



40 Caversham Road, Reading

Noise impact assessment

12565.1001

26th March 2025

Revision A



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1 Summary

- 1.1 This report has been prepared in support of a planning application for a residential development at 40 Caversham Road, Reading.
- 1.2 Noise levels affecting the proposed development from road traffic have been measured during the day and night, and the façade noise impact calculated.
- 1.3 Guideline indoor noise levels are identified with consideration of planning policy aims. On the basis of the identified noise impact on the building, façade sound insulation improvements will be required to satisfy typical noise limits.
- 1.4 The acoustic performance requirements for glazing and ventilators are summarised in Table 1. The sound insulation treatments required for each façade are shown in Figure 1.
- 1.5 Based on the details outlined in this report, the noise risks identified are mitigated and minimised in accordance with planning policy requirements, and the site is considered suitable for residential development.

Rooms affected	Elevation affected	Glazing performance	Feasible no. façade ventilators & performance, if required
Bedrooms & Living rooms only (no constraints to other room types)	Green	$\geq 31 \text{ dB } R_w$	Maximum 1 x ventilators, $\geq 30 \text{ dB } D_{ne,w}$ or Maximum of 2 x ventilators, $\geq 33 \text{ dB } D_{ne,w}$
	Orange	$\geq 31 \text{ dB } R_w$	Maximum 1 x ventilators $\geq 45 \text{ dB } D_{ne,w}$ Maximum 2 x ventilators $\geq 48 \text{ dB } D_{ne,w}$
	Red	$\geq 41 \text{ dB } R_w$	Maximum 1 x ventilators $\geq 45 \text{ dB } D_{ne,w}$ Maximum 2 x ventilators $\geq 48 \text{ dB } D_{ne,w}$

Table 1: Summary of minimum façade sound insulation treatment

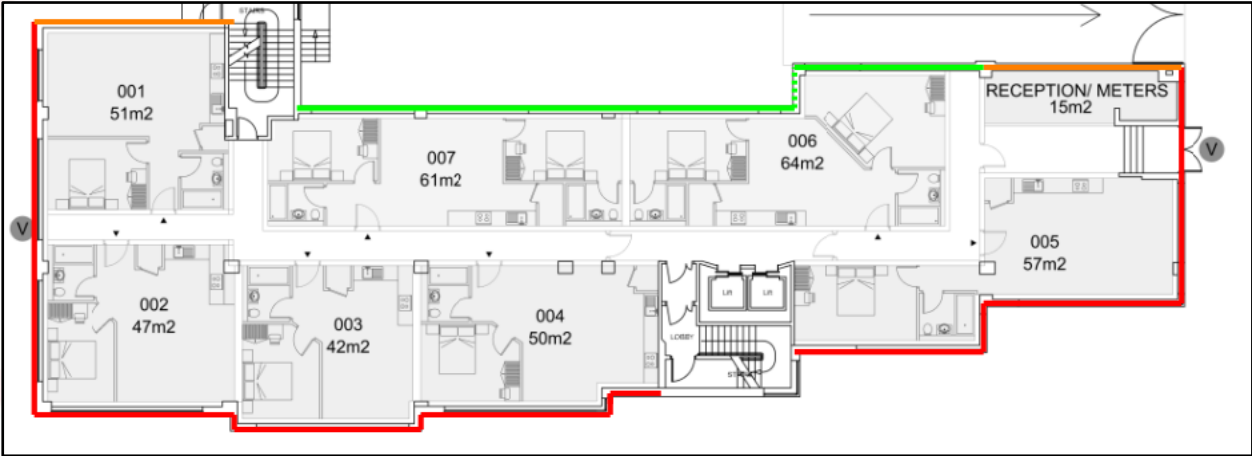


Figure 1: Mark-up showing façade categories

2 Introduction

- 2.1 A change of use to a residential development is proposed to the existing premises at 40 Caversham Road, Reading.
- 2.2 Apex Acoustics has been commissioned to undertake a noise survey and assessment of the potential noise impact on the proposed development site in support of a full planning application.
- 2.3 The site location is shown in Figure 2.
- 2.4 The purpose of this report is to identify appropriate acoustic design parameters and the manner in which these may be achieved in practice.
- 2.5 The scope of our appointment includes:
- Measure the existing noise environment at two locations representative of the front and rear facades of the building.
 - Identify typical noise guidelines, and determine the noise impact on the proposed residential accommodation;
 - Provide a detailed scheme for the mitigation of noise to reduce the risk of adverse effect, in accordance with local and national policy requirements.

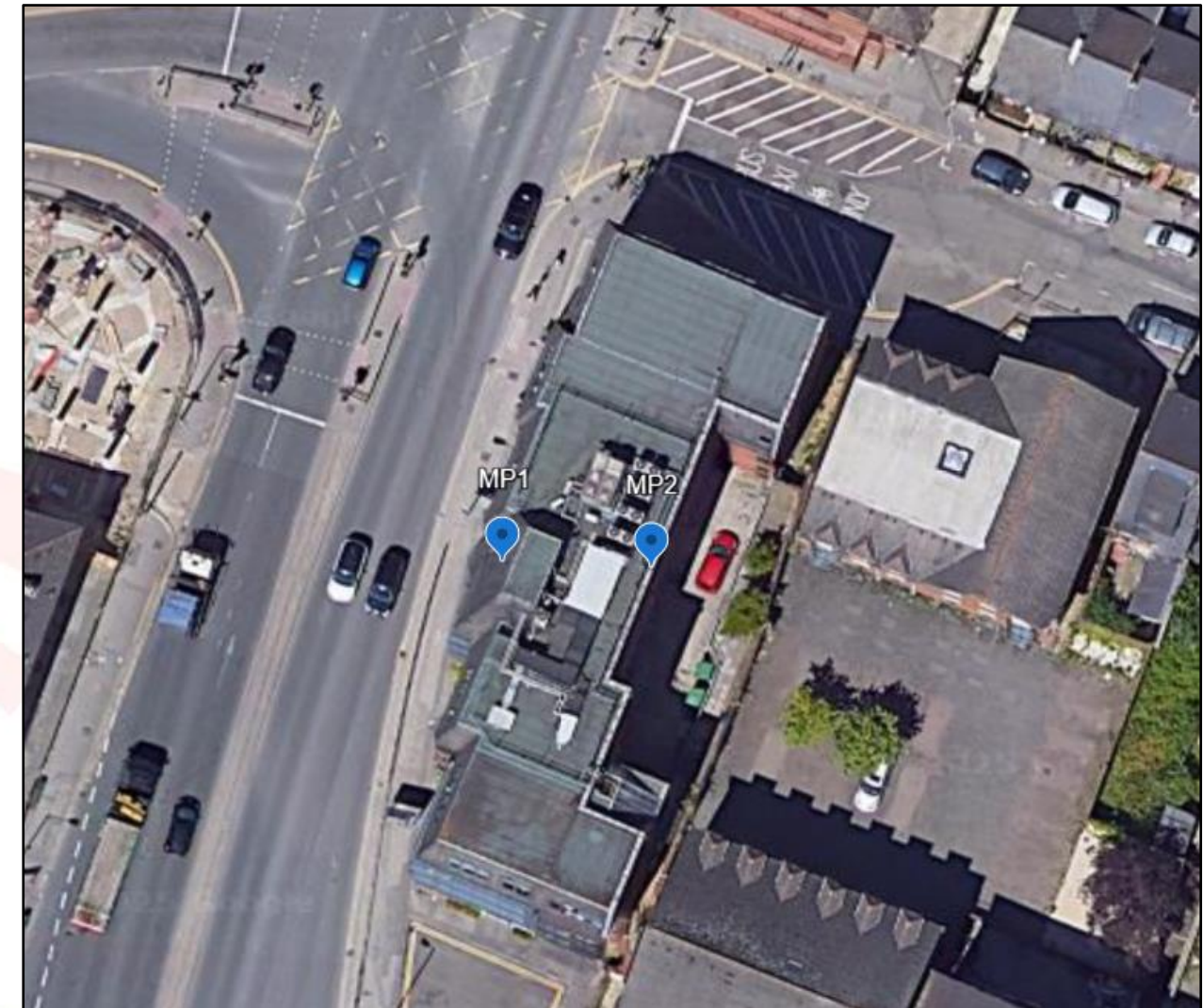


Figure 2: Satellite image of building with measurement positions to front and rear facades indicated by markers

3 Planning policy and noise criteria

3.1 National Planning Policy Framework (NPPF)

3.2 The National Planning Policy Framework (NPPF) Reference 1, sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. In respect of noise, Paragraph 187, 198 and 200 of the NPPF states the following:

3.3 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..."

3.4 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 impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁵ [See Explanatory Note to the Noise Policy Statement for England];

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;

3.5 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."

3.6 Noise Policy Statement for England (NPSE)

3.7 The Noise Policy Statement for England, Reference 2, states three policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."

3.8 The NPSE defines adverse noise impact as follows:

- No Observed Effect Level (NOEL)
This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- Lowest Observed Adverse Effect Level (LOAEL)
This is the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL)
This is the level above which significant adverse effects on health and quality of life occur

3.9 The first two aims of the NPSE require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

3.10 It is considered that meeting the internal ambient noise level limits given in BS 8233, which are in line with those given by the World Health Organisation, Reference, adequately achieve the first and second aims of the NPSE.

3.11 Local plan / Local Authority guidance

3.12 Policy EN16 of the Reading Borough Council Local Plan, Reference 4, states:

“Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.”

3.13 Paragraph 4.2.90 of the Local Plan provides further guidance on Policy EN16:

“Exposure to high levels of noise can have a significant effect on human health. This policy deals with noise issues in general, whilst policy EN17 deals particularly with noise-generating equipment. It is worth noting that there is a Professional Practice Guide on Planning and Noise available which provides guidance on design of residential developments to take account of noise, and taking account of this from the early design stage will help to reduce noise effects on future residents.”

3.14 Professional Practice Guidance on Planning & Noise

3.15 Professional Practice Guidance on Planning & Noise: New Residential Development (ProPG), Reference 5, is a guidance document on the management of noise within the planning system in England for new build housing developments.

3.16 The document draws together guideline limits for internal noise levels from external transport sources from other sources of guidance, including BS 8233, Reference 6, and the World Health Organisation (WHO) Guidelines for Community Noise, Reference 7.

3.17 These criteria are consistent with those usually adopted by the Local Environmental Health Department and are presented in Table 2.

Activity	Location	Guideline upper limit, dB		
		L _{Aeq} , daytime	L _{Aeq} , night-time	L _{AFmax}
Resting	Living room	35	-	-
Dining	Dining room	40	-	-
Sleeping (daytime resting)	Bedroom	35	30	45

Table 2: Internal noise level requirements

3.18 The daytime period is defined as the 16 hours between 07:00 to 23:00 hours and the night-time period is defined as the 8 hours between 23:00 to 07:00 hours.

3.19 With regards to the night-time L_{AFmax} criterion, ProPG states:

“In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB L_{Amax,F} more than 10 times a night.”

3.20 It is considered that the adopted internal ambient noise level targets align with the LOAEL following the terminology of the NPSE, such that meeting these targets adequately achieves the aims of the NPPF and NPSE.

3.21 ProPG states:

“Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally.”

3.22 Internal ambient noise levels 10 dB above the daytime and night-time values in Table 2 are therefore identified as the SOAEL.

3.23 Appendix A of the ProPG collates the results of various studies on sleep disturbance due to individual noise events, and states the following:

“it can be concluded that at night (2300 - 0700 hrs) a significant effect on sleep disturbance e.g. behavioural awakening, is likely to occur where the maximum sound level at the façade of a building with partially open windows is above:

- 85 dB L_{Amax, F} (where the number of events exceeding this value is ≤ 20); or
- 80 dB L_{Amax, F} (where the number of events exceeding this value is > 20).”

3.24 These values are identified as a SOAEL in the situation where windows are partially open.

4 Noise sources and measurements

4.1 Measurements

4.2 Measurements of the existing noise environment were made for a 22-hour period from 12:20 hours on the 20th March 2025 using the guidance of BS 7445, Reference 9.

4.3 The measurement locations are shown in Figure 2.

4.4 MP1 was positioned at a first-floor window. The microphone was mounted flush to the front façade such that a 6 dB correction is applied to the measurement results to determine free-field noise levels following the guidance of ISO 1996-2, Reference 10.

4.5 MP2 was position at a first-floor window approximately 1.5 m away from the façade, such that a 3 dB correction is applied to the measurement results to determine free field noise levels following the guidance of ISO 1996-2.

4.6 The equipment used is listed in Table 3.

Equipment	Model	Serial no.
Sound Level Meter	NTi XL3	A2A-01140-F0
Calibrator	Larson Davis CAL 200	21846
Sound Level Meter	NTi XL23	A2A-01135-F0
Calibrator	Larson Davis CAL 200	22086

Table 3: Equipment used

4.7 All sound level meters and calibrators used meet the technical specifications of BS 7445 and have current calibration certificates traceable to national standards. The equipment was field-calibrated before and after the measurement with no significant drift in sensitivity noted.

4.8 Weather conditions were dry with wind speeds below 5 m/s.

4.9 Noise sources

4.10 Road traffic noise was dominant at both positions during the day and night-time.

4.11 Results

4.12 The time histories of the $L_{Aeq, 1 \text{ min}}$ recorded are shown in Figure 3 and Figure 4.

4.13 The measured daytime and night-time noise levels are shown in Table 4.

Position	Parameter	dB(A)	Octave band centre frequency, Hz					
			125	250	500	1k	2k	4k
MP1 Front façade	Daytime, $L_{Aeq, 16 \text{ hr}}$	77	58	64	67	75	72	63
	Night time, $L_{Aeq, 8 \text{ hr}}$	71	51	57	61	68	65	57
	Night time, $L_{AF, \text{max}}$	90	-	-	-	-	-	-
MP2 Rear façade	Daytime, $L_{Aeq, 16 \text{ hr}}$	60	43	49	52	57	55	46
	Night time, $L_{Aeq, 8 \text{ hr}}$	54	37	42	45	51	49	38
	Night time, $L_{AF, \text{max}}$	72	-	-	-	-	-	-

Table 4: Measured facade noise levels

4.14 The single event maximum noise level presented in Table 4 is exceeded no more than 10 times during the night and therefore is used as the design case to determine compliance against ProPG Note 4 of Figure 2.

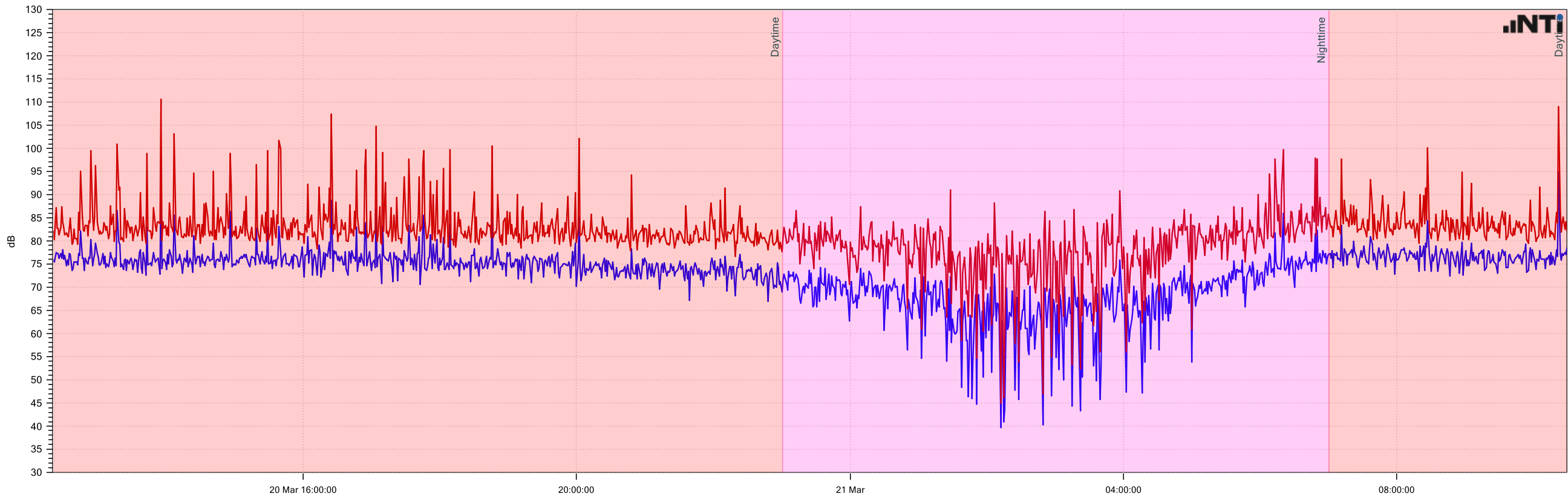


Figure 3: Time history of the recorded $L_{Aeq, 1 \text{ smin}}$ at MP1

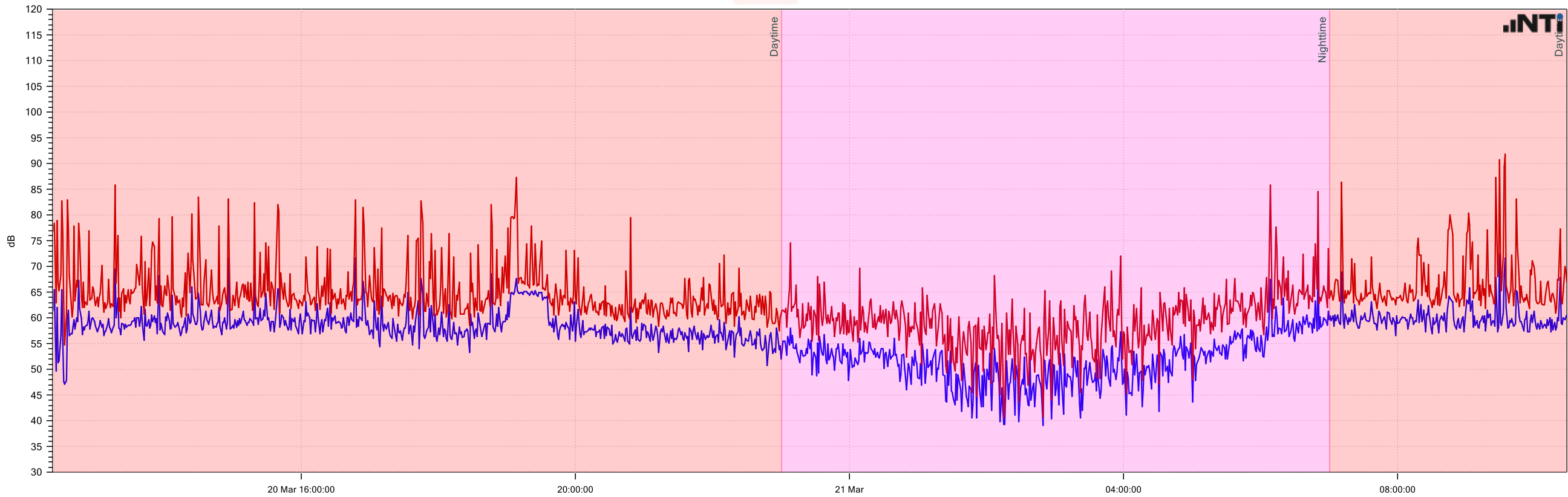


Figure 4: : Time history of the recorded $L_{Aeq, 1 \text{ smin}}$ at MP2

5 Achieving internal noise levels

5.1 Façade sound insulation calculations

- 5.2 As the measurements were taken at the facade, they are taken to be representative of the likely noise levels affecting the development to the front and rear facades.
- 5.3 Free-field noise levels are calculated from the measured façade levels by assigning a 6 dB correction to the front façade and 3 dB correction to the rear façade as shown in Table 5.

Façade affected	Parameter	dB(A)	Octave band centre frequency, Hz				
			A-weighted free-field noise level, dB				
			125	250	500	1k	2k
Front	L _{Aeq,16 hr}	71	52	58	61	69	66
	L _{Aeq,8 hr}	65	45	51	55	63	60
	L _{AFmax}	84	-	-	-	-	-
Rear	L _{Aeq,16 hr}	57	40	46	49	54	52
	L _{Aeq,8 hr}	51	34	39	42	49	46
	L _{AFmax}	69	-	-	-	-	-

Table 5: A-weighted external free-field noise levels used to calculate façade sound insulation

- 5.4 The calculation method for façade sound insulation is in accordance with BS 8233 and the principles of BS EN 12354-3, Reference 13.
- 5.5 From ISO 16283, Reference 15, the reverberation time is typically 0.5 seconds across the relevant frequency range for a furnished living room. This value is used for both living rooms and bedrooms.
- 5.6 Details of the methodology used to calculate internal noise levels are provided on our website: <https://www.apexacoustics.co.uk/calculation-facade-sound-insulation/>.
- 5.7 The room and window dimensions used in the calculations are taken from the architects' plans and elevations, Reference 11.
- 5.8 **Façade sound insulation performance**
- 5.9 The minimum glazing and ventilator performances presented in the summary Table 1 are calculated to be required to reduce noise levels to below the LOAEL.
- 5.10 The sound reduction of the masonry portion of the facade is much higher than that of the glazing and ventilation provision. Therefore, noise penetration through the masonry is disregarded as relatively insignificant.

- 5.11 The proposed development will be required to meet Part F of the Building Regulations with regard to the whole dwelling ventilation condition, as described in Approved Document F (AD-F), Reference 12. Part F does not require open windows for this typical ventilation condition, as such calculations of noise ingress are undertaken with windows closed, and any façade ventilators in their open position, where required as part of the adopted strategy.
- 5.12 The maximum number of façade ventilators and the required minimum acoustic performance that are calculated to achieve the indoor noise targets are summarised in Table 1. Performance options are provided for either 1 or 2 vents, subject to the ventilation strategy requirements.
- 5.13 Purge ventilation conditions as described by AD-F is manually controlled ventilation of rooms or spaces at a relatively high rate to rapidly dilute pollutants and/or disperse water vapour. Purge ventilation may be provided by natural means (e.g. an openable window) or mechanical means (e.g. a fan).
- 5.14 For AD-F purge ventilation conditions, ProPG states:
"It should also be noted that the internal level guidelines are generally not applicable under "purge ventilation" conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food)."
- 5.15 Considering this guidance, opening windows is considered acceptable for these occasional events without giving risk to potential adverse effect on occupants.
- 5.16 It should be emphasised that the above is not intended to constitute a ventilation strategy design, which is the responsibility of others. Once the ventilation strategy is established, if the details vary from those described above, the proposed details should be reassessed for acoustic performance.

5.17 Results

- 5.18 Calculated internal noise levels on the basis of the identified minimum performance requirements are presented in Table 6.
- 5.19 An example full calculation for the worst affected location is shown in Appendix A, based on example manufacturers test data for glazing and vent products which can achieve the required performance criteria.

Façade	Room affected	Calculated internal level		
		Daytime dB LAeq, 16 hr	Night-time dB LAeq, 8 hr	Night-time dB LAmax, F
Front	Bedroom	35	28	45
	Living room	35	-	-
Rear	Bedroom	33	27	44
	Living room	33	-	-

Table 6: Summary of calculated worst-case internal noise levels

- 5.20 Based on the proposed façade sound insulation provision and the level and frequency of the measured maximum noise event, 45 dB LAmax, F is unlikely to be exceeded more than 10 times per night, and is therefore below the LOAEL described in paragraph 3.19.

6 Conclusion

- 6.1 This report has been prepared in support of a planning application for a residential development at 40 Caversham Road, Redding.
- 6.2 Noise levels affecting the proposed development from road traffic have been measured during the day and night, and the façade noise impact calculated.
- 6.3 To satisfy the indoor noise targets identified, the acoustic performance requirements for glazing and ventilators where required are summarised in Table 1. The sound insulation treatments required for each façade are shown in Figure 1.
- 6.4 Based on the details outlined in this report, the noise risks identified are mitigated and minimised in accordance with planning policy, and the site is considered suitable for residential development.

7 References

- 1 National Planning Policy Framework, Department for Communities and Local Government, December 2024.
- 2 Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, March 2010.
- 3 Planning Practice Guidance – Noise:
<http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/>
- 4 Reading Borough Local Plan, Adopted November 2019.
- 5 Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), "ProPG: Planning & Noise - New Residential Development," May 2017.
- 6 BS 8233: 2014, Guidance on sound insulation and noise reduction for buildings.
- 7 Guidelines for Community Noise, Edited by Birgitta Berglund, Thomas Lindvall, Dietrich H Schwela, World Health Organisation, 1999.
- 8 AECOM Environment on behalf of DEFRA, NANR316 Possible options for the identification of SOAEL and LOAEL in support of the NPSE, December 2015.
- 9 BS 7445:2003, Description and measurement of environmental noise. Guide to quantities and procedures.
- 10 ISO 1996-2: 2017, Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise.
- 11 Architects Drawings, Elder Lester Architects, Drawing 24-CAV-P0001, 30th October 2024.
- 12 Approved Document F 2021 Edition, The Building Regulations 2010.
- 13 BS EN 12354-3:2000, Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound.
- 14 Practical Acoustic Design – the Apex Method, Proceedings of the Institute of Acoustics Vol 36 Pt 3 2014. Full paper and Poster presentation at Institute of Acoustics Conference 2014, available to download from www.apexacoustics.co.uk
- 15 BS EN ISO 16283-1:2014 Acoustics – Field measurement of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation.

Appendix A Example façade sound insulation calculations

Apt 11 Bedroom							
Volume, V / m ³	29						
Window area, S / m ²	4						
Reverberation Time, T / s	0.5						
Number of vents feasible	2						
Daytime L _{Aeq, T} (dB)	dB(A)	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	
External free-field noise, L _{1in}	71	52	58	61	69	66	
Glazing: 6/16/8.8 mm, R		24	26	40	48	46	
Equation 1, L ₂ (a)	33	27	31	20	20	19	
Vent: Invisivent EVO AK Extreme, D _{n,e}		39	40	44	49	53	
Equation 2, L ₂ (b)	30	20	25	24	26	20	
Total noise through all elements, L ₂	35						
Night-time L _{Aeq, T} (dB)	dB(A)	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	
External free-field noise, L _{1in}	65	45	51	55	63	60	
Glazing: 6/16/8.8 mm, R		24	26	40	48	46	
Equation 1, L ₂ (a)	26	20	24	14	14	13	
Vent: Invisivent EVO AK Extreme, D _{n,e}		39	40	44	49	53	
Equation 2, L ₂ (b)	24	13	17	17	20	13	
Total noise through all elements, L ₂	28						
Night-time L _{AFmax} (dB)		R _w /D _{n,e,w}					
External free-field noise, L _{1in}		84					
Glazing: 6/16/8.8 mm, R		41					
Equation 1, L ₂ (a)		42					
Vent: Invisivent EVO AK Extreme, D _{n,e}		48					
Equation 2, L ₂ (b)		42					
Total noise through all elements, L ₂		45					

Table 7: Example calculation for Apartment 11 bedroom