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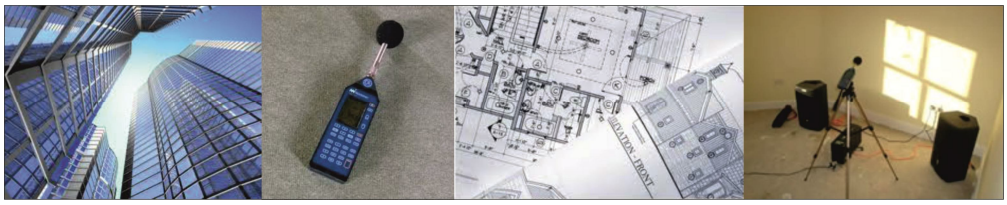


Newhaven Primary School
Southdown Road
Newhaven
East Sussex
BN9 9JL

ACOUSTIC DESIGN SPECIFICATION
v.3

Client:
ECE Architecture
Brooklyn Chambers
11 Goring Road
Worthing
West Sussex
BN12 4AP

30 September 2014
Ref: M3067

CONTENTS

1. INTRODUCTION

1.1 Ian Sharland Limited has been instructed by ECE Architecture to advise on the acoustic design of the proposed new Newhaven Primary School, Southdown Road, Newhaven, East Sussex, BN9 9JL.

1.2 To assist with the acoustic design, the following documentation has been received from the Client:

Transport Statement	GTA Civils Ltd
Proposed Site Plan	SK03

1.3 Formally, the objectives of the current exercise may be summarised as follows:

(i) A brief overview of the site, and a summary of the proposed development;

(ii) A discussion of the relevant national, regional and local planning policies, regarding the acoustic impact of the scheme:

(iii) A baseline noise survey;

(iv) A discussion of the site's suitability, in respect of environmental noise breaking into the new school building.

(v) A discussion of external activity noise, specifically sports and general play on the designated areas, with particular consideration being given to the MUGA

(vi) A discussion of activity noise within the building breaking out through windows (open or closed) and any potential impact on existing neighbouring noise-sensitive properties.

(vii) Consideration of additional traffic noise on the adjacent roads, and an assessment of the likely impact on residential neighbours.

(viii) A specification of a limit for noise emanating from any new building services plant.

1.4 This report summarises the works undertaken in respect of these objectives, and the findings which have been reached.

2. EXISTING SITE AND PROPOSED DEVELOPMENT

2.1 It is proposed to build a new primary school catering for up to 248 pupils for pupils between 4 – 11 years of age, on the vacant land east of Tideway Secondary School. The new school will be accessed via Southdown Road, Newhaven, (see Figure 1 – Site Layout).

2.2 The site layout is shown in Figure 1 and the proposed internal layout can be seen in Figure 2.

3. DESIGN CONSIDERATIONS

3.1 National Planning Policy Framework

3.1.1 The newly introduced National Planning Policy Framework (March 2012) defines the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people, and their answerable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

3.1.2 Section 123 states

Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*

- *mitigate and reduce to a minimum other adverse impacts 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; 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.*

3.1.3 The Framework states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution. It does not, however, provide any specific formal guidelines.

3.1.4 In respect of the fourth of the principal aims above, and in consideration of the past use of the site, it is debatable whether this area could be considered to be one of undisturbed tranquillity.

3.2 Noise Policy Statement for England

3.2.1 The document "Noise Policy Statement for England" sets out the following vision for on-going noise policy:

> *"Promote good health and quality of life through the effective management of noise within the context of Government policy on sustainable development."*

This vision should be achieved through the following 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".*

3.2.2 To achieve these objectives the Noise Policy Statement sets out three noise levels to be defined by the assessor:

- **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. Where levels lie between the LOAEL and SOAEL, the Statement requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development, as set out in the NPPF.

- **SOAEL** - Significant Observed Adverse Effect Level

  This is the level above which significant adverse effects on health and quality of life occur. It notes, however, that "it is not possible to have a single objective noise-based measure that describes 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".

3.2.3 Paragraph 2.7 states that "… the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications".

3.2.4 This provides clear guidance that noise must not be considered in isolation but as part of the overall scheme, taking into account the overall sustainability and associated impacts of the proposed development; there is no benefit in reducing noise to an excessively low level if this

creates or increases some other adverse impact. Similarly it may be appropriate in some cases for noise to have an adverse impact if this is outweighed by the reduction or removal of some other adverse impact that is of greater significance to the development as a whole.

3.2.5 The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the Policy Statement requires that:

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

3.2.6 Where noise levels are below the LOAEL it is considered there will be no adverse effect. Once noise levels are below the NOEL there will be no observable change. An indication of the numerical definition of LOAEL may be derived from the following guidance.

3.3 BS8233:2014 – 'Guidance on Sound Insulation and Noise Reduction for Buildings'

3.3.1 There is much guidance on the levels of intrusive noise which would be considered acceptable within residential accommodation such as this. Typical advice is found in British Standard 8233:2014 "Guidance on Sound Insulation and Noise Reduction for buildings". Following similar guidance in the 1999 World Health Organisation report "Guidelines for Community Noise", the Standard sets out the following limits for indoor ambient noise levels within living rooms and bedrooms. This suggests:

BS 8233 Guideline Values

Activity	Location	0700 - 2300	2300 - 0700
Resting	Living Room	35 dB(A) LAeq, 16 hr	-
Dining	Dining room/Area	40 dB(A) LAeq, 16 hr	-
Sleeping	Bedroom	35 dB(A) LAeq, 16 hr	30 dB(A) LAeq, 8 hr

3.3.2 It is usually considered that an open window will provide a reduction of some 10-15 dB(A)[1]. Therefore the 'good' internal standards quoted above would equate to the following targets immediately outside:

Activity	Location	0700 - 2300	2300 - 0700
Resting	Living Room	48 dB(A) LAeq, 16 hr	-
Dining	Dining room/Area	53 dB(A) LAeq, 16 hr	-
Sleeping	Bedroom	48 dB(A) LAeq, 16 hr	43 dB(A) LAeq, 8 hr

3.3.3 BS8233 recognises that, where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB, and reasonable conditions will be achieved.

3.3.4 It should be noted that the levels quoted in BS8233 are intended to reflect the acceptability of steady, continuous noise. Sources of intermittent and tonal noise may generate greater annoyance for a similar overall magnitude. Whilst BS8233 does not explicitly state a correction for those circumstances, it may be appropriate to consider that the Good and Reasonable standards would be achieved with levels which are perhaps 5 dB lower than stated in the table above.

3.3.5 It is also noted that BS8233 was written from a view of designing new buildings to protect occupants from existing noise sources. This does necessarily infer, however, that the acceptability of an occupant to an absolute level noise within a building will be different if the introduction of the noise source post-dates the construction of the building. Other factors may be relevant in certain circumstances, and they are covered in large part by BS4142, discussed below.

3.4 WHO 'Guidelines for Community Noise (1999)

3.4.1 The World Health Organisation indicates that, to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq}.

3.4.2 The document also provides guidance on the impact of peak noise levels on sleeping conditions. This suggests that levels above 45 dB(A) L_{Amax} inside a bedroom would be disturbing to sleep. With windows open, this would equate to a level of approximately 58 dB(A) L_{Amax} externally.

[1] Reference PPG24 Planning & Noise, which adopted a mid-range value of 13 dB(A)

3.5 Building Bulletin 93

3.5.1 The constructional standards for acoustics for new school buildings should meet the requirements of Part E 2003 of the Building Regulations. Building Bulleting 93 provides detailed recommendations on the acoustic design of educational spaces, from the feasibility stage, through detailed design, Building Control Approval and pre-completion commissioning testing.

3.5.2 At the detailed design stage, consideration would normally be given to the following areas:

(i) Indoor ambient noise levels, due to external noise sources;
(ii) Airborne sound insulation between spaces;
(iii) Airborne sound insulation between circulation spaces and other spaces used by students;
(iv) Impact sound insulation of separating floors;
(v) Reverberation in teaching and study spaces;
(vi) Sound absorption in corridors, entrance halls and stairwells;
(vii) Speech intelligibility in open-plan spaces
(viii) External noise emanating from mechanical services plant.

3.5.3 It is noted that the acoustic appraisal here is limited only to the ingress of external noise into the new school building.

4. SURVEY OF EXISTING NOISE LEVELS

4.1 In order to assess the likely levels of noise affecting the façade of the building and the potential break-out noise from the building onto nearby residential properties, a noise survey was undertaken at the site on Wednesday 18th June 2014

4.2 A Rion NL-31 sound level meter was positioned where the new school is proposed to be built

4.3 The meter was configured to record 5 minutes samples of the following acoustic parameters:

L_{Aeq} The A-weighted equivalent continuous sound pressure level which, over the sample period, contains the same acoustic energy as the time-varying signal being recorded.

L_{Amax} The A-weighted maximum sound pressure level recorded during each sample period (as measured on fast response).

4.4 The survey ran from 11.25am until 14.25pm, and the weather conditions were dry, warm and with a light breeze.

4.5 The results of the survey have been extrapolated to show $L_{Aeq,30mins}$ and are summarised below:

Period	L_{Amax} dB(A)	$L_{Aeq,30min}$ dB(A)
11.25 – 11.55	56.0	44.0
11.55 – 12.25	57.1	43.3
12.25 – 12.55	57.8	44.3
12.55 – 13.25	63.3*	42.9
13.25 – 13.55	67.7*	43.8
13.55 – 14.25	60.9*	42.9

**These peak levels are mainly from seagulls, helicopters, light aircraft and some isolated banging noises from the harbour.*

5. PREDICTIONS OF INTERNAL NOISE LEVELS

5.1 BB93 recommends that intrusive noise within teaching and study spaces, due to external noise sources and building services plant, should be limited to the following levels (ref. BB93 Table 1.1).

Table 1 - Target Noise Levels in Mandatory Areas

Teaching Space	Limiting Background Noise Levels dB(A) $L_{Aeq,30mins}$
Nursery	35
Classroom Reception	35
Classroom Year 1	35
Classroom Year 2	35
Classroom Year 3	35
Classroom Year 4	35
Classroom Year 5	35
Classroom Year 6	35
Shared Teaching Area	*35*
LRC	*40*
Hall	*35*
Sick Bay	*35*
Waiting / Entrance / Lobby	*45*
Interview Room	*35*

5.2 Table 1.1 of BB93 also provides guidance for intrusive noise levels in other areas of the building. These limits are provided for advice only and are not formally a requirement under the Building Regulations (this list includes areas understood to be for community use only):

Table 2 - Target Noise Levels in Advisory Areas

Non Teaching Area	Limiting Background Noise Levels dB(A) $L_{Aeq,30mins}$
Staff / Kitchen	*40*
Nursery WC & Coats	*45*
Toilets	*50*
Offices	*40*
Staff Room	*40*
Kitchen/ Servery	*50*

5.3 The main elements of the building shell are unknown at present but a probable construction would be as follows:

External Walls: 110mm brickwork outer face with 100mm partially filled cavity with 70mm insulation and inner leaf of 89mm timber stud with 15mm soundbloc liner.

External Glazing: Assumed double sealed glazing units of: 4 / 12 / 4 glass

External Doors: To provide an Rw of 30 – 35 dB minimum

Roof: Roof tiles on timber joists with insulation between and 2no 15mm Fireline boards on an independent timber grid.

5.4 Based on the external constructions outlined above, Table 3 confirms the predicted internal noise levels for each of the teaching spaces in the building, when windows are closed with no ventilation and with trickle vents. Calculations are offered in Appendices A.

Table 3 - Predicted Internal Noise Levels

Teaching Space	Internal Target (Windows Closed) $L_{Aeq, 30\ min}$ dB(A)	Predicted Internal Level $L_{Aeq, 30\ mins}$ dB(A)	
		Windows No Vents	Windows c/w Trickle Vents
Nursery	≤35	10	21
Classroom Reception	≤35	11	21
Classroom Year 1	≤35	10	20
Classroom Year 2	≤35	10	20
Classroom Year 3	≤35	12	22
Classroom Year 4	≤35	10	20
Classroom Year 5	≤35	10	20
Classroom Year 6	≤35	10	20
Shared Teaching Area	≤35	9	19
LRC	≤40	<9	<19
Hall	≤35	9	20
Sick Bay	≤35	<9	<19
Waiting / Entrance / Lobby	≤45	<9	<19
Interview Room	≤35	17	27

5.5 It can be seen that the predicted internal noise levels are comfortably within the BB93 limits.

5.6 In respect of the situation when windows are open, BB93 allows for an increase of 5 dB during such times, and it can be seen from the table above that natural ventilation is an appropriate solution to the requirement.

5.7 In respect of rain noise, an analysis of the proposed construction has been conducted using the Marshall Day INSUL software package. With 'heavy' rainfall, the predicted noise level within classroom areas is 41 dB(A).

5.8 BB93 does not provided objective criteria regarding acceptable levels of rain impact noise, but guidance may be found in the BREEAM assessment for schools. Here, it is advised that noise levels during heavy rain would be acceptable providing they are no more than 20 dB above the usual internal noise targets defined in Table 1.1 of BB93.

5.9 Referring to Section 3 of this report, this implies a limit of 55 dB(A) in particular teaching spaces. The predicted noise level of 41 dB(A) is therefore acceptable.

6. NOISE IMPACT OF EXTERNAL PLAY

6.1 Figure 1 – Site Layout , shows there are areas around the school designated for play and sporting activities, and consideration must be taken that noise emanating from these areas does not have an adverse affect on the neighbouring community.

6.2 Data taken from similar play areas such as the multi use games area (MUGA) would suggest that noise levels of 65 $L_{Aeq,30mins}$ at 5m are normal, with peak levels of c.75 $L_{Amax,fast}$ during more raucous play. Data recorded at 30m from a rugby match suggest that noise levels of 58 $L_{Aeq,90mins}$ and c.70 $L_{Amax,fast}$ would be expected.

6.3 The following table summarizes the predicted noise levels using IMMI 2010 Noise Mapping Software, that would be expected at the nearest properties to the particular play areas;

Play Area	Distance to Nearest Property (m)	Predicted Noise Levels dB(A)	
		$L_{Aeq, 30mins}$	$L_{Amax,fast}$
Hard & Soft Play	38	45	55
Hard Play	39	39	49
Soft Play	64	43	53
MUGA	63	38	48
Pitch	20	56	68

6.4 It can be seen that the predicted noise levels from activities on the pitch (rugby, football, hockey, etc) are fairly high and would certainly be above the WHO criteria for residential amenity areas and BS8233 for internal noise levels in living rooms with the windows open. However the other play areas appear to be well within the criteria.

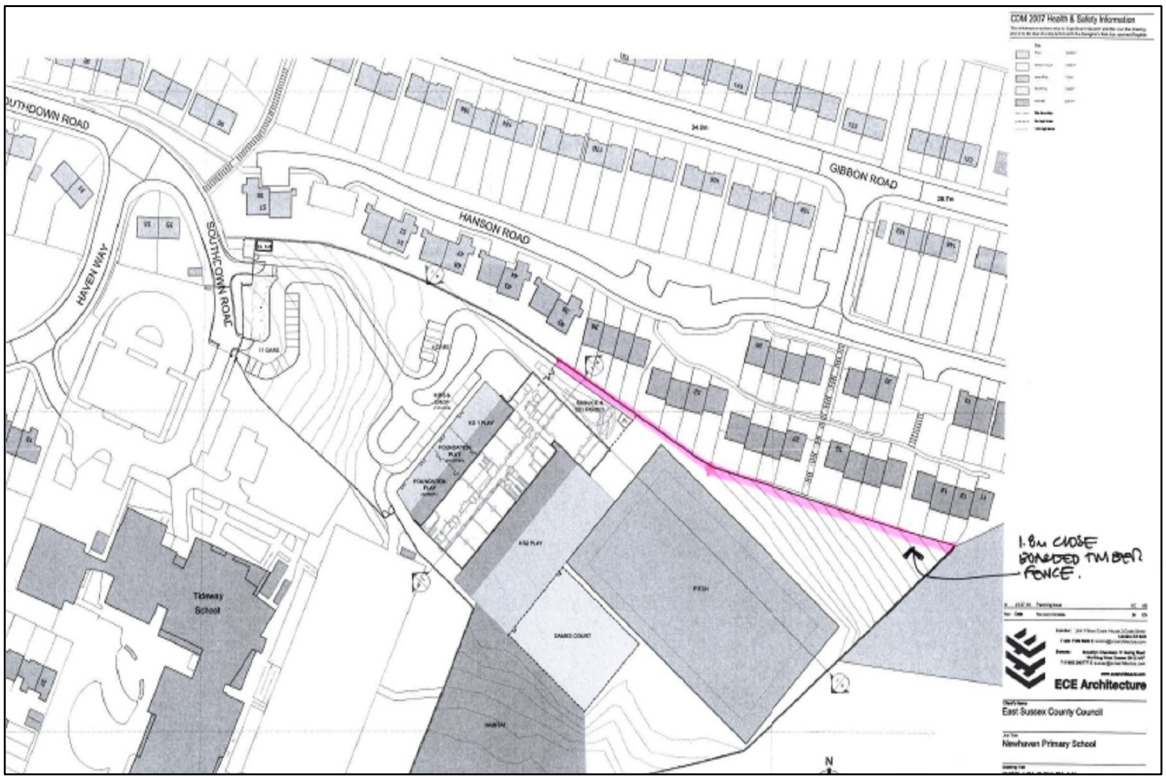
6.5 Noise levels could be attenuated by erecting close boarded timber fence to the northern boundary of the site. The specification for the fence will need to achieve an overall sound reduction of between 5 – 10 dB. The following table confirms the predicted noise levels relating to the provision of a 2m high barrier;

Play Area	Distance to Nearest Property (m)	Predicted Noise Levels with 2m high Barrier dB(A)	
		$L_{Aeq, 30mins}$	$L_{Amax,fast}$
Hard & Soft Play	38	40	50
Hard Play	39	33	43
Soft Play	64	38	48
MUGA	63	33	43
Pitch	20	51	63

6.6 It can be seen that with the barrier installed noise levels emanating from the activities within the field should meet the criteria for WHO, although they would still be a little above the target of 48 dB for living rooms with windows open of BS8233.

6.7 However, consideration should be taken into account that the nature of the noise emanating from the pitch will be intermittent and will not be isolated in any one location for long periods of time.

6.8 In light of this information, and as agreed with the Architect the degree of screening could be installed as shown below.



7. NOISE BREAK-OUT FROM INSIDE BUILDING

7.1 Consideration should be taken to avoid noisy activities within the building having an adverse affect on the neighbouring community.

7.2 Whilst we do not see any particularly noisy teaching areas (music classrooms, workshops etc), we should provide comfort that noise from noise teaching activity will not adversely affect the adjacent residents, with the windows open or shut.

7.3 The hall will probably be the noisiest room within the building, and the nearest to residential dwellings some 19m away. This will be used as a dining area, and is likely to be used as a multi-functional area with activities such as; indoor play, physical education, school assemblies and concerts (school plays, etc), taking place within.

7.4 Appendix B provides a detailed calculation of the expected noise break-out from the hall with windows open and shut based on an internal noise level of 75dB(A) $L_{Aeq,30mins}$, and Table 4 summarizes these results.

Table 4 - Predicted Noise Levels at Nearest Residential Dwellings

Teaching Space	Internal Noise Level $L_{Aeq,\ 30\ min}$ dB(A)	Predicted Noise Level at 1m From Nearest Facade $L_{Aeq,\ 30\ mins}$ dB(A)	
		Windows Shut	Windows Open
Hall	75	32	45

7.5 Sections 4.3.2 & 4.4.1 of this report have stated criteria for noise levels affecting residents:

Standard	Condition	Target
BS8233	At Residential Facade Level (to allow for open windows)	<48 dB(A) $L_{Aeq,16hrs}$
WHO	Outdoor amenity areas	<50 dB(A) L_{Aeq}

7.6 It can be seen that the predicted figures within Table 4 are below the target noise levels and therefore noise levels within the hall should be acceptable, although the internal noise levels must not exceed 75dB(A) unless windows are kept closed.

8. NOISE FROM BUILDING SERVICES PLANT

8.1 In respect of noise emission to outside, the ambient noise survey confirms that noise levels during the day can reach very low levels. A background noise level of 37 dB(A) $L_{A90,\ 5mins}$ was measured close to existing residential properties.

8.2 At night, the lowest background noise level would be expected to be at least 10 dB lower than the daytime figures due to the locality, therefore the levels would c.27 dB(A) $L_{A90,\ 5mins}$

8.3 Subject to any specific conditions set out in a Planning Consent, it is recommended that noise from any new building services plant be designed to a limit which is at least 5 dB lower than the minimum existing conditions. Such a clause would also satisfy the requirements of any BREEAM assessment for the project.

8.4 Therefore, it will be necessary to issue the following clause to the M&E Consultants

The scheme shall be designed to ensure that the cumulative noise emitted by all mechanical sources does not exceed a noise level of 32 dB(A) at the facade of the nearest residential properties, during the period 0700 - 2300. Any plant operating through the night shall be limited to a level of 22dB(A) during the period 2300 – 0700.

If the noise is tonal or intermitted in character, these limits shall be reduced by a further 5 dB(A).

9. TRAFFIC NOISE ASSESSMENT

9.1 A Transport Statement report has been carried out by GTA Civils Ltd. This indicates that the existing traffic volume on the adjacent road is approximately 200 vehicles in the morning period (0800 - 0900) and 100 movements in the afternoon period (1500 - 1600). The report predicts an additional 64 vehicles in the morning and 47 in the afternoon.

9.2 This represents an increase of 32% in the morning and 47% in the afternoon.

9.3 This increase in traffic volume would equate to a nominal increase of 1.2 dB in the morning period and 1.7 dB in the afternoon period.

9.4 Studies have shown that changes in noise levels of three decibels or less are not typically detectable by the average human ear. An increase of five decibels is generally readily noticeable by anyone, and a 10-decibel increase is usually felt to be "twice as loud" as before.

9.5 It is therefore suggested that the predicted increase in vehicles within the local area will not have any detrimental effect on the neighbouring community.

Figure 1: Site Plan

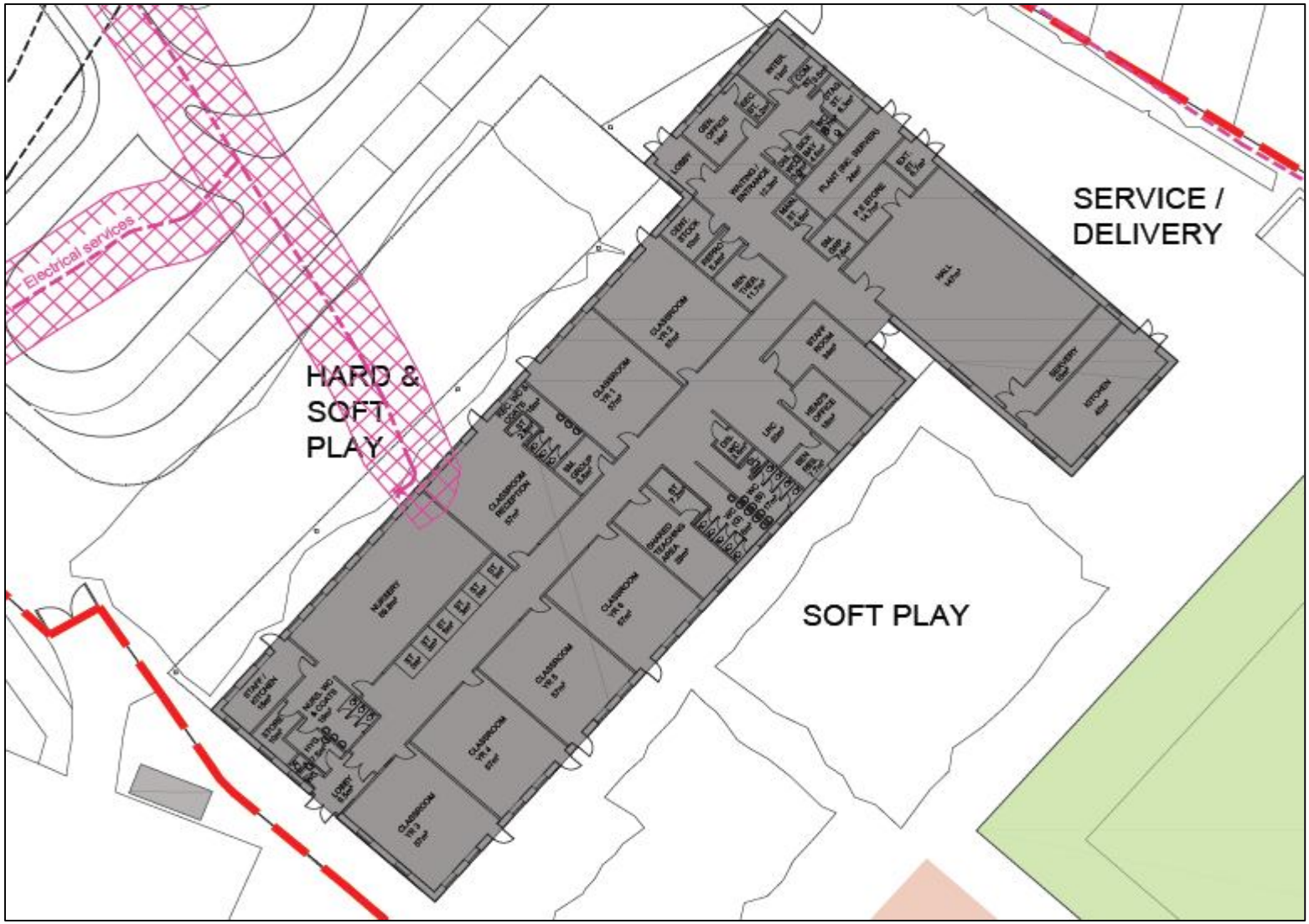


Figure 2: Internal Layout

APPENDIX A: CALCULATION OF PREDICTED INTERNAL NOISE LEVELS

NURSERY										
Windows Closed										
Frequency	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dB(A)**
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40	
Area of Window	dB	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	
Area Correction	dB	10	10	10	10	10	10	10	10	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	269	269	269	269	269	269	269	269	
Absorption		72	72	72	72	72	72	72	72	
Absorption Correction	dB	19	19	19	19	19	19	19	19	
Net SPL Inside	dB	26	11	13	5	-6	-17	-9	-27	7
SRI External Wall	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	
Area Correction	dB	15	15	15	15	15	15	15	15	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	269	269	269	269	269	269	269	269	
Absorption		72	72	72	72	72	72	72	72	
Absorption Correction	dB	19	19	19	19	19	19	19	19	
Net SPL Inside	dB	10	-10	-19	-35	-45	-61	-61	-77	-15
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	89.8	89.8	89.8	89.8	89.8	89.8	89.8	89.8	
Area Correction	dB	20	20	20	20	20	20	20	20	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	269	269	269	269	269	269	269	269	
Absorption		72	72	72	72	72	72	72	72	
Absorption Correction	dB	19	19	19	19	19	19	19	19	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wa	*dB*	*26*	*11*	*13*	*5*	*-6*	*-17*	*-9*	*-27*	*7*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**29**	**14**	**16**	**8**	**-3**	**-14**	**-6**	**-24**	**10**

With Trickle Vents or Windows Open										
Frequency	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dB(A)**
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	3	13	8	16	28	34	28	30	
Area of Window	dB	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	
Area Correction	dB	10	10	10	10	10	10	10	10	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	269	269	269	269	269	269	269	269	
Absorption		72	72	72	72	72	72	72	72	
Absorption Correction	dB	19	19	19	19	19	19	19	19	
Net SPL Inside	dB	36	21	23	15	4	-7	1	-17	17
SRI External Wall	dB	23	29	33	38	34	35	45	50	
Area of Wall	dB	41.6	41.6	41.6	41.6	41.6	41.6	41.6	41.6	
Area Correction	dB	16	16	16	16	16	16	16	16	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	269	269	269	269	269	269	269	269	
Absorption		72	72	72	72	72	72	72	72	
Absorption Correction	dB	19	19	19	19	19	19	19	19	
Net SPL Inside	dB	22	11	4	-1	4	-2	-10	-31	6
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	89.8	89.8	89.8	89.8	89.8	89.8	89.8	89.8	
Area Correction	dB	20	20	20	20	20	20	20	20	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	269	269	269	269	269	269	269	269	
Absorption		72	72	72	72	72	72	72	72	
Absorption Correction	dB	19	19	19	19	19	19	19	19	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*36*	*21*	*23*	*15*	*7*	*-1*	*1*	*-17*	*18*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**39**	**24**	**26**	**18**	**10**	**2**	**4**	**-14**	**21**

CLASSROOMS YEARS 1, 2, 4, 5 & 6

Windows Closed

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40	
Area of Window	dB	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Area Correction	dB	8	8	8	8	8	8	8	8	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	25	10	12	4	-7	-18	-10	-28	7
SRI External Wall	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	14.85	14.85	14.85	14.85	14.85	14.85	14.85	14.85	
Area Correction	dB	12	12	12	12	12	12	12	12	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	9	-11	-20	-36	-46	-62	-62	-78	-16
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	57	57	57	57	57	57	57	57	
Area Correction	dB	18	18	18	18	18	18	18	18	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*25*	*10*	*12*	*4*	*-7*	*-18*	*-10*	*-28*	*7*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**28**	**13**	**15**	**7**	**-4**	**-15**	**-7**	**-25**	**10**

With Trickle Vents or Windows Open

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	3	13	8	16	28	34	28	30	
Area of Window	dB	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	
Area Correction	dB	8	8	8	8	8	8	8	8	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	35	20	22	14	3	-8	0	-18	17
SRI External Wall	dB	23	29	33	38	34	35	45	50	
Area of Wall	dB	14.85	14.85	14.85	14.85	14.85	14.85	14.85	14.85	
Area Correction	dB	12	12	12	12	12	12	12	12	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	19	8	1	-4	1	-5	-13	-34	4
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	57	57	57	57	57	57	57	57	
Area Correction	dB	18	18	18	18	18	18	18	18	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*35*	*20*	*22*	*14*	*5*	*-3*	*0*	*-18*	*17*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**38**	**23**	**25**	**17**	**8**	**0**	**3**	**-15**	**20**

CLASSROOM RECEPTION

Windows Closed

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40	
Area of Window	dB	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
Area Correction	dB	9	9	9	9	9	9	9	9	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	26	11	13	5	-6	-17	-9	-27	8
SRI External Wall	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	
Area Correction	dB	14	14	14	14	14	14	14	14	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	11	-9	-18	-34	-44	-60	-60	-76	-14
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	57	57	57	57	57	57	57	57	
Area Correction	dB	18	18	18	18	18	18	18	18	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*26*	*11*	*13*	*5*	*-6*	*-17*	*-9*	*-27*	*8*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**29**	**14**	**16**	**8**	**-3**	**-14**	**-6**	**-24**	**11**

With Trickle Vents or Windows Open

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	3	13	8	16	28	34	28	30	
Area of Window	dB	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
Area Correction	dB	9	9	9	9	9	9	9	9	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	36	21	23	15	4	-7	1	-17	18
SRI External Wall	dB	23	29	33	38	34	35	45	50	
Area of Wall	dB	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	
Area Correction	dB	14	14	14	14	14	14	14	14	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	21	10	3	-2	3	-3	-11	-32	6
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	57	57	57	57	57	57	57	57	
Area Correction	dB	18	18	18	18	18	18	18	18	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*36*	*21*	*23*	*15*	*7*	*-1*	*1*	*-17*	*18*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**39**	**24**	**26**	**18**	**10**	**2**	**4**	**-14**	**21**

CLASSROOM YEAR 3

Windows Closed

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40	
Area of Window	dB	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	
Area Correction	dB	10	10	10	10	10	10	10	10	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	27	12	14	6	-5	-16	-8	-26	9
SRI External Wall	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	
Area Correction	dB	16	16	16	16	16	16	16	16	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	13	-7	-16	-32	-42	-58	-58	-74	-12
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	57	57	57	57	57	57	57	57	
Area Correction	dB	18	18	18	18	18	18	18	18	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*27*	*12*	*14*	*6*	*-5*	*-16*	*-8*	*-26*	*9*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**30**	**15**	**17**	**9**	**-2**	**-13**	**-5**	**-23**	**12**

With Trickle Vents or Windows Open

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	3	13	8	16	28	34	28	30	
Area of Window	dB	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	
Area Correction	dB	10	10	10	10	10	10	10	10	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	37	22	24	16	5	-6	2	-16	19
SRI External Wall	dB	23	29	33	38	34	35	45	50	
Area of Wall	dB	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	
Area Correction	dB	16	16	16	16	16	16	16	16	
Likely RT in room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	23	12	5	0	5	-1	-9	-30	8
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	57	57	57	57	57	57	57	57	
Area Correction	dB	18	18	18	18	18	18	18	18	
Likely RT in Room	sec	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Room Volume	m3	171	171	171	171	171	171	171	171	
Absorption		46	46	46	46	46	46	46	46	
Absorption Correction	dB	17	17	17	17	17	17	17	17	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*37*	*22*	*24*	*16*	*8*	*0*	*2*	*-16*	*19*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**40**	**25**	**27**	**19**	**11**	**3**	**5**	**-13**	**22**

SHARED TEACHING

Windows Closed

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40	
Area of Window	dB	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
Area Correction	dB	3	3	3	3	3	3	3	3	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	84	84	84	84	84	84	84	84	
Absorption		17	17	17	17	17	17	17	17	
Absorption Correction	dB	12	12	12	12	12	12	12	12	
Net SPL Inside	dB	24	9	11	3	-8	-19	-11	-29	6
SRI External Wall	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	
Area Correction	dB	9	9	9	9	9	9	9	9	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	84	84	84	84	84	84	84	84	
Absorption		17	17	17	17	17	17	17	17	
Absorption Correction	dB	12	12	12	12	12	12	12	12	
Net SPL Inside	dB	11	-9	-18	-34	-44	-60	-60	-76	-14
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	28	28	28	28	28	28	28	28	
Area Correction	dB	14	14	14	14	14	14	14	14	
Likely RT in Room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	84	84	84	84	84	84	84	84	
Absorption		17	17	17	17	17	17	17	17	
Absorption Correction	dB	12	12	12	12	12	12	12	12	
Net SPL Inside	dB	12	-6	-21	-29	-36	-35	-39	-55	-13
Combined Level from window, roof and wall	*dB*	*25*	*9*	*11*	*3*	*-8*	*-19*	*-11*	*-29*	*6*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**28**	**12**	**14**	**6**	**-5**	**-16**	**-8**	**-26**	**9**

With Trickle Vents or Windows Open

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	3	13	8	16	28	34	28	30	
Area of Window	dB	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
Area Correction	dB	3	3	3	3	3	3	3	3	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	84	84	84	84	84	84	84	84	
Absorption		17	17	17	17	17	17	17	17	
Absorption Correction	dB	12	12	12	12	12	12	12	12	
Net SPL Inside	dB	34	19	21	13	2	-9	-1	-19	16
SRI External Wall	dB	23	29	33	38	34	35	45	50	
Area of Wall	dB	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	
Area Correction	dB	9	9	9	9	9	9	9	9	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	84	84	84	84	84	84	84	84	
Absorption		17	17	17	17	17	17	17	17	
Absorption Correction	dB	12	12	12	12	12	12	12	12	
Net SPL Inside	dB	21	10	3	-2	3	-3	-11	-32	6
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	28	28	28	28	28	28	28	28	
Area Correction	dB	14	14	14	14	14	14	14	14	
Likely RT in Room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	84	84	84	84	84	84	84	84	
Absorption		17	17	17	17	17	17	17	17	
Absorption Correction	dB	12	12	12	12	12	12	12	12	
Net SPL Inside	dB	12	-6	-21	-29	-36	-35	-39	-55	-13
Combined Level from window, roof and wall	*dB*	*34*	*20*	*21*	*13*	*6*	*-2*	*0*	*-19*	*16*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**37**	**23**	**24**	**16**	**9**	**1**	**3**	**-16**	**19**

HALL

Windows Closed

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40	
Area of Window	dB	12	12	12	12	12	12	12	12	
Area Correction	dB	11	11	11	11	11	11	11	11	
Likely RT in room	sec	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Room Volume	m3	660	660	660	660	660	660	660	660	
Absorption		106	106	106	106	106	106	106	106	
Absorption Correction	dB	20	20	20	20	20	20	20	20	
Net SPL Inside	dB	25	10	12	4	-7	-18	-10	-28	6
SRI External Wall	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	100.5	100.5	100.5	100.5	100.5	100.5	100.5	100.5	
Area Correction	dB	20	20	20	20	20	20	20	20	
Likely RT in room	sec	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Room Volume	m3	660	660	660	660	660	660	660	660	
Absorption		106	106	106	106	106	106	106	106	
Absorption Correction	dB	20	20	20	20	20	20	20	20	
Net SPL Inside	dB	14	-6	-15	-31	-41	-57	-57	-73	-12
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	147	147	147	147	147	147	147	147	
Area Correction	dB	22	22	22	22	22	22	22	22	
Likely RT in Room	sec	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Room Volume	m3	660	660	660	660	660	660	660	660	
Absorption		106	106	106	106	106	106	106	106	
Absorption Correction	dB	20	20	20	20	20	20	20	20	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*25*	*10*	*12*	*4*	*-7*	*-18*	*-10*	*-28*	*6*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**28**	**13**	**15**	**7**	**-4**	**-15**	**-7**	**-25**	**9**

With Trickle Vents or Windows Open

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	3	13	8	16	28	34	28	30	
Area of Window	dB	12	12	12	12	12	12	12	12	
Area Correction	dB	11	11	11	11	11	11	11	11	
Likely RT in room	sec	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Room Volume	m3	660	660	660	660	660	660	660	660	
Absorption		106	106	106	106	106	106	106	106	
Absorption Correction	dB	20	20	20	20	20	20	20	20	
Net SPL Inside	dB	35	20	22	14	3	-8	0	-18	16
SRI External Wall	dB	23	29	33	38	34	35	45	50	
Area of Wall	dB	100.5	100.5	100.5	100.5	100.5	100.5	100.5	100.5	
Area Correction	dB	20	20	20	20	20	20	20	20	
Likely RT in room	sec	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Room Volume	m3	660	660	660	660	660	660	660	660	
Absorption		106	106	106	106	106	106	106	106	
Absorption Correction	dB	20	20	20	20	20	20	20	20	
Net SPL Inside	dB	24	13	6	1	6	0	-8	-29	9
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	147	147	147	147	147	147	147	147	
Area Correction	dB	22	22	22	22	22	22	22	22	
Likely RT in Room	sec	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Room Volume	m3	660	660	660	660	660	660	660	660	
Absorption		106	106	106	106	106	106	106	106	
Absorption Correction	dB	20	20	20	20	20	20	20	20	
Net SPL Inside	dB	11	-7	-22	-30	-37	-36	-40	-56	-14
Combined Level from window, roof and wall	*dB*	*35*	*20*	*22*	*14*	*7*	*0*	*0*	*-18*	*17*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**38**	**23**	**25**	**17**	**10**	**3**	**3**	**-15**	**20**

INTERVIEW ROOM

Windows Closed

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40	
Area of Window	dB	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	
Area Correction	dB	7	7	7	7	7	7	7	7	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	39	39	39	39	39	39	39	39	
Absorption		8	8	8	8	8	8	8	8	
Absorption Correction	dB	9	9	9	9	9	9	9	9	
Net SPL Inside	dB	32	17	19	11	0	-11	-3	-21	14
SRI External Wall	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	
Area Correction	dB	12	12	12	12	12	12	12	12	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	39	39	39	39	39	39	39	39	
Absorption		8	8	8	8	8	8	8	8	
Absorption Correction	dB	9	9	9	9	9	9	9	9	
Net SPL Inside	dB	17	-3	-12	-28	-38	-54	-54	-70	-8
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	13	13	13	13	13	13	13	13	
Area Correction	dB	11	11	11	11	11	11	11	11	
Likely RT in Room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	39	39	39	39	39	39	39	39	
Absorption		8	8	8	8	8	8	8	8	
Absorption Correction	dB	9	9	9	9	9	9	9	9	
Net SPL Inside	dB	12	-6	-21	-29	-36	-35	-39	-55	-13
Combined Level from window, roof and wall	*dB*	*33*	*17*	*19*	*11*	*0*	*-11*	*-3*	*-21*	*14*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**36**	**20**	**22**	**14**	**3**	**-8**	**0**	**-18**	**17**

With Trickle Vents or Windows Open

Frequency	Hz	63	125	250	500	1000	2000	4000	8000	dB(A)
External Noise Level LAeq	**dB**	47	42	39	39	40	35	37	21	**44**
Glazing Specified: 4 / 12 / 4	dB	3	13	8	16	28	34	28	30	
Area of Window	dB	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	
Area Correction	dB	7	7	7	7	7	7	7	7	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	39	39	39	39	39	39	39	39	
Absorption		8	8	8	8	8	8	8	8	
Absorption Correction	dB	9	9	9	9	9	9	9	9	
Net SPL Inside	dB	42	27	29	21	10	-1	7	-11	24
SRI External Wall	dB	23	29	33	38	34	35	45	50	
Area of Wall	dB	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	
Area Correction	dB	12	12	12	12	12	12	12	12	
Likely RT in room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	39	39	39	39	39	39	39	39	
Absorption		8	8	8	8	8	8	8	8	
Absorption Correction	dB	9	9	9	9	9	9	9	9	
Net SPL Inside	dB	27	16	9	4	9	3	-5	-26	12
SRI Roof	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	13	13	13	13	13	13	13	13	
Area Correction	dB	11	11	11	11	11	11	11	11	
Likely RT in Room	sec	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Room Volume	m3	39	39	39	39	39	39	39	39	
Absorption		8	8	8	8	8	8	8	8	
Absorption Correction	dB	9	9	9	9	9	9	9	9	
Net SPL Inside	dB	12	-6	-21	-29	-36	-35	-39	-55	-13
Combined Level from window, roof and wall	*dB*	*43*	*28*	*29*	*21*	*13*	*5*	*8*	*-10*	*24*
Tolerance on Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Internal Noise Level	**dB**	**46**	**31**	**32**	**24**	**16**	**8**	**11**	**-7**	**27**

APPENDIX B: CALCULATION OF PREDICTED NOISE LEVELS AT NEAREST FACADE

HALL																					
Windows Closed												Windows Open										
Frequency	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dB(A)**		**Frequency**	**Hz**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**dB(A)**
Internal Noise Level LAeq	**dB**	79	72	71	69	72	69	63	58	**75**		**External Noise Level LAeq**	**dB**	79	72	71	69	72	69	63	58	**75**
Glazing Specified: 4 / 12 / 4	dB	13	23	18	26	38	44	38	40			***Glazing Specified: 4 / 12 / 4 open***	dB	0	10	5	13	25	31	25	27	
Area of Window	dB	8	8	8	8	8	8	8	8			Area of Window	dB	8	8	8	8	8	8	8	8	
Area Correction	dB	9	9	9	9	9	9	9	9			Area Correction	dB	9	9	9	9	9	9	9	9	
Net SWL Outside	dB	75	58	62	52	43	34	34	27	56		Net SWL Outside	dB	88	71	75	65	56	47	47	40	69
SRI External Wall	dB	33	48	54	70	81	92	94	94			***SRI External Wall***	dB	33	48	54	70	81	92	94	94	
Area of Wall	dB	45	45	45	45	45	45	45	45			Area of Wall	dB	45	45	45	45	45	45	45	45	
Area Correction	dB	17	17	17	17	17	17	17	17			Area Correction	dB	17	17	17	17	17	17	17	17	
Net SWL Outside	dB	63	41	34	16	8	-6	-14	-19	37		Net SWL Outside	dB	63	41	34	16	8	-6	-14	-19	37
SRI Roof	dB	37	50	62	70	78	72	78	78			***SRI Roof***	dB	37	50	62	70	78	72	78	78	
Area of Roof	dB	147	147	147	147	147	147	147	147			Area of Roof	dB	147	147	147	147	147	147	147	147	
Area Correction	dB	22	22	22	22	22	22	22	22			Area Correction	dB	22	22	22	22	22	22	22	22	
Net SWL Outside	dB	64	44	31	21	16	19	7	2	38		Net SWL Outside	dB	64	44	31	21	16	19	7	2	38
Combined Level from window, roof and wall	*dB*	76	58	62	52	43	34	34	27	*56*		*Combined Level from window, roof and wall*	*dB*	88	71	75	65	56	47	47	40	*69*
Directivity	*dB*	-14	-14	-14	-14	-14	-14	-14	-14			Directivity	*dB*	-14	-14	-14	-14	-14	-14	-14	-14	
Distance Correction	*dB*	13	13	13	13	13	13	13	13			Distance Correction	*dB*	13	13	13	13	13	13	13	13	
Facade Calculation	dB	3	3	3	3	3	3	3	3			Facade Calculation	dB	3	3	3	3	3	3	3	3	
Predicted Noise Level at Facade	**dB**	**52**	**34**	**38**	**28**	**19**	**10**	**10**	**3**	**32**		**Predicted Noise Level at Facade**	**dB**	**64**	**47**	**51**	**41**	**32**	**23**	**23**	**16**	**45**

APPENDIX C: TERMINOLOGY RELATING TO NOISE

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20μPa (20x10-6 Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
Leq,T	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
Lmax,T	A noise level index defined as the maximum noise level during the period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L90,T	A noise level index. The noise level exceeded for 90% of the time over the period T. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L10,T	A noise level index. The noise level exceeded for 10% of the time over the period T. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast/Slow Time Weighting	Averaging times used in sound level meters.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit.
DnT,w	The single number quantity that characterises airborne sound insulation between rooms over a range of frequencies.
Rw	Single number quantity that characterises the airborne sound insulating properties of a material or building element over a range of frequencies.
Reverberation	The persistence of sound in a space after a sound source has been stopped