SYNTEGRA CONSULTING

104 High Street, Sittingbourne, ME10 2AN

Sound Insulation Assessment

December 2023

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1. Executive Summary

A sound insulation assessment has been carried out in relation to the proposed internal wall and floor constructions for the approved residential development at **104 High Street, Sittingbourne ME10 2AN.**

The assessment has shown that the development should achieve the identified requirements, subject to the recommend constructions being incorporated into the design subject and to a high quality of workmanship.

It is important to note that, as with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection (such as resilient bars). Additionally, any joints between different walls and the party wall and the ceiling/floor should be carefully filled with acoustic mastic.

2. Introduction

This report has been prepared to assess the internal sound insulation at an approved residential development at **104 High Street, Sittingbourne, ME10 2AN**.

The purpose of this noise assessment has been to determine the sound insulation provided by the proposed internal partitions at the site. A glossary of acoustic terms is provided in **Appendix 1**. The aim of this assessment is to provide best case means of mitigating noise transfer within the building, due to the significant limitations imposed by the historic nature of the building.

The development is conversion of an existing dwelling to a House of Multiple Occupancy (HMO).

The site location plan is presented in **Figure 2.1** and an example internal layout is presented in **Figure 2.2**.

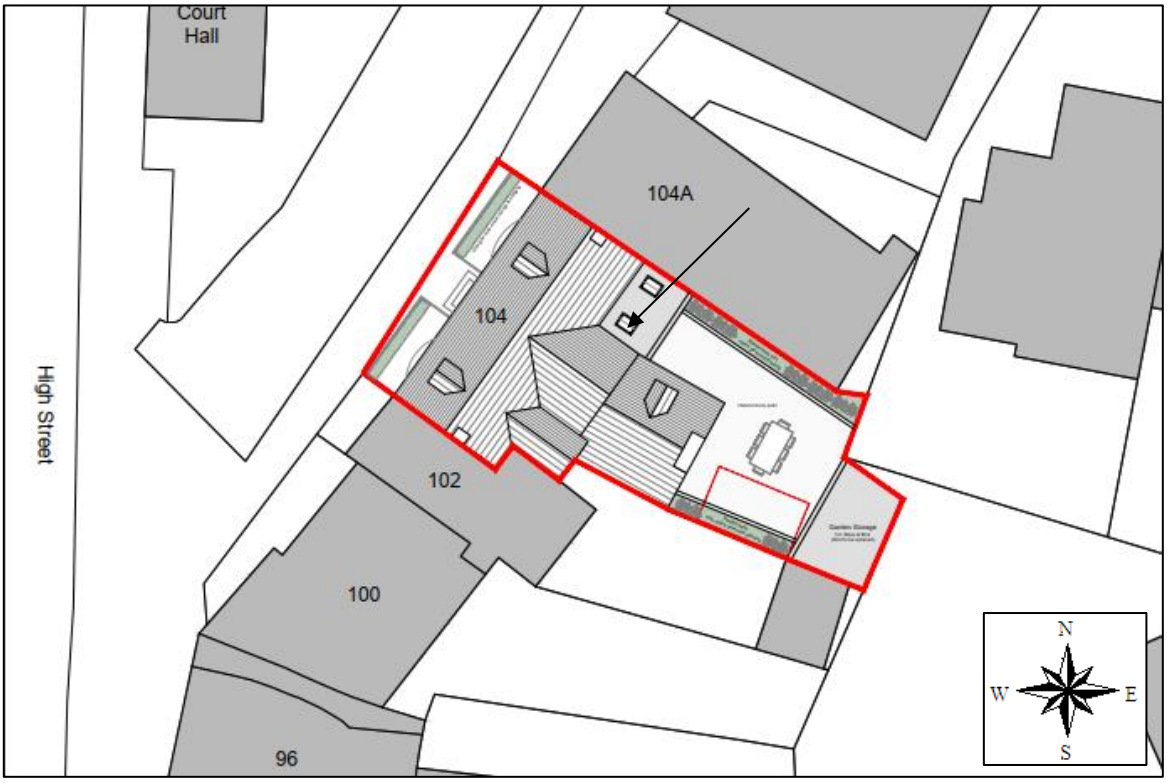

Figure 2.1: Site Location

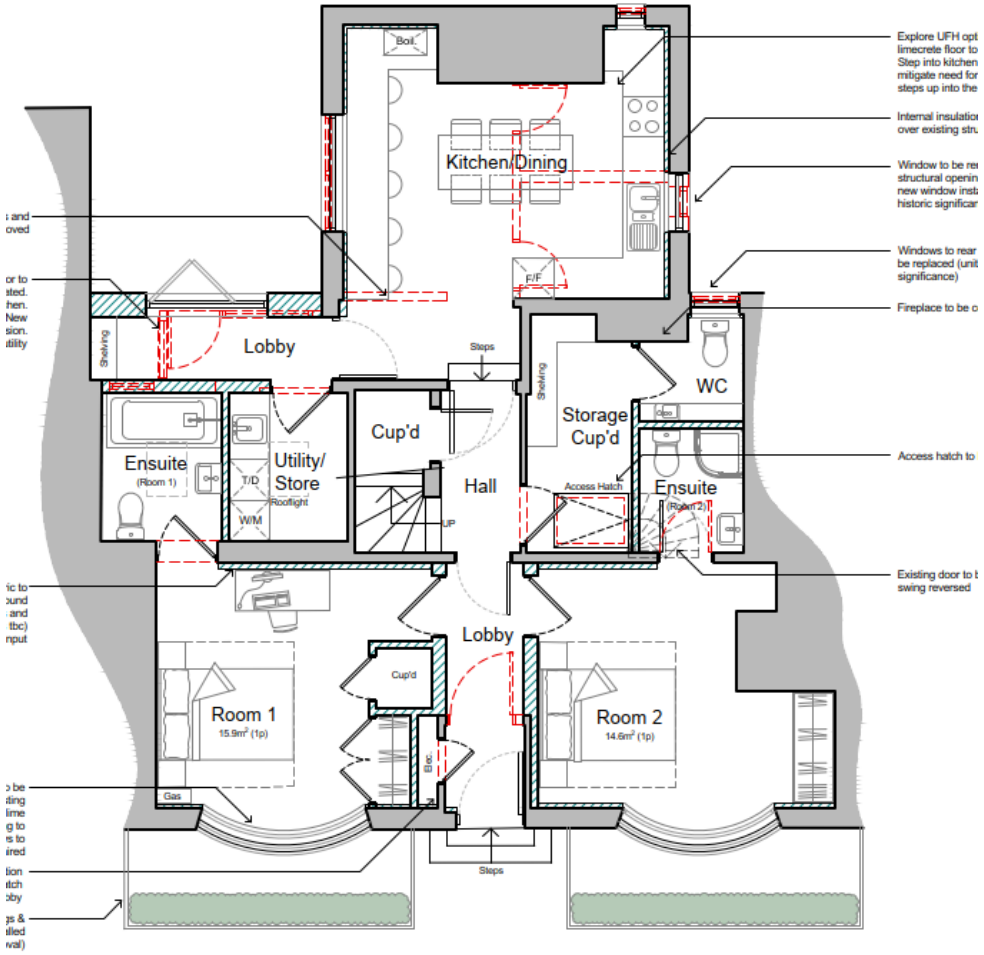

Figure 2.2: Example Internal Layout (Ground Floor)

3. Assessment Criteria

3.1. Internal Sound Insulation – The Building Regulations Approved Document E "Resistance to the passage of sound" (ADE)

The requirements under Part E of Schedule 1 to the Building Regulations 2000 are from 1st July 2003 as follows:

*'**E1.** Dwelling-houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings.'*

The minimum values for airborne and impact sound insulation for walls and floors between '*rooms for residential* purposes' that are '*formed by material change of use'* are provided in Table 0.1b of ADE and are reproduced in **Table 3.1** below.

	Partition Type	Airborne sound insulation $D_{nT,w} + C_{tr}$ dB (Minimum values)	Impact sound insulation $L'_{nT,w}$ dB (Maximum values)
Rooms for residential purposes formed by material change of use	Walls	43	-
	Floors and stairs	43	64

Table 3.1: Approved Document E Performance Standards

The aim of this assessment is to provide best case means of mitigating noise transfer within the building, due to the significant limitations imposed by the historic nature of the building.

4. Proposed Constructions

The sound insulation properties of the existing and recommended constructions have been determined utilising the INSUL software programme which implements a number of papers and standards including BS EN 12354-3:2000 *"Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound."*

4.1. Internal Partitions

The construction of the internal partitions have not been specified, but photographs of existing constructions have been provided by the scheme architects and the sound insulation of the structures has been determined utilising the INSUL software. A description of the existing constructions and the calculated sound insulation is presented in **Table 4.1** and the proposed constructions are presented in **Table 4.2**, with Syntegra's recommended improvements.

Partition	Construction Description	Airborne Sound Insulation R_w [C_{tr}] (dB)	Impact sound insulation $L_{n,w}$ (dB)
Existing Wall - Brick	• 150mm brick. *Thickness inferred from plans and photohraphs.*	49[-4]	-
Existing Wall – Lath and Plaster	• Lath and plaster • Timber stud • Lath and Plaster	37[-9]	-
Existing Floor – timber floorboards	• Timber Floorboard over 80mm joist (no insulation) with lath and plaster ceiling below. *Construction inferred from photographs*	39[-11]	78

Table 4.1: Internal Partition Sound Insulation Properties - existing walls

Partition	Construction Description	Airborne Sound Insulation R_w [C_{tr}] (dB)	Impact sound insulation $L_{n,w}$ (dB)
Separating Wall – Rooms 3 and 4	• Lath and Plaster • Timber stud (no insulation) • Lath and Plaster • 48mm independent wall lining system with partition roll • 2x15mm soundbloc	58[-10]	-
Enhanced Floor (1st Floor) – timber floorboards with hung ceiling below	• 1x18mm particle board over existing floorboards • 80mm wooden joist with mineral wool insulation. • Retained lath and plaster • 2x12.5mm Soundblock suspended ceiling on resilient hanger with 180mm cavity and 60mm partition roll	54[-4]	60
Enhanced Floor (2nd Floor) – timber floorboards with hung ceiling below	• 1x18mm cement particle board over existing floorboards • 80mm wooden joist with no insulation. • Retained lath and plaster • 2x12.5mm Soundbloc on 50mm ceiling liner system with resilient bar and 25mm partition roll	55[-6]	67

Table 4.2: Internal Partition Sound Insulation Properties – recommended separating constructions

4.2. Workmanship

It is important to note that, as with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection. Additionally, any joints between different walls and the party wall and the ceiling/floor should be carefully filled with acoustic mastic.

5. Internal Sound Insulation Assessment

The predicted sound insulation values have been calculated using the construction assumptions stated in **Section 4** and using standard acoustic formulae for example rooms across the approved development and the results for the worst-case rooms (those with the largest partition area) are presented in **Table 5.1**. The predicted sound insulation values are also compared against the assessment criteria provided in **Section 3**.

Source Room	Receiver Room	Element	Predicted $D_{nT,w} + C_{tr}$ (dB)	Achievement of Identified Criteria (Minimum 43 dB)	Predicted $L'_{nT,w}$ (dB)	Achievement of Identified Criteria (Maximum 64 dB)
Walls						
Bedroom 3	Bedroom 4	Wall	45	✓	n/a	n/a
Floors						
Bedroom 4	Bedroom 2	Floor	44	✓	64	✓
Bedroom 6	Bedroom 3	Floor	43	✓	71	X

Table 5.1: Sound Insulation Assessment

It can be identified from Table 7.1 that the proposed wall and floor constructions should achieve a reasonable level of performance, given the historic nature of the building, subject to the recommend constructions being incorporated into the design subject and to a high quality of workmanship.

6. Conclusion

A sound insulation assessment has been carried out in relation to the proposed internal wall and floor constructions for the approved residential development at **104 High Street, Sittingbourne ME10 2AN.**

The assessment has shown that the development should achieve a reasonable level of performance, given the historic nature of the building, subject to the recommend constructions being incorporated into the design subject and to a high quality of workmanship.

It is important to note that, as with any construction project, the ability to meet the specification will rely upon the quality of the built structure. As such the works should be carried out to a high standard of workmanship to ensure that any sound insulation measures are not breached, for example by installing a rigid connection across an isolated connection (such as resilient bars). Additionally, any joints between different walls and the party wall and the ceiling/floor should be carefully filled with acoustic mastic.

7. Appendix 1: Glossary of Acoustic Terminology

Term	Description
'A'-Weighting	This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.
Decibel (dB)	This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.
Frequency	Frequency is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
$L_{Aeq,T}$	The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.
L_{Amax}	The 'A'-weighted maximum sound pressure level measured over a measurement period.
R_w	Weighted sound reduction index, a single number quantity for the airborne sound insulation in buildings and of building elements such as wall, doors and windows. The quantity is intended for rating the airborne sound insulation and for simplifying the formulation of acoustical requirements in building codes, when measured in the presence of flanking sound transmission, denoted R'_w.
D	Arithmetic difference of the SPL between two spaces, for example room (a) and room (b)
$D_{nT,w}$	Weighted value of D, standardised to a constant reverberation time.
C_{tr}	The correction to a sound insulation quantity (such as $D_{nT,w}$) to take account of a specific sound spectra.
$D_{nT,w} + C_{tr}$	A single number quantity which characterises the airborne sound insulation between rooms using noise spectra No.2 as defined in BS EN ISO 717-1:1997
L	Average SPL measured in the receiver room when the floor under test is subject to a standardised impact sound source.
$L'_{nT,W}$	Weighted value of L, standardised to a constant reverberation time.