

EXTERNAL NOISE ASSESSMENT

CLIENT

Taylor Wimpey (Southern) Counties
Templars House
Lulworth Close
Chandlers Ford
Hampshire
SO53 3TJ

SITE

Block 4
Phase 3, Dukes Meadows
Waterlooville
Hampshire

SURVEY DATE (S)

2004 & 2008 WSP Acoustic
(Survey Data Supplied)

Report By



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Introduction:

Sound Advice Acoustics Ltd has been instructed by Taylor Wimpey Southern Counties, to carry out the relevant noise assessments and calculations at the site in Phase 3, Dukes Meadow, Waterloooville.

This assessment is to be carried out on the proposed development with specific regards to block 4. The purpose of this assessment is to ascertain the required window specification using the measured noise data of 2004 and 2008 supplied by WSP Acoustics.

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.

It should be noted that the National Planning Policy Framework 2012 came into force in March 2012 and as a result Planning and Policy Guidance PPG 24 has been withdrawn. However, in the absence of the council's own policy document, it was agreed with the Environmental Health Department that for this particular site PPG 24 could be used as a suitable means reference of noise levels.

The purpose of this assessment is to ensure the acoustic protection of the proposed new dwellings from the existing surrounding properties.

In addition, calculations are to be made for the predicted daytime noise levels within the outdoor living area and assessments made against the recommended levels within the World Health Organisation's 'Guidelines for Community Noise'.

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 for the PPG 24 & BS 8233 calculations, therefore assessing worst case scenario for all standards.

Procedure:

External noise levels were previously recorded on the site by WSP Acoustics during their initial site surveys in 2004 and 2008. The data contained within this report is to be used for the basis of the calculations and assessments pertaining to this proposed development.

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 $L_{Aeq\ 16\ HOUR}$ dB levels for daytime and $L_{Aeq\ 8\ HOUR}$ dB for night time.

Please refer to the WSP Acoustics reports issued 2004 & 2008

Apparatus:

Please refer to the WSP Acoustics reports issued 2004 & 2008

Environmental Conditions:

Please refer to the WSP Acoustics reports issued 2004 & 2008

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 Figure for full downloaded results, and averages.

2004 & 2008 WSP Acoustics Data																
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 AVERAGE	65	*	*	*	*	*	*	62	55	55	58	63	59	46	32	*
NIGHT TIME AVERAGE	57	*	*	*	*	*	*	54	47	47	50	55	51	38	24	*

‘*’ Values not given within original reports

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:-

The following assessments are made at the position of the highest calculated proposed façade with regards to average noise levels over their representative time periods for daytime and night time.

Position 1

Daytime	-	Average Level $L_{Aeq, 16 \text{ HOUR}}$ (07:00 – 23:00 hrs) 65 dB	
		Noise Exposure Category C	($L_{Aeq, 16 \text{ HOUR}}$ 63 - 72 dB)
Night Time	-	Average Level $L_{Aeq, 8 \text{ HOUR}}$ (23:00 – 07:00 hrs) 57 dB	
		Noise Exposure Category C	($L_{Aeq, 8 \text{ HOUR}}$ 57 - 66 dB)

All categories relate to traffic and mixed noise sources, and the results are corrected to the nearest decibel.

Recommendations:

The above noise tests have been assessed in accordance with PPG 24 and category C evaluated for daytime and night time for the worst case scenario for the front facade. Therefore, it has been evaluated that the ambient levels will reduce towards the rear of the site and for the purpose of this assessment, the corresponding façade levels will be used within the BS 8233 : 1999 calculations in order to evaluate the worst case scenario and select the correct window specification.

It can be seen from the category results that this particular site is a quieter site than most and therefore ideal for residential development.

PPG 24 introduced 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 category C:-

NEC C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
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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

Therefore in order to achieve the required reasonable noise levels of L_{Aeq} 16 HOUR 35 dB for habitable room's daytime and L_{Aeq} 8 HOUR 30 dB for Bedroom at night within the proposed residential properties, the following additional acoustic measures have been calculated. (Details on calculation sheets figure's 1 – 7 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.

<u>Rw dB</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1.0k</u>	<u>2.0k</u>	<u>4.0k</u>	<u>Frequency (Hz)</u>
50.0	40.0	44.0	45.0	51.0	56.0	61.0	dB reduction

WINDOW CONSTRUCTION (4 / 14 / 6)

<u>Rw dB</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1.0k</u>	<u>2.0k</u>	<u>4.0k</u>	<u>Frequency (Hz)</u>
39.0	24.4	26.5	36.2	41.7	40.3	42.6	dB reduction

ROOF CONSTRUCTION – MINIMUM VALUE

<u>Rw dB</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1.0k</u>	<u>2.0k</u>	<u>4.0k</u>	<u>Frequency (Hz)</u>
43.0	28.0	34.0	40.0	45.0	49.0	53.0	dB reduction

It should be noted that the proposed development is to utilise a full forced ventilation system throughout the site.

Outdoor Living Areas:

The World Health Organisation 'Guidelines for Community Noise' gives guidance as to desirable noise levels that should be achieved within outdoor living areas such as gardens, patios and verandas etc.

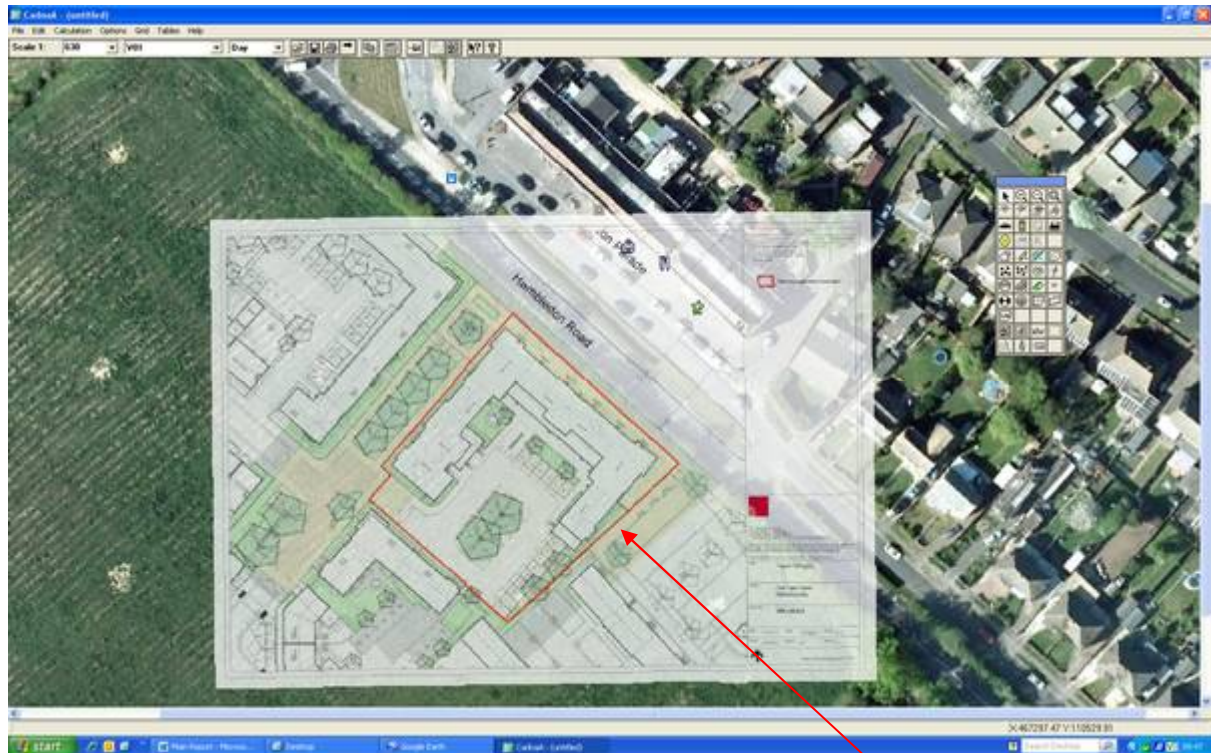
Guideline values for community noise in specific environments, details the desirable target noise levels within various areas.

Outdoor Living Area

Serious Annoyance, daytime and evening	$L_{Aeq\ 16\ HOUR}$ 55 dB
Moderate Annoyance, daytime and evening	$L_{Aeq\ 16\ HOUR}$ 50 dB

Given the recorded noise levels from the WSP Acoustics report 2004 and 2008, the sheltered gardens and outdoor living areas within Block 4 are likely to be below that of the $L_{Aeq\ 16\ HOUR}$ 50 dB level for moderate annoyance.

Plan Sketch Layout:



Proposed Block 4

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 council's requirements.

It will be necessary to install a window specification of 4mm glass / 14mm air gap / 6mm glass double glazing to all aspects of the development with the proposed forced air ventilation system in place.

An assessment in accordance with the World Health Organisation's 'Guidelines for Community Noise' has also been carried out in order to calculate and demonstrate the predicted noise levels within the proposed external living areas. Compliance is likely to be achieved to these guidelines.

This report and subsequent calculations and assessments have demonstrated that mitigation measures can be introduced to the site in order to ensure compliance with BS 8233 : 1999 for predicted internal noise levels within dwellings and the WHO guidelines for community noise for external living areas.

With regards to PPG 24, the evaluated planning category of C should taking as guidance only as this document has now been withdrawn and suitable mitigation methods demonstrated within this report prove compliance with current legislations.

Calculation Sheet BS 8233:1999 (Table 3)

Client	Taylor Wimpey
Site	Hambledon Road, Waterloooville
Figure	1

Maximum Criteria	
Daytime	Night Time
35	30

Floor	First Floor
Room	Living/Kitchen

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 14 / 6
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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)					
	125	250	500	1000	2000	4000
Sf	27	27	27	27	27	27
Sr	0	0	0	0	0	0
Swi	5.3	5.3	5.3	5.3	5.3	5.3
Sew	21.7	21.7	21.7	21.7	21.7	21.7
Srr	0	0	0	0	0	0
S	27	27	27	27	27	27
A0	10	10	10	10	10	10
V	66	66	66	66	66	66
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	21	21	21	21	21	21
Daytime Leqff	55.0	55.0	58.0	63.0	59.0	46.0
Night time Leqff	47.0	47.0	50.0	55.0	51.0	38.0
Dne	40.0	44.0	45.0	51.0	56.0	61.0
Rwi	24.4	26.5	36.2	41.7	403	42.6
Rew	40.0	44.0	45.0	51.0	56.0	61.0
Rrr	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	24.1	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	16.2	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Taylor Wimpey
Site	Hambledon Road, Waterloooville
Figure	2

Maximum Criteria	
Daytime	Night Time
35	30

Floor	First Floor
Room	Bedroom

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 14 / 6
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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)					
	125	250	500	1000	2000	4000
Sf	10	10	10	10	10	10
Sr	0	0	0	0	0	0
Swi	1.7	1.7	1.7	1.7	1.7	1.7
Sew	8.3	8.3	8.3	8.3	8.3	8.3
Srr	0	0	0	0	0	0
S	10	10	10	10	10	10
A0	10	10	10	10	10	10
V	31	31	31	31	31	31
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	10	10	10	10	10	10
Daytime Leqff	55.0	55.0	58.0	63.0	59.0	46.0
Night time Leqff	47.0	47.0	50.0	55.0	51.0	38.0
Dne	40.0	44.0	45.0	51.0	56.0	61.0
Rwi	24.4	26.5	36.2	41.7	403	42.6
Rew	40.0	44.0	45.0	51.0	56.0	61.0
Rrr	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	23.6	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	15.7	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Taylor Wimpey
Site	Hambledon Road, Waterloooville
Figure	3

Maximum Criteria	
Daytime	Night Time
35	30

Floor	First Floor
Room	Living/Dining

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 14 / 6
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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)					
	125	250	500	1000	2000	4000
Sf	11.3	11.3	11.3	11.3	11.3	11.3
Sr	0	0	0	0	0	0
Swi	2.4	2.4	2.4	2.4	2.4	2.4
Sew	8.9	8.9	8.9	8.9	8.9	8.9
Srr	0	0	0	0	0	0
S	11.3	11.3	11.3	11.3	11.3	11.3
A0	10	10	10	10	10	10
V	53	53	53	53	53	53
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	17	17	17	17	17	17
Daytime Leqff	55.0	55.0	58.0	63.0	59.0	46.0
Night time Leqff	47.0	47.0	50.0	55.0	51.0	38.0
Dne	40	38	37	34	37	38
Rwi	24.4	26.5	36.2	41.7	403	42.6
Rew	40.0	44.0	45.0	51.0	56.0	61.0
Rrr	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	31.4	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	23.4	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Taylor Wimpey
Site	Hambledon Road, Waterloooville
Figure	4

Maximum Criteria	
Daytime	Night Time
35	30

Floor	First Floor
Room	Bedroom

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 14 / 6
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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)					
	125	250	500	1000	2000	4000
Sf	10	10	10	10	10	10
Sr	0	0	0	0	0	0
Swi	2	2	2	2	2	2
Sew	8	8	8	8	8	8
Srr	0	0	0	0	0	0
S	10	10	10	10	10	10
A0	10	10	10	10	10	10
V	31	31	31	31	31	31
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	10	10	10	10	10	10
Daytime Leqff	55.0	55.0	58.0	63.0	59.0	46.0
Night time Leqff	47.0	47.0	50.0	55.0	51.0	38.0
Dne	40.0	44.0	45.0	51.0	56.0	61.0
Rwi	24.4	26.5	36.2	41.7	403	42.6
Rew	40.0	44.0	45.0	51.0	56.0	61.0
Rrr	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	23.9	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	16.0	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Taylor Wimpey
Site	Hambledon Road, Waterloooville
Figure	5

Maximum Criteria	
Daytime	Night Time
35	30

Floor	Second Floor
Room	Living/Dining

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 14 / 6
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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)					
	125	250	500	1000	2000	4000
Sf	11.3	11.3	11.3	11.3	11.3	11.3
Sr	22	22	22	22	22	22
Swi	2.4	2.4	2.4	2.4	2.4	2.4
Sew	8.9	8.9	8.9	8.9	8.9	8.9
Srr	22	22	22	22	22	22
S	33.3	33.3	33.3	33.3	33.3	33.3
A0	10	10	10	10	10	10
V	53	53	53	53	53	53
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	17	17	17	17	17	17
Daytime Leqff	55.0	55.0	58.0	63.0	59.0	46.0
Night time Leqff	47.0	47.0	50.0	55.0	51.0	38.0
Dne	40.0	44.0	45.0	51.0	56.0	61.0
Rwi	24.4	26.5	36.2	41.7	403	42.6
Rew	40.0	44.0	45.0	51.0	56.0	61.0
Rrr	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	27.1	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	19.2	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Taylor Wimpey
Site	Hambledon Road, Waterloooville
Figure	6

Maximum Criteria	
Daytime	Night Time
35	30

Floor	Second Floor
Room	Bedroom

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 14 / 6
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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	$Leq2 = Leqff + 10 \log [A0/S \cdot 10^{(-Dne/10)} + Swi/S \cdot 10^{(-Rwi/10)} + Sew/10 \cdot 10^{(-Rew/10)} + Srr/S \cdot 10^{(-Rrr/10)}] + 10 \log (S/A) + 3$
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	Octave Band Centre Frequency (Hz)					
	125	250	500	1000	2000	4000
Sf	10	10	10	10	10	10
Sr	13	13	13	13	13	13
Swi	2	2	2	2	2	2
Sew	8	8	8	8	8	8
Srr	13	13	13	13	13	13
S	23	23	23	23	23	23
A0	10	10	10	10	10	10
V	31	31	31	31	31	31
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	10	10	10	10	10	10
Daytime Leqff	55.0	55.0	58.0	63.0	59.0	46.0
Night time Leqff	47.0	47.0	50.0	55.0	51.0	38.0
Dne	40.0	44.0	45.0	51.0	56.0	61.0
Rwi	24.4	26.5	36.2	41.7	403	42.6
Rew	40.0	44.0	45.0	51.0	56.0	61.0
Rrr	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	27.8	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	19.8	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Taylor Wimpey
Site	Hambledon Road, Waterloooville
Figure	7

Maximum Criteria	
Daytime	Night Time
35	30

Floor	Third Floor
Room	Living/Dining

Daytime	MET
Evening	MET

Proposed Window Configuration	4 / 14 / 6
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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)					
	125	250	500	1000	2000	4000
Sf	27	27	27	27	27	27
Sr	27	27	27	27	27	27
Swi	5.3	5.3	5.3	5.3	5.3	5.3
Sew	21.7	21.7	21.7	21.7	21.7	21.7
Srr	27	27	27	27	27	27
S	54	54	54	54	54	54
A0	10	10	10	10	10	10
V	66	66	66	66	66	66
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	21	21	21	21	21	21
Daytime Leqff	55.0	55.0	58.0	63.0	59.0	46.0
Night time Leqff	47.0	47.0	50.0	55.0	51.0	38.0
Dne	40.0	44.0	45.0	51.0	56.0	61.0
Rwi	24.4	26.5	36.2	41.7	403	42.6
Rew	40.0	44.0	45.0	51.0	56.0	61.0
Rrr	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	27.8	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	19.9	dB(A)
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