TECHNICAL MEMO

OUR REF: 4426_002m_1-0_pa

To: Nick Stickland
Stickland Wright Ltd

From: Peter Akhurst
Senior Acoustic Consultant
E: peter@andersonacoustics.co.uk
T: 01273 696887

Date: 22 January 2020

SUBJECT: SOUND INSULATION DESIGN ADVICE, 35-37 HIGHSTREET, SHOREHAM

1 INTRODUCTION

Stickland Wright have requested acoustic design advice to assist in the development of the mixed-use scheme at 35-37 Highstreet, Shoreham. This document provides acoustic design advice for the separating walls and floors between residential units and for the separating floor between the proposed ground floor commercial unit and the residential use above; in order to achieve the minimum acoustic performance requirements in Building Regulations Approved Documents E. This technical memo also summarises the glazing sound insulation performance required to satisfy WHO internal ambient noise level guidelines.

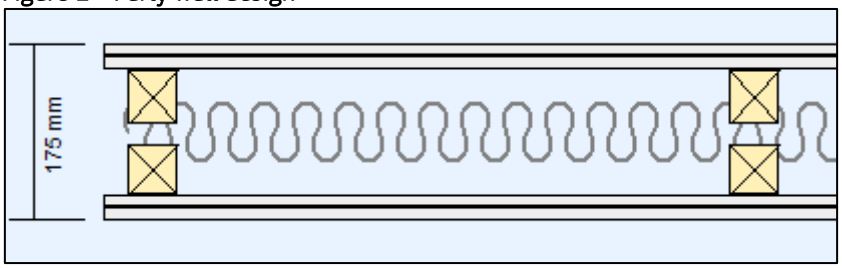
2 SOUND INSULATION PERFORMANCE – APROVED DOCCUMENT E

2.1 Separating Walls

Construction of the party walls between residential units are currently in progress, and formed from:

- 2x layers of 12.5mm SoundBloc plasterboard
- Independent studwork to form a cavity width of approximately 125mm
- 50mm mineral fibre within partition in between studs of nominal density of 12kg/m^3
- 2x layers of 12.5mm SoundBloc plasterboard

Figure 1 – Party wall design



Care should be taken with the installation of recessed sockets, and light-switches in the party walls. These should not be installed back to back. Where installed within the party wall, a plasterboard/timber box should be used around the recessed back box, alternatively a proprietary acoustic back box could be installed. These should be staggered a minimum of 1.5m from one another on the possessing plasterboard faces.

Party walls should be completed, and sealed before the installation of party ceilings, or wall lining to avoid sound flanking around the sound insulating partition. Where the studwork meets the external walls, concrete floor, and soffit of the concrete floor above a flexible isolation installed.

At second floor the party wall should be continuous through the ceiling of the second floor up to the soffit of the roof.

Construction of the party walls in line with the specification above will meet the minimum sound insulation performance, when constructed in line with good construction practice, and detailing.

2.2 Separating Floor (ground to first)

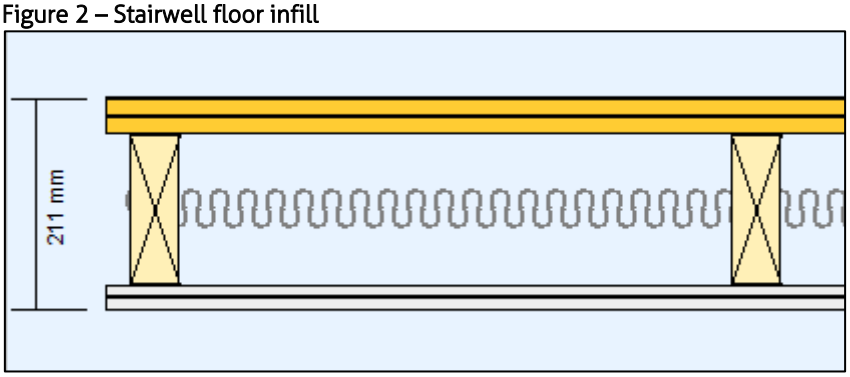
It is understood that the ground floor is to be used as a commercial unit, however its use has not been defined yet. The existing construction generally consists of a solid concrete-reinforced floor, of an estimated minimum thickness of 200mm.

The staircase to the rear of the building separating the ground floor from the proposed first floor residential unit/s is to be infilled to form the party floor. It is understood that the preference for this construction is to be timber. Within the staircase, there is also a window spanning the new party floor to be constructed. It is understood that this is to be removed, the aperture blocked up and made good to the surrounding brickwork. This should be done using dense concrete block, or similar brickwork to that of the surrounding wall, taking care to fully fill the joints.

It is recommended that the infill of the staircase, be comprised of the following:

- 2x layers of T&G chipboard
- 200mm joists (exact depth to allow new infill to staircase depth of surrounding concrete slab)
- 100mm thick layer of mineral wool nominal density 12 kg/m^3
- 2x layers of 12.5mm plasterboard (nominal density of 10.6kg/m^3)

Figure 2 – Stairwell floor infill



Where installing the joists against the surrounding masonry, a flexible resilient strip should be used. A strip of compressed mineral fibre insulation would suffice. It is recommended that noggins are installed between joists ends where they meet walls or concrete slab to minimise the likelihood of flanking. Again, the mineral wool should be used between the noggins and the perimeter of the wall /slab of the staircase being filled in.

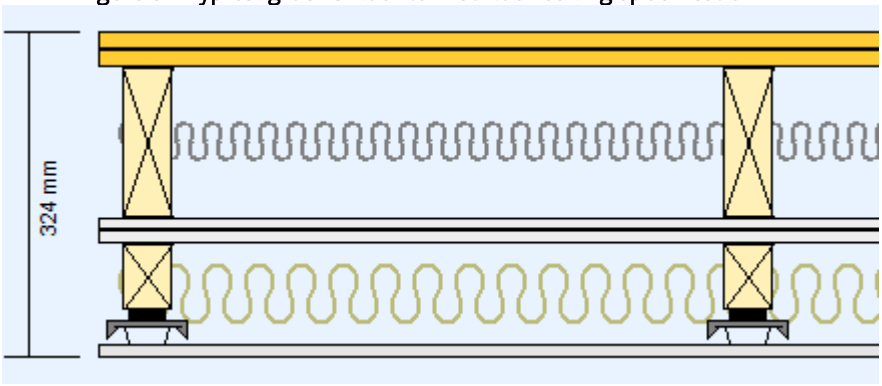
Infill of the staircase will not in not form a sufficient sound insulating partition between the commercial unit below, and the flat above. Therefore, following the completion of the of closing off the staircase aperture, a suitable sound insulating ceiling to the ground floor should be installed, to satisfy sound insulation performance to separate the residential flats at ground floor from the ground floor commercial unit. This design performance will depend on the proposed us of the ground floor.

A typical design performance for upgrading the sound insulation performance between the ground floor commercial unit and the residential units would be $D_{n,Tw + Ctr}$ of 55dB, based upon a internal noise level within the commercial space of 75 dBA. For internal noise levels above 75 dBA, a higher minimum sound insulation performance should be achieved.

Assuming the internal noise level within the commercial space is not higher than 75dBA, the sound insulation performance of $D_{n,Tw + Ctr}$ of 55dB could be achieved with the following specification: acoustically isolated hangers to form a cavity of a minimum 100mm with 50mm mineral fibre nominal density of 12kg/m^3, and finished with a layer of 12.5mm plasterboard.

Once the designated use of the ground floor commercial unit is confirmed, then the precise specification should be agreed.

Figure 3 - Typical ground floor to first floor ceiling specification

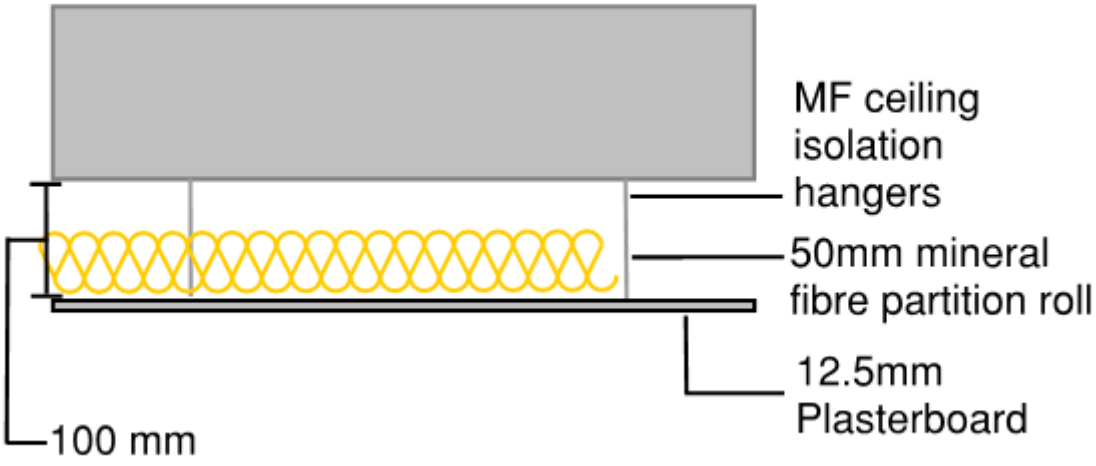


2.3 Separating Floor (first to second floor)

The existing construction between the first and second floor is a solid concrete-reinforced floor, of an estimated minimum thickness of 250mm. There are areas where the concrete slab is incomplete. The holes should be infilled with a solid pour of steel reinforced concrete to the thickness of the surrounding concrete floor.

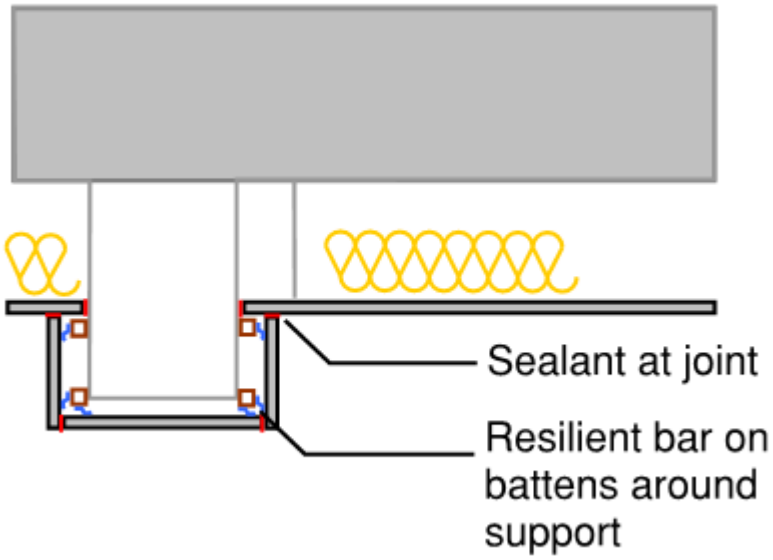
Below the soffit of the concrete floor, a metal track system with isolation hangers should be installed to form a 100mm cavity. The cavity should include 50mm mineral fibre of nominal density 12kg/m^3, and be clad with a minimum of one layer of 12.5mm standard plasterboard.

Figure 4 - Separating floor between first and second floors



The existing concrete floor includes a re-enforced support, which supports the span of the concrete floor. The support will be lower than the finished ceiling in the flats below. Where this occurs, the support should be battened out and be independently lined to reduce flanking sound transmission, a resilient bar system can be used to minimise the impact on the headroom.

Figure 5 – Ceiling detail at concrete support first to second floor



2.4 Sound insulation between common areas and flats

It is understood that the general construction between the common areas and the flats is approximately 200mm brickwork. Where there are penetrations of the masonry partition, they should be infilled with masonry, and clad with insulation backed plasterboard on the residential site of the wall. Possible this performance would achieve the minimum sound insulation criterion, however it is recommended to independently line the wall to form a cavity of approximately 50mm, and clad with a layer of nominal superficial density of 10.6 kg/m^3.

The separating wall between the flats and the hallways should be continuous to the soffit of the roof. If the existing masonry wall is not continuous, then it can be continued to the soffit using an

independent stud partition with mineral fibre and clad both sides with two layers of 12.5mm plasterboard of nominal superficial density of 10.6 kg/m^3.

2.5 General Sound Insulation guidance

- Plasterboard ceiling should not touch separating partitions, or external walls. Instead linings should be stopped 3-5mm short, with the gap sealed with a non-hardening caulk.
- Where plasterboard is layered, joints should be staggered and sealed at each layer.
- Where using resilient bars, please refer to the manufacturer's recommended screw length for the thickness of plasterboard being installed to avoid bypassing the resilient bar.
- Downlighters installed within sound insulating ceilings should ideally be avoided, however, where this is not possible the following guidance should be followed:
    - Install in accordance with manufacturer's instructions
    - Downlighters installed no more than one per 2m^2 of ceiling area in each room
    - Downlighters are installed no closer than 0.75m from one another
    - Openings for the downlighters do not exceed 100mmx100mm
- Services penetrations. Where services such as soil pipes, ducting, etc. which penetrate the party ceiling/floor or wall, should be as small as possible, and incorporate appropriate intumescent seals. The services themselves should be boxed in with 100mm mineral fibre of nominal density of 12kg/m^3, and clad with two layers of plasterboard of nominal superficial mass of 10.6 kg/m^2.

3 FAÇADE SOUND INSULATION (GLAZING - ALL FACADES)

An acoustic assessment in support of the planning application for the residential development at 35-37 High Street, Shoreham (ref: 4442_001R_1-0_JE) was undertaken in December 2019. The report details the glazing specification and ventilation strategy to achieve the recommended internal ambient noise levels within residential properties on all facades of the building. The existing glazing consists of an aluminium framed swivel frame with 4 mm / 12 mm / 4 mm double glazing units installed within them. It is understood that these existing units are in good serviceable condition.

By retaining these existing glazing units and installing a secondary glazed unit as described below, the World Health Organization Guidelines for Community Noise will be achieved. It should be noted that the Planning Noise Advice Document: Sussex targets a limit cannot be guaranteed with the maximum reasonably practicable glazing.

The proposed acoustic specification for enhancing the glazing consist of the following:

- Existing double-glazed unit (4/12/4mm),
- Cavity depth of 150mm, with acoustically absorptive material within the window reveal
- Secondary glazing unit with a pane of standard 15mm thick.

The same performance could alternatively be achieved using 9mm thick laminated glass, in place of the 15mm glass.