Measurement of Sound Insulation

Report No – **17212-1**
Client – **Rowlinson Construction**
Site – **15 St John Street, Manchester**

Tip: Printing will Skip Background

QF.18-2 (11)
17/08/2016
8389 w0 f0 i0

1.0 Executive Summary of Results

1.1 Summary of Wall Airborne Sound Insulation Test Results

Test Number	Source Room		Receive Room	$D_{nTw} + C_{tr}$ dB	Achieved ADE 2003 Value? Pass / Fail
17212-1-WA01	15 St John street Media Room	–	17 St John Street Corridor	49	Pass
17212-1-WA02	15 St John Street Media Room	–	17 St John Street Stairwell	45	Pass

1.2 Performance Standards Required – Building Regulation Compliance

The dwellings tested in this report have been identified as 'Material Change of Use', therefore the surfaces tested have to achieve the values set under 'Dwelling-houses and flats formed by material change of use' in Table 0.1a of Approved Document E 2003

Table 0.1a **Dwelling-houses and flats – performance standards for separating walls, separating floors, and stairs that have a separating function**

	Airborne sound insulation sound insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Impact sound insulation $L'_{nT,w}$ dB (Maximum values)
Purpose built dwelling-houses and flats		
Walls	45	-
Floors and stairs	45	62
Dwelling-houses and flats formed by material change of use		
Walls	43	-
Floors and stairs	43	64

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3.0 Site Description

- The site is at 15 St John Street, Manchester.
- The dwellings tested in this report are material change of use.
- The separating wall construction description provided by the client was as follows:

> ***"Construction details were not provided by client but the visual inspection indicates the wall is of masonry (red brick and is estimated to be 4.5" thick"***

4.0 Object

The object of this report is to present the findings of an airborne sound insulation survey at 15 St John Street, Manchester on a separating wall element to identify the sound insulation performance. The survey was carried out on 17th August, 2016.

It is understood that the current office/consulting room use of the site is going to be returned to house a residential dwelling which must comply with minimum Building Regulation requirements and, in the case of this report identify a suitable wall upgrade treatment to enhance the wall performance in the case of the basement 'Media Room'.

This report is in response to a Planning Application Decision Notice (for 112624/FO/2016) that requires an acoustic assessment and a specification of the maximum level of noise from any amplification system.

See below:

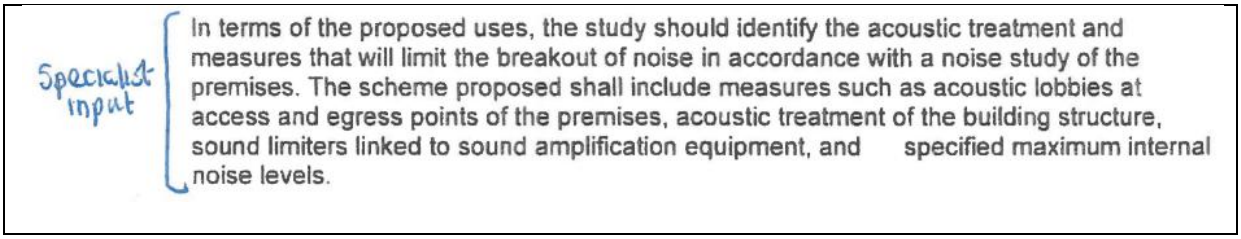
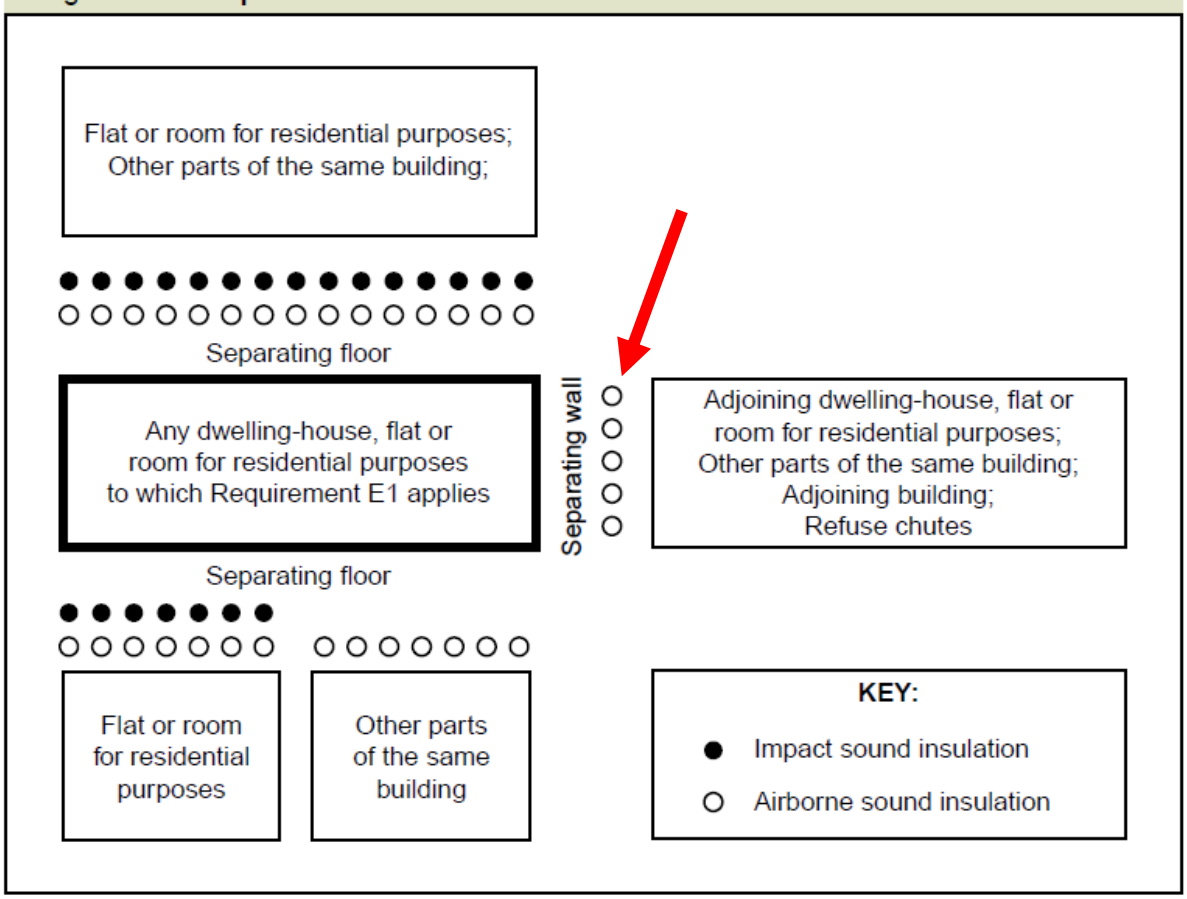


Figure 1: Paragraph stating acoustic requirements from Decision Notice dated 15/7/16

It should be noted that it is unusual for this type of requirement/condition to be placed on a simple conversion of a building to residential dwelling.

The wall performance would normally only come under the following advice in Approved Document E 2003 :

Diagram 0-1: **Requirement E1**



The red arrow indicates the separation requirement between a residential dwelling and any adjoining building,

The site is shown in the Photographs below:



Photo 1: External St John St facade of No15 left door & 17 on the right

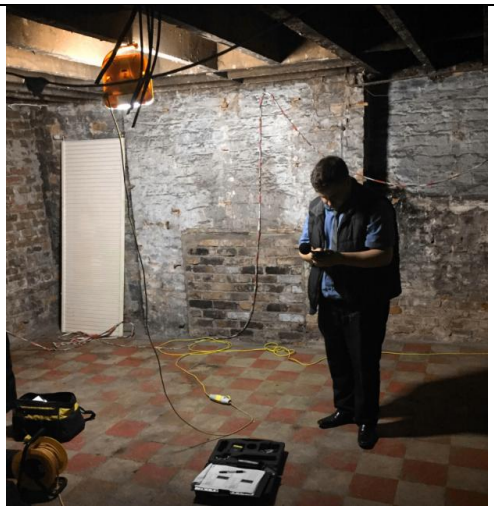


Photo 2: Brick separating wall behind site engineer Basement of No15.



Photo 3: Party wall as measured on left of this photo. Media Room in Basement of No15



Photo 4: Brick separating wall showing timber supports built into wall.



Photo 5: showing staircase in No15 which mimics the staircase position in No17

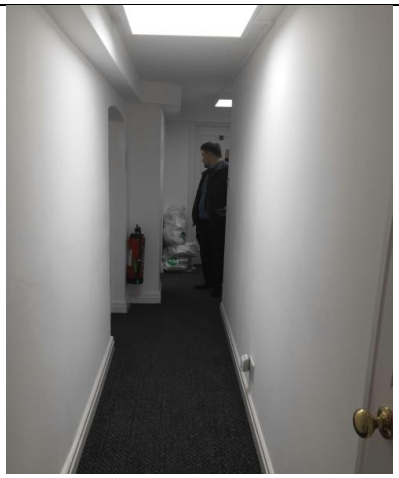


Photo 6: Corridor/staircase in No17 Basement records office. Noise from Media room measured into this space and staircase shon on right of this photo

5.0 Scope

This report covers the presentation of the survey findings with analysis and discussion in accordance with BS EN ISO 140-4.

According to **BS EN ISO 140-4**…

[2]

1 Scope

This part of ISO 140 specifies field methods for measuring the airborne sound insulation properties of interior walls, floors and doors between two rooms under diffuse sound field conditions in both rooms, and for determining the protection afforded to the occupants of the building. The methods give values for airborne sound insulation which are frequency dependent. They can be converted into a single number, characterizing the acoustic performance, by application of ISO 717-1. The results obtained can be used to compare sound insulation between rooms and to compare actual sound insulation with specified requirements.

6.0 Test Areas

Sound insulation testing requires measurements to be undertaken in the rooms directly adjacent to a separating wall, or in the rooms directly above or below the separating floor. Testing not only assesses how much sound is prevented from being transmitted through the wall or floor but can also take account of whether the rooms have additional sound absorption. **[3]**

The test regime consisted of 2 airborne wall tests. The tests are summarised in the table on the following page.

6.1 Test Summary Table

Test Number	Source Room		Receive Room	Test
17212-1-WA01	15 St John street Media Room	–	17 St John Street Corridor	Wall Airborne
17212-1-WA02	15 St John Street Media Room	–	17 St John Street Stairwell	Wall Airborne

7.0 Results

7.1 Summary of Wall Airborne Sound Insulation Test Results

Test Number	Source Room		Receive Room	D_{nTw} dB	C_{tr} dB	$D_{nTw} + C_{tr}$ dB	Unfavourable Deviations	Achieved ADE 2003 Value? Pass / Fail
17212-1-WA01	15 St John street Media Room	–	17 St John Street Corridor	58	-9	**49**	8.4dB @ 100Hz	Pass
17212-1-WA02	15 St John Street Media Room	–	17 St John Street Stairwell	53	-8	**45**		Pass

7.2 Airborne Sound Insulation Test Method (Walls): (BS EN ISO 140-4: 1998)

The airborne sound insulation measurements were taken using a prescribed procedure in BS EN ISO 140-4: 1998. The measurements were taken with a steady source generating sound pressure levels in the frequency range (16 third-octave bands 100Hz – 3150Hz). Measurements were made in the source and receive rooms over one-third octave bands. The fixed position microphone method was used to obtain a good spatial average in the source and receive room.

A correction for the receive room affect is made by measuring the reverberation time in each third octave band across the frequency range following the procedures in BS EN ISO 354: 2003.

The correction, which is applied to allow for these reverberation times, is given in the following formula, as given in BS EN 140-4: 1998:

$$Correction = 10 \log \left(\frac{T}{T_0} \right) dB$$

Where: T_0 = reference reverberation time 0.5 seconds

T = average reverberation time in the receive room.

The standardised level difference D_{nT} is given in decibels using the equation

$$D_{nT} = D + 10 \log \left(\frac{T}{T_0} \right) dB$$

Where D = the level difference ; $L_1 - L_2$

L_1 = average sound pressure level in the Source Room

L_2 = average sound pressure level in the Receive Room

The single figure descriptor of sound insulation D_{nTw} (Weighted Standardized Level Difference) and the Spectrum Adaptation Term C_{tr} measured in decibels (dB) are calculated in the procedure given in BS EN ISO 717-1: 1997 using the relevant reference curves. Unfavourable deviations (D_{nT}) from the reference curve are mentioned if they exceed 8.0dB.

The result achieved in this manner is compared to the performance standards given in Table 1a on p8 of Approved Document E 2003 (NOTE: Table 0.1a in Rev 2004) of the Building Regulations which for separating walls in dwellings formed by material change of use, no result is to be lower than **43dB D_{nTw} + C_{tr}**

The Graphs in Appendix show the results in the room, plotted against the equivalent standard curve.

8.0 Conclusions

8.1 Wall Airborne Sound Insulation:

The wall surfaces tested showed compliance with the minimum airborne performance standard for dwellings formed by material change of use (43dB $D_{nTw} + C_{tr}$), houses and flats as identified in Approved Document E 2003.

This is only indicative of the sound insulation of the wall, due to the complexity of the spaces on the receive side (17 St John Street).

Upgrade recommendations are detailed in the section below

9.0 Recommendations

It is understood that the Media room in No15 will house equipment that will be capable of amplification and reproduced sound e.g. Surround Sound TV and Hi Fi.

In order to assist in preventing noise breakout a wall treatment is specified to upgrade the existing wall and its adjoining flanking elements, in order to reduce the possibility of noise transfer between the basement of the residential dwelling and the basement records storage area in no17.

It is understood that there are likely to be dimensional constrainst due to the size of the space and a proprietary upgrade treatment is also proposed in order to reduce to a minimum the required depth of treatment.

The treatment is discussed below and the airborne sound insulation predicted usng a proprietary software suite (INSUL v8.0 in order to demonstrate the improvement expected.

Wall Upgrade Treatment:

The simple wall upgrade treatment from section 4 of Approved Document E 2003 is proposed as the most cost effective solution. This is detailed in Section 4 and is shown below for ease of reference.

Wall treatment 1: Independent panel(s) with absorbent material

4.22 The resistance to airborne sound depends on the form of existing construction, the mass of independent panel(s), the isolation of the panel(s) and the absorbent material.

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 100 mm 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) 20 kg/m^2
- each panel should consist of at least 2 layers of plasterboard with staggered joints
- if the panels are free-standing they should be at least 25 mm from masonry core
- if the panels are supported on a frame there should be a gap of at least 10 mm between the frame and the face of the existing wall
- mineral wool, minimum density 10 kg/m^3 and minimum thickness 35 mm, in the cavity between the panel and the existing wall

4.25 Points to watch

Do

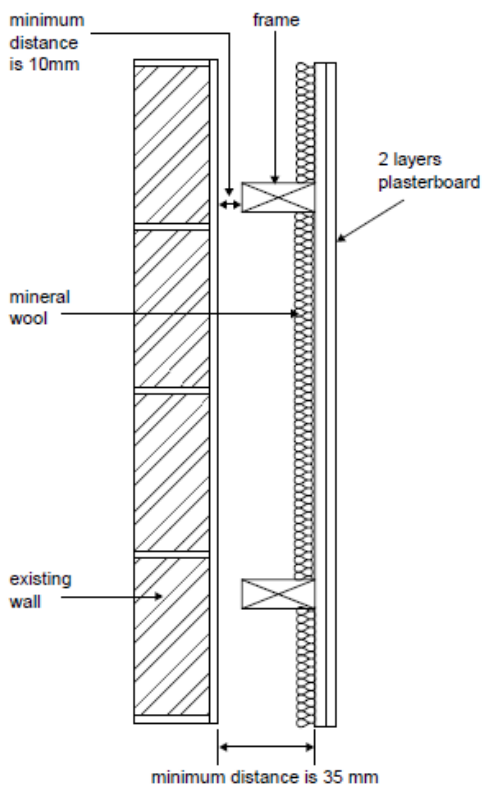
a. Do ensure that the independent panel and its supporting frame are not in contact with the existing wall.

b. Do seal the perimeter of the independent panel with tape or sealant.

Do not

Do not tightly compress the absorbent material as this may bridge the cavity.

Diagram 4-2: **Wall treatment 1**



The INSUL prediction for the upgrade treatment application is detailed below:

Sound Insulation Prediction (v8.0.9)

Program copyright Marshall Day Acoustics 2015

- Key No. 2560

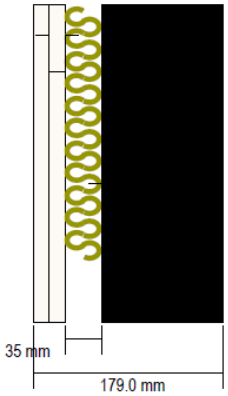
Margin of error is generally within Rw +/- 3 dB

Job Name:

Job No.: Page No.: Notes:

Date: 19 Aug 16 Initials:

File Name: Insul 19182016.ixl



Rw	63 dB	
C	-2 dB	
C_{tr}	-7 dB	
D_{nTw}	65 dB	[V:50m3] [A:11m2]

System description

Panel 1 : 2 x 15.0 mm mm Plasterboard (ρ:710 kg/m3,E:2GPa,η:0.01)

Cavity: Staggered Steel stud: Stud spacing 600 mm , Infill Fibreglass (10kg/m3) Thickness 35 mm (ρ:10 kg/m3, Rf:4000 Pa.s/m2)
Panel 2 + 1 x 114.0 mm Brick (ρ:1600 kg/m3,E:8.9GPa,η:0.02)

Figure 22 x 15mm layers of Soundbloc plasterboard on independent frame system.:

Comment: The performance increase is predicted to be from 45dB-49dB DnTw+Ctr to 58dB DnTw+Ctr.

An alternative is the Insta Coustic AS28 wall system and this is shown below and utilises a mass loaded layer which helps in controlling low frequency noise.

ACOUSTIC WALLING SYSTEMS
AS20 & AS28

The adjustable AS20 & AS28 systems provide wall levelling capabilities. The AS28 gives additional acoustic performance with the inclusion of IN8 acoustic insulation.

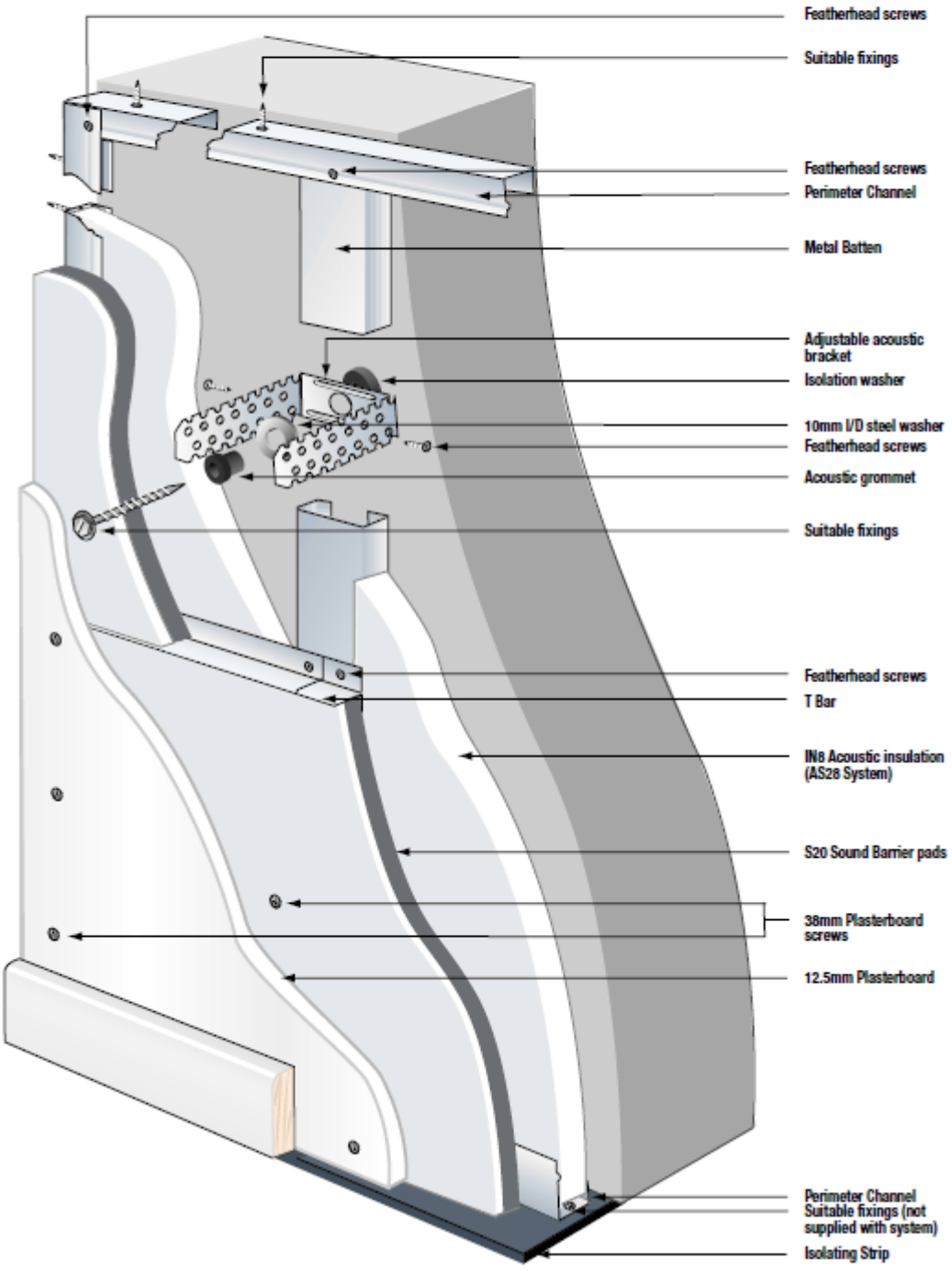


Figure 3: Insta Coustic Proprietary wall treatment.

The extent of the treatment to the walls is shown below and should include the adjacent 'flanking wall' elements:



Figure 4: Basement layout showing Media Room and extent of sound insulation treatment to the walls.

Prediction of Noise level in Corridor / Stairwell No17

Based on the proposed upgrade treatment the sound pressure level can be predicted in the basement of No17 given a music noise level in the Media Room.

This is detailed in Table 1 in the Appendix and shown below.

It is assumed that internal levels from BS8233: 2014 (Table 6) are taken to be reasonable in the office space of No17. See below:

BS 8233:2014 BRITISH STANDARD

Table 6 Typical noise levels in non-domestic buildings

Activity	Location	Design range dB $L_{Aeq,\ T}$
Speech or telephone communications	Department store Cafeteria, canteen, kitchen	50 – 55
	Concourse Corridor, circulation space	45 – 55
Study and work requiring concentration	Library, gallery, museum	40 – 50
	Staff/meeting room, training room	35 – 45
	Executive office	35 – 40
Listening	Place of worship, counselling, meditation, relaxation	30 – 35

Figure 5: Table 6 from BS8233: 2014

In this case a sound pressure level of 35 – 40dB LAeq,T would be appropriate in an executive office.

The following table details the calculation to arrive at a level of 40dB in the basement office corridor space in No17 St John St.

Table 1 - Calculation Sheet: Sound Pressure Level in Basement Stairwell/Corridor No17

No15 Media room to No17 Basement corridor		63	125	250	500	1k	2k	4k	dB(A)
Typical Internal Sound Pressure level Home entertainment system		80	85	86	83	76	73	69	84
R = Sound Reduction Index of upgraded separating Wall - INSUL v8		31	43	54	58	66	70	87	
Common area of Wall between Media room & Corridor/stairwell = approx = 2.4 x 4.522 = 10.08sq.m 10Log S (10.08m2) surface area	10.08	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Residential Room Sound Pressure Level - Worst Case		59	52	42	35	20	13	-8	40

In this case limiting the music sound pressure level to 84dBLAeq,T in the Media room is predicted to generate a sound pressure level of 40dB LAeq,T in the corridor space of No17.

If 35dB(A) were seen as a more appropriate level in No17 then the overall level in No15 could be reduced accordingly, in this case limited to 79dB LAeq,T.

79 – 84dB LAeq,T would be appropriate as a limit range for the internal environment the media room of No15 when the appropriate treatment had been applied to the wall as specified above.

With respect to noise limiters, these should be calibrated after installation in order to ensure the settings are determined and locked to the appropriate level. A suitable domestic system (if it were thought to be appropriate to have one) would be the 'Sentry' Lite noise limiter produced by Formula Sound see further details below:

http://formula-sound.co.uk/system-protection-noise-control/

PRODUCTS: WHERE TO BUY:

Sentry Lite Cut Off Limiter:



The Sentry Lite Cut Off Limiter is, as the name suggests, a smaller version of the Sentry MK2, which is widely recognised as one of the most effective and versatile sound level control equipments of it's type.

To buy direct from Formula Sound, please call us on: +44 (0)161 688 0020, email us or see details of where to buy.

Formula Sound Limited – Manchester:
Devon Mill,
Chapel Road,
Oldham,
Lancashire OL8 4QH,
United Kingdom

Telephone: +44 (0)161 688 0020
E-Mail: info@formula-sound.co.uk

Dr Bill Whitfield **BA, MSc, MIOA**

Noise & Vibration Consultant

10.0 Bibliography

Bibliography & References		
Ref	Title	No.
Approved Document E (2003)	Resistance to the passage of sound	[1]
BS EN ISO 140-4: 1998	Field measurements of airborne sound insulation between rooms.	[2]
BS EN ISO 717-1: 1997	Airborne sound insulation	
BS EN ISO 354: 2003	Acoustics – Measurement of sound absorption in a reverberation room.	
Sean Smith, John B Wood, Richard Mackenzie	Housing and Sound Insulation	[3]

11.0 Glossary

Absorption
Conversion of sound energy to heat, often by the use of a porous material.

Absorption coefficient
A quantity characterizing the effectiveness of a sound absorbing surface. The proportion of sound energy absorbed is given as a number between zero (for a fully reflective surface) and one (for a fully absorptive surface). Note that sound absorption coefficients determined from laboratory measurements may have values slightly larger than one. See BS EN 20354:1993.

Absorptive material
Material that absorbs sound energy.

Airborne sound
Sound propagating through the air.

Airborne sound insulation
Sound insulation that reduces transmission of airborne sound between buildings or parts of buildings.

Air path
A direct or indirect air passage from one side of a structure to the other.

Cavity stop
A proprietary product or material such as mineral wool used to close the gap in a cavity wall.

C_{tr}
The correction to a sound insulation quantity (such as *D*n*T*,w) to take account of a specific sound spectra. See BS EN ISO 717-1:1997.

Decibel (dB)
The unit used for many acoustic quantities to indicate the level with respect to a reference level.

Density
Mass per unit volume, expressed in kilograms per cubic metre (kg/m^3).

Direct transmission
The process in which sound that is incident on one side of a building element is radiated by the other side.

D_{nT}
The difference in sound level between a pair of rooms, in a stated frequency band, corrected for the reverberation time. See BS EN ISO 140-4:1998.

$D_{nT,w}$
A single-number quantity which characterizes the airborne sound insulation between rooms. See BS EN ISO 717-1:1997.

$D_{nT,w} + C_{tr}$
A single-number quantity which characterizes the airborne sound insulation between rooms using noise spectrum no. 2 as defined in BS EN ISO 717-1:1997. See BS EN ISO 717-1:1997.

Dynamic stiffness
A parameter used to describe the ability of a resilient material or wall tie to transmit vibration. Specimens with high dynamic stiffness (dynamically 'stiff') transmit more vibration than specimens with low dynamic stiffness (dynamically 'soft'). See BS EN 29052-1:1992 for resilient materials. e BRE Information Paper IP 3/01 for wall ties.

Flanking element
Any building element that contributes to sound transmission between rooms in a building that is not a separating floor or separating wall.

Flanking transmission
Sound transmitted between rooms via flanking elements instead of directly through separating elements or along any path other than the direct path.

Floating floor
A floating floor consists of a floating layer and resilient layer (see also resilient layer and floating layer).

Floating layer
A surface layer that rests on a resilient layer and is therefore isolated from the base floor and the surrounding walls (see also resilient layer).

Framed wall
A partition consisting of board or boards connected to both sides of a wood or metal frame.

Frequency
The number of pressure variations (or cycles) per second that gives a sound its distinctive tone. The unit of frequency is the Hertz (Hz).

Frequency band
A continuous range of frequencies between stated upper and lower limits, (see also octave band and one-third-octave band).

Hertz (Hz)
The unit of the frequency of a sound (formerly called cycles per second). Sound resulting from direct impact on a building element.

Impact sound insulation
Sound insulation which reduces impact sound transmission from direct impacts such as footsteps on a building element.

Independent ceiling
A ceiling which is fixed independently of a separating floor or an internal floor (see separating floor and internal floor).

Internal floor
Any floor that is not a separating floor (see separating floor).

Intermediate landing
A landing between two floors (see also landing).

Internal wall
Any wall that does not have a separating function.

Isolation
The absence of rigid connections between two or more parts of a structure.

Landing
A platform or part of floor structure at the end of a flight of stairs or ramp.

L'nT
The impact sound pressure level in a stated frequency band, corrected for the reverberation time. See BS EN ISO 140-7:1998.

L'nT,w
A single-number quantity used to characterize the impact sound insulation of floors. See BS EN ISO 717-2:1997.

Mass per unit area
Mass per unit area is expressed in terms of kilograms per square metre (kg/m^2).

Noise
Noise is unwanted sound.

Octave band
A frequency band in which the upper limit of the band is twice the frequency of the lower limit.

One-third-octave band
A frequency band in which the upper limit of the band is 21/3 times the frequency of the lower limit.

***R*w**
A single-number quantity which characterizes the airborne sound insulation of a material or building element in the laboratory. See BS EN ISO 717-1:1997.

Resilient layer
A layer that isolates a floating layer from a base floor and surrounding walls.

Reverberation
The persistence of sound in a space after a sound source has been stopped.

Reverberation time
The time, in seconds, taken for the sound to decay by 60 dB after a sound source has been stopped.

Separating floor
Floor that separates flats or rooms for residential purposes.

Separating wall
Wall that separates adjoining dwelling-houses, flats or rooms for residential purposes.

Sound pressure level
A quantity related to the physical intensity of a sound.

Sound reduction index (*R*)
A quantity, measured in a laboratory, which characterizes the sound insulating properties of a material or building element in a stated frequency band. See BS EN ISO 140-3:1995.

Spectrum
The composition of a particular sound in terms of separate frequency bands.

Structure-borne sound
Sound which is carried via the structure of a building.

UKAS
United Kingdom Accreditation Service.

***ΔL*w**
The measured improvement of impact sound insulation resulting from the installation of a floor covering or floating floor on a test floor in a laboratory. See BS EN ISO 717-2:1997.

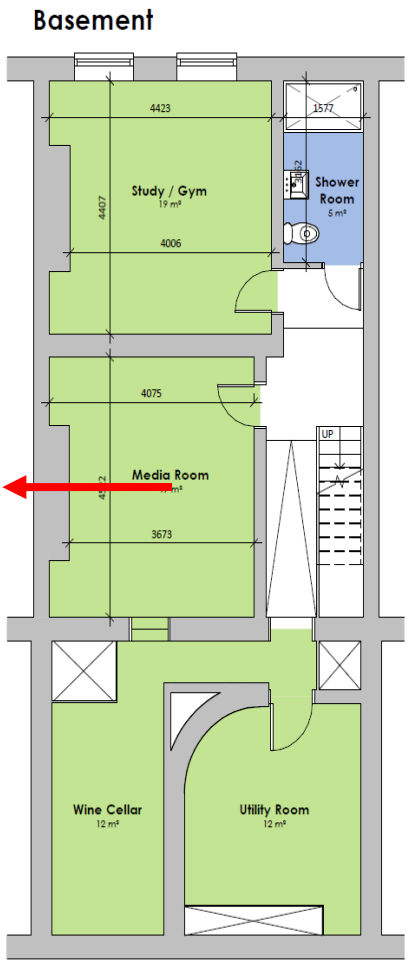
12.0 Appendix

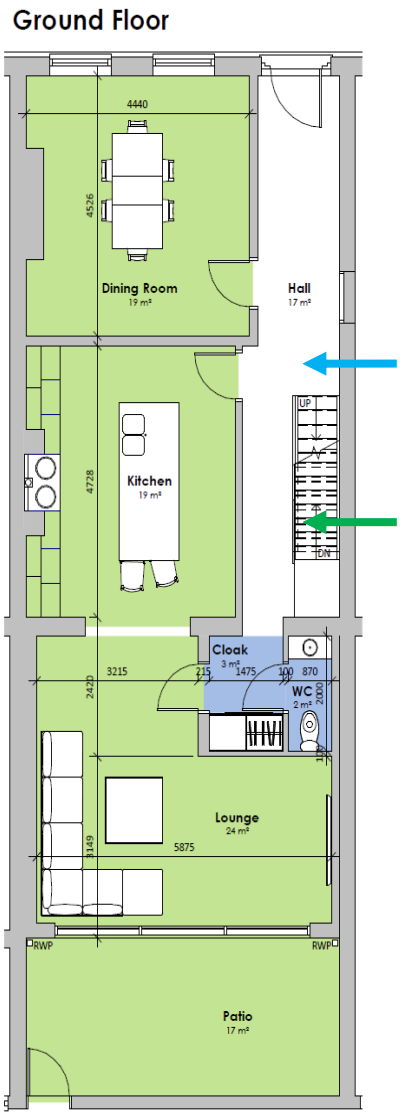
12.1 Room Layouts

Test Number	Source Room	Volume m^3	-	Receive Room	Volume m^3
17212-1-WA01	15 St John street Media Room	38	-	17 St John Street Corridor	38
17212-1-WA02	15 St John Street Media Room	38	-	17 St John Street Stairwell	12

Basic Room Layout

- Transmission
- Corridor Receive
- Stairwell Receive





15 St John Street, Manchester
Proposed Plans

0 5 m

12.2 Summary Information

Required ISO Test Report and Building Regulation Pre-Completion Testing Information (cross referenced where required)			
		Tests Carried Out to:	Analysed to:
A	Standards	EN ISO 140-4: 1997	BS EN ISO 717-1: 1997
B	Organisation performed the measurements	noise.co.uk Ltd, The Hay Barn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name & Address of Client	Contact: Company: Rowlinson Construction	
D	Date of test	17/08/2016	
E	Description & identification of building construction and test arrangement	Building Type: Dwellings Formed By Material Change Of Use Tests: Airborne Performance of Walls General Construction:	
F	Volumes of both test rooms	See Certification Detailed in Appendix	
G	Standardized Level Difference (D_{nT})	See Certification Detailed in Appendix	
H	Area S used for evaluation of R'	N/A	
I	Brief Description of details of Procedure & equipment	See section 7.2 & 13.1 of this report.	
J	Limits of measurement	See Certification Detailed in Appendix	
K	Flanking Transmission	N/A	

12.3 Test Certificates

This section intentionally left blank certificates follow on next new page

Standardized level difference according to ISO 140-4:
Field measurements of airborne sound insulation between rooms

noise.co.uk
noise and vibration consultants

Client: Rowlinson Construction **Date of Test:** 17/08/2016

Site Address: 15 St John Street, Manchester

Description and identification of the building construction and test arrangement, direction of measurement:

Construction: Construction details were not provided by client

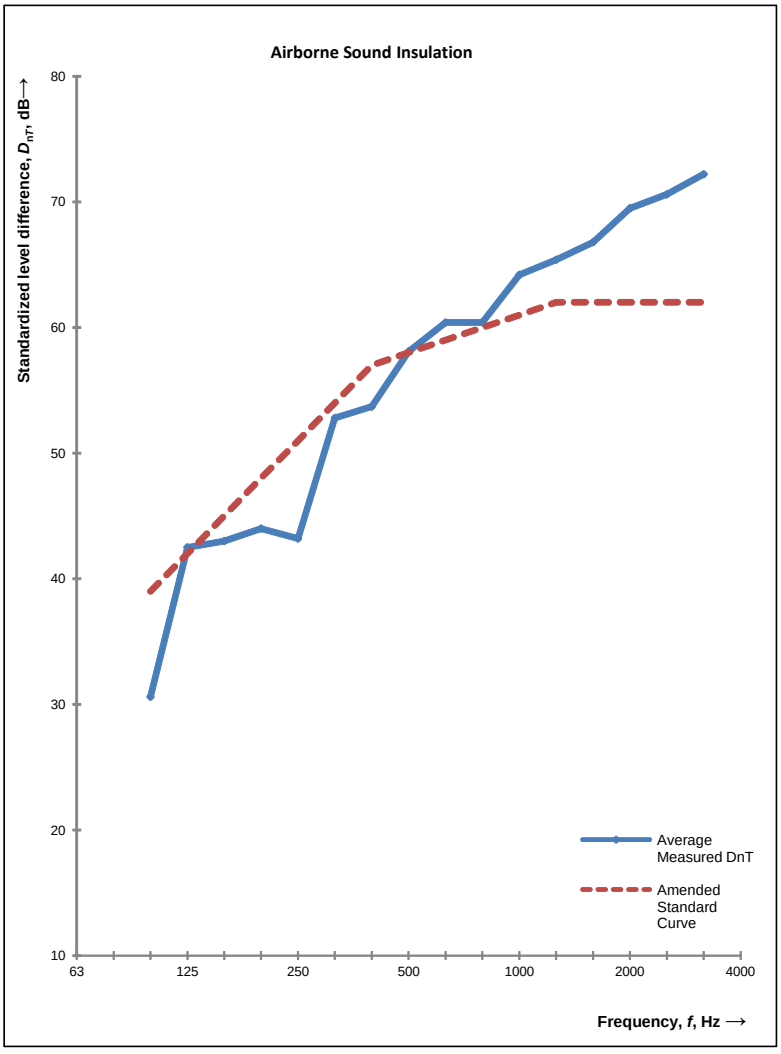
CiD:

Source Room Volume: 38m³ **Source Room:** 15 St John street Media Room

Receive Room Volume: 38m³ **Receive Room:** 17 St John Street Corridor

Frequency Hz	D_{nT} (1/3rd octave) dB	Deviation	Noted Deviation
50			
63			
80			
100	30.6	8.4	***
125	42.5	0.0	None
160	43.0	2.0	None
200	44.0	4.0	None
250	43.2	7.8	None
315	52.8	1.2	None
400	53.7	3.3	None
500	58.1	0.0	None
630	60.4	0.0	None
800	60.4	0.0	None
1000	64.2	0.0	None
1250	65.4	0.0	None
1600	66.8	0.0	None
2000	69.5	0.0	None
2500	70.6	0.0	None
3150	72.2	0.0	None
4000			
5000			

***	Means Deviation is greater than 8dB
≥	Denotes Limit of Measurement Reached
B	Denotes Background Correction made



Sound Insulation Results: EN ISO 717-1

$D_{nTw}(C;C_{tr})$ = **58 (-3; -9) dB** $C_{(100\text{-}3150)}$ = **-3 dB**

$D_{nTw} + C_{tr}$ = **49 dB** $C_{tr\,(100\text{-}3150)}$ = **-9 dB**

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Report No/Cert No:	17212-1-WA01	Name of test institute:	noise.co.uk Ltd
Sound Level Meter Serial No:	31475	Address:	The Hay Barn, Kings Newnham Lane, Warks, CV23 0JU
Amplifier Serial No:	0	Person in Charge of Test:	Jonathan Seiffert
Loudspeaker Serial No:	0	UKAS No:	2694
Date of Certificate:	17/08/2016	Signature:	W A Whitfield

QF18-1.1 i17

Standardized level difference according to ISO 140-4:
Field measurements of airborne sound insulation between rooms

Client: Rowlinson Construction **Date of Test:** 17/08/2016

Site Address: 15 St John Street, Manchester

Description and identification of the building construction and test arrangement, direction of measurement:

Construction: Construction details were not provided by client

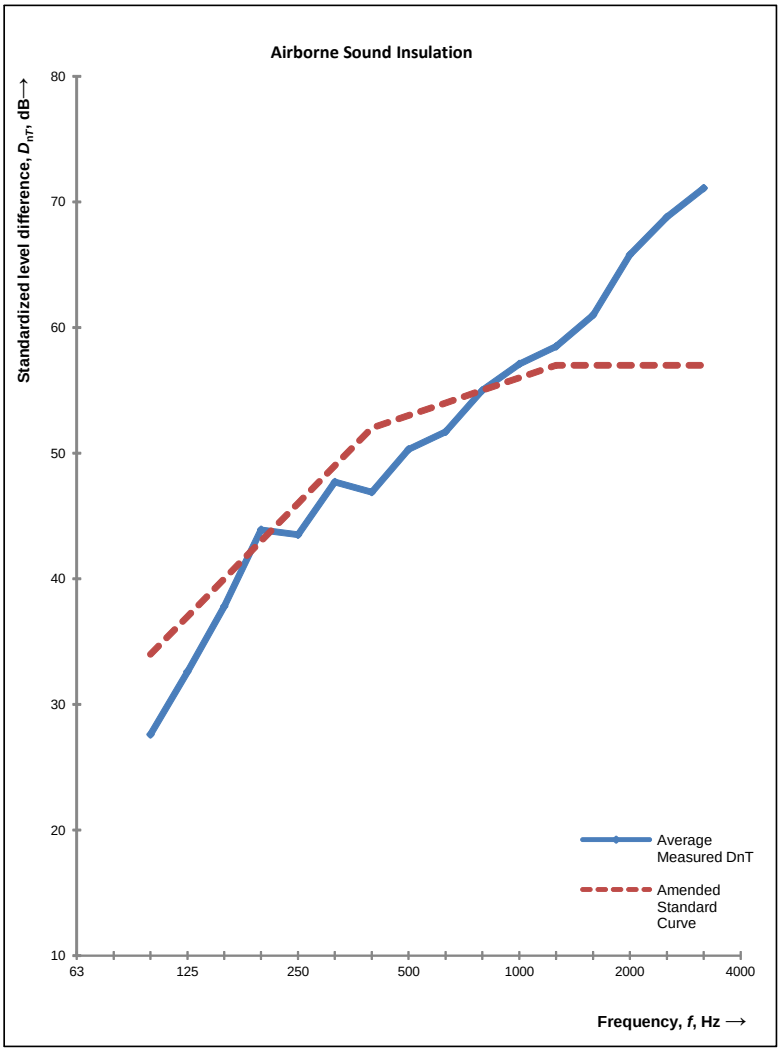
CiD:

Source Room Volume: 38m³ **Source Room:** 15 St John Street Media Room

Receive Room Volume: 12m³ **Receive Room:** 17 St John Street Stairwell

Frequency Hz	D_{nT} (1/3rd octave) dB	Deviation	Noted Deviation	
50				
63				
80				
100	27.6	6.4	None	.
125	32.6	4.4	None	.
160	37.8	2.2	None	.
200	43.9	0.0	None	.
250	43.5	2.5	None	.
315	47.7	1.3	None	.
400	46.9	5.1	None	.
500	50.3	2.7	None	.
630	51.7	2.3	None	.
800	55.0	0.0	None	.
1000	57.1	0.0	None	.
1250	58.5	0.0	None	.
1600	61.0	0.0	None	.
2000	65.8	0.0	None	.
2500	68.8	0.0	None	.
3150	71.1	0.0	None	.
4000				
5000				

***	Means Deviation is greater than 8dB
≥	Denotes Limit of Measurement Reached
B	Denotes Background Correction made



Sound Insulation Results: EN ISO 717-1

$D_{nTw}(C;C_{tr})$ = **53 (-2; -8) dB** $C_{(100\text{-}3150)}$ = **-2 dB**

$D_{nTw} + C_{tr}$ = **45 dB** $C_{tr\,(100\text{-}3150)}$ = **-8 dB**

Evaluation based on field measurement results obtained in one-third octave bands by an engineering method

Report No/Cert No:	17212-1-WA02	Name of test institute:	noise.co.uk Ltd
Sound Level Meter Serial No:	31475	Address:	The Hay Barn, Kings Newnham Lane, Warks, CV23 0JU
Amplifier Serial No:	0	Person in Charge of Test:	Jonathan Seiffert
Loudspeaker Serial No:	0	UKAS No:	2694
Date of Certificate:	17/08/2016	Signature:	

QF18-1.1 i17

13.0 Technical Appendix

13.1 Measurement Equipment

Measurements were made using the following equipment:

- Norsonic 118 Sound Level Analyser. Instrument Serial no 31475. Norsonic 1251 Calibrator. Instrument Serial no 31011.
- Loudspeaker & in built amplifier Serial no .
- Rane ME30B Graphic Equaliser Serial No .

The equipment has traceable calibration.

The sound level meter was calibrated immediately prior to and immediately after the measurements was carried out.

The calibration was as follows:	
Before	113.9dB
After	113.9dB

According to **BS EN ISO 140-4**...

[2]

4 Equipment

The equipment shall comply with the requirements of clause **6**. The accuracy of the sound level measurement equipment shall comply with the requirements of accuracy class 0 or 1 defined in IEC 60651 and IEC 60804. If not otherwise stated by the equipment manufacturer, the complete measuring system including the microphone shall be adjusted before each measurement using a sound calibrator which complies with the requirements of accuracy class 1defined in IEC 60942. For sound level meters calibrated for measurements in sound fields of progressive plane waves, corrections for the diffuse sound field shall be applied. The filters shall comply with the requirements defined in IEC 61260. The reverberation time measurement equipment shall comply with the requirements defined in ISO 354. Requirements for the sound source are given in **6.2** and Annex A.

13.2 Procedure for Sound Insulation Testing

What **Approved Document E** says...

[1]

B1 Introduction

B1.1 Section B.2 of this Annex describes the sound insulation testing procedure approved by the Secretary of State for the purposes of Regulation 20A (2)(a) of the Building Regulations and Regulation 12A (2)(a) of the Approved Inspectors Regulations. The approved procedure is that set out in Section B.2 and the Standards referred to in that Section.

B1.2 Section B.3 of this Annex provides guidance on laboratory testing in connection with achieving compliance with Requirement E2 in Schedule 1 to the Building Regulations, and in connection with evaluation of components to be used in constructions subject to Requirement E1.

B1.3 Section B.4 of this Annex gives guidance on test reports.

B1.4 The person carrying out the building work should arrange for sound insulation testing to be carried out by a test body with appropriate third party accreditation. Test bodies conducting testing should preferably have UKAS accreditation (or a European equivalent) for field measurements. The measurement instrumentation used should have a valid, traceable certificate of calibration, and should have been tested within the past two years.

B2 Field measurement of sound insulation of separating walls and floors for the purposes of Regulation 20A and Regulation 12A

Introduction

B2.1 Sound insulation testing for the purposes of Regulation 20A of the Building Regulations and Regulation 12A of the Approved Inspectors Regulations 2000, must be done in accordance with: BS EN ISO 140-4:1998; BS EN ISO 140- 7:1998; BS EN ISO 717-1:1997; BS EN ISO 717-2:1997; BS EN 20354:1993. When calculating sound insulation test results, no rounding should occur in any calculation until required by the relevant Standards, the BS EN ISO 140 series and the BS EN ISO 717 series.

Airborne sound insulation of a separating wall or floor

B2.2 The airborne sound insulation of a separating wall or floor should be measured in accordance with BS EN ISO 140-4:1998. All measurements and calculations should be carried out using one-third-octave frequency bands. Performance should be rated in terms of the weighted standardized level difference, D_nT,w, and spectrum adaptation term, Ctr, in accordance with BS EN ISO 717-1:1997.

Measurements using a single sound source

B2.3 For each source position, the average sound pressure level in the source and receiving rooms is measured in one-thirdoctave bands using either fixed microphone positions (and averaging these values on an energy basis), or using a moving microphone.

B2.4 For the source room measurements, the difference between the average sound pressure levels in djacent one-third-octave bands should be no more than 6 dB. If this condition is not met, the source spectrum should be adjusted and the source room measurement repeated. If the condition is met, the average sound pressure level in the receiving room, and hence a level difference, should be determined.

B2.5 It is essential that all measurements made in the source and receiving rooms to determine a level difference should be made without moving the sound source or changing the output level of the sound source, once its spectrum has been correctly adjusted (where necessary).

B2.6 The sound source should now be moved to the next position in the source room and the above procedure repeated to determine another level difference. At least two positions should be used for the source. The level differences obtained from each source position should be arithmetically averaged to determine the level difference, D as defined in BS EN ISO 140-4:1998.

Measurements using multiple sound sources operating simultaneously

B2.7 For multiple sound sources operating simultaneously, the average sound pressure level in the source and receiving rooms is measured in one-third-octave bands using either fixed microphone

positions (and averaging these values on an energy basis), or using a moving microphone.

B2.8 For the source room measurements, the difference between the average sound pressure levels in adjacent one-third-octave bands should be no more than 6 dB. If this condition is not met, the source spectrum should be adjusted and the source room measurement repeated. If the condition is met, determine the average level in the receiving room, and hence the level difference, *D* as defined in BS EN ISO 140-4:1998.

Impact sound transmission of a separating floor

B2.9 The impact sound transmission of a separating floor should be measured in accordance with BS EN ISO 140-7:1998. All measurements and calculations should be carried out using one-third-octave frequency bands. Performance should be rated in terms of the weighted standardized impact sound pressure level, *L*'n*T*,w in accordance with BS EN ISO 717-2:1997.

Measurement of reverberation time

B2.10 BS EN ISO 140-4:1998 and BS EN ISO 140-7:1998 refer to the ISO 354 (BS EN 20354:1993) method for measuring reverberation time. However for the approved procedure, the guidance in BS EN ISO 140-7:1998 relating to the source and microphone positions, and the number of decay measurements required, should be followed.

Room requirements

B2.11 Section 1 gives guidance on the room types that should be used for testing. These rooms should have volumes of at least 25 m3. If this is not possible then the volumes of the rooms used for testing should be reported.

Tests between rooms

B2.12 Tests should be conducted in completed but unfurnished rooms or available spaces in the case of properties sold before fitting out; see Section 1.

B2.13 Impact sound insulation tests should be conducted on a floor without a soft covering (e.g. carpet, foam backed vinyl etc) except in the case of (a) separating floor type 1, as described in this Approved Document, or (b) a concrete structural floor base which has a soft covering as an integral part of the floor.

B2.14 If a soft covering has been installed on any other type of floor, it should be taken up. If that is not possible, at least half of the floor should be exposed and the tapping machine should be placed only on the exposed part of the floor.

B2.15 When measuring airborne sound insulation between a pair of rooms of unequal volume, the sound source should be in the larger room.

B2.16 Doors and windows should be closed.

B2.17 Kitchen units, cupboards etc. on all walls should have their doors open and be unfilled.

Measurement precision

B2.18 Sound pressure levels should be measured to 0.1 dB precision.

B2.19 Reverberation times should be measured to 0.01 s precision.

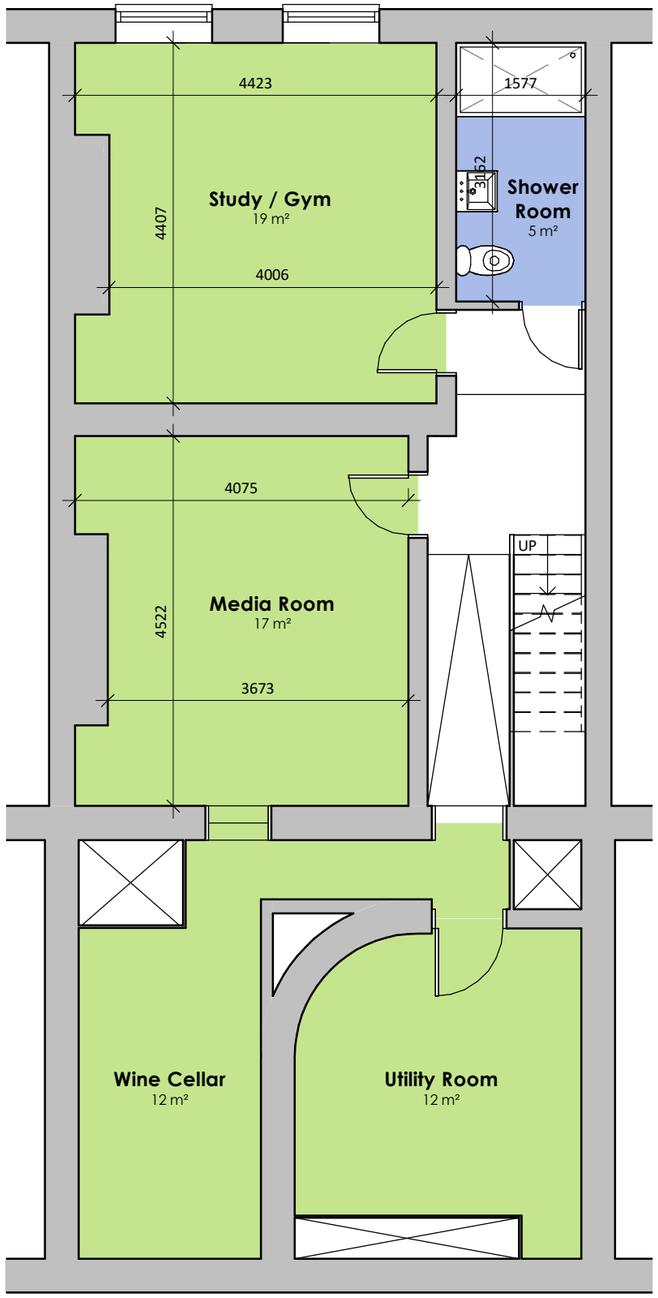
Measurements using a moving microphone

B2.20 At least two positions should be used.

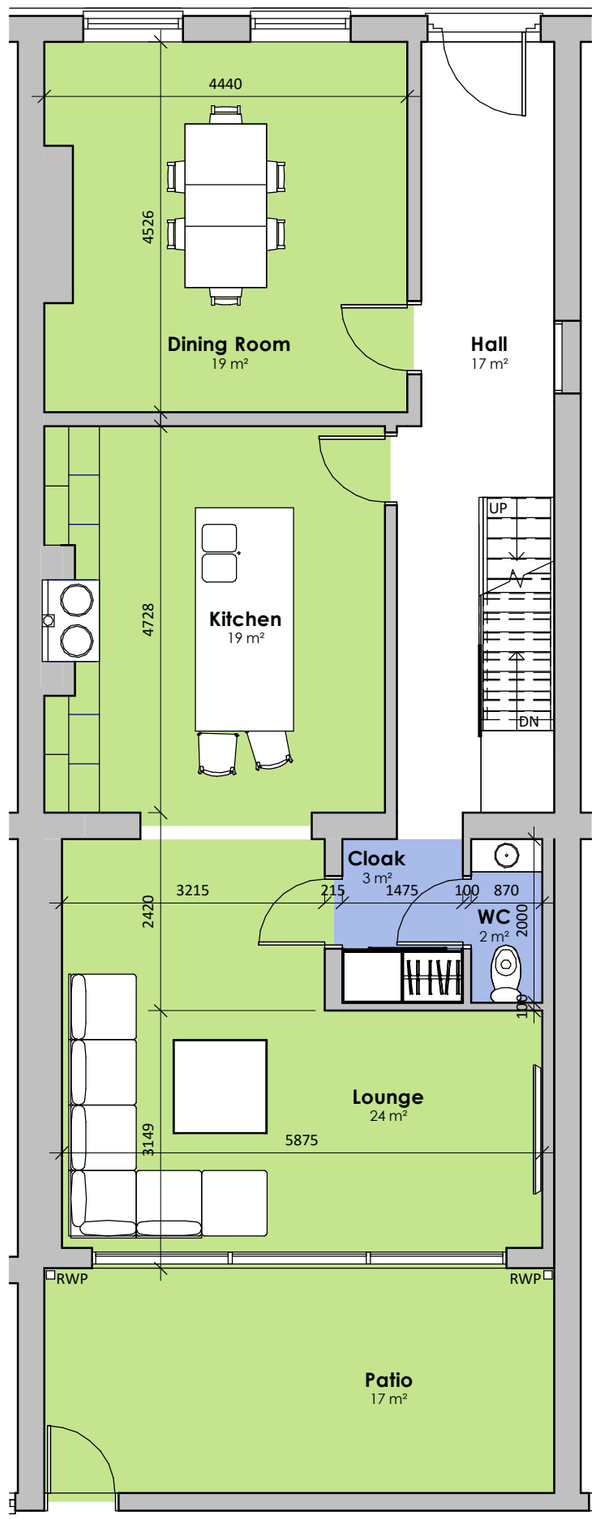
B2.21 For measurements of reverberation time, discrete positions should be used rather than a moving microphone.

14.0 Drawings

Basement

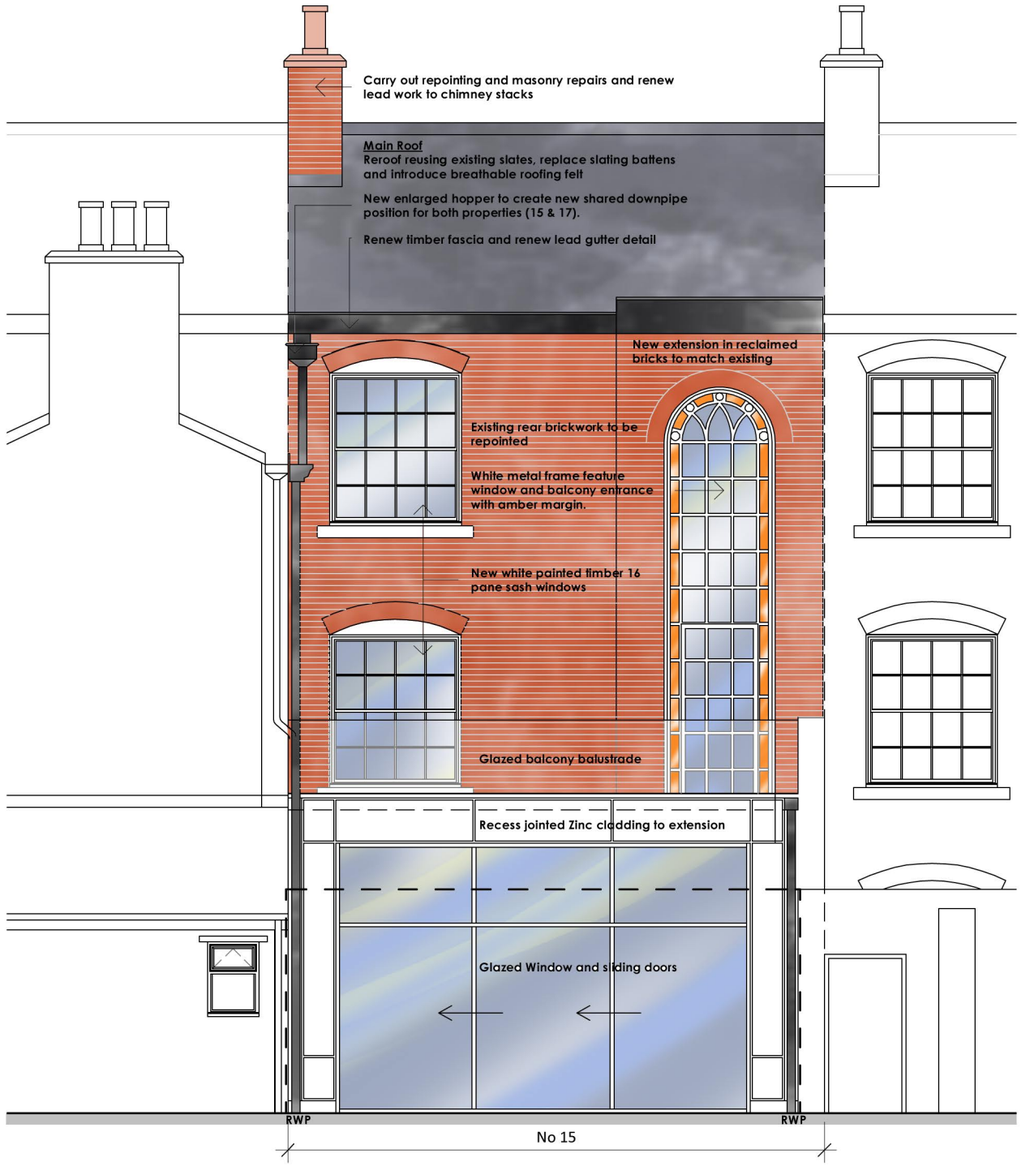


Ground Floor



0 5 m

15 St John Street, Manchester
Proposed Plans



15 St John Street, Manchester

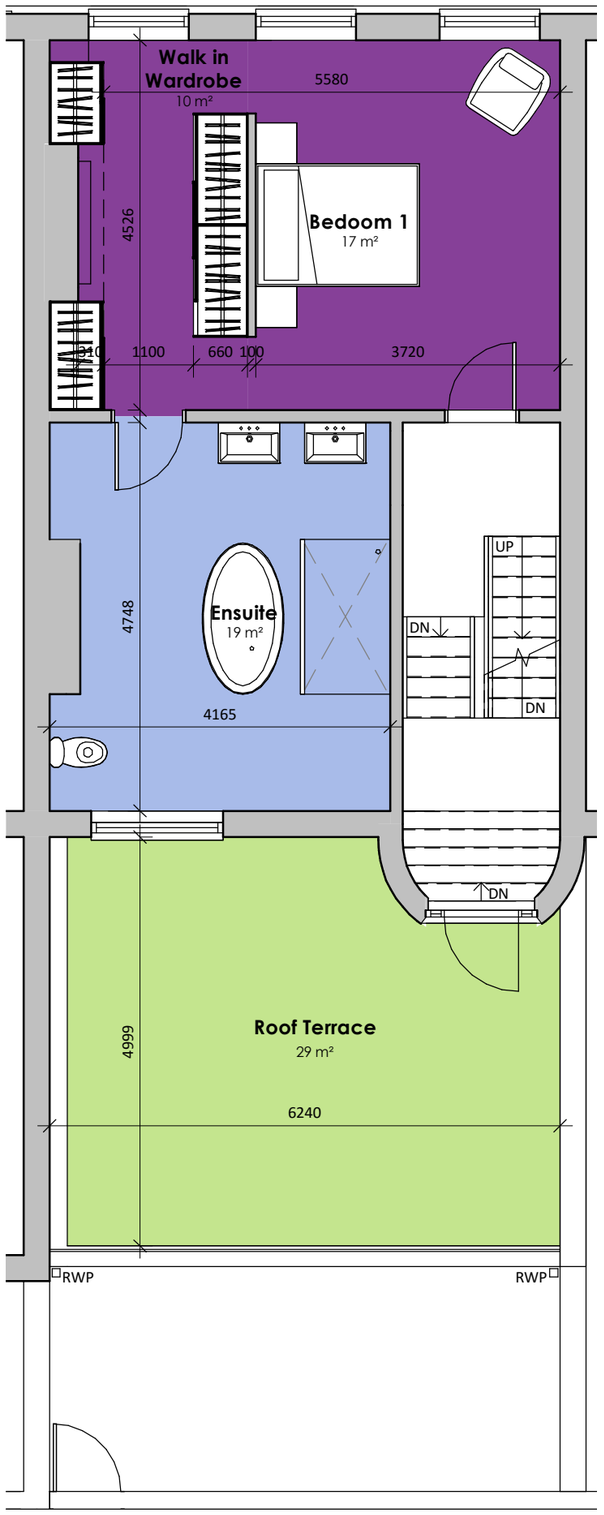
Proposed Rear Elevation



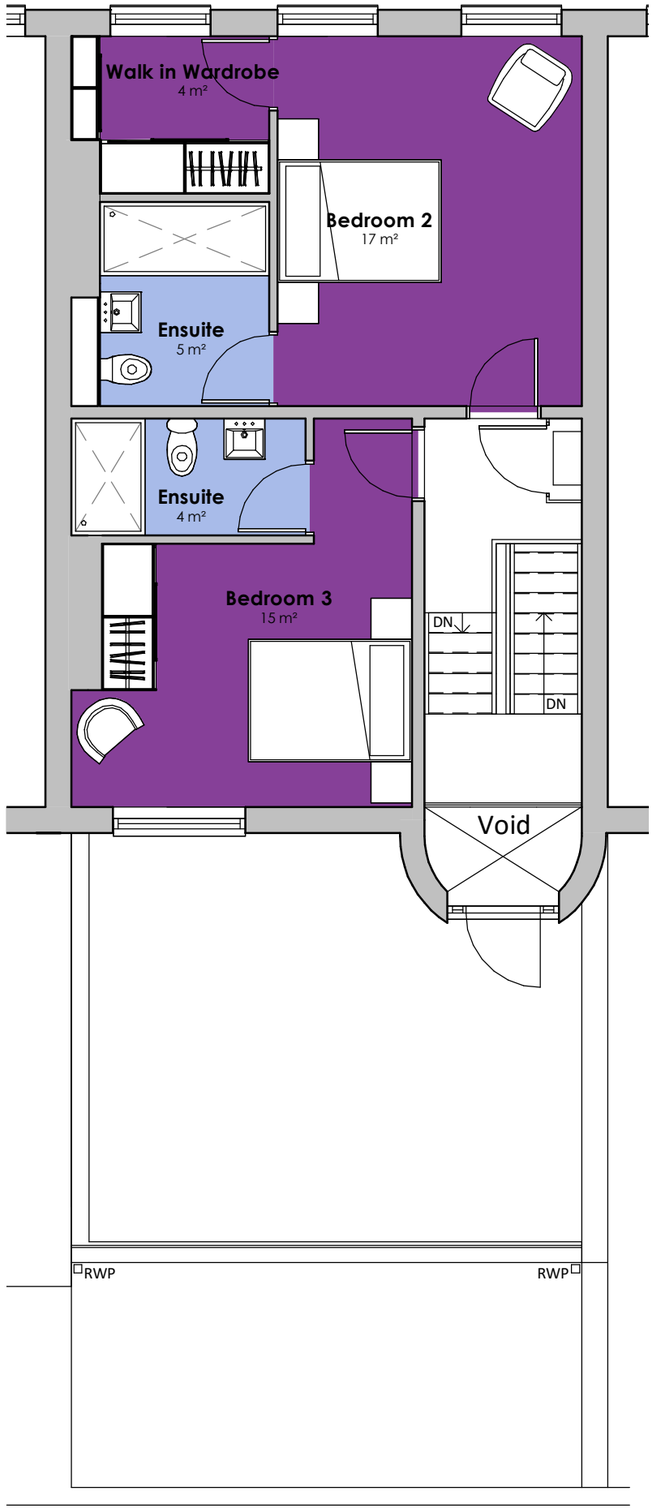
15 St John Street, Manchester

Proposed Front Elevation

First Floor



Second Floor



0 5 m

15 St John Street, Manchester

Proposed Plans

MANCHESTER
CITY COUNCIL

Technical Support Team
Planning

Telephone: 0161 234 4516
Planning.tst@manchester.gov.uk

P O Box 532 Town Hall
Manchester M60 2LA

Ms Amy Jones
Bernard Taylor Partnership
486 Elizabeth House
Didsbury Road
Heaton Mersey
Stockport
SK4 3BS

20 JUL 2016

Date: 15 July 2016

Dear Sir/Madam,

Application number: 112624/FO/2016
Proposal: The demolition of a single storey rear extension and the erection of a single storey rear extenion to creat addidional living accommodation at ground floor, and the creation of a balcony at first floor level, and an elevational alteration to creat a feature window., a balcony. The entrance to the balcony will be from a feature window within a new barrel shaped extension to the stairwell., The modern concrete yard surfaces will be replaced with new paving materials and the rear boundary brickwork wall will be rebuilt with new coping, stones.
Location: 15 St John Street, Manchester, M3 4DG

Following your recent planning application submission, I am unable to progress your proposal as the application is invalid or incomplete for the following reason(s):

additional survey *

BTP — 1) Scaled cross section drawings showing the window depths within the reveals and any modeling within the elevations.

Specialist input — In terms of the proposed uses, the study should identify the acoustic treatment and measures that will limit the breakout of noise in accordance with a noise study of the premises. The scheme proposed shall include measures such as acoustic lobbies at access and egress points of the premises, acoustic treatment of the building structure, sound limiters linked to sound amplification equipment, and specified maximum internal noise levels.

kingsdeam — A Waste Management Plan that demonstrates how both construction and demolition waste would be minimised and recycled on site wherever possible and how the sustainable waste management needs of the end user would be met.

Confirmation of what external equipment is proposed, if any, including that needed for fume extraction, air conditioning etc.

BTP — Details of how and where refuse is to be stored within the building and how the refuse is to be collected (if the use is mixed please confirm where refuse is to be stored within the residential element Please provide a scaled plan of the building showing these refuse

Photographs of all areas of the building (internal and external) affected by the proposal.

BTP - Done clarify with planners

Under the requirements of The National Planning Policy Framework (NPPF) any development with an impact on a recognised heritage asset (Conservation Area, Listed Building or Archaeological interest) must be accompanied by a Heritage Statement. This must include a description of the significance of the heritage assets affected and the contribution of their setting to that significance an a full justification for the works in line with Government guidance outlined in Section 12 of the NPPF. You should assess the existing historical, technical and architectural significance of the building and explain how the proposal may impact on the architectural and historical character and appearance of the building. You also need to clearly state how any original building fabric will be altered, removed or concealed as part of the proposal. The Statement is required to enable all consultees to make an informed response.

Accurate, annotated drawings detailing internal works required to implement any acoustic insulation scheme, thermal insulation and fire protection associated with the proposed re-use of the application building. These drawings should include details of:

Specialist input needed

(a) The location and design (including the external finishing materials and their finishes and colours) of these works;

(b) The relationship between these proposed works and the existing listed structure, including details of any raised floors or underdrawn ceilings and the means of affixing the proposed works to the existing listed structure; and

(c) The treatment of the existing elevational window openings to achieve the required acoustic insulation, including a schedule of works for the retention, repair and refurbishment of the existing windows. Such works should not include for the removal or replacement of any original windows unless a full justification for such works is provided, including a structural survey, details of why repair and refurbishment of such windows is not viable and details including materials and sections of any proposed replacement windows.

I am therefore holding your application and if you wish to discuss the information required members of my staff will be pleased to assist.

Please return any documents/information required to the Technical Support Team, Planning at the above address. If we have not heard from you within 28 days we will return your application.

Yours faithfully,

Julie Roscoe
Head of Planning, Building Control & Licensing

MANCHESTER
CITY COUNCIL

Technical Support Team
Planning

Telephone: 0161 234 4516
Planning tst@manchester.gov.uk

P O Box 532 Town Hall
Manchester M60 2LA

Ms Amy Jones
Bernard Taylor Partnership
486 Elizabeth House
Didsbury Road
Heaton Mersey
Stockport
SK4 3BS

20 JUL 2016

Date: 15 July 2016

Dear Sir/Madam,

Application number: 112625/LO/2016
Proposal: Listed Building Consent for external and internal aletrations to refurbish the existing building to create residential living accommodation.
Location: 15 St John Street, Manchester, M3 4DG

Following your recent planning application submission, I am unable to progress your proposal as the application is invalid or incomplete for the following reason(s):

1)

KINSDEAN / BTP — A full method statement for the proposed works.

BTP — Existing and proposed drawings which indicate what physical fabric of the building will be affected and whether this is original fabric.

Clarification and full details of any demolition involved and whether this is demolition of original fabric.

BTP — Scaled existing and proposed ceiling plans. *(additional survey)

Scaled existing and proposed cross sections through the building.

P externals done Internals to do — Scaled existing and proposed elevation drawings of all elevations affected by the proposed works (if applicable), including internal elevations, eg where breaking through walls. The proposed drawings should be clearly annotated to show the proposed works.

BTP — Scaled plans showing where building fabric (original and non-original) will be removed, altered or concealed.

BTP — Details of wall finishes and how any columns, downstand beams or other features such as cornices, skirting boards etc are to be dealt with. *(additional survey)

BTP - DONE. Clarify with planners extent of information. — Details of remedial / restoration works to existing historic fabric / finishes etc.

BTP

storage and collection areas and provide information on the number of bins proposed, the size of the bins, the frequency of collection and details regarding who will collect the refuse. Please also note that separate containers for recycling should be used. Please provide details on these. You should complete the 'Waste Proforma v1.0' available at: http://www.manchester.gov.uk/downloads/download/6048/waste_management_strategy If the proposed waste management strategy is as existing please confirm the existing waste management details.

BTP discuss with planners

Full details of the proposed servicing to the proposal. This should include a plan demonstrating how the servicing would operate, what size of vehicles would be used and the frequency of servicing.

BTP/Kingsdean

A justification of the levels of car parking provided. Residential developments should include 100 % provision of car parking. Where there is not 100 % provision of car parking - Justify parking numbers. What provisions / strategy do they have in place for making an authorized parking space available for all residents. This would include for example contract parking within car parks, special deals with car hire companies, car sharing, purchasing pool cars that will be available for rent through the development, writing into deeds on sale of property that owners or occupiers of flats will not have a car or joining a car club such as with Wizzgo (the City Councils partner in setting up car clubs within the City) The contact is Charlotte Morton (email = charlotte.morton@whizzgo.co.uk) and the office number is 0870 446 6000, fax 0870 135 7910.

BTP

Confirmation that direct and level access is proposed to the site, into the building and throughout the building for disabled persons. How and where would this be achieved? Please provide details of how disabled and able-bodied people would enter and move between floors within the building. Where buildings are adapted, provision of access for disabled people will be sought. Indeed, when adapting buildings, full access should be made available, unless practical considerations dictate otherwise. If you believe full access is not going to be possible at the building, you must comprehensively explain all the options you have considered in order to make the building fully accessible and explain and justify the reasons why each option has been discounted. You are advised to provide scaled drawn information to back up your findings.

BTP

A Crime Impact Statement or Crime Impact Statement Lite - this can be obtained from Greater Manchester Police Design for Security (tel. 0161 856 5912, or email: info@designforsecurity.org)

I am therefore holding your application and if you wish to discuss the information required members of my staff will be pleased to assist.

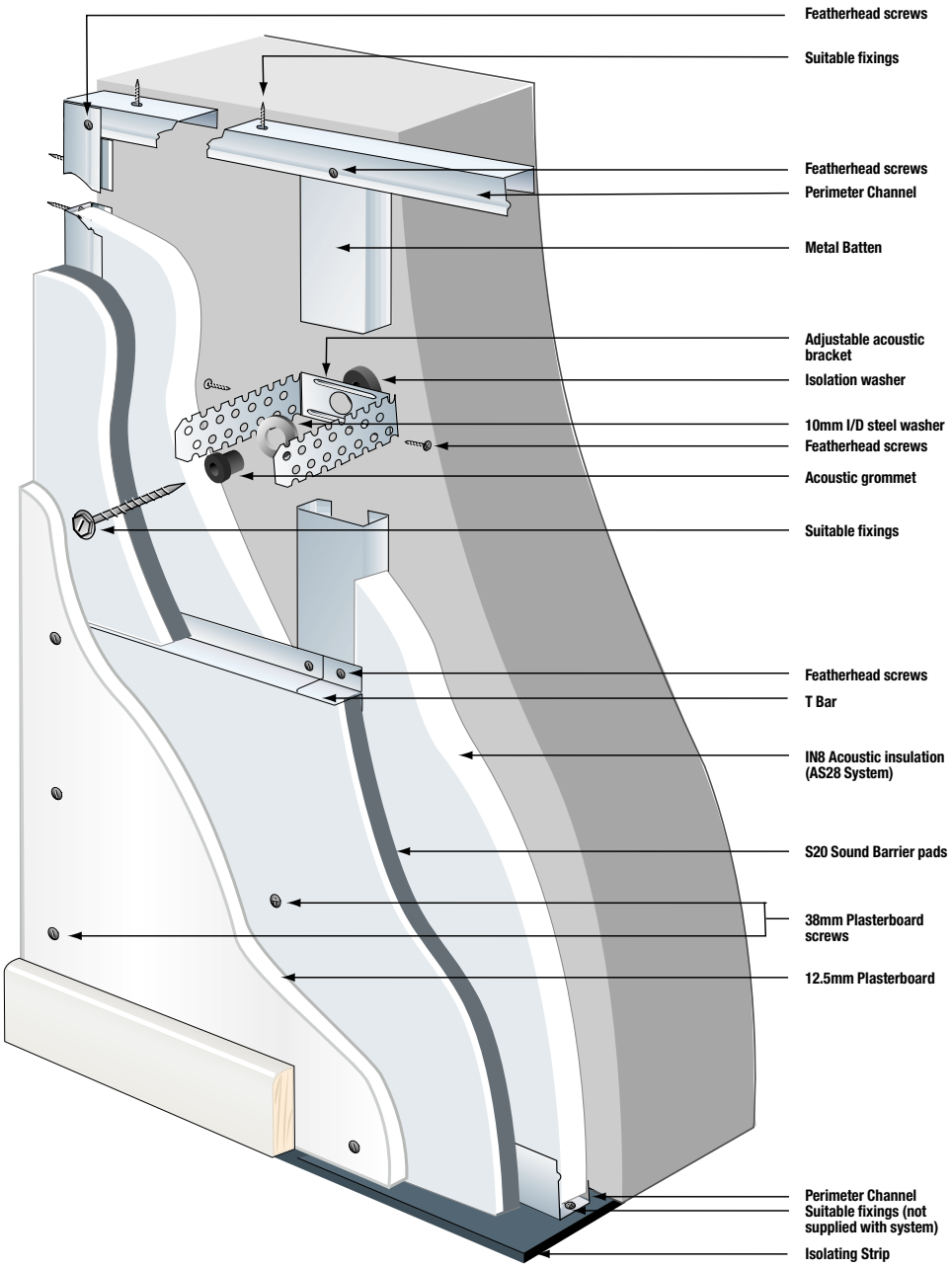
Please return any documents/information required to the Technical Support Team, Planning at the above address. If we have not heard from you within 28 days we will return your application.

Yours faithfully,

Julie Roscoe
Head of Planning Building Control & Licensing

ACOUSTIC WALLING SYSTEMS
AS20 & AS28

The adjustable AS20 & AS28 systems provide wall levelling capabilities. The AS28 gives additional acoustic performance with the inclusion of IN8 acoustic insulation.



COMPONENTS


Isolation washer

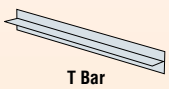

Adjustable Acoustic Bracket (supplied flat)

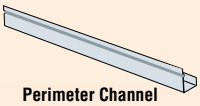

10mm I/D steel washer


Acoustic grommet

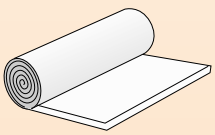

Fixing screws


Metal Batten
3.0m lengths


T Bar
3.0m lengths


Perimeter Channel
3.0m lengths


S20 Sound Barrier Pads
1.20m x 0.50m

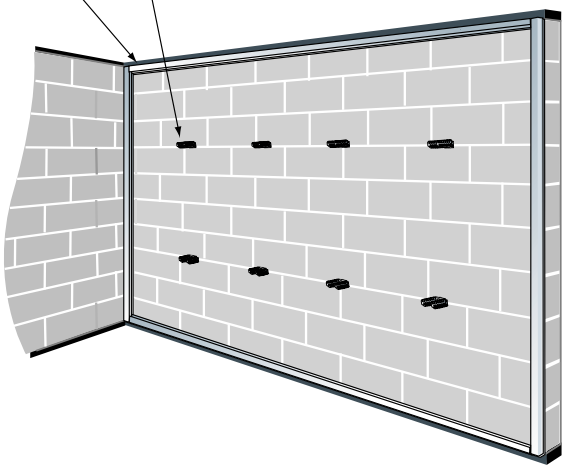

IN8 Acoustic insulation
0.58m x 20.0m roll
(AF28 only)

InstaCoustic
THE SOUND SOLUTION
Tel: 0118 973 9560 Fax: 0118 973 9547
Email: sales@instacoustic.co.uk
www.instacoustic.co.uk
Insta House, Ivanhoe Road
Hogwood Business Park, Finchampstead
Wokingham, Berks RG40 4PZ

ACOUSTIC WALLING SYSTEMS **AS20 & AS28**

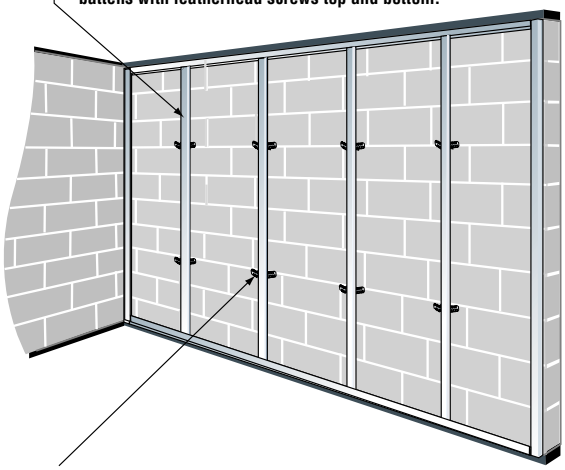
STEP 1 PERIMETER CHANNEL fixed to wall, floor and ceiling with fixings at 600mm centres. (The distance from the wall to be treated to the perimeter batten is dependent upon the overall system depth required).

STEP 2 ACOUSTIC BRACKETS, complete with isolation washer, steel washer and acoustic grommet screwed to the wall at 600mm centres horizontally, and ideally at 800mm centres vertically. Vertical spacings may be exceeded but should not be more than 900mm. Fix to wall with tapcon or suitable fixings. (Acoustic brackets are supplied flat).



NOTE: Where appropriate, Isolating Strips should be laid between the perimeter channel and both the floor and the ceiling. (Isolating Strips should be used where there is any point of contact)

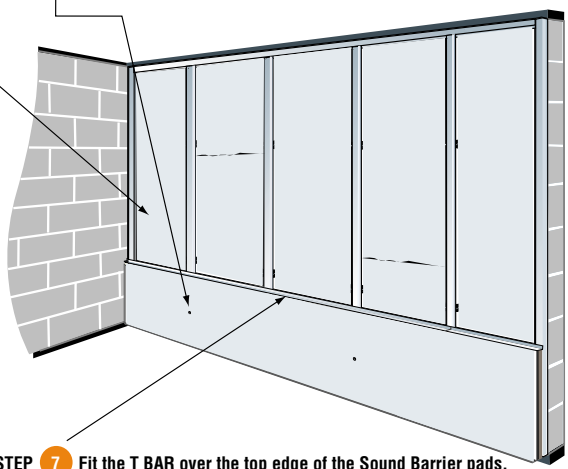
STEP 3 METAL BATTENS cut to length to fit within and between the top and bottom Perimeter Channels. Position the battens in line with the acoustic hangers and screw through the perimeter channel into the battens with featherhead screws top and bottom.



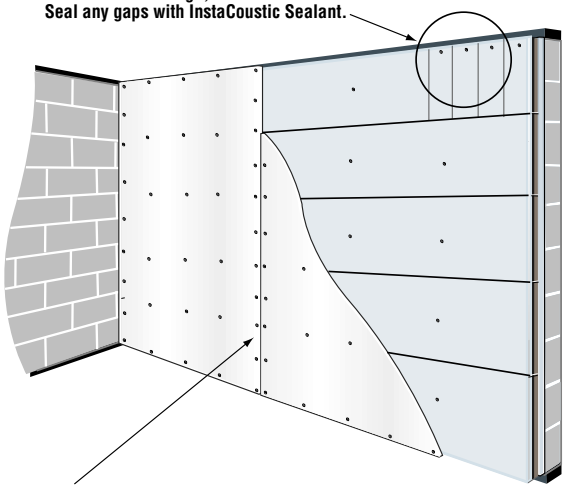
STEP 4 ACOUSTIC BRACKET LEGS bent forward around the sides of the metal battens and each leg screwed to the metal batten with featherhead screws. Cut off or bend back the acoustic bracket legs to suit.

STEP 5 IN8 ACOUSTIC INSULATION positioned between the Battens. (AS28 system) Ensure that the first row of insulation is tucked into the perimeter channel and trapped behind the metal batten.

STEP 6 S20 SOUND BARRIER PADS positioned, with the white side facing out, tight to the wall and floor, against the metal battens. Hold in position with one 38mm plasterboard screw. Repeat this process with the second and subsequent Sound Barrier pads. Ensure that each pad is tightly butt jointed to the previous. Seal any gaps between the Sound Barrier pads with InstaCoustic Sealant. (The off-cut from the first row of Sound Barrier pads may be used to start the second row of pads and so on).



To minimise wastage, utilise off-cuts on the final row of Sound Barrier pads. Seal any gaps with InstaCoustic Sealant.



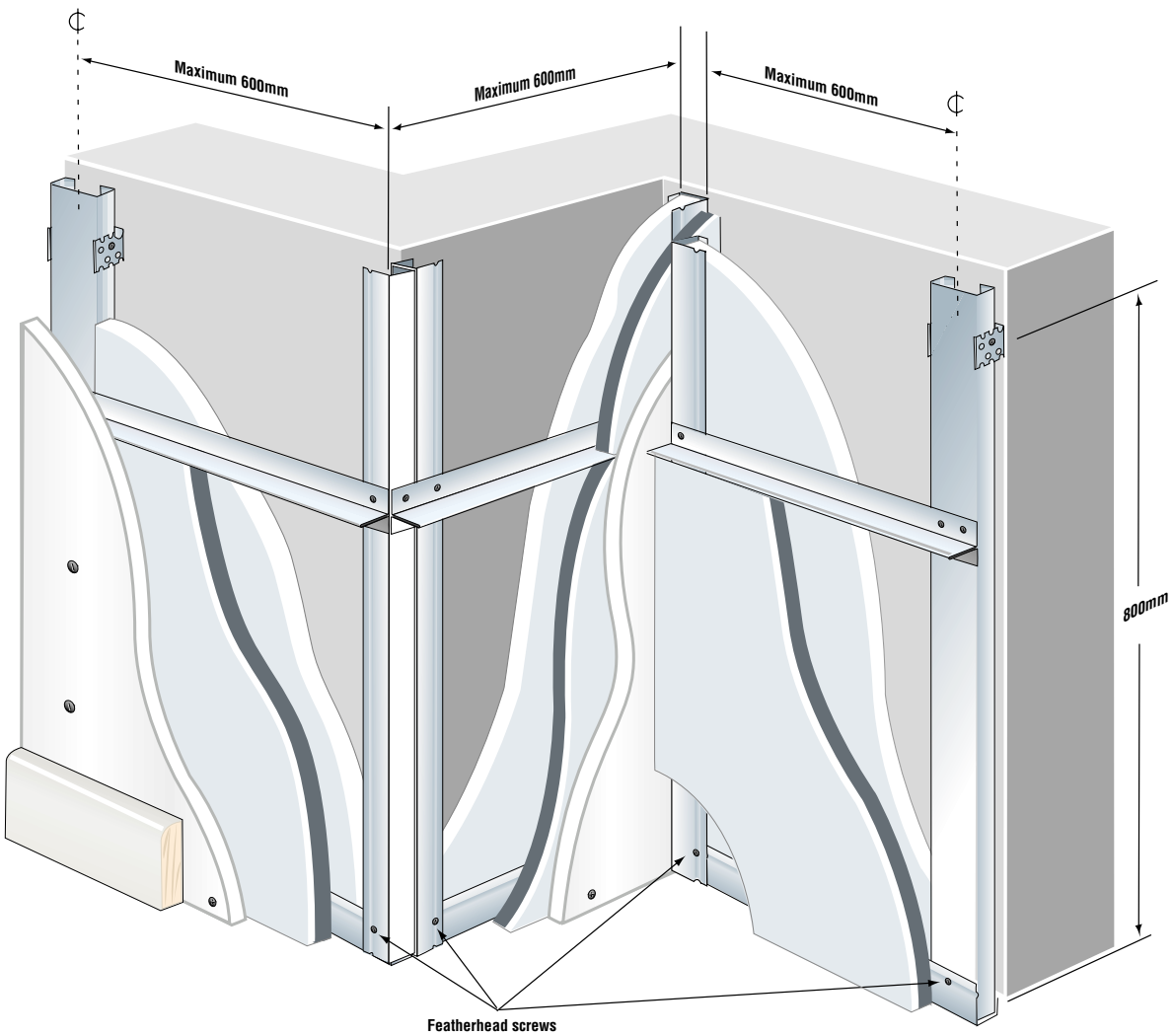
STEP 7 Fit the T BAR over the top edge of the Sound Barrier pads, ensuring that the pads butt tightly against the T Bar. Screw the T Bar to the Perimeter Channel at its ends and to each Metal Batten, through the top flange with 2 No featherhead screws. Whenever the T Bar requires joining, it must be butt-jointed and secured to a batten with featherhead screws. Repeat this process, working upwards towards the ceiling (the T Bar is not required on top of the last row of sound barrier pads).

STEP 8 PLASTERBOARD cut to size and fixed by screwing through the sound barrier pad and into the T Bar and the Perimeter Channel with 38mm plasterboard screws at 300mm centres. Where the plasterboard joins on a metal batten, fix at 250mm centres vertically. Ensure that joins occur on the centre line of the batten. Seal the finished wall system at its edges with InstaCoustic Sealant.

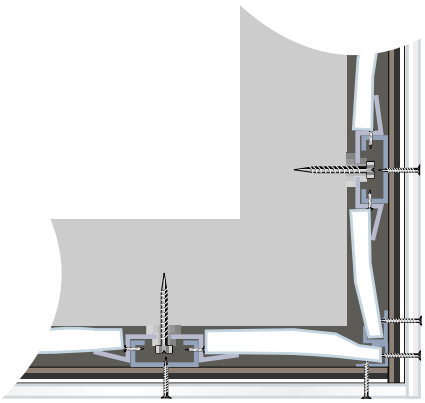
We reserve the right to change the specification without prior notice.

ACOUSTIC WALLING SYSTEMS **AS20 & AS28**

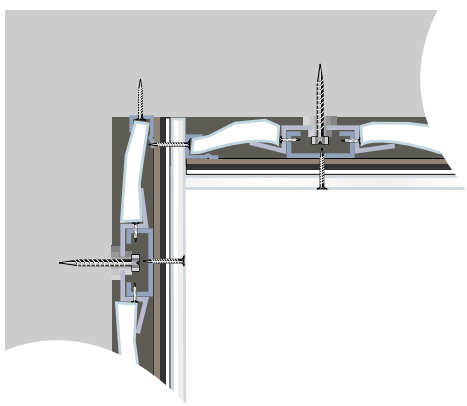
Detail showing internal and external corner assembly



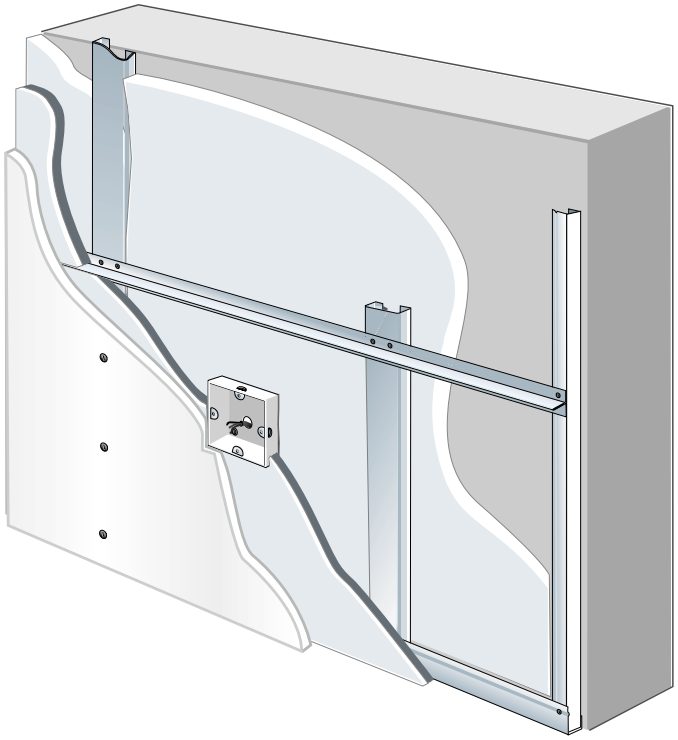
External corner assembly



Internal corner assembly



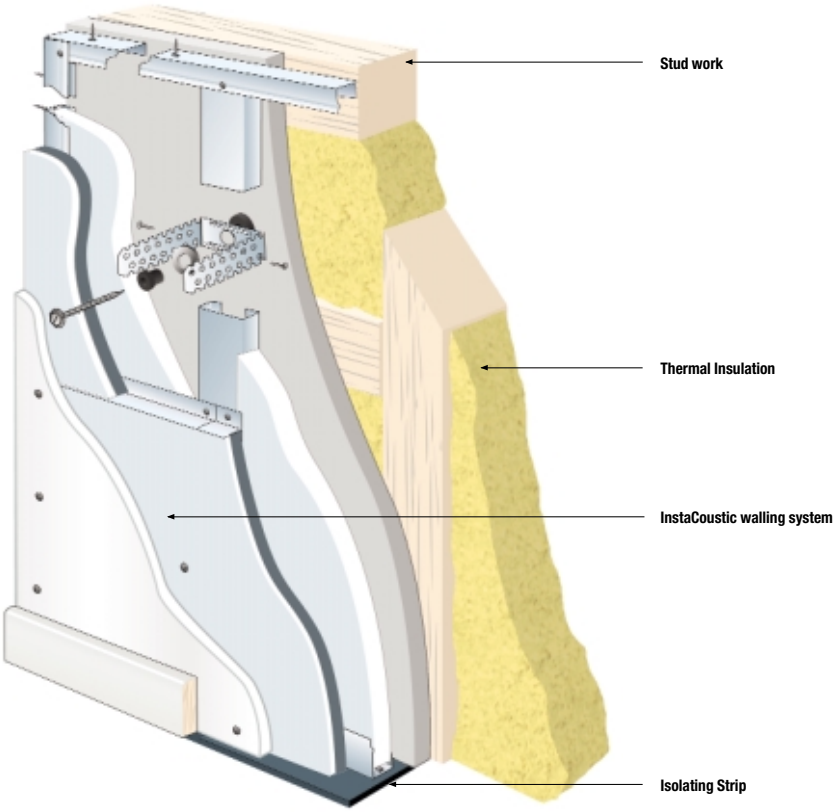
ACOUSTIC WALLING SYSTEMS **AS20 & AS28**



REQUIRED TOOLING

- STEPS/SCAFFOLDING
- HAMMER DRILL
- BATTERY DRILL
- PENCIL
- UTILITY KNIFE
- TAPE MEASURE

NOTE: If electrical boxes need to be fitted within the AS20 & AS28 acoustic wall system it is critical that these boxes do not come into contact with the structural wall being treated. Any contact with the existing structural wall will create points of contact providing a direct transmission path for sound. Therefore in all cases electrical points must be fitted within the new acoustic wall skin by means of boxes that are designed specifically to clip into the plasterboard skin. Cut an appropriate aperture in the plasterboard wall panel and the sound barrier mat as shown in the adjoining diagram and install the electrical box.



We reserve the right to change the specification without prior notice.

Sound Insulation Prediction (v8.0.9)

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- Key No. 2560

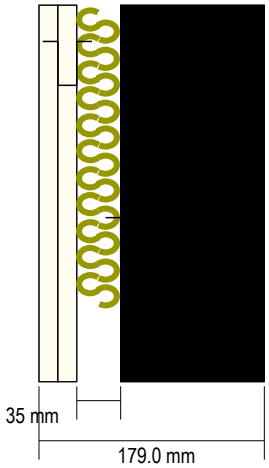
Margin of error is generally within Rw +/- 3 dB

Job Name:

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File Name: Insul 19182016.ixl



Rw	63 dB	
C	-2 dB	
C_{tr}	-7 dB	
D_{nTw}	65 dB	[V:50m3] [A:11m2]

System description

Panel 1 : 2 x 15.0 mm mm Plasterboard (ρ:710 kg/m3,E:2GPa,η:0.01)

Cavity: Staggered Steel stud: Stud spacing 600 mm , Infill Fibreglass (10kg/m3) Thickness 35 mm (ρ:10 kg/m3, Rf:4000 Pa.s/m2)
Panel 2 + 1 x 114.0 mm Brick (ρ:1600 kg/m3,E:8.9GPa,η:0.02)

Mass-air-mass resonant frequency =65 Hz

frequency (Hz)	R(dB)	R(dB)
50	33	
63	29	31
80	31	
100	39	
125	46	43
160	52	
200	57	
250	54	54
315	53	
400	56	
500	59	58
630	61	
800	64	
1000	66	66
1250	68	
1600	70	
2000	71	70
2500	70	
3150	84	
4000	88	87
5000	91	

Panel Size 2.7x4 m; Mass 204.1 kg/m2

