Chartered Building Consultancy

Acoustic South East

Planning – Change of Use

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

Date: **30/09/2024**

Project: **J3911**

Issue **1**

Site: **69 Aldwick Road, Bognor Regis, West Sussex**

Client: **Flav and Co. Acquisitions**

Constructionline

CQMS Entry Scheme

ANC THE ASSOCIATION OF NOISE CONSULTANTS

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1 Introduction and Executive Summary

Acoustic South East Ltd have been appointed to undertake an acoustic assessment to support a planning application for a permitted development. Specifically, a change of use is proposed from a commercial to residential premises (C3) at 69 Aldwick Road, Bognor Regis.

Standards and guidance referenced for this assessment include:

- BS8233 (Sound insulation and noise reduction for buildings) 2014
- National Planning Policy Framework (NPPF), 2023
- Planning Noise Advice Document Sussex, November 2023

69 Aldwick Road is a three-storey property. The building is currently vacant.

The ground floor is set to remain in commercial use and was a former restaurant. The first and second floors are to change to residential use through the permitted development/prior approval planning process.

Adjacent to the application site is a large car showroom called Newbarn, which is only at ground floor level and does not share any party walls with the first floor. The showroom and self-contained sales offices are not noisy uses. It is however noted that the ground floor offices are served by condensers which are located at roof level to the rear of the application site.

As a permitted development/prior approval process, only commercial aspects of the soundscape may be considered.

A long-term survey identified a worst-case hour to the rear of the premises (South aspect) as being 54dB $L_{Aeq,\ 1\ hour}$ (freefield), resulting in a required SRI of 19dB to protect future occupants. An assessment of the current windows (windows will not be changed as part of the current application) indicate that the required SRI is likely to be exceeded with these remaining in place.

To ensure that future residents remain protected against noise levels generated at any commercial ground floor uses, it will be necessary to ensure that the party floor achieves a minimum of 48dB $D_{nTw}+C_{tr}$ in terms of vertical airborne sound insulation performance. Such a level is capable of being conditioned by the local planning authority.

Based on the above, the application should not be withheld on noise grounds.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

A prior approval (Class MA) change of use is proposed at 69 Aldwick Road, Bognor Regis. The change of use concerns the first and second floors only. The site is currently vacant and was a restaurant use. It is required that only commercial soundscapes be considered as part of the assessment.

It is not proposed to change the windows of the site.

In considering the site, the uses likely to generate any sound are the future ground floor as well as the adjacent car showroom. The Newbarn vehicle site has a number of roof mounted condensers to provide air conditioning to the sales offices. The condensers are located to the south of 69 Aldwick Road as seen below in Figure 1.

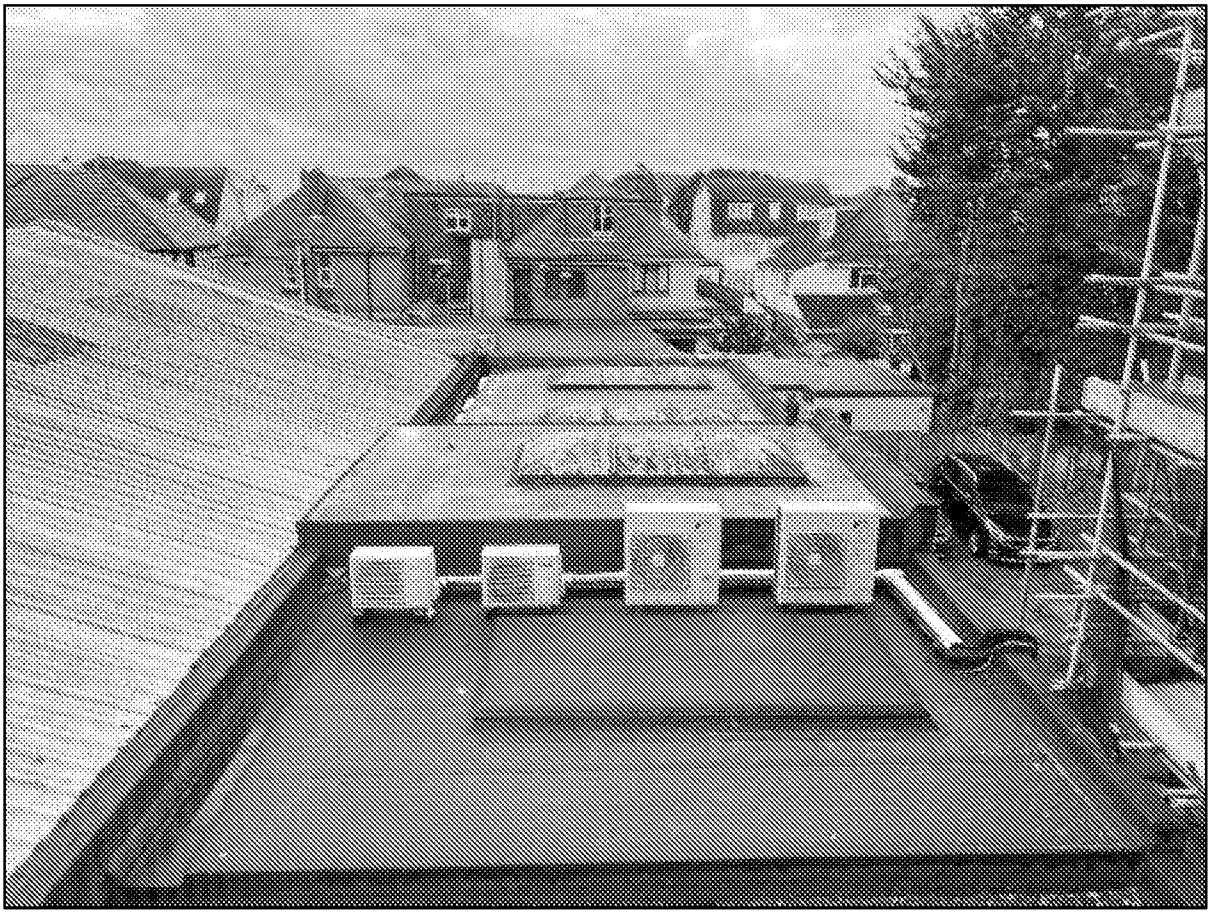

Figure 1. Location of roof mounted condensers to South of the site

2.2 Site Location

The application site is located in Figure 2 below.

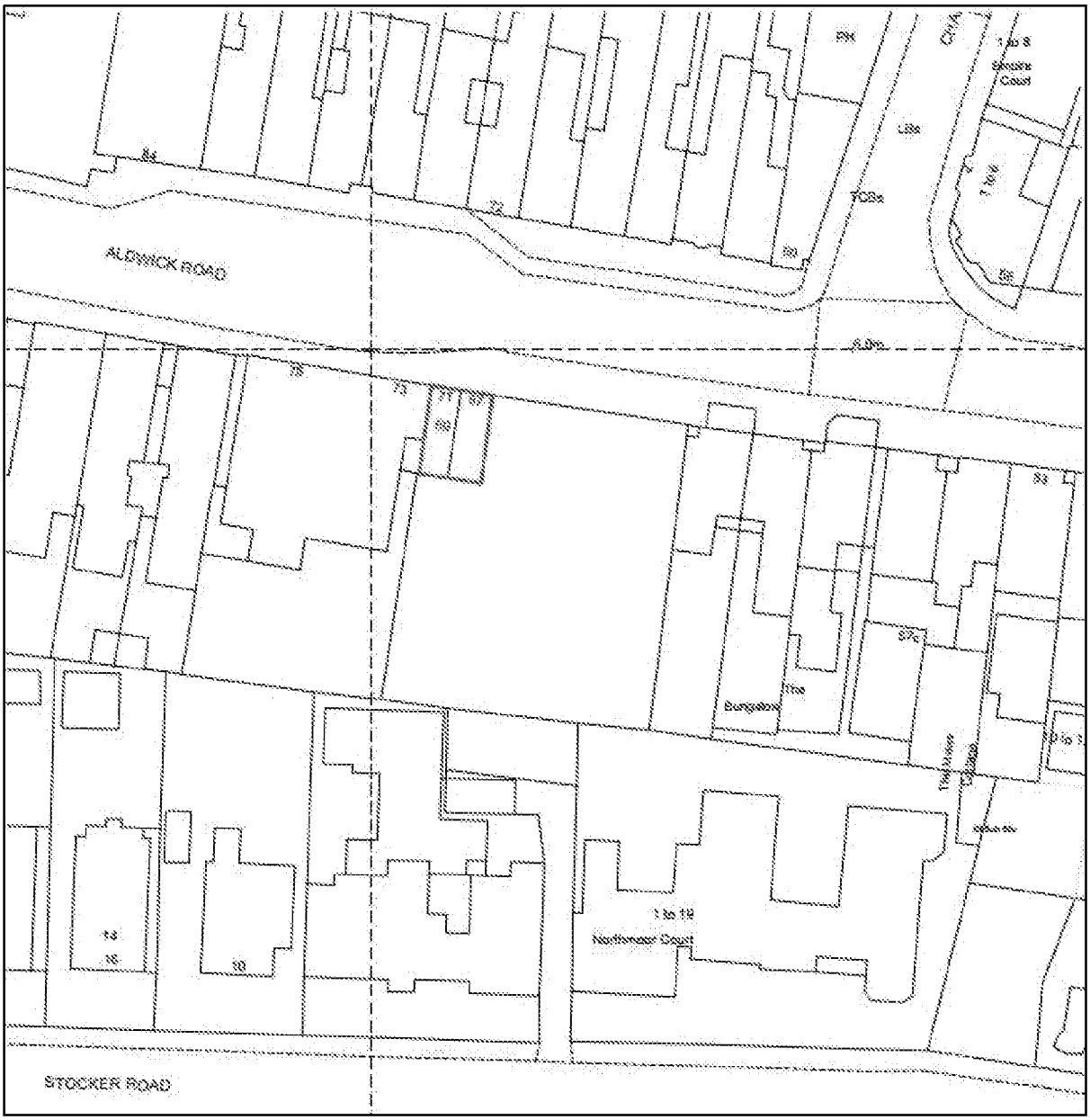

Figure 2. Site Location

2.3 Commercial Premises

The contextual understanding of the site is shown below.

Figure 3. Application Site as seen from Aldwick Road

Inside the Newbarn premises are comprised of an office and parked showroom vehicles only. No workshop or noisy working is apparent.

Figure 4. Inside Newbarn Vehicle Showroom

This is effectively a vehicle showroom with an office constructed within the building which shares a party wall with the ground floor of 69 Aldwick Road.

The premises are open from 08:30 to 17:30 Monday through to Saturday. Staff report that the air conditioners are turned on and off manually and would be operated for the working day.

The only likely sound source is therefore the roof mounted condensers located to the rear and any future ground floor commercial use immediately below the application site.

2.4 Proposed Layout and Elevations

2.4.1 Floorplans

The proposed floor plan can be seen below in Figure 5.

Figure 5. Current and Proposed Floor Plans

2.5 Soundscape

The site soundscape whilst visiting the site was dominating by passing traffic on Aldwick Road. For the avoidance of doubt, for such a permitted development application, only commercial sounds may be considered when assessing their impact on the proposed development. For this particular site, the impacted façade will be the Southern façade looking to the rear.

2.6 Existing Windows

The windows serving the first and second floor are single pane sash windows within wooden frames which demonstrate signs of deterioration with failing pulley mechanisms and fasteners. It is however noted that as an MA application, the windows are not being changed.

2.7 Methodology

The only likely commercial soundscape of comment is that of the adjacent vehicle showroom to the East. To the rear, 4 roof mounted condensers are present which serve the staff offices of the car showroom/workshop. To quantify the impact of the commercial soundscape, the following measures were undertaken:

1. A horizontal airborne sound test carried out between ground floor and first floor level.
2. A class 1 sound level meter was protruded from the second-floor rear window to assess the received impact of the air conditioning plant and assessed against a worst-case hour.

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

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. The soundscape generated by air conditioners switching in and out of service is not likely to be considered as continuous and anonymous and will consider a worst-case hour approach.

2.9 National Planning Policy Framework – Dec 2023

The National Planning Policy Framework (Dec 2023) 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 180(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 191 - 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 193– 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.

3 Sound Survey

A class 1 sound level meter was protruded from the second-floor window at the rear of the premises with a direct line of sight to the condensers. The survey which was façade due to the proximity of the wall was left in situ over a number of days and deliberately included a weekend to be able to demonstrate the impact with the premises open and closed, and accordingly, the condensers switched off for a Sunday.

The data was measured in fast and A weighted parameters. A 3dB subtraction has been made to the survey dataset and a worst-case hour approach taken. The location can be seen below in Figure 6.

Survey(s) carried out by	Scott Castle BSc(Hons) Env Health, MCIEH CEnvH MIOA
Equipment Used	Svantek 971 Class 1 Sound level Meter (Unattended)
Equipment Used	Castle Acoustic Calibrator – Serial No. 041173
Location	Pole Mounted at 8.5m above ground level
Duration	19-25th September 2024

Table 2. Survey Data

Figure 6. Survey at rear protruded from Second Floor Window

4 Sound Insulation Testing

A horizontal airborne sound insulation test was proposed between the sales office space of the car showroom and the first floor of adjacent application site to check for flanking transmission.

Due to the layout of the application site and that the ground floor will remain in commercial use, the only testable space was a room at first floor level. At the first floor, an open stairwell enters the space making transmission through the ground floor party wall likely and thus impacting the results of the assessment.

On setting up the equipment and energising the office space with high levels of pink noise, it was quickly apparent that there was no discernible pink noise at the first-floor level inside the application premises.

The first floor receiving room space was the former kitchen and had the original stainless steel cooker hoods and splashbacks affixed to the wall. All doors had been removed at first floor again making any compartmentalisation of sound difficult.

Through discussions with the Newbarn staff, it was also apparent that there was no party wall at first floor level.

The sound insulation test was, therefore, not completed.

A vertical airborne test was also proposed between the commercial ground floor space of 69 Aldwick Road and the first floor. Again, due to the site layout, this was not practicable at the Aldwick Road side of the property due to the open stairwell. Access was not possible into the rear of the building to facilitate such testing into a suitable first floor space.

5 Measured Data from Unattended Sound Survey

The survey was only set up late on a Thursday evening when Newbarn Vehicle showroom was closing and the condensers had been manually switched off, so data has been presented for Friday, Saturday, Sunday and Tuesday. Monday data has been omitted due to poor weather conditions reviewed at a local weather station.

The lower sound pressure level trace (red) in Figure 7 below indicates that there is a reduced noise impact on a Sunday without the condensers operating, as would be expected.

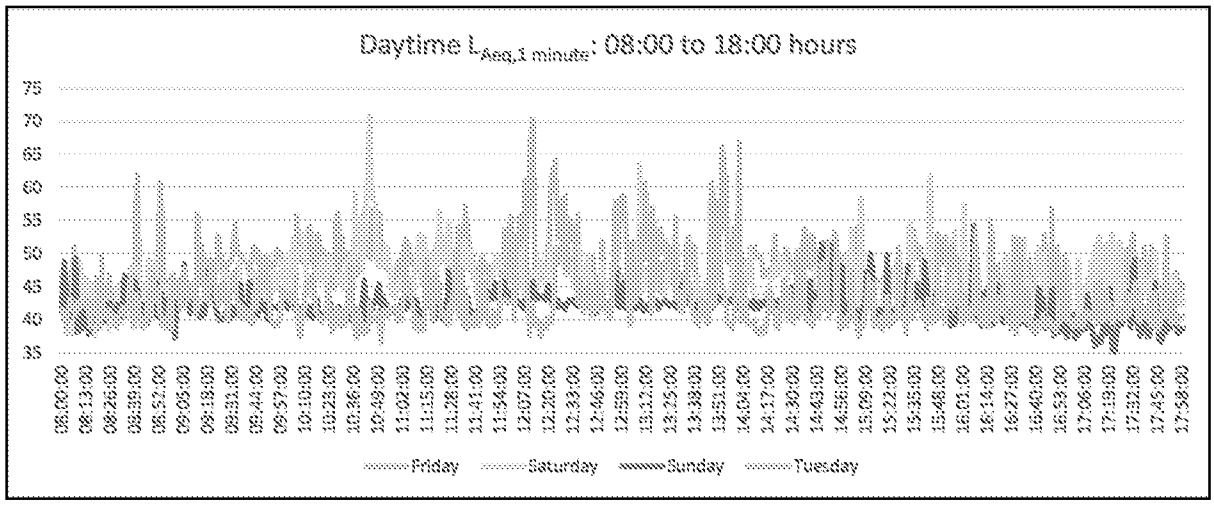

Figure 7. $L_{Aeq,1\ minute}$ 08:00-18:00 hours

As stated, only the sounds from the commercial soundscape may be considered as part of the permitted development/prior approval process. These occur only during the daytime period.

A review of the measured soundscape was undertaken to identify a worst-case hour, against which the table 4 values of BS8233:2014 may be applied.

A worst-case hour, freefield was identified as 54dB $L_{Aeq,\ 1\ hour}$ on the Friday afternoon. This was compared against the measured 16-hour average of the survey being 46dB $L_{Aeq,\ 16\ hour}$.

6 Required Sound Reduction Index for First and Second Floor Rear (South Façade)

With a measured worst-case external hour of 54dB $L_{Aeq,\ 1hour}$, compared against 35dB $L_{Aeq,\ 1hour}$ to achieve appropriate internal sound pressure levels, this results in a Sound Reduction Index or SRI of 19dB.

Given that the windows are not being changed, a rigorous calculation may be undertaken to determine if the current windows are suitable at present or whether additional mitigation measures might be needed to protect the future occupants.

The rigorous calculation has assumed a masonry cavity wall and tiles on felt pitched roof with 100m mineral wool on lath and plaster ceiling. The worst-case hour of 54dB $L_{Aeq,\ 1\ hour}$ (freefield) has been applied and the room/façade dimensions applied as per the drawings provided by the architect.

The calculation assumed 4mm single glazed sash windows as a worst case and a through frame vent (Greenwood EA5000) was also included within the calculation. This achieves internal sound pressure levels of 25dB $L_{Aeq,\ 1\ hour}$ and an SRI of 29, both of which comfortably exceed the SRI required and table 4 BS8233:2014 values.

Non Frequency Dependent Variables		
Term	Derivation	Value
Ao	Given in BS EN 20140-10 = 10 (m^2)	10
Sr	Total Facade Area (m^2)	15.3
Swi	Window Area (m^2)	2.2
Sew	External Wall Area (m^2)	13.1
Srr	Ceiling Area (m^2)	13.6
S	Total Area sound enters the room (m^2)	28.9

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	56	52	50	50	47	40
Dn,e	Greenwood 5000EA(5230mm2)	39.5	37.3	35.5	32	31	33.5
Rwi	Single Glazing 4mm	20	22	28	33	34	28
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	56	52	50	50	47	40
Ao/S . 10^(-Dn,e/10)	3.88E-05	6.44E-05	9.75E-05	0.000218	0.000275	0.000155
Swi/S . 10^(-Rwi/10)	0.000761	0.00048	0.000121	3.82E-05	3.03E-05	0.000121
Sew/S . 10^(-Rew/10)	3.6E-05	5.71E-05	1.8E-05	2.86E-06	4.53E-07	1.43E-07
Srr/S . 10^(-Rrr/10)	3.74E-06	3.74E-06	3.74E-06	3.74E-06	3.74E-06	3.74E-06
10log10(S/A)+3	7.195052	6.147698	5.567779	5.567779	5.848066	5.848066
Leq,2	32.43688	25.96919	19.36908	19.76858	17.75258	10.30555
A-Weighting	-16.1	-8.6	-3.2	0	1.2	1
A-Weighted Leq	**16.33688**	**17.36919**	**16.16908**	**19.76858**	**18.95258**	**11.30555**

A-Weigted Level Outside	54
BS8233 Predicted Internal A-Weigted Level	25
Prediced Building Envelope SRI	29

2F Bed 1, 69 Aldwick Road

BS8233 Calculation can be seen below:

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

Figure 8. Rigorous Calculation

7 Party Ceiling/Separating Ground/First Floor

Given that the ground floor will remain in commercial use, there is a requirement to ensure a degree of acoustic separation with the first floor having changed to a residential demise.

It should be noted that Building Regulations and specifically Approved Document E (resistance to the passage of sound) provide a minimum sound insulation performance level to be achieved. Within ADE and the Planning Noise Advice Document Sussex dated November 2023 it is advised that such levels are exceeded by at least 5dB(A). For a change of use scenario this would equate to 48dB $D_{nTw}+C_{tr}$ to be achieved for a vertical airborne sound insulation performance criterion.

This may typically be achieved with a suspended MF ceiling with acoustic hangers and/or improvements to the above floor build up and is capable of being conditioned by the local planning authority to achieve a minimum of 48dB $D_{nTw}+C_{tr}$.

8 Conclusion

69 Aldwick Road is a three-storey property. The building is currently vacant.

The ground floor is set to remain in commercial use and was a former restaurant. The first and second floors are to change to residential use through the permitted development/prior approval planning process.

Adjacent to the application site is a large car showroom called Newbarn, which is only at ground floor level and does not share any party walls with the first floor. The showroom and self-contained sales offices are not noisy uses. It is however noted that the ground floor offices are served by condensers which are located at roof level to the rear of the application site.

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