TREDEGAR CHAMBERS, NEWPORT

NOISE REPORT FOR PLANNING

Acoustics Report A2155 R01

27th June 2024

Report for:	Harvey Bowes Group Ltd Attention: Sarai Bowes
Prepared by: Gavin Irvine BSc MIOA Director	Reviewed by: David O'Neill BEng CEng MSc MIOA Director
Issue/Revision number: A2155 R01	Date: 27/06/2024

Ion Acoustics Ltd
Georges House
9 – 10 Bath Street
BRISTOL
BS1 6HL

www.ionacoustics.co.uk

0117 911 3765
mail@ionacoustics.co.uk

Consultants in Acoustics Noise & Vibration
Registered in England & Wales No. 5920418

Contents

1 Introduction

Ion Acoustics is appointed by Harvey Bowes to advise on environmental noise affecting the proposed conversion of the upper floors of Tredegar Chambers to residential use. The upper floors, which were formerly offices, will be converted to flats.

Tredegar Chambers is on the corner of Bridge Street and Cambrian Road in the pedestrianised centre of Newport. Therefore, traffic noise is not an issue with the exception of street cleaning and deliveries. However, there is a pub "The Lamb" opposite and other premises associated with the night-time economy nearby including McDonalds, a night-club, "Vibez" and a Wetherspoons pub at the end of Cambrian Road. Noise from people and potentially entertainment noise could be an issue and forms the main focus of this assessment.

In the pre-app discussions relating to the conversion, Newport Council have accepted the principle of residential use, but have requested a noise impact assessment be submitted. This report provides the noise assessment and describes:

- A baseline noise survey to determine external noise incident on the Bridge Street and Cambrian Road elevations;
- Planning guidance and acoustic criteria; and,
- The noise assessment and measures to improve the sound insulation of windows.

2 Scheme Details

Figure 1 shows the location of the development site and surrounding buildings and nearby roads.

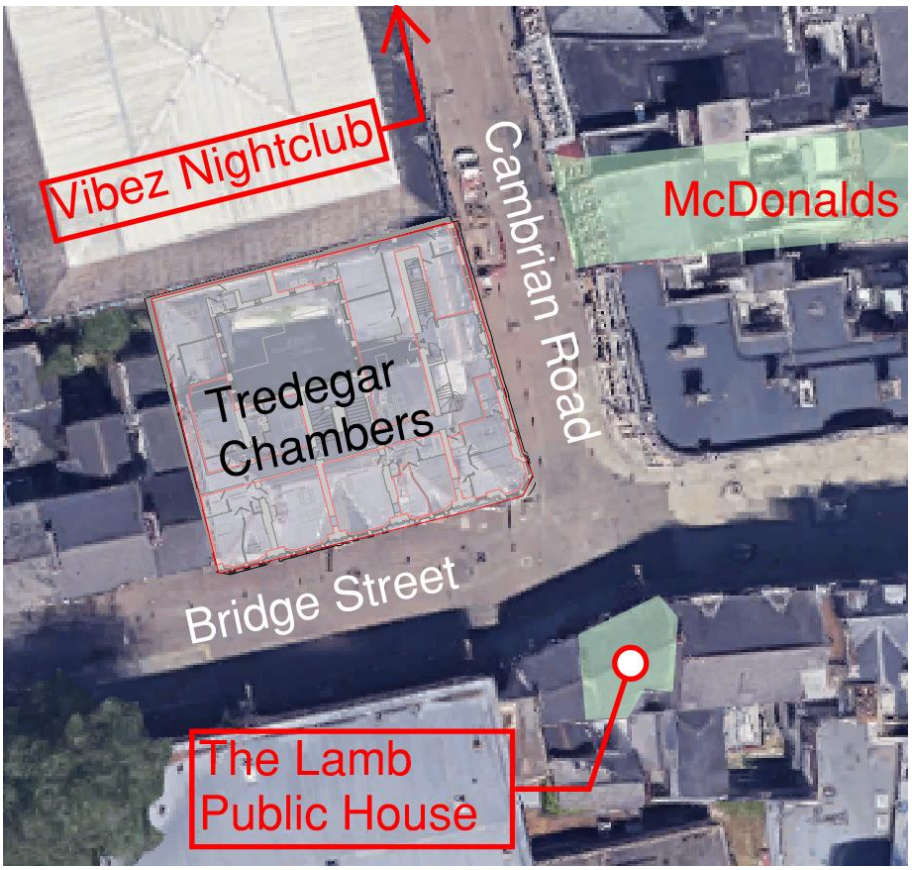


Figure 1: Aerial view of the site © Google Maps.

Tredegar Chambers is on the corner of Cambrian Road and Bridge Street. As both streets are pedestrianised, the noise climate in general from traffic is relatively quiet. However, the Lamb pub opposite is a source of noise and there will be other people on the street during the evening and into the night accessing and leaving the various venues. Vibez night-club is further along Cambrian Road with the night-club at least 60m from Tredegar Chambers. The Wetherspoons pub is further north at the end of Cambrian Road.

2.1 Proposed Scheme

The proposed scheme comprises the conversion of the 1st, 2nd and 3rd floors to provide 15 apartments. There will be five retail units retained on the ground floor. The first floor plan is shown below in Figure 2.

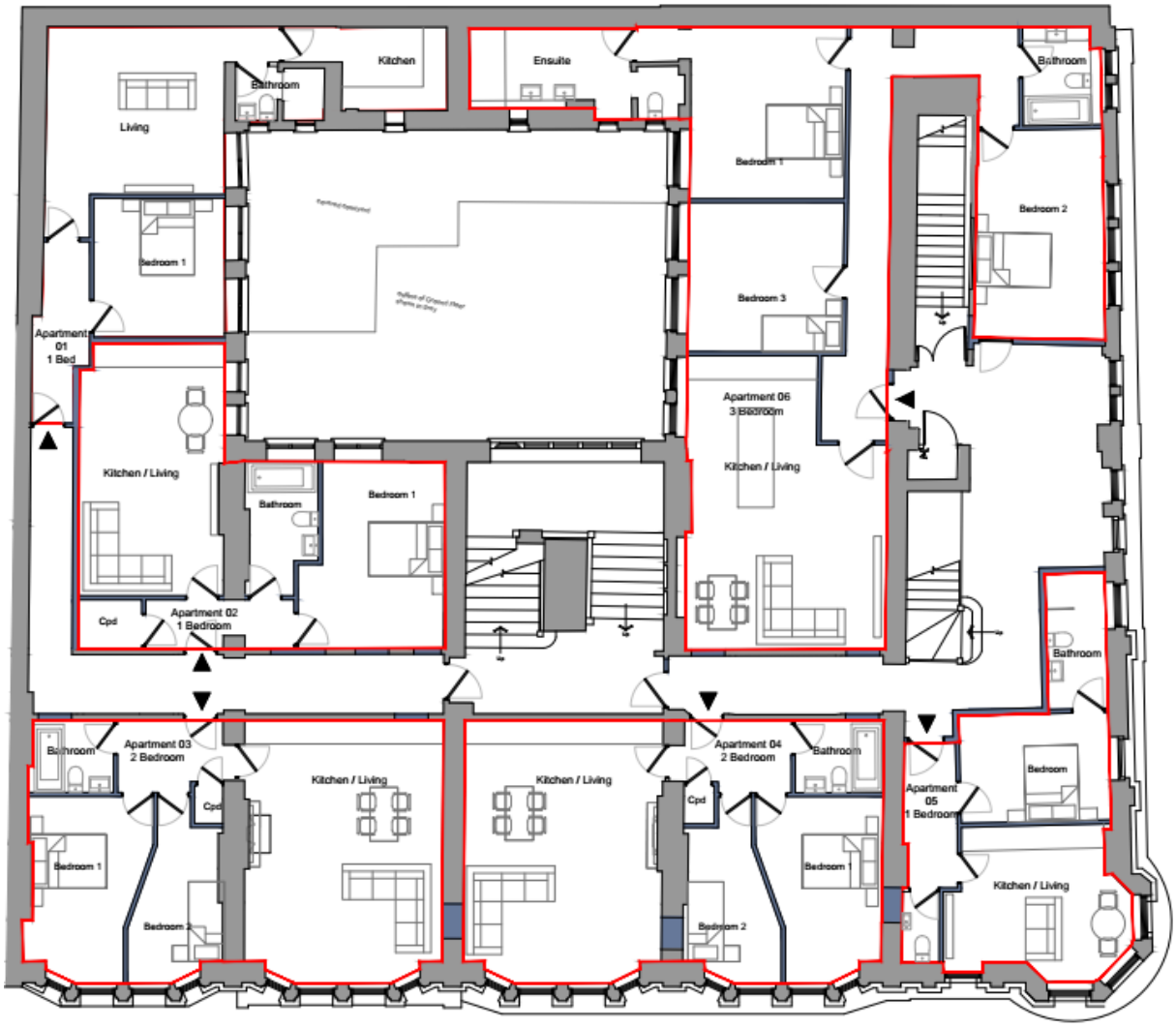


Figure 2: First Floor Proposed Site Plan

Note there is an internal lightwell / courtyard providing natural light. This will be well screened from noise from the street.

3 Planning Guidance and British Standards

Welsh Government advice on noise is available in the guidance document Technical Advice Note (TAN) 11 from 1997.

3.1 Technical Advice Note 11: Noise (1997) (TAN 11)

The current planning guidance in respect of planning and noise in Wales is TAN 11. This uses Noise Exposure Categories (NECs) to classify proposed residential developments in to one of four categories. The document is from 1997 but a letter from the Welsh Government was written in 2015 to update the references and reiterate various issues.

In section 10, TAN 11 states:

Local planning authorities should consider whether proposals for new noise-sensitive development would be incompatible with existing activities, taking into account the likely level of noise exposure at the time of the application and any increase that may reasonably be expected in the foreseeable future. Such development should not normally be permitted in areas which are, or are expected to become, subject to unacceptably high levels of noise and should not normally be permitted where high levels of noise will continue throughout the night.

And in Annex A it is stated:

A1. When assessing a proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NECs) (Table 1) the proposed site falls, taking account of both day and night-time noise levels. Local planning authorities should then have regard to the advice in the appropriate NEC.

Therefore, in principle, the site should be assessed using the Noise Exposure Categories and these are defined separately for Road, Rail and Aircraft Noise. However, this is no Noise Exposure Category for entertainment noise. There is a "mixed sources" category although this would typically be used for a combination of the above sources and industrial noise assuming no individual source dominates. The Noise Exposure Category for Mixed Sources is given below.

Table 1: TAN11 Noise Exposure Categories

NEC	Mixed Sources	Planning Advice
A	<55 dB L_{Aeq} Daytime <45 dB L_{Aeq} Night-time*	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.
B	55 - 63 dB L_{Aeq} Daytime 45 – 57 dB L_{Aeq} Night-time*	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.
C	63 - 72 dB L_{Aeq} Daytime 57 – 66 dB L_{Aeq} Night-time*	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	> 72 dB L_{Aeq} Daytime > 66 dB L_{Aeq} Night-time*	Planning permission should normally be refused.
Daytime 07-23.00 hours, Night-time is 23.00 to 07.00 hours * For Night-time noise levels (23.00 to 07.00 hours) where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq\ 8hr}$ values (except if the $L_{Aeq\ 8hr}$ value already puts the site in NEC D.		

Tan 11 only gives general advice on entertainment noise in Annex B of the document. Paragraph B18 states:

Commercial developments such as fast food restaurants, discos, night clubs and public houses pose particular difficulties, not least because associated activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the attendant problems of noise that may be made by customers in the vicinity. Disturbance that can be caused by traffic and associated car parking should not be underestimated.

In 2022, the Welsh Government published a draft of a revised TAN 11 for consultation[1]. The consultation ended in January 2023, but at the time of writing a new version has not been published.

3.2 Planning Policy Wales (February 2024)

The latest Planning Policy Wales document[2] which makes various references to considering the impact of noise pollution through the document. It also introduced the agent of change principle in respect of noise-sensitive development near existing noise-generating businesses. Paragraph 6.7.5 states:

"The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable."

3.3 Internal Noise Criteria – BS 8233:2014

TAN 11 does not provide advice on internal noise limits. Advice on those is given in BS 8233: 2014 and in World Health Organisation (WHO) Guidance "Guidelines for Community Noise", 1999.

Noise limits for dwellings are usually set in terms of two noise parameters: the ambient level L_{Aeq} and the maximum level, L_{AFmax}. The L_{AFmax} is the highest noise level in a given period and is determined by individual events such as a vehicle pass-bys. An L_{AFmax} limit is usually only applied at night, when sleep disturbance is most likely to be an issue. The L_{Aeq} is defined as the steady-state noise level which has the same energy as the actual time-varying noise over the same time period. It is effectively the average noise level.

Appropriate internal noise levels are recommended in BS 8233:2014 (shown in Table 2).

Table 2: Indoor Ambient Noise Levels from BS 8233: 2014

Activity	Location	Day (07:00 to 23:00)	Night (23:00 to 07:00)
Resting	Living rooms	35 dB $L_{Aeq, 16\ hour}$	
Dining	Dining room/area	40 dB $L_{Aeq, 16\ hour}$	
Sleeping - night Resting - day	Bedrooms	35 dB $L_{Aeq, 16\ hour}$	30 dB $L_{Aeq, 8\ hour}$

1 https://www.gov.wales/revised-planning-guidance-relation-air-quality-noise-and-soundscape
2 https://www.gov.wales/planning-policy-wales

WHO Guidelines propose internal limits of L_{Aeq} 35dB for living/dining rooms and L_{Aeq} 30dB / 45 dB L_{AFmax} inside a bedroom at night.

The internal noise criteria in BS 8233:2014 are followed by a number of notes. Those relevant to this scheme are reproduced below:

> *"Note 3: These levels are based on annual average data and do not have to be achieved in all circumstances. For example it is normal to exclude occasional events, such as fireworks night on New Year's Eve."*
>
> *"Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values."*
>
> *"Note 5: If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level."*
>
> *"Note 6: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions achieved."*

The guidance detailed within the ProPG[3] appends the guidance of BS8233 with the inclusion of the 45dB L_{AFmax} criterion and states *'For a reasonable standard in noise-sensitive rooms at night (e.g. bedrooms) individual noise events should not normally exceed 45dB L_{AFmax} more than 10 times a night'.* ProPG was prepared to provide guidance in England, but can be used in Wales as non-mandatory guidance.

The noise limits proposed for this assessment are stated below for bedrooms and living rooms. It is noted that BS 8233 differentiates between living rooms and dining rooms, and living rooms have a more onerous internal noise limit than dining rooms. In most cases, living rooms are also dining rooms and therefore the more onerous limit is adopted.

The noise limits proposed for this study are therefore as stated below.

- All Rooms Daytime: L_{Aeq} 35 dB (07.00 to 23.00 hours)
- Bedrooms at Night: L_{Aeq} 30 dB (23.00 to 07.00 hours), and L_{AFmax} 45dB not exceeded more than ten times.

3.4 Ventilation and Overheating: AVOG

The Acoustics, Ventilation, and Overheating Guidance (AVOG) was published by the Association of Noise Consultants (ANC) in January 2020[4]. AVOG is guidance for acoustic practitioners and others involved in planning, developing, designing, and commissioning new dwellings to achieve an appropriate balance of internal noise levels, ventilation, and overheating control regarding external transportation noise. It seeks to encourage an assessment of these issues at the planning stage. It is not mandatory guidance, but represents current best practices for assessing the issue. In particular, AVOG advises considering when noise levels are such that it is reasonable to control

3 ProPG: Planning & Noise – New Residential Development: Main Guidance https://www.ioa.org.uk/publications/propg
4 https://www.association-of-noise-consultants.co.uk/acoustics-ventilation-and-overheating-guidance-released/

overheating with openable windows and when it may be too noisy. The new Part O Building Regulations refer to internal noise levels under conditions controlling overheating (e.g. open windows) but that only applies to new buildings and is not relevant to this development.

It is generally accepted that some degree of elevated noise is accepted when residents choose to open windows, especially for overheating control. The ANC AVOG suggests internal ambient noise levels of L_{Aeq} 50dB during the day and L_{Aeq} 42dB during the night are acceptable limits with the windows open to control overheating; however, it acknowledges that there is a greater risk of disturbance in proximity to these thresholds. A guidance value in AVOG was also given for individual maxima of events of L_{AFmax} 65 dB.

4 Noise Survey

A noise survey was carried out from Friday 17th to Monday 20th May 2024 over the weekend period when it is expected that there would be more people out on the street and the pub would be busy. The noise survey was carried out by using logging sound level meters to determine external noise levels incident on the Bridge Street and Cambrian Road elevations. The meters were unattended except for set up and collection. The weather over the weekend was fine and dry and so it expected there would be a good number of outside in the streets generally. Photos of the noise monitoring locations are provided in Appendix A.

Two Rion NL52 sound level meters with Type WS15 windshields were used and calibrated with a Brüel & Kjær Type 4231 calibrator at the start and end of the survey. No significant drift in calibration was noted on collection. The meters were set up to log various noise indices (L_{Aeq}, $L_{Amax,F}$, L_{A90}, L_{A01}, L_{A10}) in consecutive 10-minute periods. The meters were set up to record loud events and to record a minute of audio in every 10-minute sample. The recordings have been used to determine the source of the noise.

The noise climate at the time of the survey included some construction noise which was particularly affecting the Cambrian Road elevation. The source of the construction noise could not be identified but it is not likely that it continued during the evening or night. Other noises heard set up and collection heard were people talking on the street and distant traffic noise.

5 Noise Survey Results

The noise monitoring data has been plotted as time history charts showing the variation in noise levels. These are shown in Figures 3 and 4 for the two elevations. The time history charts represent the measured values, that is, they include the reflecting effect of the façade which is expected to increase noise levels by 3dB compared to the "free-field" values (in the absence of the façade reflection).

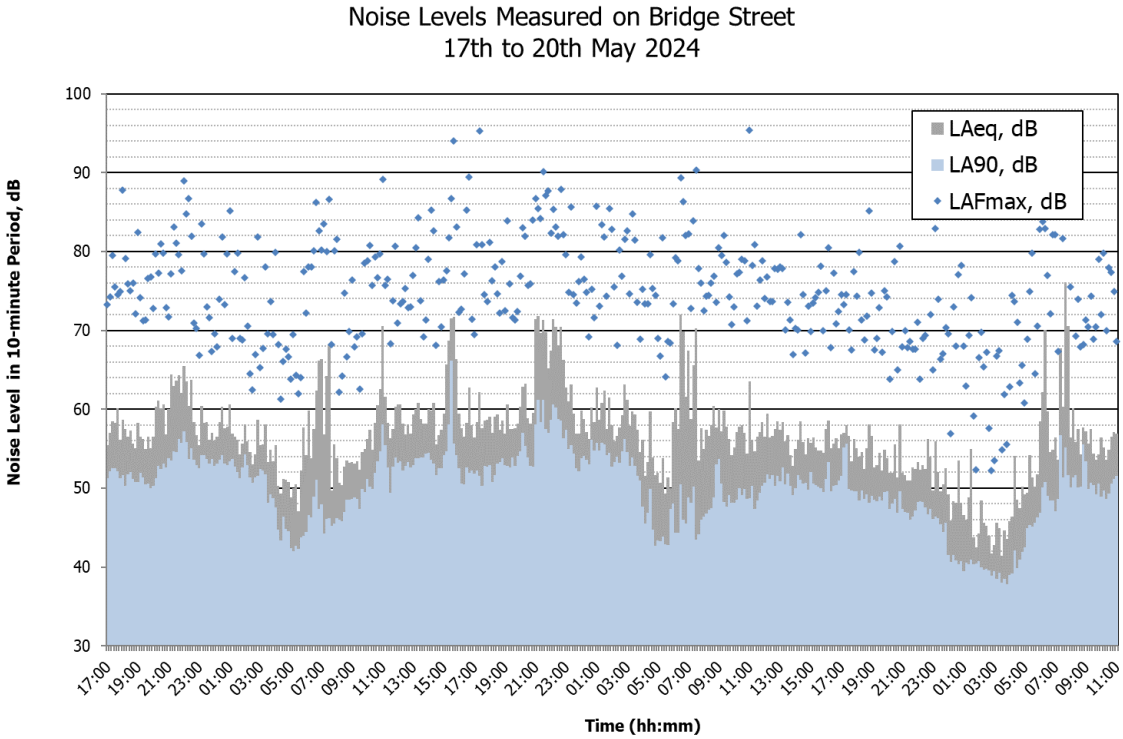


Figure 3 – Time History Plot Bridge Street (Façade Levels)

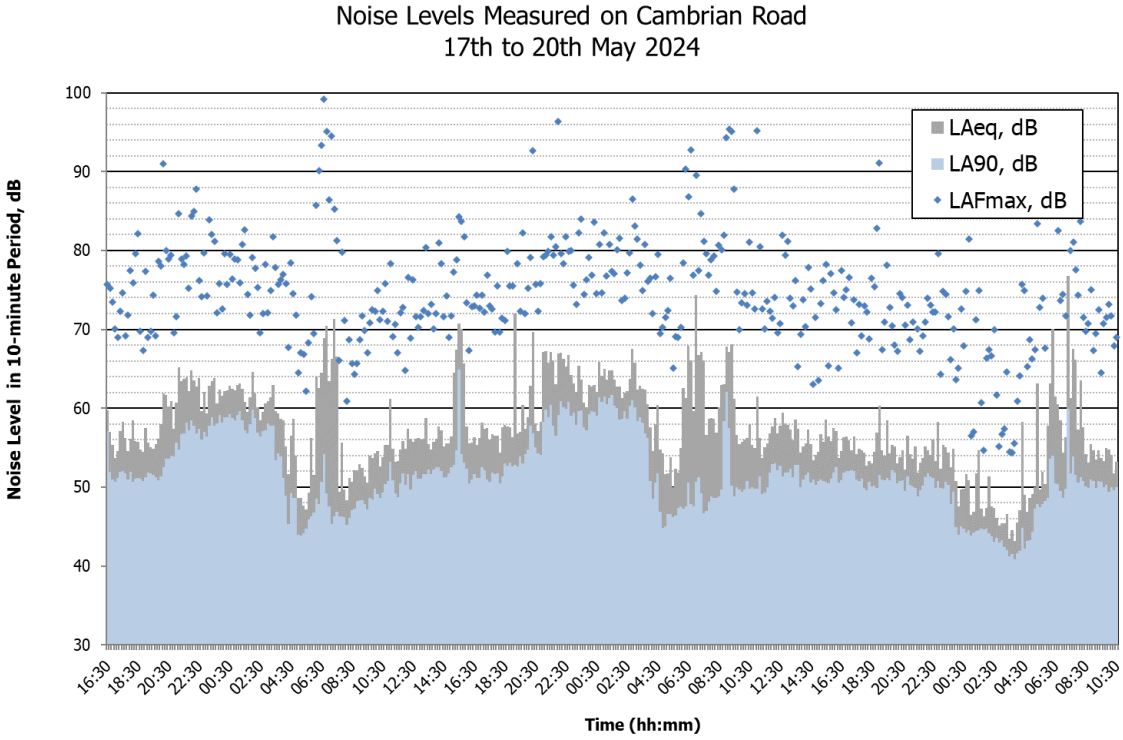


Figure 4 – Time History Plot Cambrian Road (Façade Levels)

There is considerable variation in the noise levels and several peaks including the period from 9pm would be associated with people on the streets. The pattern at both monitors is similar. The audio files have been played back to identify the sources of noise and during these periods.

Various shouts from people in the street can be heard. From around 06.30am street cleaning and possibly some deliveries commence and again there is an increase in noise levels. The highest maximum levels (dB L_{AMax}) during the night-time period are from street-cleaning at around 06.30 hours on the Sunday morning.

Noise levels have been averaged over the daytime (07.00 – 23.00) and night-time periods (23.00 – 07.00) for comparison with the TAN 11 noise exposure categories; these are summarised in Table 3. The measurements included the reflecting effect of the façade, so for the tabulated values, 3 dB has been subtracted so that the data represents the free-field or incident levels which can be used in the façade calculations and compared with the Tan 11 noise exposure categories. The L_{Aeq} over the evening period (19.00 to 23.00 hours) has also been calculated to provide additional information, although it is not separately assessed in TAN 11.

An analysis of the events (shouts etc) has been carried out to determine the maximum level which is not exceeded more than 10 times during the night. This is also reported below.

Table 3: External (Free-field) Noise Levels Bridge Street Elevation

Day	Period	Duration	L_{Aeq}, dB	L_{AFmax}, dB*
Friday 17th May	Evening (19:00 to 23:00)	4 hrs	58.1	-
	Night (23:00 to 07:00)	8 hrs	54.2	76.7
Saturday 18th May	Day (07:00 to 23:00)	16 hrs	61.0	
	Evening (19:00 to 23:00)	4 hrs	64.3	
	Night (23:00 to 07:00)	8 hrs	58.0	78.8
Sunday, 19th May	Day (07:00 to 23:00)	16 hrs	54.9	
	Evening (19:00 to 23:00)	4 hrs	50.7	
	Night (23:00 to 07:00)	8 hrs	52.7	
* Not exceeded by any event more than 10 times during the night.				

Table 4: External (Free-field) Noise Levels Cambrian Road Elevation

Day	Period	Duration	L_{Aeq}, dB	L_{AFmax}, dB*
Friday 17th May	Evening (19:00 to 23:00)	4 hrs	58.5	-
	Night (23:00 to 07:00)	8 hrs	58.9	76.6
Saturday 18th May	Day (07:00 to 23:00)	16 hrs	59.3	
	Evening (19:00 to 23:00)	4 hrs	62.4	
	Night (23:00 to 07:00)	8 hrs	59.6	78.5
Sunday, 19th May	Day (07:00 to 23:00)	16 hrs	57.2	
	Evening (19:00 to 23:00)	4 hrs	52.3	
	Night (23:00 to 07:00)	8 hrs	53.8	
* Not exceeded by any event more than 10 times during the night.				

The ambient noise levels are variable, but are higher on the Friday and Saturday evening and night due to people on the street. Therefore, it is voices and street cleaning vehicles at are responsible for the 10 highest maximum noise levels recorded.

Noise levels on the Saturday are in Noise Exposure Category B during the day and NEC C at night but on Sunday the ambient noise level over the same periods in Noise Exposure Category A and B for the day and night respectively.

The noisiest period occurred during the evening of Saturday 18th May when live music noise could be heard in the audio files recorded by the Bridge Street monitor. It is likely that the pub had its doors open. However, the live music did not continue after 11pm and after this time voices tend to dominate the noise climate. On the Friday evening some music was also audible – this may have been karaoke. This was quieter than the Saturday and did not continue after 11pm.

On the Cambrian Road elevation noise levels during the night are higher than the Bridge Street elevation. Music noise is audible during the early hours of the morning on the Cambrian Road elevation. This would be from the Vibez nightclub as the bass beats could be heard in the audio samples recorded by the Cambrian Road monitor.

5.1 Design Noise Levels

Based on the Saturday evening and night, the summary noise levels used in the sound insulation calculations are as follows:

Table 5: Design Noise Levels (free field)

Day	Period	L_{Aeq}, dB	L_{AFmax}, dB*
Bridge Street	Day (Evening)	64.3	-
	Night (23:00 to 07:00)	58.0	78.8*
Cambrian Road	Day (Evening)	62.4	
	Night (23:00 to 07:00)	59.6	78.5*
* Not exceeded by any event more than 10 times during the night.			

The noise levels measured during evening rather than the day have been used as a worst-case. This will ensure that internal levels during the evening can meet the 35 dB L_{Aeq} daytime target.

6 Sound Insulation Scheme: External Building Envelope

6.1 Sound Insulation Methodology

Sound insulation calculations for the residential rooms have then been prepared in accordance with BS EN 12354-3 to determine the sound insulation required to control internal noise levels to meet the noise limits discussed earlier in the report. To design the building envelope sound insulation, spectral values are required. The measurements were made in octave frequency bands to determine these. The typical sound spectra used in the building envelope sound insulation calculations are given in Appendix C which provides sample calculations.

6.2 Sound Insulation Requirements

The provision of secondary glazing is required for all bedrooms and living rooms. This will reduce noise substantially and will be beneficial for thermal reasons. One system which has been used elsewhere in heritage buildings and is thought to be acceptable from a conservation point of view

is from Storm windows[5]. This is a slimline system which can be fitted to the sash windows. Ventrolla can also provide slimline secondary glazing. Before the secondary glazing is installed, the existing windows should be made good and the seals improved as much as possible. Ventrolla and others can provide seals which assist in improving the acoustic performance of sash windows.

Test results from Storm Windows indicate a performance of 40 dB R_w from the slimline secondary glazing. The performance is also dependent on the depth of the cavity and where the reveals allow it, would be recommended to increase the air space between the existing external glass and the secondary glazing to 100mm or more. However, this does not appear to be possible for most of the windows.

The above improvement does not include for ventilation openings in the façade, but this is not always possible in heritage buildings. In this case, it should be possible to ventilate the building from the façade overlooking the lightwell. On other projects, a positive input ventilation system has been used which draws air into the building (from a quiet façade or the roof).

6.3 Overheating Control

With windows open for overheating control (assuming 13dB attenuation as set out in AVOG), the following calculations can be made based on the Saturday daytime and night-time noise levels. The results with windows open are compared with the AVOG limits in Tables 8 and 9 for Bridge Street and Cambrian Road respectively.

Table 8: Noise levels with open window attenuation Bridge Street

Measurement Period	External Noise Level (Free field)	Internal level with window open (13dB Attenuation)	AVOG Limit
Daytime (16hr)	61.0 dB L_{Aeq}	48.0 dB L_{Aeq}	50dB
Night-time (8hr)	58.0 dB L_{Aeq}	45.0 dB L_{Aeq}	42dB
Night-time (8hr)	78.8 dB L_{AMax}	65.8 dB L_{AMax}	65dB

Table 9: Noise levels with open window attenuation Cambrian Road

Measurement Period	External Noise Level (Free field)	Internal level with window open (13dB Attenuation)	AVOG Limit
Daytime (16hr)	59.3 dB L_{Aeq}	46.5 dB L_{Aeq}	50dB
Night-time (8hr)	59.6 dB L_{Aeq}	46.6 dB L_{AMax}	42dB
Night-time (8hr)	78.5 dB L_{AMax}	65.5 dB L_{AMax}	65dB

These levels are above the limits from AVOG for the night-time period and the ventilation and overheating scheme would need to ensure that openable windows are not relied on. Overheating is potentially less of an issue during the night, but in any case, alternative means of ventilation will need to be provided. It is noted that the windows do not need to be fixed closed.

We note that as this is a change of use, the requirements of Building Regulation Part O in respect of overheating noise do not apply.

[5] https://stormwindows.co.uk/slimline-unit/

7 Sound Insulation from Ground Floor Retail to New Flats

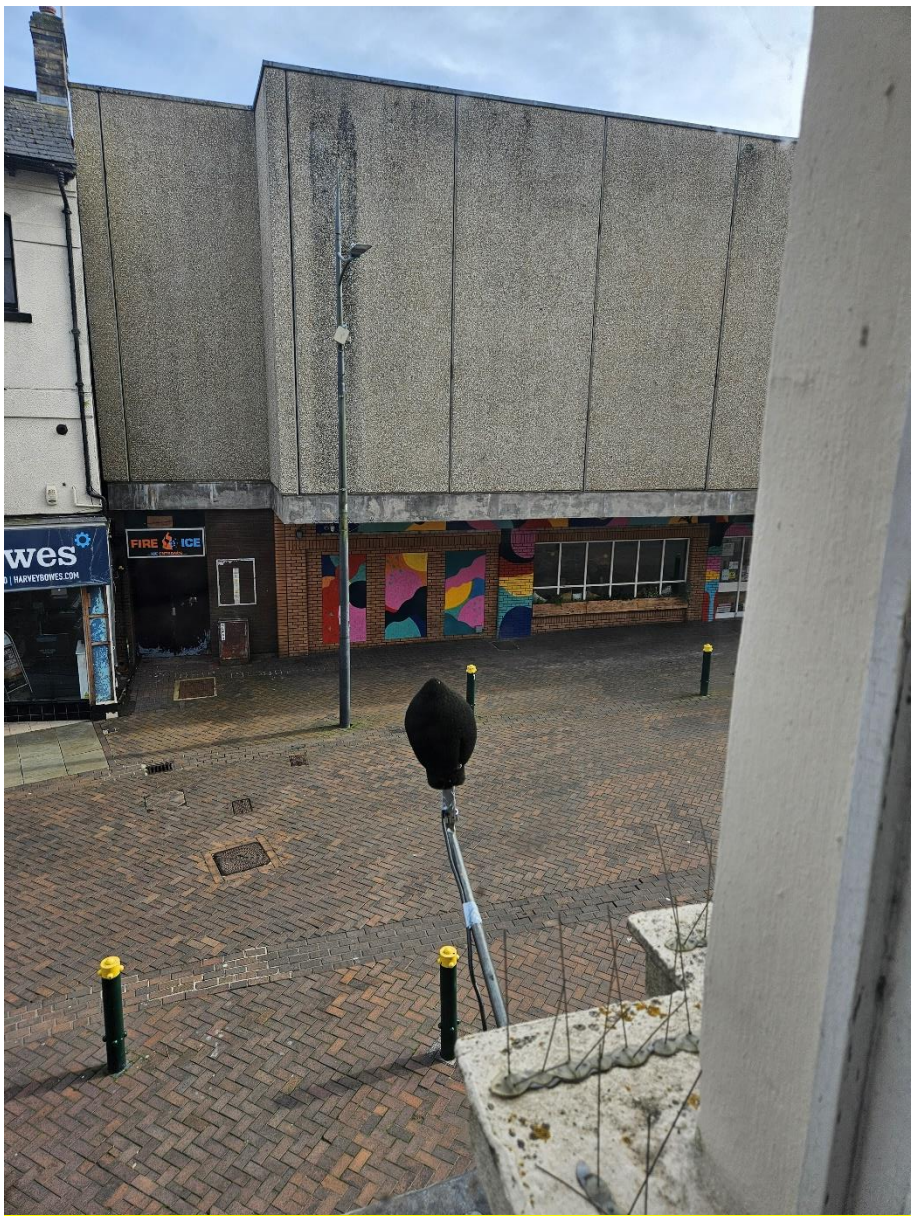
The new flats are likely to have retail units below them. Provided that the retail units are not especially noisy then a floor construction meeting the requirements of the Building Regulations Part E will be sufficient to limit disturbance to the flats above. Note this may still require an improvement to the existing depending on the existing floor construction. However, this would be an issue for Building Control rather than planning. If any of the commercial units are likely to have higher source noise levels then an assessment of the likely noise levels and the sound insulation provided would need to be carried out. Other uses such as a café, restaurant or bar would require a separate planning condition and this will allow the opportunity for noise levels to be controlled in planning.

8 Summary

This report provides a noise assessment for the proposed change of use of the upper floors of Tredegar Chambers to residential use.

The external noise levels on the Bridge Street and Cambrian Road elevations have been measured and the findings used to determine the building envelope sound insulation requirements and implications on ventilation. Secondary glazing is required and it will not be possible to open windows for overheating control and therefore some alternative means of ventilation and overeating control will be required.

Bridge Street



Cambrian Road

Bridge Street Data

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
17/05/2024 17:00	55.4	73.3	51.3	18/05/2024 01:00	60.6	85.1	53.4
17/05/2024 17:10	57.0	74.2	52.1	18/05/2024 01:10	56.9	69.0	53.7
17/05/2024 17:20	58.5	79.5	52.5	18/05/2024 01:20	56.5	77.5	52.7
17/05/2024 17:30	58.3	75.5	52.5	18/05/2024 01:30	56.1	79.8	52.0
17/05/2024 17:40	60.1	74.5	52.1	18/05/2024 01:40	54.3	69.0	51.3
17/05/2024 17:50	56.1	74.9	51.3	18/05/2024 01:50	55.6	68.8	52.6
17/05/2024 18:00	58.7	87.8	51.6	18/05/2024 02:00	58.1	76.7	54.3
17/05/2024 18:10	57.5	79.1	50.3	18/05/2024 02:10	55.9	70.5	52.9
17/05/2024 18:20	56.5	75.9	51.7	18/05/2024 02:20	54.6	64.5	51.4
17/05/2024 18:30	57.3	75.0	52.0	18/05/2024 02:30	53.0	62.5	50.7
17/05/2024 18:40	55.6	76.0	51.2	18/05/2024 02:40	54.3	66.9	51.4
17/05/2024 18:50	55.1	72.1	50.8	18/05/2024 02:50	58.7	81.8	51.5
17/05/2024 19:00	58.3	82.4	50.8	18/05/2024 03:00	55.4	65.3	52.4
17/05/2024 19:10	56.5	74.1	51.9	18/05/2024 03:10	55.5	67.7	52.2
17/05/2024 19:20	56.2	71.2	51.4	18/05/2024 03:20	58.1	78.0	51.7
17/05/2024 19:30	55.0	71.3	50.5	18/05/2024 03:30	53.3	69.6	48.1
17/05/2024 19:40	56.5	76.6	50.6	18/05/2024 03:40	54.9	73.7	49.2
17/05/2024 19:50	55.1	76.8	50.0	18/05/2024 03:50	53.4	69.5	48.7
17/05/2024 20:00	56.5	72.8	50.3	18/05/2024 04:00	55.4	79.9	47.6
17/05/2024 20:10	60.3	79.7	51.3	18/05/2024 04:10	50.3	68.2	44.7
17/05/2024 20:20	61.1	77.3	52.8	18/05/2024 04:20	49.3	61.3	43.4
17/05/2024 20:30	60.1	81.0	52.4	18/05/2024 04:30	51.2	66.1	46.4
17/05/2024 20:40	60.6	79.8	53.1	18/05/2024 04:40	51.1	67.6	44.8
17/05/2024 20:50	56.8	72.9	52.6	18/05/2024 04:50	50.8	66.6	44.5
17/05/2024 21:00	60.0	71.7	53.8	18/05/2024 05:00	48.8	63.8	42.4
17/05/2024 21:10	64.4	77.2	53.5	18/05/2024 05:10	50.0	69.5	42.0
17/05/2024 21:20	62.9	83.1	54.7	18/05/2024 05:20	50.5	64.3	42.7
17/05/2024 21:30	63.6	81.1	54.6	18/05/2024 05:30	47.1	62.0	42.3
17/05/2024 21:40	64.3	79.6	56.2	18/05/2024 05:40	52.2	64.0	43.8
17/05/2024 21:50	62.1	77.6	55.7	18/05/2024 05:50	57.7	77.5	44.0
17/05/2024 22:00	65.5	88.9	57.2	18/05/2024 06:00	54.2	72.2	44.4
17/05/2024 22:10	63.5	84.8	55.8	18/05/2024 06:10	59.8	78.0	46.6
17/05/2024 22:20	60.4	86.7	53.7	18/05/2024 06:20	53.8	78.0	46.3
17/05/2024 22:30	63.7	81.9	55.1	18/05/2024 06:30	57.5	80.1	48.9
17/05/2024 22:40	58.4	70.9	53.6	18/05/2024 06:40	62.4	86.2	51.1
17/05/2024 22:50	56.7	70.2	52.9	18/05/2024 06:50	66.2	82.6	47.4
17/05/2024 23:00	55.4	66.8	52.5	18/05/2024 07:00	66.4	80.2	47.9
17/05/2024 23:10	60.4	83.5	54.2	18/05/2024 07:10	56.8	83.5	44.2
17/05/2024 23:20	58.3	79.7	54.2	18/05/2024 07:20	64.2	80.0	46.1
17/05/2024 23:30	58.4	73.0	53.7	18/05/2024 07:30	68.2	86.6	46.2
17/05/2024 23:40	56.1	71.6	53.1	18/05/2024 07:40	49.7	68.2	45.2
17/05/2024 23:50	57.0	67.3	53.7	18/05/2024 07:50	55.5	80.1	45.5
18/05/2024 00:00	56.0	69.6	52.8	18/05/2024 08:00	53.8	81.5	46.2
18/05/2024 00:10	56.5	67.9	53.1	18/05/2024 08:10	50.7	62.2	46.0
18/05/2024 00:20	58.4	73.9	53.6	18/05/2024 08:20	50.4	64.2	45.8
18/05/2024 00:30	60.3	81.8	54.2	18/05/2024 08:30	52.7	74.7	47.0
18/05/2024 00:40	57.6	73.3	53.1	18/05/2024 08:40	53.5	66.6	48.5
18/05/2024 00:50	57.8	79.7	52.9	18/05/2024 08:50	53.2	69.9	48.5

Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB	Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB
18/05/2024 09:00	53.3	76.4	48.6	18/05/2024 17:00	56.4	69.5	51.8
18/05/2024 09:10	53.1	67.9	48.8	18/05/2024 17:10	58.4	80.9	52.2
18/05/2024 09:20	53.4	69.2	48.6	18/05/2024 17:20	62.2	95.3	51.5
18/05/2024 09:30	52.3	62.6	47.4	18/05/2024 17:30	57.6	80.9	50.3
18/05/2024 09:40	54.6	69.6	49.9	18/05/2024 17:40	58.6	74.5	52.8
18/05/2024 09:50	55.0	78.5	49.5	18/05/2024 17:50	58.7	73.7	52.7
18/05/2024 10:00	56.2	78.8	51.2	18/05/2024 18:00	59.0	81.2	52.9
18/05/2024 10:10	57.4	80.8	50.2	18/05/2024 18:10	57.0	76.3	50.8
18/05/2024 10:20	54.9	75.7	49.9	18/05/2024 18:20	59.0	78.0	51.6
18/05/2024 10:30	58.3	79.3	51.9	18/05/2024 18:30	59.3	74.6	53.1
18/05/2024 10:40	60.5	76.7	53.4	18/05/2024 18:40	57.4	72.2	53.3
18/05/2024 10:50	62.6	79.7	54.7	18/05/2024 18:50	58.6	78.7	53.8
18/05/2024 11:00	70.5	89.1	58.1	18/05/2024 19:00	56.9	72.5	52.9
18/05/2024 11:10	61.6	75.7	55.4	18/05/2024 19:10	60.6	83.9	52.8
18/05/2024 11:20	58.3	76.5	52.6	18/05/2024 19:20	57.5	75.9	52.6
18/05/2024 11:30	56.3	68.3	49.4	18/05/2024 19:30	57.5	71.6	53.9
18/05/2024 11:40	57.5	73.8	52.7	18/05/2024 19:40	57.6	71.3	52.8
18/05/2024 11:50	60.3	80.7	53.9	18/05/2024 19:50	58.2	72.4	54.1
18/05/2024 12:00	60.6	70.9	53.2	18/05/2024 20:00	60.3	76.9	54.7
18/05/2024 12:10	60.6	73.4	53.4	18/05/2024 20:10	62.8	83.0	57.0
18/05/2024 12:20	58.2	73.7	52.2	18/05/2024 20:20	63.2	81.9	55.3
18/05/2024 12:30	56.8	75.3	52.8	18/05/2024 20:30	58.9	75.7	53.9
18/05/2024 12:40	58.1	72.9	53.3	18/05/2024 20:40	58.2	75.9	52.8
18/05/2024 12:50	56.9	73.0	52.6	18/05/2024 20:50	59.5	84.0	52.7
18/05/2024 13:00	59.3	77.0	52.9	18/05/2024 21:00	71.4	86.7	58.1
18/05/2024 13:10	60.0	80.5	53.8	18/05/2024 21:10	71.8	85.4	61.2
18/05/2024 13:20	60.8	84.3	53.8	18/05/2024 21:20	69.7	84.2	58.4
18/05/2024 13:30	58.8	73.8	53.9	18/05/2024 21:30	71.3	90.1	61.2
18/05/2024 13:40	58.2	69.2	53.9	18/05/2024 21:40	69.8	87.1	57.5
18/05/2024 13:50	58.2	71.3	54.4	18/05/2024 21:50	65.2	87.7	57.0
18/05/2024 14:00	60.0	79.0	54.5	18/05/2024 22:00	67.4	82.3	58.7
18/05/2024 14:10	59.8	85.2	53.6	18/05/2024 22:10	71.4	85.3	60.6
18/05/2024 14:20	60.8	82.6	53.1	18/05/2024 22:20	70.4	83.1	60.2
18/05/2024 14:30	55.5	68.1	51.6	18/05/2024 22:30	68.1	81.9	58.8
18/05/2024 14:40	56.7	76.2	52.5	18/05/2024 22:40	70.4	87.9	58.6
18/05/2024 14:50	57.4	70.4	52.5	18/05/2024 22:50	66.3	82.1	56.3
18/05/2024 15:00	59.4	76.4	54.2	18/05/2024 23:00	62.7	79.6	57.4
18/05/2024 15:10	65.7	77.6	54.7	18/05/2024 23:10	61.0	74.8	55.0
18/05/2024 15:20	68.7	81.7	58.1	18/05/2024 23:20	63.1	85.6	55.4
18/05/2024 15:30	71.5	86.7	66.2	18/05/2024 23:30	59.4	74.5	54.4
18/05/2024 15:40	71.7	94.0	55.6	18/05/2024 23:40	56.9	73.5	52.5
18/05/2024 15:50	66.4	83.1	54.2	18/05/2024 23:50	56.9	76.2	52.1
18/05/2024 16:00	59.4	72.3	52.5	19/05/2024 00:00	59.8	79.3	53.8
18/05/2024 16:10	57.6	72.7	50.6	19/05/2024 00:10	58.8	76.5	54.1
18/05/2024 16:20	56.5	77.2	50.5	19/05/2024 00:20	57.1	74.8	53.6
18/05/2024 16:30	58.3	85.2	52.6	19/05/2024 00:30	56.2	69.2	53.0
18/05/2024 16:40	62.7	89.4	51.9	19/05/2024 00:40	60.2	75.2	56.1
18/05/2024 16:50	58.0	71.4	52.2	19/05/2024 00:50	58.4	71.6	54.8

Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB	Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB
19/05/2024 01:00	62.7	85.7	55.7	19/05/2024 09:00	60.0	80.5	53.7
19/05/2024 01:10	58.7	73.1	54.8	19/05/2024 09:10	57.2	79.5	50.6
19/05/2024 01:20	60.8	83.4	55.7	19/05/2024 09:20	59.8	82.0	48.2
19/05/2024 01:30	62.4	81.8	55.5	19/05/2024 09:30	57.8	78.6	47.7
19/05/2024 01:40	57.5	74.3	54.2	19/05/2024 09:40	56.2	74.2	49.1
19/05/2024 01:50	61.5	85.4	54.5	19/05/2024 09:50	54.2	70.7	48.1
19/05/2024 02:00	58.0	82.8	52.7	19/05/2024 10:00	55.2	73.0	48.1
19/05/2024 02:10	55.9	75.5	53.3	19/05/2024 10:10	57.1	77.2	48.5
19/05/2024 02:20	56.6	68.1	54.0	19/05/2024 10:20	57.8	77.4	50.0
19/05/2024 02:30	57.7	80.2	53.2	19/05/2024 10:30	58.0	79.0	49.1
19/05/2024 02:40	59.2	76.9	54.7	19/05/2024 10:40	57.0	78.8	49.9
19/05/2024 02:50	63.1	81.5	56.2	19/05/2024 10:50	54.4	71.2	48.6
19/05/2024 03:00	61.2	82.6	54.6	19/05/2024 11:00	63.5	95.4	48.7
19/05/2024 03:10	57.9	74.6	52.8	19/05/2024 11:10	56.1	78.2	50.3
19/05/2024 03:20	59.7	84.8	53.9	19/05/2024 11:20	54.7	80.9	47.4
19/05/2024 03:30	59.3	81.4	52.8	19/05/2024 11:30	56.5	73.1	48.4
19/05/2024 03:40	57.4	73.6	51.5	19/05/2024 11:40	57.1	76.4	49.4
19/05/2024 03:50	54.6	68.9	51.0	19/05/2024 11:50	58.4	78.8	50.3
19/05/2024 04:00	56.1	75.2	47.7	19/05/2024 12:00	56.5	74.0	50.7
19/05/2024 04:10	51.5	73.4	45.5	19/05/2024 12:10	59.4	76.8	51.7
19/05/2024 04:20	53.3	73.4	46.9	19/05/2024 12:20	56.4	73.7	51.2
19/05/2024 04:30	59.7	79.6	49.9	19/05/2024 12:30	56.6	73.7	51.6
19/05/2024 04:40	53.9	75.3	44.7	19/05/2024 12:40	57.5	77.8	50.3
19/05/2024 04:50	51.6	74.4	42.7	19/05/2024 12:50	58.5	77.7	51.5
19/05/2024 05:00	51.9	69.0	43.4	19/05/2024 13:00	57.4	78.0	50.9
19/05/2024 05:10	50.7	66.7	43.3	19/05/2024 13:10	58.4	77.8	52.6
19/05/2024 05:20	53.8	81.7	43.9	19/05/2024 13:20	55.9	70.1	50.5
19/05/2024 05:30	49.3	64.1	42.9	19/05/2024 13:30	56.7	73.6	51.8
19/05/2024 05:40	51.4	68.6	42.8	19/05/2024 13:40	54.2	71.3	50.3
19/05/2024 05:50	50.0	68.4	47.4	19/05/2024 13:50	52.8	66.9	49.1
19/05/2024 06:00	58.4	73.4	48.0	19/05/2024 14:00	55.0	70.2	50.0
19/05/2024 06:10	60.1	79.2	44.3	19/05/2024 14:10	56.1	70.1	51.6
19/05/2024 06:20	57.5	78.8	44.3	19/05/2024 14:20	58.5	82.1	51.1
19/05/2024 06:30	72.0	89.3	50.5	19/05/2024 14:30	55.8	74.5	50.6
19/05/2024 06:40	69.9	86.3	46.0	19/05/2024 14:40	54.3	67.1	50.7
19/05/2024 06:50	61.6	82.0	45.5	19/05/2024 14:50	56.3	73.1	49.8
19/05/2024 07:00	67.4	82.2	48.8	19/05/2024 15:00	55.7	69.9	52.0
19/05/2024 07:10	58.8	72.8	48.1	19/05/2024 15:10	56.4	73.5	50.6
19/05/2024 07:20	65.6	83.9	50.2	19/05/2024 15:20	55.2	74.1	50.4
19/05/2024 07:30	70.2	90.3	43.5	19/05/2024 15:30	54.8	74.8	50.2
19/05/2024 07:40	53.5	77.8	44.1	19/05/2024 15:40	54.8	78.1	50.0
19/05/2024 07:50	57.6	76.0	46.0	19/05/2024 15:50	54.5	70.0	49.5
19/05/2024 08:00	55.0	72.5	46.4	19/05/2024 16:00	57.5	75.0	51.2
19/05/2024 08:10	57.4	74.3	46.8	19/05/2024 16:10	58.6	80.5	53.3
19/05/2024 08:20	56.6	74.4	47.3	19/05/2024 16:20	55.1	67.8	49.6
19/05/2024 08:30	58.0	76.0	47.5	19/05/2024 16:30	55.6	77.3	50.3
19/05/2024 08:40	60.4	76.9	48.8	19/05/2024 16:40	56.3	70.8	50.4
19/05/2024 08:50	57.7	73.6	53.0	19/05/2024 16:50	55.1	72.4	51.0

Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB	Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB
19/05/2024 17:00	56.8	74.5	51.5	20/05/2024 01:00	46.6	68.0	39.5
19/05/2024 17:10	57.0	73.3	55.2	20/05/2024 01:10	46.0	62.9	40.5
19/05/2024 17:20	58.0	74.5	55.6	20/05/2024 01:20	48.8	69.4	40.3
19/05/2024 17:30	56.6	70.1	49.9	20/05/2024 01:30	55.0	74.1	40.9
19/05/2024 17:40	53.4	67.5	49.7	20/05/2024 01:40	43.8	59.1	40.3
19/05/2024 17:50	56.2	77.5	49.6	20/05/2024 01:50	42.5	52.3	40.4
19/05/2024 18:00	55.1	74.3	49.6	20/05/2024 02:00	44.2	66.5	40.7
19/05/2024 18:10	54.0	79.9	48.4	20/05/2024 02:10	48.4	69.8	40.0
19/05/2024 18:20	54.6	71.3	49.7	20/05/2024 02:20	45.6	65.4	39.7
19/05/2024 18:30	52.4	68.8	48.6	20/05/2024 02:30	45.2	67.2	39.8
19/05/2024 18:40	55.1	71.8	49.2	20/05/2024 02:40	44.0	57.6	39.6
19/05/2024 18:50	58.1	85.1	48.1	20/05/2024 02:50	41.7	52.2	38.9
19/05/2024 19:00	56.6	74.7	49.0	20/05/2024 03:00	42.8	53.5	39.5
19/05/2024 19:10	52.6	67.5	48.5	20/05/2024 03:10	45.6	66.7	38.5
19/05/2024 19:20	52.9	69.0	48.3	20/05/2024 03:20	44.9	67.4	39.3
19/05/2024 19:30	54.5	72.9	48.9	20/05/2024 03:30	41.4	54.9	38.0
19/05/2024 19:40	52.2	67.2	48.4	20/05/2024 03:40	44.6	61.9	38.5
19/05/2024 19:50	54.9	75.0	49.5	20/05/2024 03:50	43.6	55.5	37.8
19/05/2024 20:00	53.8	74.2	49.6	20/05/2024 04:00	45.8	62.8	39.0
19/05/2024 20:10	51.9	63.8	47.4	20/05/2024 04:10	46.4	74.4	39.2
19/05/2024 20:20	51.9	69.9	48.0	20/05/2024 04:20	54.1	73.7	42.1
19/05/2024 20:30	55.5	78.7	48.6	20/05/2024 04:30	48.5	71.0	39.9
19/05/2024 20:40	51.4	65.0	46.9	20/05/2024 04:40	47.5	63.3	40.9
19/05/2024 20:50	58.1	80.7	49.6	20/05/2024 04:50	50.2	65.6	41.9
19/05/2024 21:00	51.9	67.9	47.4	20/05/2024 05:00	49.2	60.8	42.5
19/05/2024 21:10	51.6	70.0	47.0	20/05/2024 05:10	49.4	68.9	44.9
19/05/2024 21:20	51.0	67.8	46.9	20/05/2024 05:20	54.2	74.9	45.3
19/05/2024 21:30	51.0	68.6	46.0	20/05/2024 05:30	51.4	79.8	45.1
19/05/2024 21:40	52.6	67.6	46.4	20/05/2024 05:40	50.2	64.5	45.6
19/05/2024 21:50	52.4	67.6	47.2	20/05/2024 05:50	51.7	70.5	46.3
19/05/2024 22:00	53.3	71.0	48.2	20/05/2024 06:00	58.5	82.8	46.9
19/05/2024 22:10	52.3	63.8	48.3	20/05/2024 06:10	62.2	83.8	50.1
19/05/2024 22:20	52.9	69.0	48.2	20/05/2024 06:20	70.1	82.9	50.8
19/05/2024 22:30	52.4	69.4	47.6	20/05/2024 06:30	59.7	77.0	49.0
19/05/2024 22:40	56.2	86.6	46.7	20/05/2024 06:40	54.6	72.1	48.4
19/05/2024 22:50	54.0	72.0	47.4	20/05/2024 06:50	54.9	82.1	48.4
19/05/2024 23:00	49.7	65.0	46.1	20/05/2024 07:00	56.4	82.1	47.1
19/05/2024 23:10	55.9	82.9	46.4	20/05/2024 07:10	53.6	67.3	48.6
19/05/2024 23:20	52.0	73.9	46.2	20/05/2024 07:20	67.7	84.8	56.7
19/05/2024 23:30	49.6	66.4	45.4	20/05/2024 07:30	60.3	81.6	51.4
19/05/2024 23:40	50.5	67.0	44.4	20/05/2024 07:40	76.1	90.0	55.2
19/05/2024 23:50	52.5	70.3	45.6	20/05/2024 07:50	70.5	85.8	51.6
20/05/2024 00:00	49.2	69.6	41.5	20/05/2024 08:00	56.4	75.5	50.1
20/05/2024 00:10	45.9	56.9	40.6	20/05/2024 08:10	60.1	85.7	51.4
20/05/2024 00:20	48.3	73.0	41.5	20/05/2024 08:20	55.8	69.3	51.6
20/05/2024 00:30	48.1	68.0	40.8	20/05/2024 08:30	57.5	73.9	50.1
20/05/2024 00:40	53.5	77.1	40.3	20/05/2024 08:40	54.3	67.9	50.2
20/05/2024 00:50	48.1	78.2	40.7	20/05/2024 08:50	57.7	68.2	55.5

Cambrian Road Data

Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB	Time	L_{Aeq} dB	$L_{Amax,F}$ dB	L_{AF90} dB
17/05/2024 16:30	59.7	75.7	57.1	18/05/2024 00:30	62.8	79.5	59.2
17/05/2024 16:40	57.0	75.2	51.9	18/05/2024 00:40	62.5	76.4	58.8
17/05/2024 16:50	55.3	73.5	51.0	18/05/2024 00:50	62.3	78.9	58.5
17/05/2024 17:00	53.7	70.1	50.7	18/05/2024 01:00	62.9	78.8	59.1
17/05/2024 17:10	54.6	69.0	51.2	18/05/2024 01:10	63.1	75.9	59.6
17/05/2024 17:20	57.1	72.3	51.9	18/05/2024 01:20	62.5	80.8	58.5
17/05/2024 17:30	58.3	74.6	52.0	18/05/2024 01:30	60.8	82.6	57.2
17/05/2024 17:40	56.2	69.2	51.7	18/05/2024 01:40	59.5	74.4	56.8
17/05/2024 17:50	54.6	71.8	51.0	18/05/2024 01:50	61.4	71.8	58.0
17/05/2024 18:00	56.1	77.5	51.9	18/05/2024 02:00	64.6	79.1	59.8
17/05/2024 18:10	58.5	75.9	50.7	18/05/2024 02:10	61.9	77.7	58.8
17/05/2024 18:20	55.8	79.6	51.1	18/05/2024 02:20	60.1	75.3	56.9
17/05/2024 18:30	55.7	82.1	51.2	18/05/2024 02:30	58.5	69.6	56.4
17/05/2024 18:40	54.8	69.8	51.1	18/05/2024 02:40	59.5	72.0	57.1
17/05/2024 18:50	54.5	67.3	50.8	18/05/2024 02:50	60.6	78.2	57.2
17/05/2024 19:00	57.5	77.4	51.3	18/05/2024 03:00	60.9	72.1	58.1
17/05/2024 19:10	55.6	69.0	51.8	18/05/2024 03:10	61.4	74.9	57.8
17/05/2024 19:20	55.1	69.8	51.7	18/05/2024 03:20	62.9	81.7	57.8
17/05/2024 19:30	54.9	74.3	51.5	18/05/2024 03:30	59.6	77.8	53.4
17/05/2024 19:40	55.4	69.2	51.3	18/05/2024 03:40	59.3	75.7	54.3
17/05/2024 19:50	56.1	78.6	50.9	18/05/2024 03:50	58.7	76.3	53.9
17/05/2024 20:00	58.0	78.0	51.4	18/05/2024 04:00	58.5	77.0	51.2
17/05/2024 20:10	61.9	91.0	52.5	18/05/2024 04:10	55.2	75.8	48.9
17/05/2024 20:20	61.7	80.0	53.6	18/05/2024 04:20	51.6	67.7	45.3
17/05/2024 20:30	60.2	78.9	53.6	18/05/2024 04:30	56.5	78.4	49.2
17/05/2024 20:40	60.9	79.4	54.0	18/05/2024 04:40	58.7	74.5	48.6
17/05/2024 20:50	57.4	69.6	53.9	18/05/2024 04:50	54.0	71.8	48.6
17/05/2024 21:00	60.7	71.6	55.6	18/05/2024 05:00	48.6	64.5	44.0
17/05/2024 21:10	65.2	84.7	54.8	18/05/2024 05:10	48.6	67.0	43.9
17/05/2024 21:20	63.4	78.9	56.7	18/05/2024 05:20	47.7	66.8	44.1
17/05/2024 21:30	63.7	78.2	56.8	18/05/2024 05:30	47.2	62.2	44.7
17/05/2024 21:40	63.9	79.3	58.2	18/05/2024 05:40	49.3	68.3	45.9
17/05/2024 21:50	62.2	75.2	57.2	18/05/2024 05:50	56.2	74.1	46.3
17/05/2024 22:00	64.8	84.4	58.5	18/05/2024 06:00	51.5	69.5	46.8
17/05/2024 22:10	63.5	85.0	57.8	18/05/2024 06:10	64.0	85.7	48.5
17/05/2024 22:20	62.7	87.8	56.8	18/05/2024 06:20	62.6	90.1	47.8
17/05/2024 22:30	63.8	76.2	57.4	18/05/2024 06:30	64.5	93.3	50.7
17/05/2024 22:40	59.6	74.1	56.0	18/05/2024 06:40	68.9	99.2	54.2
17/05/2024 22:50	62.1	79.7	57.0	18/05/2024 06:50	70.4	95.1	49.2
17/05/2024 23:00	59.3	74.2	56.4	18/05/2024 07:00	63.4	86.4	47.6
17/05/2024 23:10	62.8	83.9	57.8	18/05/2024 07:10	66.3	94.5	45.3
17/05/2024 23:20	63.4	82.0	58.9	18/05/2024 07:20	71.3	85.2	46.3
17/05/2024 23:30	63.8	81.2	57.8	18/05/2024 07:30	66.5	81.3	46.9
17/05/2024 23:40	60.6	72.1	58.1	18/05/2024 07:40	49.4	66.1	46.3
17/05/2024 23:50	62.4	75.8	59.1	18/05/2024 07:50	55.6	79.8	46.3
18/05/2024 00:00	61.6	72.6	58.2	18/05/2024 08:00	49.7	71.1	46.2
18/05/2024 00:10	62.2	79.6	58.9	18/05/2024 08:10	48.3	60.9	45.2
18/05/2024 00:20	62.3	75.7	58.9	18/05/2024 08:20	51.2	68.7	46.1

Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB	Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB
18/05/2024 08:30	50.7	65.7	47.1	18/05/2024 16:30	56.3	73.0	51.6
18/05/2024 08:40	52.1	64.3	47.3	18/05/2024 16:40	55.3	74.3	51.2
18/05/2024 08:50	52.1	65.7	48.2	18/05/2024 16:50	56.2	72.7	51.2
18/05/2024 09:00	52.9	68.7	48.3	18/05/2024 17:00	58.2	74.3	52.5
18/05/2024 09:10	52.4	71.7	48.3	18/05/2024 17:10	57.4	72.2	52.1
18/05/2024 09:20	51.4	69.9	47.8	18/05/2024 17:20	57.5	76.9	51.0
18/05/2024 09:30	50.6	67.0	47.2	18/05/2024 17:30	56.0	73.0	50.7
18/05/2024 09:40	54.0	70.8	48.6	18/05/2024 17:40	56.7	72.6	51.8
18/05/2024 09:50	53.7	72.5	48.4	18/05/2024 17:50	56.5	69.7	51.6
18/05/2024 10:00	54.3	72.3	49.8	18/05/2024 18:00	56.5	75.5	51.7
18/05/2024 10:10	54.6	74.9	49.1	18/05/2024 18:10	54.4	69.7	50.5
18/05/2024 10:20	52.6	71.2	48.6	18/05/2024 18:20	57.6	71.4	51.4
18/05/2024 10:30	53.8	72.3	49.3	18/05/2024 18:30	57.9	71.1	53.0
18/05/2024 10:40	55.3	75.8	50.4	18/05/2024 18:40	57.7	79.9	52.7
18/05/2024 10:50	55.3	71.0	50.8	18/05/2024 18:50	57.6	75.5	53.1
18/05/2024 11:00	61.2	78.3	53.2	18/05/2024 19:00	56.3	75.5	52.6
18/05/2024 11:10	54.9	69.1	50.9	18/05/2024 19:10	72.0	100.4	52.8
18/05/2024 11:20	53.2	70.6	49.2	18/05/2024 19:20	56.8	78.3	52.6
18/05/2024 11:30	53.3	67.0	48.7	18/05/2024 19:30	57.0	72.3	53.9
18/05/2024 11:40	54.8	72.1	50.5	18/05/2024 19:40	60.4	82.2	53.0
18/05/2024 11:50	55.8	72.8	51.7	18/05/2024 19:50	57.4	72.0	54.2
18/05/2024 12:00	54.9	64.8	50.3	18/05/2024 20:00	58.9	75.2	54.8
18/05/2024 12:10	57.4	76.6	51.6	18/05/2024 20:10	62.8	79.1	57.8
18/05/2024 12:20	56.1	68.9	49.7	18/05/2024 20:20	69.7	92.6	56.8
18/05/2024 12:30	55.7	76.3	51.5	18/05/2024 20:30	58.1	75.7	55.1
18/05/2024 12:40	56.1	71.6	52.0	18/05/2024 20:40	57.1	72.3	54.3
18/05/2024 12:50	56.2	70.2	51.1	18/05/2024 20:50	58.3	75.8	54.1
18/05/2024 13:00	56.0	71.6	51.1	18/05/2024 21:00	67.1	79.2	58.3
18/05/2024 13:10	56.1	72.4	51.6	18/05/2024 21:10	67.2	79.4	59.8
18/05/2024 13:20	58.8	80.4	51.6	18/05/2024 21:20	65.8	79.9	58.9
18/05/2024 13:30	55.4	72.0	52.2	18/05/2024 21:30	67.1	81.7	60.4
18/05/2024 13:40	54.8	73.2	51.6	18/05/2024 21:40	66.1	79.4	57.8
18/05/2024 13:50	55.7	70.1	52.2	18/05/2024 21:50	63.0	80.5	56.5
18/05/2024 14:00	56.1	72.0	52.5	18/05/2024 22:00	66.9	96.3	59.1
18/05/2024 14:10	57.7	81.0	52.5	18/05/2024 22:10	67.0	79.6	60.9
18/05/2024 14:20	57.2	78.3	52.0	18/05/2024 22:20	66.3	78.3	60.1
18/05/2024 14:30	55.2	71.6	51.3	18/05/2024 22:30	65.3	81.7	59.9
18/05/2024 14:40	55.5	74.2	51.3	18/05/2024 22:40	66.7	79.9	60.8
18/05/2024 14:50	55.5	69.0	51.7	18/05/2024 22:50	64.2	80.0	59.0
18/05/2024 15:00	56.4	71.7	52.5	18/05/2024 23:00	63.1	75.6	59.4
18/05/2024 15:10	64.5	77.3	52.8	18/05/2024 23:10	62.1	73.2	57.9
18/05/2024 15:20	67.4	78.8	54.7	18/05/2024 23:20	65.4	82.2	59.6
18/05/2024 15:30	70.7	84.3	64.9	18/05/2024 23:30	63.6	84.0	59.7
18/05/2024 15:40	70.1	83.7	54.2	18/05/2024 23:40	60.7	74.4	57.6
18/05/2024 15:50	65.7	81.7	53.1	18/05/2024 23:50	60.1	76.3	57.2
18/05/2024 16:00	57.7	73.4	52.3	19/05/2024 00:00	62.9	79.1	59.2
18/05/2024 16:10	55.5	67.3	50.5	19/05/2024 00:10	62.7	76.9	59.6
18/05/2024 16:20	55.6	72.9	51.0	19/05/2024 00:20	62.9	83.6	59.5

Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB	Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB
19/05/2024 00:30	62.1	74.5	59.0	19/05/2024 08:30	60.1	80.7	48.8
19/05/2024 00:40	65.9	80.8	61.4	19/05/2024 08:40	62.9	80.1	49.7
19/05/2024 00:50	64.1	74.6	60.8	19/05/2024 08:50	63.0	81.9	58.4
19/05/2024 01:00	65.0	82.2	61.5	19/05/2024 09:00	67.8	94.3	62.1
19/05/2024 01:10	63.6	76.8	60.5	19/05/2024 09:10	67.1	95.4	57.5
19/05/2024 01:20	64.8	80.8	61.3	19/05/2024 09:20	68.1	95.1	50.2
19/05/2024 01:30	64.8	77.4	61.7	19/05/2024 09:30	61.2	87.8	48.8
19/05/2024 01:40	63.6	77.1	60.3	19/05/2024 09:40	56.6	74.7	50.0
19/05/2024 01:50	62.7	80.1	60.0	19/05/2024 09:50	55.4	70.0	49.7
19/05/2024 02:00	62.7	81.5	58.6	19/05/2024 10:00	55.7	73.4	49.4
19/05/2024 02:10	61.3	73.7	58.7	19/05/2024 10:10	56.0	74.5	49.7
19/05/2024 02:20	62.0	73.9	59.6	19/05/2024 10:20	56.2	73.1	50.8
19/05/2024 02:30	62.2	77.2	58.7	19/05/2024 10:30	58.0	81.1	49.8
19/05/2024 02:40	63.7	79.7	60.3	19/05/2024 10:40	55.3	74.6	50.0
19/05/2024 02:50	67.5	86.5	61.0	19/05/2024 10:50	55.0	72.6	49.8
19/05/2024 03:00	65.8	83.1	60.1	19/05/2024 11:00	61.5	95.2	49.8
19/05/2024 03:10	62.4	81.4	58.4	19/05/2024 11:10	56.2	80.5	51.4
19/05/2024 03:20	62.8	78.1	58.9	19/05/2024 11:20	53.7	72.6	49.1
19/05/2024 03:30	62.5	74.9	58.2	19/05/2024 11:30	55.1	70.1	49.3
19/05/2024 03:40	62.4	80.8	56.8	19/05/2024 11:40	55.5	73.6	50.0
19/05/2024 03:50	60.5	76.1	56.2	19/05/2024 11:50	56.8	72.3	51.8
19/05/2024 04:00	57.6	76.5	50.8	19/05/2024 12:00	57.7	71.4	52.9
19/05/2024 04:10	54.6	72.0	48.5	19/05/2024 12:10	58.8	74.0	53.0
19/05/2024 04:20	58.0	76.7	50.6	19/05/2024 12:20	56.8	69.6	52.1
19/05/2024 04:30	60.4	79.5	51.7	19/05/2024 12:30	57.8	70.7	52.7
19/05/2024 04:40	54.8	69.5	46.9	19/05/2024 12:40	59.4	81.9	51.4
19/05/2024 04:50	54.3	70.2	44.8	19/05/2024 12:50	58.1	79.4	51.8
19/05/2024 05:00	51.6	71.5	45.0	19/05/2024 13:00	57.9	81.2	51.8
19/05/2024 05:10	51.7	72.4	46.6	19/05/2024 13:10	57.3	73.9	52.3
19/05/2024 05:20	53.8	76.5	46.6	19/05/2024 13:20	55.9	73.0	51.3
19/05/2024 05:30	50.0	65.1	46.2	19/05/2024 13:30	58.6	76.2	52.8
19/05/2024 05:40	52.3	69.1	46.4	19/05/2024 13:40	57.4	65.3	52.8
19/05/2024 05:50	51.8	69.0	47.4	19/05/2024 13:50	54.4	69.4	50.0
19/05/2024 06:00	55.0	70.2	47.6	19/05/2024 14:00	55.2	73.8	51.0
19/05/2024 06:10	62.6	78.4	47.3	19/05/2024 14:10	55.5	70.3	51.5
19/05/2024 06:20	61.3	90.3	47.6	19/05/2024 14:20	57.3	77.8	51.8
19/05/2024 06:30	67.9	86.8	50.6	19/05/2024 14:30	55.4	75.1	50.6
19/05/2024 06:40	66.1	92.7	47.8	19/05/2024 14:40	53.4	63.0	51.0
19/05/2024 06:50	59.6	76.9	47.6	19/05/2024 14:50	54.1	71.5	50.3
19/05/2024 07:00	74.3	89.5	50.7	19/05/2024 15:00	54.5	63.5	50.8
19/05/2024 07:10	66.7	77.5	51.3	19/05/2024 15:10	56.7	73.3	51.0
19/05/2024 07:20	67.1	84.7	49.2	19/05/2024 15:20	55.7	76.2	50.8
19/05/2024 07:30	66.1	81.2	46.7	19/05/2024 15:30	58.6	78.2	50.7
19/05/2024 07:40	56.6	79.6	47.0	19/05/2024 15:40	56.4	65.4	50.5
19/05/2024 07:50	58.7	76.9	48.1	19/05/2024 15:50	55.8	77.1	51.1
19/05/2024 08:00	58.8	78.8	48.8	19/05/2024 16:00	57.5	74.6	51.8
19/05/2024 08:10	58.7	79.3	48.6	19/05/2024 16:10	57.1	72.5	52.5
19/05/2024 08:20	56.9	74.8	48.6	19/05/2024 16:20	53.7	65.1	50.6

Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB	Time	$L_{A\,eq}$ dB	$L_{A\,max,F}$ dB	L_{AF90} dB
19/05/2024 16:30	54.6	77.5	50.9	20/05/2024 00:30	49.8	67.9	44.7
19/05/2024 16:40	56.3	74.0	51.8	20/05/2024 00:40	51.6	74.8	44.2
19/05/2024 16:50	56.4	75.0	52.0	20/05/2024 00:50	50.9	81.4	44.5
19/05/2024 17:00	55.9	76.6	52.0	20/05/2024 01:00	46.5	56.5	43.9
19/05/2024 17:10	54.7	70.8	52.1	20/05/2024 01:10	46.9	57.0	44.2
19/05/2024 17:20	56.4	73.8	52.0	20/05/2024 01:20	51.7	71.2	44.4
19/05/2024 17:30	54.2	67.0	51.0	20/05/2024 01:30	54.7	74.9	44.5
19/05/2024 17:40	54.9	73.2	50.8	20/05/2024 01:40	47.3	60.7	44.7
19/05/2024 17:50	54.7	69.2	51.1	20/05/2024 01:50	46.3	54.7	44.6
19/05/2024 18:00	54.4	73.0	49.9	20/05/2024 02:00	47.4	66.4	44.7
19/05/2024 18:10	52.7	72.2	49.6	20/05/2024 02:10	51.4	67.4	44.1
19/05/2024 18:20	53.3	68.8	50.7	20/05/2024 02:20	47.6	66.6	43.8
19/05/2024 18:30	53.0	76.5	50.1	20/05/2024 02:30	47.4	70.0	43.1
19/05/2024 18:40	54.5	75.4	50.2	20/05/2024 02:40	46.1	61.7	43.6
19/05/2024 18:50	56.9	82.8	49.9	20/05/2024 02:50	45.1	55.2	43.0
19/05/2024 19:00	60.3	91.1	51.5	20/05/2024 03:00	45.4	56.7	43.3
19/05/2024 19:10	54.7	67.4	51.0	20/05/2024 03:10	45.4	57.4	42.4
19/05/2024 19:20	54.0	70.9	50.9	20/05/2024 03:20	46.6	64.6	42.0
19/05/2024 19:30	58.5	78.1	51.2	20/05/2024 03:30	43.5	54.5	41.2
19/05/2024 19:40	54.3	72.8	50.9	20/05/2024 03:40	44.5	54.4	41.5
19/05/2024 19:50	55.3	70.4	52.1	20/05/2024 03:50	43.2	55.5	40.8
19/05/2024 20:00	55.2	68.0	51.8	20/05/2024 04:00	45.5	60.9	41.6
19/05/2024 20:10	53.0	67.2	50.5	20/05/2024 04:10	47.1	64.1	41.9
19/05/2024 20:20	53.8	74.5	50.8	20/05/2024 04:20	58.3	75.7	44.8
19/05/2024 20:30	54.7	74.0	50.9	20/05/2024 04:30	49.0	74.9	42.2
19/05/2024 20:40	52.2	70.5	49.5	20/05/2024 04:40	46.9	65.3	43.2
19/05/2024 20:50	56.5	73.1	51.4	20/05/2024 04:50	48.6	68.7	43.3
19/05/2024 21:00	54.2	68.7	50.3	20/05/2024 05:00	49.1	66.3	44.3
19/05/2024 21:10	53.6	70.9	50.1	20/05/2024 05:10	50.0	67.4	47.3
19/05/2024 21:20	55.2	85.6	49.9	20/05/2024 05:20	63.1	83.4	47.8
19/05/2024 21:30	51.8	70.1	48.8	20/05/2024 05:30	49.7	72.8	47.5
19/05/2024 21:40	53.1	67.2	49.6	20/05/2024 05:40	51.9	73.9	47.8
19/05/2024 21:50	53.7	69.2	50.2	20/05/2024 05:50	50.4	67.6	48.2
19/05/2024 22:00	55.2	70.9	51.3	20/05/2024 06:00	57.8	85.8	48.6
19/05/2024 22:10	54.7	73.9	51.7	20/05/2024 06:10	63.1	86.9	53.6
19/05/2024 22:20	54.1	73.1	51.4	20/05/2024 06:20	70.1	91.2	54.0
19/05/2024 22:30	56.0	72.2	51.2	20/05/2024 06:30	61.5	86.4	50.5
19/05/2024 22:40	53.3	72.2	49.9	20/05/2024 06:40	60.5	82.5	50.4
19/05/2024 22:50	58.3	79.6	50.8	20/05/2024 06:50	58.5	73.7	49.5
19/05/2024 23:00	52.3	64.3	49.9	20/05/2024 07:00	54.4	74.4	48.6
19/05/2024 23:10	55.3	74.8	49.8	20/05/2024 07:10	56.3	71.7	49.8
19/05/2024 23:20	55.1	74.4	50.7	20/05/2024 07:20	76.8	88.7	59.9
19/05/2024 23:30	54.4	71.6	50.3	20/05/2024 07:30	61.3	80.0	51.7
19/05/2024 23:40	52.5	66.2	47.8	20/05/2024 07:40	67.5	81.1	53.9
19/05/2024 23:50	54.9	70.1	49.4	20/05/2024 07:50	66.2	77.6	51.5
20/05/2024 00:00	50.8	63.6	44.9	20/05/2024 08:00	57.3	74.3	50.6
20/05/2024 00:10	47.6	65.1	44.0	20/05/2024 08:10	63.5	83.7	51.3
20/05/2024 00:20	49.7	72.6	45.0	20/05/2024 08:20	57.6	71.5	50.8

Building envelope: Bridge Street

Building Envelope Sound Insulation Calculation According to EN 12354-3

	Tredegar Chambers - Bridge Street		**Date**	27/06/2024						
	Night		**Room**	Bedroom 2						
Incident noise levels										
	Term	**Label**	**Octave band centre frequency (Hz)**							**dB(A)**
			63	**125**	**250**	**500**	**1 k**	**2 k**	**4 k**	
$L_{eq,ff}$	Measured L_{eq}	Bridge St, Night	61.2	56.0	53.3	55.3	53.5	49.9	47.3	0.0
		L: Bridge St, Night: Adj Spectrum	61.2	56.0	53.3	55.3	53.5	49.9	47.3	58.0
		K	3	3	3	3	3	3	3	
$L_{max,ff}$	Lmax	Bridge St, Night	73.8	75.3	68.3	74.2	75.0	72.3	67.3	0.0
		Max Specturm	73.8	75.3	68.3	74.2	75.0	72.3	67.3	78.8
		K	6	6	6	6	6	6	6	

Room Details

	Term	**Derivation**	**Value**	**Term**	**Derivation**	**Value**
	V	Volume (m^3)	22.0	Sew	Sf - Swi	3.5
	RT	RT (secs)	0.5	Srr	Area of ceiling (m^2)	7.8
	Sf	Facade area (inc. window) (m^2)	7.0	S	Sf + Sr	14.8
	Sr	Roof Area	7.8	Ao	Ref Area for Dnew	10.0
	Swi	Window area (m^2)	3.5	Attenuation to roof		

Sound Insulation Calculation elements

	Term	**Label/element**	**Octave band centre frequency (Hz)**							**Rw**
			63	**125**	**250**	**500**	**1 k**	**2 k**	**4 k**	
vent openings	$D_{n,e}$	Mechanical Vent	100	100	100	100	100	100	100	101
	$A_0/S \times 10^{-Dn/10}$	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
window	R_{wi}	Stom Windows Slimline	22.8	23.3	28.9	36.8	41.9	43.5	45.9	40
	$S_{wi}/S \times 10^{-Rwi/10}$	C	0.001	0.001	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	41.4	35.7	27.4	21.5	14.6	9.4	4.4	24.9
		L_{max} Internal SPL	54.0	55.0	42.4	40.4	36.1	31.8	24.4	43.5
Primary wall	R_{ew}	Example Wall from BS8233 (Brick and Block)	36	40	44	45	51	56	58	51
	$S_{ew}/S \times 10^{-Rew/10}$	D	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	28.2	19.0	12.3	13.3	5.5	-3.1	-7.7	13.1
		L_{max} Internal SPL	40.8	38.3	27.3	32.2	27.0	19.3	12.3	32.3
Roof	R_{rr}	None/Infinite	100	100	100	100	100	100	100	101
	$S_r/S \times 10^{-Rrr/10}$	E	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Calculated Internal Noise Levels

	10 Log (B+C+D+E)	F	-28.9	-29.5	-35.0	-42.5	-47.7	-49.5	-51.9	
	A (furnished)	Room Absorption	7	7	7	7	7	7	7	
	10 log (S/A)	G	3.2	3.2	3.2	3.2	3.2	3.2	3.2	
L_{eq}	Calc Tolerance	T	3	3	3	3	3	3	3	
	Night Internal $L_{eq,2}$	L+F+G+K+T	41.6	35.8	27.5	22.1	15.1	9.6	4.6	25.2
L_{max}	Calc Tolerance	T								
	Night Internal $L_{max,2}$	M+F+G+K+T	54.2	55.1	42.5	41.0	36.6	32.0	24.6	43.8

Building Envelope Sound Insulation Calculation According to EN 12354-3

	Tredegar Chambers - Cambrian Road	**Date**	27/06/2024	
	Night	**Room**	Bedroom 2	

Incident noise levels

	Term	Label	Octave band centre frequency (Hz)							dB(A)
			63	125	250	500	1 k	2 k	4 k	
$L_{eq,ff}$	Measured L_{eq}	Cambrian Road, Night	65.1	60.9	54.5	56.9	55.6	51.0	46.9	0.0
		L: Cambrian Road, Night: Adj Spectrum	65.1	60.9	54.5	56.9	55.6	51.0	46.9	59.6
		K	3	3	3	3	3	3	3	
$L_{max,ff}$	Lmax	Cambrian Road, Night	57.8	59.3	65.3	70.5	73.4	72.6	71.7	0.0
		Max Specturm	57.8	59.3	65.3	70.5	73.4	72.6	71.7	78.5
		K	6	6	6	6	6	6	6	

Room Details

	Term	Derivation	Value	Term	Derivation	Value
	V	Volume (m^3)	47.0	Sew	Sf - Swi	10.5
	RT	RT (secs)	0.5	Srr	Area of ceiling (m^2)	16.8
	Sf	Facade area (inc. window) (m^2)	15.3	S	Sf + Sr	32.0
	Sr	Roof Area	16.8	Ao	Ref Area for Dnew	10.0
	Swi	Window area (m^2)	4.8	Attenuation to roof		

Sound Insulation Calculation elements

	Term	Label/element	Octave band centre frequency (Hz)							Rw
			63	125	250	500	1 k	2 k	4 k	
vent openings	$D_{n,e}$	Mechanical Vent	100	100	100	100	100	100	100	101
	$A_0/S \times 10^{-Dn/10}$	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
window	R_{wi}	Stom Windows Slimline	22.8	23.3	28.9	36.8	41.9	43.5	45.9	40
	$S_{wi}/S \times 10^{-Rwi/10}$	C	0.001	0.001	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	43.3	38.6	26.6	21.1	14.7	8.5	2.0	26.0
		L_{max} Internal SPL	39.0	40.0	40.4	37.7	35.5	33.1	29.8	40.8
Primary wall	R_{ew}	Example Wall from BS8233 (Brick and Block)	36	40	44	45	51	56	58	51
	$S_{ew}/S \times 10^{-Rew/10}$	D	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	33.5	25.3	14.9	16.3	9.0	-0.6	-6.7	16.8
		L_{max} Internal SPL	29.2	26.7	28.7	32.9	29.8	24.0	21.1	34.0
Roof	R_{rr}	None/Infinite	100	100	100	100	100	100	100	101
	$S_r/S \times 10^{-Rrr/10}$	E	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Calculated Internal Noise Levels

	10 Log (B+C+D+E)	F	-30.6	-31.3	-36.9	-43.8	-49.1	-51.2	-53.6	
	A (furnished)	Room Absorption	15	15	15	15	15	15	15	
	10 log (S/A)	G	3.3	3.3	3.3	3.3	3.3	3.3	3.3	
L_{eq}	Calc Tolerance	T	3	3	3	3	3	3	3	
	Night Internal $L_{eq,2}$	L+F+G+K+T	43.8	38.8	26.9	22.4	15.8	9.0	2.6	26.5
L_{max}	Calc Tolerance	T	3	3	3	3	3	3	3	
	Night Internal $L_{max,2}$	M+F+G+K+T	39.5	40.2	40.7	39.0	36.6	33.6	30.4	41.7

Building envelope: Rear Living Room

Building Envelope Sound Insulation Calculation According to EN 12354-3

	Tredegar Chambers - Corner (Cambrian Road Side)			**Date**	27/06/2024					
	Daytime			**Room**	Livingt Room					
Incident noise levels										
	Term	**Label**	**Octave band centre frequency (Hz)**							**dB(A)**
			63	**125**	**250**	**500**	**1 k**	**2 k**	**4 k**	
$L_{eq,ff}$	Measured L_{eq}	Cambrian Road, Evening	61.7	62.7	61.0	58.7	57.3	54.3	53.2	0.0
		L: Cambrian Road, Evening: Adj Spectrum	61.7	62.7	61.0	58.7	57.3	54.3	53.2	62.4
		K	3	3	3	3	3	3	3	
$L_{max,ff}$	Lmax	Cambrian Road, Night								
		Max Specturm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
		K	6	6	6	6	6	6	6	

Room Details

Term	**Derivation**	**Value**	**Term**	**Derivation**	**Value**
V	Volume (m^3)	48.4	Sew	Sf - Swi	12.1
RT	RT (secs)	0.5	Srr	Area of ceiling (m^2)	17.3
Sf	Facade area (inc. window) (m^2)	15.3	S	Sf + Sr	32.6
Sr	Roof Area	17.3	Ao	Ref Area for Dnew	10.0
Swi	Window area (m^2)	3.2	Attenuation to roof		

Sound Insulation Calculation elements

	Term	**Label/element**	**Octave band centre frequency (Hz)**							**Rw**
			63	**125**	**250**	**500**	**1 k**	**2 k**	**4 k**	
vent openings	$D_{n,e}$	Mechanical Vent	100	100	100	100	100	100	100	101
	$A_0/S \times 10^{-Dn/10}$	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
window	R_{wi}	Stom Windows Slimline	22.8	23.3	28.9	36.8	41.9	43.5	45.9	40
	$S_{wi}/S \times 10^{-Rwi/10}$	C	0.001	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	38.0	38.5	31.2	21.0	14.5	9.9	6.4	26.8
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary wall	R_{ew}	Example Wall from BS8233 (Brick and Block)	36	40	44	45	51	56	58	51
	$S_{ew}/S \times 10^{-Rew/10}$	D	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	30.6	27.6	21.9	18.6	11.2	3.2	0.1	19.6
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roof	R_{rr}	None/Infinite	100	100	100	100	100	100	100	101
	$S_r/S \times 10^{-Rrr/10}$	E	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Calculated Internal Noise Levels

	10 Log (B+C+D+E)	F	-32.2	-33.0	-38.5	-44.9	-50.3	-52.7	-55.1	
	A (furnished)	Room Absorption	16	16	16	16	16	16	16	
	10 log (S/A)	G	3.2	3.2	3.2	3.2	3.2	3.2	3.2	
L_{eq}	Calc Tolerance	T	3	3	3	3	3	3	3	
	Night Internal $L_{eq,2}$	L+F+G+K+T	38.8	38.9	31.7	23.0	16.2	10.8	7.4	27.6
L_{max}	Calc Tolerance	T	3	3	3	3	3	3	3	
	Night Internal $L_{max,2}$	M+F+G+K+T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

63 125 250 500 1000 2000 4000

Building Envelope Sound Insulation Calculation According to EN 12354-3

	Tredegar Chambers		**Date**	27/06/2024						
	Daytime		**Room**	Livingt Room						
Incident noise levels										
	Term	**Label**	**Octave band centre frequency (Hz)**							**dB(A)**
			63	**125**	**250**	**500**	**1 k**	**2 k**	**4 k**	
$L_{eq,ff}$	Measured L_{eq}	Cambrian Road, Evening	62.1	61.4	61.0	63.6	59.9	53.7	48.4	0.0
		L: Cambrian Road, Evening: Adj Spectrum	62.1	61.4	61.0	63.6	59.9	53.7	48.4	64.3
		K	3	3	3	3	3	3	3	
$L_{max,ff}$	Lmax	Cambrian Road, Night								
		Max Specturm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
		K	6	6	6	6	6	6	6	

Room Details

	Term	**Derivation**	**Value**	**Term**	**Derivation**	**Value**
	V	Volume (m^3)	69.6	Sew	Sf - Swi	5.8
	RT	RT (secs)	0.5	Srr	Area of ceiling (m^2)	24.9
	Sf	Facade area (inc. window) (m^2)	13.1	S	Sf + Sr	38.0
	Sr	Roof Area	24.9	Ao	Ref Area for Dnew	10.0
	Swi	Window area (m^2)	7.4	Attenuation to roof		

Sound Insulation Calculation elements

	Term	**Label/element**	**Octave band centre frequency (Hz)**							**Rw**
			63	**125**	**250**	**500**	**1 k**	**2 k**	**4 k**	
vent openings	$D_{n,e}$	Mechanical Vent	100	100	100	100	100	100	100	101
	$A_0/S \times 10^{-Dn/10}$	B	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
window	R_{wi}	Stom Windows Slimline	22.8	23.3	28.9	36.8	41.9	43.5	45.9	40
	$S_{wi}/S \times 10^{-Rwi/10}$	C	0.001	0.001	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	40.5	39.3	33.3	28.0	19.2	11.4	3.7	29.7
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Primary wall	R_{ew}	Example Wall from BS8233 (Brick and Block)	36	40	44	45	51	56	58	51
	$S_{ew}/S \times 10^{-Rew/10}$	D	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	26.2	21.5	17.1	18.7	9.0	-2.2	-9.5	17.5
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roof	R_{rr}	None/Infinite	100	100	100	100	100	100	100	101
	$S_r/S \times 10^{-Rrr/10}$	E	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
		L_{eq} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		L_{max} Internal SPL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Calculated Internal Noise Levels

	10 Log (B+C+D+E)	F	-29.8	-30.4	-35.9	-43.4	-48.6	-50.4	-52.8	
	A (furnished)	Room Absorption	22	22	22	22	22	22	22	
	10 log (S/A)	G	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
L_{eq}	Calc Tolerance	T	3	3	3	3	3	3	3	
	Day Internal $L_{eq,2}$	L+F+G+K+T	40.6	39.4	33.4	28.5	19.6	11.6	3.9	30.0
L_{max}	Calc Tolerance	T	3	3	3	3	3	3	3	
	Night Internal $L_{max,2}$	M+F+G+K+T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Combined	**42.8**	**42.2**	**35.7**	**29.4**	**21.1**	**14.1**	**8.8**	**31.9**