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Engineering & Acoustics Consultancy

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Part E Design Specification **and Recommended Sound** **Insulation Works** **for** **Redevelopment of** **930 Oxford Road,** **Reading.**

Report Number: 004/17

Report written & checked by,

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Introduction

Part E of the Building Regulations place a number of requirements on property developers to ensure that a minimum standard of sound insulation is achieved to restrict the passage of sound from one dwelling to another, as well as between rooms of the same dwelling.

With regards to the material change of use Part E of the Building Regulations requires:

Airborne Sound Insulation of separating walls, floor & stairs:	$D_{nT,w} + C_{tr} = 43 \text{ dB}$ or higher
Impact Sound Insulation of separating floor & stairs:	$L'_{nT,w} = 64 \text{ dB}$ or lower
Airborne Sound Insulation of NEW internal walls:	$R_w = 40 \text{ dB}$ or higher

To achieve the above criteria the following constructions are recommended:

1) Separating Floor – Basement/Ground Floor

In this development the existing floors are comprised of 20mm square edge board over 8" joists with a single plasterboard layer below. These floors must but be upgraded to achieve the 43dB airborne and 64dB impact requirements, and will be subject to testing at the end of the project.

Due to the restricted headroom it is recommended that either of the following two options are installed.

Option 1 – Maxi Dropped Ceiling.

Note: to be installed completed prior to any thermal insulation / cladding of external walls.

- Make good existing plasterboard ceiling.
- Fit 50mm softwood timber battens through the existing ceiling into the floor joists at 600mm centres.
- Install SRS Resilient Bars fixed perpendicular to the battens at 400mm centres.
- Push fit 50mm of mineral wool slab (45kg/m³) between the timber battens.
- Install SRS Maxiboard dropped ceiling in full accordance with the manufacturer's instructions.

https://www.soundreduction.co.uk/content/files/maxi_dropped_ceiling_datasheet.pdf



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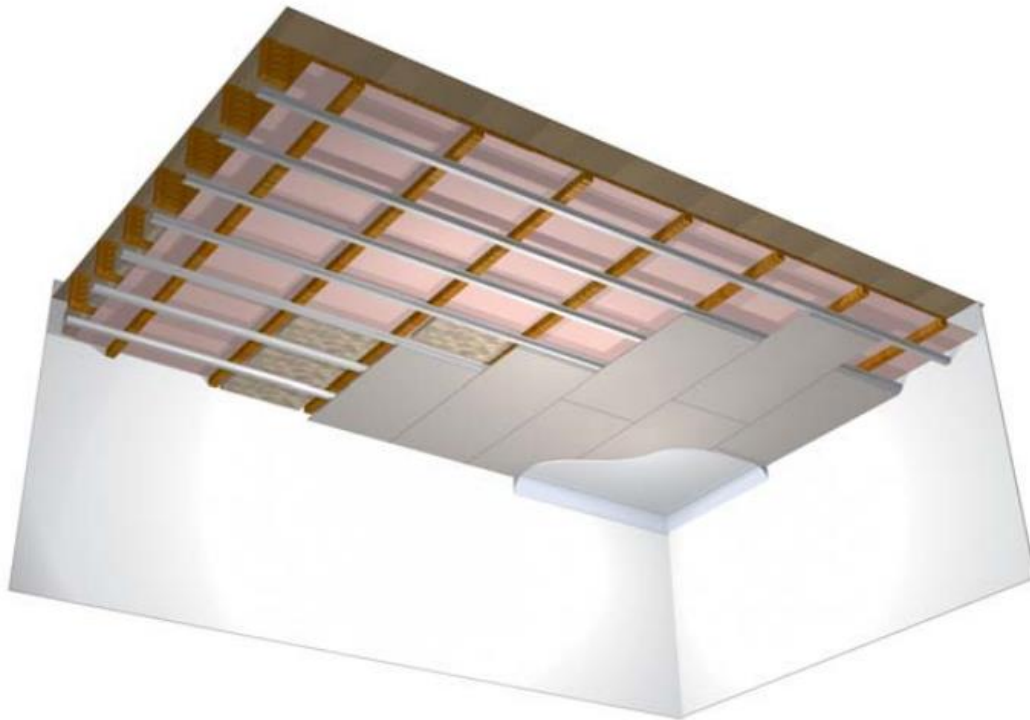


Figure 1 – Schematic of Maxi Dropped 30 Ceiling System

The Maxi Dropped Ceiling ceiling provides 30 minutes of fire protection and has been demonstrated to meet the airborne and impact sound insulation requirements of Part E of the Building Regulations achieving a $D_{nT,w}+C_{tr}$ of 48dB and an L'_{nTw} of 56dB respectively during site tests.

Option 2 – Floating Floor & Resilient Ceiling

Note: to be installed completed prior to any thermal insulation / cladding of external walls.

- In preparation for the new ceilings, all existing ceilings in the basement should be removed and the timber joists de-nailed.
- If necessary screw timber battens to the underside of the exposed joists to increase the floor joist void depth to at least 200mm. (this may not be necessary depending upon the depth of the existing floor joists).
- Fit 100mm of acoustic grade mineral wool slab (45kg/m^3 minimum density) between the floor joists ensuring that the entire surface area of the floor is covered, paying particular attention to the perimeter edges where it may be difficult to fit insulation between the perimeter wall and a parallel floor joist. This is a common flanking route for sound to pass from one floor to the next, and every effort should be made to ensure any gap is filled. If it is not possible to fit the universal slab, the gap between the wall and the joist should be filled with an acoustic grade mastic / sealer.



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- Install British Gypsum RB1 resilient bars to the underside of the floor joists in a perpendicular direction and at 400mm centres. Ensure the screw lengths are long enough to penetrate through any additional batten and into the original joists.
- Screw 15mm thick acoustic grade plasterboard to the resilient bar taking care not to screw through into the timber joists. Leave a 3mm gap around the perimeter of the ceiling.
- Screw a second layer of 12.5mm thick acoustic grade plasterboard making sure to pick up the resilient bars but avoid screwing into the joist. Seal at the perimeter with acoustic grade mastic and skim finish.
- Make good the existing timber floors on the ground floor level in the retail space (Hairdressers), replacing any damaged areas and sealing any gaps around the perimeter with acoustic mastic. This floor becomes the sub-floor for the new floating floor system.
- On top of the sub floor a new floating floor is then installed, I recommend using Monarfloor Deck 22 / Collecta DECKfon 26T or an equivalent approved product.
- Make sure to install in accordance with the manufacturer's instructions.

<http://www.monarfloor.co.uk/products/traditonal-floating-floor-treatments/monarfloor-deck-22.aspx>

http://www.collecta.co.uk/wp-content/uploads/2014/11/DECKfon_MDF_17T_CHiP_26T_30T_Acoustic_treatment_on_existing_timber_ceiling_on_resilient_bars_pct_solution.pdf

2) New Separating Walls between Flats

All walls that provide a separating function between the individual dwellings and between dwelling and the communal spaces must be designed to achieve the 43dB airborne criteria. Separating walls between dwellings will have to be tested to demonstrate their performance.

New sections of separating wall i.e. at basement level between two flats, should be formed using a "double timber stud" construction.

A typical construction comprises of two independent 100mm deep stud frames 50mm apart with 100mm of mineral wool (minimum density 45kg/m³) in each frame and 12.5mm and 15mm plasterboard layers on both faces. Plasterboard layers must have their joints staggered and be sealed using acoustic grade mastic. See Figure 2.

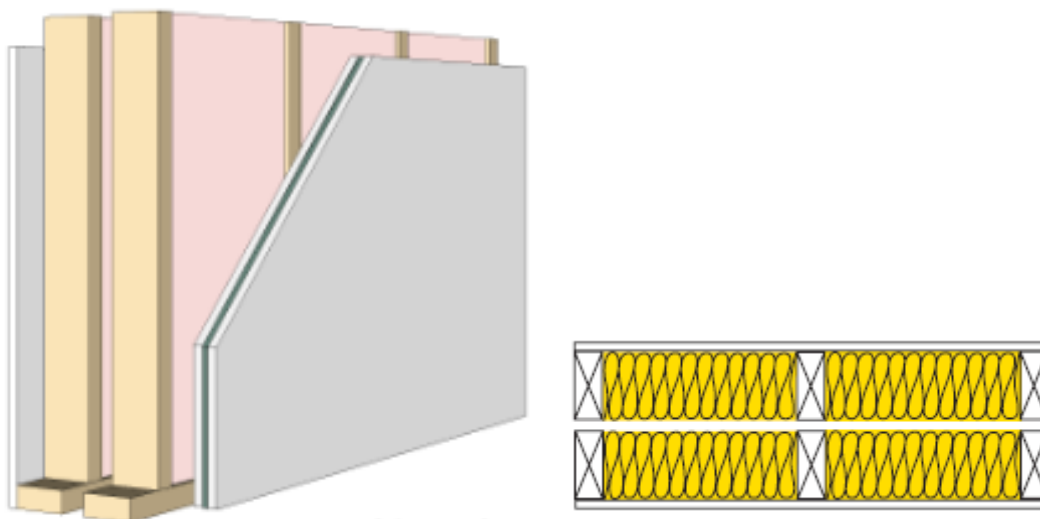


Figure 2 – Double Timber Stud Wall (best performance)

In order to save space and reduce the footprint of the separating wall it is possible to achieve the required level of sound insulation using a staggered double timber stud wall. This is similar to the double timber stud, except that the frame is built on a common header and sole plate and the vertical timbers are staggered and alternate from one side to the next. See Figure 3 below. It should be noted that from an acoustic performance perspective, the levels of sound insulation are lower than that of the standard “double timber stud” wall, but is more than adequate to comply with Part E.

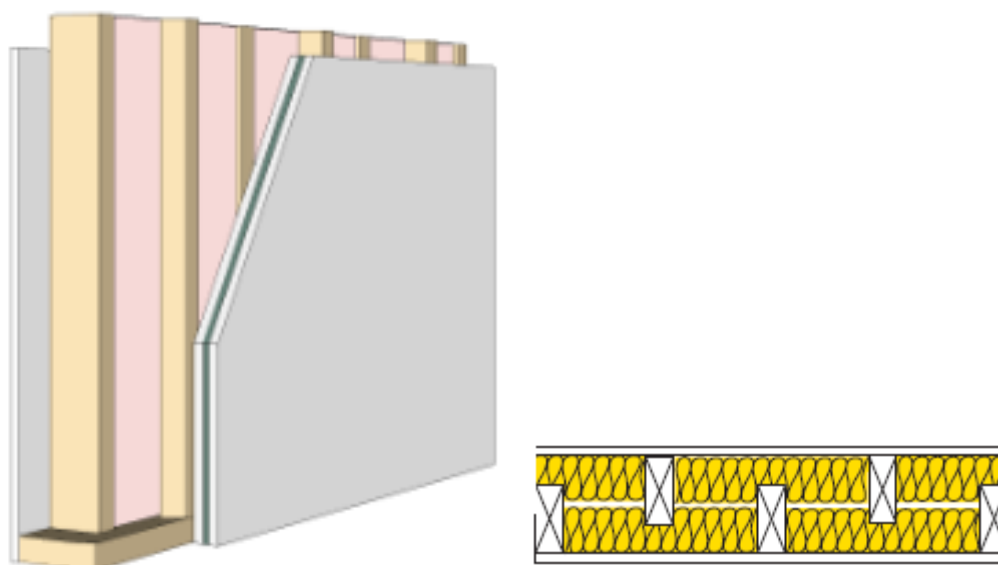


Figure 3 – Double timber stud (staggered, to reduce footprint)



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As an alternative to the timber frame option, traditional dense concrete blocks can be used to erect a solid concrete block wall or cavity block wall in accordance with the following Robust Details.

<http://www.robustdetails.com/the-handbook/selecting-your-robust-details/masonry-walls/e-wm-9#2573>

<http://www.robustdetails.com/the-handbook/selecting-your-robust-details/masonry-walls/e-wm-1#2594>

3) Internal Partitions (not separating walls)

New internal walls can be formed in a variety of ways from concrete block, metal stud, and timber stud. Part E requires that new internal partitions have a minimum R_w of 40dB. This is generally achieved by a minimum of 48-70mm stud with a 12.5mm plasterboard linings and 25mm of lightweight mineral wool in the void. Fair faced concrete block walls should be 100mm thick.

4) Important Notes

Existing walls need to be in good order to prevent flanking transmissions. Any damage to existing walls must be repaired to ensure the mass of the wall is maintained throughout its entire surface.

Where existing stud walls terminate at ceiling / floor level, the stud wall must be capped off with solid timber capping to prevent sound transmitting down the centre of the stud partition and breaking out into the room below, bypassing any ceiling / floor treatment provided.

Where separating wall run perpendicular to the joist direction, ensure air paths above and below separating walls contained within the floor or ceiling voids are blocked up using solid timber blockings to prevent sound flanking below and over the separating wall respectively.

With regards to lighting my recommendation is to use surface mount fittings and not recessed down-lighters (unless Part E approved). The use of down-lighters can reduce the acoustic performance of separating floors. Any holes for cables should be sealed with acoustic grade mastic.

Then installation of sockets, etc., in separating walls should be avoided where possible. If sockets are installed in separating walls care should be taken to ensure continuity of mass using backing boxes or timber noggins. Sockets either side of the same wall should be staggered by at least 150mm.

Any penetration by services (electrical cables, gas/ water / soil pipes) through separating walls and floors will provide flanking routes for sound. It is important the any service ducts / voids utilise at least 25mm of acoustic grade mineral wool insulation wrapped around any



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pipes, and are encased using two layers of 12.5mm plasterboard on a timber or metal stud frame. Any air gaps between services and component parts of walls / floors must be sealed using flexible acoustic sealer / mastic and fire collars where necessary.

5) Main Entrance Doors

The entrance door into each apartment must have a good perimeter seal and include a threshold where possible. The door should be of solid construction and have a minimum mass of 25 kg/m^2 , or a minimum R_w of 29dB. The door should also satisfy Part B with regards to Fire Safety.

Lorient Seals provide acoustic door kits for Part E installations.

<http://www.lorient.com.sg/products/acoustic-seals-smoke-seals-and-fire-seals-for-door-assemblies/item/doc-e-packs>

6) Pre-completion Testing

Upon completion of the building works Pre-completion testing is required to demonstrate that the required performance criteria of the separating walls and floors has been achieved in practice. This will involve a series of airborne and impact sound insulation tests between habitable rooms of adjacent dwellings, typically Lounge – Lounge and Bedroom – Bedroom.

These tests must be carried out between complete and empty rooms without soft floor coverings. Copies of the test certificates must be provided to Building Control.

For this project the test schedule will include airborne and impact test on the separating floor between the basement and the ground floor retail space, and at least one test on the new separating wall between the new flats.

If you are in any doubt about what to do please phone 07977 418945 and speak to Sean for advice.