drawing - Ground Floor
Scale:
1:50 @ A1
Drawn By:
Date:
April 2021
Drawing Number:
2242 M/101
Rev:
0
Revisions
Rev Date Comments


FIRST FLOOR
SECOND FLOOR
THIRD FLOOR
TH-04
TH-03
Bedroom 02
Bedroom 01
Hall
Bathroom
En-Suite
Store
Lobby
WC
Weir
RWP
ROOF
Jigsaw
Mechanical, Electrical and Environmental Solutions Limited
Client:
Second City
Project:
Second City, Cotton Square, Manchester, M4 5AW
Drawing title:
Kitchen Ventilation System
Drawing Description:
Planning Drawing - Plan Upper Floors
Scale:
1:50 @ A1
Drawn By:
Date:
April 2021
Drawing Number:
2242 M/102
Rev:
0
Revisions
Rev Date Comments

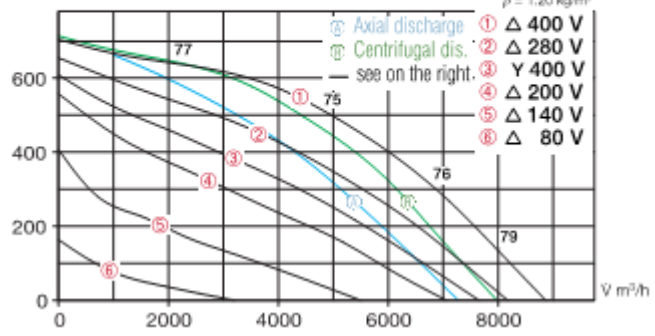
Extract Fan Noise Emission Data

GBD 500/4/4

Frequency		Hz	Total	125	250	500	1k	2k	4k	8k
L_{WA}	Case breakout	dB(A)	65	59	62	57	56	47	41	33
L_{WA}	Intake	dB(A)	77	57	66	69	74	70	64	55
L_{WA}	Extract	dB(A)	80	61	73	74	74	73	69	60

Δp_{stat} Pa

ρ = 1.20 kg/m³



Supply Fan Noise Emission Data

PRODUCT AND ELECTRICAL DETAILS - 400-450 MM, 4 POLE

Ref	Product Code	Product Number	Pitch Angle (°) Min	Pitch Angle (°) Max	Speed rev/min	Motor	Rating (kW)	Full Load Current (A)	Starting Current (A)	Wiring Diagram (CD)	Speed Controller: Electronic	Speed Controller: Transformer	Speed Controller: Inverter	Sound Levels
1	40JMv/16/4/6/18	JV436452	14	18	1400	80	0.14	0.40	2.00	CD3020	N/A	N/A	IDDXF54-2.2	51
2	45JMv/16/4/6/35	JV486460	23	35	1400	80	0.66	1.49	7.37	CD3020	N/A	N/A	IDDXF54-2.2	57

For ErP efficiency ratings and grades please refer to our Fan Selector for more information. Sound pressure levels quoted are at the inlet, and are average dBA at 3m distance over a sphere at the mid point at the highest angle given, under free field conditions. These are presented for comparative purposes only. For speed controllers please see pages 250-297.