

ENVIRONMENTAL NOISE ASSESSMENT

CLIENT

Hampshire County Council
Three Minsters House
76 High Street
Winchester
Hampshire
SO23 8UL

SITE

Blessed Hugh Farringdon Catholic School
Fawley Road
Southcote
Reading
Berkshire
RG30 3EP

SURVEY DATES

9th – 10th June 2016

Report By



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- Figure 1 Downloaded Results from Position 1 9th – 10th June 2016*
- Figure 2 - Calculation sheet for predicted noise levels within classroom*
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INTRODUCTION:

Sound Advice Acoustics Ltd has been instructed by Hampshire County Council, Three Minsters House, 76 High Street, Winchester, Hampshire to attend site at Blessed Hugh Farringdon Catholic School, Fawley Road, Southcote, Reading, Berkshire, RG30 3EP and give advice on the acoustic elements relating to the proposed project.

The site is currently a fully functioning school and it is proposed to demolish the existing three buildings and place a new modular classroom building, on the piece of land adjacent to Fawley Road.

The acoustic assessments are to be separated into two sections. The external noise assessments and the internal noise assessment will examine the proposed building structures and comment on any improvements in order to comply with the relevant criteria's within The Building Regulation 2003 Approved Document E Part E4, referring to Building Bulletin 93.

This initial report will deal with the external assessment and review the external façade construction details. From the recorded data, the average and highest recorded levels are to be evaluated. Daytime (08:00 hrs – 18:00 hrs). The daytime hours represent the period the school will be in use for normal teaching of children.

A design noise criterion will be calculated within this assessment in order to stipulate the maximum noise levels to which all external M & E plant from the proposed development should adhere to. With the M & E plant selected to ensure compliance with this design criteria the proposed development will ensure compliance with BS 4142: 2014.

Finally, it is understood that BREEAM POL 05 Acoustic Performance is not required on this site.

References and evaluations are to be made to the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE). The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise. Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

“Significant adverse” and “adverse”

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

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.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

PROCEDURE:

Noise levels were recorded over a typical 20 hour period between 9th & 10th June 2016 at the fence on the boundary of the school premises and Fawley Road over continuous 5 minute periods. 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. From the downloaded data the individual $L_{Aeq\ 1\ HOUR}$ dB noise levels have been calculated for use within this assessment.

DAYTIME HOURS 08:00 – 18:00

$L_{Aeq\ 1\ HOUR}$ dB	$L_{A10\ 1\ HOUR}$ dB
$L_{AMAX\ 1\ HOUR}$ dB	$L_{A50\ 1\ HOUR}$ dB
$L_{AMIN\ 1\ HOUR}$ dB	$L_{A90\ 1\ HOUR}$ dB

Additionally, data has been collected between the following hours in order to aid in the design criteria evaluation for all external plant to adhere to.

DAYTIME HOURS 07:00 – 23:00

NIGHT TIME HOURS 23:00 – 07:00

$L_{Aeq\ 1\ HOUR}$ dB	$L_{A10\ 1\ HOUR}$ dB	$L_{Aeq\ 5\ min}$ dB	$L_{A10\ 5\ min}$ dB
$L_{AMAX\ 1\ HOUR}$ dB	$L_{A50\ 1\ HOUR}$ dB	$L_{AMAX\ 5\ min}$ dB	$L_{A50\ 5\ min}$ dB
$L_{AMIN\ 1\ HOUR}$ dB	$L_{A90\ 1\ HOUR}$ dB	$L_{AMIN\ 5\ min}$ dB	$L_{A90\ 5\ min}$ dB

The microphone was secured to a tripod and positioned on the edge of the fenced boundary area adjacent to Fawley Road as detailed on the attached plan sketch layout. This position has been considered the representative area to capture both the impending ambient noise levels on the proposed development as well as the lowest background noise level representative to the nearest affected residential premises. The noise levels recorded were done so with the microphone positioned no closer than 3.5m from any reflective façade and therefore these have been considered to be free field with no reflection corrections applied. The measurement position was considered to be representative of that of the proposed building layout and the data collected is to be used as the typical underlying background noise level for this particular area.

The results were recorded in accordance with British Standard 7445 Part 2: 1991 'Description and Measurement of Environmental Noise'. Calculations have also been made in accordance with BS 8233: 2014 'Sound Insulation and Reduction of Buildings - Code of Practice'.

The measurement position was considered to represent the typical background noise level of the overall area, along with the external influence of any activities associated with the existing operational school. All calculations have been based on the data obtained with no additional distance or façade corrections applied.

APPARATUS:

All the following equipment was calibrated by a UKAS accredited laboratory 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	<u>31471</u>	2 YEARS	03.09.2014	03.09.2016
12.5mm Microphone (with windshield)	Norsonic	1220	<u>41075</u>	2 YEARS	03.09.2014	03.09.2016
Microphone Pre – Amplifier	Norsonic	1201	<u>30327</u>	2 YEARS	03.09.2014	03.09.2016
Calibrator	Norsonic	1251	31963	1 YEAR	22.04.2016	22.04.2017
The above equipment was calibrated using a sound pressure level of 113.90 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 0.5 dB.						

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

ENVIRONMENTAL CONDITIONS:

START OF TEST - 9th June 2016

Temperature: 21⁰C
Relative Humidity 83%
Average Wind Speed: <0.5 m/s
Cloud Cover: Full
Road Surface Dry
Atmospheric Pressure: 1024

END OF TEST - 10th June 2016

Temperature: 17⁰C
Relative Humidity 74%
Average Wind Speed: <0.5 m/s
Cloud Cover: Moderate
Road Surface Wet
Atmospheric Pressure: 1015

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

See attached figure 1 & 2 for full downloaded results and averages.

BS 8233: 2014 background measurements

9th June 2016																
Date / Time	L_{Aeq}	L_{max}	L_{min}	L_{A10}	L_{A50}	L_{A90}	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
08:00 - 18:00 DAYTIME AVERAGE L_{Aeq} 16 HOUR	60.1	77.0	47.7	60.6	54.5	51.3	60.7	61.0	56.3	52.4	51.0	52.7	54.3	48.3	33.1	27.6

10th June 2016																
Date / Time	L_{Aeq}	L_{max}	L_{min}	L_{A10}	L_{A50}	L_{A90}	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
08:00 - 18:00 DAYTIME AVERAGE L_{Aeq} 16 HOUR	60.5	78.0	47.9	60.6	55.2	52.3	60.8	60.5	56.7	52.7	51.7	53.3	54.3	48.7	32.7	26.2

BS 4142: 2014 background measurements

9 th June 2016												
Date / Time	LAeq	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
08:00 - 18:00 DAYTIME MODE L _{Aeq} 16 HOUR	55.0	43.0	58.0	59.0	55.0	51.0	49.0	49.0	50.0	44.0	27.0	16.0

10 th June 2016												
Date / Time	LAeq	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
08:00 - 18:00 DAYTIME MODE L _{Aeq} 16 HOUR	55.0	44.0	59.0	59.0	56.0	52.0	49.0	48.0	49.0	45.0	30.0	17.0

INTERNAL CRITERIA:

Building Bulletin 93, Section 1, Table 1 sets individual internal $L_{Aeq\ 30\ \text{minute}}$ dB noise criteria for each type of room within these types of developments. Each relevant external room and each façade has been designated a criteria generally as follows:-

Room Description	BB93 Maximum Internal Criteria $L_{Aeq\ 30\ \text{MINUTES}}$ dB	Predicted Internal Levels
Classroom	35.0	31.8
Dining/Social	45.0	31.0
Office	40.0	33.1
Meeting Room	40.0	33.1
Kitchen/ Life Skills	40.0	33.8

The attached calculation sheets figures 5 - 9 indicates the maximum permitted $L_{Aeq\ 30\ \text{minute}}$ dB noise level and the calculated internal noise levels will be compliant with BB93 using a double glazed window system of 4mm glass / 16mm air gap / 4mm glass on the temporary classroom structure.

For the purpose of this assessment, the average recorded $L_{Aeq\ 10\ \text{HOUR}}$ dB level as been used in order to assess the worse case scenario for the classrooms. This time frame is taken from 08:00 hrs to 18:00 hrs in order to capture the noise level during typical premises usage.

MINIMUM CONSTRUCTION SPECIFICATIONS:

The following are the individual minimum attenuation values and construction details for each of the elements required in order to meet the maximum noise levels criteria within each room as stated in BB93.

MODULAR CLASSROOM

MODULAR WALL

125	250	500	1.0k	2.0k	4.0k	(Hz)	Rw Value
23.0	27.0	28.0	44.0	39.0	42.0	dB	Rw 35 dB

ROOF CONSTRUCTION

125	250	500	1.0k	2.0k	4.0K	(Hz)	Rw Value
23.0	27.0	28.0	44.0	37.0	42.0	dB	Rw 35 dB

WINDOW CONFIGURATION - 4mm Glass / 14mm Air Gap / 6mm Glass

125	250	500	1.0k	2.0k	4.0K	(Hz)	Rw Value
24.4	26.5	36.2	41.7	40.3	42.6	dB	Rw 35 dB

D_{NE} TRICKLE VENT ATTENUATION LEVELS – Acoustic through frame slotvent

125	250	500	1.0k	2.0k	4.0K	(Hz)	Dne'w Value
40.0	38.0	37.0	34.0	37.0	38.0	dB	Rw 46dB

The above values are a minimum construction, however any construction can be utilised providing it meets the above minimum specification.

RECOMMENDATIONS:

ROOF

Any proposed roof construction for the modular classroom block should achieve the minimum attenuation values as set out on page 11 of this report. The roof constructions proposed will suitably attenuate against the external noise and in order to ensure the most stringent internal design criteria of $L_{Aeq\ 30\ MINUTES}$ 35 dB is achieved as required by BB 93.

WINDOWS

It will be acceptable to use a standard double glazing system with the glazing specification of 4mm glass / 16mm air gap / 4mm glass for the temporary classroom block. Alternatively a different variation can be installed provided it meets the stipulated minimum acoustic attenuation values given.

EXTERNAL PLAY AREA

The new modular classroom will have an additional play area created directly outside the new building and in between the existing building for up to 30 children, calculations have demonstrated that there will be no increase at the façade of the existing houses opposite the school.

A typical secondary school was visited and the levels taken of 30 children on a playground, which gave a sound power level per student of 67.8 dB(A). This was then inputted as point noise sources on a CADA A model in order to calculate the corresponding façade levels at the nearest affected properties.

Calculations have demonstrated that there will be no increase at the façade of the existing houses opposite the school.

The below diagram indicates the noise level at the façade of the houses before the new playground area is introduced.



The below diagram indicates the noise level at the façade of the houses after the new playground area is introduced.



EXTERNAL PLANT NOISE DESIGN CRITERIA:

British Standard 4142: 2014 'Method for rating Industrial Noise Affecting Mixed Residential and Industrial Areas' is to be adopted for the basis of this background noise level assessment. A BS 4142: 2014 noise assessment will also be carried out in order to demonstrate that any externally mounted plant units or activity associated with the site will not have a detrimental effect on any existing residential dwellings. This will be achieved by setting a maximum noise level spectrum criteria to which all plant should adhere to.

The following calculated design criteria ensures that all plant should be selected to meet this level in order to continue to acoustically protect the existing residential premises from unwanted plant noise.

EXTERNAL PLANT NOISE LEVEL CRITERIA

At this stage of the development the precise details of all the proposed external plant is yet to be determined and therefore for the purpose of this assessment a design criteria noise level is to be set to which any and all external noise generating plant must adhere to in order to suitably protect the local residents from unwanted noise.

Therefore, the following design criteria has been derived from the lowest recorded background noise levels for daytime periods and for the various time intervals. The following criteria's should be achieved and calculated at 23.0m from the nearest affected residential dwelling.

Octave Band Centre Frequency (Hz)										dB(A)	Comments
31.5	63	125	250	500	1.0k	2.0k	4.0k	8.0k	16.0k		
58.0	59.0	55.0	51.0	49.0	49.0	50.0	44.0	27.0	16.0		Recorded Background Noise Levels
3	3	3	3	3	3	3	3	3	3		Reflection at Residential
5	5	5	5	5	5	5	5	5	5		BS 4142 : 2014 Corrections
12	12	12	12	12	12	12	12	12	12		LAeq - LA90
27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2		Distance Correction
0	0	0	0	0	0	0	0	0	0		Barrier Attenuation
3	3	3	3	3	3	3	3	3	3		Reflection at Source
41.0	42.0	38.0	34.0	32.0	32.0	33.0	27.0	10.0	-1.0	37.8	Target Level at Residential
6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		Reflections
27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2	27.2		Distance and Barriers
62.2	63.2	59.2	55.2	53.2	53.2	54.2	48.2	31.2	20.2	59.0	Calculated Noise Source Level @ 1.0m
42.2	43.2	39.2	35.2	33.2	33.2	34.2	28.2	11.2	0.2	39.0	Calculated Noise Source Level @ 10.0m

With all external plant achieving the above design criteria's when calculated at 23.0m from the nearest affected existing residential dwelling, the requirements for both BS 4142: 2014 and the local council will be met. It is recommended that the daytime criteria's be adopted for this site in order to suitably protect local residents from any background noise level increase as a direct result of the proposed sites associated plant.

Proposed Maximum Noise Level Criteria

POSITION 1												
Date / Time	LAeq 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
08:00 - 18:00 DAYTIME LA90 1 HOUR	55	43	58	59	55	51	49	49	50	44	27	16

BS 4142: 2014 Noise Assessment - Daytime

Results	Daytime (07:00 – 23:00)
Calculated Ambient Sound Level	LAeq = 38 dB
Residual Sound Level	LAeq = 55 dB
Background Sound Level	LA90 = 43 dB
Specific Sound	LAeq = 38 dB
Acoustic Feature Correction +2 dB Tonality +3 dB Intermittency	+5 dB
Rating Level	LAeq = 43 dB
Background Sound Level	LA90 = 43 dB
Excess of Rating Over Background Sound Level	+/- 0 dB
Assessment Indicates	Low Adverse Impact

Tonal Penalty

A +2 dB penalty has been applied to the specific noise level to allow for any minor tonal elements that may be present from the proposed plant. It should be noted that the calculations made within this report have been done so in octave band centre frequency levels in order to minimise tonal element and therefore applying any more than +2 dB would not be appropriate to this assessment. To safeguard the residents from any possible unwanted noise, this penalty has been applied as an extra layer of acoustic protection.

Impulsivity Penalty

A +3 dB penalty has been applied to the specific noise level to allow for any minor impulsive elements that may be present from the proposed plant. It should be noted that the calculations made within this report have been done so with the assessment conclusion of -21 dB below the background noise levels and therefore, the impulsive nature of the plant should not be audible at the nearest associated noise sensitive preceptors. To safeguard the residents from any possible unwanted noise, this penalty has been applied as an extra layer of acoustic protection.

Assessment Conclusion

It can be seen from the above assessments that the existing plant has returned an assessment conclusion of Low Adverse Impact. Therefore no further mitigation measures are required over and above the silencers and acoustic louvres detailed within this report. It is recommended that the acoustic louvres are installed to either end of the cable ends and the silencers are fitted within the duct system within the roof void, as close to the fan units as possible.

CONCLUSION:

EXTERNAL AMBIENT NOISE ASSESSMENT BS 8233: 2014

Noise levels have been recorded at the above site over a typical 48 hour in order to obtain typical noise levels associated with the site.

In order to calculate the maximum internal noise level within the proposed development on the external facades of the proposed construction and ensure the criteria's have been met in accordance with BB93, the average $L_{Aeq\ 10\ HOUR}$ dB noise levels between 08:00hrs and 18:00 hrs has been used in accordance with British Standard 8233: 2014 'Sound Insulation and Reduction of Buildings - Code of Practice'. The proposed development can achieve the requirements of Building Bulletin 93 using standard double glazing and the proposed roof construction.

EXTERNAL PLANT ASSESSMENT BS 4142: 2014

With regards to all external plant and noise associated with the above development, a design noise criteria at 23.0m from the nearest existing noise sensitive premises has been set. The criteria should be achieved when selecting the plant and further acoustic calculations made to ensure the target levels are adhered to. If the criteria is not met then acoustic remedial works are to be introduced in order to ensure compliance. This assessment should be carried out once the precise number of units and location have been finalised in order to accurately compare the levels against the set criteria.

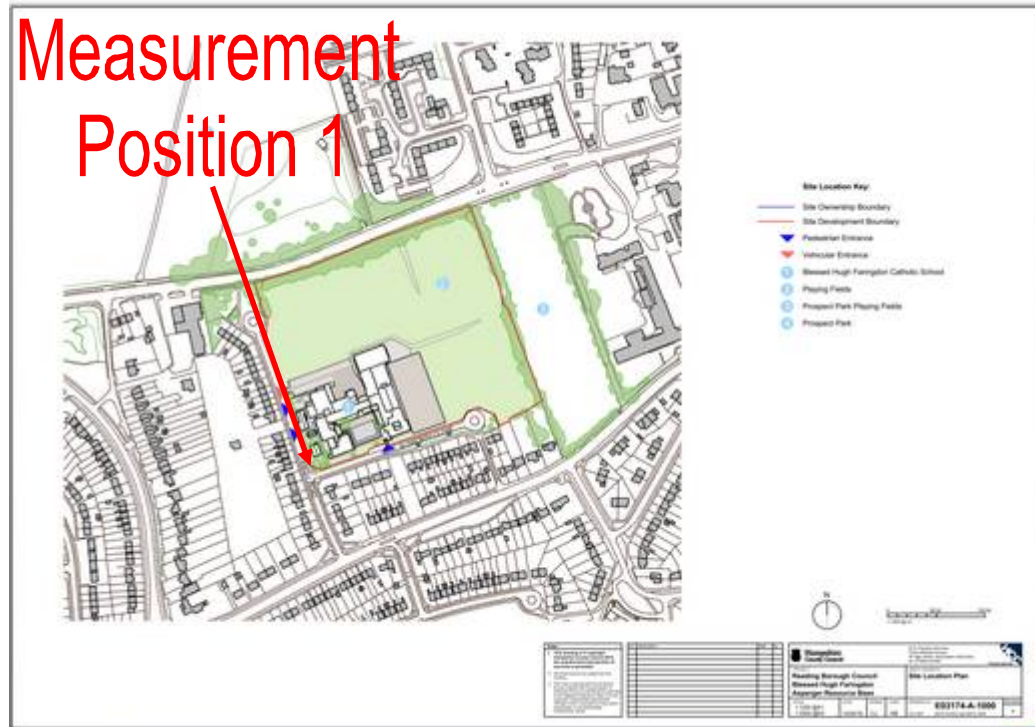
The criteria has taken into account the modal recorded $LA_{90,t}$ dB background noise levels for daytime periods at the identified noise sensitive premises to the proposed school and applied a conversion from $LA_{eq,t}$ dB to $LA_{90,t}$ dB. This has resulted in a noise level spectrum that will ensure the existing modal recorded background noise level is not increased.

Section 14 of the National Planning Policy Framework 2012 suggests that planning permission should be granted unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the framework taken as a whole, or specific policies in the framework indicate the application should be restricted.

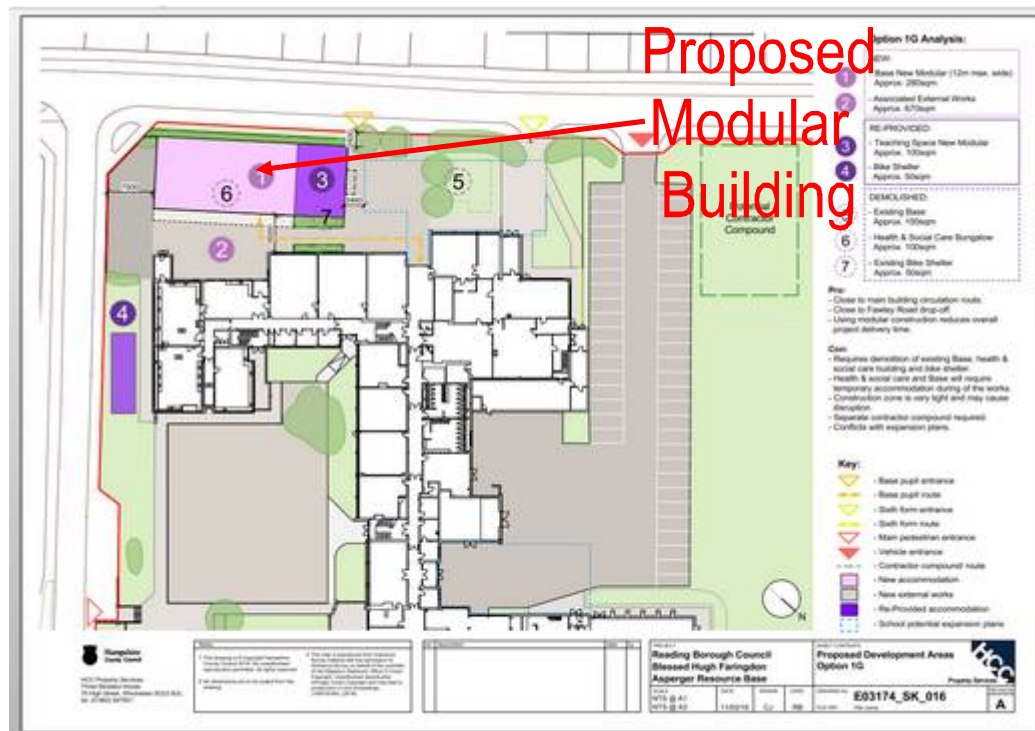
Based on the calculations and assessments made within this report it is the professional opinion of Sound Advice Acoustics Ltd that the proposed development can demonstrate compliance with the National Planning Policy Framework 2012, NPPF & NPSE and that, with regards to sound, planning permission can be granted.

MEASUREMENT POSITION:

EXISTING



PROPOSED



Calculation Sheet BS 8233:1999 (Table 3)

Client	Hampshire County Council
Site	Blessed Hugh Faringdon Catholic School
Figure	5

Maximum Criteria
Daytime Night Time
35

Floor	Ground Floor
Room	Classroom

Daytime	MET
Evening	

Proposed Window Configuration	4 / 16 / 4 with Standard Trickle Vent
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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	45	45	45	45	45	45
Sr	56	56	56	56	56	56
Swi	8	8	8	8	8	8
Sew	37	37	37	37	37	37
Srr	56	56	56	56	56	56
S	101	101	101	101	101	101
A0	10	10	10	10	10	10
V	169	169	169	169	169	169
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	54	54	54	54	54	54
Daytime Leqff	56.7	52.7	51.7	53.3	54.3	48.7
Night time Leqff						
Dne	33	32	29	29	31	33
Rwi	21.1	19.7	31.1	38.2	41.3	38.7
Rew	23.0	27.0	28.0	44.0	37.0	42.0
Rrr	23.0	27.0	28.0	44.0	39.0	42.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (08:00-18:00)	L_{Aeq} 10 HOUR	31.8	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Hampshire County Council
Site	Blessed Hugh Faringdon Catholic School
Figure	6

Maximum Criteria
Daytime Night Time
35

Floor	Ground Floor
Room	Office

Daytime	MET
Evening	

Proposed Window Configuration	4 / 16 / 4 with Standard Trickle Vent
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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	25	25	25	25	25	25
Sr	17	17	17	17	17	17
Swi	3	3	3	3	3	3
Sew	22	22	22	22	22	22
Srr	17	17	17	17	17	17
S	42	42	42	42	42	42
A0	10	10	10	10	10	10
V	52	52	52	52	52	52
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	17	17	17	17	17	17
Daytime Leqff	56.7	52.7	51.7	53.3	54.3	48.7
Night time Leqff						
Dne	33	32	29	29	31	33
Rwi	21.1	19.7	31.1	38.2	41.3	38.7
Rew	23.0	27.0	28.0	44.0	39.0	42.0
Rrr	23.0	27.0	28.0	44.0	37.0	42.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (08:00-18:00)	L_{Aeq} 10 HOUR	33.8	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Hampshire County Council
Site	Blessed Hugh Faringdon Catholic School
Figure	7

Maximum Criteria
Daytime Night Time
35

Floor	Ground Floor
Room	Meeting Room

Daytime	MET
Evening	

Proposed Window Configuration	4 / 16 / 4 with Standard Trickle Vent
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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	31	31	31	31	31	31
Sr	26	26	26	26	26	26
Swi	6	6	6	6	6	6
Sew	25	25	25	25	25	25
Srr	26	26	26	26	26	26
S	57	57	57	57	57	57
A0	10	10	10	10	10	10
V	78	78	78	78	78	78
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	25	25	25	25	25	25
Daytime Leqff	56.7	52.7	51.7	53.3	54.3	48.7
Night time Leqff						
Dne	33	32	29	29	31	33
Rwi	21.1	19.7	31.1	38.2	41.3	38.7
Rew	23.0	27.0	28.0	44.0	39.0	42.0
Rrr	23.0	27.0	28.0	44.0	37.0	42.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (08:00-18:00)	L_{Aeq} 10 HOUR	33.1	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Hampshire County Council
Site	Blessed Hugh Faringdon Catholic School
Figure	8

Maximum Criteria
Daytime Night Time
35

Floor	Ground Floor
Room	Dining Room

Daytime	MET
Evening	

Proposed Window Configuration	4 / 16 / 4 with Standard Trickle Vent
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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	48	48	48	48	48	48
Sr	120	120	120	120	120	120
Swi	22	22	22	22	22	22
Sew	26	26	26	26	26	26
Srr	120	120	120	120	120	120
S	168	168	168	168	168	168
A0	10	10	10	10	10	10
V	360	360	360	360	360	360
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	115	115	115	115	115	115
Daytime Leqff	56.7	52.7	51.7	53.3	54.3	48.7
Night time Leqff						
Dne	33	32	29	29	31	33
Rwi	21.1	19.7	31.1	38.2	41.3	38.7
Rew	23.0	27.0	28.0	44.0	39.0	42.0
Rrr	23.0	27.0	28.0	44.0	37.0	42.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (08:00-18:00)	L_{Aeq} 10 HOUR	31.0	dB(A)
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Calculation Sheet BS 8233:1999 (Table 3)

Client	Hampshire County Council
Site	Blessed Hugh Faringdon Catholic School
Figure	9

Maximum Criteria
Daytime Night Time
35

Floor	Ground Floor
Room	Kitchen/Life Skills

Daytime	MET
Evening	

Proposed Window Configuration	4 / 16 / 4 with Standard Trickle Vent
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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	13	13	13	13	13	13
Sr	16	16	16	16	16	16
Swi	2.56	2.56	2.56	2.56	2.56	2.56
Sew	10.44	10.44	10.44	10.44	10.44	10.44
Srr	16	16	16	16	16	16
S	29	29	29	29	29	29
A0	10	10	10	10	10	10
V	49	49	49	49	49	49
T (BS8233)	0.50	0.50	0.50	0.50	0.50	0.50
A	16	16	16	16	16	16
Daytime Leqff	56.7	52.7	51.7	53.3	54.3	48.7
Night time Leqff						
Dne	33	32	29	29	31	33
Rwi	21.1	19.7	31.1	38.2	41.3	38.7
Rew	23.0	27.0	28.0	44.0	39.0	42.0
Rrr	23.0	27.0	28.0	44.0	37.0	42.0

*estimated

Predicted dB(A) Level Within The Above Room During Daytime Hours (08:00-18:00)	L_{Aeq} 10 HOUR	33.1	dB(A)
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