PEAK acoustics

Noise Impact Assessment Report

Rev. 0 25/02/2019

Noise Impact Assessment

Project Reference Number: PA768

Assessment Standards: BS4142:2014

Client: Mr. Leitner

Site: 157 Bevendon Square, Salford, M7 4TP

Written By	**Checked By**
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Contents

Project Information

Peak Acoustics have been commissioned to undertake the assessment detailed within this report. Below is a summary of pre-commencement requirements and comments as communicated to Peak Acoustics by involved parties, this information forms the basis of the assessment and report.

Client Contact	Mr. D. Bitan, Debtal Architecture
Client Requirement	A change of use from a retail unit to an educational establishment (Yeshiva High School) is proposed at 157 Bevendon Square, Salford, M7 4TP. The local planning authority have requested that a noise assessment is submitted as part of a planning application for the change of use.
Selected Methodology	In order to assess the noise impact of the proposed Yeshiva High School Peak Acoustics will conduct an assessment in accordance with BS4142:2014.
Methodology Justification	'BS4142:2014 – Methods for rating and assessing industrial and commercial sound' is a recognised standard for assessing the noise impact of fixed plant machinery via relation of noise emissions to current background noise levels. It is noted that the standard omits usage for human voice noise however in the absence of other formal guidance, the method of referencing a predicted noise level to the existing background sound level on site is deemed a useful tool for the assessment.
Local Authority Contact	N/A
Local Authority Consultation	N/A
Local Authority Guidance/Unitary Development Plans/Unique or bespoke standards	N/A

Assessment Summary

A noise assessment has been undertaken at 157 Bevendon Square, Salford, M7 4TP to assess the resultant noise impact upon the nearest noise sensitive receptors (NSRs) due to the proposed development of a Yeshiva High School on site.

It has been calculated that internal to external noise breakout due to speech noise within the Yeshiva High School is likely to have a Low Impact at the NSR locations.

A kitchen extraction system and plant room are proposed as part of the development, however prospective plant equipment specifications are not yet known. Suitable noise rating limits have been specified that if adhered to, will maintain a Low Impact at the NSR locations.

A noise management plan has been specified with view of minimising external noise due to students congregating within the frontal yard area at the start of the school day and between lessons.

Providing the measures listed within the report are implemented alongside the proposed development, it is deemed that the nearest NSRs will not suffer a loss of amenity due to noise from the development.

1. Noise Sources

1.1 The noise sources associated with the proposed development include:

- Internal to external noise breakout through the building envelope due to human voice noise associated with lessons and the dining / assembly hall
- Fixed plant noise emissions associated with a kitchen extraction system and from the proposed plant room

2. Subjective Impressions

2.1 The primary noise source of the residual noise climate was birdsong and road traffic noise. Secondary noise sources were noted as nearfield road traffic as cars accessed the nearby houses on Bennet Drive and Basten Drive and emergency vehicle sirens.

3. Existing Context

3.1 The site was previously used as a retail outlet and is located within a mixed-use area, Bevendon Square, whereby commercial / retail premises are located south and east of the site and residential properties are located to the north and west.

3.2 It is proposed to develop the site with an extension to the east and for the use to be changed to an education establishment, namely Yeshiva High School.

3.3 The proposed operational hours of the site are 08:00 – 19:00, Monday – Sunday.

4. Measurement Locations

4.1 Environmental noise levels were measured on site to determine the existing noise levels.

4.2 Noise measurements were obtained from 08:01 – 09:01 on Sunday 27th January 2018 as to represent a period whereby environmental noise levels are likely to be at their lowest within the proposed operational hours.

4.3 Measurement position photographs are shown in **Appendix F**.

5. NSR Locations

5.1 Two NSRs have been selected for the assessment:

- NSR_1 –Residential dwellings located on Bennet Drive situated closest to the proposed classrooms
- NSR_2 – Residential dwelling gardens located on Rigby Street / Basten Drive closest to the proposed dining / assembly hall, kitchen and plant room

5.2 The measurement position, site location and NSRs are indicated in figure 1 below:

Figure 1: Measurement, Site and NSR Locations

Site Location

NSR_1

NSR_2

Background Sound Measurement Location

6. Measurement Equipment

6.1 Measurements were undertaken using calibrated class 1 sound level meters. Full equipment details can be found in **Appendix B**.

6.2 The calibrator reference level was 114.0dB. Full calibration details can be found in **Appendix D**.

7. Weather Conditions

7.1 Wind speeds of 2 – 4ms^{-1} NW and a temperature of 4°C were measured using a Hold Peak HP-817A anemometer / thermometer. Full meteorological conditions are detailed in **Appendix C**.

8. Background Sound Level

8.1 Environmental noise levels were measured on site at a location representative of the NSRs. Measured levels are shown graphically in **Appendix E**.

8.2 The background sound levels were measured across a 1hr period representative of the most sensitive hours of operation during a Sunday morning and were measured between T_1 and T_2 in 30s aggregated intervals and under free-field conditions as follows:

Table 1: Background Sound Level

T_1	T_2	dB $L_{A90,1hr}$	dB $L_{Aeq,1hr}$
08:01	09:01	49.6	54.5

9. Noise Source Levels

9.1 In order to determine the resultant noise level at the NSR locations, assumptions are made with regards to the internal noise levels within the classrooms and dining / assembly hall respectively.

9.2 The following noise source spectra[1] for a raised voice (independent of gender) is normalised to an overall noise level of 75 dB L_{Aeq} and 80 dB L_{Aeq} for the classrooms and dining / assembly hall respectively:

Table 2: Internal Noise Levels, dB L_{Aeq}

	63	125	250	500	1k	2k	4k	Sum
Raised Voice	23.8	39.9	53.4	62.8	62.0	58.2	52.0	66.6
Classroom	32.2	48.3	61.8	71.2	70.4	66.6	60.4	75.0
Dining / Assembly	63.4	69.4	75.4	79.4	75.4	70.4	64.4	80.0

9.3 It is unlikely that noise levels within the classrooms and dining / assembly hall will regularly reach the assumed noise levels however in order to provide a robust assessment, the worst-case scenario is considered.

9.4 The internal noise level is to be corrected for noise breakout through the building façade. The following assumptions are made:

- Windows are partially open to give a free area of 0.3m^2 per window
- Windows are single glazed, 4mm, as a worst-case scenario
- The wall is of a double-skin brick construction giving a total thickness of 280mm

9.5 Sound insulation models are shown in **Appendix F** and noise breakout calculations are shown in **Appendix G**.

9.6 Please note that noise due to the prospective kitchen extraction system and plant room is addressed separately in section 13.

[1] ANSI 3.5: 1997, Methods For Calculation Of The Speech Intelligibility Index

10. Specific Sound Level

10.1 The specific sound level is denoted L_{As} and is the A-weighted, equivalent noise level at the NSR location over the reference time period.

10.2 The derived specific sound levels are shown below:

Table 3: Specific Sound Level

NSR	Noise Source	Specific Sound Level
1	Classroom Breakout	41.3
2	Dining / Assembly Breakout	39.1

11. Rating Level

11.1 The specific sound level may be corrected for certain characteristics that make a sound more noticeable at the NSR location. Corrections for tonality, impulsivity and intermittency may be applied.

11.2 The noise spectra for human speech is naturally focused towards the most sensitive period therefore it is possible that the tonalites associated with sibilance may be perceptible at the NSR locations, therefore, a + 4 dB tonality penalty is deemed appropriate.

11.3 It is expected that noise emitted from the site will be relatively continuous throughout the reference time period of 1hr and there will be no impulsive emissions, therefore penalties for impulsivity and intermittency are not deemed appropriate.

11.4 The resultant sound rating level is tabulated below:

Table 4: Sound Rating Level

NSR	SSL, dB L_{As}	Penalty, dB	Rating, dB L_{Ar}
1	41.3	+ 4	45.3
2	39.1	+ 4	43.1

12. Rating Level Vs Background

12.1 The rating level is to be compared to the background sound level to determine the resultant noise impact in accordance with BS4142:2014:

A Sound Rating Level at or below the background noise level is indicative of *Low Impact;*

A Sound Rating Level that exceeds the background noise level by around + 5dB is likely an indication of *Adverse Impact*, depending on the context;

A Sound Rating Level that exceeds the background noise level by around + 10dB is likely an indication of *Significant Adverse Impact*, depending on the context;

12.2 The noise impact is tabulated below:

Table 5: Noise Impact

NSR	Rating, dB L_{Ar}	Background, dB L_{A90}	Difference, dB	Impact
1	45.3	49.6	- 4.3	Low
2	43.1	49.6	- 6.5	Low

12.3 It is predicted that internal to external noise breakout from the development will result in a Low Impact at the nearest NSRs.

13. Prospective Plant Equipment Noise Limit

13.1 A kitchen extraction system and plant room are proposed as part of the development however prospective plant equipment specifications are not yet known.

13.2 In order for a Low Impact to be maintained at the NSR locations, prospective equipment must meet the following rating levels at NSRs 1 and 2 respectively. Note that the plant equipment rating level is summed with the internal to external noise breakout rating level as to ensure that the cumulative impact remains Low:

Table 6: Prospective Plant Equipment Rating Level

NSR	Plant Equipment, dB L_{Ar}	Noise Breakout, dB L_{Ar}	Sum Rating Level, dB L_{Ar}	Background, dB $L_{A90,1hr}$	Difference, dB	Impact
1	47.6	45.3	49.6	49.6	0	Low
2	48.5	43.1	49.6	49.6	0	Low

13.3 Upon confirmation of plant equipment specification, it is recommended that additional assessment is provided as to ensure that the rating level of the prospective plant equipment does not exceed **47.6 dB L_{Ar}** and **48.5 dB L_{Ar}** at NSRs 1 and 2 respectively.

13.4 Where required, mitigation should be implemented to maintain the rating level noise limits and the effectiveness of the mitigation measures should be demonstrated within an acoustic report for approval by the local planning authority.

14. Noise Management Plan

14.1 It is expected that students may congregate outside of the proposed Yeshiva school at the start of the day and / or between lessons. It is recommended that suitable management is implemented as to ensure that excessive noise is reduced. Management strategies should include:

- Ensuring that the yard space at the front of the Yeshiva school is monitored by at least one teacher between lessons
- Provide additional seating and tables within the entrance hall areas, cloak areas and hot drinks area that can be utilised between lessons
- Ensure that the dining / assembly hall is available for access between lessons
- Provide signage to the frontal yard area and at the points of access to the frontal yard area reminding students that they are within a residential area and to therefore be mindful of their conversation volume

15. Conclusion

15.1 Noise breakout due to speech within the Yeshiva High School is predicted to have a Low Impact at the NSR locations.

15.2 An appropriate noise rating limit for prospective plant equipment has been derived to ensure that a Low Impact is maintained. Compliance with the noise rating limit should be determined at the design stage and where required, additional specifications / calculations / reporting should be submitted to the local planning authority to demonstrate compliance, where requested by the local planning authority.

15.3 A noise management plan has been suggested with view of minimising noise emissions should students congregate within the frontal yard area at the start of the school day or between lessons.

16. Uncertainty

16.1 The monitoring equipment is subject to a 1dB error margin, however calibration before and after measurements allows the drift within the margin to be monitored and thus demonstrates that minimal drift occurred throughout the measurements.

16.2 Background noise levels were measured over a shortened attended period. Lower background sound levels may occur during longer monitoring periods.

16.3 Uncertainty in the assessment has been minimised by measuring noise levels in weather conditions conducive to obtaining lowest background sound levels.

16.4 Uncertainty is offset by assessing measured noise levels during a period whereby they are likely to be at their lowest within the proposed operating hours.

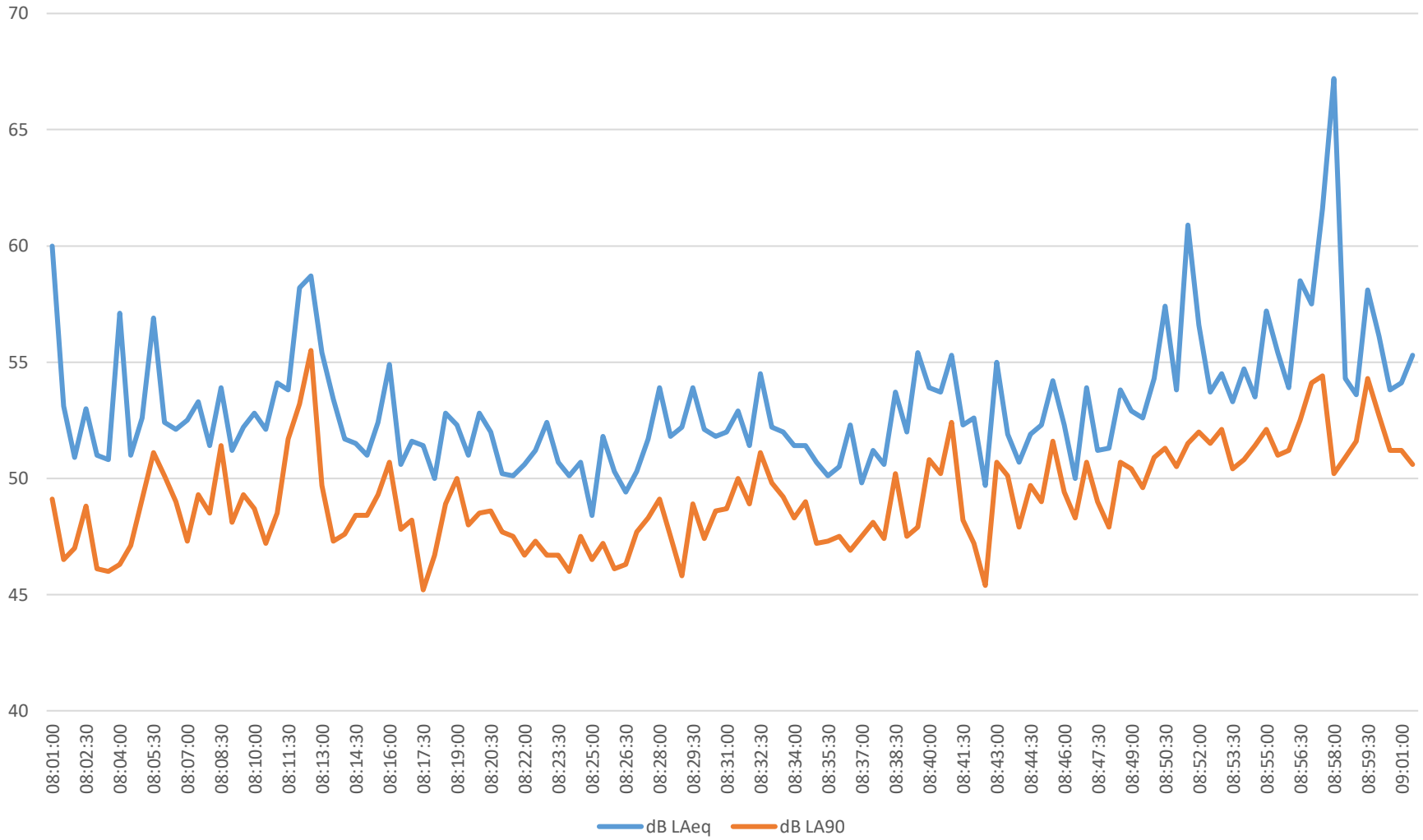
Appendix A - Measurement Details					
Measurement	Kit	Start Date	Start Time	End Date	End Time
M1	A4	27/01/2019	08:01	27/01/2019	09:01

Appendix B - Equipment Details					
Kit	Equipment	Make	Model	Class	Serial Number
A4	Sound Meter	Svantek	971	1	60688
A4	Pre-Amp	Svantek	SV18	1	62781
A4	Calibrator	Svantek	SV31	1	90274

Appendix C - Meteorology Details						
Measurement	Temp C	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
M1	4	2 – 4	NW	69	0	1 / 8

Appendix D - Calibration Details					
Meter	Calibrator Ref Level (dB)	Level Before (dB)	Deviation Before (dB)	Level After (dB)	Deviation After (dB)
A3	114.0	114.38	0.38	114.46	0.46

Appendix E – Background Noise Measurement Details



Appendix F – Sound Insulation Models

Glazing

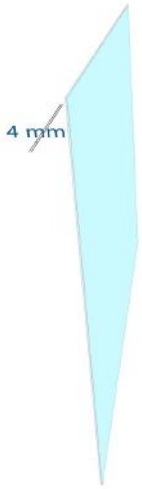
Sound Insulation Prediction (v9.0.5)

INSUL

Program copyright Marshall Day Acoustics 2017

- Key No. 2539
Job Name:
Job No.: Initials:lukeh
Date:18/01/2019
File Name:

Notes:



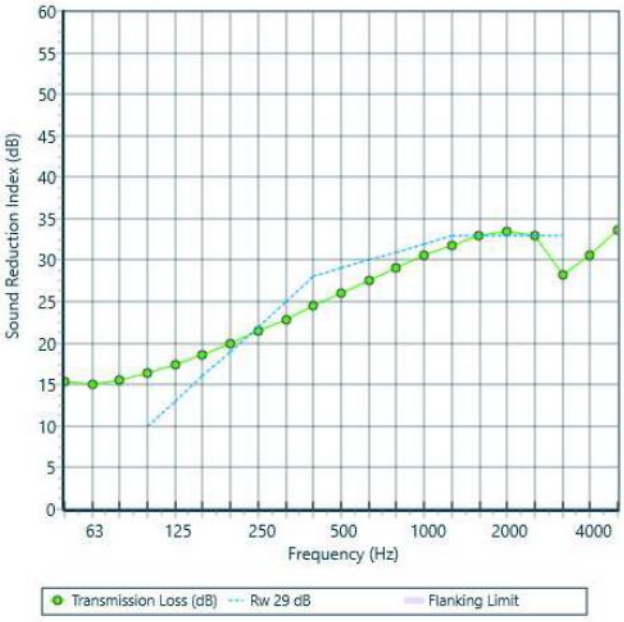
Rw 29 dB
C 0 dB
Ctr -3 dB

Size = 2.0 m x 1.5 m
on surface mass = 24.9 kg/m²

System description

Pane 1 + 1 x 4.0 mm Glass

freq.(Hz)	TL(dB)	TL(dB)
50	15	
63	15	15
80	15	
100	16	
125	17	17
160	19	
200	20	
250	21	21
315	23	
400	24	
500	26	26
630	28	
800	29	
1000	31	30
1250	32	
1600	33	
2000	34	33
2500	33	
3150	28	
4000	31	30
5000	34	



Wall

Sound Insulation Prediction (v9.0.5)

- Key No. 2539
Job Name:
Job No.: Initials:lukeh
Date:18/01/2019
File Name:Brick.ixl

INSUL

Notes:

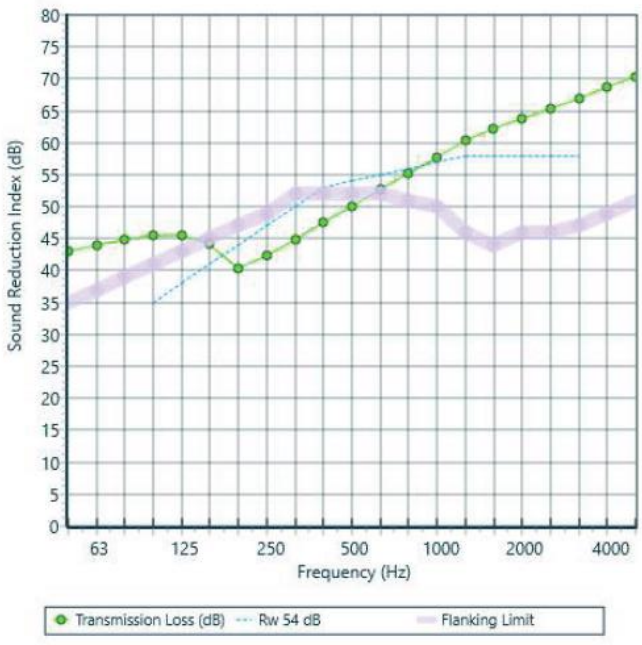
Rw 54 dB
C -1 dB
Ctr -4 dB

Size = 2.7 m x 4.0 m
on surface mass = 448 kg/m²

System description

Panel 1 : 2 x 140.0 mm Brick

freq.(Hz)	TL(dB)	TL(dB)
50	43	
63	44	44
80	45	
100	46	
125	46	45
160	44	
200	40	
250	42	42
315	45	
400	47	
500	50	50
630	53	
800	55	
1000	58	57
1250	60	
1600	62	
2000	64	64
2500	65	
3150	67	
4000	69	68
5000	70	



Appendix G – Noise Breakout Calculations

Classrooms

Noise Breakout Calculation

Description:

Calculation of noise breakout from internal space to external receiver location

1/1 Octave Centre-Freq. Band	Hz	63	125	250	500	1k	2k	4k
Source Noise Level, dB	dB	58.4	64.4	70.4	74.4	70.4	65.4	59.4
R Wall	R, dB	44.0	45.0	42.0	50.0	57.0	64.0	68.0
R Glazing	R, dB	15.0	17.0	21.0	26.0	30.0	33.0	30.0
R Open Window	R, dB	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Comp R	Rcomp, dB	-15.9	-16.3	-16.6	-16.8	-16.8	-16.9	-16.8
Receiver Level	dBZ	25.6	31.2	36.9	40.7	36.7	31.6	25.7
A-Weighting	dB	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0
Receiver Level	dBA	-0.6	15.1	28.3	37.5	36.7	32.8	26.7

Partition & Receiver Details			
S Wall	m2	84.3	
S Glazing	m2	15.8	
S Open Window	m2	2.1	
S Total	m2	102.1	
S Facing Receiver	m2	102.1	
Source > Receiver Distance	m	20.0	
Lw Ground Atten. Factor	dB	-11.0	*-14 Hard Grnd, -11 Soft Grnd*
Source Room Level	dBA	75.0	
Receiver Level	dBA	41.3	

Formula:

$$L_2 = L_1 - SRI + 10Log[S] + 20Log[r] - 14, dB$$

Dining / Assembly Hall

Noise Breakout Calculation

Description:

Calculation of noise breakout from internal space to external receiver location

1/1 Octave Centre-Freq. Band	Hz	63	125	250	500	1k	2k	4k
Source Noise Level, dB	dB	63.4	69.4	75.4	79.4	75.4	70.4	64.4
R Wall	R, dB	44.0	45.0	42.0	50.0	57.0	64.0	68.0
R Glazing	R, dB	15.0	17.0	21.0	26.0	30.0	33.0	30.0
R Open Window	R, dB	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Comp R	Rcomp, dB	-16.4	-16.7	-17.1	-17.3	-17.3	-17.3	-17.3
Receiver Level	dBZ	23.4	29.0	34.7	38.5	34.5	29.4	23.5
A-Weighting	dB	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0
Receiver Level	dBA	-2.8	12.9	26.1	35.3	34.5	30.6	24.5

Partition & Receiver Details			
S Wall	m2	41.3	
S Glazing	m2	6.8	
S Open Window	m2	0.9	
S Total	m2	48.9	
S Facing Receiver	m2	48.9	
Source > Receiver Distance	m	30.0	
Lw Ground Atten. Factor	dB	-11.0	*-14 Hard Grnd, -11 Soft Grnd*
Source Room Level	dBA	80.0	
Receiver Level	dBA	39.1	

Formula:

$$L_2 = L_1 - SRI + 10Log[S] + 20Log[r] - 14, dB$$

PEAK acoustics

Let us introduce ourselves

Peak Acoustics formed in 2011, we are a fully accredited specialist consultancy and testing organisation.

We are a diverse team of Acoustic Consultants, Specialist Engineers and Building Compliance Technicians, with a network spanning the UK. We are proud to offer our services nationally, with no job too big or small.

We provide Acoustic Consultancy, Building Compliance Testing and Energy Services.

Additional Services

We offer an extensive range of services in the sectors of Acoustic Consultancy, Building Compliance & Energy Efficiency. We are able to put together custom packages combining multiple services which saves both time and money for you.

Building Compliance

- **Sound Insulation Testing**
- **Air Tightness Testing**
- **Ventilation Testing**
- **Water Efficiency Calculations**
- **Sound Insulation Specification**

Energy Efficiency

- **SAP Calculations**
- **EPC's**
- **SBEM Calculations**
- **Energy Statements**
- **Sustainability Statements**
- **MEES Regulations**
- **Commercial EPC's**

Acoustic Consultancy

- **Noise Assessment for planning conditions**
- **Construction site noise monitoring**
- **Noise at work assessments**
- **Noise & Vibration Impact Assessments**

Peace of mind

We are accredited and registered by all the relevant major UK authorities to provide the services we offer. Peak Acoustics is UKAS accredited for sound insulation testing, ATTMA registered for Air Leakage Testing. and our Energy team are all Domestic On-Completion Energy Assessors.

OUR ADDED VALUE

We combine our detailed knowledge of building regulations with our technical understanding of building physics, acoustics and environmental sciences to maximise development quality. Our work ensures appropriate strategies and studies are prepared to demonstrate to demonstrate to local authorities how proposed developments will be of high quality and generate acceptable impact on the surrounding environment.

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