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49-51 LONDON ST, READING RG1 4PS



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Environmental Noise Report

Wallmer Asset Management Ltd

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1.0 INTRODUCTION

MACH Acoustics have been appointed by Red Brick Property Services Ltd to carry out an environmental noise survey and subsequent assessment for the proposed residential development at 49 – 51 London Street, Reading, RG1 4PS. Proposals are for the conversion of an office building to a mixed scheme containing offices, a beauty salon and three flats.

The purpose of the assessment is to review the suitability of the proposed secondary glazing system to protect the future occupants against noise ingress from the local environment. To undertake this assessment, an environmental noise survey was carried out on-site between the 23rd and 24th of February 2016.

A review of the proposed secondary glazing has been provided, in line with guidance given within BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'.

This report describes the noise survey and its results. Figure 4.1 contains a graphical representation of the noise measurements taken on site. Section 6.0 provides an assessment in accordance with guidelines set out in BS8233.

2.0 SITE DESCRIPTION

The proposed plans are for a new residential development on the site located at 49 – 51 London Street. The proposed development has an inner city location in close proximity to the A327 (west), hence appropriate noise control measures will be required in order to protect the future occupants from excessive noise levels. The site in relation to its surroundings is shown in the map and aerial photograph below.



Figure 2.1: Aerial photograph and site map

The primary noise source affecting the proposed development is the A327 which runs past the west façade and has a consistent flow of traffic throughout the day. There is a general drop of ambient noise levels during the night however average noise levels do still fluctuate during this period. This is likely to be due to individual instances of vehicles passing by. As expected, noise levels then increase during the early morning rush hour period.

3.0 NOISE SURVEY

In order to establish environmental noise levels on site, continuous 5-minute samples of the acoustic parameters $L_{Aeq,T}$, $L_{A90,T}$, and $L_{Amax,T}$ were measured between 13:00 on 23/02/16 and 15:30 on 24/02/16, at a fixed microphone position (designated “F”) on site. Data has been gathered over a 24 hour period, in order to provide L_{Aeq} and L_{Amax} levels for both day and night.

As stated in Section 2.0, the primary noise source is the A327 that runs past the west façade. MACH Acoustics fixed noise monitoring position has been installed in order to provide a clear picture of noise levels from this source.

Figure 3.1 below provides the location of fixed measurement position F. The microphone was placed approximately 1m from the west façade, on the 1st floor. A spot measurement (designated S1) has been conducted in synchronisation with fixed microphone F, in order to establish variance in noise levels at facades which are screened from road traffic noise.

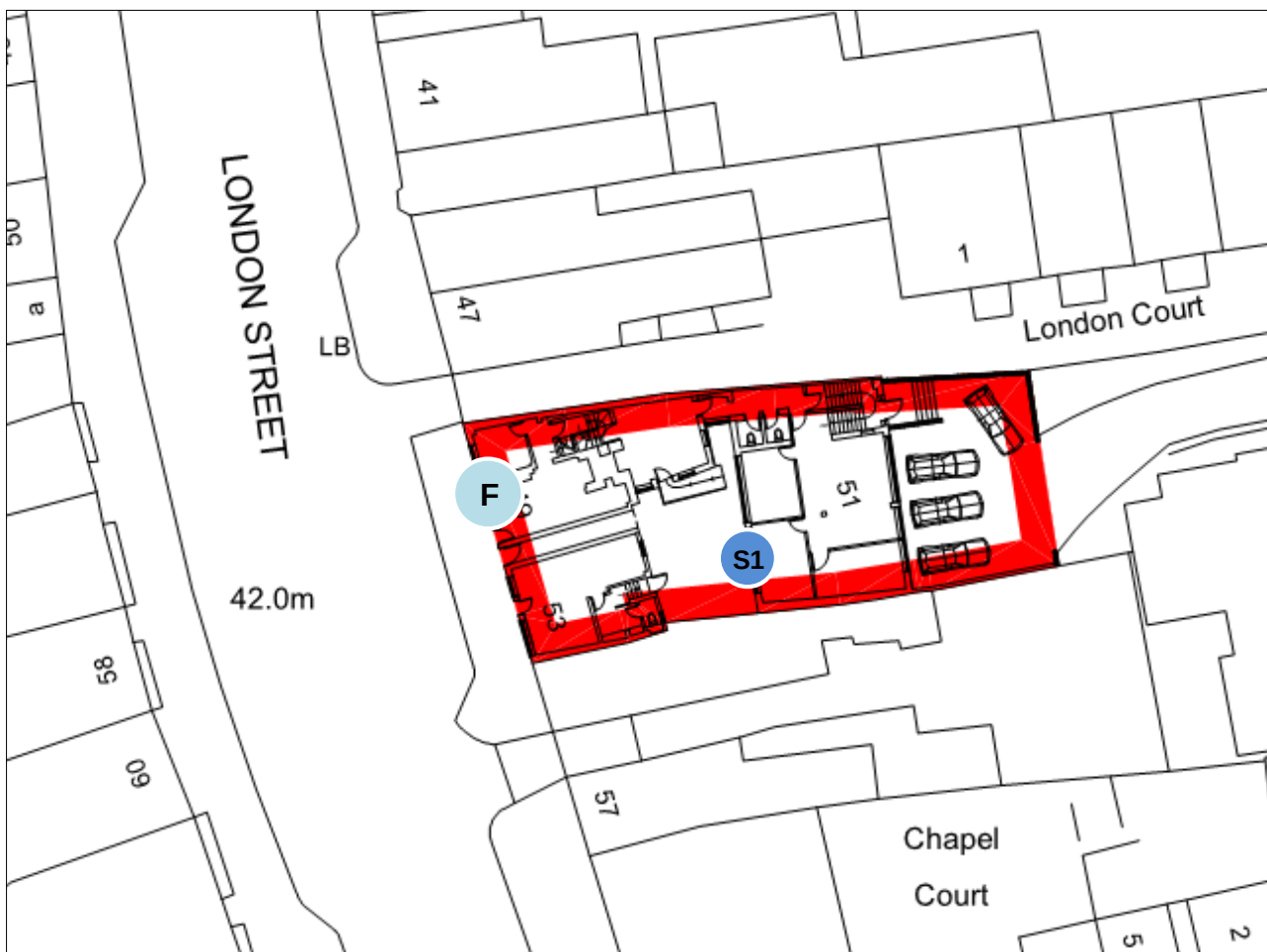


Figure 3.1: Measurement location map

The long term meter was set to measure consecutive ‘A’ weighted 5 minute time samples. This scenario was implemented so that any inconsistencies in the data could be easily identified and explained. The results of the environmental noise survey are provided within Section 4.0 of this report.

3.1 Measurement Equipment

The measurement equipment illustrated in Table 3.1 was used during the survey, all equipment complies with BS EN 60942:2003 i.e. a class 1 device.

Name	Serial Number	Last Calibrated	Calibration Due
Norsonic Precision Sound Analyser Type 131	1313109	Feb 2014	Feb 2016
Norsonic Type 1207 Pre-amplifier	12303	Feb 2014	Feb 2016
Norsonic Type 1228 Microphone	00812	Feb 2014	Feb 2016
Norsonic Sound Calibrator Type 1251	32090	May 2014	May 2016

Table 3.1: Noise Measurement Equipment

3.2 Weather Conditions

The following climate conditions were recorded for the site:

Wind: Less than 5 m/s.
Humidity: The weather was clear.
Temperature: 0 - 8°C.

The above weather conditions are suitable for the measurement of environmental noise in accordance with BS7445 *Description and Measurement of Environmental Noise*.

4.0 NOISE SURVEY RESULTS

4.1 Fixed Measurement Results

The following graph and table show the measured noise levels at fixed measurement location F on site. All measurements are shown in dB(A). The complete set of measurement data is available on request. The graph in Figure 4.1 below provides the L_{Amax} , L_{Aeq} and L_{A90} levels measured over the length of the noise survey.

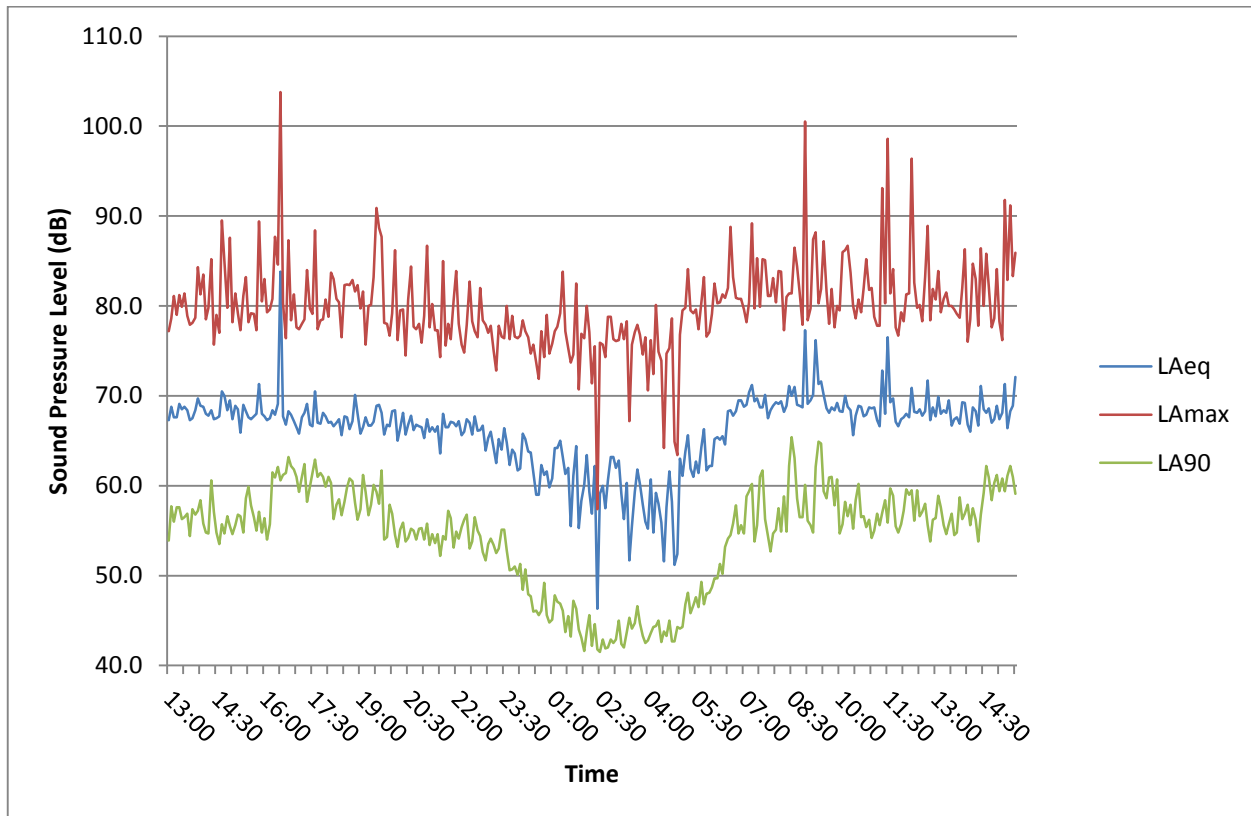


Figure 4.1: Graph of on-site environmental noise measurements

Measurement	Maximum	Minimum	Average
L_{Aeq}	84	64	69
L_{A90}	65	52	58
L_{fmax}	104	74	86

a) DAY (0700 – 2300)

Measurement	Maximum	Minimum	Average
L_{Aeq}	70	46	63
L_{A90}	58	42	49
L_{fmax}	89	57	79

b) NIGHT (0700 – 2300)

Table 4.1: Noise survey results

4.2 Spot Measurement Results

As stated previously, spot measurements were recorded on site in order to help quantify existing noise levels at screened facades. These levels have been used to establish the level difference between these locations and the London Street façade. The L_{Amax} , L_{Aeq} and L_{A90} levels obtained from this spot measurement are shown in Table 4.2.

Position	Time	L_{Aeq} , dB	L_{A90} , dB	L_{Fmax} , dB
P1	13:05	48	46	68

Table 4.2: Spot measurements – position S1

5.0 GOVERNMENT GUIDANCE DOCUMENTATION – NOISE CONTROL

In March 2012 the Government published the National Planning Policy Framework (NPPF) which sets out the Government's planning policies for England and how these are expected to be applied.

The Framework replaces many of the existing Planning Policy documents including Planning Policy Guidance 24: Planning and Noise that gave guidance on the control of noise to sensitive developments which may be affected by noise and vice versa. The NPPF provides a framework within which local people and their council can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

With regards to noise the Framework states that 'Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts²⁷ on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts²⁷ on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;²⁸ and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

[27] The NPPF does make reference to The Noise Policy Statement for England, published by Defra in March 2010.

5.1 Noise Policy Statement for England

The aim of the Noise Policy Statement for England (NPSE) is to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion. The NPSE applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.

Noise Policy Vision: Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

Noise Policy Aims: 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

5.2 Interpretation of NPSE

The Noise Policy Statement for England does not provide any specific guidance on noise levels for residential developments therefore it is seen that it is up to the discretion of the Local Planning Authority to decide on what is deemed acceptable.

Based on MACH Acoustics previous experience on similar developments it is proposed that planning be granted providing that internal noise levels within habitable spaces are within the recommendations of BS 8233: 2014.

6.0 FAÇADE ASSESSMENT

To determine internal noise levels within the proposed dwellings, an indicative façade noise break-in assessment has been undertaken in accordance with the guidance given within BS8233. The calculations are shown within Appendix A and have been based on the assessment noise levels shown in section 4.0. Noise ingress calculations have been based on façade and room dimensions as supplied by Red Brick Property Services Ltd.

The Noise Policy Statement for England does not provide guidance on internal noise levels within residential buildings. As a result, the advised levels within BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings' have been adopted. BS8233 states that to achieve adequate sleeping and living conditions, background noise levels should be 30 dB L_{Aeq} or less within bedrooms at night, and 35 dB L_{Aeq} or less within Living rooms during the day. The advised levels are tabulated below.

Activity	Location	0700 - 2300	2300 - 0700
Resting	Living Room	35 dB L_{Aeq} , 16 Hour	
Dining	Dining Room	40 dB L_{Aeq} , 16 Hour	-
Sleeping	Bedroom	35 dB L_{Aeq} , 16 Hour	30 dB L_{Aeq} , 8 Hour

Table 6.1 - BS8233 Internal noise levels

BS 8233: 2014 provides no definitive methodology for assessment of L_{Amax} levels. The standard simply states that a guideline value for the internal level may be set depending on the character of the noise source and number of events per night. Calculations have been based on achieving 45 dB L_{Amax} within bedrooms. It is widely accepted that noise events should not exceed this level more than 10-15 times during the night time period (0700 – 2300).

6.1 Assessment Noise Levels

It is necessary to extrapolate a series of assessment parameters from the noise survey results presented in Section 4.0. These noise levels form the basis of assessment, and are provided below. These levels are representative of the London Street façade of the proposed residential development.

Worst Case Exposure: L_{Aeq} 16 Hour 69 dB
 L_{Aeq} 8 Hour 63 dB
 L_{Amax} 81 dB (Maximum 10 instances exceeding per night)

6.2 Existing Facade Construction

MACH Acoustics assessment of noise break-in has been based on a solid masonry construction, representative of the existing structure. The predicted sound reduction is provided in Table 6.2 below (INSUL Sound insulation prediction software).

Frequency:	63 Hz	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz
SRI:	36	36	41	42	47	43	54

Table 6.2: Existing facade - Calculated sound reduction indices

6.3 Proposed Secondary Glazing System

MACH Acoustics have based noise break-in calculation on the following secondary glazing system;

Outer: Clear Float Glass – 4mm

Cavity: 85mm Air Filled

Inner: Pilkington K Float – 4mm Hard Coated Surface.

The predicted sound insulation performance of this system is provided in Table 6.3 below (INSUL Sound insulation prediction software).

Frequency:	63 Hz	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz
SRI:	13	18	33	40	45	47	46

Table 6.3: Existing facade - Calculated sound reduction indices

6.4 Predicted Internal Noise Levels

In order to illustrate compliance with the internal noise level targets of BS8233: 2014, predicted internal noise levels are provided in Table 8.3 below. Supporting calculations are provided in Appendix A.

	63 Hz	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz	dBA
L _{Aeq} Living Room	56	41	30	29	22	15	5	30 dB
L _{Aeq} Bedroom	55	40	24	20	18	11	4	26 dB

Table 8.3: Predicted internal noise levels - L_{Aeq}

Table 8.4 below provides calculated internal L_{Amax} levels. The levels shown may at times be exceeded, but normally no more than 10 times between 2300 – 0700.

	63 Hz	125 Hz	250 Hz	500 Hz	1.0 K Hz	2.0 K Hz	4.0 K Hz	dBA
L _{Amax}	74	59	42	38	36	29	20	45 dB
Maximum Level:								45 dB

Table 8.4: Predicted internal noise levels – L_{Amax}

The results indicate that with the inclusion of the proposed secondary glazing, internal noise levels will be compliant with BS8233: 2014.

7.0 SUMMARY

MACH Acoustics have been appointed by Red Brick Property Services Ltd to carry out an environmental noise survey and subsequent assessment for the proposed residential development at 49 – 51 London Street, Reading, RG1 4PS. Proposals are for the conversion of an office building to a mixed scheme containing offices, a beauty salon and three flats.

To determine internal noise levels within the proposed dwellings, an indicative façade noise break-in assessment has been undertaken in accordance with the method given within BS8233 for both day and night time noise levels. Calculations were based façade and room dimensions as supplied by Red Brick Property Services Limited.

Section 6.4 above indicates that the proposed secondary glazing system will be suitable to achieve compliance with BS8233: 2014 'Guidance on sound insulation and noise reduction for buildings'. The proposed residential development is therefore seen to be compliant with planning policy for noise.

APPENDIX A – FAÇADE BREAK-IN CALCULATIONS

A1 EXPOSURE LEVEL 1

BS8233 Facade Noise Break In Calculation		63	125	250	500	1000	2000	4000	dB(A)
Noise Level at Façade		77.5	66.8	64.9	63.9	65.4	63.0	54.5	69
Calculation of environmental noise break-in to hotel rooms 3dB Safety (Calculation of environmental noise break-in) $L_2 = L_0 - R + 10 \log(S/A) + 3 \text{ dB}$ (Freefield version)									
	1 dB	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Calculated $A = 0.161V/RT$ Volume =									
	42 m ³								
RT									
	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
A (absorption in sabins)		13.5	13.5	13.5	13.5	13.5	13.5	13.5	
$10 \log(S/A)$		-3.5	-3.5	-3.5	0.0	-3.5	-3.5	-3.5	
FAÇADE Elements									
Total Façade Area									
	6.0 m ²								
Plastered Solid Brickwork 260kg/m ²									
	5 m ²	36	36	41	42	47	52	52	
$10 \log((S_i/Stot)10^{-R/10})$		-37	-37	-42	-43	-48	-53	-53	
Predicted noise level in building $L_{ff}+t_l+10 \log(A_0/A)+K$		41.4	30.7	23.8	25.3	18.3	10.9	2.4	25.4
Saint Gobain - 8 (20) 12.8A									
	1 m ²	13	18	33	40	45	47	46	
$10 \log((S_i/Stot)10^{-R/10})$		-22	-27	-42	-49	-54	-56	-55	
Predicted noise level in building $L_{ff}+t_l+10 \log(A_0/A)+K$		55.9	40.2	23.3	18.9	11.8	7.4	-0.1	31.1
-									
	n = 1								
-									
	Dne-10Log(n)	43	43	40	44	50	55	65	
Ao/A		-41	-41	-38	-42	-48	-53	-63	
Predicted noise level through trickle vent $L_{ff}-Dne+10 \log(A_0/A)+K$		37.2	26.5	27.6	26.1	18.1	10.7	-7.8	25.8
		63	125	250	500	1000	2000	4000	dB(A)
Combined Noise Levels (1+2+3+4+5)		56.1	40.9	30.1	29.2	21.7	14.7	4.6	30
Target									
NR Difference		-9	-14	-17	-12	-16	-20	-28	35
NR pass / fail		Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Figure A1: Day time façade noise break-in $L_{Aeq, 16 \text{ Hour}}$

BS8233 Façade Noise Break In Calculation		63	125	250	500	1000	2000	4000	dB(A)
Noise Level at Façade		70.8	60.4	57.8	57.8	59.7	56.8	47.9	63
Calculation of environmental noise break-in to hotel rooms									
3dB Safety (Calculation of environmental noise break-in)	1 dB	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
L2 = L0 - R + 10*log(S/A) + 3dB (Freefield version)									
Calculated A = 0.161V/RT									
Volume =	26 m3								
RT	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
A (absorption in sabins)		8.5	8.5	8.5	8.5	8.5	8.5	8.5	
10*log(S/A)		0.5	0.5	0.5	0.0	0.5	0.5	0.5	
FAÇADE Elements									
Total Façade Area	9.6 m2								
Plastered Solid Brickwork 260kg/m2									
	8 m2	36	36	41	42	47	52	52	
10Log((Si/Stot)10^(-R/10))		-37	-37	-42	-43	-48	-53	-53	
Predicted noise level in building Lff+tl+10log(A0/A)+K		38.4	28.0	20.4	18.9	16.3	8.4	-0.5	21.4
Saint Gobain - 8 (20) 12.8A									
	2 m2	13	18	33	40	45	47	46	
10Log((Si/Stot)10^(-R/10))		-20	-25	-40	-47	-52	-54	-53	
Predicted noise level in building Lff+tl+10log(A0/A)+K		55.1	39.7	22.1	14.5	12.0	7.1	-0.8	30.2
-									
	n = 1								
-									
	Dne-10Log(n)	99	99	99	99	99	99	99	
-									
	Ao/A	-99	-99	-99	-99	-99	-99	-99	
Predicted noise level through trickle vent Lff-Dne+10log(A0/A)+K		0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
		63	125	250	500	1000	2000	4000	dB(A)
Combined Noise Levels (1+2+3+4+5)		55.2	39.9	24.3	20.3	17.8	11.2	4.3	26
Target									
NR Difference		-10	-15	-23	-21	-20	-24	-29	30
NR pass / fail		Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Figure A2: Night time façade noise break-in L_{Aeq}, 8 Hour

BS8233 Façade Noise Break In Calculation		63	125	250	500	1000	2000	4000	dB(A)
Noise Level at Façade		89.6	79.4	75.8	75.7	77.5	74.5	65.1	81
Calculation of environmental noise break-in to hotel rooms									
3dB Safety (Calculation of environmental noise break-in)	1 dB	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
L2 = L0 - R + 10*log(S/A) + 3dB (Freefield version)									
Calculated A = 0.161V/RT									
Volume =	26 m3								
RT	0.5 s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
A (absorption in sabins)		8.5	8.5	8.5	8.5	8.5	8.5	8.5	
10*log(S/A)		0.5	0.5	0.5	0.0	0.5	0.5	0.5	
FAÇADE Elements									
Total Façade Area	9.6 m2								
Plastered Solid Brickwork 260kg/m2	8 m2	36	36	41	42	47	52	52	
10Log((Si/Stot)10^(-R/10))		-37	-37	-42	-43	-48	-53	-53	
Predicted noise level in building Lff+tl+10log(A0/A)+K		57.2	47.0	38.4	36.8	34.1	26.1	16.7	39.5
Saint Gobain - 8 (20) 12.8A	2 m2	13	18	33	40	45	47	46	
10Log((Si/Stot)10^(-R/10))		-20	-25	-40	-47	-52	-54	-53	
Predicted noise level in building Lff+tl+10log(A0/A)+K		73.9	58.7	40.1	32.4	29.8	24.8	16.4	49.0
-	n = 1								
-	Dne-10Log(n)	99	99	99	99	99	99	99	
	Ao/A	-99	-99	-99	-99	-99	-99	-99	
Predicted noise level through trickle vent Lff-Dne+10log(A0/A)+K		0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
		63	125	250	500	1000	2000	4000	dB(A)
Combined Noise Levels (1+2+3+4+5)		74.0	58.9	42.3	38.2	35.5	28.5	19.6	45
Target	NR Difference	9	4	-5	-3	-3	-7	-13	45
	NR pass / fail		Pass	Pass	Pass	Pass	Pass	Pass	Pass

Figure A3: Night time façade noise break-in L_{Amax}