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The enclosed External Noise Assessment was commissioned by Madigan Browne Architects for the previously submitted Planning Application for the same site and similar proposal. (REF: 2011/0779) The current client has obtained copyright for the report to use it for this submission.

Validity:

The existing building and surroundings have not changed, therefore we assume the report is valid.

External Noise Assessment cover note

7 Fitzroy Square
London, W1T 5HL
October 2011

BROOKSMURRAY ARCHITECTS

EXTERNAL NOISE ASSESSMENT

CLIENT

Fitzrovia Properties

SITE

7 Fitzroy Square
London

SURVEY DATE (S)

27th – 28th June 2011

Report By



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CONTENTS PAGE

PAGE NO:

CONTENTS PAGE	2
INTRODUCTION	3
PROCEDURE	4
APPARATUS	5
ENVIRONMENTAL CONDITIONS	6
RESULTS	7 - 9
DISCUSSION OF RESULTS	10
NOISE EXPOSURE CATAGORIES	11
RECOMMENDATIONS	12 - 17
PLAN SKETCH LAYOUT	18
CONCLUSION	19

ADDITIONAL INFORMATION

FIGURE 1	EXTERNAL NOISE LEVEL RESULTS FROM POSITION 1, 27 TH – 28 TH JANUARY 2011
FIGURE 2 - 6	BS 8233 : 1999 CALCULATION SHEETS

Introduction:

Following the proposal of demolishing the existing mews building, then the erection of a new dwelling, Sound Advice Acoustics Ltd has been instructed by Madagan Browne, to carry out the relevant noise assessments and calculations at the existing site.

With regards to external ambient noise, noise levels are to be monitored generally in accordance with Planning and Policy Guidance PPG 24 and assessments and calculation made in accordance with BS 8233 : 1999 Sound Insulation and Noise Reduction for Buildings Code of Practice. The levels recorded are to be used to evaluate the NEC Category in accordance with PPG 24 and the minimum window specification required for the proposed development.

In addition, Lmax levels are also to be assessed in accordance with PPG 24 for night time level exceedance.

External noise levels are to be recorded over, what has been considered for the site, an average / typical time period in order to assess the highest daytime and night time averages and therefore assess worse case scenario.

Procedure:

External noise levels were recorded over typical weekday periods including 27th – 28th June 2011 at position 1 as detailed on the attached plan sketch layout. Sample measurements were recorded over continuous 5 minute samples and from this data the hourly LAeq daytime values have been evaluated. Sound Pressure Levels were recorded on the following setting along with a full octave band frequency analysis measured simultaneously and between 31.5 Hz and 16.0 kHz.

Daytime 07:00 – 23:00

LAeq 1 HOUR dB

LA10 1 HOUR dB

LAMAX 1 HOUR dB

LA50 1 HOUR dB

LAMIN 1 HOUR dB

LA90 1 HOUR dB

Night Time 23:00 – 07:00

LAeq 5 MINUTES dB

LA10 5 MINUTES dB

LAMAX 5 MINUTES dB

LA50 5 MINUTES dB

LAMIN 5 MINUTES dB

LA90 5 MINUTES dB

The external results recorded were assessed in accordance with Planning and Policy Guidance PPG 24. Calculations have also been made in accordance with BS 8233 : 1999 'Sound Insulation and Reduction of Buildings - Code of Practice'. Recommendations were made for any additional acoustics measures to conform to these standards.

From the downloaded recorded results both the daytime and night time averages for the 24 hour period were assessed and used within the above calculations as LAeq 16 HOUR dB levels for daytime and LAeq 8 HOUR dB for night time. These are detailed on the attached figure 1.

Apparatus:

The above equipment was calibrated using a sound pressure level of 114.0 dB at an octave band centre frequency of 1000Hz with reference to $2 \times 10^{-5} \text{ Nm}^{-2}$ before and after the tests and the equipment set to have no inaccuracy greater than 0.2 dB.

All the following equipment was calibrated by Salford University (UKAS NO: 0801) in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS) on the following dates.

Calibration schedules are implemented within Sound Advice Acoustics Ltd in accordance with UKAS directive LAB 23.

Description	Make	Type	Serial No.	Calibration Intervals	Last Calibrated	Next Due Calibration
Integrated Sound Level Meter	Norsonic	118	28191	2 YEARS	28.04.11	28.04.13
12.5mm Microphone (with windshield)	GRAS	40AF	73337	2 YEARS	28.04.11	28.04.13
Microphone Pre – Amplifier	Norsonic	1206	27587	2 YEARS	28.04.11	28.04.13
Calibrator	Norsonic	1251	31963	1 YEAR	28.04.11	28.04.12

FULL UKAS CALIBRATION DATA SHEETS AND CERTIFICATES ARE AVAILABLE UPON REQUEST.

Environmental Conditions:

START OF TEST - 27th June 2011
Temperature: 25⁰C
Relative Humidity 82%
Average Wind Speed: <0.0 m/s
Cloud Cover: None
Road Surface Dry
Atmospheric Pressure: 1014

END OF TEST - 28th June 2011
Temperature: 30⁰C
Relative Humidity 88%
Average Wind Speed: <0.0 m/s
Cloud Cover: None
Road Surface Dry
Atmospheric Pressure: 1018

* Wind speed, temperature and relative humidity were all recorded using standard equipment supplied by RS Components, Hedge End, Southampton and are taken as an average over the designated time period.

Results:

- $L_{Aeq,t}$ - The equivalent A weighted sound pressure level recorded over a time interval of 5 minutes night time and 1 hourly daytime.
- $L_{A90,t}$ - The A weighted sound pressure level that is exceeded for 90% of the time period 5 minutes night time and 1 hourly daytime.
- $L_{A50,t}$ - The A weighted sound pressure level that is exceeded for 50% of the time period 5 minutes night time and 1 hourly daytime.
- $L_{A10,t}$ - The A weighted sound pressure level that is exceeded for 10% of the time period 5 minutes night time and 1 hourly daytime.
- L_{Amax} - The maximum A weighted sound pressure level recorded over a time interval of 5 minutes night time and 1 hourly daytime.
- L_{Amin} - The minimum A weighted sound pressure level recorded over a time interval of 5 minutes night time and 1 hourly daytime.

See attached figures 1 for full downloaded results, and averages.

27 th – 28 th June 2011 – Position 1																	
Date / Time	LAeq	Lmax	Lmin	LA10	LA50	LA90	Octave Band Centre Frequency (Hz)										
							31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k	
DAYTIME LOWEST	49.5	56.2	47.8	50.4	49.0	48.3	53.6	55.1	51.4	49.1	46.3	46.1	39.7	29.6	17.6	12.7	
DAYTIME HIGHEST	54.2	63.6	48.4	57.3	51.7	49.0	53.9	55.2	53.8	50.9	51.8	50.2	46.1	37.9	27.6	19.4	
DAYTIME AVERAGE	51.6	60.4	48.8	53.4	50.5	49.4	56.2	56.5	53.6	51.3	49.3	48.0	43.6	38.5	31.9	24.1	
NIGHT TIME LOWEST	47.6	49.8	46.9	48.1	47.6	47.1	50.4	51.0	48.0	45.3	44.9	44.7	37.8	27.6	15.1	12.0	
NIGHT TIME HIGHEST	51.2	54.3	49.4	52.3	51.1	50.2	55.2	56.8	53.6	50.8	48.6	47.7	41.3	32.3	23.5	18.5	
NIGHT TIME AVERAGE	49.1	52.9	47.5	50.2	48.8	48.0	52.0	53.4	50.0	48.0	46.2	45.7	39.5	30.2	18.6	13.5	

Discussion of Results:

It can be seen from the attached graph and downloaded results that the external noise levels have followed the expected path and remained fairly constant throughout the day. The levels then gradually dropped off as the evening progressed and began to rise when morning traffic levels increased.

With regards to maximum levels, PPG 24 states that

“Night-time noise levels (23:00 – 07:00): sites where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D).”

It can be seen from the downloaded data that the L_{max} limit of 82 dB has not been exceeded during the night time period. Therefore the above statement from PPG 24 would not come into force and the PPG 24 categories remain as evaluated.

Noise Exposure Categories:

The following noise exposure categories have been assessed in accordance with Planning Policy Guidance Planning and Noise PPG 24 and assessed to the nearest affected façade of the proposed residential dwelling:-

AVERAGE LEVELS	DATE OF ASSESSMENT	
	27 TH – 28 TH JUNE 2011	PPG 24 Category
DAYTIME 07:00–23:00	51.6	A
NIGHT TIME 23.00-07.00	49.1	B

PPG 24 introduces the concept of Noise Exposure Categories (NECs) for residential developments; these are classified as shown in Table 1. The noise levels corresponding to the noise exposure categories for new housing are given in Table 2.

Policy Planning Guidance PPG 24 states within Annex 1 that for NEC categories A & B:-

NEC A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
NEC B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.

Table 1. Noise Exposure Categories

Noise Source	NEC A dB L _{Aeq}	NEC B dB L _{Aeq}	NEC C dB L _{Aeq}	NEC D dB L _{Aeq}
Mixed				
07:00 to 23:00 hrs	<55	55-63	63-72	>72
23:00 to 07:00 hrs	<45	45-57	57-66	>66

Table 2. Extract from PPG 24

Recommendations:

The above noise tests have been assessed in accordance with PPG 24 and category A evaluated for daytime and category B for night time for the site. Averages will be used within the BS 8233 : 1999 calculations in order to evaluate the worse case scenario and select the correct window specification.

It can be seen from the category results that the site and surrounding areas, due to the fact that there was an existing residential property, that this particular site is therefore ideal for residential development.

Therefore in order to achieve the required reasonable noise levels of L_{Aeq} 35 dB for habitable rooms and L_{Aeq} 30 for Bedroom at night within the proposed residential properties, the following additional acoustic measures have been calculated. (Details on calculation sheets Figure's 2 – 6 inclusive).

It should be noted that the calculations have been made with the proposed windows closed. Additional calculations were made for the top floor due to the influence of sound transmission into the various rooms via the roof / ceiling i.e. an increased impeding façade.

MINIMUM CONSTRUCTION DETAILS

STANDARD WALL CONSTRUCTION

Brick Outer face, cavity, inner brick or block system.

63	125	250	500	1.0k	2.0k	4.0k	Frequency (Hz)
36.0	40.0	44.0	45.0	51.0	56.0	60.0	dB reduction

WINDOW CONSTRUCTION (4 / 16 / 4)

63	125	250	500	1.0k	2.0k	4.0k	Frequency (Hz)
24.4	20.4	20.1	26.5	39.6	42.4	38.9	dB reduction

STANDARD TRICKLE VENTS

63	125	250	500	1.0k	2.0k	4.0k	Frequency (Hz)
35.0	33.0	32.0	29.0	29.0	31.0	33.0	dB reduction

ROOF CONSTRUCTION – MINIMUM VALUE

63	125	250	500	1.0k	2.0k	4.0k	Frequency (Hz)
22.0	28.0	34.0	40.0	45.0	49.0	53.0	dB reduction

Conclusion:

Levels have been recorded and assessments made in accordance with the relevant standards. Internal criteria's have been set and calculations made in order to determine the minimum construction details required in order to meet the desired level within the proposed residential dwellings and satisfy the local councils requirements.

It will be necessary to install a window specification of 4 / 16 / 4 double glazing to all aspects of the development with standard trickle vents.

Therefore, based on the assessments and calculations made within this report it is the professional opinion of Sound Advice Acoustics Ltd that, with regards to acoustics, planning permission should be granted.

DAYTIME NOISE LEVELS 07:00 - 23:00																
Date / Time	LAeq	Lmax	Lmin	LA10	LA50	LA90	Octave Band Centre Frequency (Hz)									
							31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
07:00 - 08:00	51.9	57.9	49.7	53.0	51.6	50.4	56.5	55.1	56.2	57.7	53.9	50.8	49.3	48.3	42.5	32.9
08:00 - 09:00	52.4	57.6	50.4	53.7	52.0	51.0	56.9	58.2	54.7	51.1	49.1	48.5	44.0	37.7	27.5	21.0
09:00 - 10:00	52.4	60.1	49.9	54.1	51.4	50.4	57.0	57.7	53.6	50.8	48.8	48.6	44.1	37.3	27.0	16.9
10:00 - 11:00	53.0	61.7	49.6	55.6	51.3	50.1	57.8	58.1	54.4	51.8	50.1	49.3	44.2	35.3	25.5	18.3
11:00 - 12:00	52.7	59.3	50.2	54.9	51.7	50.7	57.7	57.8	53.2	50.5	49.0	49.2	44.7	36.8	28.3	19.5
12:00 - 13:00	52.6	60.7	50.1	54.2	51.3	50.4	57.9	58.0	54.4	51.3	50.1	48.3	43.6	37.4	34.6	31.2
13:00 - 14:00	50.2	58.3	47.8	51.4	49.2	48.4	56.4	56.2	52.7	49.8	48.2	46.1	40.0	30.9	20.6	14.6
14:00 - 15:00	49.6	57.8	47.5	50.5	48.9	48.1	56.2	56.2	52.8	49.1	46.6	45.7	40.4	31.6	22.7	18.3
15:00 - 16:00	50.2	58.4	47.9	51.5	49.2	48.3	56.0	56.2	52.9	50.1	48.2	46.1	39.8	29.9	20.0	14.0
16:00 - 17:00	49.5	57.0	47.5	50.9	48.9	48.0	56.6	56.0	53.1	48.9	47.0	45.6	39.9	30.8	21.5	16.0
17:00 - 18:00	50.4	60.8	48.1	51.6	49.5	48.6	56.3	56.3	53.2	49.7	47.3	46.4	42.0	33.7	23.5	16.8
18:00 - 19:00	50.6	64.7	48.1	51.5	49.4	48.6	56.1	55.7	53.1	49.9	48.0	46.6	41.0	33.9	24.2	17.3
19:00 - 20:00	49.8	54.9	47.8	51.3	49.1	48.3	53.9	54.7	53.5	48.6	47.1	46.3	39.8	29.9	19.3	13.4
20:00 - 21:00	54.2	63.6	48.4	57.3	51.7	49.0	53.9	55.2	53.8	50.9	51.8	50.2	46.1	37.9	27.6	19.4
21:00 - 22:00	52.5	63.6	48.3	54.9	50.5	48.8	53.7	54.4	52.4	50.4	49.8	48.9	43.4	35.2	26.9	20.5
22:00 - 23:00	49.5	56.2	47.8	50.4	49.0	48.3	53.6	55.1	51.4	49.1	46.3	46.1	39.7	29.6	17.6	12.7

NIGHT TIME NOISE LEVELS 23:00 - 07:00																
Date / Time	LAeq	Lmax	Lmin	LA10	LA50	LA90	Octave Band Centre Frequency (Hz)									
							31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
23:00 - 00:00	48.7	49.8	47.7	49.3	48.7	48.1	52.7	53.3	49.8	48.0	45.9	45.5	38.3	28.1	16.0	12.5
	48.8	53.2	47.8	49.4	48.7	48.1	53.1	54.9	50.1	48.1	46.1	45.4	38.4	28.3	17.0	12.5
	48.4	49.6	47.2	49.0	48.3	47.7	52.2	52.9	49.6	47.4	45.3	45.3	38.2	27.9	15.9	12.5
	48.3	50.3	47.3	49.0	48.2	47.6	51.0	52.4	48.5	48.2	45.0	45.1	38.2	27.8	16.5	12.6
	48.4	49.7	47.4	49.1	48.4	47.7	50.9	52.6	49.3	47.8	45.1	45.3	38.4	27.9	17.4	13.7
	50.5	57.5	47.7	53.2	48.9	48.1	52.6	54.6	49.9	48.5	45.7	47.6	42.3	28.5	16.6	12.5
	48.3	49.5	47.3	49.0	48.3	47.6	51.8	54.6	49.5	47.9	45.2	45.1	38.3	27.8	15.8	12.2
	48.6	49.5	47.6	49.2	48.5	47.9	52.2	55.0	50.2	48.4	45.3	45.2	38.4	27.9	16.0	12.6
	48.8	50.6	47.5	49.7	48.6	47.9	54.7	55.4	50.2	48.8	45.5	45.4	38.6	28.4	16.8	13.7
	49.5	54.7	47.7	50.7	49.0	48.1	52.7	54.8	51.9	50.0	46.9	45.9	38.6	28.1	16.8	14.0
	48.8	51.0	47.5	49.6	48.6	47.8	51.4	55.3	50.5	49.3	45.5	45.3	38.4	28.0	16.2	13.6
	48.6	50.3	47.5	49.5	48.4	47.8	52.2	55.4	50.5	48.6	45.3	45.2	38.2	27.7	15.8	13.4
00:00 - 01:00	50.3	57.4	46.8	53.3	48.9	47.9	52.1	55.6	50.1	48.9	45.6	46.9	42.7	28.2	16.2	13.7
	48.4	49.4	46.7	49.1	48.4	47.3	50.8	53.5	49.0	48.5	45.0	45.0	38.2	27.8	16.4	13.8
	48.8	53.1	47.5	49.6	48.7	47.8	51.6	55.2	50.8	49.2	45.8	45.2	38.4	28.1	16.6	13.8
	48.3	50.1	47.2	49.2	48.3	47.5	51.9	53.5	48.4	47.6	45.2	45.1	38.4	28.0	16.5	13.5
	48.2	50.4	47.2	49.0	48.1	47.5	52.3	53.0	49.5	48.3	45.1	44.8	38.0	27.6	15.7	13.2
	48.1	49.2	47.2	48.8	48.1	47.5	51.4	52.5	48.6	47.8	45.0	44.9	37.9	27.5	15.5	13.0
	48.3	50.9	47.2	49.2	48.2	47.5	50.9	51.8	48.3	48.1	45.1	45.1	38.1	27.7	15.7	12.5
	47.9	49.2	46.8	48.4	47.8	47.3	50.8	51.2	47.5	47.6	44.7	44.7	37.6	27.1	15.1	12.6
	48.2	54.2	47.0	48.7	47.8	47.2	50.6	51.5	48.3	47.5	44.7	44.9	39.0	27.4	15.2	12.6
	48.1	50.4	47.1	48.8	48.0	47.4	51.4	51.7	47.8	47.4	44.9	45.0	38.2	27.5	15.2	12.7
	48.0	50.3	47.2	48.6	48.0	47.5	50.7	52.3	50.9	47.2	44.9	44.8	37.7	27.2	15.0	12.6
	50.4	60.8	47.1	52.0	48.4	47.6	52.0	53.1	53.3	51.0	48.6	46.3	39.1	28.0	15.2	12.6
01:00 - 02:00	50.8	60.7	47.2	53.7	48.3	47.5	54.0	53.6	53.2	51.4	49.0	46.7	39.8	28.5	15.5	12.6
	47.9	49.3	46.6	48.5	47.9	47.2	50.6	51.1	48.6	47.1	44.9	44.7	37.8	27.6	16.1	12.9
	48.2	49.8	47.0	48.9	48.1	47.4	50.8	51.8	48.3	47.6	45.2	44.9	37.9	27.5	15.3	12.8
	48.5	52.3	47.2	49.3	48.3	47.7	50.3	51.5	48.1	47.8	45.6	45.3	38.3	27.8	15.5	13.0
	48.2	49.9	47.1	48.9	48.1	47.5	50.8	51.7	48.6	46.8	45.3	45.0	38.2	27.8	15.8	13.2
	48.2	50.6	46.9	49.0	48.0	47.3	49.8	51.4	48.5	46.7	45.3	45.0	38.3	28.1	15.8	13.0
	48.2	50.5	47.2	48.8	48.1	47.5	49.4	51.4	49.1	47.5	45.3	44.8	38.1	27.9	15.7	12.9

NIGHT TIME NOISE LEVELS 23:00 - 07:00																
Date / Time	LAeq	Lmax	Lmin	LA10	LA50	LA90	Octave Band Centre Frequency (Hz)									
							31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
01:00 - 02:00 <i>Continued</i>	48.1	50.3	46.7	48.8	48.0	47.2	49.3	51.0	49.1	46.8	45.3	44.8	38.0	27.7	15.4	12.8
	48.1	49.2	47.2	48.8	48.0	47.5	49.5	50.1	48.5	47.1	45.4	44.8	38.0	27.8	15.8	12.8
	48.0	49.4	46.9	48.8	47.9	47.4	49.2	50.2	48.7	47.4	45.1	44.7	38.0	27.6	15.2	12.9
	47.9	50.0	46.5	48.6	47.8	47.2	49.4	51.6	48.2	46.6	45.3	44.7	37.8	27.7	15.2	12.4
02:00 - 03:00	47.9	49.4	46.8	48.6	47.8	47.3	51.3	52.4	49.1	46.0	45.2	44.8	38.0	27.8	15.4	12.4
	48.1	52.7	47.0	48.8	47.8	47.2	50.4	50.3	48.3	45.4	45.2	45.2	38.5	28.6	15.2	12.0
	47.6	49.8	46.9	48.1	47.6	47.1	50.4	51.0	48.0	45.3	44.9	44.7	37.8	27.6	15.1	12.0
	48.0	50.5	46.7	48.8	47.9	47.2	50.1	50.7	51.7	46.6	45.2	44.8	37.9	27.5	14.9	11.9
	47.8	49.4	46.9	48.5	47.7	47.2	50.4	51.2	48.9	46.1	44.9	44.8	37.7	27.6	15.1	12.1
	47.7	49.3	47.0	48.2	47.6	47.1	49.7	50.1	48.8	46.0	44.9	44.6	37.7	27.5	15.1	12.1
	47.7	49.2	47.0	48.4	47.7	47.1	49.5	50.7	49.1	46.1	45.0	44.6	37.8	27.7	15.2	12.1
	48.1	50.5	46.7	49.1	47.9	47.2	50.5	51.1	48.5	46.4	45.6	44.9	38.1	28.3	15.6	12.2
	48.0	49.4	47.1	48.7	47.9	47.2	50.4	50.5	49.8	46.6	45.3	44.8	37.9	27.7	15.3	12.5
	47.8	49.2	46.9	48.4	47.7	47.2	50.6	50.4	47.9	46.0	45.3	44.7	37.7	27.6	15.2	12.3
	48.5	50.0	47.5	49.1	48.4	47.8	51.4	51.3	49.5	47.9	46.2	45.0	37.9	27.7	15.4	12.4
	47.7	49.0	46.9	48.4	47.7	47.1	49.9	50.3	48.4	46.1	45.2	44.5	37.7	27.7	15.0	11.8
03:00 - 04:00	48.0	49.3	46.9	48.6	47.9	47.3	51.0	52.0	50.2	46.5	45.3	44.8	37.9	27.7	14.9	11.5
	48.8	52.0	47.3	50.5	48.3	47.7	52.0	52.2	49.6	48.5	46.7	45.2	38.3	28.1	15.2	11.6
	48.1	50.9	47.1	48.6	48.0	47.5	50.8	51.1	48.8	47.1	45.6	44.8	37.9	27.8	15.0	11.7
	48.1	49.6	47.0	48.9	48.0	47.4	49.8	52.0	48.6	46.5	45.4	45.0	38.1	27.9	14.9	11.7
	48.2	50.7	47.3	48.9	48.1	47.5	49.8	50.9	50.4	46.6	45.5	45.0	38.2	27.9	15.1	11.5
	48.1	50.1	47.1	48.8	48.0	47.4	51.1	51.6	48.8	46.5	45.4	45.0	38.0	27.7	15.0	11.5
	48.2	49.6	46.9	48.8	48.1	47.5	51.0	51.5	49.1	46.7	45.4	45.0	38.2	27.9	15.2	11.5
	48.2	50.9	47.1	48.9	48.1	47.6	50.1	50.6	48.8	47.2	45.6	44.8	38.3	28.0	15.2	11.3
	49.0	55.6	47.2	49.8	48.4	47.7	50.0	52.1	49.0	47.8	45.7	45.5	40.3	31.1	16.1	11.3
	48.7	51.0	47.3	49.8	48.4	47.7	50.1	51.2	49.6	47.3	45.6	44.8	40.5	32.4	17.2	11.9
	48.7	52.1	47.1	49.8	48.4	47.5	52.1	51.7	49.9	46.7	45.8	45.1	40.2	32.1	17.1	11.4
	48.5	51.0	46.8	49.6	48.2	47.5	50.3	50.7	48.4	46.6	45.3	44.8	40.3	33.5	21.5	13.2
04:00 - 05:00	48.9	51.9	47.2	50.4	48.5	47.6	49.5	50.7	48.8	47.2	45.4	44.9	41.2	34.9	22.9	13.2
	48.6	51.2	46.8	50.1	48.1	47.3	49.3	49.9	48.8	47.3	45.1	44.6	40.6	35.0	22.4	13.5
	49.0	52.2	46.9	50.6	48.6	47.5	49.5	51.1	47.8	46.5	45.4	45.2	41.4	35.0	23.3	13.4
	49.0	51.5	47.2	50.3	48.6	47.5	49.7	51.3	48.3	46.8	45.6	44.9	41.3	35.1	22.4	12.9

NIGHT TIME NOISE LEVELS 23:00 - 07:00																
Date / Time	LAeq	Lmax	Lmin	LA10	LA50	LA90	Octave Band Centre Frequency (Hz)									
							31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
04:00 - 05:00 <i>Continued</i>	49.7	56.0	47.5	51.2	49.3	48.0	50.6	51.8	48.1	46.5	45.7	45.5	43.0	37.2	24.3	15.9
	49.9	55.6	47.7	51.5	49.2	48.0	49.8	51.8	49.3	46.5	45.8	46.4	42.7	35.3	21.0	12.5
	48.8	51.1	46.9	49.8	48.7	47.7	50.9	52.9	49.3	46.8	45.7	45.4	40.2	31.9	17.1	11.9
	50.3	60.2	47.3	52.8	48.6	47.8	54.4	55.6	51.4	49.7	48.7	46.4	39.4	28.7	16.5	12.0
	49.5	55.7	47.7	50.4	49.3	48.3	51.0	54.5	49.7	46.8	46.9	46.3	40.0	30.1	16.6	11.4
	48.8	51.3	46.8	49.8	48.7	47.6	51.6	51.9	48.6	46.7	46.6	45.6	39.0	28.7	15.3	11.3
	50.3	56.3	47.4	52.3	49.3	47.8	56.3	55.3	53.6	51.4	48.6	46.0	39.0	29.6	20.7	16.7
	48.8	51.2	47.3	49.5	48.7	48.0	50.7	52.2	49.4	46.9	46.1	45.6	39.1	29.0	17.8	12.9
05:00 - 06:00	49.2	52.0	47.4	50.2	49.1	48.1	51.3	52.0	48.7	47.1	46.8	46.1	39.3	29.1	17.3	13.0
	49.0	51.0	47.5	50.0	48.9	48.1	51.6	52.3	49.6	48.2	46.4	45.7	39.0	29.0	17.9	14.2
	48.9	50.8	47.6	49.7	48.8	48.0	51.7	52.3	49.0	47.2	46.1	45.7	39.2	29.3	19.4	14.9
	49.8	57.1	47.7	50.5	49.0	48.2	51.4	52.1	48.8	47.2	47.1	46.7	40.5	29.8	21.2	16.6
	49.0	51.7	47.4	50.1	48.8	47.8	51.7	52.9	48.7	47.1	46.4	45.8	39.2	29.8	21.3	16.0
	48.9	50.8	47.3	49.9	48.7	47.9	51.2	52.5	48.8	47.6	46.3	45.5	38.9	29.0	18.1	13.5
	49.3	51.1	47.9	50.3	49.1	48.2	52.7	53.4	49.0	47.7	46.5	46.2	39.5	29.8	20.4	15.2
	50.2	51.8	47.9	51.2	50.1	49.0	53.4	54.9	49.7	48.2	47.5	46.9	41.0	31.5	17.7	12.2
	49.8	52.3	48.4	50.8	49.6	48.7	53.1	54.1	50.7	48.1	47.0	46.5	40.6	31.3	20.1	15.4
	49.6	53.6	48.0	50.5	49.5	48.7	52.6	54.4	49.8	47.4	46.7	46.4	40.6	32.3	23.6	17.5
	49.7	51.3	48.3	50.6	49.6	48.9	52.9	54.4	50.3	47.8	47.0	46.5	40.1	30.2	18.4	14.2
	50.2	52.3	48.7	51.1	50.1	49.2	52.7	54.3	50.4	48.4	47.4	46.9	40.7	32.6	23.8	17.7
06:00 - 07:00	50.6	52.3	48.9	51.4	50.5	49.7	54.4	56.3	52.2	49.8	47.7	47.1	40.8	32.3	21.3	12.5
	51.1	52.6	49.1	52.0	51.0	50.2	54.1	55.9	52.2	49.7	48.1	47.7	41.6	34.3	26.4	16.3
	50.4	52.1	48.7	51.2	50.4	49.4	53.7	56.1	51.4	48.8	47.4	47.2	40.9	31.1	20.0	15.5
	51.0	54.7	49.2	52.0	50.7	49.6	54.2	56.2	53.1	50.7	48.7	47.3	40.7	30.8	21.3	16.9
	51.2	54.3	49.4	52.3	51.1	50.2	55.2	56.8	53.6	50.8	48.6	47.7	41.3	32.3	23.5	18.5
	50.3	54.3	48.7	51.3	50.1	49.1	53.6	55.6	51.3	48.7	47.9	47.0	40.4	30.4	17.1	11.6
	50.4	56.6	48.3	51.5	50.1	49.1	54.2	56.5	52.0	49.3	47.9	47.0	40.5	30.5	18.6	13.5
	50.5	53.0	48.4	51.4	50.4	49.5	54.0	55.0	51.7	48.8	47.5	47.4	41.0	31.1	18.3	11.9
	50.7	52.3	48.7	51.7	50.8	49.4	54.3	56.0	52.0	49.2	47.6	47.5	41.2	31.6	19.3	13.2
	51.0	53.1	49.5	51.9	50.9	49.9	56.7	56.9	52.6	49.6	48.2	47.7	41.4	31.9	20.6	14.7
	50.5	52.4	48.7	51.4	50.4	49.3	54.7	56.2	51.4	48.8	47.5	47.3	41.0	32.0	20.8	13.8
	51.0	52.8	49.7	51.9	50.9	50.2	55.3	56.7	52.2	49.6	48.0	47.7	41.4	32.3	21.1	14.9

NOISE LEVEL SUMMARY ASSESSMENT																
Date / Time	LAeq	Lmax	Lmin	LA10	LA50	LA90	Octave Band Centre Frequency (Hz)									
							31.5	63	125	250	500	1.0 k	2.0 k	4.0 k	8.0 k	16.0 k
DAYTIME LOWEST	49.5	56.2	47.8	50.4	49.0	48.3	53.6	55.1	51.4	49.1	46.3	46.1	39.7	29.6	17.6	12.7
DAYTIME HIGHEST	54.2	63.6	48.4	57.3	51.7	49.0	53.9	55.2	53.8	50.9	51.8	50.2	46.1	37.9	27.6	19.4
DAYTIME AVERAGE	51.6	60.4	48.8	53.4	50.5	49.4	56.2	56.5	53.6	51.3	49.3	48.0	43.6	38.5	31.9	24.1
NIGHT TIME LOWEST	47.6	49.8	46.9	48.1	47.6	47.1	50.4	51.0	48.0	45.3	44.9	44.7	37.8	27.6	15.1	12.0
NIGHT TIME HIGHEST	51.2	54.3	49.4	52.3	51.1	50.2	55.2	56.8	53.6	50.8	48.6	47.7	41.3	32.3	23.5	18.5
NIGHT TIME AVERAGE	49.1	52.9	47.5	50.2	48.8	48.0	52.0	53.4	50.0	48.0	46.2	45.7	39.5	30.2	18.6	13.5

PPG 24 NOISE EXPOSURE CATEGORY

road traffic 07:00 - 23:00 23:00 - 07:00	A B
rail traffic 07:00 - 23:00 23:00 - 07:00	A B
air traffic 07:00 - 23:00 23:00 - 07:00	A B
mixed sources 07:00 - 23:00 23:00 - 07:00	A B

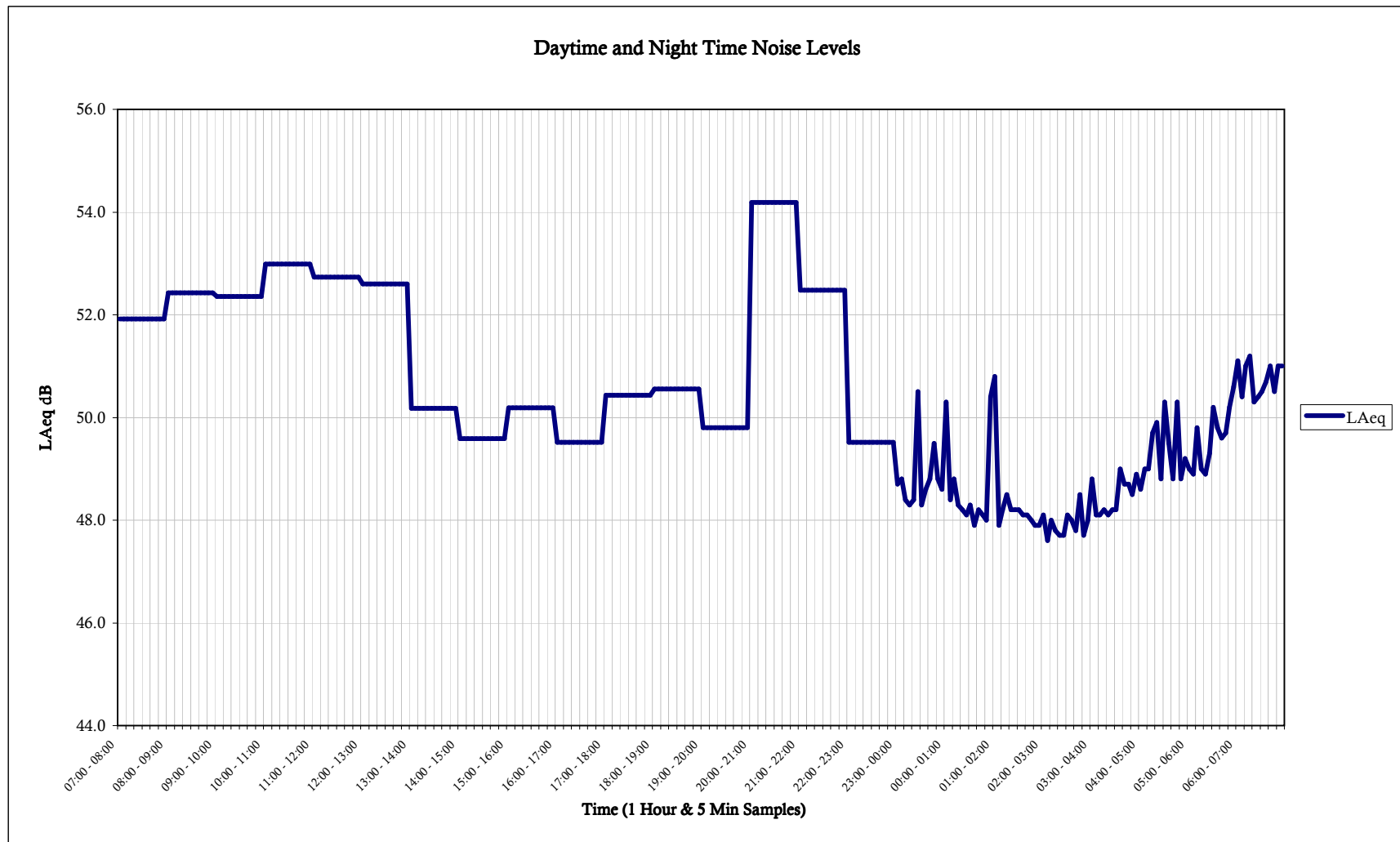


FIGURE 1
PAGE 6 OF 6

Calculation Sheet BS 8233:1999 (Table 3)

Client	Madigan Browne
Site	7 Fitzroy Square, London
Figure	2

Maximum Criteria	
Daytime	Night Time
35	30

Floor	4th Floor
Room	Master Bedroom

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 16 / 4 with Greenwood S Vent
--------------------------------------	----------------------------------

Leqff	The equivalent continuous sound pressure level outside the room elements under consideration
A0	The reference absorption area of 10m ² and is independent of frequency
Sf	The total façade area of the room in question
Swi	The area of the windows in the room
Sew	The area of the external wall of the room
Srr	The area of the ceiling of the room (if applicable)
S	The total area of the elements through which sound enters the room
Dne	The insulation value of the trickle ventilator (if applicable)
Rwi	The sound reduction index of the window
Rew	The sound reduction index of the external wall
Rrr	The sound reduction index of the ceiling/roof (if applicable)
A	The equivalent absorption area of the receiving room where $A=0.163V/T$

Formula	$Leq2=Leqff+10\log[A0/S*10^{(-Dne/10)}+Swi/S*10^{(-Rwi/10)}+Sew/10*10^{(-Rew/10)}+Srr/S*10^{(-Rrr/10)}]+10\log(S/A)+3$
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Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000
Sf	10.56	10.56	10.56	10.56	10.56	10.56	10.56
Sr	17.6	17.6	17.6	17.6	17.6	17.6	17.6
Swi	4	4	4	4	4	4	4
Sew	6.56	6.56	6.56	6.56	6.56	6.56	6.56
Srr	17.6	17.6	17.6	17.6	17.6	17.6	17.6
S	28.16	28.16	28.16	28.16	28.16	28.16	28.16
A0	10	10	10	10	10	10	10
V	42.24	42.24	42.24	42.24	42.24	42.24	42.24
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
A	14	14	14	14	14	14	14
Daytime Leqff	56.5	53.6	51.3	49.3	48.0	43.6	38.5
Night time Leqff	53.4	50.0	48.0	46.2	45.7	39.5	30.2
Dne	35	33	32	29	29	31	33
Rwi	24.4	20.4	20.1	26.5	39.6	42.4	38.9
Rew	22.0	28.0	34.0	40.0	45.0	49.0	53.0
Rrr	22.0	28.0	34.0	40.0	45.0	49.0	53.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)	L_{Aeq} 16 HOUR	27.5	dB(A)
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Predicted dB(A) Level Within The Above Room During Night Time Hours (23:00-07:00)	L_{Aeq} 8 HOUR	24.4	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Madigan Browne
Site	7 Fitzroy Square, London
Figure	3

Maximum Criteria	
Daytime	Night Time
35	30

Floor	4th Floor
Room	Bedroom 2

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 16 / 4 with Greenwood S Vent
--------------------------------------	----------------------------------

Leqff	The equivalent continuous sound pressure level outside the room elements under consideration
A0	The reference absorption area of 10m ² and is independent of frequency
Sf	The total façade area of the room in question
Swi	The area of the windows in the room
Sew	The area of the external wall of the room
Srr	The area of the ceiling of the room (if applicable)
S	The total area of the elements through which sound enters the room
Dne	The insulation value of the trickle ventilator (if applicable)
Rwi	The sound reduction index of the window
Rew	The sound reduction index of the external wall
Rrr	The sound reduction index of the ceiling/roof (if applicable)
A	The equivalent absorption area of the receiving room where $A=0.163V/T$

Formula	$Leq2=Leqff+10\log[A0/S*10^{(-Dne/10)}+Swi/S*10^{(-Rwi/10)}+Sew/10*10^{(-Rew/10)}+Srr/S*10^{(-Rrr/10)}]+10\log(S/A)+3$
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Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000
Sf	8.88	8.88	8.88	8.88	8.88	8.88	8.88
Sr	13.69	13.69	13.69	13.69	13.69	13.69	13.69
Swi	2	2	2	2	2	2	2
Sew	6.88	6.88	6.88	6.88	6.88	6.88	6.88
Srr	13.69	13.69	13.69	13.69	13.69	13.69	13.69
S	22.57	22.57	22.57	22.57	22.57	22.57	22.57
A0	10	10	10	10	10	10	10
V	32.85	32.85	32.85	32.85	32.85	32.85	32.85
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
A	11	11	11	11	11	11	11
Daytime Leqff	56.5	53.6	51.3	49.3	48.0	43.6	38.5
Night time Leqff	53.4	50.0	48.0	46.2	45.7	39.5	30.2
Dne	35	33	32	29	29	31	33
Rwi	24.4	20.4	20.1	26.5	39.6	42.4	38.9
Rew	22.0	28.0	34.0	40.0	45.0	49.0	53.0
Rrr	22.0	28.0	34.0	40.0	45.0	49.0	53.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)	L_{Aeq} 16 HOUR	27.6	dB(A)
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Predicted dB(A) Level Within The Above Room During Night Time Hours (23:00-07:00)	L_{Aeq} 8 HOUR	24.5	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Madigan Browne
Site	7 Fitzroy Square, London
Figure	4

Maximum Criteria	
Daytime	Night Time
35	30

Floor	3rd Floor
Room	Living/Dining

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 16 / 4 with Greenwood S Vent
--------------------------------------	----------------------------------

Leqff	The equivalent continuous sound pressure level outside the room elements under consideration
A0	The reference absorption area of 10m ² and is independent of frequency
Sf	The total façade area of the room in question
Swi	The area of the windows in the room
Sew	The area of the external wall of the room
Srr	The area of the ceiling of the room (if applicable)
S	The total area of the elements through which sound enters the room
Dne	The insulation value of the trickle ventilator (if applicable)
Rwi	The sound reduction index of the window
Rew	The sound reduction index of the external wall
Rrr	The sound reduction index of the ceiling/roof (if applicable)
A	The equivalent absorption area of the receiving room where $A=0.163V/T$

Formula	$Leq2=Leqff+10\log[A0/S*10^{(-Dne/10)}+Swi/S*10^{(-Rwi/10)}+Sew/10*10^{(-Rew/10)}+Srr/S*10^{(-Rrr/10)}]+10\log(S/A)+3$
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Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000
Sf	11.28	11.28	11.28	11.28	11.28	11.28	11.28
Sr	0	0	0	0	0	0	0
Swi	4	4	4	4	4	4	4
Sew	7.28	7.28	7.28	7.28	7.28	7.28	7.28
Srr	0	0	0	0	0	0	0
S	11.28	11.28	11.28	11.28	11.28	11.28	11.28
A0	10	10	10	10	10	10	10
V	45.12	45.12	45.12	45.12	45.12	45.12	45.12
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
A	14	14	14	14	14	14	14
Daytime Leqff	56.5	53.6	51.3	49.3	48.0	43.6	38.5
Night time Leqff	53.4	50.0	48.0	46.2	45.7	39.5	30.2
Dne	35	33	32	29	29	31	33
Rwi	24.4	20.4	20.1	26.5	39.6	42.4	38.9
Rew	22.0	28.0	34.0	40.0	45.0	49.0	53.0
Rrr	22.0	28.0	34.0	40.0	45.0	49.0	53.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)	L_{Aeq} 16 HOUR	26.6	dB(A)
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Predicted dB(A) Level Within The Above Room During Night Time Hours (23:00-07:00)	L_{Aeq} 8 HOUR	23.5	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Madigan Browne
Site	7 Fitzroy Square, London
Figure	5

Maximum Criteria	
Daytime	Night Time
35	30

Floor	3rd Floor
Room	Bedroom 2

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 16 / 4 with Greenwood S Vent
--------------------------------------	----------------------------------

Leqff	The equivalent continuous sound pressure level outside the room elements under consideration
A0	The reference absorption area of 10m ² and is independent of frequency
Sf	The total façade area of the room in question
Swi	The area of the windows in the room
Sew	The area of the external wall of the room
Srr	The area of the ceiling of the room (if applicable)
S	The total area of the elements through which sound enters the room
Dne	The insulation value of the trickle ventilator (if applicable)
Rwi	The sound reduction index of the window
Rew	The sound reduction index of the external wall
Rrr	The sound reduction index of the ceiling/roof (if applicable)
A	The equivalent absorption area of the receiving room where $A=0.163V/T$

Formula	$Leq2=Leqff+10\log[A0/S*10^{(-Dne/10)}+Swi/S*10^{(-Rwi/10)}+Sew/10*10^{(-Rew/10)}+Srr/S*10^{(-Rrr/10)}]+10\log(S/A)+3$
----------------	--

Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000
Sf	13.68	13.68	13.68	13.68	13.68	13.68	13.68
Sr	0	0	0	0	0	0	0
Swi	1	1	1	1	1	1	1
Sew	12.68	12.68	12.68	12.68	12.68	12.68	12.68
Srr	0	0	0	0	0	0	0
S	13.68	13.68	13.68	13.68	13.68	13.68	13.68
A0	10	10	10	10	10	10	10
V	20.88	20.88	20.88	20.88	20.88	20.88	20.88
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
A	7	7	7	7	7	7	7
Daytime Leqff	56.5	53.6	51.3	49.3	48.0	43.6	38.5
Night time Leqff	53.4	50.0	48.0	46.2	45.7	39.5	30.2
Dne	35	33	32	29	29	31	33
Rwi	24.4	20.4	20.1	26.5	39.6	42.4	38.9
Rew	22.0	28.0	34.0	40.0	45.0	49.0	53.0
Rrr	22.0	28.0	34.0	40.0	45.0	49.0	53.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)	L_{Aeq} 16 HOUR	28.5	dB(A)
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Predicted dB(A) Level Within The Above Room During Night Time Hours (23:00-07:00)	L_{Aeq} 8 HOUR	25.6	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Madigan Browne
Site	7 Fitzroy Square, London
Figure	6

Maximum Criteria	
Daytime	Night Time
35	30

Floor	1st Floor
Room	Master Bedroom

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 16 / 4 with Greenwood S Vent
--------------------------------------	----------------------------------

Leqff	The equivalent continuous sound pressure level outside the room elements under consideration
A0	The reference absorption area of 10m ² and is independent of frequency
Sf	The total façade area of the room in question
Swi	The area of the windows in the room
Sew	The area of the external wall of the room
Srr	The area of the ceiling of the room (if applicable)
S	The total area of the elements through which sound enters the room
Dne	The insulation value of the trickle ventilator (if applicable)
Rwi	The sound reduction index of the window
Rew	The sound reduction index of the external wall
Rrr	The sound reduction index of the ceiling/roof (if applicable)
A	The equivalent absorption area of the receiving room where $A=0.163V/T$

Formula	$Leq2=Leqff+10\log[A0/S*10^{(-Dne/10)}+Swi/S*10^{(-Rwi/10)}+Sew/10*10^{(-Rew/10)}+Srr/S*10^{(-Rrr/10)}]+10\log(S/A)+3$
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Octave Band Centre Frequency (Hz)							
	63	125	250	500	1000	2000	4000
Sf	17.04	17.04	17.04	17.04	17.04	17.04	17.04
Sr	0	0	0	0	0	0	0
Swi	1	1	1	1	1	1	1
Sew	16.04	16.04	16.04	16.04	16.04	16.04	16.04
Srr	0	0	0	0	0	0	0
S	17.04	17.04	17.04	17.04	17.04	17.04	17.04
A0	10	10	10	10	10	10	10
V	29.32	29.32	29.32	29.32	29.32	29.32	29.32
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
A	9	9	9	9	9	9	9
Daytime Leqff	56.5	53.6	51.3	49.3	48.0	43.6	38.5
Night time Leqff	53.4	50.0	48.0	46.2	45.7	39.5	30.2
Dne	35	33	32	29	29	31	33
Rwi	24.4	20.4	20.1	26.5	39.6	42.4	38.9
Rew	22.0	28.0	34.0	40.0	45.0	49.0	53.0
Rrr	22.0	28.0	34.0	40.0	45.0	49.0	53.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (07:00-23:00)	L_{Aeq} 16 HOUR	27.3	dB(A)
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Predicted dB(A) Level Within The Above Room During Night Time Hours (23:00-07:00)	L_{Aeq} 8 HOUR	24.3	dB(A)
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