



Noise Impact Assessment

Project Reference Number: PA440

Date of Issue: 11/01/18

Client: Umar Faruque

Site: Former Riley's Snooker Hall, Kirkmanshulme Lane, M12
4WB

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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	Umar Faruque
Client Requirement	The client wishes to demonstrate the predicted impact of noise breakout through the unit facade due to the use of the venue as a wedding function hall, inclusive of noise emissions from a PA system. Parking vehicles are also to be considered as an external noise source.
Site details as communicated by client.	The site is in close proximity of a hotel.
Selected Methodology	In order to assess the noise impact of the equipment on the nearest sensitive receptor, Peak Acoustics will undertake measurement and assessment using BS4142:2014.
Methodology Justification	BS4142:2014 is the prescribed standard for assessing fixed plant sources of industrial and commercial noise on residential receptors for the UK. It is noted the assessment standard omits usage for music and entertainment noise sources, however the method of referencing noise emissions in relation to the background noise climate 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	Manchester City Council – Planning & Noise, Technical Guidance 'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (Leq) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq), respectively'.

Assessment Summary

A noise assessment has been undertaken at a Former Riley's Snooker Hall, Kirkmanshulme Lane, M12 4WB. This is to assess the likelihood of noise impact upon a nearby hotel windows at Ground Floor and First Floor level, considering noise breakout through the building envelope due to raised voices from wedding guests and music produced from a PA system within the proposed wedding venue.

Environmental noise levels have been measured on site from 15th – 18th December 2017 to identify the existing background noise levels representative of the Noise Sensitive Receptor within close proximity of the proposed wedding venue. A representative background noise level has been identified as 48.3 dB $L_{A90, 1hr}$, taken from the last proposed operating hour on the 17th December 2017.

It is demonstrated that with the use of noise limits, the breakout through the building façade would be below the background noise level at the NSR location. Currently, a Low Impact has been identified at the NSR due to the breakout through the building façade, therefore mitigation is not deemed necessary. Breakout calculations have been based on plans and material details that have been provided by the client. Noise emissions from parking vehicles have also been calculated to have a Low Impact at the NSR location.

1. Noise Source

- 1.1 The primary internal noise source to be expected on site is noise emissions relating to music through a PA system and raised voices from patrons of the venue. An estimated occupancy has been given as 250 – 300 patrons.
- 1.2 Parking vehicles are considered as an external noise source.
- 1.3 The venue is proposed to be in use at two intervals within a day; 13:00 - 17:00 and 17:00 - 23:00.

2. Subjective Impressions

- 2.1 The current dominant noise source at the nearest Noise Sensitive Receptor (NSR) was identified as road traffic noise, which was inclusive of cars, HGV's and motorbikes travelling along Hyde Road (A57) and Kirkmanshulme Lane.
- 2.2 Secondary noise sources were noted as passing aircraft, emergency service sirens, cars parking in the car park and pedestrians along Kirkmanshulme Lane.

3. Existing Context

- 3.1 The site is currently a vacant commercial unit and the car park is used by members of the public.
- 3.2 The site is in close proximity of the Belle Vue Greyhound Stadium, approximately 120m from the racetrack, which currently hosts races on Friday and Saturday evenings from 18:00 – 23:00. Additional races are also held on Wednesday afternoons from 14:15 and Sunday mornings from 11:00.
- 3.3 The nearest NSR location is shown in **Appendix F**.

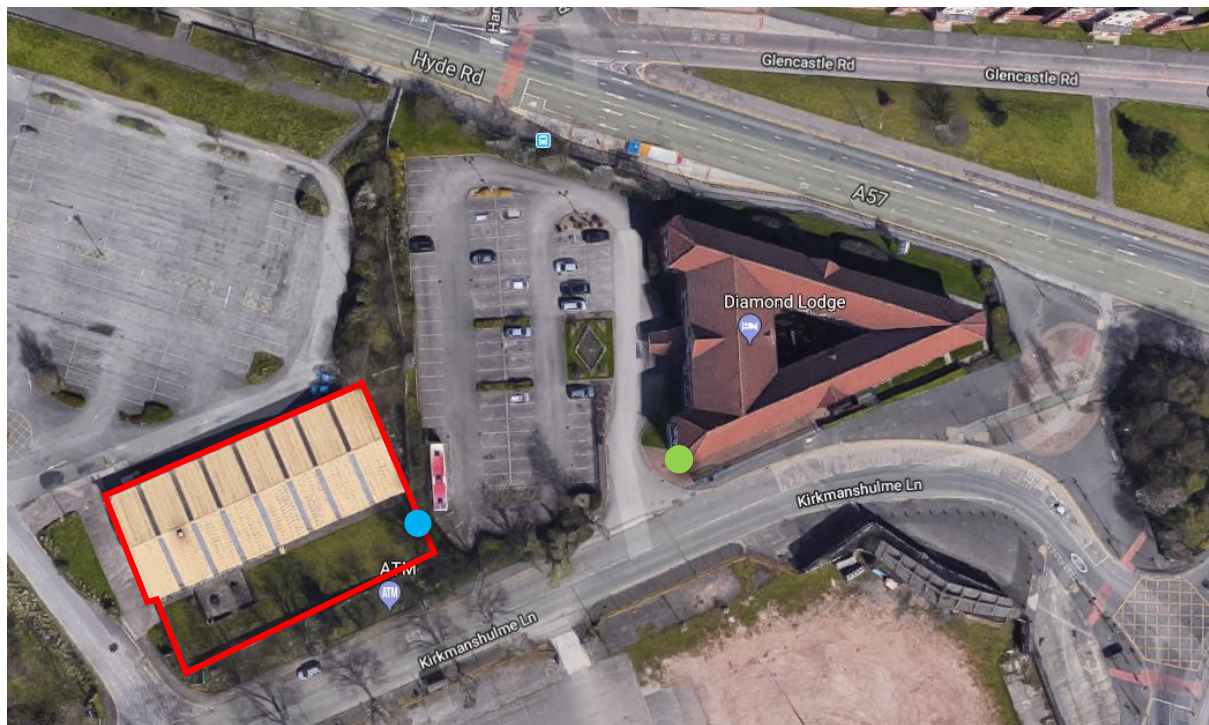
4. NSR Location

- 4.1 The nearest NSR has been identified as ground floor and first floor hotel windows approximately 50m east of the external façade of the proposed development.

5. Measurement Locations

- 5.1 Background noise levels were measured at ground floor level within the garden area of the proposed site.
- 5.2 Measurement locations are indicated in Figure 1 and measurement photographs are shown in **Appendix F**.

Figure 1: Measurement Locations



-  - Background Noise Measurement
-  - Unit Location
-  - NSR 1

6. Measurement Equipment

- 6.1 Measurements were undertaken using a calibrated class 1 sound level meter. 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 0.4 – 1.6 ms⁻¹ SW were measured using a Skywatch Xplorer 1 anemometer; temperatures of 1°C were measured using a TPI 312C thermometer; 0.7mm of precipitation on 15th December 2017. Full meteorological conditions are detailed in **Appendix C**.

8. Measurement Procedure

- 8.1 Background noise levels were measured over a weekend period at a location representative of the nearest NSR location. Daytime and evening noise levels are considered for the assessment.
- 8.2 The background noise levels were measured in 1/1 octave bands in 5-minute logging intervals.

9. Specific Sound Level

The dominant noise source on-site is expected to be raised voices of patrons and background music through the PA system within the proposed development. The noise emitted by parking vehicles within the car park of the proposed development may have further influence at the NSR location.

This report considers the voices and the music individually and a noise limit has been calculated for the music system with a view of maintaining a Low Impact at the NSR location.

9.1 Internal Noise

Internal noise levels are expected in the form of raised voices from patrons within the proposed wedding venue. ANSI 3.5-1997 determines sound levels from such voices to be as follows:

Frequency, Hz	63	125	250	500	1k	2k	4k	Sum, dB L _{Aeq}
1 Raised Voice, L _{eq}	45	56	62	66	62	57	51	69.1

The above noise level has been normalised to give an accumulative noise level of **88.0 dB L_{Aeq}**, deemed to be a worst-case noise level with regards to patron voices within the proposed wedding venue:

Frequency, Hz	63	125	250	500	1k	2k	4k	Sum, dB L _{Aeq}
Normalised Voice Level, L _{eq}	66.4	77.4	83.4	87.4	83.4	78.4	72.4	88.0

Internal noise levels arising from the public-address system is likely to further influence the noise breakout through the building envelope to the NSR location and is therefore considered within this report. A noise limit has been calculated with a view to maintain a Low Impact at the NSR location due

to breakout through the building façade. The following noise limit would ensure noise breakout is at least 10 dB below the current background noise level in each 1/1 octave band from 63Hz – 4kHz.

Sound System Internal Noise Level

Frequency, Hz	63	125	250	500	1k	2k	4k	Sum, dB L _{Aeq}
Sound system, L _{eq}	82	78	76	79	87	82	88	88.0

Calculations can be seen in **Appendix G**.

9.2 External Noise

The noise emitted by parking vehicles has been considered within this report due to the likelihood of increased traffic within the car park located at the front of the site. An assumed 144no. vehicles have been assumed in line with the number of available car parking spaces.

Measurement of a 2009 Vauxhall Astra SRi Turbo was undertaken at a distance of 1m, in order to capture the event level (L_{AE}) of closing/opening doors, parking and driving at low speed.

The L_{AE} parameter is able to combine the sound energy of all of these aspects into a 1-second *event*. This event has been re-calculated in order to derive a continuous level over 1-hour.

Levels of sound from parking vehicles is calculated as follows:

$$\begin{aligned}
 L_{Aeq, 1hr} &= L_{AE} + 10\log(n) - 10\log(t) - 20\log(r) \\
 &= 77.4\text{dB} + 10\log(144 \text{ events}) - 10\log(60\text{sec} \times 60\text{min}) - 20\log(60) \\
 L_{Aeq, 1hr} &= \mathbf{27.9 \text{ dB } L_{Aeq, NSR1}}
 \end{aligned}$$

Sound emissions from parking vehicles have been determined as **27.9 dB L_{Aeq, 1hr} NSR₁** which is 20.4 dB below the background noise level.

Calculations are shown in **Appendix G**.

9.3 The Specific Sound Level

In order to calculate the Specific Sound Level at the NSR, the internal to external breakout has been calculate through the East façade and distance corrected to the nearest NSR location.

Specific Sound Level

Location	Source	Breakout, dB $L_{Aeq, 1hr}$
NSR ₁	Voices	34.5
	Music	34.8

Specific Sound Level due to voices at the nearest NSR is calculated as **34.5 L_{As}** .

Specific Sound Level due to music at the nearest NSR is calculated as **34.8 L_{As}** .

Calculations are shown in **Appendix G**.

11. Background Sound Level

11.1 The background sound level was measured on site at a representative location of the NSR from 15th December 2017, 11:32 to 18th December, 11:07.

11.2 The lowest measured daytime background sound level is tabulated below. Background sound level measurements are shown graphically in **Appendix E**.

Background Sound Levels

	T	dB $L_{Aeq,T}$	dB $L_{A90,T}$
Night-time	22:02-23:02	55.7	48.3

11.3 In addition to the broadband background dB $L_{eq,T}$ noise level criterion, due to the nature of the sound source, a criterion has been set in accordance with MCC criteria for breakout in each octave band to be 10 dB below the measured background noise level in each respective octave band. 1/1 octave band background noise levels have been derived as shown in **Appendix E**.

Octave Band Assessment Criteria

Frequency, Hz	63	125	250	500	1K	2k	4K
dB $L_{A90,1hr}$	49.9	42.9	37.8	37.5	43.1	39.9	28.2

12. Specific Sound Level Vs Background

12.1 The noise impact is tabulated below:

Table 5: Noise Impact

NSR	Sound Level, dB L_{As}	Background, dB $L_{A90,T}$	Difference	Impact
1 (Voices)	34.5	48.3	-13.8	Low
1 (Music)	34.8	48.3	-13.5	Low

12.2 A Low Impact has been identified at the NSR location, therefore mitigation is not deemed necessary.

12.3 In order to achieve the octave band criteria at the NSR location, the following music noise limit must be adhered to:

Music Noise Limit

Frequency, Hz	63	125	250	500	1k	2k	4k	Sum, dB L_{eq}
Music noise limit, L_{eq}	82	78	76	79	87	82	88	92.1

12.4 The noise limit is applicable internally within the building envelope. It may be preferable to mount a limiting device microphone internally at the eastern extent of the building envelope. Such limiters can be supplied, installed and calibrated by Lime Technologies (<https://noiselimiters.co.uk/>).

13. Mitigation

- 13.1 If required, installed external plant equipment as part of the ventilation system should not exceed a sound rating level of **47 dB L_{Ar}** at the NSR location, inclusive of any rating penalties in order to maintain a Low Impact rating.
- 13.2 Any external plant equipment installed as part of the proposal should be assessed in accordance with 'BS4142:2014 – Methods for rating and assessing industrial and commercial sound.'

14. Uncertainty

- 14.1 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.
- 14.2 Internal to external noise breakout calculations consider that the partition resonates equally in each frequency and thus maximises noise transfer across the considered frequency spectrum. In practise, this does not occur, therefore it is likely that a worst-case scenario has been considered through the calculation method.
- 14.3 Uncertainty can arise when a calculated method, such as distance correction and noise level summation, is used to determine an overall noise level at a NSR location, however it is an accepted method when specific noise sources on site cannot be accurately measured.
- 14.4 Uncertainty is offset via assessing noise levels to the lowest measured background noise level.

Appendix A - Measurement Details

Measurement	Kit	Start Date	Start Time	End Date	End Time
M1	A3	15/12/17	11:32	18/12/17	11:07

Appendix B - Equipment Details

Kit	Equipment	Make	Model	Class	Serial Number
A3	Sound Meter	Svantek	971	1	41980
A3	Pre-Amp	Svantek	SV18	1	44331
A3	Calibrator	Svantek	SV31	1	32507

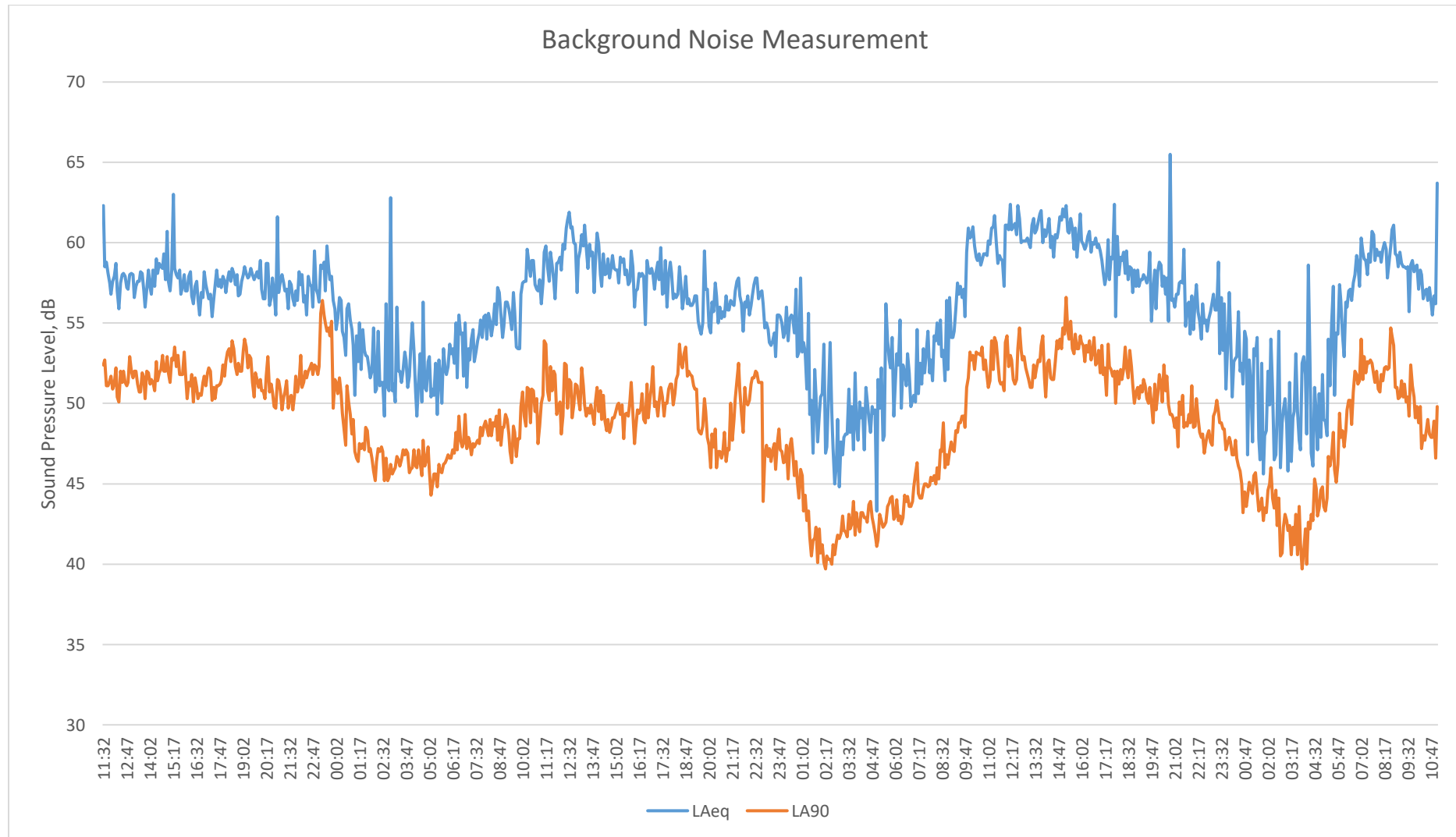
Appendix C - Meteorology Details

Measurement	Temp C	Wind Speed m/s	Wind Direction	Humidity %	Precipitation mm	Cloud Cover (Oktas)
M1 Setup	2	0.4	WSW	92	0.7	8/8
M1 Collect	2	1.6	W	81	0.5	8/8

Appendix D - Calibration Details

Measurement	Calibrator Ref Level (dB)	Level Before (dB)	Deviation Before (dB)	Level After (dB)	Deviation After (dB)
M1	114.0	113.71	0.29	112.66	0.34

Appendix E – Noise Measurement Details



1/1 Octave Band Background Noise Level Derivation

Levels Listed from Highest to Lowest as measured from 22:00 – 23:00, dB Leq

#	63 Hz	125 Hz	250	500	1k	2k	4k
1	60.9	56.4	51.2	49.9	54.8	51.1	39.5
2	62.8	56.3	49.3	49.3	53.4	48.5	38.4
3	63.1	55.2	49.3	49.2	53.7	49.3	40.2
4	61.5	55.1	49.2	49.1	53.9	49.6	39.3
5	61.6	54.8	49.1	49.6	54	49.2	39.5
6	63.9	54.1	49	48.9	52.5	48	40.4
7	59	54	48.8	48.6	52.7	48.6	39.1
8	60.3	53.8	48.6	48.5	52.2	47.3	37.5
9	60.3	53.5	48.3	48	52.1	47.5	37.9
10	60.4	53.4	48	47.5	51.5	47.1	37.6
11	61.3	53.1	48	48.4	52.7	48.6	38.8
12	59.9	52.9	47.8	47.5	53.1	49.9	38.2
13	60.8	51.6	47.4	47.8	52.6	48.4	38.6

90th percentile = No. Records * 0.9 = 11.7 ≈ 12

Appendix F – Measurement Photographs



- - Measurement Location
- - NSR location

Appendix G– Noise Breakout Calculations

Voice

Voice	63.00	125.00	250.00	500.00	1k	2k	4k
Source	66.43	77.43	83.43	87.43	83.43	78.43	72.43
Cladding	12.0	15.0	19.0	23.0	24.0	22.0	40.0
Brick	38.0	42.0	43.0	38.0	46.0	54.0	61.0
Doors	20.0	24.0	26.0	21.0	28.0	36.0	45.0
Comp R	-16.9	-20.0	-23.9	-26.8	-28.7	-27.0	-44.8
Breakout	34.3	42.3	44.4	45.4	39.5	36.2	12.5
A-Weighting	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0
	8.1	26.2	35.8	42.2	39.5	37.4	13.5
Breakout Sum	34.5						
S1	25						
S2	51						
S3	4.2						
S Total	80.2						
S Facing NSR	80.2						

Source - Rec.	50
Noise Source	90.6

Music

Music	63	125	250	500	1k	2k	4k
Noise Limit	82	78	76	79	87	82	88
Cladding	12.0	15.0	19.0	23.0	24.0	22.0	40.0
Brick	38.0	42.0	43.0	38.0	46.0	54.0	61.0
Doors	20.0	24.0	26.0	21.0	28.0	36.0	45.0
Comp R	-16.9	-20.0	-23.9	-26.8	-28.7	-27.0	-44.8
Breakout	49.9	42.9	36.9	37.0	43.1	39.8	28.1
A-Weighting	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0
	23.7	26.8	28.3	33.8	43.1	41.0	29.1

Breakout Sum	34.8
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S1	25
S2	51
S3	4.2
S Total	80.2
S Facing NSR	80.2

Source - Rec.	50
Noise Source	92.1

Voice Normalisation

Freq, Hz	63	125	250	500	1k	2k	4k	Sum
1 Raised Voice, Leq	45.0	56.0	62.0	66.0	62.0	57.0	51.0	69.1
A weight	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	
1 Raised Voice, LAeq	18.8	39.9	53.4	62.8	62.0	58.2	52.0	66.6
Normalised Voice, LAeq	40.2	61.3	74.8	84.2	83.4	79.6	73.4	88.0
Normalised Voice, Leq	66.4	77.4	83.4	87.4	83.4	78.4	72.4	88.0

Music Limit Calculation

Freq, Hz	63.0	125.0	250.0	500.0	1k	2k	4k	Sum
Limit Leq	82.0	78.0	76.0	79.0	87.0	82.0	88.0	92.1
A weight	-26.2	-16.1	-8.6	-3.2	0.0	1.2	1.0	
Limit LAeq	55.8	61.9	67.4	75.8	87.0	83.2	89.0	91.9

Appendix H – Insulation Details

Roof Specification

Sound Insulation Prediction (v9.0.5)

Program copyright Marshall Day Acoustics 2017.

Key No. 2539

Job Name:

Job No.:

Date: 08/01/2018

File Name: insul ceiling.id

Initials: corin



Notes:



Rw 24 dB
C -1 dB
Ctr -2 dB

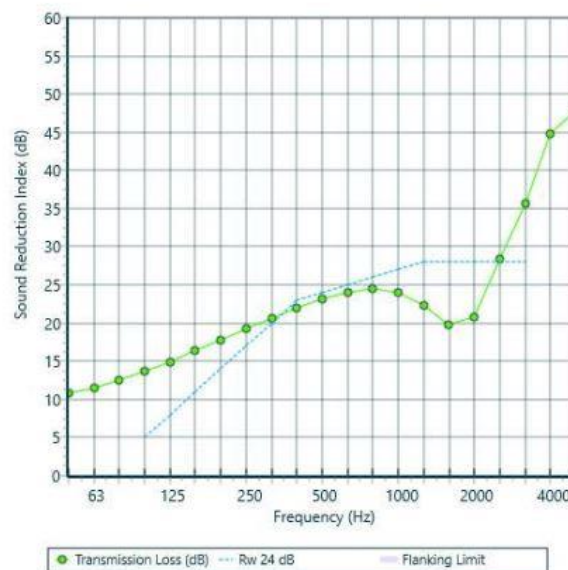
Size = 2.7 m x 4.0 m

on surface mass = 8.96 kg/m²

System description

Panel 1 : 1 x 29.9 mm Kingspan KS1000 RW 30/40mm

freq.(Hz)	TL(dB)	TL(dB)
50	11	
63	12	12
80	12	
100	14	
125	15	15
160	16	
200	18	
250	19	19
315	21	
400	22	
500	23	23
630	24	
800	24	
1000	24	24
1250	22	
1600	20	
2000	21	22
2500	28	
3150	36	
4000	45	40
5000	48	



Brick Wall

Sound Insulation Prediction (v9.0.1)

Program copyright Marshall Day Acoustics 2017

Key No. 2539

Job Name:

Job No.:

Date: 19/12/2017

File Name: 140m brick.m

Initials: tim

Notes:



Rw 46 dB
C -1 dB
Ctr -3 dB
Dntw 48 dB
[v.50m3] [A.11m2]

Size = 2.7 m x 4.0 m

on surface mass = 224 kg/m²

System description

Panel 1 : 2 x 70.0 mm Brick

freq.(Hz)	TL(dB)	TL(dB)
50	37	
63	38	38
80	40	
100	41	
125	42	42
160	43	
200	44	
250	44	43
315	41	
400	36	
500	39	38
630	41	
800	44	
1000	46	46
1250	49	
1600	52	
2000	54	54
2500	57	
3150	59	
4000	61	61
5000	62	

