njd
Environmental Associates

Noise Assessment

Sedgefield House Farm

March 2023

Stuart and Catherine Tweddle

Noise Assessment

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Client: **Stuart and Catherine Tweddle**

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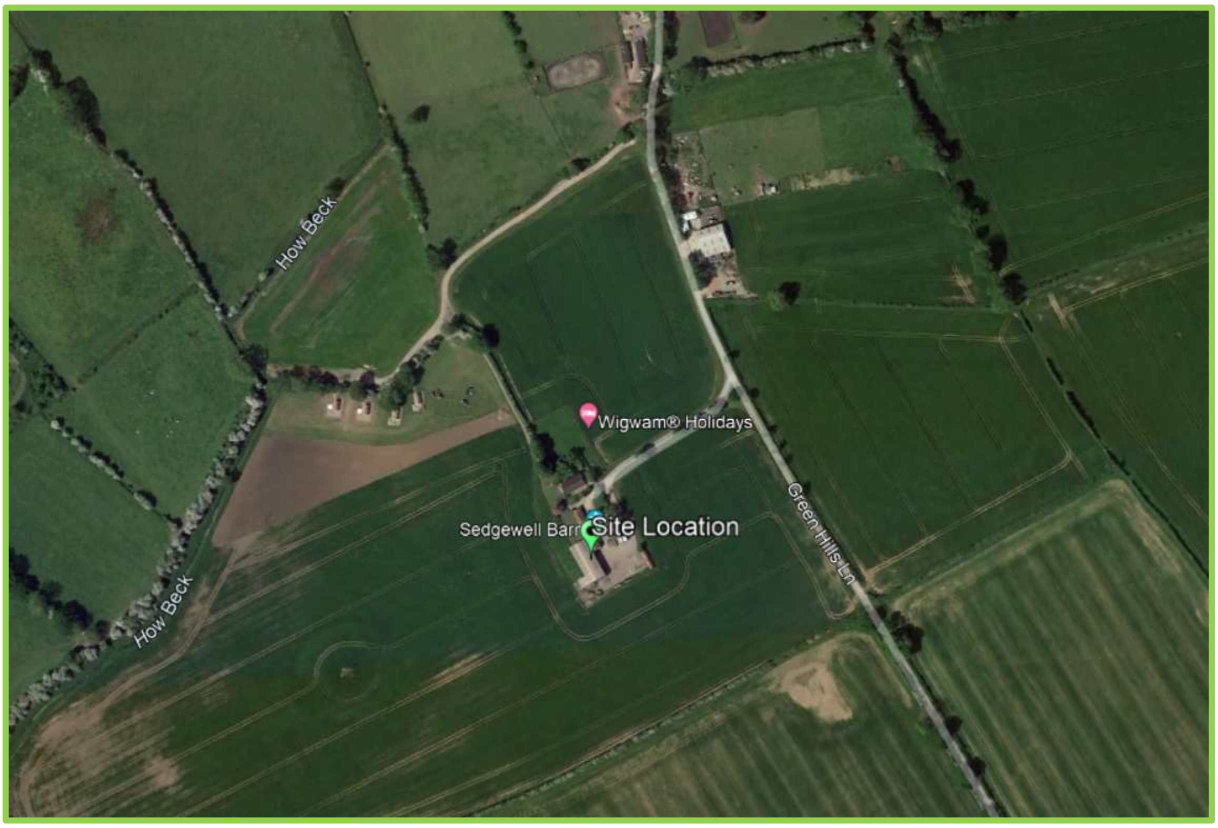
1 INTRODUCTION

1.1 Background

1.1.1 NJD Environmental Associates LTD was instructed by Stuart and Catherine Tweddle to provide a noise assessment to accompany a change of use application for an events venue.

1.1.2 The site location is provided below in Drawing 1.



Drawing 1: Site location

1.1.3 The report has been prepared with sound insulation of the building facades and the reverberation time inside the buildings determined from on-site measurements. Calculations have been performed and the results interpreted in accordance with the relevant standards.

1.1.4 Music noise measurements have been adopted from a representative site and calculations have been performed using noise modelling software.

1.1.5 Comparisons have been made to the prevailing background noise measurements taken in the vicinity of noise sensitive receptor locations.

1.1.6 A scheme of mitigation and recommended improvements has been provided in order to achieve the most relevant criteria and minimise any noise impacts resulting from events at the venue.

2 PLANNING POLICY AND GUIDANCE

2.1 National Planning Policy Framework (NPPF)

2.1.1 The revised NPPF published in July 2021 provides the following with regards to noise, set out at paragraph 185:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.

In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

2.1.2 It is clear that the NPPF seeks to limit the exposure of new development to unacceptable levels of noise, although the policy does not seek to prescribe what constitutes an unacceptable level of noise.

2.2 Noise Policy Statement for England (NPSE)

2.2.1 The Department for Environment, Food and Rural Affairs (DEFRA) published the NPSE in March 2010.

2.2.2 The explanatory note of NPSE defines the terms used in the NPPF:

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

'Significant adverse' and 'adverse;

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

<u>NOEL – No Observed Effect Level</u>

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.

<u>LOAEL – Lowest Observed Adverse Effect Level</u>

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

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

<u>SOAEL – Significant Observed Adverse Effect Level</u>

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

2.2.3 The NPSE does not define the SOAEL numerically, stating at paragraph 2.22:

"2.22 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."

2.2.4 There is no local or national guidance on how the three terms should be defined numerically, it is for the assessor to collate and interpret appropriate guidance on noise, such as may be found in British Standards, and correlate the guidance with the concepts of NOEL, LOAEL and SOAEL.

2.3 Planning Practice Guidance: Noise (PPGN)

2.3.1 In March 2014, the Government released the PPG on noise. This document sets out a number of principles and reinforces the guidance set out in the NPPF and NPSE.

2.3.2 Paragraph 001 of PPGN notes that:

"Noise needs to be considered when new development may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."

2.3.3 It goes on to note in paragraph 003 that:

"Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved."*

2.3.4 The PPGN broadly repeats the NPSE definitions of the NOEL, LOAEL AND SOAEL and it provides a summary table to explain how the terms relate to each other and to typical human response to sound. The table is replicated below in Table 1.

Table 1: PPGN Noise Exposure Hierarchy			
Perception	**Examples of Outcome**	**Increasing Effect Level**	**Action**
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Present and intrusive	Noise can be heard and small changes in behaviour and/or attitude, e.g. turning up volume of televisions; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the areas such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory or non-auditory	Unacceptable Adverse Effect	Prevent

2.3.5 The PPGN provides advice on how to mitigate the effects of noise, noting that there are options to reduce noise at source, to optimise site layouts and to use planning conditions.

3 ASSESSMENT METHODOLOGY

3.1 MNL Breakout at Nearby Receptors

3.1.1 Discussions have been held HDC with in order to determine a suitable methodology for the assessment of music noise breakout from the venue.

3.1.2 HDC has requested that the MNL be compared to the measured background noise level during the night-time period (2300 to 0700h), albeit no entertainment noise is proposed during these hours.

3.1.3 The limit therefore agreed for music noise breakout at the nearby receptors is as follows:

- The MNL during events shall not exceed the measured background LA90 at external areas of any existing residential dwelling.

3.1.4 The Noise Council 'Code of Practice on the Control of Noise from Concerts' (Pop Code) outlines that for venues hosting events more than 12 times per year, the MNL should not exceed the LA90,1h by more than 5dB in any 15-minute period. The agreed methodology is therefore more stringent than the requirements of the Pop Code.

3.1.5 The Code of Practice (Good Practice Guide) on the Control of Noise from Pubs and Clubs was issued in 2002 in draft, and has never officially been published or adopted.

3.2 Patron Noise

3.2.1 Noise associated with guests using the courtyard area of the development during events has been considered. The assessment methodology is based upon published noise levels associated with people vocalising at different levels.

3.2.2 The levels have been modelled using CadnaA, with the resultant levels evaluated at the receptor locations through comparison with measured background noise levels.

3.3 Road Traffic Noise

3.3.1 The proposals include the development of a new access road that will replace the existing access off Green Hill Lane to the north.

3.3.2 Noise from this source has been evaluated using traffic data derived from previous events at the venue. The assessment has considered a 1-hour 'peak' scenario, with CadnaA used to model the resultant levels to the existing receptor locations, and comparisons made to the prevailing baseline conditions in accordance with the Design Manual for Roads and Bridges 'LA 111 Noise and vibration' (2020) methodology.

3.4 Reverberation Time Within Venue

3.4.1 Section 7 of BS8233 states the following in relation to reverberation time:

"As well as internal ambient noise level, the reverberation time, T, measured in seconds (s), should also be considered because it affects the noise level in the space, and also affects the clarity of speech and the warmth of music. Even where good speech conditions are not paramount, an excessively long reverberation time accentuates the background noise and can reduce the clarity of public address announcements.

General guidance on designing rooms for speech (e.g meeting rooms) is given in 7.7.10, although the acoustic design of auditoria is a specialized subject and is beyond the scope of this British Standard."

3.4.2 No specific criteria are outlined in 7.7.10, only general advice for design. Therefore, in the absence of any criteria within BS8233, it is proposed that the new build criteria within Building Bulletin 93 (BB93) is the most appropriate for this type of development.

3.4.3 Reverberation Time (RT) is presented in terms of the mid-frequency time, Tmf, which is the mean average of the reverberation time in 500hz, 1kHz and 2kHz octave bands.

3.4.4 It is considered that the most appropriate equivalent would be a 'performance/recital room'. The room needs to be 'live' enough for performances but also not too reverberant to effect speech intelligibility during lunches / dinners.

Table 2: BB93 Reverberation Criteria

Room	BB93 Room Type Equivalent	Reverberation Time Limit Tmf (seconds)	Requirement
Rustic Barn	Performance/recital room	≈1.0 – 1.5	Advisory
Celebration Barn	Performance/recital room	≈1.0 – 1.5	Advisory

3.4.5 It should be noted that the values within BB93 are for rooms that are furnished for normal use. Adding additional dining chairs and tables may marginally alter the results presented within this report.

4 BASELINE NOISE SURVEY

4.1 Introduction

4.1.1 Between the 12th and 14th August 2022, noise measurements were taken in the vicinity of the development site in order to determine representative background noise levels at the nearest existing noise sensitive receptor (ESR) locations.

4.1.2 Measurements were taken using Acoem Fusion sound level meters. The Class 1 instruments logged 1/3 octave levels throughout the measurements, in addition to audio recordings to aid subsequent analysis. The instruments were calibrated before and after the measurements to a reference level of 94dB, with no notable drift observed.

4.1.3 The sound level meters (SN: 11763 and SN: 14360) and field calibrator (SN: 34675377) all hold valid calibration certificates traceable to national standards, compliant with the requirements of BS7445. All calibration certificates are provided at Appendix 5.

4.2 Monitoring Locations

4.2.1 Measurements were taken at the locations shown in Drawing 2 below, following the guidance contained within BS7445.

Drawing 2: Noise monitoring locations

4.2.2 The monitoring locations were as follows:

- **ML1:** Located towards the north-east of the site, in an area of trees and vegetation considered to be the closest accessible location to the noise sensitive receptors off Warlaby Lane, where equipment could be securely deployed unattended.

  The measurement took place during the following dates and times:
  - 1300h on the 12th August, to 2300h on the 14th August 2022.

- **ML2:** Located towards the north-west of the site, in an area of trees and vegetation considered to be the closest accessible location to the noise sensitive receptors at Ainderby Steeple village, where equipment could be securely deployed unattended.

The measurement took place during the following dates and times:

- 1300h on the 12th August, to 2300h on the 14th August 2022.

4.2.3 The microphones and pre-amps were mounted approximately 1.5m above ground level in free field conditions, equipped with manufacturer supplied windshield and nose cone.

4.2.4 The acoustic environment was found to be primarily influenced by distant road traffic noise, occasional military aircraft movements and activities at nearby farms.

4.2.5 Weather conditions throughout the survey were favourable; with windspeeds typically between 2 to 4ms^{-1} from the north and east, with no periods of rainfall noted.

Uncertainties

4.2.6 Background noise measurements have been undertaken with high precision Class 1 instruments calibrated before and after the survey by an appropriately qualified and experienced technician.

4.2.7 The noise monitoring data has been recorded across a weekend period during the school summer holidays, where existing background and ambient noise levels should generally be lower.

4.2.8 The noise models presented in this assessment calculate noise propagation to the methodologies contained within ISO 9613-2 Acoustic – Attenuation of sound during propagation outdoors. This gives a higher level of accuracy for the level of attenuation provided by intervening topography and barriers than the method provided by BS5228.

4.2.9 Whilst an element of uncertainty will inherently exist in any noise assessment due to the large number of potential variables, all reasonable steps have been taken to reduce this, as outlined above.

4.2.10 As such, the level of uncertainty should not be significant and the results and conclusions should be considered robust.

4.3 Existing Noise Levels

4.3.1 The noise levels from the identified monitoring locations are summarised in Tables 3 and 4 below.

Table 3: Summary of measured noise levels at ML1 (dBA)						
Date	Daytime (0700 – 2300h)		Evening (1900 to 2300h)		Night-time (2300 – 0700h)	
	LAeq	LA90	LAeq	LA90	LAeq	LA90
Friday 12th Aug	44	30	42	28	36	24
Saturday 13th Aug	41	32	38	33	35	25
Sunday 14th Aug	41	30	40	30	n/a	n/a

Table 4: Summary of measured noise levels at ML2 (dBA)						
Date	Daytime (0700 – 2300h)		Evening (1900 to 2300h)		Night-time (2300 – 0700h)	
	LAeq	LA90	LAeq	LA90	LAeq	LA90
Friday 12th Aug	41	31	40	30	38	26
Saturday 13th Aug	38	31	36	30	34	21
Sunday 14th Aug	38	30	39	29	n/a	n/a

4.3.2 During the baseline monitoring on Saturday 13th August 2022, a wedding took place at Sedgewell Barn. The intention was therefore to discount this period from the dataset; however, following review of the data it was found that the resultant levels were consistent across the full weekend, and indeed during the daytime and evening periods on Saturday 13th, the LAeq at both ML1 and ML2 was actually equal to or lower than the corresponding periods on the 12th and 14th August, suggesting that noise from the event was not significant.

4.3.3 Full details of the measurements are presented in Appendix 1.

5 SOUND INSULATION MEASUREMENT METHODOLOGY

5.1.1 On-site measurements have been performed to determine the sound insulation of each façade and roof of both the 'Rustic' and 'Celebration' Barns.

5.1.2 The Standardized Difference Level (Dls,2m,nT) of each elevation has been determined in accordance with the requirements of BS EN ISO 16283-3 (2016) *'Acoustics – Field measurements of sound insulation in buildings and of building elements: Façade sound insulation'*.

5.1.3 The process was conducted for all available facades, with an external loudspeaker used as the sound source. For each test a microphone was positioned 2m from the external façade of the building, and another in the corresponding receiving room of the building.

5.1.4 Measurements were taken concurrently; with at least 5no. positions selected in the receiving room at fixed positions following the criteria stipulated in the guidance.

5.1.5 The reverberation time was measured in each room using an interrupted signal, with a minimum of 2no. fixed source positions per room, and 5no. measurement positions per speaker position.

5.1.6 Noise breakout from the roof was measured using an internally positioned loudspeaker, and a microphone positioned externally at approximately 1m from the roof.

6 REVERBERATION TIME

6.1.1 The detailed reverberation time measurements are shown within Appendix 2 and are summarised within Table 5 below. The Table identifies whether the internal space will achieve the advisory criteria as outlined within Table 2 above.

Table 5: Summary of Measured Reverberation Time

No. Tests	Room	Measured Average Reverberation Time (s)	Advisory Time	Advisory Level Achieved?
15	Celebration Barn	2.7	≈1.0 – 1.5	No
6	Rustic Barn	0.9	≈1.0 – 1.5	Yes

6.1.2 As shown, the approximate advisory criteria are sufficiently achieved within the Rustic Barn, however within the Celebration Barn, the reverberation time is considered to be too long and therefore may result in unsuitable conditions for performance and/or speech intelligibility.

6.1.3 Currently, the Celebration Barn is finished with solid concrete flooring, a fibre cement roof and a mixture of wooden and glazed facades elements.

6.1.4 Calculations have been undertaken using Sabine's formula method to calculate the necessary absorption required to achieve the relevant reverberation criteria.

6.1.5 The simplest way to increase the absorption within the space would be to add to the floor and ceiling area (as these are the largest, continuous areas). It is recommended that a 'thin carpet' should be applied to the floor and a certain amount of Class C absorber added to the finished ceiling.

6.1.6 Typical absorption coefficients are presented within Table 6 below.

Table 6: Typical Absorption Data

Absorber	Octave-band Centre Frequency Absorption Co-efficient, a (Sabine m2)					Source
	250 Hz	500 Hz	1 kHz	2kHz	4kHz	
Fibre Cement	0.03	0.03	0.03	0.03	0.04	PTB
Concrete Floor	0.03	0.05	0.02	0.02	0.02	PTB
Class C Absorber	0.00	0.20	0.40	0.60	0.60	BS11654
Thin Carpet	0.04	0.08	0.20	0.35	0.40	PTB

6.1.7 'Class C absorber' covers a wide range of soft to medium products that could be positioned on the ceiling. The performance of the products may differ slightly from those assumed in calculations. Table 7 below presents the Sabine's Calculation.

Table 7: RT Calculation

Floor Area m²	255.0						
Ceiling Area m²	271.7						
Element	**Octave-band absorption coefficient Hz**						**Area (m²)**
	125	**250**	**500**	**1000**	**2000**	**4000**	
Thin Carpet	0.02	0.04	0.08	0.20	0.35	0.40	255.0
Painted Plasterboard	0.02	0.02	0.02	0.02	0.02	0.02	146.7
Required Class C Absorber	0.20	0.40	0.60	0.60	0.60	0.50	**225.0**
Total Area (m²)							626.7
Reverberation Calculation							
Reverberation Time (s)		2.33	1.52	1.27	1.06	1.10	**1.46**
$T_{250Hz-4kHz}$ (s)		2.33	1.52	1.27	1.06	1.10	**1.46**
T_{mf} (s)			1.52	1.27	1.06		**1.28**

6.1.8 As shown above, with the floor area covered in a thin carpet and 225m² of class C absorber attached to the ceiling, the RT time will be reduced to be within the advisory level of circa 1.0 – 1.5s.

6.1.9 Reverberation could be further reduced (if desired) through the introduction of wall mounted acoustic baffles, with example products identified in Appendix 3.

6.1.10 It should be noted that any improvement in reverberation time would be of primary benefit to the acoustic performance of the space for the purpose of speech intelligibility and/or enjoyment of entertainment noise. This element is therefore not critical for the control of noise breakout from the structures, but may have some minor benefit for that purpose.

7 ASSESSMENT OF MNL BREAKOUT

7.1 Source Noise Level

7.1.1 During a meeting with HDC on the 1st February 2023, discussions were held with the EHO in order to confirm the use of surrogate archive data for the purpose of the assessment.

7.1.2 The data is derived from a wedding/function venue at Bowburn Hall in County Durham.

7.1.3 Measurements were taken using an Acoem 01dB Fusion sound level meter. The Class 1 instrument logged 1/3 octave levels throughout the measurement, in addition to audio recordings to aid subsequent analysis. The instrument was calibrated before and after the measurements to a reference level of 94dB, with no notable drift observed.

7.1.4 The microphone was mounted on a tripod 1.2m above the floor, at a static position approximately 1m away from the façade inside the dancehall, and approximately 4m from the nearest speaker. The position was selected to be representative of the internal reverberant music noise level at the façade overlooking the nearest receptor location.

7.1.5 As part of the assessment, the DJ was asked to play a range of songs that could be typically expected to be played during an entertainment event.

7.1.6 The songs played were as follows:

- 9 to 5 – Dolly Parton
- Uptown Funk – Mark Ronson
- I'm in the Mood for Dancing – The Nolans
- Blurred Lines – Robin Thicke
- More than Friends – James Hype
- Angie – Rolling Stones

7.1.7 The music played reflects a range of different styles and genres, with certain songs particularly noteworthy for their low frequency content.

7.1.8 The equipment used by the DJ was as follows:

- Speakers (x2): Eminence PX2:3K5
- Amplifier: Crown Macro-tech 2402
- Mixing Deck: Denon DJ

7.1.9 The DJ confirmed that the music was being played at a level and set-up that was representative of a normal event.

7.1.10 The continuous music noise level (MNL) throughout the 22-minute measurement is shown in Tables 8 and 9 below. The results are shown as both a weighted LAeq, and also separated into linear 1/1 octave levels for use in the noise modelling exercise.

Data type	Leq		
Weighting	A		
Start	10/16/2017 12:41:45 PM		
End	10/16/2017 1:05:07 PM		
Source	Leq specific dB	Lmax dB	Duration cumulated h:min:s
Music Noise	84.7	91.4	00:22:09

Channel	Type	Wght	Unit	Leq
MY_LOC	Oct 8Hz	Lin	dB	59.6
MY_LOC	Oct 16Hz	Lin	dB	59.6
MY_LOC	Oct 31.5Hz	Lin	dB	64.3
MY_LOC	Oct 63Hz	Lin	dB	82.5
MY_LOC	Oct 125Hz	Lin	dB	85.4
MY_LOC	Oct 250Hz	Lin	dB	88.7
MY_LOC	Oct 500Hz	Lin	dB	85.0
MY_LOC	Oct 1kHz	Lin	dB	77.2
MY_LOC	Oct 2kHz	Lin	dB	70.1
MY_LOC	Oct 4kHz	Lin	dB	65.1

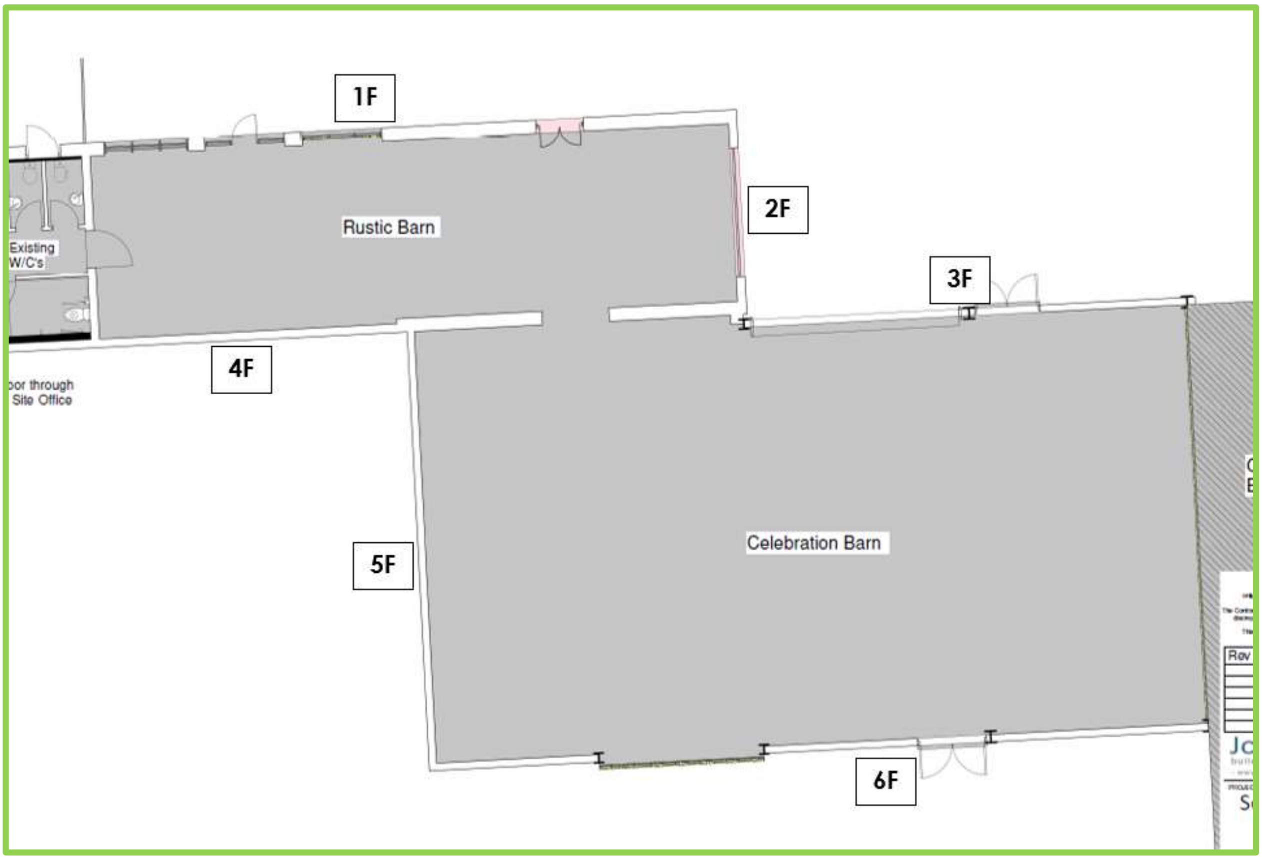
Tables 8 and 9: A-weighted Leq, and linear octave levels measured inside the dancehall

7.2 Existing Performance of Structure

7.2.1 The detailed calculations for each facade assessed are shown in Appendix 4, which includes notes of any specific conditions that were encountered during the survey. Table 10 summarises the Dls,2m,nT for each measured façade, with Drawing 3 showing the positions of each facade / test.

Table 10: Measured Sound Insulation of External Facades and Roofs

Façade Ref	Dls,2m,nT (dB) Hz														
	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500
Rustic Barn															
1F	19.3	21.5	26.0	24.6	19.4	25.0	28.3	27.7	27.9	26.1	21.8	25.1	31.5	34.3	31.0
2F	7.6	15.0	16.8	16.7	14.6	15.9	16.0	17.6	19.4	22.4	22.5	18.2	21.8	24.3	26.4
4F	31.1	33.1	30.3	31.1	30.1	29.2	32.2	37.7	39.8	37.3	37.2	33.9	38.2	37.6	39.1
Roof	18.0	17.2	21.8	20.3	21.7	26.2	26.6	27.4	26.1	27.6	27.1	24.7	26.0	26.7	27.7
Celebration Barn															
3F	15.8	7.3	13.9	22.5	22.7	22.6	22.0	25.6	25.9	25.8	21.3	21.2	29.5	31.0	26.9
5F	16.0	23.6	27.0	26.3	24.4	30.7	31.3	33.1	31.5	29.9	26.4	27.5	29.1	27.5	27.7
6F	21.1	22.8	22.6	21.8	23.0	25.0	24.3	23.7	25.6	23.6	17.1	18.2	24.9	26.3	28.4
Roof	13.6	18.1	19.1	23.9	24.7	27.4	27.2	27.7	28.5	29.5	31.1	31.3	31.7	34.6	34.7



Drawing 3: Façade Measurements

7.2.2 It should be noted that the northern façade of the Rustic Barn could not be tested as this was above the existing site office. As worst-case, the model has assumed that this façade will perform the same as 4F given they are both predominantly of a brickwork construction.

7.2.3 The measured attenuation has then been applied within CadnaA noise prediction software to determine noise breakout and propagation from the structures.

7.2.4 The resultant external noise levels at the nearest existing receptors are summarised within Table 11 below with MNL breakout shown within Figure 1.

7.2.5 In response to Local Authority requirements, the broadband MNL has also been calculated in order to perform comparisons with the measured background noise levels.

Table 11: Resultant External Noise level at nearest ESR's (as built)								
ESR Location	Noise Level Contribution (dB) in Each Octave (Hz)							Broadband Level
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	dB LAeq
ESR1	42.5	31.7	27.9	19.9	12.1	0.0	10.1	24
ESR2	41.7	23.9	21.6	15.4	10.7	0.0	0.0	20
ESR3	35.4	22.7	19.6	12.5	6.0	0.0	0.0	16
ESR4	43.1	26.4	23.2	16.7	12.4	0.0	0.0	21

7.2.6 The ISO 16283-3 standard provides data with the 125 to 2000k Hz range, and therefore no attenuation is provided in the modelling for levels outside this range for the 'as built' scenario (i.e. source levels at 63Hz and 4kHzare assumed to propagate freely from the structures).

7.3 Proposed Performance of Structure

7.3.1 The resultant breakout from the structure with the proposed mitigation measures (as outlined in subsequent Sections) has been evaluated.

7.3.2 A further model has therefore been developed to consider this scenario (Figure 2). The proposed enhancements include the following:

- Patio door on eastern elevation of Celebration Barn (replacing existing shutter door, which is the weakest element)
- Eastern elevation of Celebration Barn enhanced with a second layer of Yorkshire Board, infilled with rockwool insulation.
- Western elevation of Celebration Barn (from south up to existing patio doors) enhanced with a second layer of Yorkshire Board, infilled with rockwool insulation.
- Full roof of Celebration Barn internally boxed-off below rafters with Soundbloc plasterboard and infilled with rockwool insulation.

7.3.3 Noise breakout from the structure has been evaluated using measured data for any retained elements, and Insul predictions for any upgraded elements.

7.3.4 The resultant external noise levels at the nearest existing receptors are summarised within Table 12 below with MNL breakout shown within Figure 2.

7.3.5 A precautionary correction of +6dB (i.e. above the levels derived from the model presented in Figure 2) has been applied to the predicted levels to account for quality of workmanship that may reduce the predicted performance of the proposed build-ups.

Table 12: Resultant External Noise level at nearest ESR's (as proposed)								
ESR Location	**Noise Level Contribution (dB) in Each Octave (Hz)**							**Broadband Level**
	63Hz	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**dB LAeq**
ESR1	37	31	20	10	3	0	1	18
ESR2	33	28	20	13	3	0	0	17
ESR3	29	25	17	8	0	0	0	13
ESR4	34	30	16	8	4	0	0	18

7.4 Noise Rating Curve Assessment

7.4.1 In order to evaluate the resultant noise levels at receptor locations across different frequencies, it is recommended that the assessment should aim to demonstrate compliance with the NR20 curve inside the nearest ESR location with receptor windows partially open for ventilation.

7.4.2 For the purpose of this assessment, it is assumed with reference to WHO1999, that a partially open residential window will achieve approximately 15dB of attenuation across each octave assessed.

7.4.3 Using the correction for an open window as described above, the noise rating curve assessment is shown in Tables 13 and 14 below for the 'as proposed' scenario. As outlined in the previous Section, a precautionary +6dB correction has been applied across each octave to account for the quality of workmanship.

7.4.4 ESR1 is closest to the venue, however in this scenario ESR4 was found to experience similar noise impact from the calculated levels. The NR assessment has therefore considered both receptor locations.

Table 13: NR20 Curve Assessment at ESR1 (dB)							
Description	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**
Linear External MNL at ESR1	37	31	20	10	3	0	1
Attenuation Open Window	-15	-15	-15	-15	-15	-15	-15
Linear Internal MNL at ESR1	22	16	5	0	0	0	0
NR20 Levels	51.3	39.4	30.6	24.3	20.0	16.8	14.4
NR20 Achieved?	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

Table 14: NR20 Curve Assessment at ESR4 (dB)							
Description	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**
Linear External MNL at ESR4	34	30	16	8	4	0	0
Attenuation Open Window	-15	-15	-15	-15	-15	-15	-15
Linear Internal MNL at ESR4	19	15	1	0	0	0	0
NR20 Levels	51.3	39.4	30.6	24.3	20.0	16.8	14.4
NR20 Achieved?	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

7.4.5 The assessment demonstrates that internal noise levels at the closest sensitive receptor locations comfortably achieve NR20 based on the 'as proposed' scenario, with an internal music noise level of 85dBA.

7.5 Comparison to Measured Background Noise Level

7.5.1 Through discussion with the LPA, further assessment has been conducted in order to provide a comparison of music noise breakout against the prevailing background noise level. The LPA has outlined that the MNL should not exceed the measured background noise level (LA90) in the garden of any existing noise sensitive receptor.

7.5.2 The measured background noise levels from the evening periods (reference Tables 3 and 4) across the duration of the survey are summarised in Table 15 below.

7.5.3 In order to perform a robust assessment, the lowest background levels have been evaluated and adopted for comparison to the calculated music noise level breakout. The periods selected are highlighted below, and are both derived from periods when no events were taking place at Sedgewell Barn.

Table 15: Summary of measured noise levels (dB LA90)

Date	Evening (1900 to 2300h)	
	ML1	ML2
Friday 12th Aug	28	30
Saturday 13th Aug	33	30
Sunday 14th Aug	30	29

7.5.4 The LPA has further requested that the MNL should be compared to the measured night-time (2300 to 0700h) background noise level of 24dB LA90 (albeit, music noise is not proposed during the night-time period).

7.5.5 As shown in Figure 2 and summarised in Table 12, the highest predicted MNL from the 'as proposed' scenario is found to be 18dBA at ESR1 and 4, which is approximately 6dB lower than the measured night-time background LA90, and 10dB below the evening background at ML1.

7.5.6 On this basis, the 'as proposed' build-up achieves the LPA requirement, based on an internal MNL in the Celebration Barn of 85dBA.

8 PATRON NOISE ASSESSMENT IN COURTYARD AREA

8.1 Introduction

8.1.1 Comments received from the LPA have indicated that the potential for noise from human voices in the courtyard between the Rustic Barn and the Byre building should be assessed.

8.1.2 The LPA has further sought clarity on the intended use of the Byre building during events. It is therefore confirmed that the Byre building will not be used as a bar or for the playing of any music. The structure will solely be available for guests to sit and relax in if desired (i.e., as an alternative to the courtyard area).

8.2 Noise from Courtyard

8.2.1 Patron noise associated with the use of the external courtyard area has been evaluated with reference to Hayne, M.J. *et al* (2011) *'Prediction of Noise from Small to Medium Sized Crowds'*, which provides example sound pressure levels ranging from 'whispering' to 'maximal shout' for human voices.

8.2.2 The data are summarised in Table 16 below:

Table 16: Summary of Sound Pressure Levels at 1m

Description	Speech Level (Lp dBA)
Whispering	36
Soft	42
Relaxed	48
Relaxed, normal	54
Normal, raised	60
Raised	66
Loud	72
Very loud	78
Shouting	84
Maximal Shout	90
Maximal shout (individual cases)	96

8.2.3 It is expected that the patrons will generally talk at somewhere between a 'relaxed' to a 'raised' voice for the majority of the time.

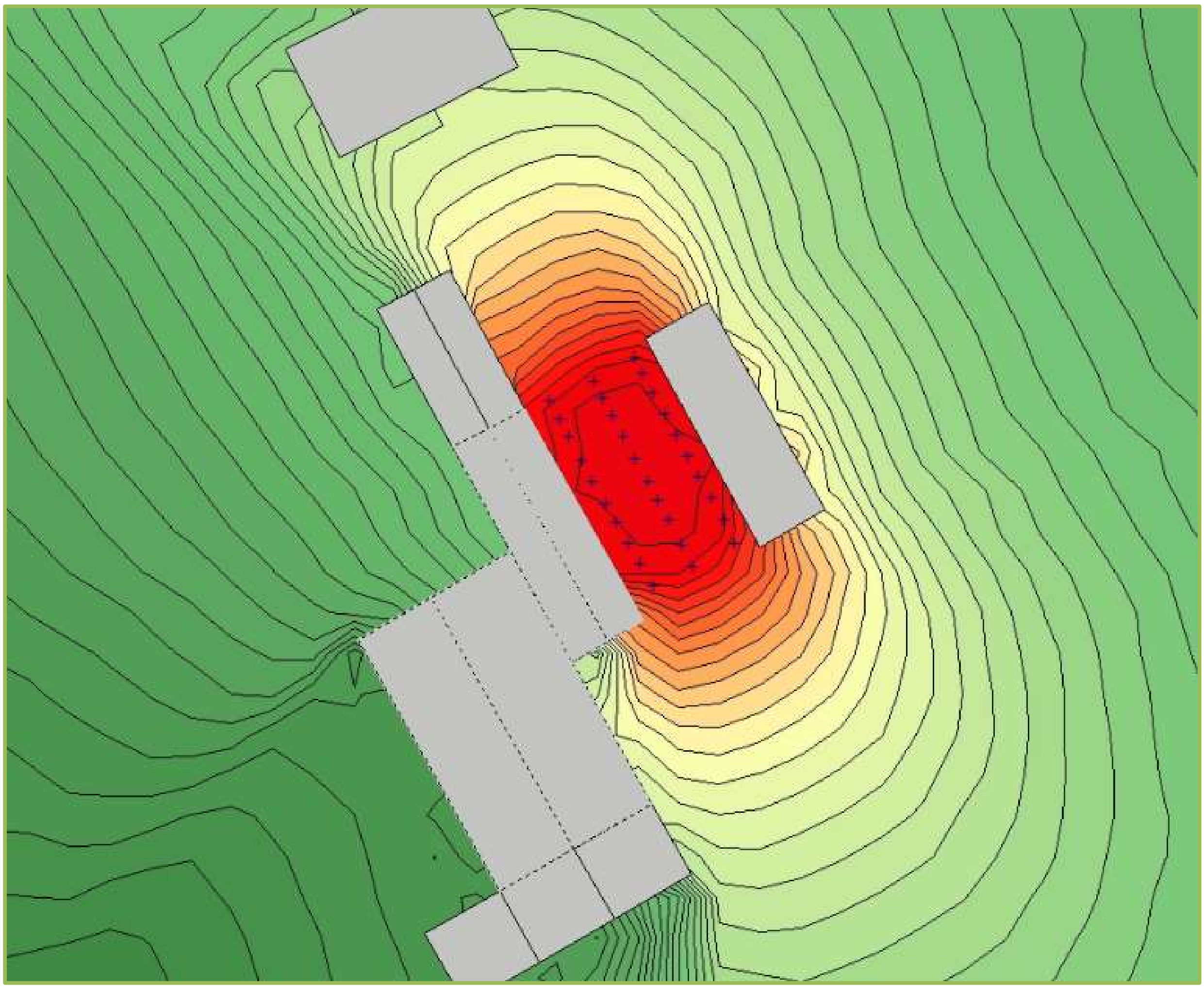
8.2.4 However, there will also potentially be times where individuals may express 'loud' vocal effort depending on the nature of the circumstances. Equally, there will also be periods of quiet, where individual guests will not make any noticeable noise at all.

8.2.5 With reference to Rindel ('*Acoustical capacity as a means of noise control in eating establishments*.' 2012), the 'acoustic group size' is likely to be in the range of 3 to 4 people, with 3.5 therefore taken as the average.

8.2.6 On this basis it is estimated that 29% of the patrons will be talking at any one time, and that on average a 'raised' voice (66dBA at 1m = 77dB LwA) is likely to be typical for the individual speaker.

8.2.7 The above factors have therefore been used in Figure 3 to calculate the operational noise impact of guests using the courtyard area of the development.

8.2.8 A total of 30 no. guests have been programmed as omnidirectional point sources (1.7m height) evenly distributed around the courtyard as shown in Drawing 4 below.



Drawing 4: CadnaA model showing the propagation of patron noise from the courtyard area between the Rustic Barn and the Byre building

8.2.9 The models consider attenuation provided by existing structural elements. These structures have been scaled from architect plans and programmed as buildings.

8.3 Resultant Levels

8.3.1 The resultant levels from guests using the courtyard area are presented in Table 17 below.

Table 17: Summary of Patron Noise Levels	
ESR Location	**Patron Noise from Courtyard dB LAeq,T**
ESR1	18
ESR2	3
ESR3	10
ESR4	12

8.3.2 The results show that levels of up to 18dB LAeq,T can be expected from human voices at the nearest receptor location, which is 6dB below the prevailing background noise level during the night-time period. The impact is therefore not considered significant.

9 ASSESSMENT OF ROAD TRAFFIC NOISE

9.1 Introduction

9.1.1 During a meeting with officers from HDC on 1st February 2023, proposals were put forward in relation to the relocation of the existing access road from its current location off Greenhills Lane to the north.

9.1.2 The new proposed access will extend eastward from the site, and join Warlaby Lane, leading to Warlaby, as shown in Drawing 5 below.

Drawing 5: Proposed new access (denoted by the orange line)

9.1.3 It was agreed in the meeting with HDC that noise associated with the use of the access should be modelled and assessed at the closest receptor locations.

9.2 Noise Modelling of Proposed Access

9.2.1 Data has been provided by the Applicant in relation to traffic movements to and from the venue during events in 2022. Traffic counts were undertaken using review of CCTV footage across four events held between 16th July to 20th August 2022, with average and peak flows determined.

9.2.2 The data provided are summarised in Table 18 below.

Table 18: Summary of Traffic Data from Events

	16th July 2022	23rd July 2022	13th August 2022	20th August 2022	Mean Averages
No. Cars	8	16	4	13	10
No. Taxi Minibus	4	8	2	5	5
No. Taxi Car Type	12	20	8	22	16
No. Staff & Vans	6	8	7	8	7
Total No. Vehicles	30	52	21	48	38
No. of Guests	97	137	72	140	112

9.2.3 The event from the 23rd July 2022 was found to have the highest number of movements in total. 1-hour Peak flow data from the night-time period of this event has therefore been evaluated, in order to determine the worst-case impact. Total (i.e. both directions) movements of 27no. vehicles were recorded during the period of 0000h to 0100h.

9.2.4 The peak flow data has then been used in CadnaA using the associated road traffic noise function, to model the resultant levels at the closest receptor locations.

9.2.5 The models assume a speed of 20mph, a road width of 3.7m, and no surface correction (i.e., the road is assumed to be fully reflective). Receptor and contour heights have been programmed to 4m.

9.2.6 The resultant levels are shown in Figure 4, with the data summarised in Table 19.

Table 19: 1-hour peak flow analysis of road traffic noise levels from proposed access	
ESR Location	Noise Level (dB LAeq,1h)
ESR1	28
ESR5	31

9.3 Assessment of Results

9.3.1 DMRB 'LA 111 Noise and vibration' (2020) methodology outlines a means of determining the magnitude of any increase in resulting levels from the development of a new road against the following criteria.

Table 20: DMRB magnitude of change criteria (dB LA10,18hr or Lnight)	
Short Term Magnitude	**Short term noise change**
Major	Greater than or equal to 5.0
Moderate	3.0 to 4.9
Minor	1.0 to 2.9
Negligible	less than 1.0

9.3.2 Using the measured baseline night-time noise level from ML1 (in the vicinity of the closest receptors at ESR1 and 5), the DMRB assessment has been conducted in Table 21 below.

Table 21: DMRB assessment (night-time 1-hour peak (dB LAeq,T))	
Do Minimum Opening Year (DMOY) Measured Baseline Noise Level from ML1	35 dB
Highest Calculated Level from Access Road	31dB
Do Something Opening Year (DSOY) Cumulative Noise Level	36.5 dB
DMOY compared against the DSOY	+1.5 dB
Short-term Magnitude	Minor

9.3.3 The DMRB assessment demonstrates that the increase in BLN as a result of the 1-hour peak flows from the access road will result in a minor magnitude of change, and therefore resides below the LOAEL.

9.3.4 It should be noted that the DMRB guidelines stipulates that the assessment should be conduct with reference to either the LA10,18h or Lnight metric. However, given the circumstances of the proposed access (i.e., flows concentrated around certain hours, as opposed to distributed across the full day or night), the 1-hour peak flows have been evaluated, which will inevitably provide a higher resultant level.

9.3.5 The principles of the DMRB guidelines are still considered suitable and the most relevant means for evaluating the magnitude of change.

10 GENERAL RECOMMENDATIONS

10.1 Structural

10.1.1 A comprehensive site walkover was undertaken both internally and externally of the premises and a number of defects were identified. Recommendations have been provided to remediate such defects, where appropriate.

10.2 Celebration Barn Roller Shutter Door

10.2.1 Two gaps were identified at the base of the roller shutter doors on the eastern façade of the Celebration Barn as shown within Drawing 6 below, which should as a minimum be suitably filled / sealed with acoustic sealant, or boxed off using Soundbloc plasterboard or similar.

10.2.2 Subsequent discussions with the Applicant have confirmed the intention for this roller shutter door to be removed and replaced with a 6000 x 3000mm sliding door.

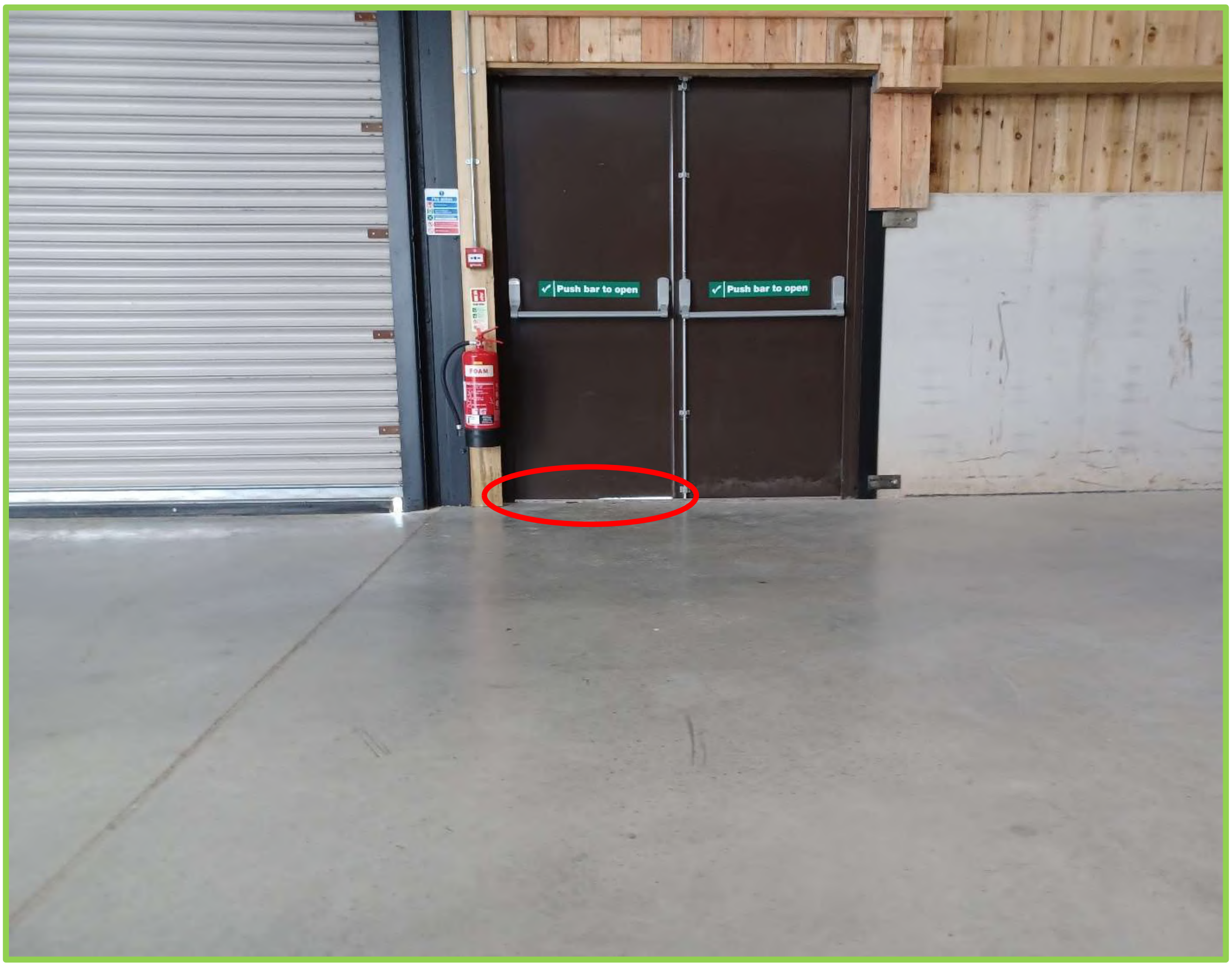
10.2.3 The sliding door will have 6/6/6.8mm laminated toughened glass, and will be suitably sealed when closed. The door will be locked throughout the performance of any amplified music, and will therefore provide significantly better sound attenuation compared to the existing shutter door on this elevation.

Drawing 6: Celebration Barn Roller Shutter Door

10.3 Celebration Barn Eastern Façade Fire Door

10.3.1 A gap was identified at the bottom of the fire door on the eastern façade of the Celebration Barn as shown on Drawing 7 below. The door should be adjusted or altered to ensure the gap is removed and the door is fully sealed.

10.3.2 This could again be supplemented by a recessed threshold, or drop-down seal/compression seal that tightly engages with the existing threshold when the door is closed.



Drawing 7: Celebration Barn Eastern Façade Fire Door

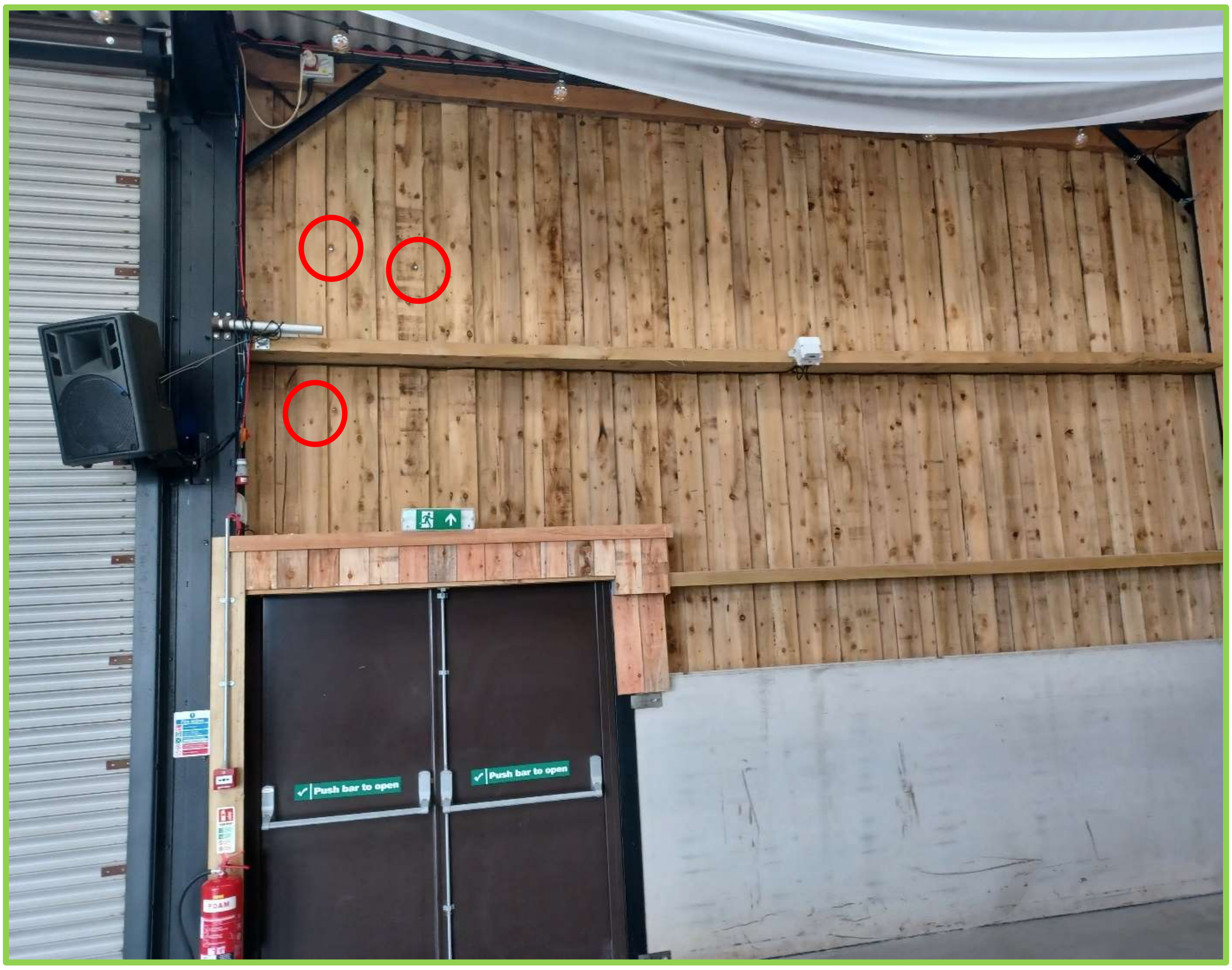
10.4 Gaps between overlapping Yorkshire boards

10.4.1 A number of gaps were identified between the two layers of the overlapping Yorkshire Boarding on each façade. Examples (but not limited to) are shown in Drawing 8 below. All gaps should ideally be suitably filled/sealed with a high-density acoustic sealant.

Drawing 8: Gaps between overlapping Yorkshire boards

10.5 Holes within Yorkshire Boards

10.5.1 On façades containing Yorkshire Boards, a number of holes were identified which were previously knots in the wood. Examples (but not limited to) are shown on Drawings 9 and 10 below. These should be suitably sealed / filled with a high-density acoustic sealant.



Drawing 9: Holes within Yorkshire Boards

Drawing 10: Holes within Yorkshire Boards

10.5.2 Discussions with the Applicant have confirmed the intention to enhance the eastern, western and northern elevations of the Celebration Barn through the introduction of a second internal layer of Yorkshire Board, with the cavity created then in-filled with rockwool insulation.

10.5.3 This modification will improve both the thermal and acoustic performance of the structure, as detailed in previous Sections.

10.6 Celebration Barn Western Façade Fire Door

10.6.1 A gap was identified at the bottom of the fire door on the western façade of the Celebration Barn as shown on Drawing 11 below. This should be adjusted or altered to ensure the door is fully sealed.

10.6.2 This could again be supplemented by a recessed threshold, or drop-down seal/compression seal that tightly engages with the existing threshold when the door is closed.

Drawing 11: Celebration Barn Western Façade Fire Door

10.7 Brush Seals on Western Façade Sliding Door in Celebration Barn

10.7.1 As shown on Drawing 12 below, the sliding doors on the western façade of the Celebration Barn have been fitted with brush seals at the base. These should be replaced by a recessed threshold, or drop-down seal/compression seal that tightly engages with the existing threshold when the door is closed.

Drawing 13: Brush Seals on Western Façade Sliding Door in Celebration Barn

10.8 Gaps in junctions between wood and frame

10.8.1 In certain places, where the steel frame of the barn meets the wooden Yorkshire boards, there are holes / gaps at the junctions, an example is shown in Drawing 14 below. These should be suitably filled with an acoustic sealant, and/or boxed off using Soundbloc plasterboard or similar.

Drawing 14: Gaps in junction between wood and frame.

10.9 Glazing Filled Gaps

10.9.1 Historic structural openings on the eastern façade of the Rustic Barn have been filled with a single pane of tempered glass, as shown in Drawing 15 below. It was noted that there were gaps in the sealant, which should be replaced and filled. Furthermore, a second or even third pane of toughened glass could be added to increase the performance of this glazing.

Drawing 15: Glazing Filled Gaps, Eastern Façade of Rustic Barn

11 ACOUSTIC PERFORMANCE ENHANCEMENTS

11.1 Introduction

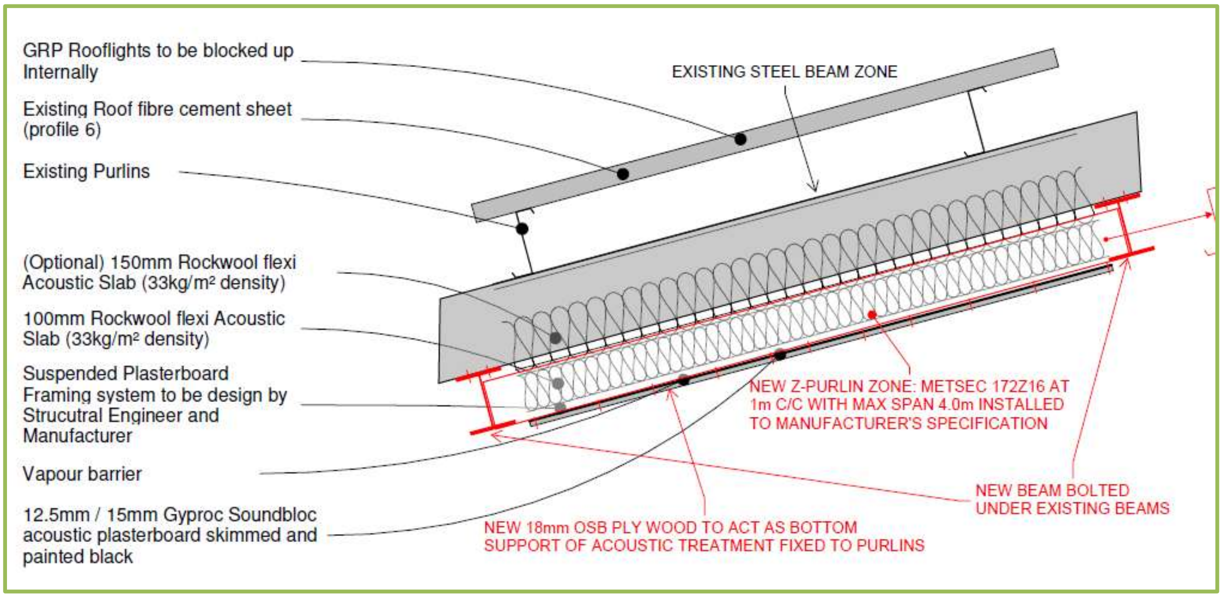
11.1.1 As detailed in previous Sections, the Applicant proposes a scheme of enhancements to the building fabric, which will be further supplemented by other management processes, as outlined below.

11.1.2 All proposed enhancements are fully costed and budgeted for by the Applicant, and can be conditioned by the LPA to be discharged pre-commencement.

11.2 Roof/ceiling

11.2.1 To reduce breakout as far as practicable the Applicant proposes to enhance the roof/ceiling in the Celebration Barn.

11.2.2 The existing roof shall be upgraded to include the introduction of 200mm of Rockwool (33kg/m2) insulation and a secondary internal layer of 12.5mm Gyproc Soundbloc. The proposed roof detail is shown in Drawing 16 below.



Drawing 16: Roof/ceiling detail for Celebration Barn

11.2.3 The existing roof has been tested and provides sound insulation of approximately 27dB R'w. With the proposed enhancement to the roof/ceiling in the Celebration Barn, the resulting performance is calculated in Insul sound insulation software is shown in Table 22 below.

Table 22: Calculated roof/ceiling attenuation - Celebration Barn (dB)								
Element	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**Rw**
Ceiling	15	33	41	47	52	55	61	51

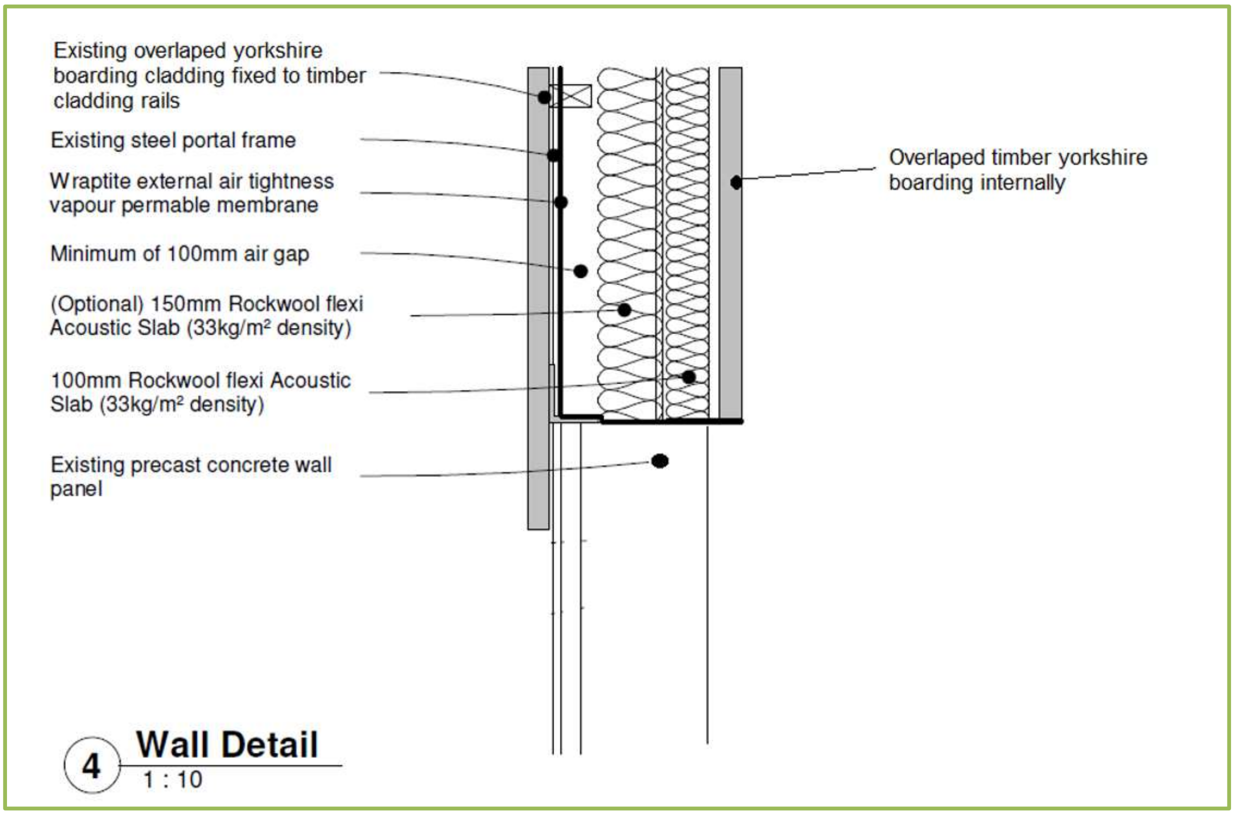
11.2.4 The Insul calcuations have assumed a single framework of purlins that extend continuously from the existing roof to the proposed ceiling as a worst case. Due to the retrospective nature of the works, the true construction detail shall be more complicated, with a combination of steel purlins, steel beams (both existing) and wooden purlins (proposed). This composite of materials will likely reduce bridging slightly between the two panels, compared to the worse case assumptions made in the Insul modelling.

11.2.5 Further decoupling could be achieved through the introduction of resilient hangers on the underside of the purlins, subject to structural considerations.

11.3 Walls

11.3.1 As outlined in the previous Section, the Applicant proposes to further increase the attenuation of the Celebration Barn eastern elevation through the removal of the shutter door (considered the weakest element) and replacing with a sliding door with acoustic glazing.

11.3.2 This elevation, along with areas of the western elevation and full northern elevation, will then be further enhanced through the introduction of 100mm of Rockwool (33kg/m2) insulation and a secondary internal layer of overlapping Yorkshire Boarding. The proposed wall enhancement detail is shown in Drawing 17 below.



Drawing 17: Enhanced wall detail for Celebration Barn

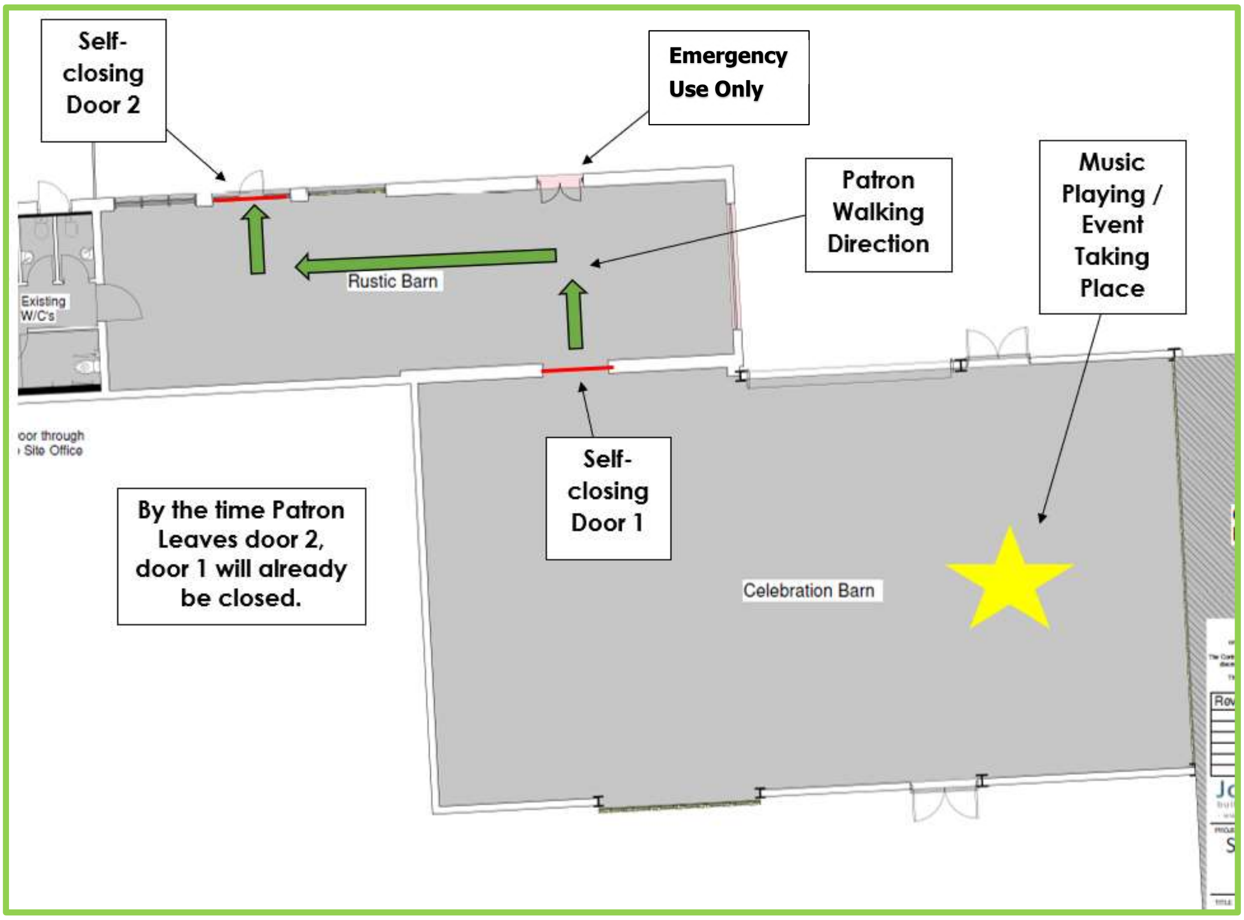
11.3.3 The existing composite facade has been tested and provides sound insulation of approximately 25dB R'w. With the proposed enhancement to the Celebration Barn walls, the resulting composite performance is calculated in Insul sound insulation software to be as follows:

Table 23: Calculated composite façade attenuation - Celebration Barn (dB)								
Elevation	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**Rw**
Eastern	18	16	32	37	44	47	56	39
Northern	17	15	35	43	46	49	62	40
Western	15	16	25	29	30	33	40	31

11.4 Lobby System

11.4.1 Through discussions with the Applicant, a 'lobby' system shall be introduced for patrons leaving the Celebration Barn, through the Rustic Barn, to the external courtyard area.

11.4.2 The system shall introduce a series of self-closing doors as outlined below in Drawing 18.



Drawing 18: Proposed 'Lobby' System

11.4.3 This system shall work in conjunction with management practices that include the locking of patio doors in the Celebration Barn during any time when amplified music is being played. This system will ensure that the predicted noise breakout from the structure is achieved at all times.

11.4.4 It is recommended that the self-closing door between the Celebration Barn and Rustic Barn ('Door 1' in Drawing 18) should achieve a minimum of 30dB Rw.

11.5 Relocation of Bar Area

11.5.1 The bar is currently located within the 'Byre' building, which is across the courtyard from the Rustic and Celebration Barns.

11.5.2 It has been identified that moving the bar to within the Celebration Barn will reduce footfall between the buildings and therefore minimise the time any doors are open and reduce the tendency for guests to gather within the courtyard area before and after getting drinks.

11.6 Mechanical Ventilation

11.6.1 As previously outlined in the report, the existing and proposed patio doors in the Celebration Barn shall be closed and locked during any period where amplified music is being played.

11.6.2 In order to maintain thermal comfort for guests during events, the Applicant therefore proposes to install air conditioning serving the Celebration Barn.

11.6.3 The exact location of the equipment has not yet been determined, with plans still being evaluated with the M&E consultant. It is however likely that the plant will discharge towards the south-west of the Celebration Barn, where existing plant is already located.

11.6.4 This location will therefore be fully screened from any receptors to the north and east, meaning that noise from the plant itself will not be perceptible at the nearest ESR locations.

11.7 Noise Limiting Device

11.7.1 The assessments presented assume an internal MNL of up to 85 dB LAeq,T in the Celebration Barn. However, there is currently no noise limiting device associated with the sound system of the venue.

11.7.2 Following discussions with the Applicant, noise levels may have exceeded this during previous events, particularly during live band performances where the tendency exists for noise levels to be excessive.

11.7.3 The Applicant is therefore committed to incorporating a noise limiting device into a dedicated in-house sound system.

11.7.4 The noise limiting device should be installed and properly calibrated by a qualified technician. When installed, the device will limit the noise levels permissible from the sound system.

11.7.5 It is proposed that an inline system is installed (which compresses the amplified signal prior to it being played through the speaker).

11.7.6 The inline system will allow adjustments of any frequencies, and can be used in conjunction with an electric drumkit for any live performances.

11.7.7 An example system shown below is the VCX Intelligent Automatic Volume Limiter with 31 Band Mono Graphic Equaliser.

Drawing 19: Example Noise Limiting Device

11.7.8 Based on the NR curve assessment and comparisons to the measured background noise levels presented in Section 7, there is potential headroom for the reverberant internal noise level to exceed 85dB LAeq,T in the Celebration Barn, without the night-time background noise level at the ESR locations being exceeded.

11.7.9 It is recommended that the installer discusses the requirements with NJD Environmental Associates Ltd prior to the device being installed in order to ensure the system is positioned and calibrated as intended.

11.7.10 It is further recommended that compliance testing should be conducted following installation, which can again be controlled through planning condition.

11.7.11 The Applicant welcomes engagement with the LPA in order to ensure the noise limiting device is calibrated to a level that satisfies the requirements.

11.7.12 This will allow the ‘as proposed’ performance of the structure to be evaluated in real life, with measurements taken at the receptor locations of the music noise level during an event. Should any exceedances be identified through compliance testing, then the necessary adjustments can be made to the noise limiter to ensure acceptable conditions are achieved.

11.7.13 Example products for the measures and products outlined in this Section are included at Appendix 3.

11.8 Speakers

11.8.1 It is recommended, where possible, that speakers associated with the sound system should be suspended using structural anti-vibration hangers.

11.8.2 The use of anti-vibration hangers will serve to decouple the speakers from the structure and minimise the degree of structure borne noise that transmits from the Celebration Barn when amplified music is being played.

11.9 Access Road

11.9.1 Discussions held with the LPA have outlined concerns regarding the use of the existing access road to the site along Green Hills Lane, in relation to this application.

11.9.2 As outlined in previous Sections, the Applicant therefore proposes to introduce a new access road that links with Warlaby Lane to the east.

11.9.3 In order to ensure that traffic flows as intended (i.e., not directly passing existing dwellings on Green Hills Lane and Warlaby Lane), the Applicant proposes to introduce signage on the A684 to direct any incoming traffic towards the new access via Warlaby.

11.9.4 Likewise, signage shall be introduced for traffic leaving the site via the new access, instructing traffic to turn right onto Warlaby Lane, towards Warlaby.

11.9.5 This approach shall be further supplemented by the Applicant establishing dialogue with local taxi firms and providing information on how the site should be accessed.

11.9.6 Further details relating to traffic management are provided in the submitted Overview of the Business and Event Management Plan prepared by the Applicant.

11.10 Event Management Plan

11.10.1 The Applicant has developed an Event Management Plan in order to document the processes that shall be followed before, during and after any event.

11.10.2 The document (to be submitted separately to the LPA for review) outlines procedures for managing the following:

- Vehicles Arriving and Departing During/After an Event
    - Including schedules, signage and arrangements with local taxi firms
- Amplified Music
    - Including the locking of doors, use of noise limiter, noise monitoring, use of lobby system and staff training
- Patron Noise
    - Including signage, designated smoking area, use of stewards to guide guests to accommodation and taxis
- Waste Disposal
    - Time limits
- Checks, Audits and Complaints Procedure
    - Including procedures and checklists that shall be completed before, during and after any event to ensure the above is complied with.

11.10.3 The Event Management Plan is a working document, and the Applicant welcomes engagement from the LPA in order to ensure that it meets the requirements for ongoing management of the venue.

12 CONCLUSION

12.1 Introduction

12.1.1 NJD Environmental Associates has undertaken a noise assessment for a change of use application for an events venue to host weddings and celebrations.

12.2 Assessment Summary

12.2.1 Sound insulation testing has been undertaken which considered both the internal reverberation time and the sound attenuation performance of the building facades.

12.2.2 Where exceedances of advisory reverberation time guidelines have been identified, calculations have been performed to estimate the amount of additional absorption required to suitably reduce reverberation within the appropriate internal spaces.

12.2.3 Sound attenuation performance has been measured and further calculations have been performed based on the proposed build-up of the Celebration Barn walls and roof.

12.2.4 The resultant noise levels are found to be below the NR20 criteria at the closest sensitive receptors.

12.2.5 The MNL breakout from the structure has been further compared to the measured background noise levels at the ESR locations. The results of this assessment have demonstrated that the limits stipulated by the LPA are comfortably achieved based on the proposed performance of the structure.

12.2.6 To reduce noise breakout further, details have been outlined for proposed passive controls/management in the formation of a lobby system and the introduction of a noise limiting device on the sound system.

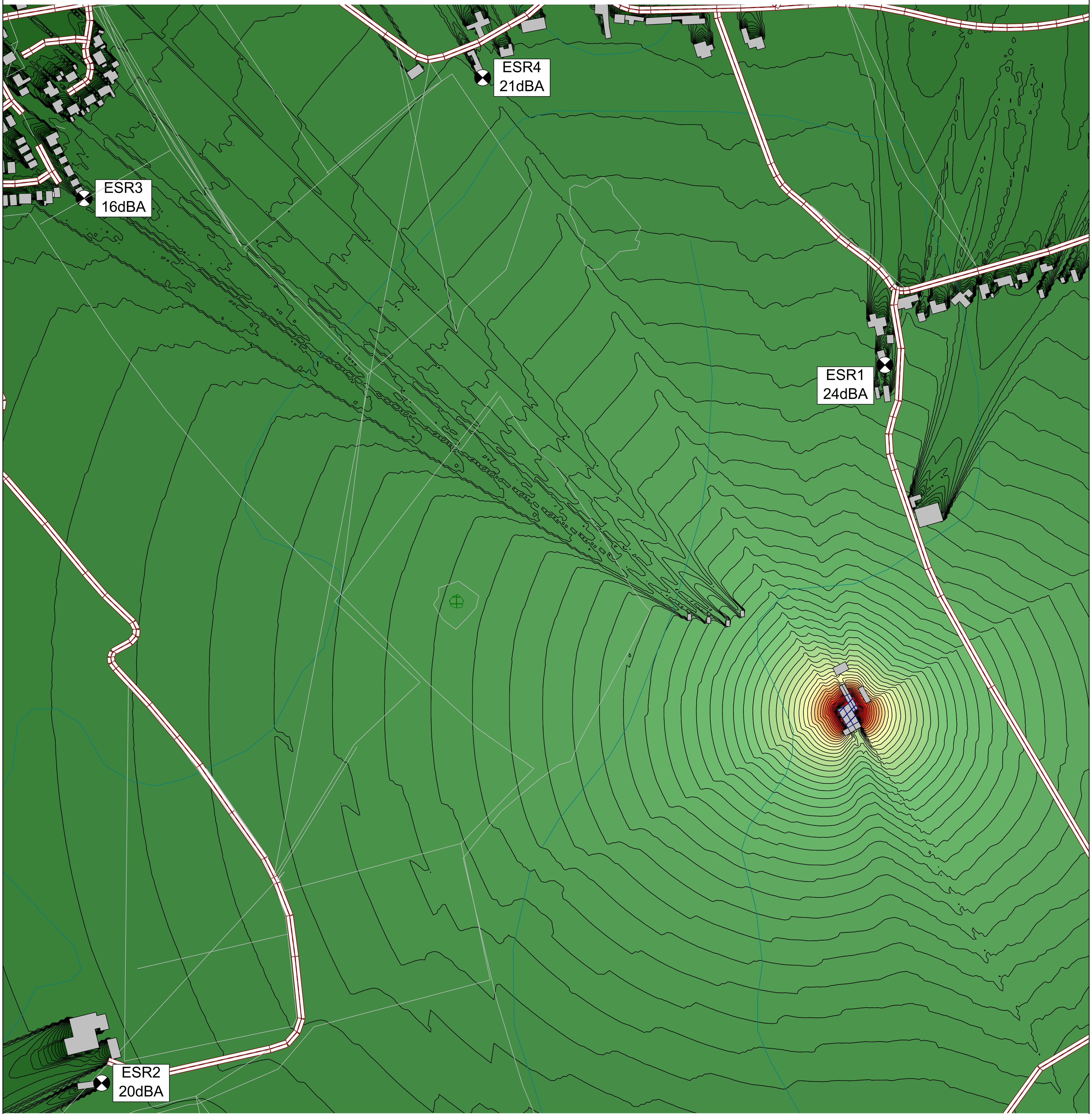
12.2.7 Further details have been proposed to minimise effects associated with the use of the new access road and noise from patrons.

12.2.8 A detailed Event Management Plan has been drafted by the Applicant to ensure that all necessary procedures are in place for sustainable and effective management of the venue in the future.

NJD Environmental Associates LTD

www.njdenvironmental.co.uk

Company Registration No 10956987



njd Environmental Associates

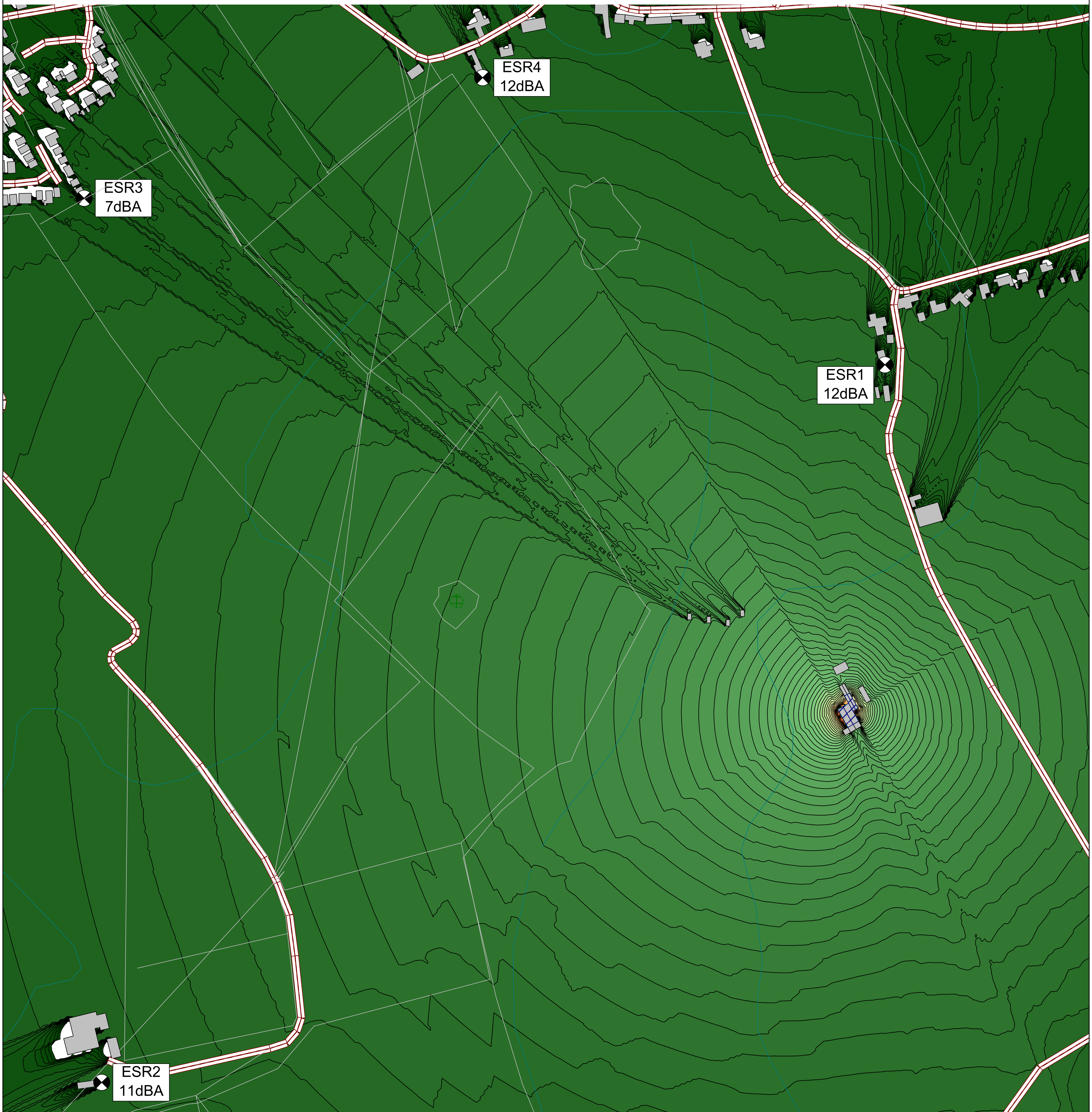
Client:
Stuart and Catherine Tweddle

Figure 1:
MNL Breakout 'As Built' LAeq,T
(4m receptor height)

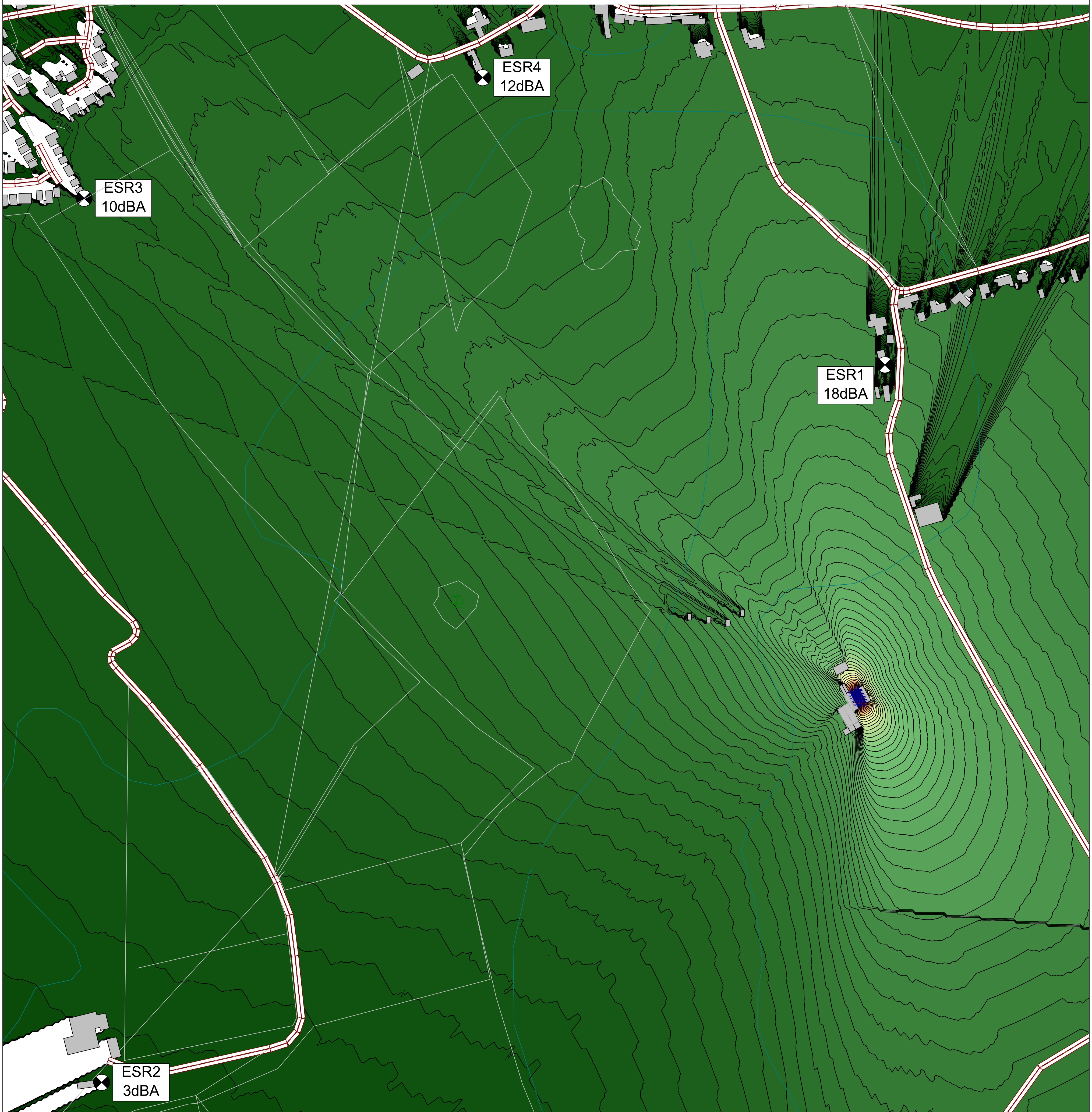
Job Title:
NJD21-0208
Sedgefield House Farm

Drawn By:
NJ Dennon

Date:
Feb 2023



njd Environmental Associates	Client: Stuart and Catherine Tweddle	Figure 2: MNL Breakout 'As Proposed' LAeq,T (4m receptor height)	0, 40, 50, 55, 60, 70, 75, 80	N
	Job Title: NJD21-0208 Sedgefield House Farm	Drawn By: NJ Dennon		Date: Feb 2023



njd Environmental Associates	Client: Stuart and Catherine Tweddle	Figure 3: Patron Noise from Courtyard dB LAeq,T (4m receptor height)	0 40 50 55 60 70 75 80	N
	Job Title: NJD21-0208 Sedgefield House Farm	Drawn By: NJ Dennon		Date: Feb 2023

Client:
Stuart and Catherine Tweddle

Figure 4:
Road Traffic Noise Level - Night-time Peak (dB LAeq,1h)
(4m receptor height)

	0 <= ... < 35
	35 <= ... < 40
	40 <= ... < 45
	45 <= ... < 50
	50 <= ... < 55
	55 <= ... < 60
	60 <= ... < 65
	65 <= ... < 70
	70 <= ... < 75
	75 <= ... < 80
	80 <= ...

N

Job Title:
NJD21-0208
Sedgefield House Farm

Drawn By:
NJ Dennon

Date:
Feb 2023

njd Environmental Associates

Appendix 1 – Baseline Noise Measurments

File	20220812_141122_000000_1.CMG				
Location	ML1				
Data type Weighting Unit	Leq A dB				
Start End	12/08/2022 00:00:00 15/08/2022 00:00:00				
Period	Day (Ld)				
Time slots	Day 07:00 23:00 Kd = 0 dBA				
Day	Ld dB	Leq dB	Lmax dB	L90 dB	L10 dB
Fri 12/08/2022	43.8	43.8	68.1	29.6	47.5
Sat 13/08/2022	40.5	40.5	65.7	31.7	44.1
Sun 14/08/2022	40.7	40.7	59.9	29.5	44.1
Period	Evening (Le)				
Time slots	Evening 19:00 23:00 Ke = 0 dBA				
Day	Le dB	Leq dB	Lmax dB	L90 dB	L10 dB
Fri 12/08/2022	41.5	41.5	60.0	28.0	45.9
Sat 13/08/2022	37.9	37.9	58.7	32.7	40.5
Sun 14/08/2022	40.4	40.4	52.8	30.3	43.9
Period	Night (Ln)				
Time slots	Night 23:00 07:00 Kn = 0 dBA				
Day	Ln dB	Leq dB	Lmax dB	L90 dB	L10 dB
Fri 12/08/2022	35.7	35.7	63.3	23.5	39.1
Sat 13/08/2022	35.0	35.0	61.2	24.5	38.4
Sun 14/08/2022					

File	20220812_133554_000000_1.CMG				
Location	ML2				
Data type Weighting Unit	Leq A dB				
Start End	12/08/2022 00:00:00 15/08/2022 00:00:00				
Period	Day (Ld)				
Time slots	Day 07:00 23:00 Kd = 0 dBA				
Day	Ld dB	Leq dB	Lmax dB	L90 dB	L10 dB
Fri 12/08/2022	40.5	40.5	73.0	31.1	40.1
Sat 13/08/2022	38.1	38.1	74.0	30.6	38.4
Sun 14/08/2022	37.6	37.6	65.0	29.5	39.4
Period	Evening (Le)				
Time slots	Evening 19:00 23:00 Ke = 0 dBA				
Day	Le dB	Leq dB	Lmax dB	L90 dB	L10 dB
Fri 12/08/2022	39.9	39.9	64.2	29.8	39.4
Sat 13/08/2022	35.8	35.8	53.7	29.9	37.8
Sun 14/08/2022	38.5	38.5	64.0	29.0	40.5
Period	Night (Ln)				
Time slots	Night 23:00 07:00 Kn = 0 dBA				
Day	Ln dB	Leq dB	Lmax dB	L90 dB	L10 dB
Fri 12/08/2022	37.3	37.3	70.9	25.7	37.8
Sat 13/08/2022	33.8	33.8	66.6	21.2	34.8
Sun 14/08/2022					

Appendix 2: Reverberation Measurements

Celebration Barn

CMG6						
Test ID Data Type Source Receive	5 7/27/2022 11:32:09 AM Reverberation time Unit_5_05	8 7/27/2022 11:33:10 AM Reverberation time Unit_5_05	12 7/27/2022 11:34:01 AM Reverberation time Unit_5_05	16 7/27/2022 11:35:25 AM Reverberation time Unit_5_05	20 7/27/2022 11:37:15 AM Reverberation time Unit_5_05	24 7/27/2022 11:38:35 AM Reverberation time Unit_5_05
Hz	s	s	s	s	s	s
100	0.97	1.28	1.85	2.05	2.05	2.15
125	0.69	1.95	1.39	1.30	1.83	1.93
160	1.02	2.07	1.75	1.92	0.19	2.28
200	2.79	2.08	1.89	2.92	2.49	2.33
250	2.80	2.11	2.08	2.19	1.66	2.93
315	2.45	2.42	2.17	1.64	1.12	2.16
400	2.15	1.79	2.55	2.34	2.40	1.80
500	1.80	2.08	2.47	2.27	2.18	2.02
630	2.95	2.27	2.38	1.97	2.23	2.41
800	2.81	2.65	2.66	2.79	3.20	2.80
1 k	2.51	2.26	2.74	2.65	3.23	2.85
1.25 k	2.75	2.34	2.46	2.79	2.64	2.45
1.6 k	2.36	2.23	2.25	2.12	2.26	2.20
2 k	2.29	2.09	1.94	1.98	2.07	2.27
2.5 k	2.07	2.03	2.07	2.13	2.13	2.12

CMG6					
Test ID Data Type Source Receive	28 7/27/2022 11:39:09 AM Reverberation time Unit_5_05	32 7/27/2022 11:39:56 AM Reverberation time Unit_5_05	36 7/27/2022 11:40:52 AM Reverberation time Unit_5_05	39 7/27/2022 11:41:17 AM Reverberation time Unit_5_05	43 7/27/2022 11:43:21 AM Reverberation time Unit_5_05
Hz	s	s	s	s	s
100	1.08	3.40	2.36	1.44	0.26
125	2.04	1.42	1.70	0.57	1.06
160	2.89	2.28	2.08	1.83	0.11
200	2.71	2.65	3.10	3.60	2.38
250	1.97	2.77	2.47	2.35	1.15
315	2.01	1.55	2.22	2.24	1.70
400	2.03	2.32	1.71	2.20	2.86
500	2.43	2.23	2.46	2.05	2.64
630	2.65	2.47	3.03	2.68	2.51
800	2.72	3.23	3.12	2.56	3.19
1 k	3.13	2.50	2.64	2.35	2.72
1.25 k	2.60	2.13	2.27	2.06	2.11
1.6 k	2.16	2.25	2.43	2.42	2.36
2 k	2.09	1.94	1.88	2.16	2.22
2.5 k	2.02	2.09	2.10	2.04	2.12

CMG6					
Test ID Data Type Source Receive	47 7/27/2022 11:44:05 AM Reverberation time Unit_5_05	51 7/27/2022 11:44:31 AM Reverberation time Unit_5_05	55 7/27/2022 11:44:56 AM Reverberation time Unit_5_05	59 7/27/2022 11:45:25 AM Reverberation time Unit_5_05	63 7/27/2022 11:45:54 AM Reverberation time Unit_5_05
Hz	s	s	s	s	s
100	1.21	2.55	4.45	1.98	1.09
125	1.45	2.63	1.02	2.58	1.51
160	2.05	2.77	2.31	1.32	1.30
200	1.39	2.38	1.65	1.87	1.92
250	2.52	1.72	1.79	1.87	0.40
315	2.03	2.20	1.36	2.44	3.15
400	2.38	2.20	2.11	2.27	2.37
500	2.11	2.22	1.96	2.63	1.73
630	2.66	2.77	2.59	2.48	2.21
800	2.75	2.71	3.01	3.00	2.68
1 k	2.82	2.61	2.49	2.74	2.96
1.25 k	2.57	2.37	1.93	2.30	2.24
1.6 k	2.33	2.32	2.45	2.16	2.26
2 k	2.16	2.14	2.30	2.16	2.17
2.5 k	2.05	1.95	1.96	1.89	2.00

Rustic Barn

CMG6			
Test ID Data Type Source Receive	 67 7/27/2022 11:48:50 AM Reverberation time Unit_5_05	 71 7/27/2022 11:49:39 AM Reverberation time Unit_5_05	 75 7/27/2022 11:50:13 AM Reverberation time Unit_5_05
Hz	s	s	s
100	0.68	1.43	1.00
125	0.63	0.40	0.26
160	0.79	1.50	1.21
200	0.76	1.11	0.62
250	0.70	0.71	0.60
315	0.83	0.89	0.99
400	0.85	1.04	1.25
500	0.92	0.83	0.75
630	0.90	1.20	1.20
800	1.01	0.68	1.00
1 k	1.02	0.87	0.83
1.25 k	0.88	0.95	0.83
1.6 k	0.68	1.00	0.91
2 k	0.74	0.82	0.88
2.5 k	0.78	0.77	0.85

CMG6			
Test ID Data Type Source Receive	 79 7/27/2022 11:51:28 AM Reverberation time Unit_5_05	 83 7/27/2022 11:51:47 AM Reverberation time Unit_5_05	 87 7/27/2022 11:52:10 AM Reverberation time Unit_5_05
Hz	s	s	s
100	1.03	0.67	0.86
125	1.48	1.05	0.24
160	0.60	1.32	0.66
200	0.81	0.88	0.81
250	0.95	0.70	1.24
315	0.93	0.97	1.20
400	0.67	0.94	1.16
500	0.84	1.01	0.63
630	0.85	0.68	1.01
800	1.00	1.05	1.08
1 k	0.84	0.94	0.86
1.25 k	0.84	0.80	0.82
1.6 k	0.96	0.81	0.85
2 k	0.80	0.71	0.91
2.5 k	0.74	0.79	0.80

Summary

Celebration Barn		RT(s)		**Rustic Barn**		RT(s)
Speaker Position 1	Measurement 1	2.5		Speaker Position 1	Measurement 1	1.0
	Measurement 2	2.3			Measurement 2	0.9
	Measurement 3	2.7			Measurement 3	0.8
	Measurement 4	2.7		Speaker Position 2	Measurement 1	0.8
	Measurement 5	3.2			Measurement 2	0.9
	Measurement 6	2.9			Measurement 3	0.9
Speaker Position 2	Measurement 1	3.1				
	Measurement 2	2.5			Average	0.9
	Measurement 3	2.6				
	Measurement 4	2.3				
	Measurement 5	2.7				
Speaker Position 3	Measurement 1	2.8				
	Measurement 2	2.6				
	Measurement 3	2.5				
	Measurement 4	2.7				
	Measurement 5	3.0				
	Average	2.7				

Appendix 3 – Example Products

Acoustic Door Seals

https://www.lorientuk.com/products/las8040

https://www.lorientuk.com/products/las3002-si

https://www.firesealsdirect.co.uk/passive-fire-protection/drop-down-door-seals/applique-37-surface-mounted-drop-down-seal-930mm/

Acoustic Sealant

https://soundproofingstore.uk/product/soundproof-acoustic-sealant-900ml-tube/#:~:text=Acoustic%20Sealant%20is%20a%20high,where%20services%20have%20been%20installed.

Self-Closing Doors

https://www.firesealsdirect.co.uk/fire-door-hardware/fire-door-closers/overhead-door-closer-rutland-ts3204-c-w-cover/

Noise Limiting Device

https://noiselimiters.co.uk/vcx-automatic-volume-limiter-p-80.html

Plasterboard

https://www.british-gypsum.com/products/board-products/gyproc-soundbloc-125mm

Speaker Vibration Isolation Mounts

https://www.customaudiodirect.co.uk/speaker-anti-vibration-mounts

Acoustic Panels

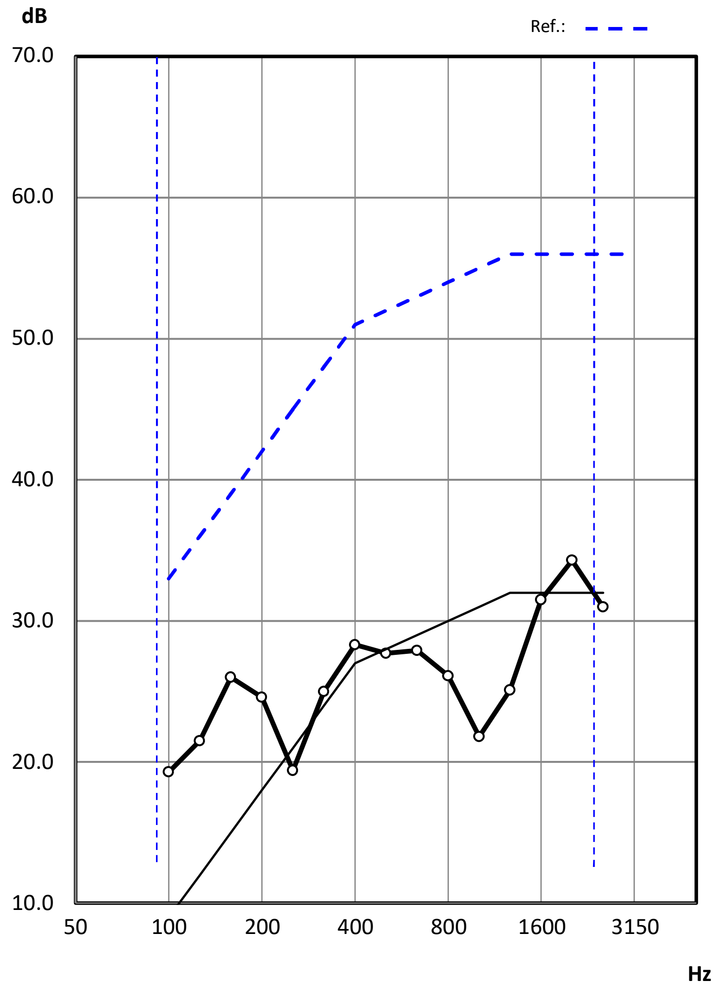
https://www.muffle.co.uk/mufflestick-rectangle-self-adhesive-acoustic-panel.html

https://www.muffle.co.uk/mufflecork-by-corkbee-stripe.html

Airborne Sound Insulation of façades ISO 16283-3

Client :
Test : 1F
Date of test : 27/7/22 12:21
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Dtr,2m,n 1/3 oct [dB]
50	
63	
80	
100	**19.3**
125	**21.5**
160	**26.0**
200	**24.6**
250	**19.4**
315	**25.0**
400	**28.3**
500	**27.7**
630	**27.9**
800	**26.1**
1000	**21.8**
1250	**25.1**
1600	**31.5**
2000	**34.3**
2500	**31.0**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w 28 (-1 ; -3) dB

njd
Environmental Associates

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : 1F
Date of test : 27/7/22 12:21
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Source Level [dB]	Receiver Level [dB]	Receiver RT [s]	Receiver BGN [dB]	Dtr,2m,n 1/3 oct [dB]
50					
63					
80					
100	81.6	63.1	0.9	31.8	**19.3**
125	90.4	68.2	0.7	31.1	**21.5**
160	99.1	74.1	1.0	32.0	**26.0**
200	102.0	77.6	0.8	32.4	**24.6**
250	98.2	78.9	0.8	27.4	**19.4**
315	99.8	75.7	1.0	25.7	**25.0**
400	98.3	70.9	1.0	25.0	**28.3**
500	94.9	67.3	0.8	25.2	**27.7**
630	91.0	63.9	1.0	24.3	**27.9**
800	87.3	62.1	1.0	23.9	**26.1**
1000	81.3	60.0	0.9	24.1	**21.8**
1250	82.6	57.8	0.9	22.4	**25.1**
1600	92.2	61.1	0.9	20.2	**31.5**
2000	91.9	57.7	0.8	19.6	**34.3**
2500	88.2	57.2	0.8	17.5	**31.0**
3150					
4000					
5000					

MEASUREMENT RESULTS

Dtr,2m,n,w 28 (-1 ; -3) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :

Test : 2F | Date of test : 27/7/22 12:27

Test Results : D-01

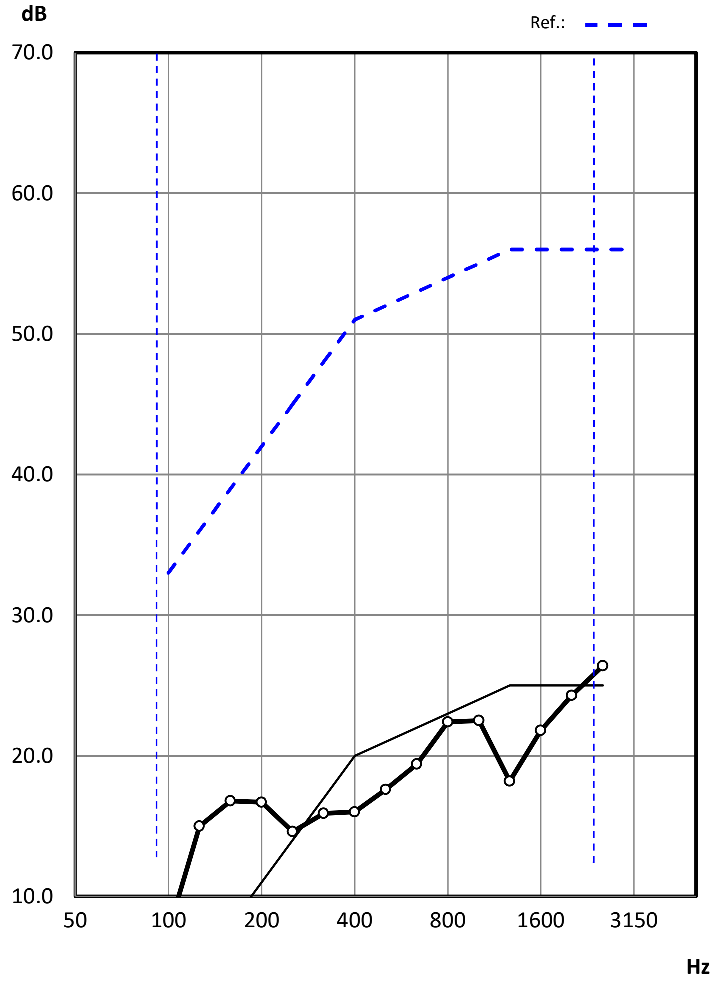
Transmission : Façade

Type of Source : Noise source

Emission : Unit_5_05

Receiving : Unit_5_05

Frequency F [Hz]	Dtr,2m,n 1/3 oct [dB]
50	
63	
80	
100	**7.6**
125	**15.0**
160	**16.8**
200	**16.7**
250	**14.6**
315	**15.9**
400	**16.0**
500	**17.6**
630	**19.4**
800	**22.4**
1000	**22.5**
1250	**18.2**
1600	**21.8**
2000	**24.3**
2500	**26.4**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w 21 (-0 ; -2) dB

njd
Environmental Associates

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : 2F Date of test : 27/7/22 12:27
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency	Source	Receiver			Dtr,2m,n
F	Level	Level	RT	BGN	1/3 oct
[Hz]	[dB]	[dB]	[s]	[dB]	[dB]
50					
63					
80					
100	76.8	69.9	0.9	31.8	**7.6**
125	89.3	73.6	0.7	31.1	**15.0**
160	96.3	80.5	1.0	32.0	**16.8**
200	98.8	82.4	0.8	32.4	**16.7**
250	96.5	82.1	0.8	27.4	**14.6**
315	99.9	84.8	1.0	25.7	**15.9**
400	98.3	83.2	1.0	25.0	**16.0**
500	95.2	77.7	0.8	25.2	**17.6**
630	92.3	73.8	1.0	24.3	**19.4**
800	90.0	68.5	1.0	23.9	**22.4**
1000	88.0	66.0	0.9	24.1	**22.5**
1250	83.6	65.7	0.9	22.4	**18.2**
1600	88.6	67.2	0.9	20.2	**21.8**
2000	90.1	65.9	0.8	19.6	**24.3**
2500	89.9	63.5	0.8	17.5	**26.4**
3150					
4000					
5000					

MEASUREMENT RESULTS

Dtr,2m,n,w 21 (-0 ; -2) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :

Test : 3F   Date of test : 27/7/22 12:31

Test Results : D-01

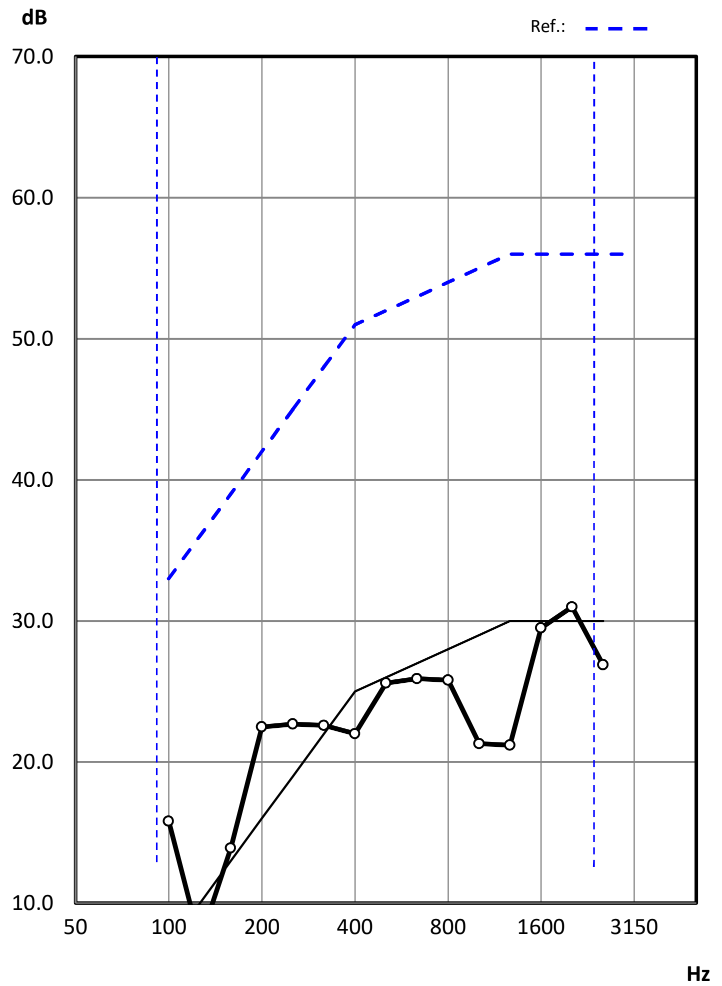
Transmission : Façade

Type of Source : Noise source

Emission : Unit_5_05

Receiving : Unit_5_05

Frequency F [Hz]	**Dtr,2m,n 1/3 oct [dB]**
50	
63	
80	
100	**15.8**
125	**7.3**
160	**13.9**
200	**22.5**
250	**22.7**
315	**22.6**
400	**22.0**
500	**25.6**
630	**25.9**
800	**25.8**
1000	**21.3**
1250	**21.2**
1600	**29.5**
2000	**31.0**
2500	**26.9**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w   26 (-2 ; -4)   dB

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : 3F
Date of test : 27/7/22 12:31
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Source Level [dB]	Receiver Level [dB]	Receiver RT [s]	Receiver BGN [dB]	Dtr,2m,n 1/3 oct [dB]
50					
63					
80					
100	87.1	75.0	1.9	41.4	**15.8**
125	83.4	79.1	1.6	35.5	**7.3**
160	92.6	82.2	1.8	36.2	**13.9**
200	101.8	84.1	2.4	36.0	**22.5**
250	103.3	84.7	2.0	32.2	**22.7**
315	100.1	81.6	2.1	31.9	**22.6**
400	96.1	78.6	2.2	30.0	**22.0**
500	98.5	77.4	2.2	24.9	**25.6**
630	94.7	73.8	2.5	20.2	**25.9**
800	90.3	70.1	2.9	19.7	**25.8**
1000	85.5	69.5	2.7	17.6	**21.3**
1250	85.1	68.6	2.4	17.4	**21.2**
1600	95.1	70.2	2.3	18.1	**29.5**
2000	94.2	67.5	2.1	19.2	**31.0**
2500	90.0	67.2	2.0	17.8	**26.9**
3150					
4000					
5000					

MEASUREMENT RESULTS

Dtr,2m,n,w 26 (-2 ; -4) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :

Test : 4F — Date of test : 27/7/22 12:43

Test Results : D-01

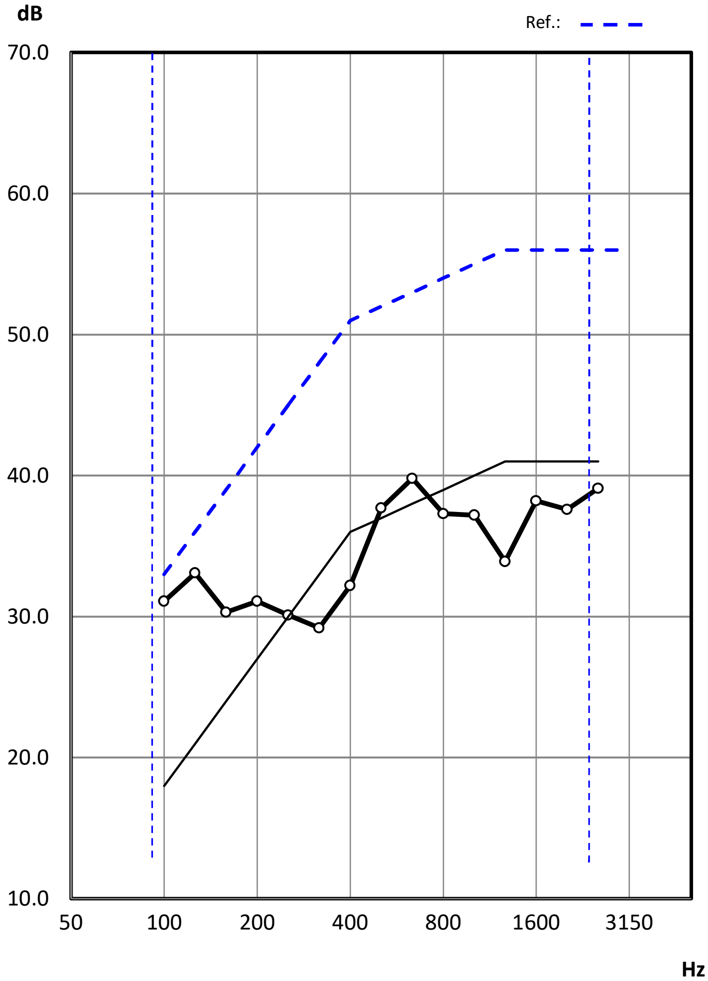
Transmission : Façade

Type of Source : Noise source

Emission : Unit_5_05

Receiving : Unit_5_05

Frequency F [Hz]	Dtr,2m,n 1/3 oct [dB]
50	
63	
80	
100	**31.1**
125	**33.1**
160	**30.3**
200	**31.1**
250	**30.1**
315	**29.2**
400	**32.2**
500	**37.7**
630	**39.8**
800	**37.3**
1000	**37.2**
1250	**33.9**
1600	**38.2**
2000	**37.6**
2500	**39.1**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w 37 (-1 ; -2) dB

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : 4F
Date of test : 27/7/22 12:43
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency	Source	Receiver			Dtr,2m,n
F	Level	Level	RT	BGN	1/3 oct
[Hz]	[dB]	[dB]	[s]	[dB]	[dB]
50					
63					
80					
100	85.1	57.7	1.9	40.2	**31.1**
125	93.1	63.0	1.6	33.2	**33.1**
160	97.2	70.4	1.8	33.9	**30.3**
200	102.0	75.7	2.4	33.6	**31.1**
250	100.8	74.9	2.0	30.2	**30.1**
315	95.3	70.2	2.1	29.9	**29.2**
400	93.6	65.9	2.2	28.3	**32.2**
500	95.9	62.6	2.2	24.7	**37.7**
630	95.0	60.3	2.5	20.5	**39.8**
800	89.4	57.6	2.9	20.3	**37.3**
1000	88.6	56.7	2.7	18.1	**37.2**
1250	83.6	54.4	2.4	17.2	**33.9**
1600	92.8	59.3	2.3	17.9	**38.2**
2000	91.4	58.1	2.1	18.7	**37.6**
2500	90.6	55.6	2.0	17.6	**39.1**
3150					
4000					
5000					

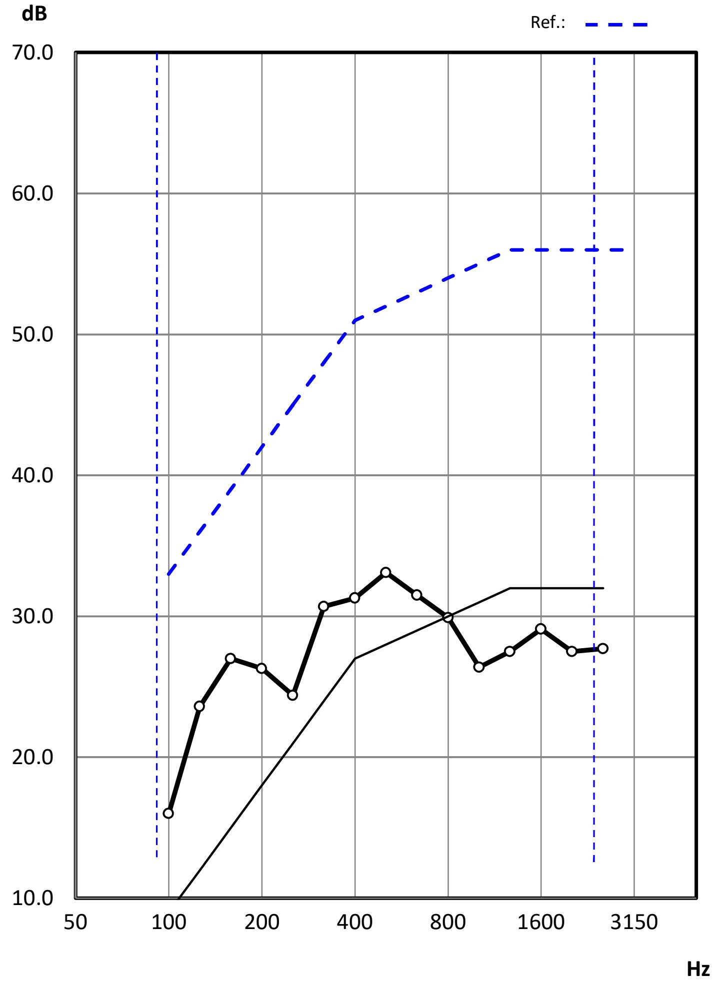
MEASUREMENT RESULTS

Dtr,2m,n,w 37 (-1 ; -2) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :
Test : 5F
Date of test : 3/8/22 11:16
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Dtr,2m,n 1/3 oct [dB]
50	
63	
80	
100	**16.0**
125	**23.6**
160	**27.0**
200	**26.3**
250	**24.4**
315	**30.7**
400	**31.3**
500	**33.1**
630	**31.5**
800	**29.9**
1000	**26.4**
1250	**27.5**
1600	**29.1**
2000	**27.5**
2500	**27.7**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w 28 (-0 ; -1) dB

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : 5F Date of test : 3/8/22 11:16
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Source Level [dB]	Receiver Level [dB]	Receiver RT [s]	Receiver BGN [dB]	Dtr,2m,n 1/3 oct [dB]
50					
63					
80					
100	74.7	62.5	1.9	40.2	**16.0**
125	87.0	66.4	1.6	33.2	**23.6**
160	93.2	69.7	1.8	33.9	**27.0**
200	91.8	70.3	2.4	33.6	**26.3**
250	89.2	68.9	2.0	30.2	**24.4**
315	92.8	66.3	2.1	29.9	**30.7**
400	89.6	62.7	2.2	28.3	**31.3**
500	87.3	58.7	2.2	24.7	**33.1**
630	83.0	56.5	2.5	20.5	**31.5**
800	78.9	54.6	2.9	20.3	**29.9**
1000	76.1	55.0	2.7	18.1	**26.4**
1250	78.7	55.9	2.4	17.2	**27.5**
1600	82.3	57.9	2.3	17.9	**29.1**
2000	82.2	59.0	2.1	18.7	**27.5**
2500	82.6	59.1	2.0	17.6	**27.7**
3150					
4000					
5000					

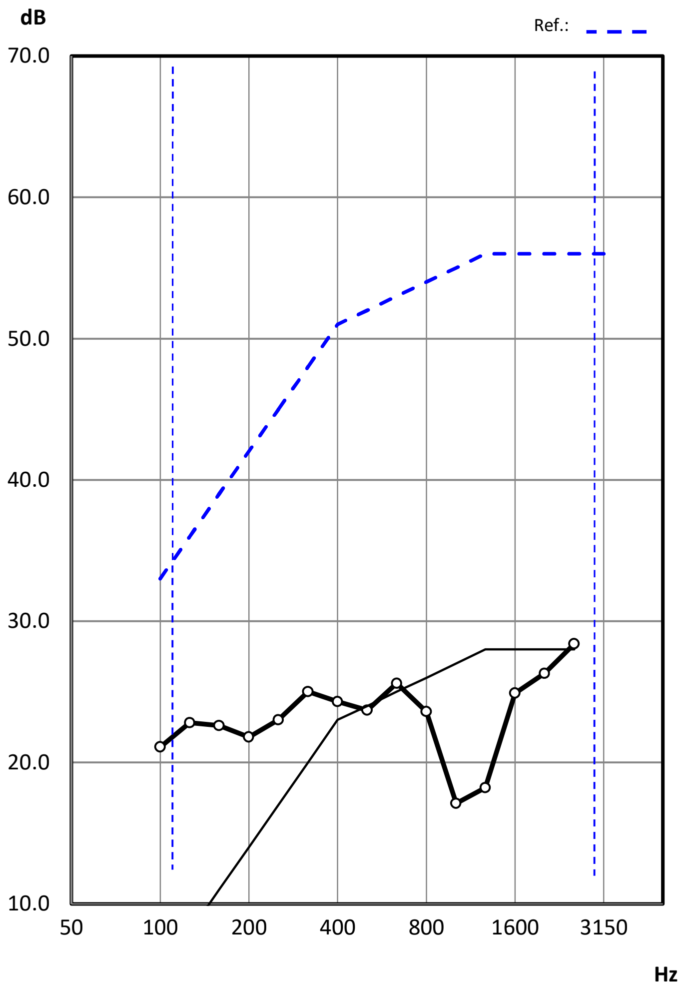
MEASUREMENT RESULTS

Dtr,2m,n,w 28 (-0 ; -1) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :
Test : 6F (1)   Date of test : 3/8/22 11:30
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Dtr,2m,n 1/3 oct [dB]
50	
63	
80	
100	**21.1**
125	**22.8**
160	**22.6**
200	**21.8**
250	**23.0**
315	**25.0**
400	**24.3**
500	**23.7**
630	**25.6**
800	**23.6**
1000	**17.1**
1250	**18.2**
1600	**24.9**
2000	**26.3**
2500	**28.4**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w   24 (-2 ; -3)   dB

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : 6F (1) Date of test : 3/8/22 11:30
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency	Source	Receiver			Dtr,2m,n
F	Level	Level	RT	BGN	1/3 oct
[Hz]	[dB]	[dB]	[s]	[dB]	[dB]
50					
63					
80					
100	73.5	56.1	1.9	40.2	**21.1**
125	82.1	62.3	1.6	33.2	**22.8**
160	86.1	66.9	1.8	33.9	**22.6**
200	87.1	70.1	2.4	33.6	**21.8**
250	91.2	72.3	2.0	30.2	**23.0**
315	93.4	72.6	2.1	29.9	**25.0**
400	92.3	72.5	2.2	28.3	**24.3**
500	91.9	72.7	2.2	24.7	**23.7**
630	90.3	69.8	2.5	20.5	**25.6**
800	87.8	69.8	2.9	20.3	**23.6**
1000	80.8	69.0	2.7	18.1	**17.1**
1250	80.4	66.9	2.4	17.2	**18.2**
1600	86.6	66.3	2.3	17.9	**24.9**
2000	87.8	65.8	2.1	18.7	**26.3**
2500	90.5	66.1	2.0	17.6	**28.4**
3150					
4000					
5000					

MEASUREMENT RESULTS

Dtr,2m,n,w 24 (-2 ; -3) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :

Test : 6F(2) Date of test : 3/8/22 11:37

Test Results : D-01

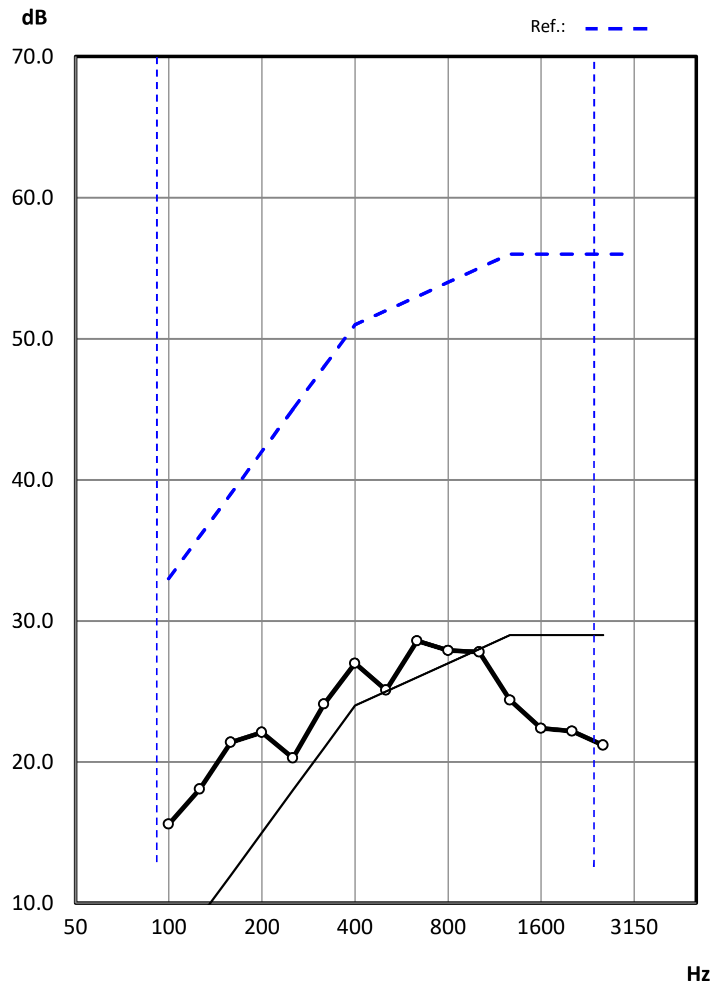
Transmission : Façade

Type of Source : Noise source

Emission : Unit_5_05

Receiving : Unit_5_05

Frequency F [Hz]	**Dtr,2m,n 1/3 oct [dB]**
50	
63	
80	
100	**15.6**
125	**18.1**
160	**21.4**
200	**22.1**
250	**20.3**
315	**24.1**
400	**27.0**
500	**25.1**
630	**28.6**
800	**27.9**
1000	**27.8**
1250	**24.4**
1600	**22.4**
2000	**22.2**
2500	**21.2**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w 25 (-1 ; -1) dB

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : 6F(2) Date of test : 3/8/22 11:37
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Source Level [dB]	Receiver Level [dB]	Receiver RT [s]	Receiver BGN [dB]	Dtr,2m,n 1/3 oct [dB]
50					
63					
80					
100	67.8	55.9	1.9	40.2	**15.6**
125	76.4	61.2	1.6	33.2	**18.1**
160	84.6	66.6	1.8	33.9	**21.4**
200	86.1	68.8	2.4	33.6	**22.1**
250	87.2	71.0	2.0	30.2	**20.3**
315	90.0	70.0	2.1	29.9	**24.1**
400	92.5	70.0	2.2	28.3	**27.0**
500	89.2	68.6	2.2	24.7	**25.1**
630	91.3	67.8	2.5	20.5	**28.6**
800	88.5	66.1	2.9	20.3	**27.9**
1000	85.8	63.3	2.7	18.1	**27.8**
1250	80.8	61.1	2.4	17.2	**24.4**
1600	81.2	63.4	2.3	17.9	**22.4**
2000	85.1	67.1	2.1	18.7	**22.2**
2500	84.4	67.3	2.0	17.6	**21.2**
3150					
4000					
5000					

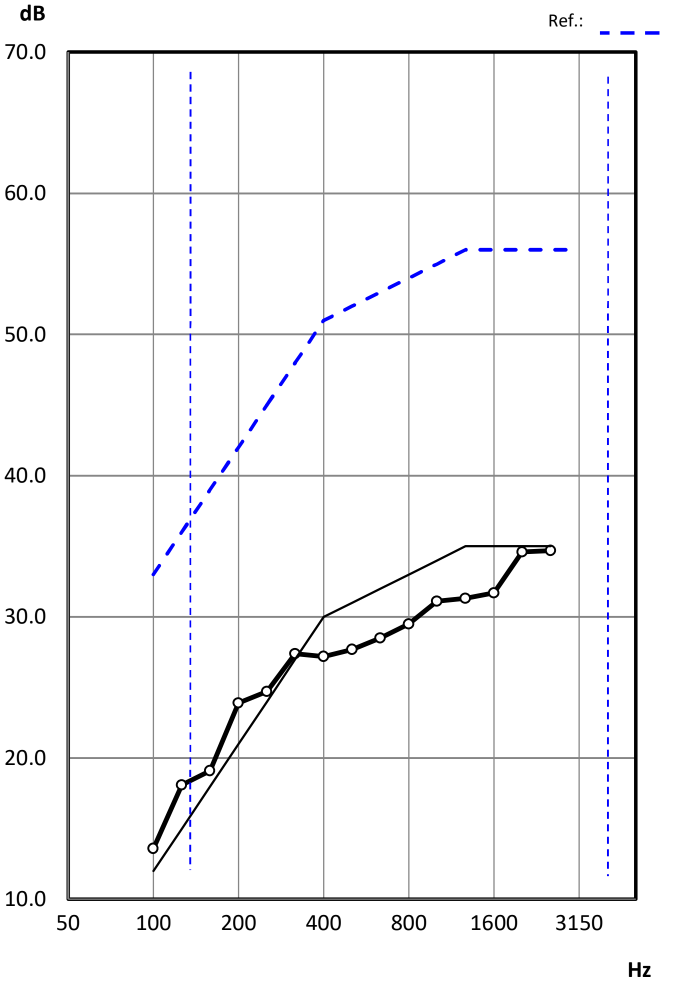
MEASUREMENT RESULTS

Dtr,2m,n,w 25 (-1 ; -1) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :
Test : Celebration Roof   Date of test : 3/8/22 12:27
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Dtr,2m,n 1/3 oct [dB]
50	
63	
80	
100	**13.6**
125	**18.1**
160	**19.1**
200	**23.9**
250	**24.7**
315	**27.4**
400	**27.2**
500	**27.7**
630	**28.5**
800	**29.5**
1000	**31.1**
1250	**31.3**
1600	**31.7**
2000	**34.6**
2500	**34.7**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w   31 (-1 ; -4)   dB

njd Environmental Associates

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : Celebration Roof   Date of test : 3/8/22 12:27
Test Results : D-01
Transmission : Façade
Type of Source : Noise source
Emission : Unit_5_05
Receiving : Unit_5_05

Frequency F [Hz]	Source Level [dB]	Receiver Level [dB]	Receiver RT [s]	Receiver BGN [dB]	Dtr,2m,n 1/3 oct [dB]
50					
63					
80					
100	67.4	57.5	1.9	40.2	**13.6**
125	77.2	62.0	1.6	33.2	**18.1**
160	82.4	66.8	1.8	33.9	**19.1**
200	87.8	68.7	2.4	33.6	**23.9**
250	90.9	70.3	2.0	30.2	**24.7**
315	92.8	69.5	2.1	29.9	**27.4**
400	92.5	69.8	2.2	28.3	**27.2**
500	93.1	69.9	2.2	24.7	**27.7**
630	93.2	69.7	2.5	20.5	**28.5**
800	91.9	68.0	2.9	20.3	**29.5**
1000	91.7	65.9	2.7	18.1	**31.1**
1250	91.5	65.0	2.4	17.2	**31.3**
1600	90.5	63.4	2.3	17.9	**31.7**
2000	91.1	60.8	2.1	18.7	**34.6**
2500	91.0	60.4	2.0	17.6	**34.7**
3150					
4000					
5000					

MEASUREMENT RESULTS

Dtr,2m,n,w 31 (-1 ; -4) dB

Airborne Sound Insulation of façades ISO 16283-3

Client :

Test : Rustic Roof   Date of test : 3/8/22 12:18

Test Results : D-01

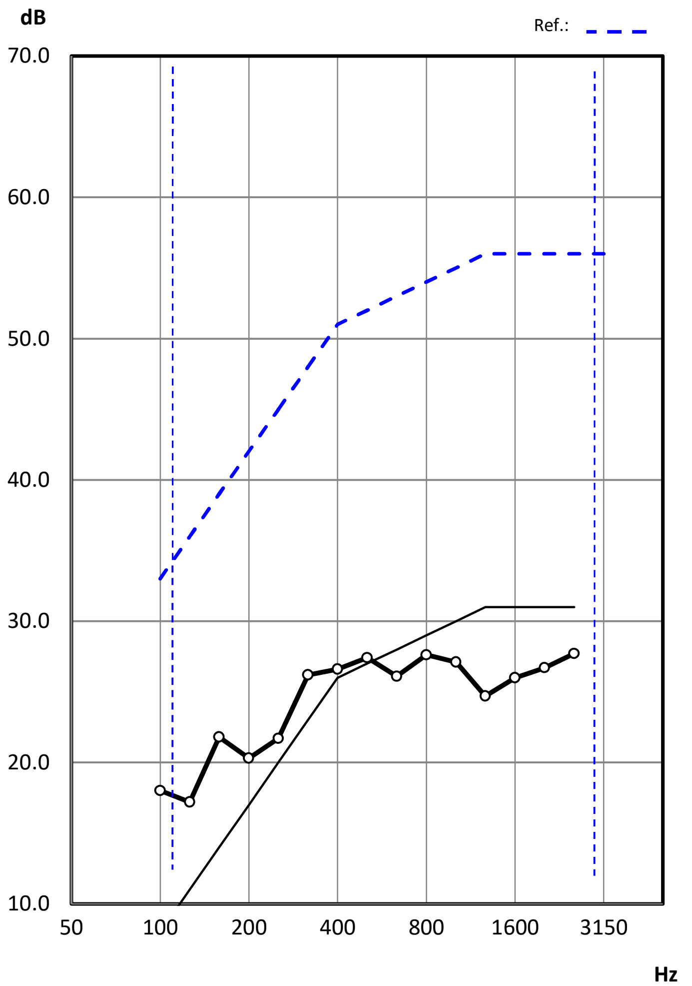
Transmission : Façade

Type of Source : Noise source

Emission : Unit_5_05

Receiving : Unit_5_05

Frequency F [Hz]	**Dtr,2m,n 1/3 oct [dB]**
50	
63	
80	
100	**18.0**
125	**17.2**
160	**21.8**
200	**20.3**
250	**21.7**
315	**26.2**
400	**26.6**
500	**27.4**
630	**26.1**
800	**27.6**
1000	**27.1**
1250	**24.7**
1600	**26.0**
2000	**26.7**
2500	**27.7**
3150	
4000	
5000	



Weighted Standardised Level Difference based on ISO 717-1

Dtr,2m,n,w   27 (-1 ; -2)   dB

DETAILED RESULTS OF MEASURED AIR BORNE NOISE

Test : Rustic Roof　　Date of test : 3/8/22 12:18

Test Results : D-01

Transmission : Façade

Type of Source : Noise source

Emission : Unit_5_05

Receiving : Unit_5_05

Frequency F [Hz]	Source Level [dB]	Receiver Level [dB]	Receiver RT [s]	Receiver BGN [dB]	Dtr,2m,n 1/3 oct [dB]
50					
63					
80					
100	82.6	65.3	0.9	31.8	**18.0**
125	91.2	73.3	0.7	31.1	**17.2**
160	95.0	74.2	1.0	32.0	**21.8**
200	95.5	75.4	0.8	32.4	**20.3**
250	97.9	76.4	0.8	27.4	**21.7**
315	99.5	74.2	1.0	25.7	**26.2**
400	97.6	72.0	1.0	25.0	**26.6**
500	96.9	69.7	0.8	25.2	**27.4**
630	96.0	70.8	1.0	24.3	**26.1**
800	95.7	69.0	1.0	23.9	**27.6**
1000	94.7	68.1	0.9	24.1	**27.1**
1250	91.9	67.6	0.9	22.4	**24.7**
1600	90.9	65.3	0.9	20.2	**26.0**
2000	90.9	64.3	0.8	19.6	**26.7**
2500	90.3	62.6	0.8	17.5	**27.7**
3150					
4000					
5000					

MEASUREMENT RESULTS

Dtr,2m,n,w 27 (-1 ; -2)　　dB

Calibration Certificate

CE-REP-10331.xls

ISSUED FOR : NJD
MILBURN HOUSE
DEAN STREET

NE1 1LF NEWCASTLE UPON TYNE
UK

Name and location of the laboratory of calibration:
Acoustic1 - Overdale Manordeilo, Llandeilo
Carmathenshire UK SA19 7BD

TESTED INSTRUMENT
Designation : Sound calibrator

Manufacturer : 01dB

Type : CAL21

Serial number : 34675377

Identification number :

Date of issue : 03/03/2021

This certificate includes 3 pages

The measurements are performed according to the IEC 60942: 2017, Electroacoustics, - Sound calibrators.

Steve THOMAS
Head of calibration laboratory at Acoustic 1

François MAGAND
Head of calibration laboratory at ACOEM-01dB

Maxime DONET (delegated)

THIS CERTIFICATE is compliant with THE FD X 07-012 STANDARD DOCUMENTATION

Identification :

	Sound calibrator
Manufacturer	01dB
Type	CAL21
Serial number	34675377
Adaptor	BAC21

Calibration Program:

The calibrator has been calibrated on different characteristics:
- Acoustic pressure level
- Acoustic signal frequency
- Total distortion + noise

Calibration Method:

The instrument has been calibrated in a air conditioning room. The characteristics are measured on a measuring chain which used a calibrated acoustic calibrator as reference.
The total distortion + noise is measured using a rejection filter device (distortion factor meter).

Calibration conditions:

Date of calibration	3/3/2021
Operator Name	Steve Thomas
Calibration instruction	MET.18.INS.084
Static pressure	>95,5 ; <105 kPa
Temperature	23 ± 3 °C
Relative humidity	>25 ; <70 %HR

Instruments used for calibration:

Designation	Manufacturer	Type	Serial number	Identification number
Multimeter	HP	34401A	3146A27296	-
Distortion meter	HP	8903E	2818A00381	-
Conditioner	GRAS	12AK	323147	-
Calibrator	ACOEM	CAL21	34675324	-
Microphone	ACOEM	MCE212	18019	-
Thermometer, hygrometer, barometer	TESTO	622	39517641/806	-

Results:

Mentioned expanded uncertainties correspond to two standard uncertainty types (k=2). Standard uncertainties are calculated including different uncertainty components, reference standards, instruments used, environmental conditions, calibrated instrument contribution, repeatability…

This calibration certificate guarantees the traceability of calibration measurements to the International System of Units (SI).
Cofrac is signatory of the European co-operation for Accreditation (EA) and of International Laboratory Accreditation Cooperation (Ilac) multilateral agreement. EA signatories recognise the equivalence of calibration certificates issued by EA agreement signatories.

	Nominal value	Displayed value	Measurement error	Maximum permissible errors	Expanded uncertainty
Frequency (Hz)	1000.0	1001.9	1.9	± 7,0	0.6
Level (dB)	94.00	94.10	0.10	± 0,25	0.08
Total distortion + noise (%)		1.6		2.5	0.4

Calibrator user manual	NOT1406 September 2016 G - CAL21 CAL02 User Manual FR_EN
Type-approval certificate	France: LNE-30010 rev. 0 01/09/2015 Deutschland: PTB 21.51 03.01 27/01/2003

Conclusion:

This sound level calibrator is **compliant with the specifications.**

End of calibration certificate

FUSION Smart Sound & Vibration Analyzer

Tests report, according to the IEC 61672-3

01dB.com

Tests report

TR-REP-10474.xls

ISSUED FOR :

NJD
Collingwood Buildings
38 Collingwood Street

NE1 1JF NEWCASTLE UPON TYNE
UK

Name and location of the laboratory of tests:
Acoustic1 - Overdale Manordeilo, Llandeilo
Carmathenshire UK SA19 7BD

TESTED INSTRUMENT

Designation : Integrator Sound Level Meter

Manufacturer : 01dB

Type : FUSION + DMK

Serial number : 11763

Identification number :

Date of issue : 24/06/2022

This report includes 7 pages

The measurements are performed according to the IEC 61672-3, Electroacoustics, - Sound level meters – Part 3: Periodic tests.

Steve THOMAS
Head of calibration laboratory at Acoustic 1

François MAGAND
Head of calibration laboratory at ACOEM-01dB

Maxime DONET (delegated)

THIS REPORT is compliant with THE FD X 07-012 STANDARD DOCUMENTATION

Identification :

	Sound level meter	Microphone	Accessories
Manufacturer	01dB	GRAS	
Type	FUSION + DMK	40CE	
Serial number	11763	291804	
Firmware version	See Tests report of FUSION without DMK		
Calibrator	**Calibrator of the Laboratory**		

Program:

The Sound level meter has been tested on the following characteristics:

- Self-generated noise
- Acoustical signal tests of a frequency weightings
- Electrical signal tests of frequency weightings
- Frequency and time weightings at 1 kHz
- Long-term stability
- Level linearity
- Toneburst response
- C-weighted peak sound level
- Overload indication
- High-level stability

Method:

The instrument is tested in an air conditioned room. The characteristics are tested with multimeter and generator calibrated in amplitude and in frequency. Some manufacturer's corrections have been applied to account the acoustical effect from the case of the sound level meter and his accessories (IEC 61672-3). These corrections are available in the sound level meter user manual.

The reference frequency of the sound level meter is 1000 Hz. The reference sound pressure level of the sound level meter is 94 dB. The sound level meter possesses a single level range.

Tests conditions:

Date of tests	6/24/2022
Operator Name	MET.15.INS.001_D_Fr
Tests instruction	0
Static pressure	>95,5 ; <105 kPa
Temperature	23 ± 3 °C
Relative humidity	>25 ; <70 %HR

Instruments used for tests:

Designation	Manufacturer	Type	Serial number	Identification number
Insulated chamber	SKC Acoustic	-	-	-
Waveform generator	KEYSIGHT	33500B	MY57301384	-
Progammable Attenuator	ACOEM	OUT1694000	17-10-208	-
Electrostatic actuator	GRAS	14AA	288498	-
Thermometer, hygrometer, barometer	TESTO	622	39517641/806	-
Calibrator	ACOEM	CAL 21	34675324	-

Results:

Mentioned expanded uncertainties correspond to two standard uncertainty types (k=2). Standard uncertainties are calculated including different uncertainty components, reference standards, instruments used, environmental conditions, calibrated instrument contribution, repeatability…

The indicated Maximum Permissible Errors (M.P.E.) are the ones defined in the standard 61672-1 for a class 1 sound level meter.

Indication at the calibration check frequency

Initial indication (dB)	Correction (dB)	Adjusted indication (dB)	Tolerance (dB)
93.3	0.4	93.5	+/- 1,0

Self-generated noise

0° RA208 + short windscreen

Microphone replaced by the electrical input-signal device	Nominal value (dB)	Displayed value (dB)
Leq dBA	< 14	11.1
Leq dBB	< 15	10.5
Leq dBC	< 20	11.4
Leq dBZ	< 21	17.1

Microphone installed	Nominal value (dB)	Displayed value (dB)
Leq dBA	< 20	16.7

Acoustical signal tests of a frequency weightings

0° RA208 + short windscreen	Measurement error *C* (dB)	Uncertainty (dB)	Maximum Permissible Error (dB)
125 Hz	-0.1	0.3	+/- 1,0
1000 Hz	0.0	0.3	+/- 0,7
8000 Hz	-0.9	0.5	-2,5 ; +1,5

Electrical signal tests of frequency weightings

0° RA208 + short windscreen	Measurement error *Z* (dB)	*A* (dB)	*C* (dB)	Uncertainty (dB)	Maximum Permissible Error (dB)
63 Hz	-0.1	-0.3	-0.3	0.4	+/- 1,0
125 Hz	-0.2	-0.3	-0.2	0.4	+/- 1,0
250 Hz	-0.2	-0.2	-0.2	0.4	+/- 1,0
500 Hz	0.0	-0.1	0.0	0.4	+/- 1,0
1000 Hz	0.0	0.0	0.0	0.4	+/- 0,7
2000 Hz	0.1	0.1	0.1	0.4	+/- 1,0
4000 Hz	0.5	0.5	0.5	0.6	+/- 1,0
8000 Hz	-0.5	-1.0	-1.0	0.6	-2,5 ; +1,5
16000 Hz	-3.1	-8.4	-8.4	0.4	-16,0 ; +2,5

Frequency and time weightings at 1 kHz

0° RA208 + short windscreen	Displayed value (dB)	Measurement error (dB)	Uncertainty (dB)	M.P.E. (dB)
Lp dBA / 1000 Hz Fast	94.0	Reference	0.0	
Lp dBA / 1000 Hz Slow	94.0	0.0	0.0	+/- 0,1
LEQ dBA / 1000 Hz	94.0	0.0	0.0	+/- 0,1
Lp dBC / 1000 Hz Fast	94.0	0.0	0.0	+/- 0,2
Lp dBZ / 1000 Hz Fast	94.0	0.0	0.0	+/- 0,2

Long-term stability

0° RA208 + short windscreen

Displayed value (dB) Initial indication	Final indication	Measured deviation (dB)	Uncertainty (dB)	Maximum Permissible Error (dB)
94.0	94.0	0.0	0.1	+/- 0,1

Level linearity

0° RA208 + short windscreen

Nominal value (dB)	Displayed value (dB)	Measurement error (dB)	Uncertainty (dB)	Maximum Permissible Error (dB)
94.0	94.0	0.0	0.3	+/- 0,8
99.0	99.1	0.0	0.3	+/- 0,8
104.0	104.0	0.0	0.3	+/- 0,8
109.0	109.0	0.0	0.3	+/- 0,8
114.0	113.9	-0.1	0.3	+/- 0,8
119.0	118.9	-0.1	0.3	+/- 0,8
124.0	123.9	-0.1	0.3	+/- 0,8
128.0	127.9	-0.1	0.3	+/- 0,8
129.0	128.9	-0.1	0.3	+/- 0,8
130.0	129.9	-0.1	0.3	+/- 0,8
131.0	130.9	-0.1	0.3	+/- 0,8
132.0	131.9	-0.1	0.3	+/- 0,8
133.0	132.9	-0.1	0.3	+/- 0,8
94.0	94.0	0.0	0.3	+/- 0,8
89.0	89.0	0.0	0.3	+/- 0,8
84.0	84.1	0.1	0.3	+/- 0,8
79.0	79.1	0.1	0.3	+/- 0,8
74.0	74.0	0.0	0.3	+/- 0,8
69.0	69.0	0.0	0.3	+/- 0,8
64.0	64.1	0.1	0.3	+/- 0,8
59.0	59.1	0.0	0.3	+/- 0,8
54.0	54.0	0.0	0.3	+/- 0,8
49.0	49.0	0.0	0.3	+/- 0,8
44.0	44.0	0.0	0.3	+/- 0,8
39.0	39.0	0.0	0.3	+/- 0,8
34.0	34.0	0.0	0.3	+/- 0,8
29.0	29.2	0.2	0.3	+/- 0,8
28.0	28.3	0.3	0.3	+/- 0,8
27.0	27.3	0.3	0.3	+/- 0,8
26.0	26.1	0.0	0.3	+/- 0,8
25.0	25.1	0.1	0.3	+/- 0,8
24.0	24.0	0.0	0.3	+/- 0,8

Toneburst response

0° RA208 + short windscreen

Description	Displayed value (dB)	Measurement error (dB)	Uncertainty (dB)	Maximum Permissible Error (dB)
Lpmax 135 dB 4000 Hz A Slow 200 ms	127.6	0	0.1	+/- 0,5
Lpmax 135 dB 4000 Hz A Slow 2 ms	108	0	0.1	-3,0 ; +1,0
Lpmax 135 dB 4000 Hz A fast 200 ms	134	0	0.1	+/- 0,5
Lpmax 135 dB 4000 Hz A fast 2 ms	117	0	0.1	-1,5 ; +1,0
Lpmax 135 dB 4000 Hz A fast 0.25 ms	107.9	-0.1	0.1	-3,0 ; +1,0
Leq 135 dB 4000 Hz A 1000 200 ms	128	0	0.1	+/- 0,5
Leq 135 dB 4000 Hz A 1000 2 ms	108	0	0.1	-1,5 ; +1,0
Leq 135 dB 4000 Hz A 1000 0.25 ms	98.9	-0.1	0.1	-3,0 ; +1,0

C-weighted peak sound level

0° RA208 + short windscreen

Description	Displayed value (dB)	Measurement error (dB)	Uncertainty (dB)	Maximum Permissible Error (dB)
8000 Hz Complete cycle	136.9	1.5	0.1	+/- 2,0
500 Hz Positive one-half-cycle	134.3	-0.1	0.1	+/- 1,0
500 Hz Negative one-half-cycle	134.4	0.0	0.1	+/- 1,0

Overload indication

0° RA208 + short windscreen

Displayed value (dB)		Measured deviation	Uncertainty	Maximum Permissible Error (dB)
Positive one-half-cycle	Negative one-half-cycle	(dB)	(dB)	
110.8	111.1	-0.3	0.2	+/- 1,5

High-level stability

0° RA208 + short windscreen

Displayed value (dB)		Measured deviation	Uncertainty	Maximum Permissible Error (dB)
Initial indication	Final indication	(dB)	(dB)	
135.9	135.9	0.0	0.0	+/- 0,1

Conclusion

CEI 61672-3 CEI:2013 Chapter:	Tests	Results
5	Preliminary inspection	Compliant
7	Environmental conditions	Compliant
10	Indication at the calibration check frequency	Compliant
11	Self-generated noise	Compliant
12	Acoustical signal tests of a frequency weighting	Compliant
13	Electrical signal tests of frequency weightings	Compliant
14	Frequency and time weightings at 1 kHz	Compliant
15	Long-term stability	Compliant
16	Level linearity on the reference level range	Compliant
18	Toneburst response	Compliant
19	C-weighted peak sound level	Compliant
20	Overload indication	Compliant
21	High-level stability	Compliant

FUSION user manual	DOC1131 version M February 2018
Type-approval certificate	France: LNE-27092 revision 2 dated 04/04/2017 Deutschland: DE-16-M-PTB-0006 dated 28/09/2016

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organization responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

End of tests report

Chapitre 2.
CERTIFICAT D'ETALONNAGE
CALIBRATION CERTIFICATE

CE-DTE-L-22-PVE-82125

DELIVRE PAR :
ISSUED BY :

ACOEM

Service Métrologie

85 route de Marcilly
69380 LISSIEU
France

INSTRUMENT ETALONNE
CALIBRATED INSTRUMENT

Désignation :
Designation :
Sonomètre Intégrateur-Moyenneur
Integrating-Averaging Sound Level Meter

Constructeur :
Manufacturer :
01dB

Type :
Type :
FUSION

N° de serie :
Serial number :
14360

N° d'identification :
Identification number

Date d'émission :
Date of issue :
11/02/2022

Ce certificat comprend 10 Pages
This certificate includes *Pages*

LE RESPONSABLE PRODUCTION
MANUFACTURING MANAGER
Francis FERASIN

DTE-L-22-PVE-82125

CE CERTIFICAT EST CONFORME AU FASCICULE DE DOCUMENTATION FD X 07-012.
THIS CERTIFICATE IS COMPLIANT WITH THE FD X 07-012 STANDARD DOCUMENTATION