



Approved Document E: Acoustic Design

Site Address: 1390 Ashton Old Road, Openshaw, Manchester, M11 1JX

Client Name: Emmanuel Adedokun

Project Reference: NP-013220



Authorisation and Version Control

Revision	Reported By	Checked By
01	R. Whitfield, MSc, MIOA	M. Caley, MSc, MIOA

Amendment History

Revision	Date	Summary of Amendments
01	05/09/2025	--

Disclaimer

This document has been prepared for the Client only and solely for the purposes expressly defined herein. NOVA Acoustics Ltd owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by NOVA Acoustics Ltd in signed writing, NOVA Acoustics Ltd hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. This report has been solely based on the specific design assumptions and criteria stated herein.

All works undertaken by NOVA Acoustics Ltd are carried out in accordance with NOVA Acoustics Ltd.'s terms and conditions found at www.novaacoustics.co.uk.

Contact Details

NOVA Acoustics Ltd,
Suite 13, Crown House,
94 Armley Road,
Leeds,
LS12 2EJ

0113 322 7977

www.novaacoustics.co.uk
technical@novaacoustics.co.uk

Delivering sustainable development by promoting good health and well-being through effective management of noise.

Contents

1.	INTRODUCTION	3
1.1	Proposal Brief	3
2.	REQUIREMENT E1 – ACOUSTICALLY SEPARATING ELEMENTS	4
2.1	Separating Walls Specification	4
2.2	Separating Floors Specification	5
3.	JUNCTION DETAILING	8
4.	FLANKING RISKS	12
4.1	Steelwork Supporting Structures – Ceilings	12
4.2	External Walls	13
4.3	Concrete Pillars or Other Common Structural Masonry	13
4.4	Separating Walls on Timber Floors	13
4.5	Doors	13
4.6	Downlighters and Recessed Lighting	14
4.7	Electrical Sockets	14
4.8	Piped Services / Ducts	14
5.	REQUIREMENT E2 – INTERNAL PARTITIONS	15
6.	REQUIREMENT E3 – REVERBERATION	16
7.	PRE – COMPLETION TESTING REGIME	17
	APPENDIX A – SITE FLOORPLANS	18

List of Figures

<i>Figure 1 – Proposed Development Layout</i>	<i>3</i>
<i>Figure 2 – Separating Wall Key</i>	<i>4</i>
<i>Figure 3 – Separating Floor Key</i>	<i>6</i>
<i>Figure 4 – Separating Floor – Section View</i>	<i>7</i>
<i>Figure 5 – RSJ Ceiling Detail</i>	<i>12</i>
<i>Figure 6 – RSJ Ceiling Boxing Detail – Independent Timber Battens</i>	<i>12</i>
<i>Figure 7 – RSJ Ceiling Boxing Detail – Resilient Bars</i>	<i>13</i>
<i>Figure 8 – Piped Service Detailing</i>	<i>14</i>

List of Tables

<i>Table 1 – ADE Dwellings Houses and Flats Performance Standards</i>	<i>4</i>
<i>Table 2 – Proposed Separating Wall Specification – Requirement E1</i>	<i>5</i>
<i>Table 3 – Proposed Separating Floor Specification – Requirement E1</i>	<i>6</i>
<i>Table 4 – Upgraded Separating Floor Specification – Requirement E1</i>	<i>7</i>
<i>Table 5 – Sound Insulation Specification – Requirement E2</i>	<i>15</i>
<i>Table 6 – Absorption Specification – Requirement E3</i>	<i>16</i>

1. Introduction

NOVA Acoustics Ltd has been commissioned to provide an acoustic design for a residential development ('the proposed development') at 1390 Ashton Old Road, Openshaw, Manchester, M11 1JX ('the site').

This aim of this report is to assess the compliance of the current design proposals with respect to the Requirements E1, E2 and E3 of Building Regulations Approved Document E 2003 (Including 2004, 2010, 2013 and 2015 amendments) ('ADE').

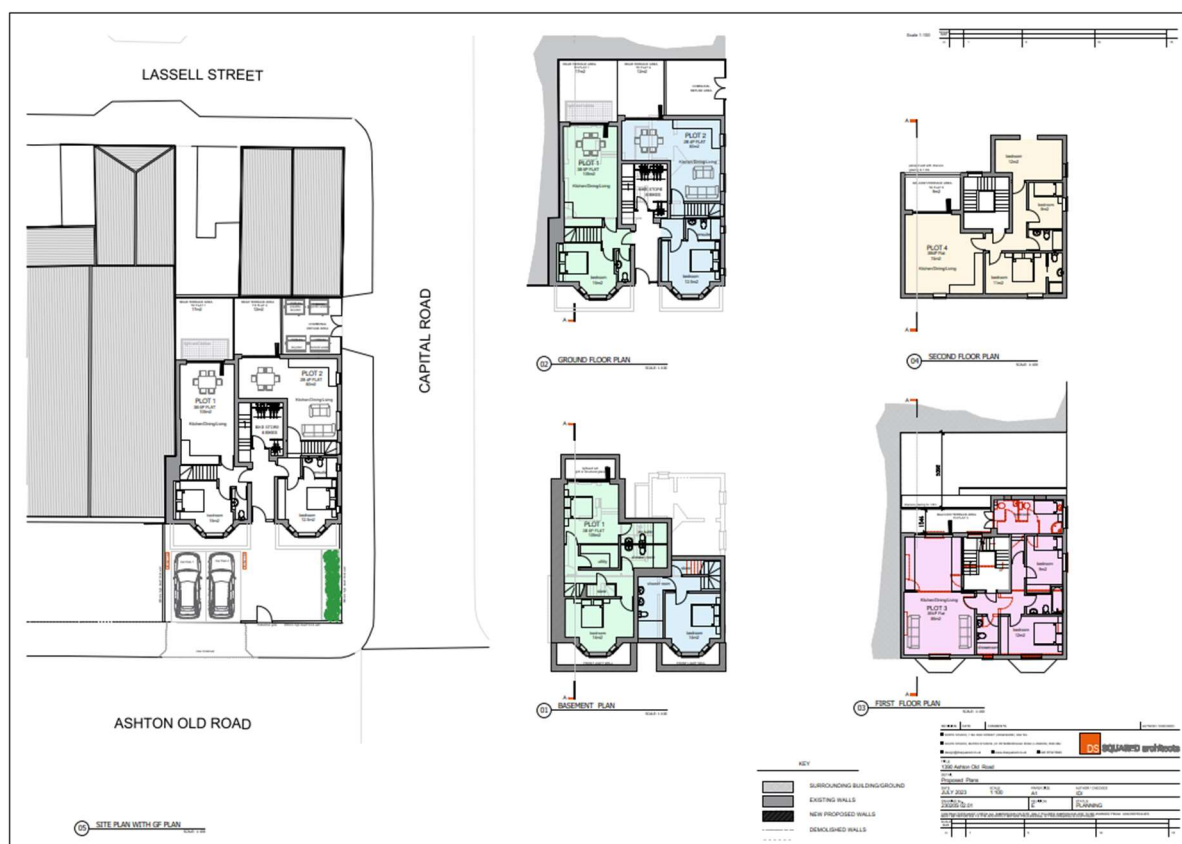
The requirements are defined as follows:

- E1 – Provide sufficient airborne and impact sound insulation **between** separate dwellings and acoustically separate spaces.
- E2 – Achieve appropriate levels of sound insulation for internal walls **within** dwellings.
- E3 – Control reverberation times within communal spaces such as corridors and entrance halls.

Where construction details have been provided by the client, these have been assessed within the report and upgraded designs/specifications have been included where necessary. Where partitions details have not yet been finalised, compliant constructions are proposed. In addition, guidance on junction detailing and measures required to mitigate flanking sound transmission are also provided.

1.1 Proposal Brief

The proposal is for the change of use of an existing vacant building into 4no. residential dwelling-flats. The proposed layout of the development is shown below.



Drawing Ref. 23020S 02.01-E from 'DS Squared Architects'

Figure 1 – Proposed Development Layout

2. Requirement E1 – Acoustically Separating Elements

Protection against sound from other parts of the building and adjoining buildings

It is stated in Requirement E1 of Approved Document E that dwelling-houses, flats, and rooms for residential purposes must be designed and constructed to provide reasonable resistance to sound from adjoining dwellings or other parts of the same building. The separating walls and floors in **developments undergoing a material change of use** must meet minimum standards shown in the following table to limit the transmission of both airborne noise (such as speech or music) and impact noise (such as footsteps).

Partition Type	Airborne Sound Insulation ($D_{nT,w} + C_{tr}$, dB)	Impact Sound Insulation ($L'_{nT,w}$, dB)
Walls	≥ 43	--
Floors and Stairs	≥ 43	≤ 64

Table 1 – ADE Dwellings Houses and Flats Performance Standards

2.1 Separating Walls Specification

The locations of the separating walls are highlighted in the figure below. The partitions have been colour-coded to indicate the different construction types that have been identified.

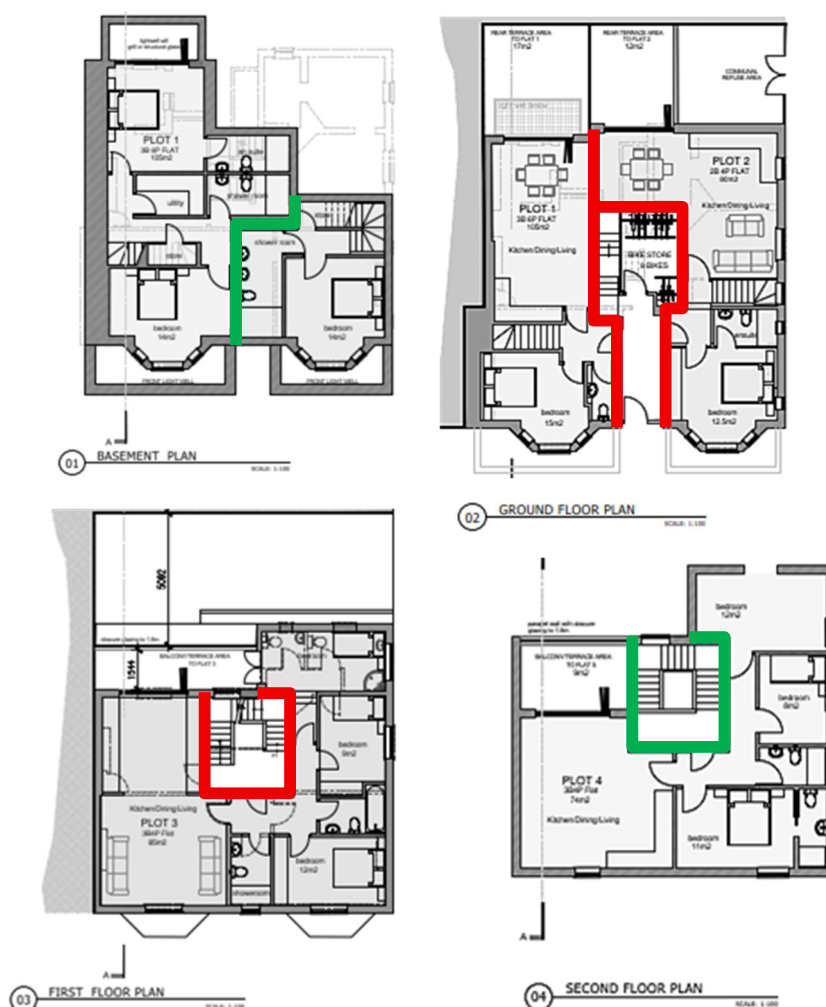


Figure 2 – Separating Wall Key

The client has advised that the existing separating walls are formed from standard brickwork (assumed to have a minimum thickness of 100–200mm and a minimum density of 1600kg/m³). In response to the client's request, the construction details for the proposed new partitions are outlined in the table below.

Element	Required Attenuation	Proposed Separating Wall Construction
	$\geq 43\text{dB}$ $D_{nT,w} + C_{tr}$	Wall Type 1 – Existing Masonry with Independent Wall Liner - Existing 100-200mm brick wall (made good) - Min. 25mm air cavity - Min. 50mm independent timber stud filled with 50mm acoustic mineral wool insulation (min. density 45kg/m³) between studs - 1no. 12.5mm SoundBloc plasterboards (min. surface mass 10.6kg/m²)
	$\geq 43\text{dB}$ $D_{nT,w} + C_{tr}$	Wall Type 2 – Double Timber Stud - 2no. 12.5mm SoundBloc plasterboards (min. surface mass 10.6kg/m² per board) - 70mm (min.) independent timber studwork - Min. 50mm air cavity filled with 50mm acoustic mineral wool insulation (min. density 45kg/m³) in the cavity - 70mm (min.) independent timber studwork - 2no. 12.5mm SoundBloc plasterboards (min. surface mass 10.6kg/m² per board)

Table 2 – Proposed Separating Wall Specification – Requirement E1

Installation Guidance:

- Ensure all products are installed in accordance with the manufacturer's guidance.
- Existing masonry should be made good with no hole or gaps.
- Keep wall linings at least 190mm apart (Wall Type 2)
- Ensure mineral wool covers the whole partition area and is installed tightly between the studs without sagging.
- Air gaps should not be bridged at any point.
- The plasterboard joints should be staggered to avoid direct air paths.
- All joints in the outer layers of plasterboard should be sealed to an airtight condition with acoustic sealant.
- All plasterboards should be finished 3mm from the partition junction. This gap should be filled with acoustic mastic.
- Head and sole plates should be isolated from the building structure using appropriate isolation strips.

2.2 Separating Floors Specification

The locations of the separating floors are highlighted in the figure below. Again, the partitions have been colour-coded to indicate the different construction types that have been identified.

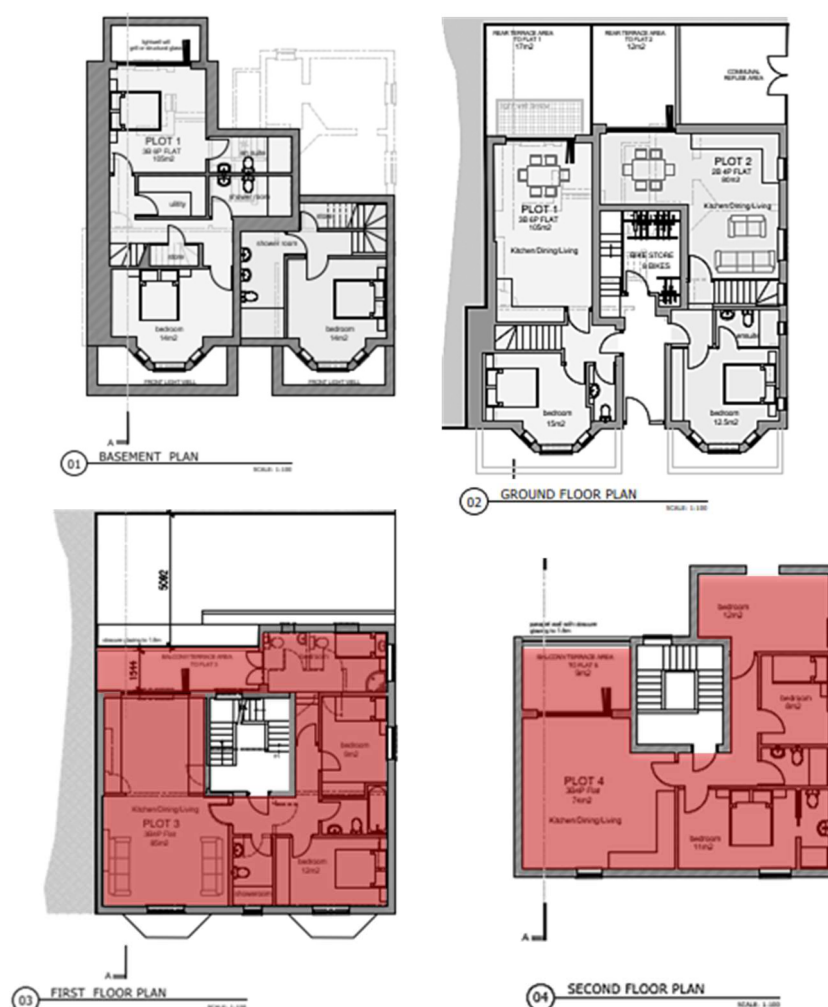


Figure 3 – Separating Floor Key

The proposed separating floor construction is shown in the table below.

Element	Required Attenuation	Existing Separating Floor Construction	Upgrade Required?
	$\geq 43\text{dB}$ $D_{nT,w} + C_{tr}$ $\leq 64\text{dB}$ $L'_{nT,w}$	- 20mm timber floorboards - Min. 150mm timber joists - 1no. 12.5mm plasterboards (assumed min. surface mass 8kg/m²)	Yes

Table 3 – Proposed Separating Floor Specification – Requirement E1

Discussion

This construction is predicted to fall short of the ADE criteria. This is due to a lack of mass and decoupling in the system. To rectify this, it is recommended that the existing ceiling is removed, and isolation clips are affixed to the joists. Acoustic mineral wool should be installed between the joists, and the ceiling should be finished with 2no. SoundBloc plasterboards. To limit impact sound transmissions, a 10mm resilient layer (iKoustic MuteMat® 2 or equivalent) should also be installed on top of the floorboards. It should be noted that an additional 6-9mm plywood layer may also need to be installed depending on the choice of final floor finish. More information can be found in the manufacturer installation guidance.

The upgraded separating floor construction is detailed in the table below.

Element	Upgraded Separating Floor Specification
	- 10mm resilient layer (iKoustic MuteMat® 2 or equivalent) - Existing 20mm timber floorboards - Existing 150mm timber joists filled with 100mm acoustic mineral wool insulation (min. density of 45kg/m³) - Isolation clips (iKoustic MuteClips or equivalent) and furring channels - 2no. 15mm SoundBloc plasterboard (min. surface mass 12.6kg/m² per board)

Table 4 – Upgraded Separating Floor Specification – Requirement E1

A section view of the proposed floor construction can be seen below.

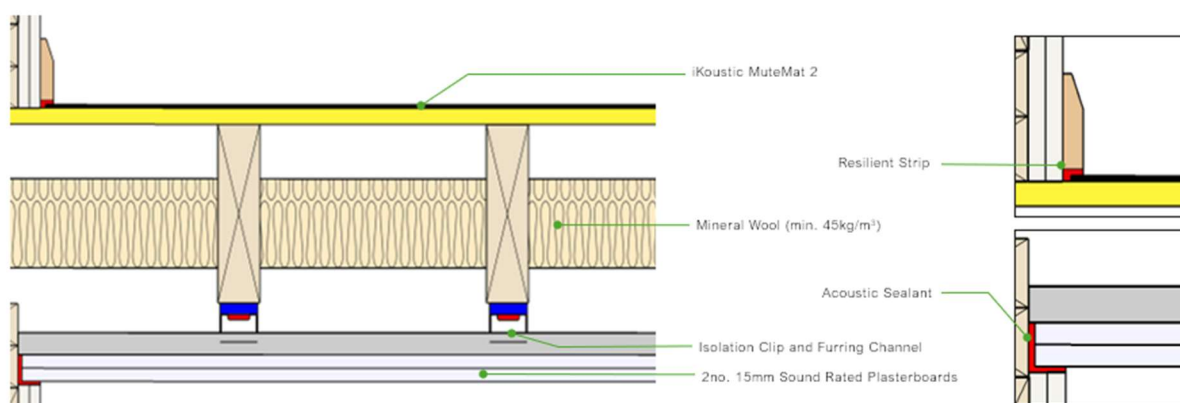


Figure 4 – Separating Floor – Section View

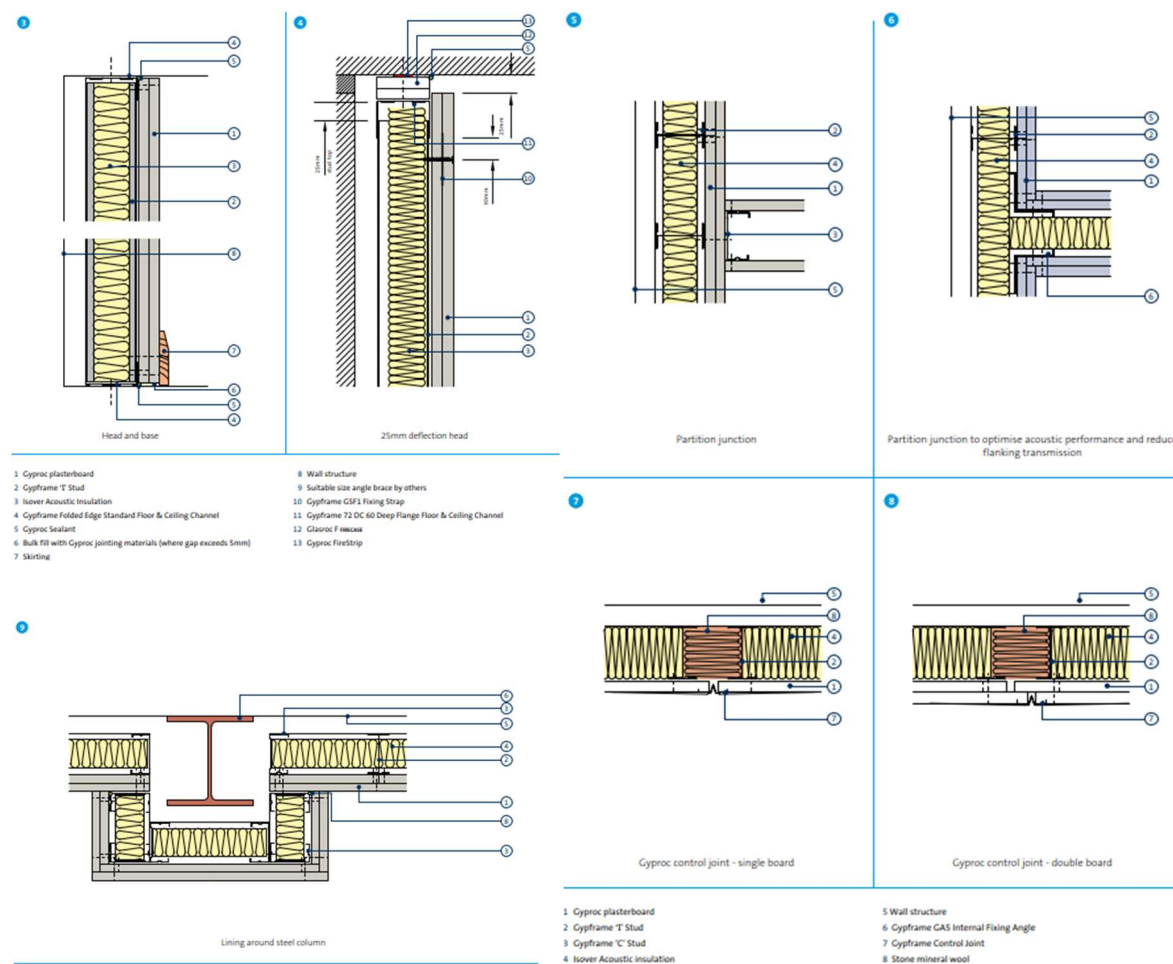
Installation Guidance:

- Ensure all products are installed in accordance with the manufacturer's guidance.
- Lay mineral wool between joists ensuring there are no gaps.
- Install flanking strips around the perimeter of the floorboards and impact matting to isolate floor from walls and skirtings.
- The plasterboard joints should be staggered to avoid direct air paths.
- All joints in the outer layers of plasterboard should be sealed to an airtight condition with acoustic sealant.
- All plasterboards should be finished 3mm from the partition junction. This gap should be filled with acoustic mastic.

3. Junction Detailing

Designing correct junction details for interfaces between wall and floor partitions is critical to ensure that the performance of the partitions is not downgraded. As junction details have not yet been specified, indicative details are provided. Although the specific materials outlined in the figures may differ slightly from the recommended design, the details are considered to be appropriate.

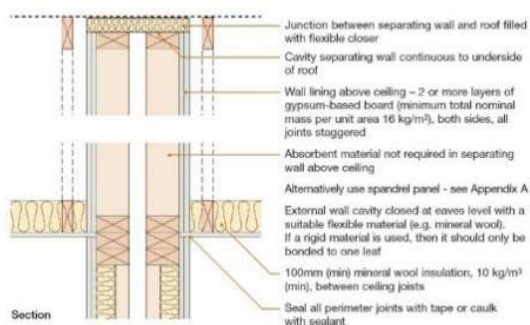
Wall Type 1 - Independent Wall Liner



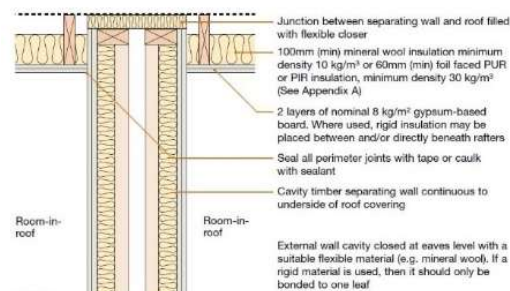
Double Timber Stud

Roof and Foundation Junction

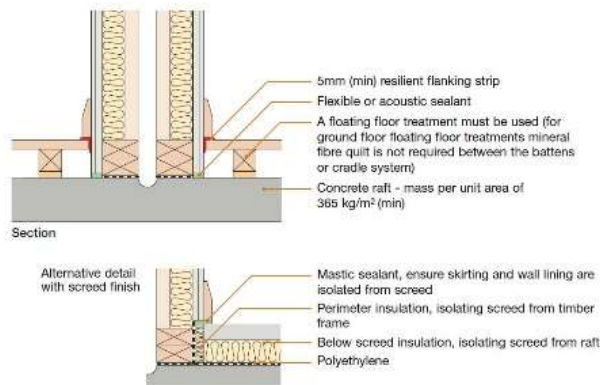
8. Roof junction - pitched roof with no room-in-roof



9. Roof junction - pitched roof with room-in-roof

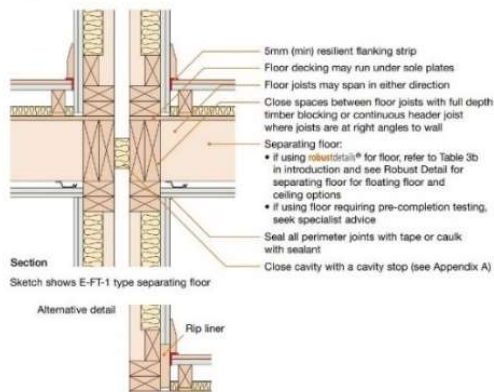


7. Raft foundation



Internal & Separating Floor Junctions

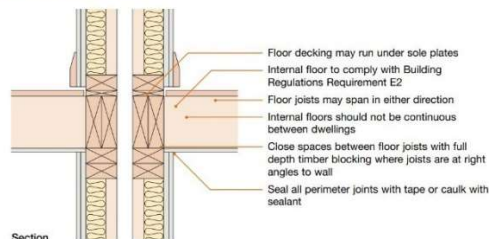
4. Separating floor junction



Separating Wall - Timber Frame

E-WT-1

3. Internal floor junction

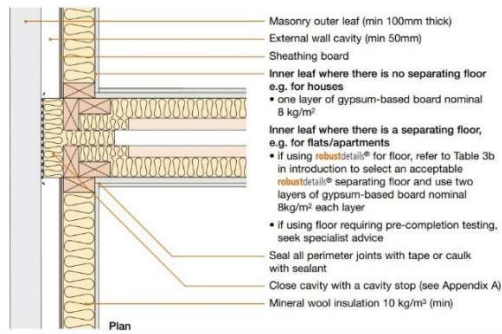


External Wall & Internal Wall

Separating Wall – Timber Frame

E-WT-1

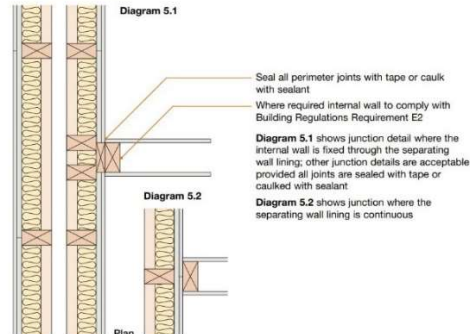
1. External (flanking) wall junction



Separating Wall – Timber Frame

E-WT-1

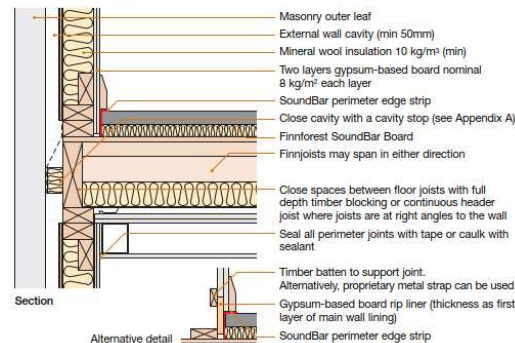
5. Internal wall junction



Separating Floor Junction Details

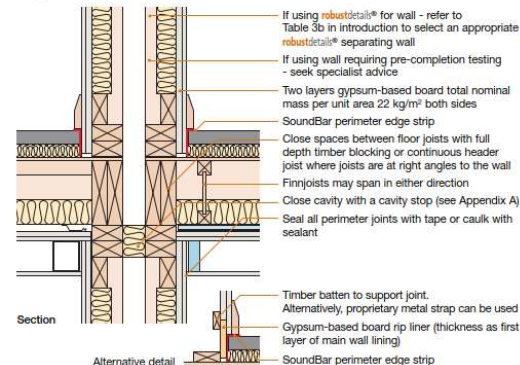
External Walls

1. External (flanking) wall junction



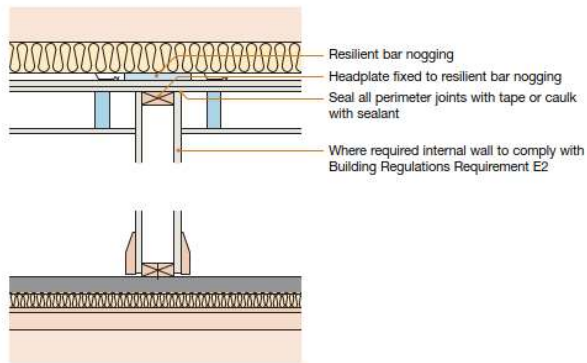
Separating Walls

2. Separating wall junction

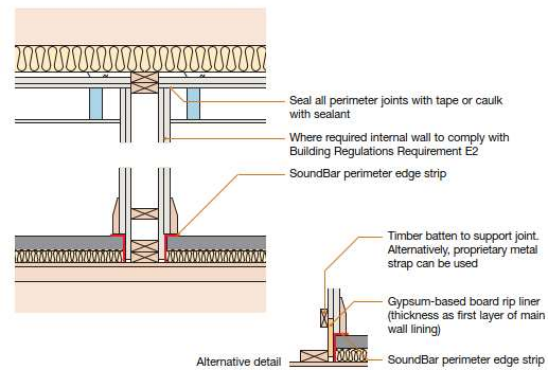


Internal Walls

3. Internal wall junction (non loadbearing)



4. Internal wall junction (loadbearing)



4. Flanking Risks

Flanking transmission occurs when sound travels indirectly through a building's structure, bypassing the separating partition. This can take place in various locations, such as through connecting steelwork, ductwork, and service runs, and can significantly impact the overall acoustic performance of the separation element. Effective acoustic design must therefore consider not only the insulation of main elements but also the control of flanking paths through careful detailing, use of resilient materials, and proper isolation techniques. Common flanking paths and recommended treatments are described in the following section.

4.1 Steelwork Supporting Structures – Ceilings

To avoid noise flanking through interconnecting structural steelwork at ceiling level, it is recommended that the steelwork itself is completely enveloped within the separating partition. To be effective, the steelwork should not touch or be attached to the ceiling in any way. An example of this is shown below.

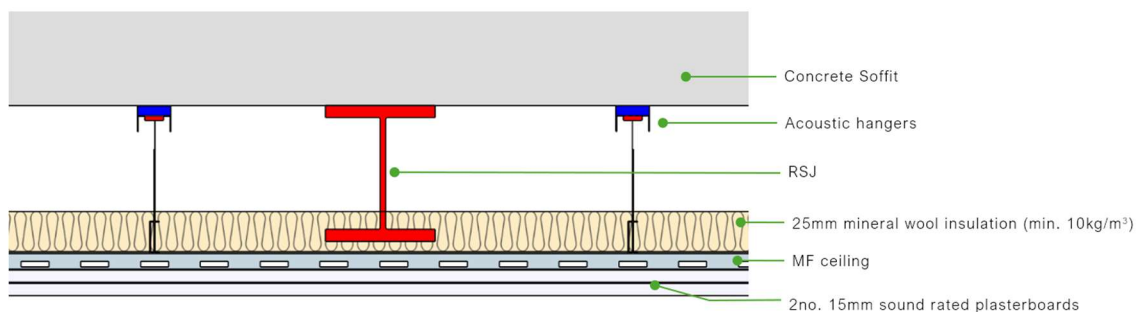


Figure 5 – RSJ Ceiling Detail

Where the steelwork will sit below the acoustic ceiling, it is recommended that it is encased within two layers of sound rated plasterboard attached to an independent frame, as shown below.

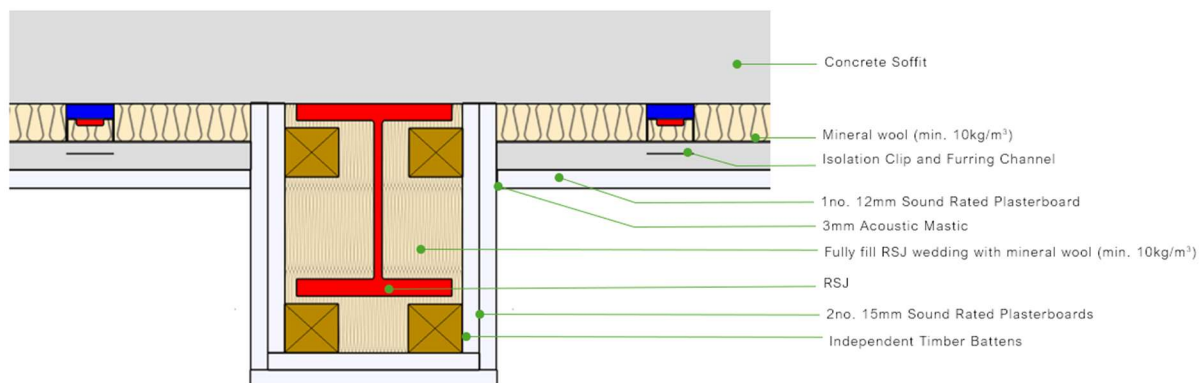


Figure 6 – RSJ Ceiling Boxing Detail – Independent Timber Battens

If it is not possible to install an independent timber frame, an alternative option is to affix timber battens to the steelwork, and install the plasterboards on resilient bars, as shown below.



Figure 7 – RSJ Ceiling Boxing Detail – Resilient Bars

If there is an unavoidable need to connect separating walls or ceilings to these structures, then specific details and section drawings should be issued to NOVA Acoustics for review.

4.2 External Walls

In cavity wall constructions where there is a lightweight inner leaf of blockwork (density lower than 1200kg/m^3 , e.g., 'Thermalite' blocks), there is a risk of noise flanking through the blockwork into adjacent rooms. This is due to reradiated vibration when the inner leaf is continuous across rooms. To treat this, it is recommended that an acoustic lining system is installed, comprising of timber or steel frames affixed to the external wall, with 25mm absorbent mineral wool between the frames finished with 1no. 12.5mm SoundBloc plasterboard (min. surface mass of 10.6 kg/m^2). The plasterboard must not run common between acoustically separate spaces, and all joints must be well sealed with acoustic mastic. Affixing plasterboard via dot and dab to the inner blockwork leaf will not be sufficient.

4.3 Concrete Pillars or Other Common Structural Masonry

NOVA Acoustics has not been made aware of any common structural masonry within the development site. However, if such elements are present, there remains a potential risk of sound transmission along the structure into adjoining spaces. To mitigate possible flanking effects in these areas, it is recommended that the same specification and mitigation measures as those applied to external walls are adopted.

4.4 Separating Walls on Timber Floors

Where separating walls are constructed from a timber subfloor where the joists do not run directly beneath and in line with the partition, there is a risk of noise flanking through the floor void. If this is the case, the void should be fully filled with high density mineral wool (min. density of 45kg/m^3) to a minimum of 1m either side of the partition.

4.5 Doors

It must be ensured that all doors located in acoustically separating partitions have good perimeter sealing (including the threshold where practical) and a minimum surface mass of 25kg/m^2 .

The doorsets should provide a minimum sound reduction of $29\text{dB } R_w$ (measured in the laboratory according to BS EN ISO 140-3:1995 and rated according to BS EN ISO 717-1:1997). All doors should also satisfy the requirements of Building Regulations Part B – Fire safety.

Wherever possible, it is recommended that doors to neighbouring dwellings (or bedrooms in HMOs) are not positioned in close proximity to each other to reduce flanking transmission.

4.6 Downlighters and Recessed Lighting

Based upon considerable testing experience standard downlighters and recessed lighting do not require special acoustic backs or hoods. Where there is a minimum ceiling void of 75mm downlighters may be installed in the ceiling. They should be installed in accordance with the manufacturer's instructions, at no more than one light per 2m², at centres of not less than 0.75m. Openings should not exceed 100mm diameter.

4.7 Electrical Sockets

Where electrical sockets are to be located on separating walls between rooms, they should ideally be surface mounted. If sockets are to be recessed, they must not be positioned back-to-back and should be staggered by a minimum of 150mm in different stud bays. Acoustic backboxes or baffles equivalent to the wall lining should be installed behind sockets in stud/framed walls with all joints fully sealed or, alternatively, for standard room to room sound insulation requirements, the use of acoustic putty pads can be sufficient.

4.8 Piped Services / Ducts

Piped services and ducts which pass through separating walls or floors should be surrounded with mineral wool (min. density of 10kg/m³) and enclosed for their full height with 2no. layers of sound rater plasterboard.

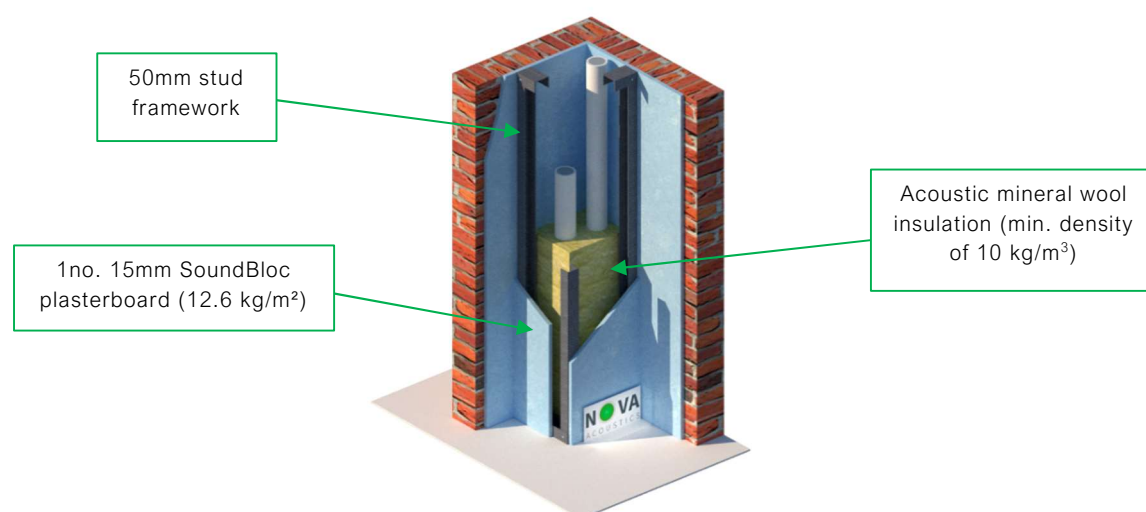


Figure 8 – Piped Service Detailing

5. Requirement E2 – Internal Partitions

Sound Insulation Within Residential Properties

Requirement E2 relates to the sound insulation provided by partitions or separating elements within a single dwelling. The criteria are explained in the following excerpt from Approved Document E.

“Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that: (a) internal walls between a bedroom or a room containing a water closet, and other rooms; and (b) internal floors provide reasonable resistance to sound.

Requirement E2 does not apply to:

- (a) An internal wall which contains a door.*
- (b) An internal wall which separates an ensuite toilet from the associated bedroom.*
- (c) Existing walls and floors in a building which is subject to a material change of use.”*

As described above, the requirement relates to new internal walls and floors exclusively. It should be noted that there is no specific testing requirement for these walls and compliance can be demonstrated with appropriate design work.

A compliant partition design which is suitable for the development is shown in the following table.

Element	Required Attenuation	Proposed Internal Wall Partition Construction
Internal Walls	40dB R _w	Internal Wall - 1 layer of plasterboard (minimum mass per unit area 10kg/m²) - Linings fixed to timber frame with a minimum distance between linings of 75mm, or metal frame with a minimum distance between linings of 45mm. - An absorbent layer of unfaced mineral wool batts or quilt (minimum thickness 25mm, minimum density 10kg/m³) - 1 layer of plasterboard (minimum mass per unit area 10kg/m²) - All joints well sealed.
Internal Floors	40 dB R _w	Internal Floor - Floor surface of timber or wood-based board, minimum mass per unit area 15kg/m². - Ceiling treatment of single layer of plasterboard, minimum mass per unit area 10kg/m², fixed using any normal fixing method. - An absorbent layer of mineral wool (minimum thickness 100mm, minimum density 10kg/m³) laid in the cavity. - Note: Insulation against impact sounds can be improved by adding a soft covering (e.g. carpet).

Table 5 – Sound Insulation Specification – Requirement E2

6. Requirement E3 – Reverberation

Reverberation in the common internal parts of buildings containing flats or rooms for residential purposes

Requirement E3 relates to reverberation in the common areas of buildings. It is important to control reverberant build-up in these areas to ensure that noise within corridors, atriums, and similar spaces does not negatively affect the amenity of adjacent residents.

Again, whilst the development must be designed to achieve the criteria, there is no specific requirement for testing in order to prove compliance.

Two methods of achieving the criteria are provided in Approved Document E. These are as follows:

- Method A to BS EN ISO 11654:1997 detailed in Approved Document E Sections 7.10 - 7.12, or
- Method B in accordance with Approved Document E Sections 7.13 - 7.25.

In general, the simplest methods of achieving compliance with the criteria are outlined in the table below.

Room Type	Required Interior Finish
Corridors, Entrance Halls and Hallways	Cover the surface area greater than or equal to the floor area with a Class C absorber. Typically, the ceiling area.
Stairwells	Cover the surface area greater than or equal to the floor area, including landings and stair treads with a Class C absorber. Typically, the ceiling area.

Table 6 – Absorption Specification – Requirement E3

As can be seen, providing the floors of the areas outlined above are covered with an appropriate carpet layer, Requirement E3 will be satisfied. Where this is not desirable or practicable, absorptive surfaces can be installed on the walls and/or ceiling, such as acoustic panelling (e.g., iKoustic StillNote panels), or perforated plasterboard (e.g., British Gypsum Gyptone Quatro 41). Further advice can be provided by NOVA Acoustics if required.

7. Pre – Completion Testing Regime

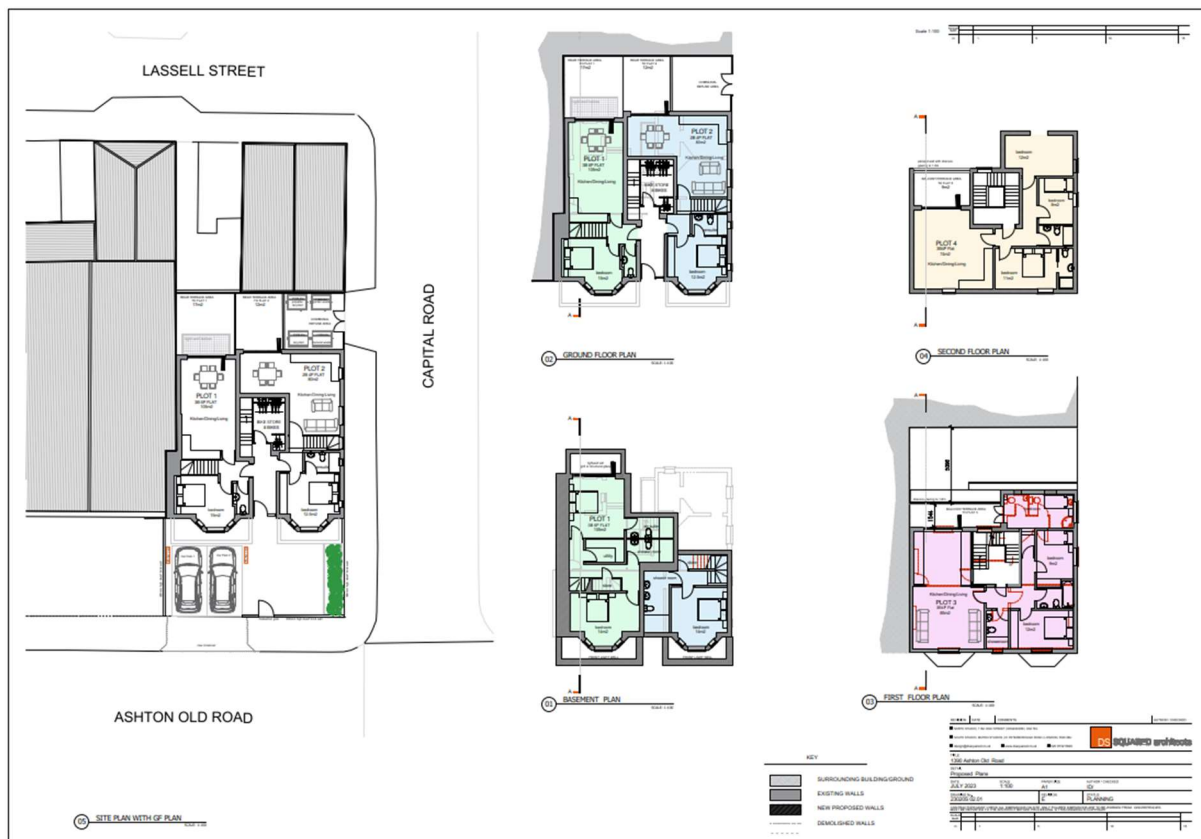
Upon completion of the development, pre-completion sound insulation testing is required to be carried out by a UKAS or ANC accredited organisation in accordance with Approved Document E. The schedule of testing should, where possible, include testing between one pair of rooms used as living rooms and one pair of rooms used as bedrooms. The minimum sample of testing that is required for the development is as follows:

4 x Airborne sound insulation tests between residential dwellings in accordance with BS EN ISO 140: Part 4 (1998): "Field measurement of airborne sound insulation between rooms". Analysis of the airborne sound test results in accordance with BS EN ISO 717 (1997) Part 1: Airborne sound insulation.

2 x Impact sound insulation test between residential dwellings in accordance with BS EN ISO 140: Part 7 (1998): "Field measurements of impact sound insulation of floors". Analysis of the impact tests in accordance with BS EN ISO 717 (1997) Part 2: Impact sound insulation.

It is advised that the final schedule of pre-completion testing is agreed with the building control body prior to testing being completed.

Appendix A – Site Floorplans





NOVA
ACOUSTICS