

Richbridge Property Group

UNITS 1 & 2 WESLEY GATE, READING

Scheme for Noise Mitigation

Report No. 20-0015-1 R01



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Prepared by:

Chris Heal MEng CEng MIOA

Checked by:

Jim Smith MEng(Hons) MIOA



Managing Director: Peter Rogers BSc(Hons) MSc CEng FIOA FRSA

5 Charlecote Mews, Staple Gardens, Winchester, Hampshire. SO23 8SR

T +44 (0)1962 858800 **E** sa@sustainableacoustics.co.uk **W** www.sustainableacoustics.co.uk

Registered in England • Company No 08149321 • VAT Registration No 180557205





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1 INTRODUCTION

It is proposed to convert the offices at units 1-2 Wesley Gate, Queens Road, Reading into residential dwellings under Class O, General Permitted Development Order (2015). Prior Approval has been given for the proposed development (Application No. 191520) subject to conditions. Condition 3 of the approval requires that a scheme for protecting the dwellings from the external noise environment of the area is submitted to and approved by the Local Planning Authority. This report contains a noise assessment for the site and details for a proposed noise mitigation scheme.

A noise survey at the adjacent site was previously undertaken by Sustainable Acoustics in 2017 (report 17-0090-0 R02) for an application for a roof extension above units 3-4 Wesley Gate, which has been used to form the basis of this assessment for noise mitigation.

2 CONDITION 3

Condition 3 states:

“3. No development shall take place until a detailed scheme, informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved, in writing, by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS8233 internal levels being exceeded. Thereafter, the development shall not be carried out other than in accordance with the approved scheme which shall be completed before any part of the accommodation hereby approved is occupied, unless the Local Planning Authority otherwise agrees in writing.”

Table 4 of BS 8233:2014 is shown below:

Table 4 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

3 SITE CONTEXT

The site is on Queens Road in the central Reading area and the front north façade is affected by road traffic noise. The rear south façade is screened from the main noise source. The front elevation and a typical floor layout are shown below. The layout is essentially the same on each floor, however there are larger windows on the ground floor and small balconies on the first floor.



Figure 1: Front elevation

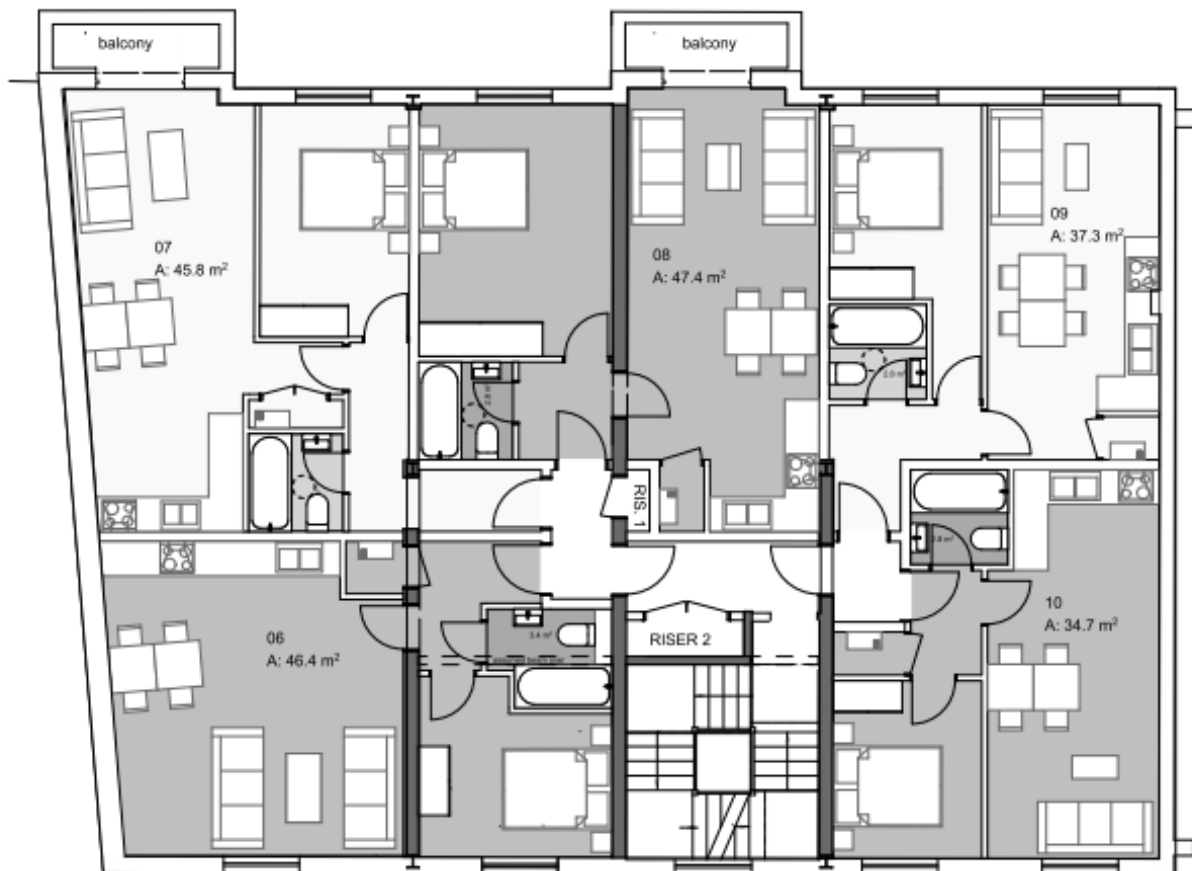


Figure 2: Typical floor layout



4 NOISE SURVEY RESULTS

Details of the previous noise survey, undertaken in 2017, are provided in Appendix 1. A summary of the noise levels is shown below:

Period	Front	Rear
Day	71 dB L _{Aeq} , 16 hour	52 dB L _{Aeq} , 16 hour
Night	64 dB L _{Aeq} , 8 hour	44 dB L _{Aeq} , 8 hour

Table 1: Measured noise levels (free field)

A partially open window will typically provide around 12-15 dBA of attenuation of road traffic noise. Internal noise levels in the front façade will therefore be more than 5 dB above the criteria in Table 4 of BS 8233. At the rear façade, noise levels may exceed the criteria with open windows, but are less likely to exceed the criteria by more than 5 dB. There is no criterion for maximum noise events in Table 4 of BS 8233 and maximum noise level have therefore not been assessed.

5 NOISE MITIGATION SCHEME

As windows will need to be closed in order to achieve the internal noise criteria in BS 8233: 2014, MVHR units are proposed in each dwelling. Note this does not mean that windows cannot be openable. The exposed façade is north facing and is therefore considered to be at a lower risk of overheating.

5.1 Glazing specification

Front Façade

The following specification is proposed, which applies to the whole window including the frame and seals. As MVHR is proposed, there should be no frame trickle vents fitted. The sound reduction requirements have been calculated using the measured frequency spectrum.

Room	Criterion from BS 8233 Table 4	Approx. room volume, m ³	Approx. window area, m ²	Minimum sound reduction index, dB R _w
Ground floor				
Living room with window	35	46	4.2	35
Living room with doors	35	65	5.0	35
Bedroom	30	28	4.2	37
First floor				
Living room with window	35	46	1.8	33
Living room with doors	35	65	2.8	34
Bedroom	30	28	1.8	34

Table 2: Glazing specifications



Typical example glazing configurations for varying sound reduction requirements are shown below:

Rw 33 dB	6mm float/12mm void/4mm float
Rw 34 dB	6.4mm acoustic laminated/12mm void/4mm float
Rw 35 dB	7mm acoustic laminated/12mm void/4mm float
Rw 37 dB	6.4mm acoustic laminated/12mm void/6mm float
Rw 38 dB	6.8mm acoustic laminated/16mm void/6mm float
Rw 40 dB	10mm float/12mm void/6.4mm acoustic laminated

Glazing specification should be chosen with differing thickness of inner and outer panes of glass to avoid coincidence dip in performance at the same critical frequencies. Note the void gap between the panes of glass is not critical, and can normally be increased to fit the frames.

Rear Façade

Standard thermal double glazing typically provides a weighted sound reduction value of R_w 31-33 dB and would be sufficient to meet the attenuation requirements.

5.2 Ventilation

It is proposed that each plot should have full Mechanical Ventilation with Heat Recovery. In order to ensure that the internal noise criteria can be achieved, the units should be specified and located to achieve 5 dB below the criteria in BS8233 Table 4 in normal operation. Note this may need attenuators to the supply and extract depending on the airflow requirements and sound power level of the MVHR unit:

Period	Maximum mechanical service noise
Living rooms	30 dB L_{Aeq}
Bedrooms	25 dB L_{Aeq}

Table 3: Mechanical services noise limits

The ventilation scheme should be selected to meet the requirements of Part F and L of the Building Regulations and the extract designed such that the supply and extract do not compromise the sound insulation of the building envelope. The ductwork, MVHR units and supply extract grills will need to be designed to achieve approximately 45 dB(A) of attenuation from the outside to each room; it is estimated these are likely to provide approximately 35 dBA of attenuation and therefore attenuators achieving at least 10 dBA of attenuation are likely to be required.

Where the air intake and discharge to atmosphere ductwork to the MVHR unit pass through or over habitable rooms, particularly bedrooms, care should be taken to ensure that external noise break-in via the ductwork does not contribute significantly to the noise level in the room; this may require use of metal ductwork, lagging ducts, or enhance sound insulation of ceilings.



APPENDIX 1 Previous Noise Survey



PREVIOUS NOISE SURVEY

A2.1 Methodology

A logging sound level meter was installed at both the front and the rear of the site between 31st August and 4th September 2017. At the front the microphone was placed at 1st floor level at 1m from the façade on an existing balcony. At the rear the microphone was placed on a boom approximately 1m from the façade at the second-floor level. Both microphones were fitted with outdoor windshields. Noise level parameters were measured in 15 periods.

The weather during this period was calm with wind speeds of less than 1m/s from a south westerly direction, rising slightly on the afternoon of 3rd. Temperatures were up to 20 C during the day and falling to approximately 10 C at night. There was a period of heavy rain on the afternoon of 3rd and into the early morning of the 4th.

A2.2 Instrumentation

The equipment used during the survey is shown below. Prior to and on completion of the survey, the calibration of the sound level meter and microphone was checked using the field calibrator and no significant change in the calibration level occurred.

Equipment	Type	Serial Number	Calibration	
			Date*	Certificate no
Front				
Rion Class 1 sound level meter	NA-28	00170246	06/04/17	U18435
Preamplifier	NH-23	60254	06/04/17	U18435
Microphone	UC-59	00299	06/04/17	18433
Rion Calibrator	NC-74	34773049	06/04/17	U18434
Rear				
Larson Davis Class 1 Sound Level Meter	824	1344	13/06/16	28811
Preamplifier	PRM 902	3159	13/06/16	28811
Microphone	2541	5099	13/06/16	28811
Larson Davis sound calibrator	CAL 200	2206	09/06/16	28814U

**Date of calibration shown prior to survey in September 2017.*

A2.3 Analysis of measured noise levels

The measured noise levels are shown in Figures A1.1 and A1.2 below. Note that as they are measured at 1m from the façade they include a reflected component from the façade and incident/free-field levels are up to 3 dB lower.

The period of rain from the afternoon of 3rd to early morning of the 4th appears to have affected the measurements at the rear and it is assumed that there may be, for example, a blocked gutter overflowing and water splashing on or near the microphone. The data measured the start of the period of rain onwards has, therefore, been ignored.

There were demolition works being undertaken inside the building at the second-floor level to remove partitions, ceilings and during the day on 31st August finishing at around 3:30pm. These may have marginally affected the measured noise levels at the rear monitoring position and this period has therefore been excluded from the analysis.

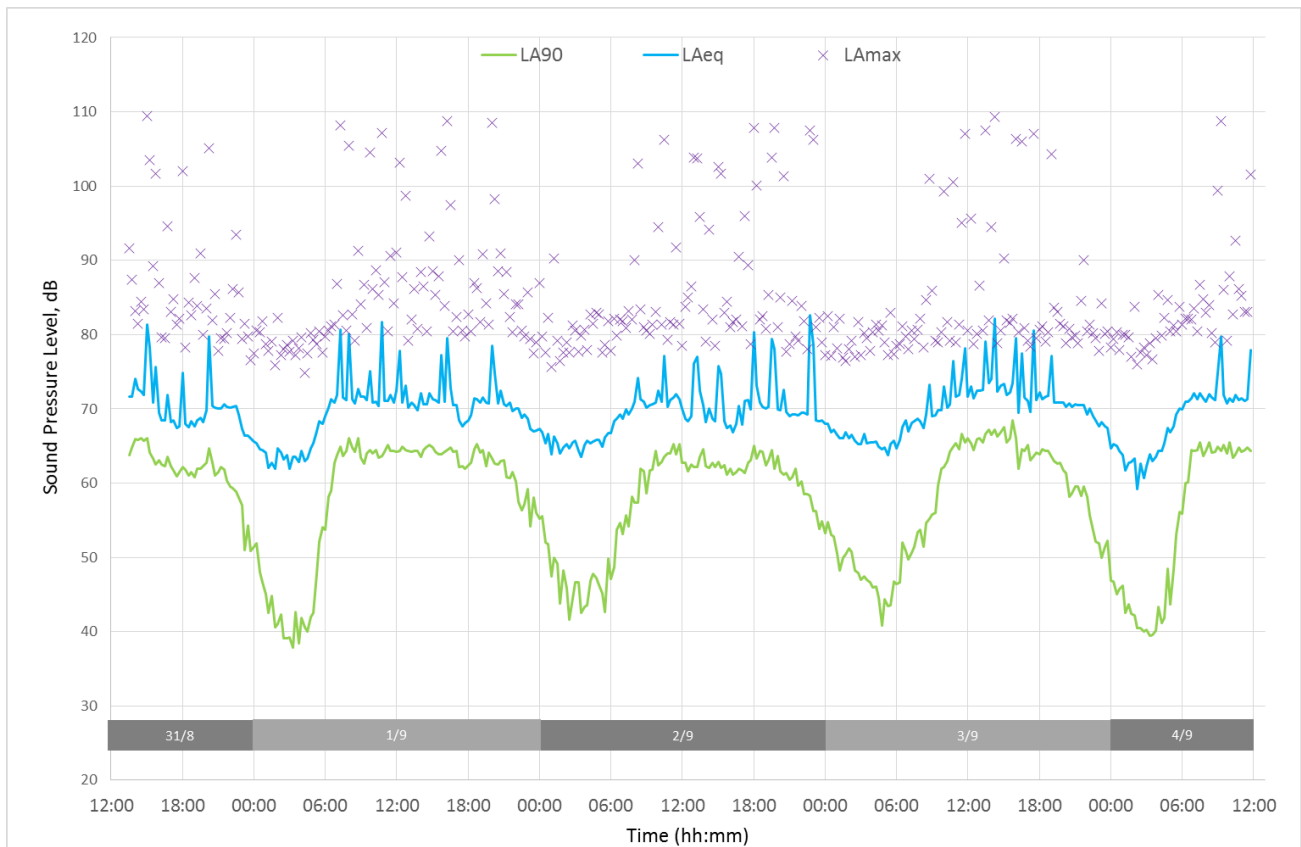


Figure A 1: Façade noise level measured at the front in 15-minute periods

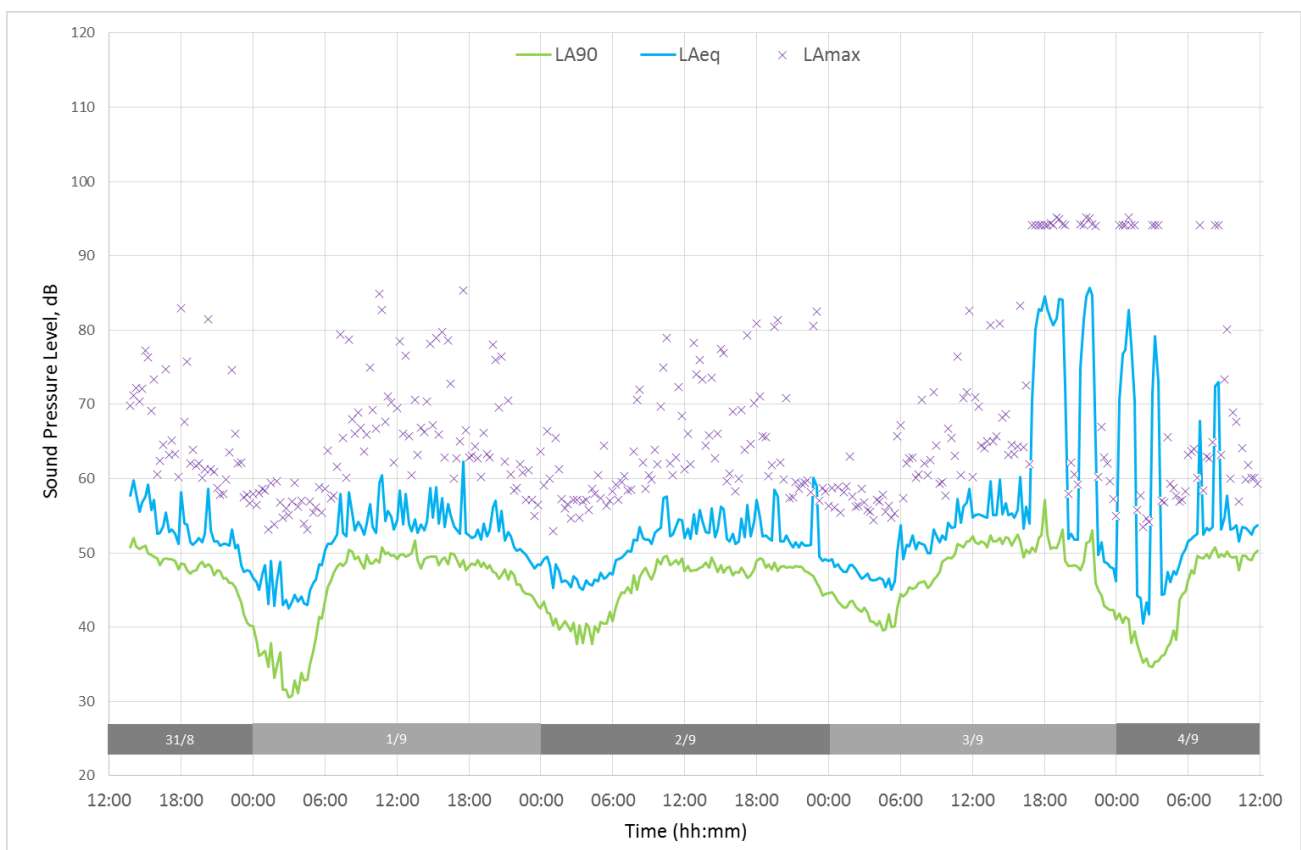


Figure A 2: Façade noise level measured at the rear in 15-minute periods



A summary of the measured noise levels for the overall 16-hour daytime (0700-2300) and 8 hour night-time (0230-0700) periods is shown in the table below. Note these have been corrected to free-field/incident levels by subtracting 2.5 dB.

Period	L _{Aeq}		L _{A90}		L _{Amax, fast}
	Range (15min)	Period	Range (15min)	Range (15min)	
Front 1st floor					
16hr Daytime	64-80	71	47-66	75-107	
8hr Night-time	57-76	64	35-62	72-104	
Rear 2nd floor					
16hr Daytime	47-60	52	42-50	55-83	
8hr Night-time	40-57	44	28-45	50-80	

Table A 1: Summary of measured noise levels (free-field)