

20 Bridge Street, Caversham

Planning Noise Assessment

Report 17/0063/R1

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TW-2

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Site plan showing measurement positions

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Time history graphs at measurement positions MP1 and MP2

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1 Introduction

- 1.1 It is proposed that there be an extension to an existing dental surgery at 20 Bridge Street, Caversham, Reading. As part of the planning application, a noise assessment is required to determine the noise impact on the development to determine the internal noise levels in staff accommodation spaces.
- 1.2 Details of the methodology and results of the noise survey undertaken at the site are provided within this report along with the subsequent assessment with reference to relevant guidance along with any criteria set by the Local Authority.
- 1.3 Details of any mitigation measures required in order to achieve appropriate internal noise limits, along with mechanical services noise limits for any external plant items are provided within this report.

2 Site Description

- 2.1 The existing dental surgery is located at 20 Bridge Street, Caversham and is proposed to extend into the area of land available to the north of the site.
- 2.2 Bridge Street bounds the site to the east with a set of traffic lights outside the site. Retail properties are located along Bridge Street with some occupied residential apartments above. A garden area to the dental surgery is located to the west with a small car park area located adjacent to the garden.
- 2.3 The proposed extension is to include additional office and treatment spaces along with staff accommodation at first and second floor level.

3 Planning Guidance

3.1 Internal Noise Criteria

- 3.1.1 The local authority has provided guidance for assessing noise to the proposed staff accommodation spaces. The assessment should be undertaken in accordance with BS 8233:2014 and WHO Guidelines for Community Noise, meeting the following criteria:



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

T1 Table 4 of BS 8233:2014

- 3.1.2 The council have also stated that L_{Amax} noise levels within bedroom spaces at night should be controlled so to not exceed 45 dB.

3.2 Plant Noise Criteria

- 3.2.1 The site falls within the jurisdiction of Reading Borough Council (RBC). It has been confirmed with RBC that the assessment should be undertaken in accordance with BS 4142: 2014 with noise from any proposed plant not exceeding 10 dB below the existing background level during the period of operation 1m from the window of the nearest noise sensitive properties.

- 3.2.2 We would recommend that plant noise limits are capped at 30 dB(A) externally 1m from the façade, where background noise levels are low.

- 3.2.3 To further add context to this limit, the internal noise levels stated in BS 8233 for sleeping conditions in bedrooms at night is 30 dB(A). Although this standard is typically considered for 'anonymous' environmental noise sources such as road traffic, it does illustrate how low the noise limits would be.

- 3.2.4 This approach of considering absolute noise levels rather than those set relative to the background in such circumstances is consistent with BS 4142:2014 which states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

- 3.2.5 Based upon the current and historic (1997) versions of BS 4142, we would suggest that a noise limit of 30 dB(A) externally as an absolute noise levels is entirely reasonable and appropriate in such an environment. The limit is 5 dB lower than what is considered "very low" in



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accordance with the old standard and is the same as the internal noise level for sleeping conditions at night.

4 Environmental Noise Survey

4.1 Methodology and Instrumentation

- 4.1.1 A 24-hour unattended noise survey was undertaken on site commencing at 10h00 on Thursday 25th May and concluding on Friday 26th May 2017.
- 4.1.2 Unattended measurements were carried out at two positions, as described below and shown on the attached site plan 17/0063/SP1.
- MP1 – Unattended free-field measurement position at the eastern boundary of the site, 4m above ground level, measuring traffic noise from Bridge Street.
 - MP2 – Unattended free-field measurement position at the western boundary of the site, 1.5m above ground level, measuring noise levels to the rear of the site.
- 4.1.3 Measurements of the L_{Amax} , L_{Aeq} and L_{A90} indices were made over sequential 15 minute periods (see the Glossary of Acoustic Terms for an explanation of the noise units used). L_{Amax} values were also recorded during every minute of the survey.
- 4.1.4 Noise measurements during the survey were made using the equipment listed in table T2 below.

Item	Manufacturer	Type
Sound Level Analyser (x2)	Rion	NL-52
Acoustic Calibrator (x2)	Rion	NC-74
Weatherproof windshield (x2)	Rion	WS-15

T2 Equipment used during unattended noise survey.

- 4.1.5 The microphones for the noise monitors were fitted with weatherproof windshields and were calibrated before and after the survey to ensure that a consistent and acceptable level of accuracy was maintained throughout. No significant drift in level was noted.
- 4.1.6 The weather conditions during the setting up and collection of the survey were dry, warm and clear with mostly still conditions.



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4.2 Results

- 4.2.1 The results of the unattended survey measurements are shown in the attached time history graphs 17/0063/TH01-02.
- 4.2.2 The noise climate was noted to be controlled by stop-start traffic on Bridge Street due to the traffic light system.
- 4.2.3 The calculated free-field daytime $L_{Aeq, 16hr}$ and night time $L_{Aeq, 8hr}$ levels at positions MP1 and MP2, along with the typical night time L_{Amax} level (taken as the 10th highest measured 1-minute level during the night time hours) are shown in the table below:

Location	Daytime (0700-2300)	Night time (2300-0700)	
	$L_{Aeq, 16h}$	$L_{Aeq, 8h}$	$L_{Amax, F}$
MP1	70	62	81
MP2	55	49	72

T3 $L_{Aeq, 16h}$ and $L_{Aeq, 8h}$ noise levels

- 4.2.4 The representative background L_{A90} noise levels measured during the daytime and night time, established in accordance with BS 4142:2014 at each position are shown in the following table:

Location	Background Noise Levels, $L_{Aeq, 15min}$	
	Daytime (0700-2300)	Night time (2300-0700)
MP1	60	39
MP2	48	35

T4 Typical background noise levels measured

5 Noise Impact Assessment

5.1 External Building Fabric

- 5.1.1 The proposed staff accommodation areas are to be located within the existing part of the building. The existing façade construction is built up around two layers of brick. With this



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brickwork outer layer providing substantial mass, the façade should provide a high level of sound insulation from external noise sources.

5.1.2 Based on this base construction, the glazing and ventilation elements have been assessed, as discussed below. Room sizes have been taken from the following drawings:

- 14 427 PL10A
- 14 427 PL11A
- 14 427 PL12A
- 14 427 PL13A
- 14 427 PL14A
- 14 427 PL15A

5.2 Glazing

5.2.1 On the basis of the noise survey, two glazing types will be required to the staff accommodation living and bedroom spaces to ensure internal ambient noise levels as set out previously in table T1. This would apply to all glazed elements – window, patio and balcony doors etc.

5.2.2 Both glazing types are required to be acoustically rated, meeting the performances set out below:

Façade Group	Sound Reduction Index, Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
	27	36	43	52	55	60
Glazing Type 1	27	36	43	52	55	60
Glazing Type 2	26	27	34	40	39	46

T5 Required sound reduction performance of glazed elements

5.2.3 The sound reduction performance of the two glazing types can typically be achieved using the following glazing configurations.



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Performance Reference	Typical Configuration
Glazing Type 1	8.8mm acoustic laminate glass – 20mm air gap – 10.8mm acoustic laminate glass
Glazing Type 2	10mm glass – 16mm air gap – 6mm glass

T6 Proposed typical glazing configuration

- 5.2.4 The sound reduction performance stated above in table T5 must be achieved by the glazing system taken as a whole and in its installed condition. The specification therefore applies to the glazing, frames and all seals on any operable parts of the system and any integrated or condensation control mechanisms. This list is not exhaustive; no part of the windows shall cause the above figures not to be achieved. It should be confirmed with any supplier that the full glazing system complies with the requirements.
- 5.2.5 Glazing Type 1 is required to the staff accommodation living spaces whilst Glazing Type 2 should be installed to the bedrooms.
- 5.2.6 If the existing windows are retained, then a secondary glazing system should be suitable to mitigate noise, utilising minimum 6mm glass for the secondary glazing and a minimum airspace of 100mm between the primary and secondary panes.

5.3 Ventilation

- 5.3.1 To maintain suitable internal noise levels, the minimum required ventilation should be provided for when windows are closed. Windows should not be sealed, but openable for times when purge ventilation is required (examples given in Approved Document F include purging of fumes from burnt food when cooking or removal of fumes when painting).
- 5.3.2 Due to high noise levels at the front of the site, mechanical ventilation will be required to the living spaces. This should comprise a unit that provides both supply and extract to each accommodation space individually; whereby inlet and outlet ducts would need to be run to the façade or in a rise to the roof. This type of system can also be incorporated with heat recovery built in if desired.
- 5.3.3 The units will be designed to achieve appropriate sound levels. The room side connections should be specified to achieve noise levels of no greater than 30 dB(A) within the living spaces and 35 dB(A) with the bathroom space. If used within the bedrooms then the units should be designed to achieve noise levels of no greater than 25 dB(A) within these spaces. These noise levels should be achieved while providing the “*minimum low rate*” ventilation levels, all as set out within Approved Document F. If heat recovery is to be used, then a summer override switch is advisable.



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- 5.3.4 Some systems switch to boost mode when wet rooms or kitchens within individual accommodation spaces are in use. This can potentially lead to noise levels in bedrooms increasing above the criteria when the bathroom or kitchen is used and boost mode is operational. To combat this there are three options:
- Use separate fans for bedrooms and bathrooms/kitchens, to avoid increase in noise levels throughout the accommodation space when one room is used, and to give greater controllability.
 - The system can be designed with a manual override switch to avoid this boost mode occurring at night.
 - The system can be designed to achieve the above noise criteria when under the worst case boost mode.
- 5.3.5 Due to being towards the rear of the building, suitable noise levels can be achieved within the bedrooms utilising standard trickle ventilators. Such vents can potentially be mounted in line with window frames or otherwise as separate 'through wall' units within the main façade.
- 5.3.6 With the above noted ventilation options introduced together with the recommended glazing performances, the internal noise climate would be protected to provide suitable levels of amenity within the accommodation spaces.

6 Plant Noise Limits

- 6.1 Based on the criteria detailed in section 3.2 and the background noise levels measured during the noise survey, the following plant noise limits have been calculated:

Location	Plant Noise Emission Limit, dB(A)	
	Daytime (0700-2300 only)	Night time (24-hour)
MP1 – Front of site	50	30
MP2 – Rear of site	38	30

T7 Plant noise emission limits at the nearest residential properties.

- 6.2 Due to low background noise levels during the night time, the noise emission limit has been capped at 30 dB(A) for the reasons detailed within section 3.2.
- 6.3 Plant which is distinctively tonal or has a character which would substantially attract attention would then be subject to further penalties based on the BS 4142: 2014 procedure.



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- 6.4 These noise limits are to apply to the combined effect of all plant items running during the appropriate period as measured 1m from the appropriate window.

7 Conclusions

- 7.1 It is proposed that there be an extension to an existing dental surgery at 20 Bridge Street, Caversham, Reading.
- 7.2 A noise survey has been conducted at the site, the results of which are provided within this report. The survey results have been used to conduct a noise break-in assessment into the proposed staff accommodation spaces. Two glazing types have been recommended to achieve the internal noise levels provided within BS 8233: 2014, as detailed within this report.
- 7.3 Mechanical services plant noise limits have been provided based upon the criteria of the Local Authority.
- 7.4 The noise impact assessment has shown that the internal requirements can be achieved within the staff accommodation spaces permitting the mitigation measures are incorporated, and therefore, noise should not be considered a reason to refuse planning permission.

 End of Section



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Glossary of Acoustic Terms

L_{Aeq} :

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq} .

L_{Amax} :

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the “fast” sound level meter response.

L_{A10} & L_{A90} :

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly, L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_n .

L_{AX} , L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

■ End of Section

Figure 17/0063/SP1



Title: Site plan showing measurement positions

Project: 20 Bridge Street, Caversham

Date: June 2017

Scale: Not to scale



Figure 17/0063/TH01

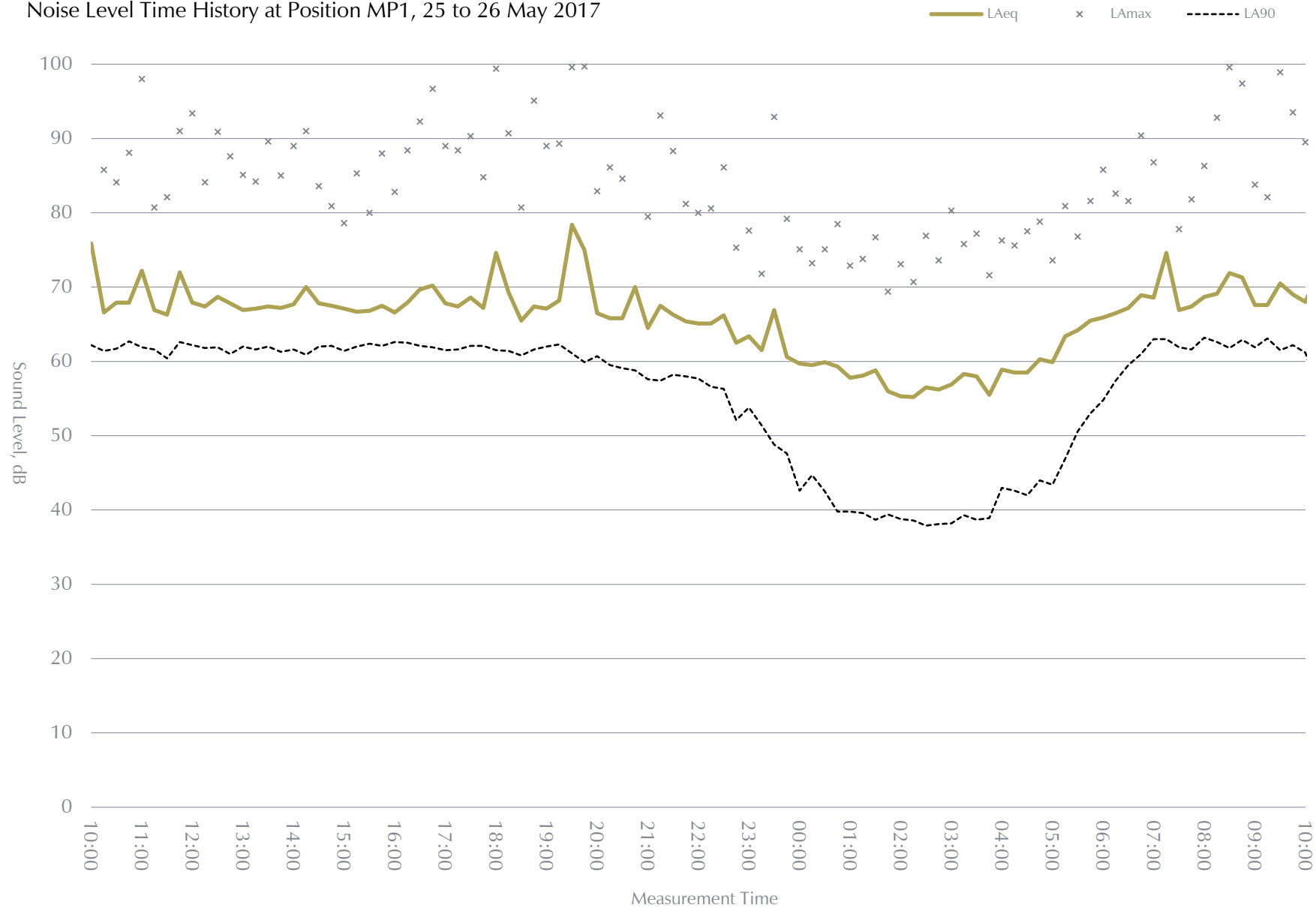




Figure 17/0063/TH02

