

**Assessment of the Potential Internal Sound Transmission  
from the Proposed Wine Bar at 27 Britannia Road, Slaithwaite.**

**Report Prepared for:**

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## **Contents**

### **1.0 Summary**

### **2.0 Introduction**

### **3.0 Sound Insulation Performance Standards**

- 3.1 Approved Document E, 2003 edition
- 3.2 Kirklees Council "Noise Design Advice" May 2007

### **4.0 Sound Transmission Pathways**

### **5.0 Sound Insulation Assessment Details**

- 5.1 Description of the Assessed Premises
- 5.2 Sound Insulation Assessment Procedure

### **6.0 Sound Insulation Assessment - Proposed Separating Floor**

### **7.0 Potential Sound Transmission - Proposed Wine Bar to first floor flat**

### **8.0 Background Music Provision**

### **9.0 Conclusion**

**Appendix 1:** Bastian Calculation Results

**Appendix 2:** Noise Transmission Calculations

**Appendix 3:** Installation Information

## 1.0 Summary

Planning consent is being sought to permit the conversion of the former ground floor hairdressing salon at 27 Britannia Road in Slaithwaite to form a new wine bar within the existing ground floor space, whilst preserving the existing first floor residential flat above.

In a pre-application response issued by Kirklees Council, comments were made relating to the potential "*impact on residential amenity*" from the proposed conversion. With respect to the potential impact of noise, Druk Limited was commissioned to conduct an assessment of the airborne sound insulation of the existing floor, which would become the separating floor between the proposed ground floor wine bar and the first floor residential flat. The assessment was conducted to assess whether the airborne sound insulation of the existing structure would comply with the performance requirements contained within Approved Document E (ADE) and other associated guidance.

The sound insulation assessment has indicated that airborne sound insulation performance of the existing floor, separating the ground floor commercial use from the proposed flat above, would not be sufficient to ensure compliance with the minimum performance requirement detailed within ADE. With this in mind suitable remedial measures have been proposed which would enhance the sound insulation of this element in compliance with the minimum requirement detailed within ADE. Further calculations have indicated that the proposed remedial measures would have the ability to control the transmission of noise from the proposed wine bar to the first floor flat, such that acceptable internal noise levels should prevail within the flat.

It should however be remembered that whilst every effort has been made to ensure that the advice contained within this report represents best practice with respect to achieving the required sound insulation performance, it does not represent a performance guarantee as the ultimate performance will depend on a number of contributory factors such as the selection and installation of the various components and the quality of workmanship, all of which are beyond the control of Druk Limited.

Additionally, the guidance and examples detailed within this report are solely focused on identifying potential acoustic factors that may arise during the design and construction process. They are intended for advisory purposes only and should be integrated into the Architect's design drawings where applicable, for review and confirmation by all relevant parties and other specialists. As the sound insulation remedial options would impose an additional load on the existing building structure, it is recommended that advice from a suitably qualified and experienced individual or organisation is sought, to ensure that the implementation will not have detrimental effects on any of the existing building elements.

Report prepared by:



Robert Smith

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## 2.0 **Introduction**

Planning consent is being sought to permit the conversion of the former ground floor hairdressing salon at 27 Britannia Road in Slaithwaite, to form a new wine bar within the existing ground floor space whilst preserving the present first floor residential flat above.

In a pre-application response issued by Kirklees Council, comments were made relating to the potential "*impact on residential amenity*" from the proposed conversion, which included the potential impact of noise from the proposed ground floor wine bar on the existing first floor residential flat. With respect to the potential impact of noise from the proposed wine bar, Druk Limited was commissioned to conduct an assessment of the airborne sound insulation of the existing floor that would separate the ground floor wine bar from the residential flat above. The assessment was conducted to assess whether the airborne sound insulation of the existing structure would comply with the performance requirements contained within Approved Document E (ADE) and other associated guidance.

## 3.0 **Sound Insulation - Internal Noise Transmission Guidance**

### 3.1 **Approved Document E, 2003 edition**

Approved Document E (ADE) "Resistance to the Passage of Sound", 2003 edition, (amended in 2004) provides guidance as to how the requirements of the Building Regulations 2000, as they relate to sound insulation, may be met. The Approved Document details specific sound insulation performance requirements that are required for separating elements, walls and floors, in a number of situations, namely: dwelling houses and flats whether 'purpose built' or 'formed by material change of use' and rooms for residential purposes which may be either 'purpose built' or 'formed by material change of use'. The specific sound insulation performance requirements that should be achieved by either 'purpose built' separating elements or those formed by 'material change of use' are detailed in Tables 0.1a and 0.1b of Section 0 in Approved Document E.

As the proposed wine bar would be formed from the conversion of the ground floor space previously occupied by the hairdressing salon, it is suggested that the required minimum sound insulation performance for the floor separating the proposed wine bar from the existing first floor flat would fall within the "Dwelling houses and flats formed by a material change of use" category detailed in Table 0.1a of Approved Document E. As such, the sound insulation performance of what will become the separating floor should comply with the criteria highlighted (emboldened) in table 1 overleaf.

With reference to the assessment of the sound insulation of the floor separating the proposed wine bar from the existing first floor flat, according to Diagram 0.1 contained within Section 0 of ADE, which illustrates the requirements of Requirement E1, the performance requirement for this floor relates to airborne sound insulation only. With respect to airborne sound insulation, the quoted performance standard is a minimum requirement, therefore the obtained test result should exceed, or as a minimum equal, the requirement.

**Table 1.** Sound Insulation Performance Criteria

<b>Dwelling Houses and Flats</b>		
<b>Situation</b>	<b>Airborne sound insulation, <math>D_{nT,w} + C_{tr}</math> dB (Minimum Value)</b>	<b>Impact sound insulation, <math>L'_{nT,w}</math> dB (Maximum Value)</b>
<b>Formed by material Change of use</b>		
Walls	43	-
Floors and stairs	43	64

Additionally where an element, either a wall or floor, separates a residential use from a commercial or non-residential use, ADE provides guidance in addition to that contained within Tables 0.1a and 0.1b relating to the sound insulation standards to be met. In this case ADE at paragraph 0.8 of section 1 states:

*"The performance standards set out in tables 1a and 1b are appropriate for walls, floors and stairs that separate spaces for normal domestic purposes. A higher standard of sound insulation may be required between spaces used for normal domestic purposes and non-domestic purposes".*

The above guidance would be applicable to the existing floor which would ultimately separate the proposed ground floor wine bar from the existing first floor flat.

### 3.2 Kirklees Council "Noise Design Advice" May 2007

As the internal environment of the proposed wine bar will be subject to noise from both conversation and some background music, more specifically dealt with in section 8 of this report, it is thought that it would have more in common with noise from an entertainment venue than would be the case where the noise climate comprised voices alone.

With this in mind reference will be made to the guidance contained within Kirklees Council's "Noise Design Advice". This document was produced in May 2007 and provides guidance to developers as to how acceptable noise levels can be achieved, so protecting the existing noise environment in the vicinity of the proposed development. The guidance document covers a range of scenarios ranging from the assessment of commercial, industrial, entertainment, residential noise etc., and the criteria that would be considered acceptable when evaluating what effect such development may have on the existing noise environment.

Of the many scenarios covered in the guidance document, it is thought that section 5 is the most directly applicable to the potential emission of sound from the proposed wine bar to the existing first floor residential flat above. With this in mind the relevant section is reproduced below and overleaf:

## **5. New Noise Sensitive Premises near to Places of Entertainment**

*This advice aims to protect your new residents from noise from existing places of entertainment.*

*Developers should assess the likely impact of the entertainment premises on the noise environment. The residential premises must be designed to ensure that music and associated noise is inaudible inside any residential premises in the vicinity. The minimum acceptable standard is:*

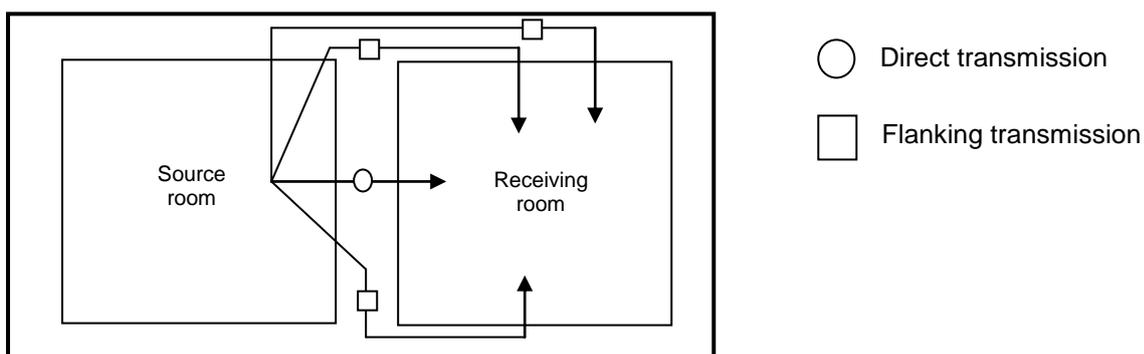
- 5.1.1 NR 20 in bedrooms (2300 to 0700)
- 5.1.2 NR 25 in all habitable rooms (0700 to 2300)
- 5.1.3 All indoor levels shall be taken with windows open or closed (which ever makes the music appear louder) or with alternatively provided acoustic ventilation over and above “background” ventilation.
- 5.1.4 Noise Rating curves should be measured as a 15 minute linear Leq at the octave band centre frequencies 31.5 Hz to 8 kHz.
- 5.1.5 Other noise sources from the places of entertainment, such as air conditioning plant and kitchen odour extraction systems shall be treated as industrial development and scenario 3 is applicable.

#### 4.0 Sound Transmission Pathways

When considering the sound insulation of a structure the transmission of sound energy through the various elements must be considered. The transmission of sound may be regarded as comprising two principal pathways, namely direct transmission and flanking transmission.

As the name suggests, the direct transmission of sound energy relates to that ‘portion’ that ‘passes’ directly through the separating element under consideration; consequently, flanking transmission then accounts for all other indirect transmission routes. These basic distinctions are illustrated in figure 1 below.

**Figure 1.** Basic illustration of the sound transmission pathways through building elements



In any consideration of the sound insulation performance of a separating element, both of these potential contributory elements should be taken into account. It is quite possible that the sound insulation performance of what would otherwise be a perfectly satisfactory separating element, in terms of its sound insulation performance, could be significantly reduced by ‘uncontrolled’ flanking transmission routes and vice versa.

## 5.0 Sound Insulation Assessment Details

By virtue of the condition of the existing floor/ceiling structure with the premises at 27 Britannia Road, detailed in photograph 1 below, the airborne sound insulation of this element could not be assessed by direct measurement on site. To this end the assessment of the airborne sound insulation of this element will be addressed by calculation.

**Photograph 1.** Existing floor/ceiling within the ground floor space at 27 Britannia Road



### 5.1 Description of the Assessed Premises

The proposed wine bar will be formed from a conversion of the ground floor space, previously occupied by a hairdressing salon, at 27 Britannia Road in Slaithwaite (photograph 2 overleaf). The existing building is believed to date from the mid to late nineteenth century and is of robust masonry construction with timber joist internal floors.

**Photograph 2.** Existing building, 27 Britannia Road, Slaithwaite

## 5.2 Sound Insulation Assessment Procedure

The potential airborne sound insulation of what will become the separating floor between the proposed ground floor wine bar and the existing first floor flat, will be evaluated using BASTIAN software which is based on the methods and procedure detailed in BS EN 12354:2000 “Building acoustics – Estimation of acoustic performance of buildings from the performance of elements”. It should however be remembered that the calculations produced according to this procedure are based on best practice assumptions as to the construction elements and usual building practice. Consequently the results of these calculations may be considered as a guide as to the sound insulation of the elements rather than a definitive statement. Despite this, recent sound insulation tests have revealed that sound insulation performances calculated using the BASTIAN software produces results that are frequently in the region of  $\pm 2$ dB of the subsequent in-situ tested results.

When discussing the sound insulation of separating walls and floors, including any potential enhancements that may be required to existing structures, it is first worth considering the difference between the different descriptors used to indicate levels of airborne sound insulation performance. Approved Document E, 2003 edition, expresses airborne sound insulation in terms of the  $D_{nT_w} + C_{tr}$  parameter, this being a field test value which includes contributions from both direct and flanking sound transmission. An alternative and often quoted descriptor of airborne sound insulation is the  $R_w$ , this descriptor has been obtained in a laboratory where the detrimental effects of flanking transmission have, to all intents and purposes, been eliminated. As a consequence it is not unusual for the quoted laboratory sound insulation value,  $R_w$ , to be better than the field test,  $D_{nT_w} + C_{tr}$  value, although the degree to which the  $R_w$  value exceeds the  $D_{nT_w} + C_{tr}$  value will depend on factors such as the quality of workmanship on site etc. Typically laboratory sound insulation values exceed on site values by around 5 - 8dB, although this again will depend on workmanship etc.

With reference to the advice contained within the following sections, this advice relates to the acoustic performance of the separating floor only and does not consider any other aspects of the building including, but not limited to, structural integrity, electrical installation, fire safety etc.

## 6.0 Sound Insulation Assessment - Proposed Separating Floor

The existing timber joist floor will ultimately separate the proposed ground floor wine bar from the existing flat above, as such there exists the potential for noise from the proposed wine bar to 'break-in' to the existing first floor flat. With reference to this potential noise transmission route, it is understood that the latest closing time of the proposed wine bar would be 23:00 hours.

Site inspection indicated that the existing floor construction comprised, from the top down, a timber deck fixed to 175 x 50mm (nominal) timber joists with a ceiling comprising two layers of plasterboard (photograph 3 below). Although an additional partially independent ceiling had previously been installed, as this had been largely removed the beneficial effects of this structure on the airborne sound insulation of the existing floor will be discounted. Calculations of the likely level of airborne sound insulation that could be expected from a floor of this type are summarised in table 2 overleaf.

**Photograph 2.** Existing ceiling structure, 27 Britannia Road, Slaithwaite



**Table 2.** Calculated airborne sound insulation, existing floor

Separating element description	Calculated level, dB $D_{nT,w} + C_{tr}$	Minimum ADE performance, dB $D_{nT,w} + C_{tr}$
Separating floor	35 - 38	43

Reference to the result presented within table 2 suggests that the airborne sound insulation of the existing floor would not comply with the minimum performance requirement contained within ADE. The calculated result also compares well with recent in-situ sound insulation tests, conducted in similar age premises, which revealed that the airborne sound insulation of these similar structures was in the range 36 - 39dB  $D_{nT,w} + C_{tr}$ .

Consequently, the calculated airborne sound insulation result suggests that the airborne sound insulation of the existing floor would require enhancing in order to obtain the minimum airborne sound insulation value specified within ADE. Enhancement of the airborne sound insulation of the existing floor would also be required to limit the potential transmission of noise from the proposed ground floor wine bar to the existing first floor flat.

Improvements to the sound insulation of a floor can be effected by remedial works installed above or below the joists. In general works below the level of the joists, typically in the form of a new acoustic ceiling, have the potential to produce greater improvements in the airborne sound insulation of the floor than do works above the level of the joists. With reference to the conversion of 27 Britannia Road, it is anticipated that all potential remedial works would be installed below the level of the existing joists. The potential advantage of this type of installation is that the improvement in the airborne sound insulation is likely to be higher than measures installed above the level of the joists. With reference to measures installed below the level of the joists, the use of a fully independent or partially independent ceiling is suggested.

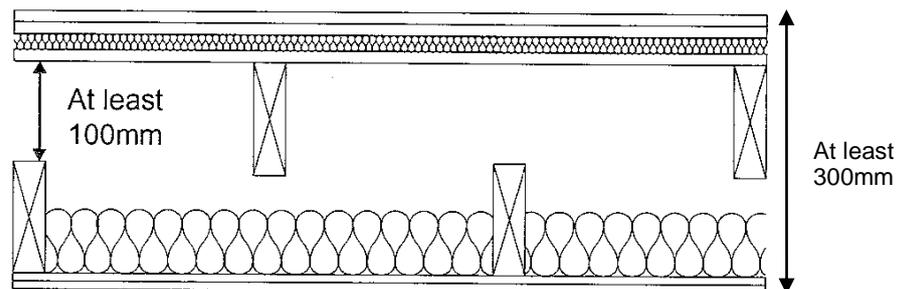
In the case of the fully independent ceiling this utilises ceiling joists that are separated from the floor joists by a minimal gap, around 25mm should be sufficient, although a larger gap would improve the airborne sound insulation of the floor. It is therefore suggested that where possible the void between the existing ceiling and the rear face of the innermost layer of plasterboard forming the new ceiling is at least 300mm deep.

The size of the independent ceiling joists will be determined largely by the span and the load, however a ceiling comprising two layers of acoustic plasterboard will represent a significant load. Where the existing independent ceiling joists, comprising 75 x 50mm (nominal) timber joists, are to be retained it is recommended that their load bearing capacities are assessed, by a suitably qualified and experienced individual/organisation to ensure that they will be able to support the load. It would be prudent to ensure that the void between the new ceiling and the existing ceiling is at least partially filled with mineral fibre and in this case a minimum of 100mm should be sufficient. Turning to the ceiling, this should be formed from two layers of 12.5mm SoundBloc plasterboard (or equivalent) fixed to the independent joists on staggered joints.

Typical details of an independent ceiling are as detailed in figure 2 overleaf and it is recommended that the ceiling should comprise the following elements:

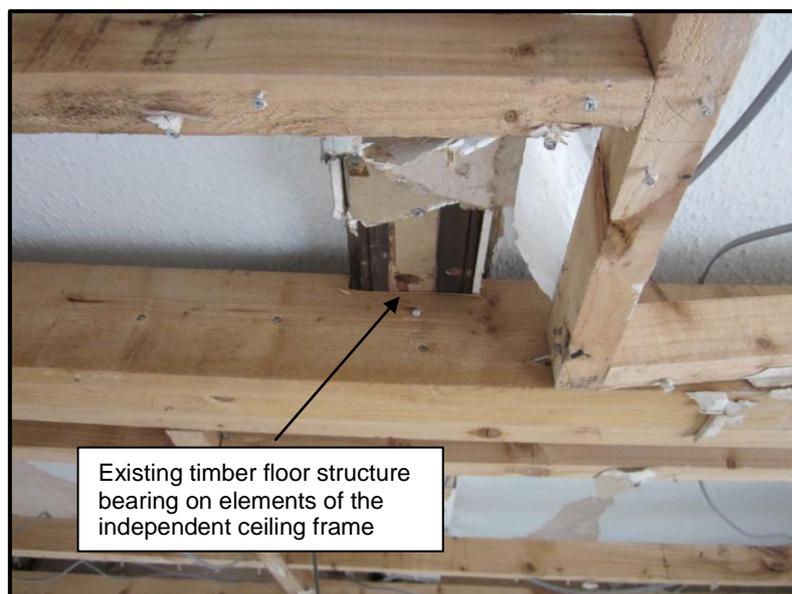
- Existing ceiling joists, assumed to be at least 175 x 50mm.
- Independent ceiling joists installed below the level of the existing ceiling, of sufficient dimensions to support the load imposed by two layers of plasterboard. The existing 75 x 50mm ceiling joists may be retained subject to the caveat detailed above.
- 100mm (minimum) of mineral minimum fibre in the new ceiling void
- Ideally two layers of 12.5mm SoundBloc board (or equivalent) on staggered joints fixed to the ceiling channels

**Figure 2.** Independent Ceiling Construction



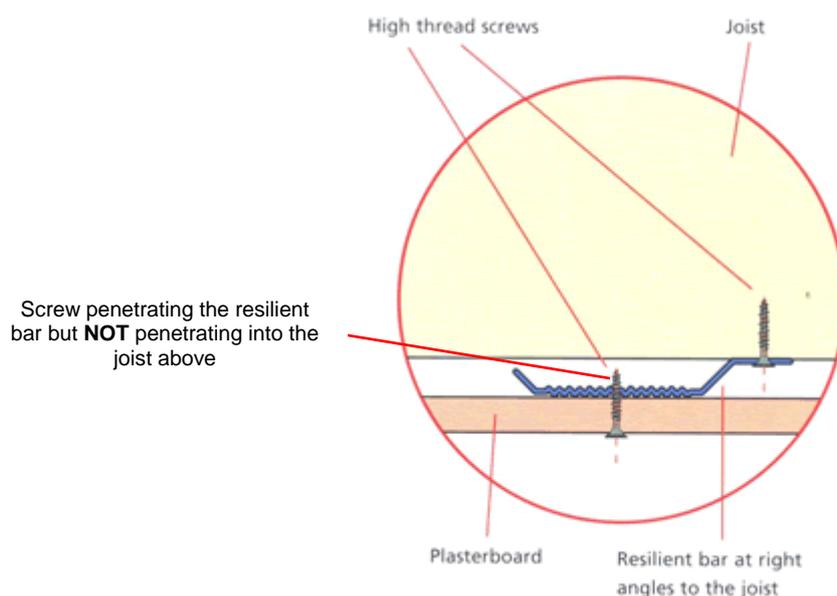
One feature relating to the existing independent ceiling joists that should be considered is the fact that part of this structure is connected to the existing floor structure, photograph 3 below, presumably to provide support to the existing structure. The fact that this connection with the existing structure exists, would suggest that the independence of the independent frame would be slightly compromised. Consequently, such a structure may not, without additional remedial measures, provide the required level of airborne sound insulation. This potential structural connection may be partially overcome by the use of resilient bars, or other type of suitable resilient fixing, fixed to the existing independent timber frame. Here, the resilient bars act like springs and partially disconnect the ceiling from the rest of the structure. The resilient bars are fixed, at right angles, to the existing joists and the new ceiling boards are then fixed through the resilient bars.

**Photograph 3.** Existing ceiling structure, 27 Britannia Road, Slaithwaite



Although resilient bars can provide performance benefits, the ultimate performance of this type of system is frequently dictated by both the correctness of the resilient bar installation and the cavity that exists between the new and existing ceilings. A common fault that can result in a considerable reduction in the overall performance of the floor, is where the resilient bars have been ‘short circuited’ by the fixings used to secure the plasterboard to the bars. The plasterboard fixings should penetrate into the resilient bar, but they should not pass through the resilient bar into the joists above as this would ‘short circuit’ the resilient bar (figure 3 below). In a two board ceiling the selection of the correct length of fixing is therefore critical, consequently the guidance in table 3 below should be carefully considered.

**Figure 3.** Correct fixing of plasterboards to a resilient bar



**Table 3.** Correct screw lengths for use with resilient bars

Table 5 Screw lengths and centres
25mm screws for 12.5mm and 15mm wall board.
32mm screws for 19mm plank.
36mm screws for 12.5mm wall board fixed over 12.5mm wall board.
42mm screws for 12.5mm wall board fixed over 19mm plank and 15mm wall board fixed over 15mm wall board.

**Source:** British Gypsum

An alternative to the above would be the use of a partially independent ceiling option, which would see the new ceiling suspended from the existing ceiling joists by acoustic hangers only, so creating a partially independent ceiling that is disconnected from the existing structure. In this system it is quite acceptable to fix the new ceiling boards to either new timber ceiling joists or an MF system. In the case of the existing floor the acoustic hangers could be fixed to the underside of the secondary, upper, joists. Again, it would be prudent to ensure that the



Calculations have been undertaken to assess the effectiveness of the proposed sound insulation remedial ceilings. The results of the calculations are summarised in table 4 below. Full calculations may be found in Appendix 1.

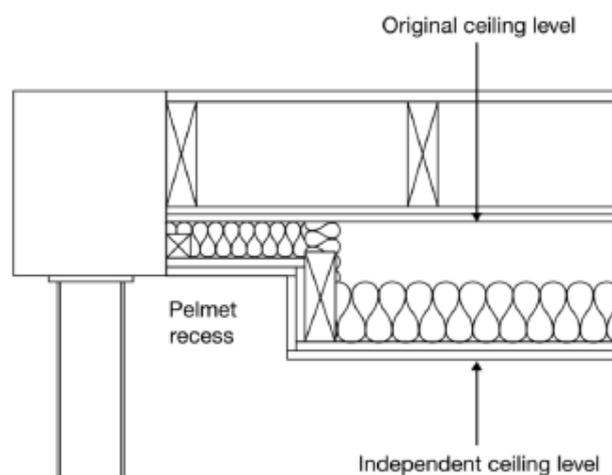
**Table 4.** Calculated airborne sound insulation levels, independent and resiliently hung ceilings

location	Calculated level, dB $D_{nT,w} + C_{tr}$	Minimum ADE performance, dB $D_{nT,w} + C_{tr}$
Independent ceiling, incorporating resilient fixings, ground to first floor	51	43
Partially independent ceiling, ground to first floor	51	43

As can be seen from the summary contained in table 4 above, both the proposed remedial ceiling options have the potential to enhance the airborne sound insulation of the floor such that it should exceed the minimum performance requirement contained within ADE. It should be remembered that increasing the depth of the ceiling void will further improve the overall sound insulation performance of the new ceiling.

The potential disadvantage of both the fully or partially independent ceiling systems is that the head of the existing ground floor front window is quite low. Consequently, the adoption of a fully or partially independent ceiling may require the construction of a pelmet recess detail to accommodate the window heads. This is a relatively simple construction with the general details being as details in figure 5 below.

**Figure 5.** Pelmet recess general details



**Source:** Diagram 4.4, reproduced from Approved Document E, 2003 edition (incorporating the 2004, 2010, 2013 and 2015 amendments)

## 7.0 Potential Sound Transmission - Proposed Wine Bar to first floor flat

With reference to the proposed sound insulation remedial treatments highlighted above, the following paragraphs will evaluate the likely sound transmission that would occur between the proposed ground floor wine bar and the existing first floor flat. For the purposes of this calculation the internal noise level guidance contained within the Kirklees Council guidance detailed in section 3.2 above, in particular the NR25 criterion for habitable rooms, will be adopted as a guide.

In order to evaluate the potential sound levels within the existing first floor flat, resulting from transmission from the proposed wine bar, an indication of the likely sound source levels within the proposed ground floor wine bar would be required. Sound source levels were obtained from the current Wine premises at Lidget Street in Lindley, at approximately 20:45 hours, on Saturday 24<sup>th</sup> May 2025, during which time the premises were busy. The measured sound levels from Wine in Lindley are presented in table 5 below.

**Table 5.** Measured sound levels from Wine in Lindley

OBCF, Hz*	63	125	250	500	1k	2k	4k	8k	Overall, dB(A)
Internal activity sound level, dB $L_{Aeq}$	56	65	69	73	70	66	63	57	<b>75</b>

\* Octave Band Centre Frequency

Using the calculated third octave  $D_{nT}$  data from the Bastian sound insulation assessments of the likely noise levels within the existing first floor flat resulting from activity within the proposed ground floor wine bar will be evaluated. The comparison will be made with reference to the NR25 guide values for habitable rooms. For the purposes of the calculation, the following assumptions have been made:

- The measured sound levels detailed in table 6 above would be uniformly distributed across the separating floor.
- It has been assumed that the ground and first floor areas and the overall room dimensions would be the same.
- The reverberation time within the receiving rooms would be 0.5 seconds.
- The external envelope of the building is formed from stone with a depth of at least 500mm and assumed mass of at least 2000kg/m<sup>3</sup>.
- The mass of the existing external elements would be such that flanking transmission would be regarded as being trivial.

The calculated resulting sound levels within the existing flat, resulting from the transmission of sound from the proposed wine bar, are summarised in tables 6 and 7 overleaf. Full data may be found within Appendix 2.

**Table 6.** Calculated sound levels within the existing first floor flat, fully independent ceiling

OBCF, Hz*	63	125	250	500	1k	2k	4k	8k	Overall, dB(A)
Calculated in flat sound level, dB $L_{Aeq}$	56	65	69	73	70	66	63	57	20
NR25 values	72	55	44	35	29	25	22	20	
Overall NR value	15								

**Table 7.** Calculated sound levels within the existing first floor flat, partially independent ceiling

OBCF, Hz*	63	125	250	500	1k	2k	4k	8k	Overall, dB(A)
Calculated in flat sound level, dB $L_{Aeq}$	38	27	24	19	9	2	-3	-14	21
NR25 values	72	55	44	35	29	25	22	20	
Overall NR value	15								

As can be seen from tables 6 and 7 above, the proposed separating floor remedial measures have the potential to improve the airborne sound insulation of the floor separating the proposed wine bar to the existing first floor flat to such a level, that the calculated sound levels within the existing flat would comply with the guide values contained within the Kirklees Council guidance. Remaining with the resulting noise levels within the existing flat, quoted with reference to NR levels, the calculated NR levels would be NR15 in both cases.

## 8.0 Background Music Provision

It is understood that the internal spaces within the proposed wine bar would be provided with a sound system to permit the playing of background music only. Whilst it is understood that the background music would be very much incidental to activity within the proposed wine bar and provided to enhance the overall experience rather than being the main reason for visiting the premises, there exists the possibility that such provision could result in unnecessary noise transmission to the residential flat above.

Where speakers are to be provided, it is essential that these are fixed to the existing structure, typically a wall, via correctly specified AV mounts. Correctly specified mounts would isolate the speakers from the existing structure and minimise and potential structure-borne sound transmission that could find its way into the existing first floor flat.

A well designed sound system would also make use of a number of smaller and more directional speakers distributed throughout the space, rather than relying on a smaller number of speakers operating at higher volumes to project the sound throughout the space. A greater number of smaller and more directional speakers would permit a better distribution of the background music but, very importantly, at a lower volume. An important caveat here is that the design and installation of a good sound system is a specialised procedure and should only be entrusted to suitably qualified and

experienced individuals and or organisations. A poorly designed and installed system could result in unnecessary disturbance being caused to the first floor neighbour.

## **9.0 Conclusion**

The results of the sound insulation assessments have indicated that airborne sound insulation performance of would become the separating floor between the proposed wine bar and the existing first floor flat, would not be sufficient to ensure compliance with the minimum performnce requirement detailed within ADE. With this in mind suitable remedial measures have been proposed for this element which will enhance the sound insulation and ensure that the internal noise levels, resulting from transmission from the commercial premises, are suitably controlled.

Further calculations have indicated that the proposed remedial measures would have the ability to control the transmission of noise from the proposed wine bar, in compliance with the adopted design guide values for acceptable internal noise levels within the flat.

## Appendix 1: Bastian Calculation Results

New fully independent ceiling

### BASTIAN® - Worksheet 1 [DM (1)]

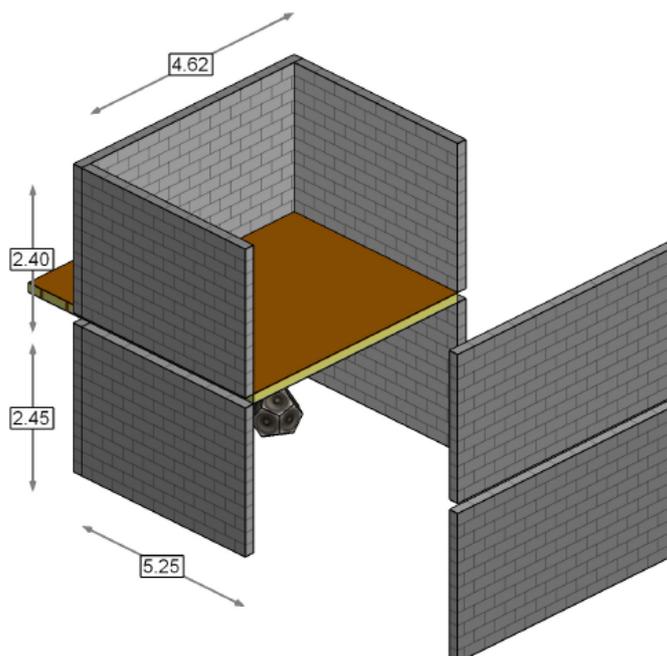
#### Project Info

Project Name: Slaitwaite wine bar  
 Project: 27 Britannia Road  
 Worksheet: Worksheet 1 [DM (1)]  
 Program: BASTIAN V 2.3

#### Worksheet Configuration

Calculation Model:	DM (1)
Perf. Param. Airborne Sound Transm. in Buildings:	DnT,w + Ctr
Perf. Param. Impact Sound Transm. in Buildings:	L'n,w
Perf. Param. Outdoor Sound Transmission:	R'45°;w
Reference Reverberation Time T0 (s):	0.5
f1: Surface mass m <sup>4</sup> (kg/m <sup>2</sup> ):	200
f1: Outer leaf interrupted:	no
f2: Surface mass m <sup>4</sup> (kg/m <sup>2</sup> ):	200
f2: Outer leaf interrupted:	no
f3: Surface mass m <sup>4</sup> (kg/m <sup>2</sup> ):	200
f4: Surface mass m <sup>4</sup> (kg/m <sup>2</sup> ):	200
Correction Sigma_free/Sigma_forced for Monolithic Flanking Elements:	off
Correction Sigma_free/Sigma_forced for Lightweight Flanking Elements:	off
Alpha_k-Limit, MIN (-):	-
Alpha_k-Limit, MAX (-):	-
Ts-Limit for Elements, MIN (dB):	-
Ts-Limit for Elements, MAX (dB):	-
R'45° - R' (dB):	1.0
R'tr,s - R' (dB):	0.0
Level Difference DeltaL_fs (dB):	-

#### Room View



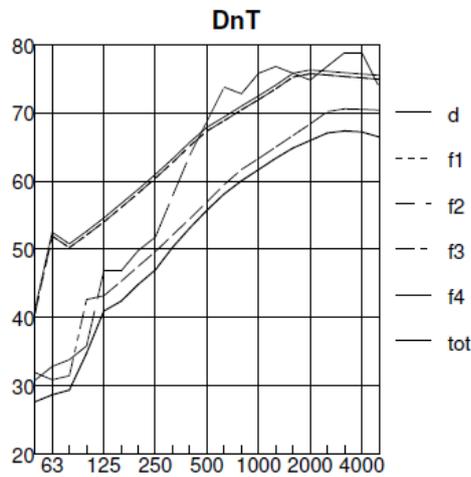
**Worksheet-Table**

Sending Room		Junctio	Receiving Room		DnT,w (0.5 s)		L'n,w			
M	t	Basic Element	Additional L	Type-N	Basic Element	Additional L	dB	%	dB	%
X	d	195 x 50 timber floor with independent ceiling and					53.9	50		
X	f1	BAST: brick (2000 kg/m³) 365 mm		18	BAST: brick (2000 kg/m³)		65.0	4		
X	f2	BAST: brick (2000 kg/m³) 365 mm		18	BAST: brick (2000 kg/m³)		65.0	4		
X	f3	BAST: brick (1200 kg/m³) 240 mm		17	BAST: brick (1200 kg/m³)		55.0	39		
X	f4	BAST: brick (2000 kg/m³) 365 mm		18	BAST: brick (2000 kg/m³)		65.6	3		
<b>Total:</b>							<b>51.6</b>	<b>100</b>		

**Airborne Sound per Element**

tau	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	DnT,w (0.5 s)
d	30.8	32.8	33.8	35.8	46.8	46.8	49.8	51.8	57.8	63.8	68.8	73.8	72.8	75.8	76.8	75.8	74.8	76.8	78.8	78.8	73.8	53.9
f1	40.6	52.0	50.3	52.1	54.0	56.1	58.2	60.4	62.8	65.2	67.4	68.9	70.5	72.0	73.6	75.3	75.8	75.6	75.4	75.2	75.0	65.0
f2	40.6	52.0	50.3	52.1	54.0	56.1	58.2	60.4	62.8	65.2	67.4	68.9	70.5	72.0	73.6	75.3	75.8	75.6	75.4	75.2	75.0	65.0
f3	32.0	30.9	31.5	42.7	43.2	45.3	47.5	49.7	52.1	54.5	57.0	59.5	61.7	63.3	65.0	66.7	68.4	70.2	70.6	70.5	70.4	55.0
f4	41.2	52.5	50.8	52.7	54.6	56.7	58.8	61.0	63.3	65.7	67.9	69.4	71.0	72.5	74.1	75.8	76.3	76.1	75.9	75.7	75.5	65.6
tot	27.7	28.7	29.4	34.8	41.0	42.4	44.9	47.0	50.3	53.2	55.8	58.1	60.1	61.7	63.3	64.9	66.0	67.1	67.4	67.2	66.5	51.6

**Resulting Diagram**



DnT,w = 58  
 DnT,w + C = 56  
 DnT,w + Ctr = 51

New partially independent ceiling

**BASTIAN® - Worksheet 1 [DM (1)]**

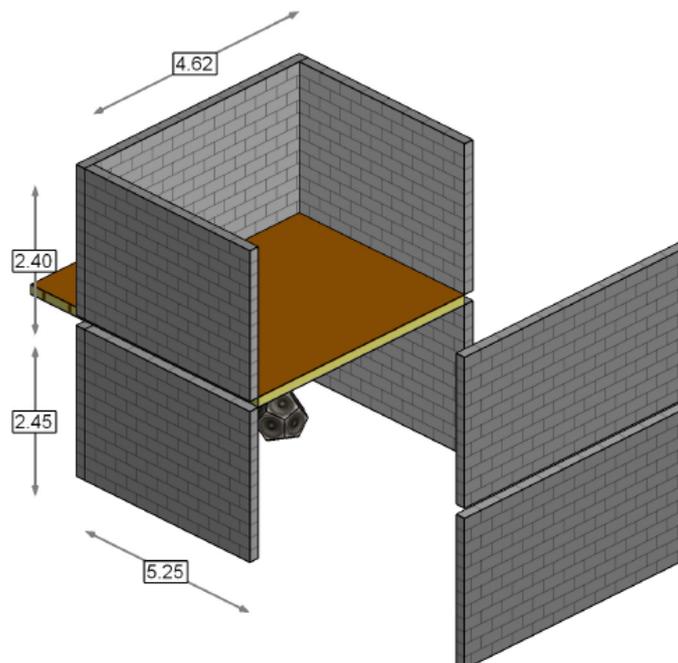
**Project Info**

Project Name: Slaithwaite wine bar  
 Project: 27 Britannia Road  
 Worksheet: Worksheet 1 [DM (1)]  
 Program: BASTIAN V 2.3

**Worksheet Configuration**

Calculation Model:	DM (1)
Perf. Param. Airborne Sound Transm. in Buildings:	DnT,w + Ctr
Perf. Param. Impact Sound Transm. in Buildings:	L'n,w
Perf. Param. Outdoor Sound Transmission:	R'45°,w
Reference Reverberation Time T0 (s):	0.5
f1: Surface mass m"4 (kg/m²):	200
f1: Outer leaf interrupted:	no
f2: Surface mass m"4 (kg/m²):	200
f2: Outer leaf interrupted:	no
f3: Surface mass m"4 (kg/m²):	200
f4: Surface mass m"4 (kg/m²):	200
Correction Sigma_free/Sigma_forced for Monolithic Flanking Elements:	off
Correction Sigma_free/Sigma_forced for Lightweight Flanking Elements:	off
Alpha_k-Limit, MIN (-):	-
Alpha_k-Limit, MAX (-):	-
Ts-Limit for Elements, MIN (dB):	-
Ts-Limit for Elements, MAX (dB):	-
R'45° - R' (dB):	1.0
R'tr,s - R' (dB):	0.0
Level Difference DeltaL_fs (dB):	-

**Room View**



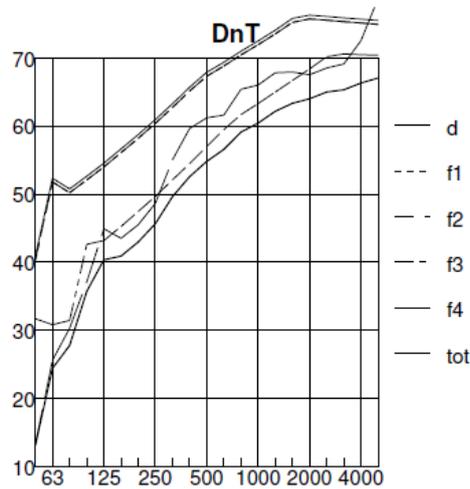
**Worksheet-Table**

		Sending Room			Junctid	Receiving Room			DnT,w (0.5 s) +		L'n,w			
M	t	Basic Element			Additional L	Type-N	Basic Element			Additional L	dB	%	dB	%
X	d	195 x 50 joists with 18mm deck,acc hangers, 2 x									53.0	55		
X	f1	BAST: brick (2000 kg/m³) 365 mm				18	BAST: brick (2000 kg/m³)				65.0	3		
X	f2	BAST: brick (2000 kg/m³) 365 mm				18	BAST: brick (2000 kg/m³)				65.0	3		
X	f3	BAST: brick (1200 kg/m³) 240 mm				17	BAST: brick (1200 kg/m³)				55.0	35		
X	f4	BAST: brick (2000 kg/m³) 365 mm				18	BAST: brick (2000 kg/m³)				65.6	3		
										Total:	50.7	100		

**Airborne Sound per Element**

tau	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	DnT,w (0.5 s) +
d	13.3	25.6	30.3	37.1	44.9	43.5	45.5	48.6	55.0	59.6	61.2	61.6	65.4	66.0	67.8	67.9	67.5	68.5	69.1	72.5	78.7	53.0
f1	40.4	51.8	50.2	52.1	54.0	56.1	58.2	60.4	62.7	65.2	67.4	68.9	70.5	72.0	73.6	75.3	75.8	75.6	75.4	75.2	75.0	65.0
f2	40.4	51.8	50.2	52.1	54.0	56.1	58.2	60.4	62.7	65.2	67.4	68.9	70.5	72.0	73.6	75.3	75.8	75.6	75.4	75.2	75.0	65.0
f3	31.8	30.9	31.5	42.7	43.2	45.3	47.5	49.7	52.1	54.5	57.0	59.5	61.7	63.3	65.0	66.7	68.4	70.2	70.6	70.5	70.4	55.0
f4	40.9	52.4	50.8	52.7	54.6	56.7	58.8	61.0	63.3	65.7	67.9	69.4	71.0	72.5	74.1	75.8	76.3	76.1	75.9	75.7	75.5	65.6
tot	13.2	24.5	27.8	35.8	40.4	40.9	43.0	45.7	49.7	52.6	54.9	56.6	59.1	60.5	62.2	63.4	64.0	65.0	65.3	66.3	67.1	50.7

**Resulting Diagram**



DnT,w = 57  
 DnT,w + C = 55  
 DnT,w + Ctr = 51

## Appendix 2. Noise Transmission Calculations

<b>27 Britannia Road, Slaithwaite</b>										
				18	38	45	54	60	64	66
<b>Internal noise transmission from the ground floor to first floor flat - independent ceiling</b>										
Octave Band Centre Frequency, Hz.	dB(A)	31.5	63	125	250	500	1000	2000	4000	8000
<b>Noise source level, dB</b>										
Noise source level, busy bar (Wine, Lindley) Saturday night, $L_{Aeq}$ dB	75	60	56	65	69	73	70	66	63	57
<b>Transmission between ground and first floor - independent ceiling structure</b>										
Calculated level difference ( $D_{nT}$ ) achieved by remedial floor, dB		24	29	38	47	54	61	66	67	72
Red values = extrapolated values										
Noise source level, busy restaurant reverberant level, $L_{Aeq}$ dB	75	60	56	65	69	73	70	66	63	57
Noise source level - $D_{nT}$	19	36	27	27	22	19	9	0	-4	-15
NR 25 curve		72	55	44	35	29	25	22	20	18
Resulting noise level, NR curve comparison (level below NR curve)		-36	-28	-17	-13	-10	-16	-22	-24	-33
NR value	15									
<b>27 Britannia Road, Slaithwaite</b>										
				18	38	45	54	60	64	66
<b>Internal noise transmission from the ground floor to first floor flat - partially independent ceiling</b>										
Octave Band Centre Frequency, Hz.	dB(A)	31.5	63	125	250	500	1000	2000	4000	8000
<b>Noise source level, dB</b>										
Noise source level, busy bar (Wine, Lindley) Saturday night, $L_{Aeq}$ dB	75	60	56	65	69	73	70	66	63	57
<b>Transmission between ground and first floor - independent ceiling structure</b>										
Calculated level difference ( $D_{nT}$ ) achieved by remedial floor, dB		13	18	38	45	54	60	64	66	71
Red values = extrapolated values										
Noise source level, busy restaurant reverberant level, $L_{Aeq}$ dB	75	60	56	65	69	73	70	66	63	57
Noise source level - $D_{nT}$	21	47	38	27	24	19	9	2	-3	-14
NR 25 curve		72	55	44	35	29	25	22	20	18
Resulting noise level, NR curve comparison (level below NR curve)		-25	-17	-17	-11	-10	-16	-20	-23	-32
NR value	15									

## Appendix 3. Installation Information

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### Installation - RB1 Ceiling



8

- Mark the underside of joists at 450mm centres to indicate the positioning of Gypframe RB1 Resilient Bars (centres will be 400mm for 2400mm long board).
- Fix Gypframe RB1 Resilient Bars through their flange to each joist using 36mm Gyproc Drywall Screws.
- If the resilient bars are not long enough to span the ceiling, join by nesting together under a joist and a screw through both flanges.



9

- Cut Gypframe RB1 Resilient Bar noggings to fit between the rows of bar at the ceiling perimeter and screw-fix to the joist.



10

- Lay Isover General Purpose Roll (100mm) between joists to rest on the resilient bars.
- Fix base layer board to the resilient bars using appropriate length Gyproc Drywall Screws with the long edge of boards at right angles to the resilient bars.
- Insert screws at 230mm maximum centres in the field of boards, and 150mm maximum centres at board ends.

Technical support: T 0844 800 1991 F 0844 561 8816 E [bgtechnical.enquiries@bpb.com](mailto:bgtechnical.enquiries@bpb.com)



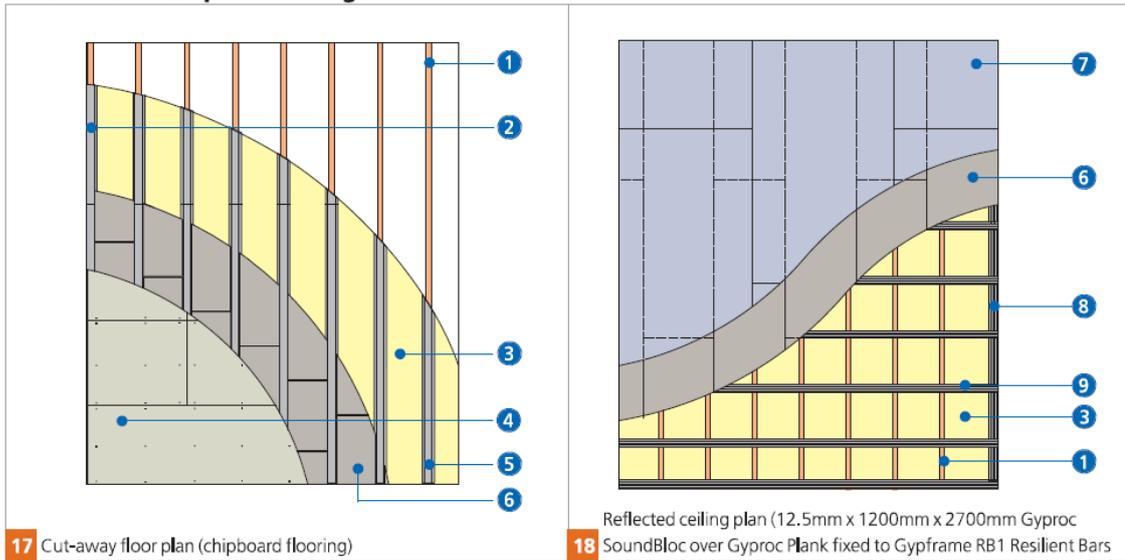
11

- Fix face layer board through to all resilient bar supports using appropriate length Gyproc Drywall Screws. Insert screws no closer than 10mm from bound board edges and 13mm from cut edges. Stagger board joints in the second layer relative to the first (see **Junction details**).

**NB** Select length of fixing to provide a nominal 10mm penetration into the Gypframe RB1 Resilient Bar supports. Ensure no contact of screw with timber joists.

Technical support: T 0844 800 1991 F 0844 561 8816 E bgtechnical.enquiries@bpb.com

**Junction details - plan drawings**



- |                                       |                                      |   |
|---------------------------------------|--------------------------------------|---|
| 1 Solid timber joists                 | 5 Gypframe SIF1 / SIF4 Floor Channel | 8 Gypframe RB1 Resilient Bar noggings at room perimeter |
| 2 Gypframe SIF2 Floor Channel         | 6 Gyproc Plank                       | 9 Gypframe RB1 Resilient Bar                            |
| 3 Isover General Purpose Roll (100mm) | 7 Gyproc SoundBloc                   |   |
| 4 Chipboard flooring                  |                                      |   |