Chartered Building Consultancy

Acoustic South East

Assessment of Sound Insulation

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Date: 09/08/2024

Project: J3855

Issue 1

Site: **Upper Beeding Pharmacy, Upper Beeding. BN44 3HZ**

Client: **Alan Robinson Sussex Limited**

Constructionline Part of Capita plc

CQMS Safety Scheme

ANC THE ASSOCIATION OF NOISE CONSULTANTS

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Acoustic South East is a Trading Name of Acoustic Associates Sussex Ltd, Company Registration No: 5646519

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Issue 1	09/08/2024	Original Issue

1 Introduction and Executive Summary

Acoustic South East have been appointed to provide the client, Alan Robinson Sussex Limited to provide a suitable scheme of sound insulation for a planning application. Specifically, the report may be used to discharge a planning condition for details of acoustic insulation which was suggested by the Environmental Health technical consultee to planning application DC/23/1770.

The current sound insulation performance of the separating floor partition is poor (32-34dB $D_{nT,w}+C_{tr}$), when considered against the requirement for an upgraded commercial/residential requirement of 48dB $D_{nT,w}+C_{tr.}$

The ground floor pharmacy use will remain in place and the pharmacy use is not a use which generates elevated sound pressure levels. As a live/work environment, it is likely that staff are downstairs during working hours and upstairs at the end of the working day.

However, as a listed building, is it apparent that the normal requirements of Building Regulations Approved Document E will not apply.

Notwithstanding this, a strategy is proposed which maximises the floor to ceiling height of the ground floor pharmacy, whilst also building on top of the original floorboards to ensure mass for airborne sound insulation. Such a proposal will improve upon the current level of sound insulation between the pharmacy and dwelling above.

2 Context and requirement for a Scheme of Sound Insulation

Planning permission has been submitted for a change of use to Horsham District Council under DC/23/1770. The changes concern an existing ground floor pharmacy which operates between 09:00-17:30 hours and residential apartments above. A pharmacy use does not generate elevated sound pressure levels.

The Environmental Health Officer as technical consultee to the application indicated a scheme of works to achieve 5dB better than Building Regulations Approved Document E. The aim of such a condition is to protect residential amenity above from commercially generated sound below, albeit the pharmacy does not generate elevated noise levels.

It should be noted that the premises is a listed building and it is reported by the client that there is minimal sound insulation between the ground and first floors.

Contextually the client owns both the commercial ground floor as well as the residential demises above and it is currently a live work scenario.

3 Scope

Please note that the scope of the assessment relates only to sound insulation. Fire safety and structural integrity and loading remain outside of the scope and the client must take specialist advise from suitably qualified practitioners.

4 Building Regulations Approved Document E(ADE)

Sound insulation is governed by Approved Document E "Resistance to the passage of sound". In this particular instance, with a ground floor commercial use to a residential first floor above, the sound insulation criteria to be applied only relates to vertical airborne sound, and not impact from above.

In circumstances with a mixed tenure, ie commercial at ground floor and residential above, it is normal to seek an increased sound insulation performance above building regulations. This is reflected in section 0.8 of the building regulations, as shown below in Figure 1.

Whilst ordinarily, one would seek to achieve compliance with the criterion of a conversion for such a property, the fact that it is a listed building is recognised within the ADE and is discussed in Figure 1 below (see section 0.7). Principally, there is a balance to be struck in preserving historic features and yet improving sound insulation. There has been specific liaison with the conservation officer who is supportive of the works being proposed.

0.7 In the case of some historic buildings undergoing a material change of use, it may not be practical to improve the sound insulation to the standards set out in Tables 1a and 1b. The need to conserve the special characteristics of such historic buildings needs to be recognised[1], and in such work, the aim should be to improve sound insulation to the extent that it is practically possible, always provided that the work does not prejudice the character of the historic building, or increase the risk of long-term deterioration to the building fabric or fittings. In arriving at an appropriate balance between historic building conservation and improving sound insulation it would be appropriate to take into account the advice of the local planning authority's conservation officer. In such cases it will be reasonable to improve the sound insulation as much as is practical, and to affix a notice showing the sound insulation value(s) obtained by testing in accordance with Regulation 41 or 20(1) and (5), in a conspicuous place inside the building.

0.8 The performance standards set out in Tables 1a and 1b are appropriate for walls, floors and stairs that separate spaces used for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to establish if a higher standard of sound insulation is required and, if so, to determine the appropriate level.

Figure 1. Extract from Approved Document E - Historic Buildings

4.1 Suitable Sound Insulation Performance Criterion

$D_{nT,w+Ctr}$ is a single number quantity that characterizes the airborne sound insulation between rooms.

Given the requirement to protect a resident above, it would be relevant to seek to achieve 5dB better than a conversion inside a property, therefore 43dB $D_{nTw}+C_{tr}+5$ = 48dB $D_{nTw}+C_{tr}$ at the very least. 48dB $D_{nTw}+C_{tr}$ is the minimum design target considered within the report.

5 Conservation Officer (Horsham)

Feedback evident on the planning website from the conservation officer is supportive of the proposals and responses are noted dated 9th October 2023, 12 March 2024 and 31 May 2024.

6 Methodology

Given the listed building status, it is relevant to consider that any improvement made on the separating floor will be a positive one. With this in mind, a number of baseline tests were carried out on 13th June 2024 to consider the current sound insulation performance of the separating floor.

The results of the testing, along with the proposed improvements to the floor are submitted herewith to the local planning authority for consideration accordingly.

7 Current Measured Sound Insulation Performance

Three vertical airborne sound insulation tests were carried out on 13th June 2024 from the ground floor premises to the first floor to identify the baseline performance of the separating floor partition. These were carried out at the front and rear. The ceiling height in the pharmacy is 2.23m and this is lowered in some instances to 2.12m where low beams are encased. Surface mounted lighting is used.

The $D_{n,Tw}+C_{tr}$ results ranged from 32 to 34dB, which are below the requirements of normal Approved Document E which mandate that for a conversion, these should be greater than 43dB $D_{nTw}+C_{tr}$.

However, attention is drawn to 0.7 in Figure 1 above which indicates that the overall position should be to improve the current situation.

8 Proposed Flooring

Given that the client owns the whole of the building, improvements may be made from above in terms of over boarding, as well as below the ceiling partition. The solution is however constrained by the limited depth of the floor.

The structural engineer has commented as follows with regards to the new joists:

The existing joists spanning front to back between the existing oak beams over the pharmacy shop are approximately 90 x 90 Oak joists at 400mm centres where they were exposed above. These would not be sufficient for the additional loading from the extra plaster boarding layers etc and would need to have 47 x 97 C24 timbers fixed to both sides of the existing joists to increase the load capacity sufficiently. The C24 timbers would need to be fixed to the sides of the existing oak joists with Truslok screws or similar at 200mm staggered centres

The following strategy is proposed in terms of specification of the floor from top down;

- 18/22mm Cement T&G Chipboard
- Existing boards
- New Joists
- 100mm acoustic roll (no less than 12kg/m3 for density) **or** 50mm Rockwool (40-50kg/m3 density)
- Genie clip on side of joists – see here https://soundstop.co.uk/products/genieclip-lb3
- 19mm Gyproc Plank
- 12.5mm Gyproc Fireline

It is critical that the manufacturers instructions are followed with regards to installation and fitting- see below: - https://cdn.shopify.com/s/files/1/0661/6399/8943/files/Genie_Clip_Wall_fitting_instructions.pdf?v=1663695289

Past testing with such a narrow floor and the use of genie clips has achieved Approved Document E minimum requirements (ie 43dB D_{nTw} $+C_{tr)}$ for a conversion project, however, it may not achieve the enhanced level being suggested by the Environmental Health Officer.

9 Shop Lighting

Given the commercial to residential tenure, it is strongly recommended that any lighting is surface mounted on the new ceiling. This prevents holes being cut into acoustic boards and bypassing the integrity of the newly provided sound attenuation.

10 Through Ceiling Services

The following applies to any services that pass from one floor to another or that pass through a separating wall.

- Pipes and ducts that penetrate a floor separating habitable rooms in different flats should be enclosed for their full height in each flat. The enclosure should be constructed of two layers of board material having a combined mass per unit area of at least 16kg/m^2. (2x12.5mm plasterboard)
- Either line the enclosure, or wrap the duct or pipe within the enclosure, with 25 mm unfaced mineral wool.
- Soil pipes should be fixed to the masonry wall with a resilient material between the pipe and collar support bracket
- Penetrations through a separating floor by ducts and pipes should have fire protection to satisfy Building Regulation Part B - Fire safety. Fire stopping should be flexible and also prevent rigid contact between the pipe and floor. Note: There are requirements for ventilation of ducts at each floor where they contain gas pipes. Gas pipes may be

contained in a separate ventilated duct or they can remain unducted. Where a gas service is installed, it shall comply with relevant codes and standards to ensure safe and satisfactory operation.

- Do seal the joint between casings and ceiling with tape & sealant.
- Do leave a nominal gap (approx. 5 mm) between the casing and any floating layer and fill with sealant.

11 Workmanship

As previously stated, workmanship must be of a high standard and includes the following points:

- Where soundbloc is laid, the sheets must be staggered to avoid common joints. The seals must be taped at the joins and perimeter edges.
- The soundbloc layers must continue to all walls and be taped and treated at the wall junctions to avoid weaker areas where sound energy will penetrate.
- Dense mineral wool fibre must be laid evenly and across all tiles without any gaps
- The mineral wool must not fill the void to avoid creating a bridging of sound energy through the partition.
- It is noted that the listed status requires a lime mortar render to be applied to brickwork in areas where conservation is critical for the internal wall linings. Where lime mortar is not necessary, 12.5mm soundbloc plasterboard can be applied to avoid flanking transmission through the wall structures.

12 Summary

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