Change of Use Planning Application (Prior Approval)

Report by: Scott Castle BSc (Hons) CEnvH, MCIEH: Acoustics MIOA

Date: 04/06/2025

Project: J3850

Issue 2

Site: **291 Tarring Road, Worthing.**

Client: **DIM South Limited**

Contents

Tables

Figures

Report by: Scott Castle BSc (Hons) CEnvH, MCIEH MIOA
Checked by: Peter Attwood BSc(Hons) MSc MCIOB MIOA

Issue 1	07/06/2024	Original Issue
Issue 2	04/06/2025	Revised Issue to Account for floor plan change

1 Introduction and Executive Summary

Acoustic South East have been appointed to undertake an acoustic assessment to support a planning application for a change of use. Specifically, a change of use is proposed which sees offices converted to residential uses through the expedited “prior approval” process.

Standards and guidance referenced for this assessment include:

- BS8233 (Sound insulation and noise reduction for buildings) 2014
- National Planning Policy Framework (NPPF), 2023
- ProPG2017

A class 1 sound level meter was left at the site over 5 complete days and 6 complete nights to understand the site soundscape. The measured dataset and subjective assessment indicate that the commercial Cedar Garage to the rear is only intermittently audible.

Contextually, the garage premises is only open weekdays and closes at 17:30 Monday to Thursday and earlier on Fridays (16:30 hours). Residential receptors already exist in much closer proximity to the garage at 305 Tarring Road with a direct line of view into the workshops.

The measured soundscape at the application site is relatively low, 48dB $L_{Aeq,16\ hour}$ for the daytime period and 43dB $L_{Aeq,\ 8\ hour}$ for the night time period. When considered in line with the ProPG2017 initial site risk assessment, the outcome is negligible to low, indicating that noise is not a major concern at the site.

Given the intermittent soundscape from the garage, a worst-case hour was derived (49dB $L_{Aeq,\ 1hour}$) and considered against 35dB $L_{Aeq,1\ hour}$ to provide a worst-case Sound Reduction Index (SRI) of 14dB. The driver for the bedroom is the night time soundscape which has a higher SRI requirement of 18dB to account for the L_{Amax} events.

Rigorous calculations indicate that standard thermal double glazing and off the shelf passive commercial through frame or through wall vents are capable of being applied to provide the occupants with sufficient ventilation.

Based on the evidence presented, planning permission for the commercial change of use to residential based on an expedited prior approval process, should not be withheld on noise grounds.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

This assessment supports a change of use application being made to Adur and Worthing Council for a conversion from offices to residential. The application is made under the "prior approval" process which can only consider commercial elements of the site soundscape.

2.2 Site Location

The application site is detailed in red in Figure 1. To the immediate North is Tarring Road and the mainline Southern railway station for West Worthing.

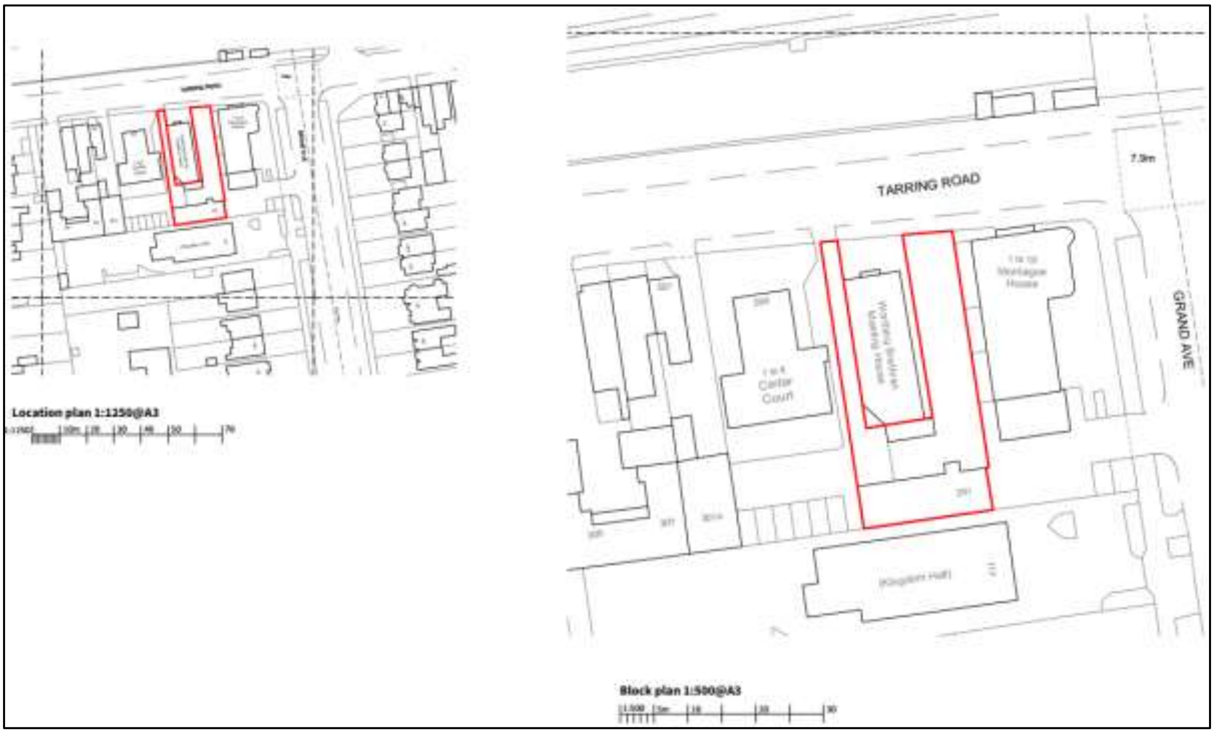


Figure 1. Site Location Plan

Acoustic South East

Figure 2. Application Site

2.3 Soundscape

The soundscape was comprised of road traffic noise from Tarring Road as well as trains transiting through West Worthing station. Occasional air tools could be heard during visits to the site, albeit these were intermittent.

2.4 Commercial Setting

The site remains an unoccupied office. There are places of worship located to the North and South of the site which were locked up during visits to the site.

To the West is a commercial vehicle workshop called Cedar Garage. A visit to the site identified that the premises operates 08:00-17:30 Monday to Thursday and 08:00-16:30 on Friday with the premises closed on Saturday and Sunday. The manager reports that the noisiest item carried out on the site is the pressure washing of courtesy cars which can occur at any time and are no longer than 5 minutes. Contextually, 305 Tarring Road as a residential property is significantly closer to the garage than the application site.

Grand Avenue was also viewed to determine if there was any plant serving the religious building to the immediate South.

2.5 Floor Plans

2.5.1 Existing Floor Plans

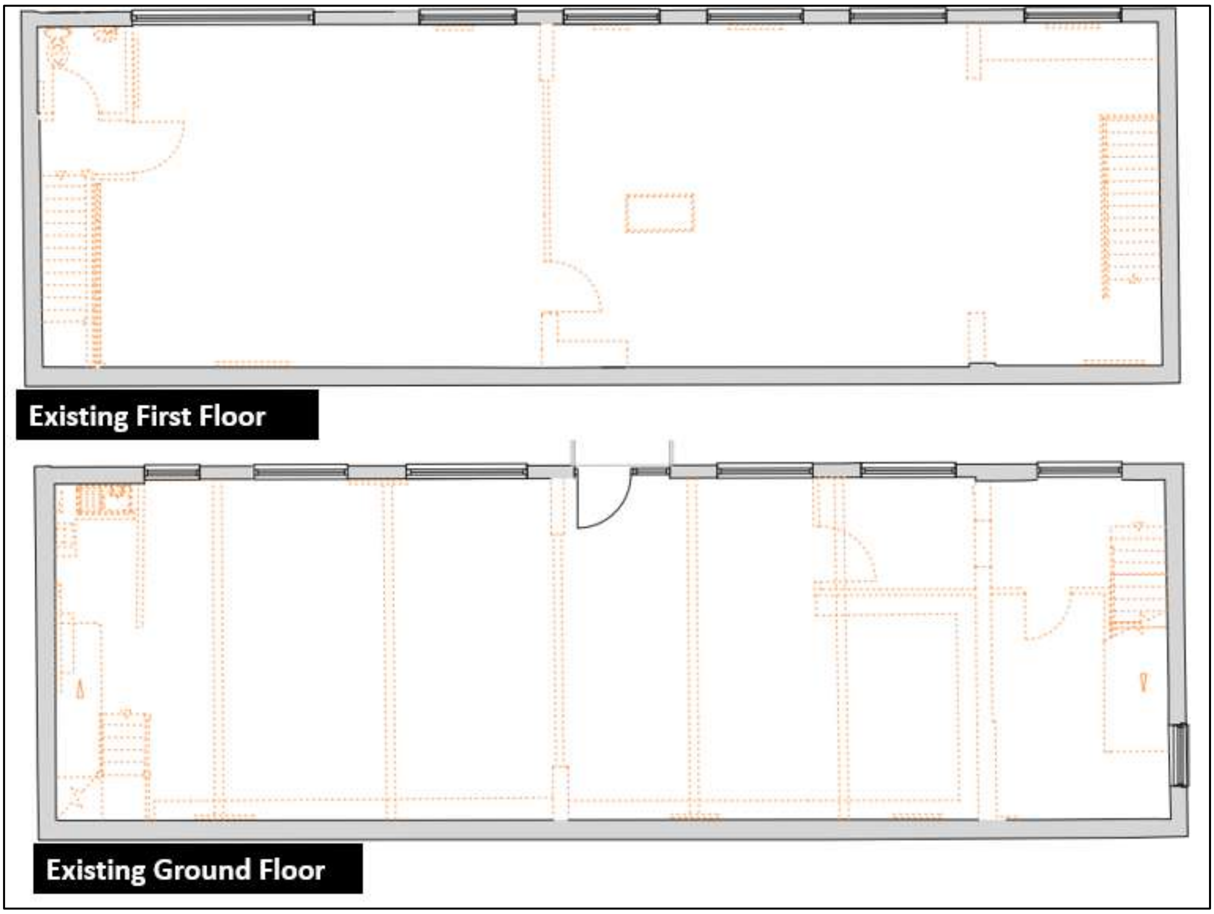


Figure 3. Existing Site Plans

The site is single glazed (measured as 4mm) with wooden frames. These are proposed to be replaced in due course with smaller windows.

2.5.2 Proposed Floor Plans

Figure 4. Proposed Floor Plans

Note that there are no windows to the rear, and no new windows are created. It is proposed that the windows will also be replaced at the site.

2.5.3 Proposed Elevations

Figure 5. Proposed New Windows on Northern Facade

2.5.4 Proposed Windows

It is relevant to note that the windows will be as per the specification in AWDM/0071/25 as a separate application was made to Adur and Worthing District Council to upgrade the windows and doors. The proposed windows utilise a 4mm glass, 20mm gap and 4mm glass. Using INSUL noise modelling this is likely to have a D_{nTw}+C_{tr}/$R_{traffic}$ value of 28dB(A)

2.6 BS8233:2014 Noise Criteria

Table 4 of BS8233:2014 provides the following guideline values:

Activity	Location	Time 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

It is relevant to note that Table 4 criteria in BS8233:2014 relates to continuous and anonymous sound. With intermittent sounds generated from the garage use to the West, it would be appropriate to select a worst-case hour.

2.7 National Planning Policy Framework (Dec 2024)

The National Planning Policy Framework (Dec 2024) defines the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.

The following paragraphs are relevant within NPPF Section 15 (Conserving and enhancing the natural environment) states the following:

Paragraph 187(e) - Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability, and

Paragraph 198 - Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

Paragraph 200– Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

2.8 Overheating

As a change of use, it is noted that Building Regulations Approved Document O relating to Overheating does not apply.

With regards to the Acoustics, Ventilation and Overheating Guidance (AVOG) (Jan 2020), as well as the newly implemented Building Regulations Approved Document O (ADO), attention is drawn to the fact that these relate to new build developments and not conversions. For the AVOG, 2020, this is found in paras 1.4 and 1.13 and for the ADO, see para 0.3.

The ADO Frequently Asked Questions (FAQ) also referenced that an overheating assessment for a change of use is not applicable- Approved Document O: Overheating, frequently asked questions - GOV.UK (www.gov.uk).

2.9 Methodology

Given the proposed application is a prior approval, it is relevant to consider the commercial soundscape. Whilst present on the site, this was not immediately apparent with an occasional compressor sound noted to the West and likely to have arisen from the Cedar garage.

A sound level meter position was therefore located on the iron railings which separate the site, albeit at the Western end of the building to identify what, if any commercial sounds might be generated. From the context section, and through a discussion with the site manager of the Cedar Garage, the noisiest element is that of the compressor to run the pressure washer and clean courtesy vehicles on their return by customers. However, there are no set periods for when such cleaning occurs.

It is therefore proposed to consider a worst-case hour within the Monday to Friday dataset to inform the assessment process.

3 Sound Survey

A class 1 sound level meter was secured and left at the front of the property between 31st May 2024 and 6th June 2024. The position of the sound level meter and more specifically the microphone was located in façade conditions at 1.5m from the wall and 2.6m above ground level. The sound level meter was set to record in A weighted and Fast conditions and measured sound pressure levels every second. The dataset was processed using dBTrait software. A weather station was also co-located on the site.

Survey(s) carried out by	Scott Castle. MCIEH CEnvH, MIOA
Equipment Used	01dB Black Solo, Class 1 Sound Level Meter
Equipment Used	Norsonic 1251 Acoustic Calibrator – Serial No. 31719
Location	WhatThreeWords.Gaps.Unions.broom
Duration	31st May 2024 to 6th June 2024

Table 2. Survey Data

Figure 6. Application Site and Location of Survey (plus weather station)

4 Results of the Sound Survey

4.1 Unattended Survey

The freefield measured data at the survey location is presented in Figure 7 below. The dataset was measured in ideal weather conditions for environmental monitoring and the weather data is presented in Appendix A.

L_{Amax} events which will be relevant to a bedroom soundscape are reviewed in Figure 8 below.

Logarithmically Averaged Day and Night time Periods (External - Freefield)-dB(A)			
$L_{Aeq, 16 hour}$- 07:00-23:00		$L_{Aeq, 8 hour}$ 23:00-07:00	
Day 1	46.8	Night 1	40.5
Day 2	44.7	Night 2	42.1
Day 3	46.1	Night 3	41.2
Day 4	47.3	Night 4	39.7
Day 5	48.2	Night 5	40.7
Arithmetic Average	**46.6**	Night 6	43.1
		Arithmetic Average	**41.2**

Figure 7. Measured Continuous Sound Pressure Levels (Day and Night)

No. of Occurrences of L_{Amax} between 23:00-07:00 hours above 45dB L_{Amax} (SRI-13dB)					
Night 1	**Night 2**	**Night 3**	**Night 4**	**Night 5**	**Night 6**
16	20	11	14	20	23

No. of Occurrences of L_{Amax} between 23:00-07:00 hours above 45dB L_{Amax} (SRI-18dB)					
Night 1	**Night 2**	**Night 3**	**Night 4**	**Night 5**	**Night 6**
4	9	3	2	2	5

Figure 8. Predicted L_{Amax} Events Per Night (Inside a Bedroom)

From Figure 7 above, it is apparent that the soundscape is relatively low for the application site.

From Figure 8 above, and using a 13dB of attenuation provided by a partially open bedroom window, it is apparent that the L_{Amax} events during the night time period would not allow openable windows, and an alternative ventilation strategy for bedroom windows will be needed.

4.2 Worst Case Hour (Daytime Period)

The dataset was examined on the basis of a worst-case hour on the premise that the intermittent sounds from the garage are not consistent with the direct application of table 4 values for BS8233:2014. With this in mind, the data was post processed into single hour periods.

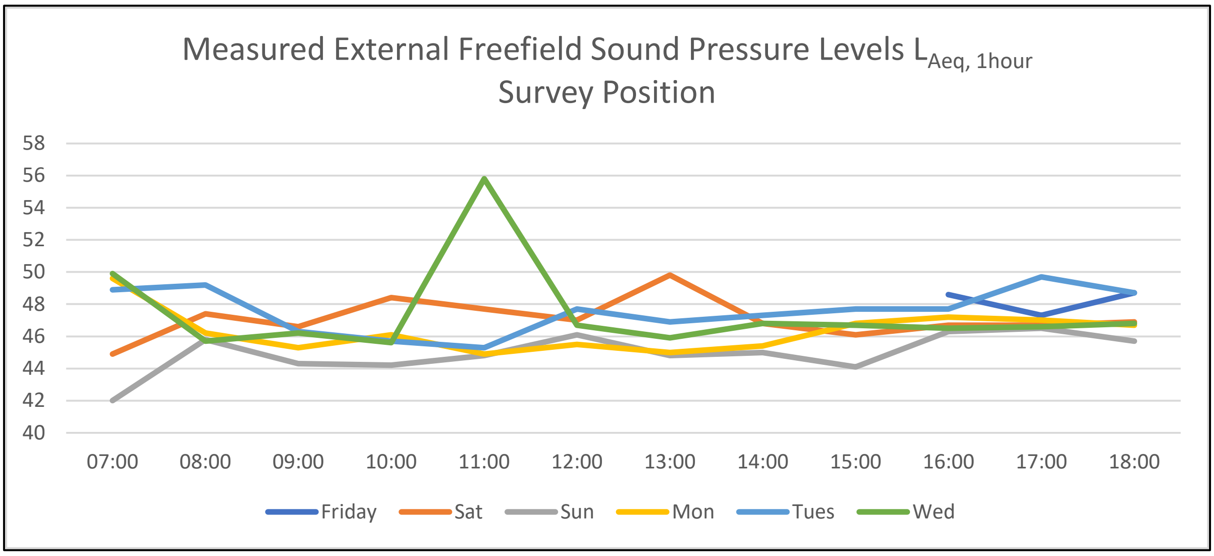


Figure 9. Measured External Freefield Dataset ($L_{Aeq,\ 1\ hour}$)

Whilst the data indicates a raised level of 56dB $L_{Aeq,1\ hour}$ at 11:00-12:00 hours on the Wednesday, this was not consistent with the sounds heard subjectively at different visits to the site.

Sound pressure levels were reviewed for periods when car washing and air tools were being used as notes were made whilst present on the application site as well as the Cedar Garage site, and these did not generate 56dB L_{Aeq},T at the survey position.

Given the single instance, this was felt to be an outlier and more likely peak hours of 49dB $L_{Aeq,\ 1\ hour}$, were felt to be more representative of the garage activities. Therefore a worst case freefield hour of 49dB $L_{Aeq,\ 1\ hour}$ has been used for the daytime assesment.

To check this, the 1 minute resolution for 11:00-12:00 hours on 5th June 2024 was reviewed and this included sound pressure levels up to 69 dB $L_{Aeq,\ 1minute}$ which would not be consistent with the garage activities. It is also relevant to note that the garage is closed Saturday and Sundays.

5 Discussion

5.1 Calculation of the Sound Reduction Index (SRI)

By being aware of how the soundscape impacts the proposed properties, the required Sound Reduction Index (SRI) to achieve satisfactory internal sound pressure levels can be calculated.

There are three drivers that impact the façade sound reduction index or SRI. These are the daytime continuous noise levels measured over 16 hours in $L_{Aeq'T,}$ the night time continuous noise levels over 8 hours, also measured in $L_{Aeq'T.}$ Thirdly, ProPG2017 requires a consideration of the number of L_{Amax} events which will occur in a bedroom during the night time period. Specifically, ProPG2017 requires no more than ten events exceeding 45dB L_{Amax} measured internally. Whichever of these drivers is highest is applied to ensure that the residents are protected from all criteria.

It is relevant to note that living room and bedroom calculations differ, as although 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 daytime SRI is the predicted external freefield 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 L_{Amax} SRI is achieved by using the predicted night time external sound pressure level and comparing this with the measured night time survey noise level. The SRI figure is then adjusted to prevent no more than 10 L_{Amax} events per night inside the bedroom environment above 45dB L_{Amax}. The adjustment process takes account of each of the 6 measured night time periods to ensure that no individual night exceeds 10 events of 45dB L_{Amax} inside the bedroom.

An assessment has been made below of all rooms at ground and first floor as these all have fenestration on the Northern façade. The exception to this is a lone window on the Eastern façade at ground floor level.

Summary of Sound Reduction Index (SRI) Required for Living Rooms			
Location	Highest Predicted Daytime External Sound Pressure Level ($L_{Aeq, 16 hour}$)- Rounded	BS8233:2014 Daytime Criterion	Daytime SRI
North	49*	35 dB $L_{Aeq, 1 hour}$	14
North	48	35 dB $L_{Aeq, 16 hour}$	13
* relates to worst case measured hour			
All data presented is dB(A) and Freefield			

Figure 10. Sound Reduction Index for Living Room Spaces

Summary of Sound Reduction Index (SRI) Required for Bedrooms								
Location	Highest Predicted Daytime External Sound Pressure Level ($L_{Aeq, 16 hour}$)- Rounded	BS8233:2014 Daytime Criterion	Daytime SRI	Highest Predicted Night Time External Sound Pressure Level $L_{Aeq, 8 hour}$- Rounded	BS8233:2014 Night Time Criterion	Night Time SRI	SRI to ensure less than 10 L_{Amax} events 45dB(A)	SRI to Apply
North	48	35 dB $L_{Aeq, 16 hour}$	13	43	30 dB $L_{Aeq, 8 hour}$	13	18	**18**
All data presented is dB(A) and Freefield								

Figure 11. Sound Reduction Index for Living Room Spaces

Based on the information above in respect of the required attenuation from outside to inside, this is a very straight forward calculation. However, when used in conjunction with the table B2 in Figure 11 below extracted from Acoustics, Ventilation and Overheating Guidance dated Jan 2020, it is apparent that for the single fenestration façade (north) of the building, this is capable of being achieved with passive ventilation and either through frame or through wall vents.

Table B-2 Potential level differences associated with different ventilation Systems from ADF

Ventilation System from ADF	Cont. equiv. (L_{Aeq}) or events (L_{AFmax})	Level Difference, external free field level – internal reverberant level, dB	
		Typical windows and vent	Higher acoustic performance windows and vent
1, 2	L_{Aeq}	21	31
	L_{AFmax}	22	35
3 (with trickle vent)	L_{Aeq}	23	33
	L_{AFmax}	24	38
4 (no trickle vent)	L_{Aeq}	27	38
	L_{AFmax}	31	45

Figure 12. Extract from AVOG, Jan 2020

5.2 Assessment of Opening Windows

It is relevant to consider whether windows may be opened to provide background ventilation into the habitable spaces.

It is relevant to note that the table below has used a 13dB of attenuation from freefield external values to reverberant internal values. Also, both BS8233:2014 and the AVOG guidance indicate that for ventilation purposes, a relaxation of the table 4 values by 5dB will still provide "*reasonable internal living conditions*".

Based on Figure 13 below it indicates that windows are likely to be openable for the daytime and night time periods. However, it should be remembered that Figure 13 is based on continuous sound pressure levels.

When considering L_{Amax} events for the internal bedroom soundscape, these are likely to exceed the requirements of ProPG2017 as already indicated in section 4.1 above. Alternative ventilation requirements for the bedroom are discussed later in section 6.2.

Assessment of whether windows may be opened for background ventilation				
Location	**Highest Predicted <u>Daytime</u> External Sound Pressure Level ($L_{Aeq, 1\ hour}$)**	**Open Window (-13dB)**	**BS8233:2014 Daytime Criterion**	**Openable Windows (Yes/No)**
North	49	36	35 dB $L_{Aeq, 16\ hour}$	Yes
Location	**Highest Predicted <u>Night Time</u> External Sound Pressure Level $L_{Aeq, 8\ hour}$**	**Open Window (-13dB)**	**BS8233:2014 Night Time Criterion**	**Openable Windows (Yes/No)**
North	43	30	30 dB $L_{Aeq, 8\ hour}$	Yes
All predicted External data presented is dB(A) and Freefield				

Figure 13. Assessment of Openable Windows

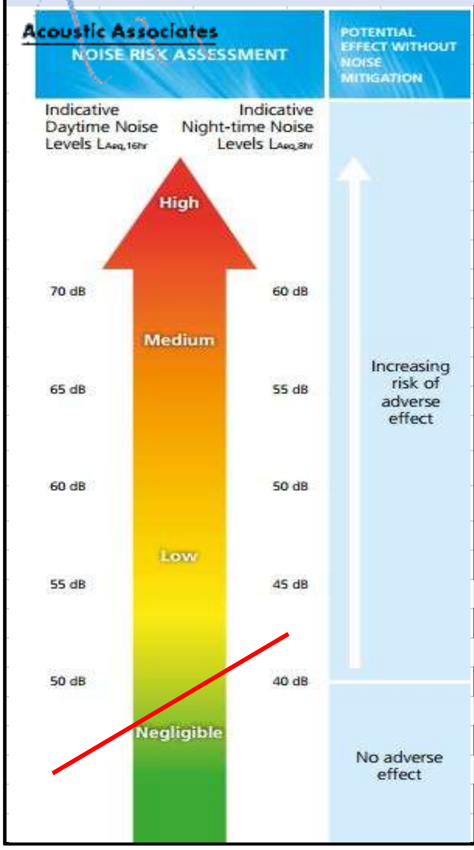
5.3 ProPG 2017 Initial Site Risk Assessment

In line with the requirements of ProPG2017, an initial site risk assessment has been undertaken which requires that the worst case/typical 24 hours are represented.

The assessment details a negligible to low impact for the front façade.

Accordingly, the grant of planning consent should not be withheld on noise grounds.

Stage 1. Initial Site Risk Assessment



Site:	291 Tarring road, West Worthing
Date:	31st May-6th June 2024
Individual	Scott Castle
Proposal	Proposed Residential
Survey or Prediction	Survey
Freefield Survey	Yes
Instrumentation used	01db Black Solo
Typical/Worst case 24 hour period	
Location Assessed(Grid Ref)	WhatThreeWords-gaps.unions.broom
Subjective Noise sources at site	Road noise, rail, intermittent garage
Weather conditions	Dry, low wind speeds
Survey Result	
No Mitigation Measures	
Daytime ($L_{Aeq, 16 hour}$)	48 dB $L_{Aeq,16 hour}$
Night ($L_{Aeq, 8 hour}$)	43 dB $L_{Aeq, 8 hour}$
Night L_{AMax} Events above 45dB(A)	17 events assuming Rw13 at Survey Location
Outcome	
Level of Risk Posed	Negligible to Low
Next Steps	
Stage 2 Full Assessment	No
Signed Off by	Scott Castle
Date	6th June 2024

Figure 14. ProPG2017 Initial Site Risk Assessment

5.4 Rigorous Calculations

Given that new windows are proposed, the elevations from the proposed window finishes have been used to scale the facades and specifically the window sizes.

Rigorous calculations, as per Annex G2 of BS8233:2014 consider the worst-case measured external (freefield levels) sound pressure level, but rather than using a simplistic external to internal sound pressure level subtraction, the Sound Reduction Index (SRI) is achieved using ratios of window sizes, facades, glazing specification as well as the proposed ventilation considerations. The rigorous calculations have taken account of the following:

- The worst case highest daytime sound pressure levels have been used.
- All rigorous calculations use freefield data.
- The calculations have assumed a masonry cavity wall and a pitched roof with tile exterior.
- The calculations include for the roof as a means of sound energy penetrating the building envelope for the first-floor bedroom calculations.
- 35dB $L_{Aeq,16\ hour}$ has been applied as the daytime criteria for a Kitchen/Lounge/Diner
- The calculations have used a commercially available through frame trickle vent (Greenwood 5000EAx2) and standard thermal double-glazed windows (4\20\4)
- Bedroom 3 for the first floor was used as a worst case with 3.8m^2 of glazing.
- Similarly, Kitchen/Living/Diner on the ground floor was used to demonstrate a worst case with 4.32m^2 of glazing.
- The most onerous requirement for a bedroom, ie an SRI of 18 is comfortably achieved with an SRI of 25dB provided and a low internal sound pressure level of 24dB which is 11dB below the daytime requirements of BS8233:2014 (ie 35dB $L_{Aeq,\ 1\ hour}$)

Non Frequency Dependent Variables		
Term	Derivation	Value
Ao	Given in BS EN 20140-10 = 10 (m^2)	10
Sf	Total Facade Area (m^2)	12.24
Swi	Window Area (m^2)	3.84
Sew	External Wall Area (m^2)	8.4
Srr	Ceiling Area (m^2)	15.6
S	Total Area sound enters the room (m^2)	27.84

Key for Table Below	
Rwi	Sound Reduction of Window (Octave)
Rew	Sound Reduction Index of External Wall (
Rrr	Sound Reduction Index of Roof/Ceiling (
A	Equivalent Absorbtion Area of Rx Room
Dn,e	Insulation of Trickle Vent (BS EN 20140-1(

Frequency Dependent Variables							
		Octave Band Centre Frequency					
Term	Description	125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	51	47	45	45	42	35
Dn,e	2x Greenwood EA	36.5	34.3	32.5	29	28	30.5
Rwi	4-20-4	19	16	34	44	48	45
Rew	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
Rrr	Tiles on felt, pitched roof, 100mm mineral wool on lath and plaster ceiling	51	51	51	51	51	51
A	Equivalent Absorbtion Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
	Octave Band Centre Frequency					
Term From Equation Below	125	250	500	1000	2000	4000
Leq,ff	51	47	45	45	42	35
Ao/S . 10^(-Dn,e/10)	8.04E-05	0.000133	0.000202	0.000452	0.000569	0.00032
Swi/S . 10^(-Rwi/10)	0.001736	0.003465	5.49E-05	5.49E-06	2.19E-06	4.36E-06
Sew/S . 10^(-Rew/10)	2.4E-05	3.8E-05	1.2E-05	1.9E-06	3.02E-07	9.54E-08
Srr/S . 10^(-Rrr/10)	4.45E-06	4.45E-06	4.45E-06	4.45E-06	4.45E-06	4.45E-06
10log10(S/A)+3	7.032765	5.985412	5.405492	5.405492	5.68578	5.68578
Leq,2	30.69339	28.59709	14.77291	17.0711	15.2917	5.858285
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	**14.59339**	**19.99709**	**11.57291**	**17.0711**	**16.4917**	**6.858285**

A-Weigted Level Outside	49
BS8233 Predicted Internal A-Weigted Level	24
Prediced Building Envelope SRI	25

Bedroom 3-First Floor

BS8233 Calculation can be seen below:

$$L_{eq,2} \approx L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

Figure 15. First Floor Bedroom 3

Non Frequency Dependent Variables		
Term	Derivation	Value
Ao	Given in BS EN 20140-10 = 10 (m^2)	10
Sf	Total Facade Area (m^2)	13.44
Swi	Window Area (m^2)	4.32
Sew	External Wall Area (m^2)	9.12
Srr	Ceiling Area (m^2)	0.00001
S	Total Area sound enters the room (m^2)	13.44001

Key for Table Below	
Rwi	Sound Reduction of Window (Octave)
Rew	Sound Reduction Index of External Wall (
Rrr	Sound Reduction Index of Roof/Ceiling (
A	Equivalent Absorbtion Area of Rx Room
Dn,e	Insulation of Trickle Vent (BS EN 20140-1

Frequency Dependent Variables							
		Octave Band Centre Frequency					
Term	Description	125	250	500	1000	2000	4000
Leq,ff	Free-Field External Noise Level	51	47	45	45	42	35
Dn,e	2x Greenwood EA	36.5	34.3	32.5	29	28	30.5
Rwi	4-20-4	19	16	34	44	48	45
Rew	Cavity Masonry (Brick Cavity with Insulation lightweight block)	41	39	44	52	60	65
Rrr	No Roof	100	100	100	100	100	100
A	Equivalent Absorbtion Area of Room (Copied from BS8233)	11.00	14.00	16.00	16.00	15.00	15.00

BS8233 Calculation Details						
	Octave Band Centre Frequency					
Term From Equation Below	125	250	500	1000	2000	4000
Leq,ff	51	47	45	45	42	35
Ao/S . 10^(-Dn,e/10)	0.000167	0.000276	0.000418	0.000937	0.001179	0.000663
Swi/S . 10^(-Rwi/10)	0.004047	0.008074	0.000128	1.28E-05	5.09E-06	1.02E-05
Sew/S . 10^(-Rew/10)	5.39E-05	8.54E-05	2.7E-05	4.28E-06	6.79E-07	2.15E-07
Srr/S . 10^(-Rrr/10)	7.44E-17	7.44E-17	7.44E-17	7.44E-17	7.44E-17	7.44E-17
10log10(S/A)+3	3.870069	2.822716	2.242796	2.242796	2.523083	2.523083
Leq,2	31.17131	29.08397	14.82726	17.03727	15.2603	5.806535
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	**15.07131**	**20.48397**	**11.62726**	**17.03727**	**16.4603**	**6.806535**

A-Weigted Level Outside	**49**
BS8233 Predicted Internal A-Weigted Level	**24**
Prediced Building Envelope SRI	**25**

KLD Ground Floor

BS8233 Calculation can be seen below:

$$L_{eq,2} \approx L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3$$

Figure 16. Ground Floor Kitchen/Living/Diner

6 Recommendations

6.1 Glazing

The clients architect provided a specific window product with a 28mm glazing system (4mm glass, 20mm gap, 4mm glass). This has a predicted $R_{traffic}$ value of 28dB(A).

6.2 Ventilation

Whilst windows may be opened in some instances, it is noted for the bedrooms during the night time period, the L_{Amax} events with an open window would likely exceed the requirements of ProPG2017.

Commerically available passive vents may be used to provide an alternative ventilation solution. Two Greenwood EA5000 (5000mm^2) through frame slot vents were used in the rigorous calculations.

7 Conclusion

A class 1 sound level meter was left at the site over 5 complete days and 6 complete nights to understand the site soundscape. The measured dataset and subjective assessment indicate that the commercial Cedar Garage to the rear is only intermittently audible.

Contextually, the garage premises is only open weekdays and closes at 17:30 Monday to Thursday and earlier on Fridays (16:30 hours). Residential receptors already exist in much closer proximity to the garage at 305 Tarring Road with a direct line of view into the workshops.

The measured soundscape at the application site is relatively low, 48dB $L_{Aeq,16\ hour}$ for the daytime period and 43dB $L_{Aeq,\ 8\ hour}$ for the night time period. When considered in line with the ProPG2017 initial site risk assessment, the outcome is negligible to low, indicating that noise is not a major concern at the site.

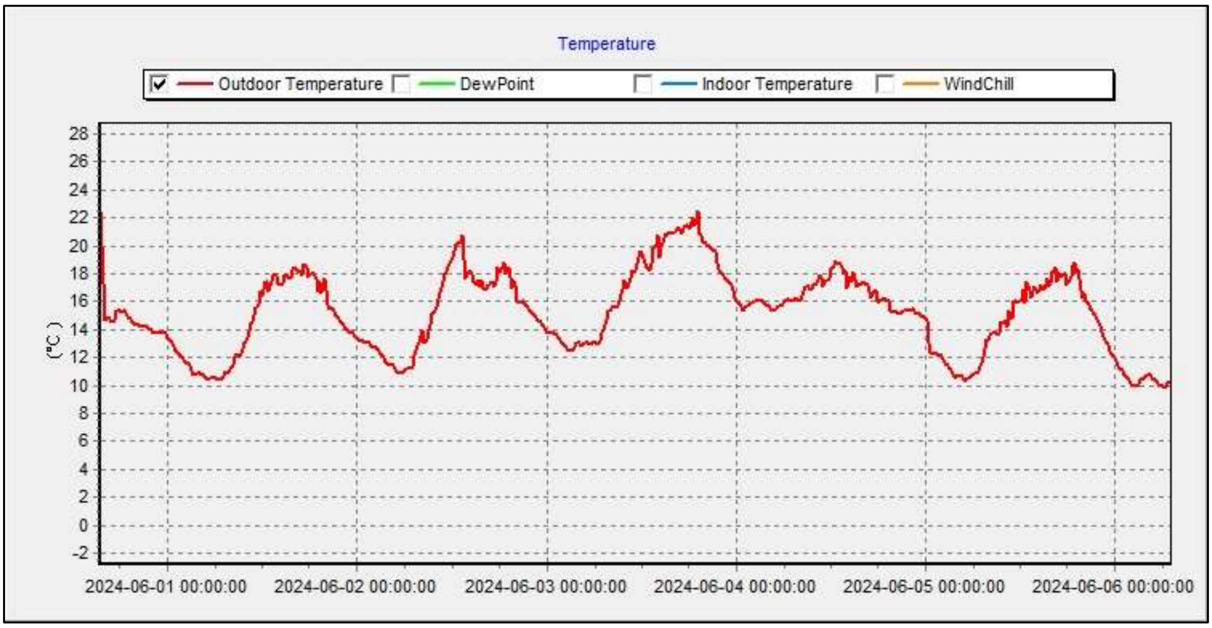
Given the intermittent soundscape from the garage, a worst-case hour was derived (49dB $L_{Aeq,\ 1hour}$) and considered against 35dB $L_{Aeq,1\ hour}$ to provide a worst-case Sound Reduction Index (SRI) of 14dB. The driver for the bedroom is the night time soundscape which has a higher SRI requirement of 18dB to account for the L_{Amax} events.

Rigorous calculations indicate that standard thermal double glazing and off the shelf passive commercial through frame or through wall vents are capable of being applied to provide the occupants with sufficient ventilation.

Based on the evidence presented, planning permission for the commercial change of use to residential based on an expedited prior approval process, should not be withheld on noise grounds.

8 Weather Data

8.1 Temperature



8.2 Windspeed