Chartered Building Consultancy

Acoustic South East

Noise Impact Assessment – Permitted Development

Report by: Josh Robinson AMIOA

Date: 12/10/2026

Project: J4282

Issue 1

Site: **81 Chapel Road – Permitted Development**

Client: **Newlands Property**

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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Report by: Josh Robinson AMIOA
Checked by: Scott Castle BSc(Hons) MCIEH CEnvH MIOA

Issue 1	12/10/2026	Original Issue

1 Introduction and Executive Summary

Acoustic South East have been appointed to undertake an acoustic assessment in support of a change of use planning application being made to Adur & Worthing District Council. The site is located at 81 Chapel Road, Worthing, BN11 1HU. The proposed changes would see the 1st and 2nd floors changed from a commercial space into a residential demise.

As a permitted development application, this report only considers and assesses commercial sound sources.

Standards and guidance referenced for this assessment include:

- ProPG2017- Planning & Noise, Professional Practice Guidance on Planning & Noise
- Acoustics Ventilation and Overheating Guidance, January 2020
- BS8233:2014 – Guidance on Sound Insulation and Noise reduction for Buildings.
- BS4142:2014 – Methods for Rating and Assessing Industrial and Commercial Sound.
- BS4142:2104+A1:2019 Technical Note – March 2020
- World Health Organisation Guidelines for Community Noise (1999, revised 2018)
- Approved Document E of the Building Regulations 2010 (2015 amendments)
- Planning Noise Advice Document, Sussex, November 2023

A class 1 sound level meter was installed at a representative location at the rear of the existing property. This was to identify the soundscape and incident sound levels on the rear facade between the 18th to the 23rd of September 2026

The soundscape at the rear consists mostly of the of the road traffic noise from Chapel Road.

For the daytime period, the average measured sound pressure levels were 61dB $L_{Aeq,\ 16\text{-}hour}$ and 49dB $L_{Aeq,\ 8\text{-}hour}$ during the night time period.

For permitted development, only commercial sound sources are considered. The commercial units assessed are two Daikin air conditioning units. They have a combined sound power level of 69 dB(A). When assessed at the window of the 1st and 2nd floor of 81 Chapel Road, the nearest NSR (noise sensitive receptor), the sound pressure level was predicted to be 51.8 dBA at the rear Kitchen and 48.6 dBA at the rear Bedroom.

The initial site risk assessment consistent with the approach in ProPG2017 is that the risk associated with developing the site is low.

The assessment concludes that the development is capable of being converted when assessed against commercial noise. The indoor sound criteria of BS8233:2014 can be achieved with standard double glazing and acoustic trickle vents. The required sound reduction for these would be R_w+C_{tr} ≥27dB and D_{new} ≥33dB respectively.

Recommendations have been made which should achieve the relevant conversion criteria set out by Approved Document E for the separating floor between the ground floor commercial unit and the 1st floor residential unit.

Based on the information presented, if appropriate measures are implemented, planning permission should not be withheld on noise grounds.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

The proposal is for a change of use, prior approval planning application. This seeks to convert the 1st and 2nd floors of the existing property from commercial use to a residential property.

The ground floor commercial unit is being submitted in a separate planning application. It is currently empty due to the works.

Attached to the rear of the 1st floor property are two wall mounted Daikin air conditioning units which serve the existing ground floor commercial unit. These are to be retained but are currently not functioning.

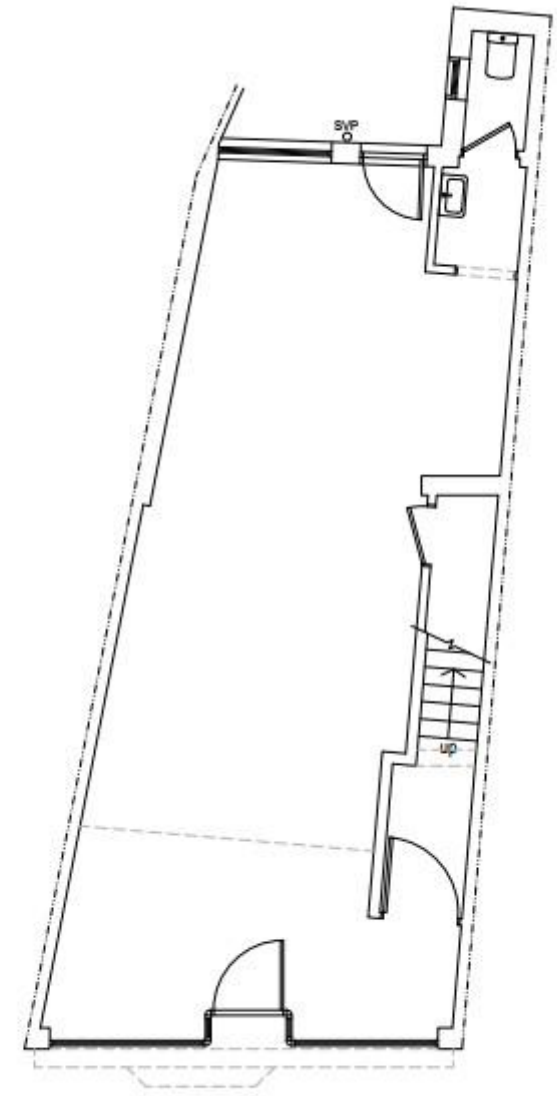


Figure 1. Existing ground Floor Drawing Plan – Commercial Unit



Figure 2. Proposed Drawings - Plan

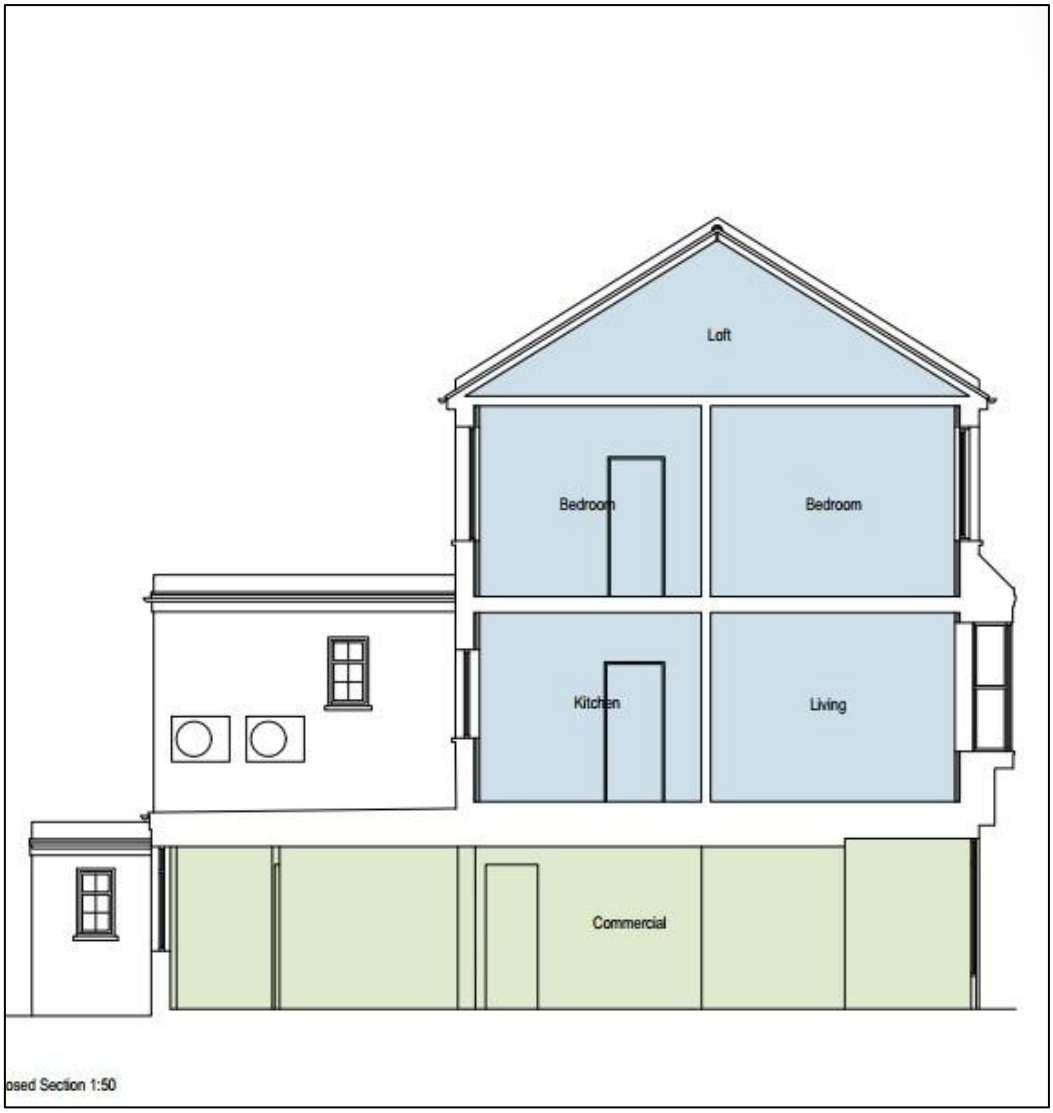


Figure 3. Proposed Sections

2.2 Location

The site is located at 81 Chapel Road, Worthing, BN11 1HU. The site is neighboured by other commercial units on the ground floor and residential units on the 1st floor.



Figure 4. Site Location

2.3 Site Soundscape

The sound of road traffic from Chapel Road was heard constantly at the front façade. At the rear however, it was reduced considerably albeit, still audible. The plant to the rear of the property is currently not functioning.

2.4 Relevant Standards and Polices

2.4.1 BS8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings

Table 4 of BS8233 provides the following guideline values:

Activity	Location	Period of day	
		07:00-23:00	23:00-07:00
Resting	Living Rooms	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 1 BS8233:2014 Criteria

Please note this relates to continuous and anonymous sound and a soundscape which has acoustic character or features, which may draw a listener's attention, will typically require either the use of a worst-case hour or, a reduced internal criterion.

2.4.2 National Planning Policy Framework (NPPF) 2026

P1: Planning for clean and safe places

1. To support efforts to avoid and mitigate risks from natural and man-made hazards, minimise levels of pollution and create clean, liveable and safe places for people to live, work and visit, development plans should:

a. Allocate land for development where, taking into account the potential for mitigation:

iii. Development proposals will not cause unacceptable levels of pollution, either alone or in combination with other pollution sources, taking into account communities which may be particularly vulnerable to its effects, such as children and older people, as well as habitats and species which may be vulnerable to pollution;

iv. The intended uses will not place unreasonable restrictions on the operation of existing businesses, community facilities, public services, defence and security activities

b. Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area (such as by identifying opportunities for strategic nature-based solutions);

P3: Living conditions and pollution

1. Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area (including where certain groups could be particularly vulnerable to its effects, such as children and older people).

2. Within this context development proposals should:

a. Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions

b. Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting);

d. Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas (those areas that have remained relatively undisturbed by noise from human sources and are prized for their recreational and amenity value for this reason);

3. In applying this policy, it should be assumed, unless there is clear evidence to the contrary, that separate regulatory regimes for the control of pollution will operate effectively, as set out in policy DM7. This means that it will be appropriate to take into account emissions limits set through those other regimes

P4: Impact of development on existing activities

1. Existing businesses, community facilities, public services and defence and security activities should not have unreasonable restrictions placed on their current or permitted operation as a result of development being approved after they were established. This means that development proposals should be capable of being integrated effectively with existing business, community and public service activities and infrastructure in their vicinity (including, but not limited to, uses such as pubs, music venues, places of worship, sports clubs, blue light services, defence, electricity network infrastructure and industrial and waste sites).

2. Where the operation of an existing activity could have a significant adverse effect on a proposed new development in its vicinity, development proposals should:

a. Identify the nature of the potential impacts, informed where necessary by early discussions between the applicant (i.e. the ‘agent of change’) and those existing uses which could be affected by the proposal to inform the scope for mitigation; and

b. Be able to demonstrate that suitable mitigation can be provided before first occupation of the development, if it is to be acceptable. Planning conditions or obligations should be used to secure agreed mitigation measures.

3. This policy applies to new development involving changes of use of land and property, as well as to new construction, and includes situations where new development may interfere with the operation of electronic communications networks. Both lawful current and permitted levels of operation of existing activities should be taken into account when applying this policy.

2.4.3 ProPG: Planning & Noise: 2017

Planning guidance (ProPG2017) relates to new residential development and airborne transportation noise, which includes exposure to road traffic, railway and aviation noise. Whilst ProPG, 2017 generally mirrors the requirements of BS8233:2014 and the World Health

Organisation Guidelines, 1999, it goes further in setting a limit for inside bedrooms for L_{Amax} events and specifically, no more than 10 L_{Amax} events per night time period above 45dB(A).

Although the dominant sound sources are not transport related, we have used the criteria for L_{Amax} as the it is often the preferred target by Local Authorities. The internal bedroom L_{Amax} values will be used in accordance with ProPG2017. An initial site risk assessment is provided within the report.

2.4.4 Planning Noise Advice Document – Sussex, November 2023

A planning noise advice document which all Sussex local authorities have contributed to and signed up to (including Arun District Council) remains relevant. The guidance document has been followed in respect of measurement parameters and report presentation of data.

2.4.5 ADO Noise Assessments – Overheating Condition

ADO Criteria

For new dwellings Approved Document O of the Building Regulations details ways of reducing the risk of overheating.

Assessment criteria for the overheating condition (at times when cooling is required) have been adopted based on the criteria in Approved Document O:

Noise

3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).

b. 55dB L_{AFmax}, more than 10 times a night (between 11pm and 7am).

Figure 5. ADO Criteria

2.4.6 BS4142:2014-A1:2019 - Methods for rating and assessing industrial and commercial sound

The BS4142:2014 document provides a means of assessing the impact of industrial or commercial sound upon nearby noise-sensitive receptors, including residential properties. However, it should be noted that this application does not fall under the scope of BS4142:2014. Prior approval applications only consider commercial sound sources which affect the proposed development, whereas BS4142:2014 is for the rating and assessment of commercial sound created or generated by a given proposal or scheme upon residential premises.

As this application is not proposing to introduce any new commercial sound sources, using BS4142:2014 to assess the ambient commercial sound is inappropriate.

Section 1.3 (A1) of BS4142 states that:

> A1 The methodology set out in Clauses 7, 8, and 9 of this standard is not intended to be used to assess the extent of the impact at indoor locations. Internal sound levels can be taken into account as outlined in Clause 11. A1
>
> A1 The standard is not intended to be applied to the assessment of indoor sound levels. A1

Section 1 of the BS4142:2104+A1:2019 Technical Note states:

> BS 4142 **'is not intended to be applied to the assessment of indoor sound levels'** (Subclause 1.3) and cannot, therefore, be used for façade design. Whilst BS 4142 can be used to assist in the determination of the likelihood of an adverse or significant adverse impact, guidance on internal design criteria and mitigation is provided elsewhere. BS 8233:2014[4], for example, provides guidance on indoor ambient noise levels, although recognition should be given to the associated scope and/or limitations.

2.5 Compliance With ADE E1

Approved Document E of the Building Regulations 2010 specifies minimum performance values of Weighted Standardised Level Difference ($D_{nT,w} + C_{tr}$) for airborne noise transmission through party floors and walls and Weighted Standardised Sound Pressure Level ($L'_{nT,w)}$ for impact sound transmission through a floor.

It should be noted that with airborne sound insulation, it is the level difference between rooms that is measured. The higher the result the better the insulation.

ADE 0.8 makes comment about mixed commercial and residential tenure.

> **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.

A summary of the acoustic requirements, for a conversion property, are as follows:

Requirements of:	Element	Airborne Sound Insulation ($D_{nT,w} + C_{tr}$)	Impact Sound Insulation ($L_{nT,w}$)
Commercial/Dwelling*	Floor	≥50dB	N/A
B-regs Dwelling/Dwelling	Floor	≥43dB	≤64dB
B-regs Dwelling/Dwelling	Wall	≥43dB	N/A

Table 2. Building Regulations Noise Criteria

** For many other projects the Local Authorities in Sussex require that the basic ADE target is exceeded when there is a commercial unit directly adjacent to a dwelling. In this case the new build Building Regulations+5dB target should be sufficient (ground floor units are most likely going to be retail units and will not open late)*

This approach is consistent with the Planning Noise Advice Document, Sussex (Nov) 2023

3 Methodology

3.1 Survey Location

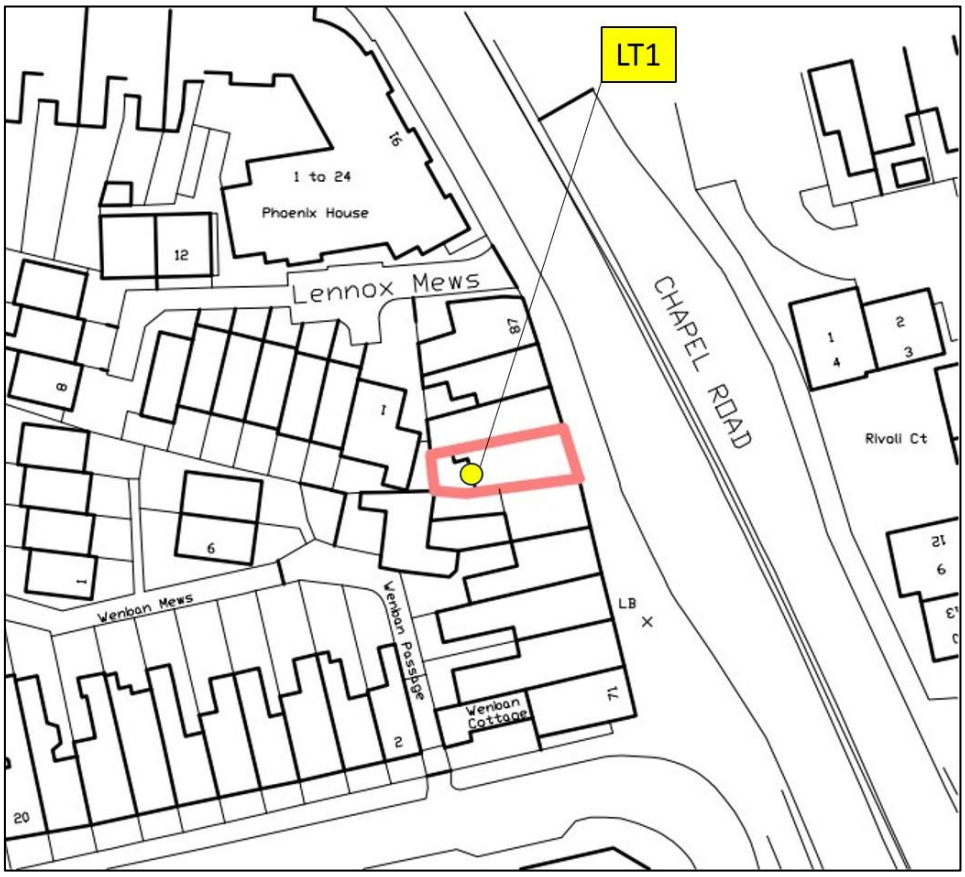


Figure 6. Measurement Positions.

3.2 Sound Survey Details

A survey of the site soundscape was carried out between 18th to the 23rd of September 2026. This was to measure the existing sound pressure levels experienced by the site. All noise levels in this report are fast time weighted and A-weighted levels, unless stated otherwise**.** The sound level meter was set to a 1-minute resolution.

As the application is a prior approval and only commercial sound sources are considered, no long-term survey was placed at the front of the building.

Please note that the sound pressure levels measured by the survey were next to a façade. They have therefore been adjusted to be freefield by subtracting 3dB from the measured results.



Figure 7. LT1

LT1 - Rear of Property.	
Survey(s) carried out by	Josh Robinson AMIOA
Equipment Used	Svantek 971A Class 1 Sound Level Meter. Mounted on tripod. Serial No. 159493
	Norsonic 1251 Calibrator. Serial No. 31698
Location of Microphone	4.7m from ground level, 0.2m from façade. W3W: ///deep.shakes.fumes
Duration of Survey	18th to the 23rd of September 2026

Table 3. Survey Details



Figure 8. 1st Floor Air Conditioning Units (non-functional)

4 Results of the Unattended Sound Survey

4.1 Long term Noise Survey Results

The results obtained from the rear façade are seen in Table 4 below. Only complete daytime or night time periods have been presented from the dataset.

4.1.1 Review of Data

Day	Date	$L_{Aeq\ 16/8Hr}$		11th L_{Amax}		Sound Reduction		
		Day	Night	1 min	2min	Day 16Hr	Night 8 Hr	$L_{Amax,\ 1min}$
Fri	18/10	-	48.8	44.7	44.7		19	0
Sat	19/10	57.5	50.4	44.8	44.7	22	20	0
Sun	20/10	56.8	49.1	45.5	45.5	22	19	0
Mon	21/10	58.6	49.5	44.7	44.6	24	20	0
Tue	22/10	60.2	47.3	44.8	44.8	25	17	0
Wed	23/10	70.4	-	-	-	35	-	-
AVERAGE:		**61**	**49**	**45**	**45**	**26**	**19**	**0**

Table 4. Results LT1

In the table above, the required daytime sound reduction (SRI) is the predicted external free field sound pressure level minus 35dB as per the Table 4 values in BS8233:2014 and the same for the night time values (albeit minus 30dB). Please note that this survey does not contain the commercial sound sources as the units are currently not in use.

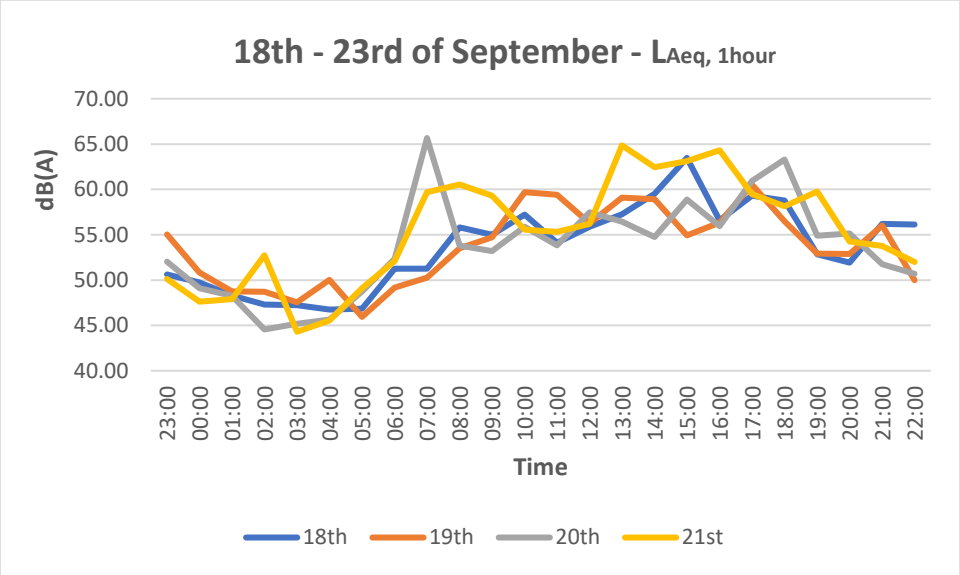


Figure 9. $L_{Aeq,\ 1\text{-}Hour}$ – 1 Hour Day time Period

5 Commercial Sound Sources

The commercial sound sources on site comprise of two Daikin air conditioning units.

These are directly fixed to the wall of the 1st floor of the existing property via metal L brackets without any anti -vibration mounts. It is understood that these will be repaired and utilised for the ground floor commercial premises.

The details of the units are below:

- Daikin RX35GV1B – Sound Power Level – 63 dBa
- Daikin RX35GV1B9 – Sound Power Level – 63 dBa

The sound power level data was obtained from the AC unit's installation manual SiBE06-708_C.

Given the units are side by side and have the same sound power level, these can be assessed as a source of 66dBa. In addition, 3dB will be added to account for the close proximity of the wall. While the floor is also in close proximity, the formula used in Section 5.1 below is for hemispherical propagation and already takes one reflecting plane into account.

The total sound power of commercial noise will be 69 dBA.

5.1 Commercial Sound at nearest NSR

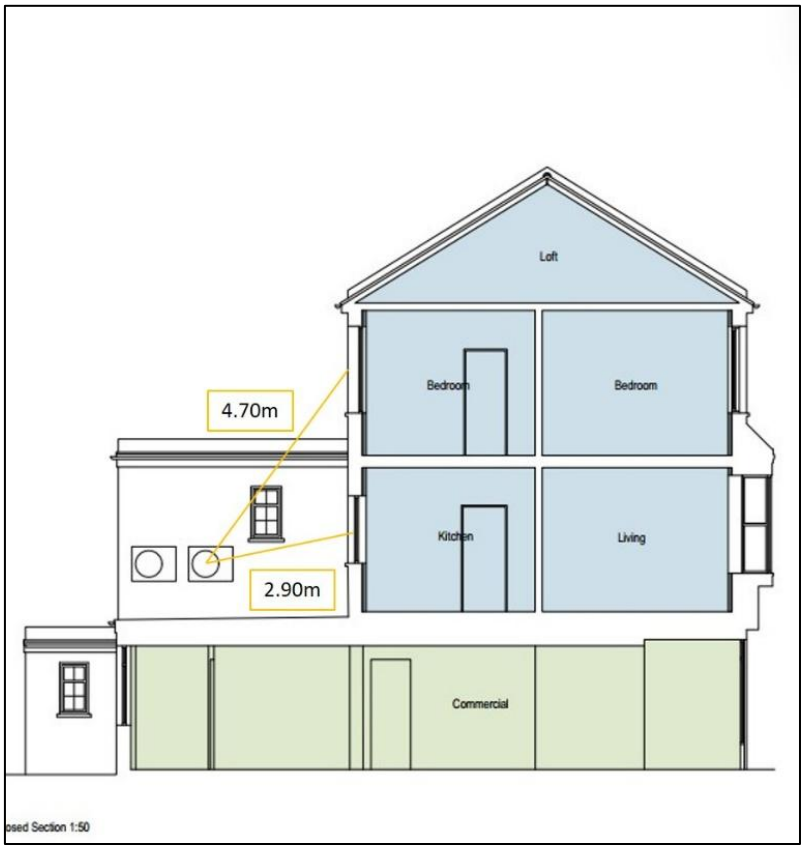


Figure 10. Nearest ASHP to Nearest NSR

As the figure above shows, the nearest NSR windows are the 1st Floor Kitchen window at 2.9m away. Which is the closest AC Unit, and the rear 2nd floor bedroom which is 4.7m away.

To ascertain the expected sound pressure level at the rear 2nd floor bedroom window the following formula has been used:

For above a reflecting plane (hemi-spherical radiation):

$$L_p = L_w - 20\log(r) - 8$$

Where r is the radius / distance from source to receptor.

Kitchen:

$$69 - 20\log(2.9) - 8 = 51.8 \text{ dBa}$$

Rear 2nd Floor bedroom:

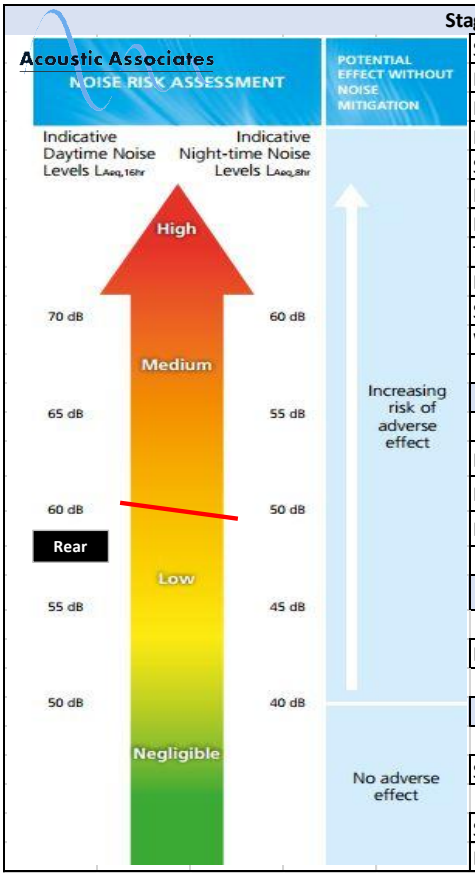
$$69 - 20\log(4.7) - 8 = 47.6 \text{ dBa}$$

The kitchen experiences the worst-case sound pressure level at 51.8 dBa.

6 ProPG2017 Assessment

6.1 Initial Site Risk Assessment – ProPG2017

In accordance with the requirements of ProPG2017, an initial site risk assessment has been carried out. The results in Figure 10 below indicate a low risk with regard to noise for the development of the site on the Rear facades. It should be noted that this initial assessment only considers the full Daytime and Night time periods.



Stage 1. Initial Site Risk Assessment	
Site:	81 Chapel Road, Wothing
Date:	6th October 2026
Individual	Josh Robinson
Proposal	Proposed Residential
Survey or Prediction	Survey
Freefield Survey	Yes
Instrumentation used	Svantek 971A. Serial 31698
Typical/Worst case 24 hour period	Measured
Location Assessed (W3W)	deep.shales.fumes
Subjective Noise sources at site	Road Traffic Noise
Weather conditions	Dry, Sunny, negligible wind
Result	
No Mitigation Measures	
Daytime ($L_{Aeq,\ 16\ hour}$)	60.7 dB
Night ($L_{Aeq,\ 8\ hour}$)	49.0 dB
Night L_{AMax} Events above 45dB(A)	0
Outcome	
Level of Risk Posed	Low
Next Steps	
Stage 2 Full Assessment	No
Signed Off by	Scott Castle
Date	6th October 2026

Figure 11. ProPG2017 Initial Site Risk Assessment

7 Mitigation Measures

7.1 Required Sound Reduction of External Façade

As permitted development only considers commercial noise, the predicted levels of 51.8 dBa and 47.6dBA from Section 5.1 will be used for the assessment.

As the operation of the units is unknown (due to a new tenure of the commercial unit) an $L_{Aeq, 1\text{-hour}}$ has been used.

As ProPG:2017 requires no more than ten events exceeding 45dB L_{Amax} measured internally, it is not possible to assess the ProPG condition as the sound pressure level is predicted from the unit's data sheet. While it is not commercial sound, The survey data shown in Table 4 show that no mitigation would be necessary to meet the ProPG requirement for environmental sound.

The required SRI for night time will be taken as the highest required SRI. Given the commercial unit is likely to close before the night time period (23:00-07:00) it is unlikely the AC units will be in operation. For the purposes of a robust report however, both day and nighttime predicted sound pressure levels have been assessed.

It is relevant to note that living room and bedroom calculations differ, as whilst living rooms are subject to only the daytime predicted sound pressure levels, bedrooms must consider both daytime and night time continuous sound pressure levels as well as L_{Amax} events during the night to protect sleep.

The required daytime SRI is the predicted external free field sound pressure level minus 35dB as per the Table 4 values in BS8233:2014 and the same for the night time values (albeit minus 30dB).

The SRI requirements are shown in as shown below in Table 5 below.

Location	Worst Case Daytime $L_{Aeq, 1\text{-Hour}}$	Worst Case Nighttime $L_{Aeq, 1\text{-Hour}}$	SRI Required for Daytime	SRI Required for Nighttime	Daytime SRI +5dB (for non-continuous anonymous sound)	Nighttime SRI +5dB (for non-continuous anonymous sound)
1st Floor Kitchen	51.8	51.8	17	22	22	27
2nd floor Bedroom	47.6	47.6	13	18	18	23

Table 5. Façade Sound Reduction for Commercial Noise

As permitted development only considers commercial noise the highest required SRI is 22dB during the daytime period and 27dB for the nighttime period. As the sound will not be continuous anonymous, a 5dB uplift to the Table 4 BS8233 criteria has been applied.

Comparing these results to those of the measured survey shown in Table 4, The measured ambient $L_{Aeq,16\text{-Hour}}$ is significantly higher than the predicted commercial sound pressure level. The SRI needed to mitigate the measured ambient daytime $L_{Aeq, 16\text{-Hour}}$ would be 26dB at the rear, with likely further elevated SRIs needed at the front facade. It is strongly advised to provide a building SRI that is capable of mitigating this to protect future resident's amenity.

7.2 SRI - Specifications

Table 5 shows that the highest sound reduction required for commercial noise is 27dB for the 1st floor kitchen and 23dB for the 2nd floor bedroom. In order to achieve this, the effect of both the glass, wall and ventilation were taken into account and adjusted until an acceptable internal sound pressure level was achieved. Please see the Appendix for the Insul data sheet outputs.

Using the modelling software, Insul, the predicted performance of a masonry cavity wall was calculated. The assumed building makeup was: 100mm brick with a 100mm cavity, 50mm of Rockwool (33kg/m^3) 100mm brick with a 12.5mm layer of plasterboard.

Two Simon SL trickle vents were used in the assessment for the bedroom while one was used for the kitchen. Each have an equivalent area of 2500m^2. The glazing used in the assessment was Velfac 4/16/4mm double glazing. The predicted SRI for the kitchen and bedroom is 27dB, covering both day and night.

The glazing and ventilation used in construction should provide at least the same level of acoustic performance or better. Please see the Section below for the glazing and ventilation specifications used in the assessment.

7.2.1 Glazing and Ventilation Specification

The octave band attenuation provided by the glazing and vents used in the assessment can be seen below:

Velfac 4/16/4mm Rw+Ctr = 27 (32-5) Attenuation values (from Manufacturer)						
Octave Band	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Attenuation	-20	-18.9	-28.5	-37.5	-38.7	-34.9

Simon Acoustic SL Trickle Vent D_{new} = 33 (open) Attenuation values (from Manufacturer)						
Octave Band	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Attenuation	-34.8	-35.2	-31.2	-31.9	-34.5	-39.9

Table 6. Ventilation & Double-Glazing Octave Band Information.

The data provided here was obtained from the manufacturer.

Summary of minimum sound reduction required:

- Bedroom
  - Glazing $R_w+C_{tr} \geq 27dB$
  - Vents $D_{new} \geq 33dB$

7.3 Required SRI – Road Racing Rooms

It should be highlighted that the rooms on the front façade will require a higher SRI than specified in Section 7.2 in order to mitigate the road traffic noise from Chapel Road. While road noise is outside the scope of a permitted development application, it is strongly advised to consider the impact of this on future tenants, especially with a measured $L_{Aeq,\ 16\text{-}Hour}$ of 61 dB at rear of the property, indicating an even higher sound exposure to the front.

7.4 Vibration

As the AC units are not in operation currently it would be prudent to consider any sound transfer into the building via vibration.

It was noted that the AC units are mounted to wall of the property using metal 'L' brackets. There are no current signs of any existing anti-vibration mounts.

It is recommended to remount the units with anti-vibration mounts to mitigate potential sound internal noise. The same should be applied to any cables/piping that is directly fixed to the structure.

8 Overheating

It should be noted that a simplified overheating assessment was conducted for the rear facades only. As only commercial noise is to be considered, no measured data for the front façade is available. For the rear of the property, it has been determined that windows would be openable on the basis of acoustics. This is for client information only and the report is not recommending that openable windows should be relied upon to mitigate overheating.

Simplified Overheating Assessment						
Room	**Night time $L_{Aeq,8\text{-}Hour}$**	**Above 50dB?**	**Attenuation from Open Window (10dB)**	**Open Window based on $L_{Aeq,\ 8\text{-}Hour}$**	**Number of L_{Amax} events based on Open Window (10dB)**	**Openable Windows?**
Rear Facades	49	N	39	Yes	0	Y

Table 7. Simplified Overheating Assessment

9 Building Regulations – Approved Document E – Resistance to the Passage of Sound

9.1 Existing Construction

Please note that the existing ground to 1st floor construction details are not known. It is assumed that the existing floor is comprised of a plywood boarding/skin over floor boards on timber joists.

Some elements of the existing flooring/ceiling of the 1st floor may well achieve a similar result if its construction is similar to the panels of the recommendation, i.e. the original floorboards.

If any existing flooring/ceiling elements are to be retained and made good, care should be taken to examine the build-up and ensure it's of a similar detail to the recommended build up prior to any works being undertaken. It should be altered to be as similar as the recommended detail as possible.

If the existing or new floorboards are butt-joined then a plywood skin or similar should be laid over the top to cover any cracks.

9.2 Proposed Separating Floor– Commercial to Residential

9.2.1 Recommended Separating Floor Detail

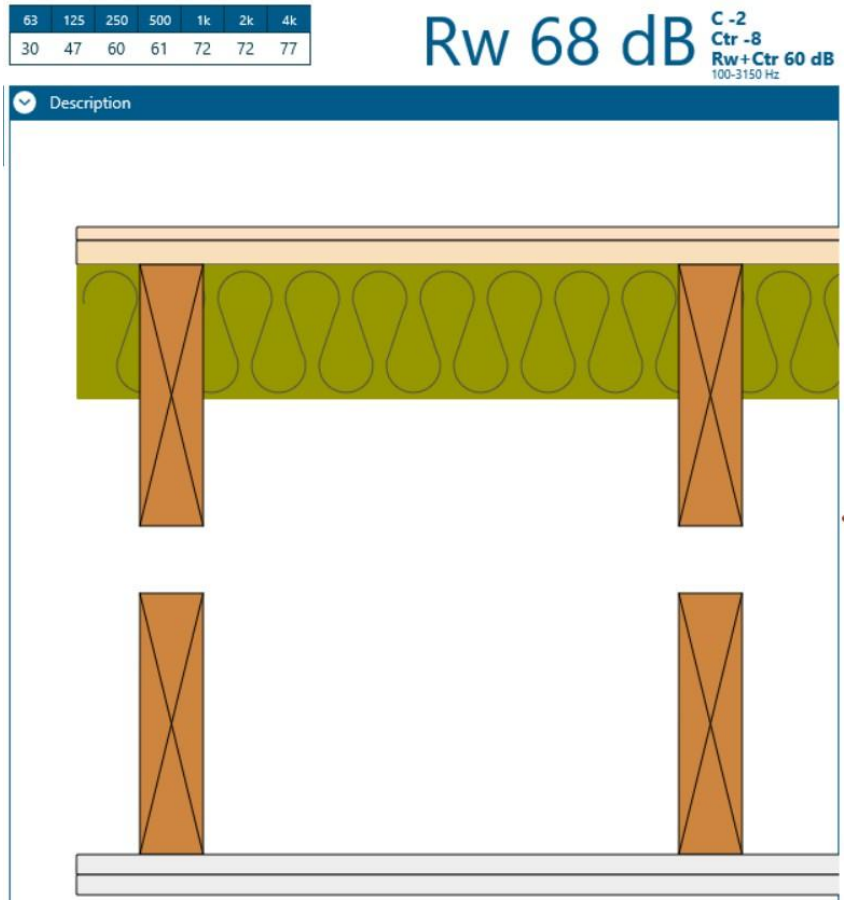


Table 8. Proposed Separating Floor – Independent Joists

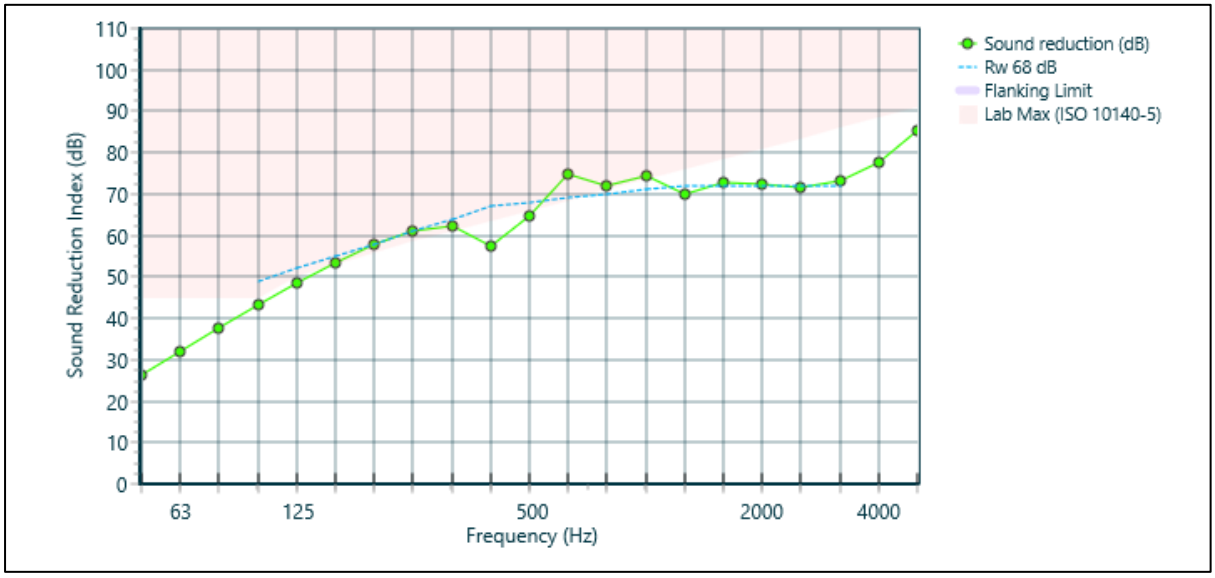


Figure 12. Proposed Separating Floor – Predicted Frequency Response

Recommended Separating Floor (Independent Floor Joists)

- Panel 1: 1 x 10 mm Plasterboard + 1 x 18 mm Pine
- Frame: Separate Joists (194 mm x 47 mm), Joist spacing 400 mm, Void Depth 438 mm + 100 mm Fibreglass (10kg/m3) 60mm
- Panel 2: 2 x 15 mm Gyproc Wallboard 15mm

Please note that any construction detail should be checked by other consults for other required building specifications (fire safety, structural integrity etc.)

A calculation has been made to estimate the $D_{nT,w} + C_{tr}$ which uses the formula below:

$$R_{w+}C_{tr,\,est} = R_{w+}C_{tr} - 5 \text{ (this is to correct for flanking conditions)}$$

$$D_{nT,w} + Ctr = R_{w+}C_{tr,\,est} - 10*\log\,(s*t/v) - 8$$

S=Surface area of separating element, T=Reverberation time of receiving room, V=Volume of receiving room.

Separating Floor:

$$60 - 5 = 55$$

$$55 - 10*\log(20.1*0.5/54.3) - 8 = 54.3\ D_{nT,w} + C_{tr}$$

This shows the estimated $D_{nT,w}$ +C_{tr} of the recommended construction details. As the calculation shows, the predicted $R_{w+}C_{tr}$ of the recommended detail should provide a suitable SRI for airborne sound to achieve the enhanced criteria of ADE with a 4dB safety margin.

9.2.2 Alternative Floor/ Ceiling Detail

An alternative to the recommended detail is a suspended ceiling. This option is commonly used in commercial premises and the expected performance of this has been outlined below

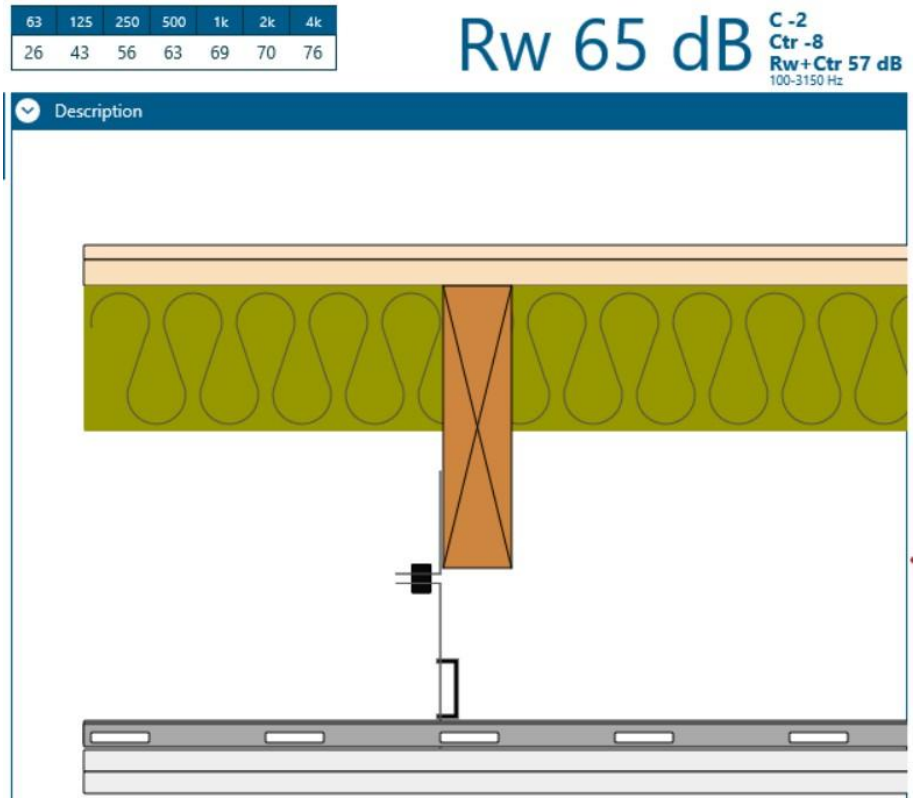


Figure 13. Alternative Separating Floor – Suspended Ceiling

Alternative Separating Floor (Suspended Ceiling)

- Panel 1: 1 x 10 mm Plasterboard + 1 x 18 mm Pine
- Frame: Solid Joist with Gyproc acoustic hanger (194 mm x 47 mm), Stud spacing 400 mm, Void Depth 307 mm + 100 mm Fibreglass (10kg/m3) 60mm
- Panel 2: 2 x 15 mm Gyproc Wallboard 15mm

Please note that any construction detail should be checked by other consults for other required building specifications (fire safety, structural integrity etc.)

A calculation has been made to estimate the $D_{nT,w} + C_{tr}$ which uses the formula below:

$$R_{w+}C_{tr,\,est} = R_{w+}C_{tr} - 5 \text{ (this is to correct for flanking conditions)}$$

$$D_{nT,w} + Ctr = R_{w+}C_{tr,\,est} - 10*\log(s*t/v) - 8$$

S=Surface area of separating element, T=Reverberation time of receiving room, V=Volume of receiving room.

Separating Floor:

$$57 - 5 = 52$$

$$52 - 10*\log(20.1*0.5/54.3) - 8 = 51.3\ D_{nT,w} + C_{tr}$$

This shows the estimated $D_{nT,w}$ +C_{tr} of the recommended construction details. As the calculation shows, the predicted $R_{w+}C_{tr}$ of the recommended detail will provide a suitable SRI for airborne sound to achieve the enhanced criteria of ADE albeit with a reduced safety margin of only 1dB.

Using the independent floor joists recommended in section 9.2.1 is strongly advised as 1dB is easily within the margin of error of that could be introduced by flanking or test conditions. See below.

9.2.3 Flanking Sound

Care should be taken to minimise flanking sound as much as possible. The total sound insulation provided by the party floor relates to the construction of the flanking walls as well as the separating floor itself. If not detailed correctly flanking sound transmission will likely cause a sound test fail regardless of the floor construction.

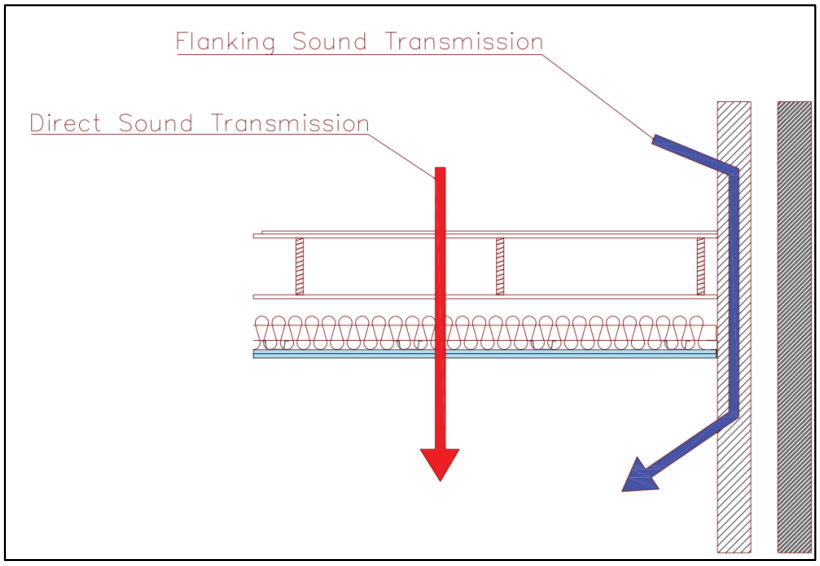


Figure 14: Flanking Sound and Direct Sound Transmission paths

The floor detail described in section 9.2.1 is sufficient to meet the requirement of ADE for direct sound transmission between the floors. However, sound energy transmitted up the walls and then re-radiated as airborne sound at first floor level may impact the $D_{nt,w}$ + C_{tr} results.

In order to prevent this, it is recommended that a wall treatment be applied to either the perimeter walls of the ground floor commercial area or the first-floor flat (whichever is more convenient). The Gyplyner Single system, with a 30mm void would be suitable.

Section 3.107 of Approved Document E states that inner leaf of external wall which is continuous past the timber joist based separating floor should have a surface mass of 375kg/m^2. This is generally equivalent to 9" Brickwork or Dense Aggregate Blockwork. If it does not meet this criterion then it should be lined. Wall lining details are below.

The full details would be:

- Existing masonry wall
- Gyplyner Single
- 30mm min Void
- 25mm Insulation
- 2x 12.5mm Fireline/Soundbloc

Specific Products - Gyplyner Single

https://www.british-gypsum.com/white-book-system-selector/systems-overview/linings/gyplyner-universal-wall?tab0=0

If the wall lining is fitted at ground floor level it is essential that the wall treatment does not pass through the suspended ceiling. The suspended ceiling should continue to the outer existing masonry wall with the wall lining constructed to meet it. This is shown in Figure 15: Wall Lining Suspended Ceiling Junction below.

Only resilient connections between the wall system and the existing masonry wall should be made. Any mechanical bridging, i.e. screws between the wall system and masonry wall, will re-introduce flanking paths.

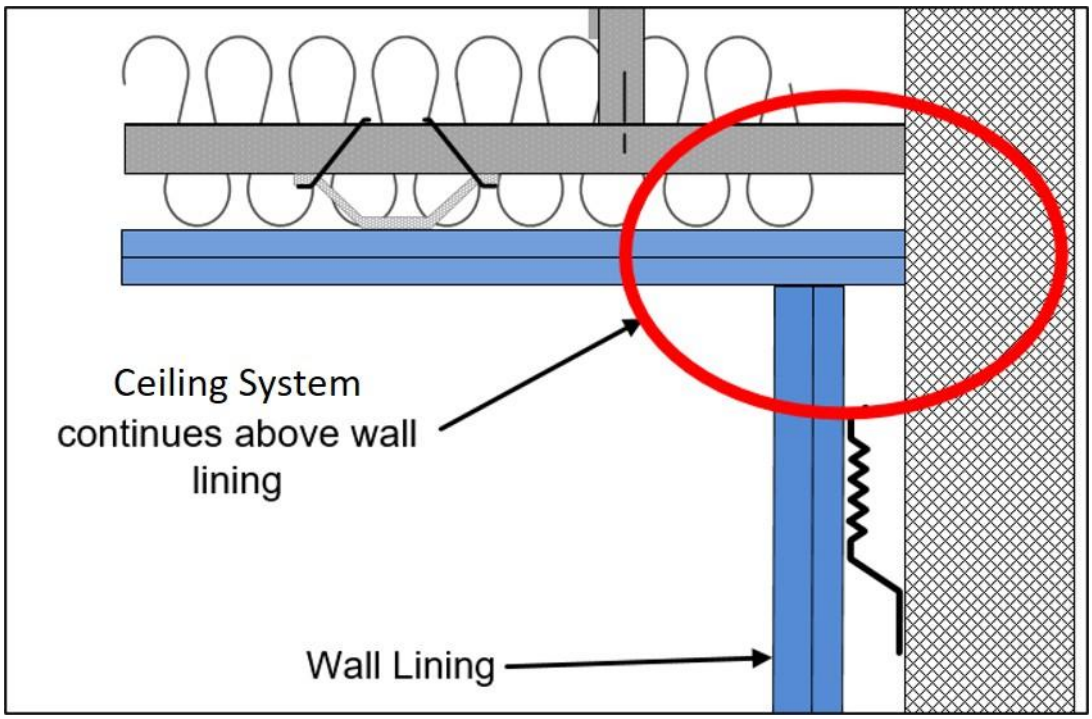


Figure 15: Wall Lining Suspended Ceiling Junction

9.3 Workmanship

- Where Wallboard/Soundbloc/Fireline is laid, the sheets must be staggered to avoid common joints. The seals must be taped at the joins.
- The board layers must continue to all walls and be taped and treated at the wall junctions to avoid weaker areas where sound energy will penetrate. This could be achieved with resilient acoustic strip such as YELOfon ES5 or similar.
- Dense mineral wool must be laid evenly and across all cavities without any gaps
- Mechanical bridging between the elements should be avoided, including completely filling the voids with mineral wool. Mechanical bridging will allow for sound energy to travel through the partition and will negatively impact the level of sound insulation achieved.
- Where the existing ceiling & floor is to be retained, it should be made good.

9.4 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 party floor separating commercial unit and habitable rooms in the residential flat should be enclosed for their full height.
- 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.
- 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 un-ducted. 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.

10 Discussion

10.1 BS8233:2014 & ProPG:2017 Requirements

The primary sound source affecting the proposed property is the road traffic noise from Chapel Road. The average daytime $L_{Aeq,\ 16\text{-}Hour}$ was measured to be 61 dB at the rear of the property. The commercial noise that will affect nearest residential NSR (the residence directly above the commercial unit) belongs to two air conditioning units. As shown in Section 7, the estimated commercial noise at the 1st floor kitchen is 51.8dBA and the 2nd floor rear bedroom window is 47.6dBA

Given the low levels of sound mitigation required for the commercial noise (27dB), this level of sound mitigation would be insufficient to mitigate the daytime $L_{Aeq,\ 16\text{-}Hour}$ sound at the front of the property. As 26dB of sound reduction would be required to mitigate the rear, the SRI required to mitigate the front is likely to be considerably more. This assessment has only considered the commercial noise as per the scope of a permitted development application however. Within this scope the development would be capable of being constructed with standard double glazing with acoustic trickle vents.

With regards to the ProPG:2017 requirement of no more than 10 events over 45 dB $L_{Amax\ during}$ the night time period, the measured data from the survey was analysed and it was found no additional mitigation would be required (Please see

Day	Date	$L_{Aeq\ 16/8Hr}$		11th L_{Amax}		Sound Reduction		
		Day	Night	1 min	2min	Day 16Hr	Night 8 Hr	$L_{Amax,\ 1min}$
Fri	18/10	-	48.8	44.7	44.7		19	0
Sat	19/10	57.5	50.4	44.8	44.7	22	20	0
Sun	20/10	56.8	49.1	45.5	45.5	22	19	0
Mon	21/10	58.6	49.5	44.7	44.6	24	20	0
Tue	22/10	60.2	47.3	44.8	44.8	25	17	0
Wed	23/10	70.4	-	-	-	35	-	-
AVERAGE:		**61**	**49**	**45**	**45**	**26**	**19**	**0**

Table 4. Results LT1). As the predicted worst case sound pressure level of the AC units is 51.8dB and the operation schedule of the units is unknown, it should be ensured that any operation of the AC units in the night time period do not exceed the ProPG:2017 criteria. This could easily be handled by ensuring the units are not switched on between the hours of 23:00 – 07:00.

10.2 ADE Requirements

The required sound reduction could be achieved with either independent floor joists or a suspended ceiling. The independent floor joists are strongly recommended over the suspended ceiling due to the increased acoustic performance it would provide. The theoretical $D_{nt,w}+C_{tr}$ of the suspended ceiling is only 1dB above the enhanced ADE requirement which introduces an increased likelihood of not achieving the ADE criteria. This would be due to flanking and test conditions etc.

11 Uncertainty

The following measures were taken to reduce uncertainty:

- The equipment was calibrated before and after measurements were undertaken with no significant drift occurring.
- Decibel values were rounded to the nearest 0.1 dB
- The most recent plans were used and plan scales were checked.
- The sound pressure levels of the air conditioners have been predicted based on the manufacturer's product data.

12 Conclusion

A class 1 sound level meter was installed at a representative location at the rear of the existing property. This was to identify the soundscape and incident sound levels on the rear facade between the 18th to the 23rd of September 2026

The soundscape at the rear consists mostly of the of the road traffic noise from Chapel Road.

For the daytime period, the average measured sound pressure levels were 61dB $L_{Aeq,\ 16\text{-}hour}$ and 49dB $L_{Aeq,\ 8\text{-}hour}$ during the night time period.

For permitted development, only commercial sound sources are considered. The commercial units assessed are two Daikin air conditioning units. They have a combined sound power level of 69 dB(A). When assessed at the window of the 1st and 2nd floor of 81 Chapel Road, the nearest NSR (noise sensitive receptor), the sound pressure level was predicted to be 51.8 dBA at the rear Kitchen and 48.6 dBA at the rear Bedroom.

The initial site risk assessment consistent with the approach in ProPG2017 is that the risk associated with developing the site is low.

The assessment concludes that the development is capable of being converted when assessed against commercial noise. The indoor sound criteria of BS8233:2014 can be achieved with standard double glazing and acoustic trickle vents. The required sound reduction for these would be R_w+C_{tr} ≥27dB and D_{new} ≥33dB respectively.

Recommendations have been made which should achieve the relevant conversion criteria set out by Approved Document E for the separating floor between the ground floor commercial unit and the 1st floor residential unit.

Based on the information presented, if appropriate measures are implemented, planning permission should not be withheld on noise grounds.

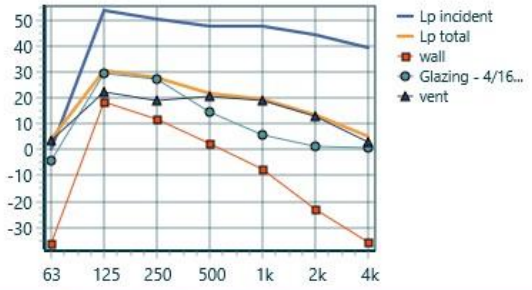
13 Appendix

Title 81 Chapel Road - 1st Floor Kitchen

Comments

Wall - 100 mm Brick, Butterfly Tie (2.6 mm stainless steel) (100 mm)
50 mm Rockwool (33kg/m3), 100 mm Brick, 12.5 mm Plasterboard

Glazing - Velfac 4/16/4
Vents - Simon SL Trickle vent



Source: Standard Sources

Exterior Sound Pressure Level	63	125	250	500	1k	2k	4k	Overall dBA
Traffic (ISO 717)	0.0	53.8	50.3	47.9	47.7	44.5	39.7	52.0

Path Element 1 | Element 2 | Element 3 | Element 4 | Element 5 | Element 6 | Element 7 | Element 8

Description wall Area 6.70 m²

Path details	63	125	250	500	1k	2k	4k	-
-Sound Transmission Loss ? Get R	-38	-37	-40	-47	-57	-69	-77	
Facade Shape Level diff. Facade	0	0	0	0	0	0	0	
Insertion Loss	0	0	0	0	0	0	0	
+10 Log(A)	8.3	8.3	8.3	8.3	8.3	8.3	8.3	

Receiving Room Volume 27.70 m³

Room details	63	125	250	500	1k	2k	4k	Overall dBA
-10 Log(V)+11	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	
Reverberation Time (secs) ?	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
+10 Log(T)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Element 1 sound level contribution	-36	19	12	3	-8	-23	-36	7.0
Room Sound Level	4	31	28	21	19	13	5	24.7

Level Difference	63	125	250	500	1k	2k	4k	LpAinc - LpARev,T0
D2m,nT	-1.0	26.3	25.6	29.6	31.5	34.4	37.8	27.2

Figure 16. Insul Prediction for the nearest NSR (1st floor Kitchen)

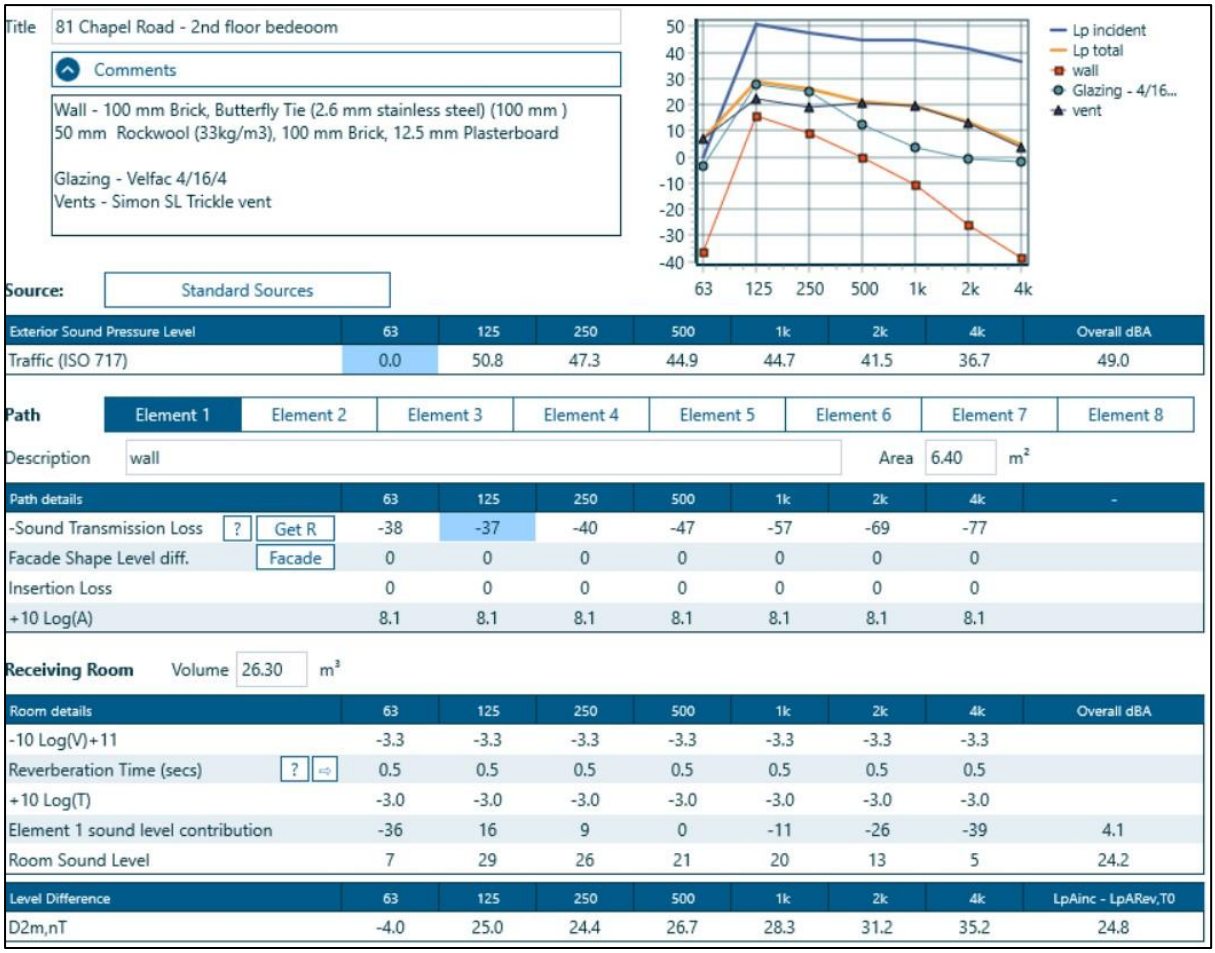


Figure 17. Insul Prediction for the nearest NSR (2nd floor Bedroom)