



PENINSULAR

ACOUSTICS

Ms Janet Lawless
Manchester City Council
Planning
PO Box 532
Manchester
M60 2LA

Monday 8th January 2024

Ref: PA0128 – Hatro House, Palatine Road, Manchester.

Dear Ms Lawless,

Further to the recent email correspondence we wished to provide the following information in relation to the ground floor commercial to residential separation, with proposed specifications. If the environmental health officer has any further questions, we will be happy to help.

Analysis of existing external Noise Levels and Noise Break-in.

	Noise Break-in predicted internal noise levels from external sources (example calculations from report)	MCC Requirement	To ensure no impact from commercial below	Combined Internal Noise level, from external and commercial sources.
Day (LAeq,16hour)	33.6	Less than 35dBA	Impacting Noise level less than 23.6dBA	33.6
Night (LAeq,8hour)	23.2	Less than 30dBA	Impacting Noise level less than or equal to 23.2dBA	26.2
Night (LAmax)	43.0	Less than 45dBA		N/A

Therefore we will calculate the required sound reduction the separating floor needs to achieve to meet these figures.

From library acoustic data, the typical noise levels from a kitchen, which would be assumed to be the worst case noise level in the commercial premises from the takeaway, can be seen below as 81dBA.

Sound Pressure level dBA									
Example Source	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dBA
Dog Kennel	N/A	N/A	90	104	106	101	89	79	108
Gymnasium	72	78	84	89	86	80	72	64	90
Kitchen	86	85	79	78	77	72	65	57	81
Laboratory	65	70	73	75	72	69	65	61	77



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Calculations:

$$Lp2 = Lp1 - R + 10\log(S) - 10\log(A)$$

$$\text{Implies; } R = Lp1 - Lp2 + 10\log(S) - 10\log(A)$$

R = Required Sound Reduction.

S = Surface Area of the floor approx in receiving room.

A = Absorption Area

Lp1 = Source room noise level.

Lp2 = Required level in the receiver room

RT = Reverberation Time.

V = volume

$$RT = 0.161V / A$$

$$A = 0.161 V / RT$$

Assume the RT = 0.5Seconds for a completed residential room.

Example Flat 1 Bedroom Area

Example Flat 1 Bedroom floor Area = 11.2m², ceiling height assumed 2.4m, implies Volume = 26.9m³

$$\text{In Bedroom, } A = 0.161 V / RT \quad A = (0.161 * 26.9) / 0.5 = 8.67\text{m}^2$$

$$\text{In Bedroom floor surface Area (S) = 11.2m}^2$$

Therefore;

$$R = Lp1 - Lp2 + 10\log S - 10\log A$$

$$R = 81 - 23.2 + 10\log(11.2) - 10\log(8.67)$$

R = 58.9dB Required Sound Reduction.

Example Flat 1 Living Room Area

Example Flat 1 Living Room Area = 17.6m², ceiling height assumed 2.4m, implies Volume = 42.2m³

$$\text{In Living Room, } A = 0.161 V / RT \quad A = (0.161 * 42.2) / 0.5 = 13.59\text{m}^2$$

$$\text{In Living Room floor surface Area (S) = 17.6m}^2$$

Therefore;

$$R = Lp1 - Lp2 + 10\log S - 10\log A$$

$$R = 81 - 23.6 + 10\log(17.6) - 10\log(13.59)$$

R = 58.5dB Required Sound Reduction.



In both the examples for bedroom and living room a **Sound Reduction of the separating floor of 60dB** would be a good benchmark to ensure the internal noise levels remain below the MCC Internal Noise Requirements.

Current Separating Floor between Residential and Commercial.

We are informed there is a 200mm concrete floor in place. Visually to the underside within the commercial takeaway premises there is a plasterboard ceiling, however it is unknown how the ceiling is connected to the concrete, whether there is an insulated void and the depth of the void.

Assuming worst case, we have modelled a 200mm concrete floor with one layer of 12.5mm plasterboard, fixed on 50mm battens to the underside of the concrete. This provided a guide RW of 56dB.

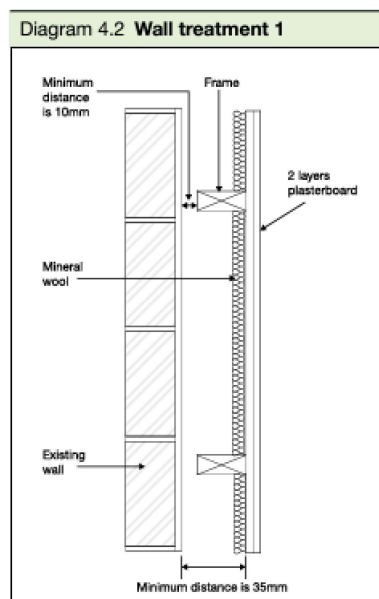
We have then provided a flooring upgrade option to enhance the structure, which includes the introduction of a 50mm batten, installed on a resilient layer such as "Soundstrata Fleece +", with 50mm mineral wool between battens and 19mm plasterboard plank and 20mm chipboard flooring above. This provided a guide RW of 70dB.

Investigation and testing of the structure at building regulations stage, may allow for a marginally reduced specification of the separating floor, while still complying with the 60dB reduction of the floor structure.

Flanking

The limitation of the separating floor is flanking via the external walls. An acoustic flanking detail will be required to external walls, while also capable of achieving appropriate thermal performance for Part L of the building regulations.

The below diagrams are taken from Building Regulations Document E 2003.



Construction

4.23 The independent panel may be used on one side of the existing wall only where the existing wall is masonry, and has a thickness of at least 100mm and is plastered on both faces. With other types of existing wall the independent panels should be built on both sides.

4.24 Independent panel(s) with absorbent material (see Diagram 4.2)

- minimum mass per unit area of panel (excluding any supporting framework) 20kg/m²;
- each panel should consist of at least two layers of plasterboard with staggered joints;
- if the panels are free-standing they should be at least 35mm from masonry core;
- if the panels are supported on a frame there should be a gap of at least 10mm between the frame and the face of the existing wall;
- mineral wool, minimum density 10kg/m³ and minimum thickness 35mm, in the cavity between the panel and the existing wall.



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We would therefore suggest the following at 1st floor level;

A modification of the Building Regulations Document E 2003 system will form the following specification while providing the required thermal performance for Part L of the Building Regulations;

225mm approx. Brick, 25mm cavity, 50mm timber stud with 50mm mineral wool (Conductivity 0.042 W/mk) between studs, 15mm Soundbloc plasterboard and 52.5mm Thin-R Thermal Liner XT/TL (consisting 40mm PIR Conductivity 0.022 W/mk and 12.5mm plasterboard).

Should you require any further information, please do not hesitate to contact me.

Kind Regards,

Jonathan Howell

Director

Telephone: 07719328404

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Existing Worst Case Floor (based on information provided)

Sound Insulation Prediction (v9.0.23)

Program copyright Marshall Day Acoustics 2017

Margin of error is generally within $R_w \pm 3$ dB

- Key No. 6541

Job Name:

Job No.:

Date: 08/01/2024

File Name:

Initials: Jonathan



Notes:



R_w 56 dB

C -5 dB

Ctr -11 dB

Mass-air-mass resonant frequency = 94 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 477 kg/m²

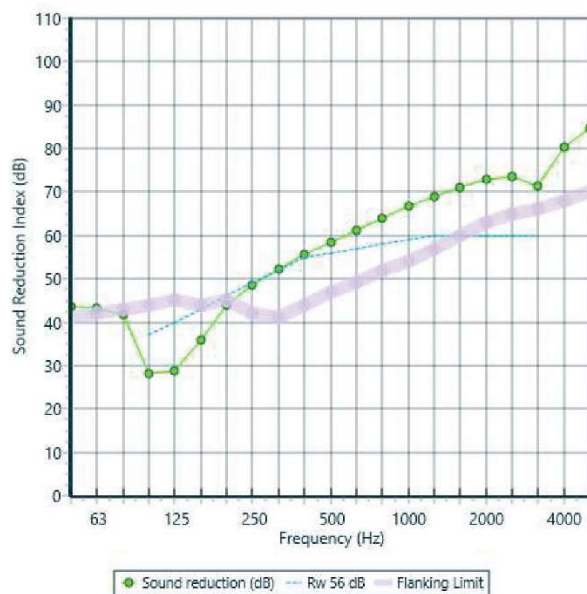
System description

Panel 1 : 1 x 200 mm Concrete

Frame: Solid Joist (50 mm x 45 mm), Stud spacing 600 mm; Cavity Width 50 mm

Panel 2 : 1 x 12.5 mm Gyproc Wallboard 12.5mm

freq.(Hz)	R(dB)	R(dB)
50	44	
63	43	43
80	42	
100	28	
125	29	30
160	36	
200	44	
250	48	47
315	52	
400	55	
500	58	58
630	61	
800	64	
1000	67	66
1250	69	
1600	71	
2000	73	72
2500	74	
3150	71	
4000	80	76
5000	85	





Upgraded Separating Floor

Sound Insulation Prediction (v9.0.23)

Program copyright Marshall Day Acoustics 2017

Margin of error is generally within $R_w \pm 3$ dB

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Job No.:

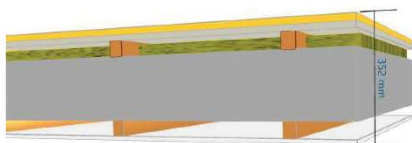
Date: 08/01/2024

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Notes:



R_w 70 dB

C -2 dB

Ctr -8 dB

Mass-air-mass resonant frequency = 52 Hz, 113 Hz

Panel Size = 2.7 m x 4.0 m

Partition surface mass = 505 kg/m²

System description

Panel 1 : 1 x 20 mm Flooring Particle Board

+ 1 x 19 mm Siniat GTEC Plank 19mm

Frame: Solid Joist (50 mm x 45 mm), Stud spacing 600 mm; Cavity Width 50 mm, 1 x Fibreglass (10kg/m³) Thickness 60 mm

Panel 2 : 1 x 200 mm Concrete

Frame: Timber stud (50 mm x 40 mm), Stud spacing 600 mm; Cavity Width 50 mm

Panel 3 : 1 x 12.5 mm Gyproc Wallboard 12.5mm

freq.(Hz)	R(dB)	R(dB)
50	34	
63	38	37
80	44	
100	46	
125	50	49
160	53	
200	58	
250	62	61
315	65	
400	66	
500	68	68
630	70	
800	71	
1000	72	72
1250	72	
1600	70	
2000	77	73
2500	77	
3150	76	
4000	84	80
5000	86	

