BRAIDEN ACOUSTICS LTD

Innovation Forum | 51 Frederick Road | Salford | Manchester | M6 6FP

Noise Impact Assessment

Prepared For :	Clitheroe Football Club Limited	Date :	25 Jun 2026
Site :	The Loom Loft Stadium, Pendle Road, Clitheroe BB7 1LZ	Report No. :	11506

1 Introduction

Braiden Acoustics Ltd has been commissioned by Clitheroe Football Club Limited to undertake an acoustic survey at the site of The Loom Loft Stadium, Pendle Road, Clitheroe BB7 1LZ in order to support planning application 3/2025/0647 which states "Proposed demolition of existing clubhouse and construction of new clubhouse and community hub".

1.1 Planning permission

A basic Noise Assessment was submitted with the other planning documents with the following response from the Environmental Health department:

Levels measured do not state what it is it an LAeq what time was measured etc…

Background noise isn't defined how have they determined it as background? No statistical analysis (e.g., typical background LA90).

It doesn't state measurable goals (e.g., required external noise limits at nearest receptors). It lacks a clear statement of assessment criteria — e.g., the relevant noise limits that the construction design aims to meet.

How are the averages calculated (there's an acoustic method, not a numerical method)

What class of sound level meter was used?

What was the calibration level?

Limited data points only 2 readings on 2 match days no daytime baseline, no post-event noise, no weekday measurement.

A single "base level" (46 dBA) is not robust enough for environmental assessment.

There's no assessment of noise breakout from the building - namely readings taken inside clubhouse do not quantify breakout levels at boundaries.

There's no differentiation between Rw, DnT,w, or façade performance The type of acoustic performance of the building is unclear. Planning/IOA guidance typically requires façade sound insulation performance, including corrections for low frequencies. (Music noise will have low frequency elements.)

The roof insulation performance appears low 40–45 dB for the roof is relatively weak compared to walls. In music venues, the roof is often the primary pathway for breakout noise, especially low frequency.

The construction details alone, without façade calculations or low-frequency modelling, do not prove that noise breakout will be adequately controlled to prevent disturbance.

Use of a sound limiter is welcomed but need to set levels on frequency ranges 90 dBA LAeq inside is typical of nightclub-level music and is likely to cause breakout unless the building envelope is extremely robust. Many venues limit internal levels to 85 dBA or lower to control breakout.

Basically no modelling of external levels

The key missing element is prediction of noise at nearest receptors given:

internal source levels

wall/roof/door/window performance

distance to receptors

Without façade breakout calculations, we cannot judge if emissions will be acceptable at nearby residential properties.

Noise from music venues is usually assessed using Control of Noise from Pubs and Clubs (IOA), with emphasis on low-frequency impacts. No low-frequency analysis is included.

A Noise Impact Assessment (NIA) with modelling, low-frequency analysis, environmental noise assessment, and predicted receptor levels would almost certainly be required.

1.2 AIM

This report shall determine the noise sources and receivers, their baseline noise thresholds and assess noise break out according to relevant standards and guidance.

In summary, the EHO's comment's above will be addressed so that suitable mitigation can be proposed after robust assessment, where appropriate.

2 DESCRIPTION OF SITE

The current site is a single storey clubhouse on the southern edge of Clitheroe football ground.

Figure 1
Current Clubhouse

2.1 SITE LOCATION AND SURROUNDING USES

The clubhouse is on the southern elevation of the football ground, beyond which is a small car park associated with the clubhouse. Beyond that is an alleyway / unofficial road that accesses the rear of the properties to the south that front on to Shawbridge Road.

To the north west is a bigger car park that is accessed just off Shawbridge Road. To the south east is access to 1 Shawbridge Road (Ashgrove Barn) and a small detached residential property that was formerly an outbuilding of Ashgrove Barn.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

To the east of the site are the rear elevations of the residential properties at 33 – 39 Mearly Skye, with 27 -31 Mearly Syke a little further to the north east, although the gable end of 31 faces the clubhouse.

Figure 2
Site location and surrounding uses

2.1.1 Nearest sensitive receivers

There is residential accommodation at the following addresses and their distances from the new clubhouse:

- Ashgrove Barn 21.1m
- Ashgrove Barn outbuilding 14.9m
- 57 – 67 Shawbridge Road 29.3m
- 33 – 39 Mearley Syke 34.8m

The nearest residential property is Ashgrove Barn outbuilding, as shown in Figure 2

2.2 PROPOSED USE

The proposed works are to replace the prefabricated, modular clubhouse building, with a new masonry built structure.

The design has been adapted to allow for the building to be used as a community hub and not solely as a match day venue. It is planned to offer the building for community groups & clubs and for family functions.

The 'pitch' elevation (north east) and 'turnstile' elevation (north west) will remain in the same location except that that the footprint of the new clubhouse will be 3.65m longer (into the car park) and 5.2m wider.

The proposed building is to be constructed in rendered concrete blockwork with an insulated, coated steel sheet roof.

It is proposed to have a bar, beer cellar, small kitchen and toilets. As now, there will be facilities for DJs and live/amplified music.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

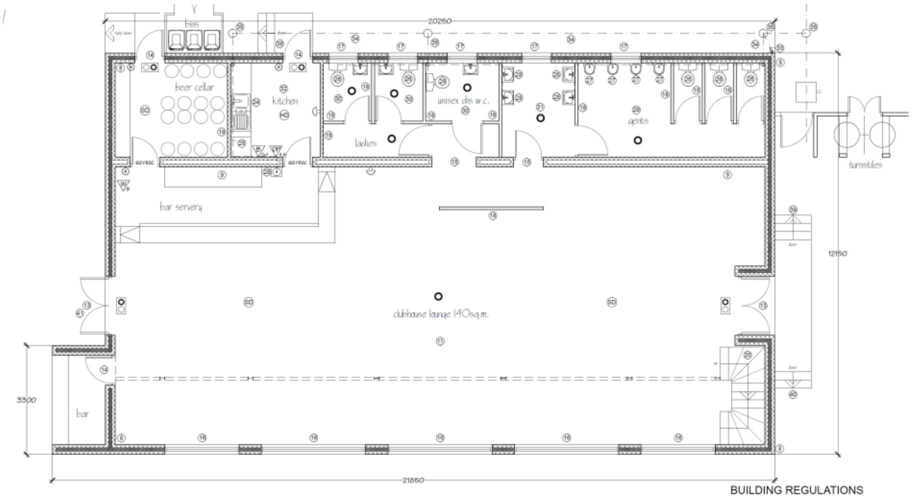

Figure 3
Ground floor proposed layout

2.2.1 Construction

Initially[1] the construction details are as follows:

External wall to be 100mm Tarmac Toplite 7 (7.3N/mm²) concrete blockwork outer leaf with 15mm self-coloured K-Rend render finish, 100mm Xtratherm CavityTherm full fill thermal insulation, 100mm Tarmac Toplite 7 (7.3N/mm²) concrete blockwork inner leaf with 13mm 2no coat lightweight plaster finish internally.

New roof to be 131mm Kingspan Quadcore KS1000RW insulated roof panels (110mm insulation core) 273 x 122mm Mi-Tek Posi-Rafter engineered rafters at 400mm centres (nominal pitch 10°). 1no layer 12.5mm Gyproc wallboard fitted to underside of rafters with lightweight plaster skim finish.

Windows - New upvc window c/w high performance hermetically sealed double-glazed units. Glazing to be laminated safety glass with manifestation markings.

Doors - new double entrance doors and frame fitted into new opening c/w high performance hermetically sealed double-glazed units. Glass to be laminated safety glass. Doors to be fitted with overhead door closers. The door to the external bar area will be 2040 x 900 x 44 solidcore timber but will only be in use during match days.

2.2.2 Opening hours

Monday	10:00 - 22:30
Tuesday to Thursday	10:00 - 23:00
Friday	10:00 - 21:00
Saturday	12:00 - 23:00
Sunday	12:30 – 17:00

2.2.3 Building services

There will be the introduction of cellar cooling condenser unit on the south eastern elevation, as shown below.

[1] Construction details may change pending this assessment.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

Figure 4
Location of new condenser unit

The proposed condenser unit is a J&E Hall J6LC41CV1 (indoor unit is JCC3 -40E).

The noise level of the outdoor unit is 26dB(A) @ 10m.

2.2.4 Sound system

Details of the sound system have yet to be finalised but recommendations will be given later in this report.

3 ACOUSTIC CRITERIA AND METHODOLOGY

3.1 BS 4142

BS 4142:1999 "Method for rating industrial noise affecting mixed residential and industrial areas" [1] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (*specific noise level*), L_{Aeq}, to the background noise level, L_{A90}, at the nearest sensitive receptor (NSR).

This Standard has been recently updated, BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" [2]. Whereas the old standard added 5dB 'penalty' to the Specific Noise Level (SNL) if the noise source has a 'character' that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise 'character'. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the *rating level*. The new Standard gives the guidance for the following types of noise character:

> *Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.*
>
> *Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.*
>
> *NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source's tonal and/or impulsive characteristics could also vary with time.*
>
> *Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.*
>
> *Tonality*
>
> *For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.*

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the *Rating Level*.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level.

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

3.2 COUNCIL NOISE CRITERIA

3.2.1 Entertainment Venues

For music and other 'entertainment noise', it is low frequencies that can be most problematic; hence the use of octave bands.

3.2.1.1 External noise transmission

For noise break out from a venue's façade(s) then the following criterion should be adhered to:

'Entertainment noise (LAeq) should be controlled to 10dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location'.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

4 Measurement Details

A site visit measured external Background Noise Levels at a local noise sensitive receptor.

4.1 Background noise monitoring

In order to assess potential noise from the proposed site, Background Noise Levels have been taken at the rear of 57 Shawbridge Street. Noise levels measured here are representative of those at the other nearby dwellings. There was no football match during the monitoring, nor any amplified music from the current clubhouse.

Background noise measurements were made in line with Section 8 – Background sound level, of BS4142:2014.

4.1.1 Measurement Time Interval, T_m

The Measurement Time Interval, T_m is given (in BS4142:2014 Section 3.6) as:

> *total time over which measurements are taken*

For measuring background noise levels, Section 8.1.3 of BS 4142:2014 states:

> *"Ensure that the measurement time interval is sufficient to obtain a representative value of the background sound level for the period of interest. This should comprise continuous measurements of normally not less than 15 min intervals, which can be contiguous or disaggregated."*

A site visit measured external background noise levels.

4.1.2 Monitoring details

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Equipment: NTi XL2 Class 1 integrated real time analyser & B&K 4231 calibrator.

Date: Wednesday 29th April 2026.

The sound level meter was calibrated before after the measurements with no drift reported.

Monitoring was unmanned.

4.1.3 Weather

The weather was conducive for noise monitoring.

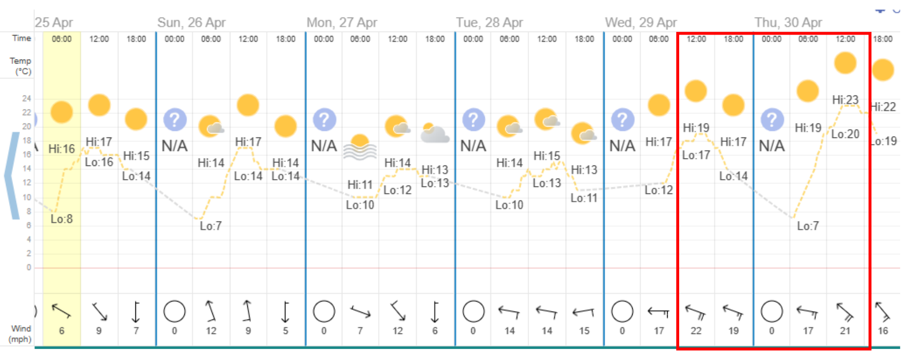

Figure 5
Weather condition during monitoring

The wind speeds tipped over the 10m/s limit, although there was no adverse effect on the noise data; otherwise the weather was fine and dry.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

4.1.4 Monitoring location

The location of the monitoring was at 1.5m from ground an over 3.5m from the rear elevation of 57 Shawbridge Street.

Figure 6
Monitoring Location

4.1.5 Monitoring times

Monitoring took place on a Wednesday[2] around midday for approximately 24 hours.

4.1.6 Monitoring results

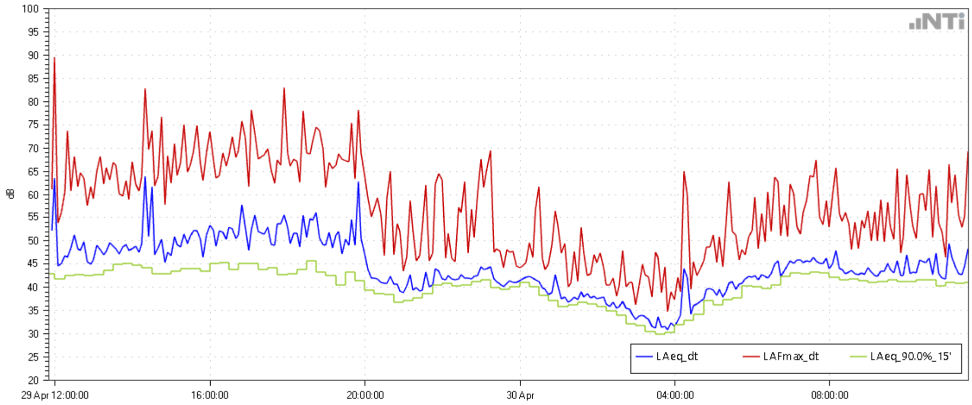

Figure 7
Measured noise levels

The noise climate in the immediate area is on the low side. There was some distant road traffic noise from the surrounding road network.

There were some faint aeroplane passes.

4.1.6.1 Background noise levels

The typical Background Noise Levels were determined using histograms. There were two time periods chosen:

1. Daytime 10:00 – 19:00 and
2. Evening 19:00 – 23:00.

[2] Wednesday is a relatively quiet time of the week and, therefore, worse case Background Noise Levels.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

This is because the evening period may be a more sensitive time for local residents.

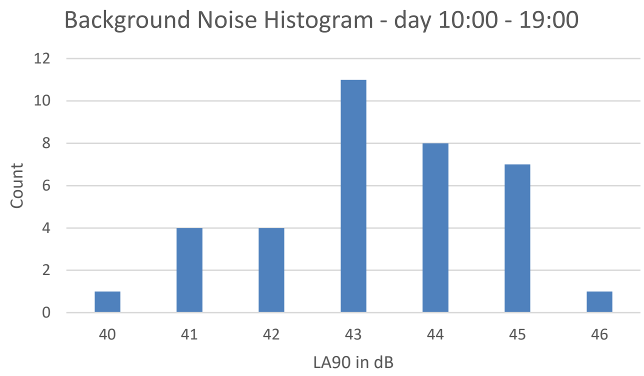

Figure 8
Histogram of day time BNLs

The typical Background Noise Level for the day time period when the clubhouse would be open (10:00 – 19:00) is 43 dB L_{A90}.

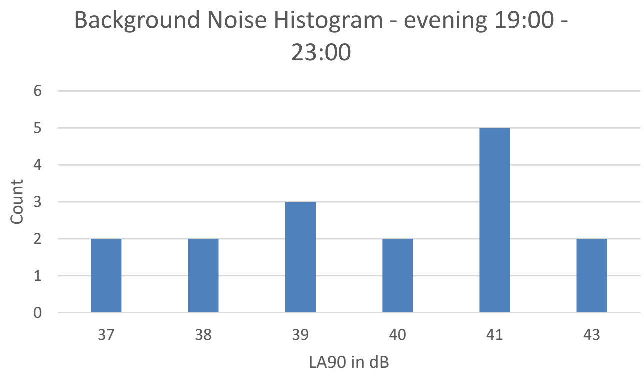

Figure 9
Histogram of evening time BNLs

The typical Background Noise Level for the evening time period when the clubhouse would be open (19:00 – 23:00) is 41 dB L_{A90}.

When the above typical background noise level Is expressed in octave frequency bands and un-weighted, and then plotted, it is obvious that there is an abundance of low frequency noise in the area, the source of which is unclear at this time.

However, in the assessment, the 63 Hz band will equal the adjacent 125Hz band, as a worst case scenario.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

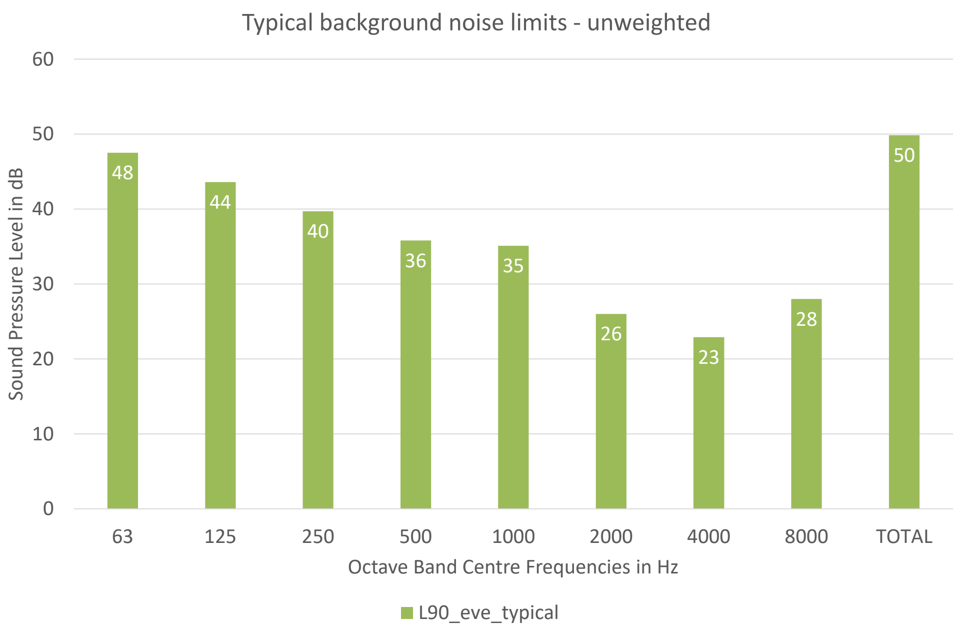

Figure 10
Typical evening background noise level in octave bands and unweighted

4.2 CLUBHOUSE INTERNAL NOISE LEVELS

A sound level meter was recorded the typical highest noise levels that the current clubhouse operates.

It is the lower frequency bands that are of interest (especially 63 and 125Hz), therefore the un-weighted octave band levels are given.

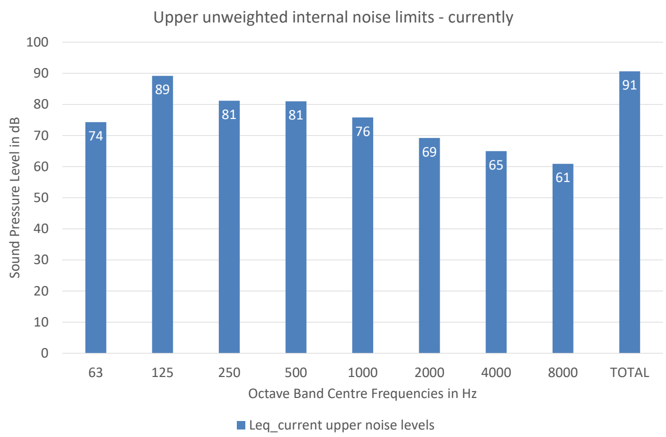

Figure 11
Current unweighted upper octave band noise levels

The above Figure shows that the highest octave band is 125 Hz).

5 ACOUSTIC ASSESSMENT

The assessment will consider:

1. Noise breakout from the venue via
   a. Rear façade
   b. Side façade.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

5.1 NOISE BREAKOUT

Using the Background Noise Levels, internal noise levels of the clubhouse have been calculated using a detailed methodology.

The measured external noise levels represent the typical evening time Background Noise Levels at the nearest residential dwellings as shown in Figure 2. From the octave band data, 10dB is deducted from each octave band to form the target noise levels at the nearest resident. Distance attenuation and the sound reduction of the relevant façade[3] are used to calculate the maximum permitted noise levels within the clubhouse. There are also corrections for an external free field level being transferred to an internal reverberant noise level.

Eqn (1) is a modified break out calculation (from a reverberant room to outside [3:p97]) to account for the fact that the external level is known (10dB below L_{A90}) and the unknown is the internal reverberant noise level.

$$SPL_{int,rev} = SPL_{ext} + SRI - 10\log S + A_{dist} + 14 \quad (1)$$

where SPL_{ext} = external open air sound pressure level (SPL), dB

$SPL_{int,rev}$ = internal reverberant SPL, dB

SRI = sound reduction index of building element, dB

S = area of building element, m²

A_{dist} = attenuation due to distance, dB

5.1.1 Distance attenuation, A_{dist}

There will be attenuation due to distance, of the noise break out from the façade of the site to the nearby residents (as shown in Figure 2). However, the façade is too big to be considered a point source and not long enough to be thought of as a line source. Therefore, it is a plane source where the distance attenuation is calculated using Eqn (2) [3]

$$A_{dist,plane} = 10\log_{10}\left(\frac{b/\pi}{a/\pi}\right) + 20\log_{10}\left(\frac{r}{b/\pi}\right) \quad (2)$$

where a = shorter façade length, m

b = longer façade length, m

r = source – receiver distance, m

5.1.2 Sound Reduction Index (SRI) facade calculation - methodology

The external elevations comprise of blockwork and glazing (not including the roof), so a composite Sound Reduction Index has been determined using a modified version of Equation G.1 in BS 8233.

$$L_{eq,2} = L_{eq,ff} + 10\log_{10}\left(\frac{A_0}{S}10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S}10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S}10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S}10^{\frac{-R_{rr}}{10}}\right) + 10\log_{10}\left(\frac{S}{A}\right) + 3 \quad (3)$$

[3] The composite SRI calculation in BS 8233, Eqn. G.1, is used to determine the overall façade Sound Reduction Index (SRI).

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

Details of the various construction is given in Section 2.2.1.

5.1.3 Façade dimensions

Initially, the areas of the various façade elements need to be determined.

5.1.3.1 Side Façade dimensions

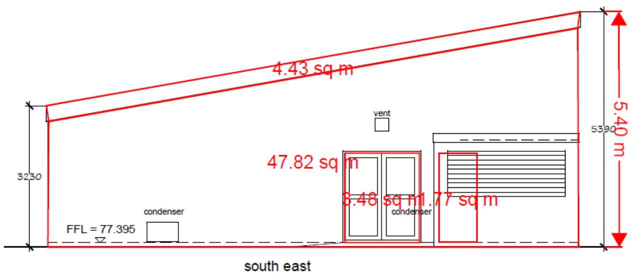

Figure 12
Façade and building element areas for the south eastern facade

5.1.3.2 Rear Façade dimensions

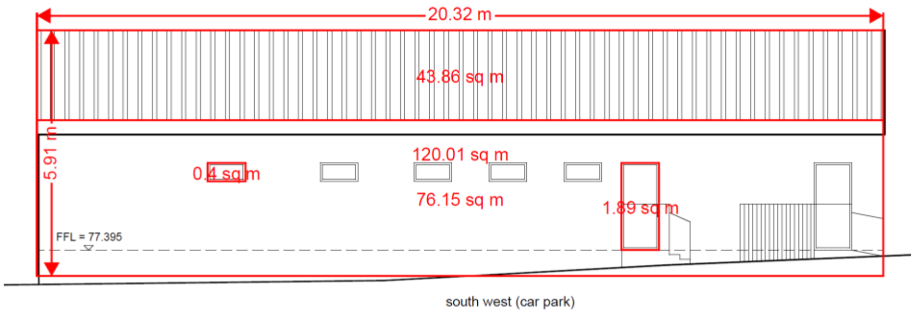

Figure 13
Façade and building element areas for the south western facade

5.1.4 Façade noise break-in assessments

Now that the external noise level, methodology and façade elements are known, internal noise levels can be determined. It was the goal of the assessment to achieve similar upper noise levels to those currently, as shown in Figure 11.

The rear elevation was assessed to the rear facades of the houses on Shawbridge Road, some 29m away.

The side elevation was assessed to the nearest residential property, which is 15m away.

Using the above methodology, assuming all windows and doors are closed, and factoring any upgraded glazing, the maximum permitted internal noise levels[4] have been calculated for both the rear and side elevations floors with the full calculations shown in the Appendix[5].

[4] Noise levels for the ground floor are likely to be less in reality due to leakage via the lobbied door system.

[5] The full calculation has used unweighted noise levels.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

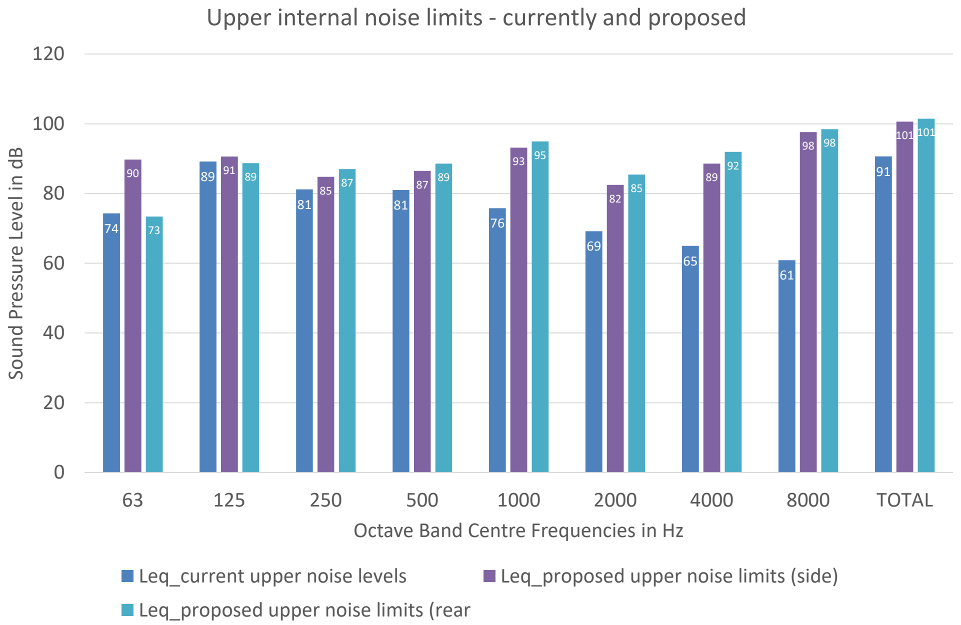

Figure 14
Existing and proposed noise levels for the side and rear facades

Interesting, the 'weaker' façade for noise breakout is the rear, even though is it 14m further away. This is because a lot of the total façade area is the roof, which is a poor sound insulation that a cavity blockwork wall.

Therefore, the permitted internal noise levels are as follows:

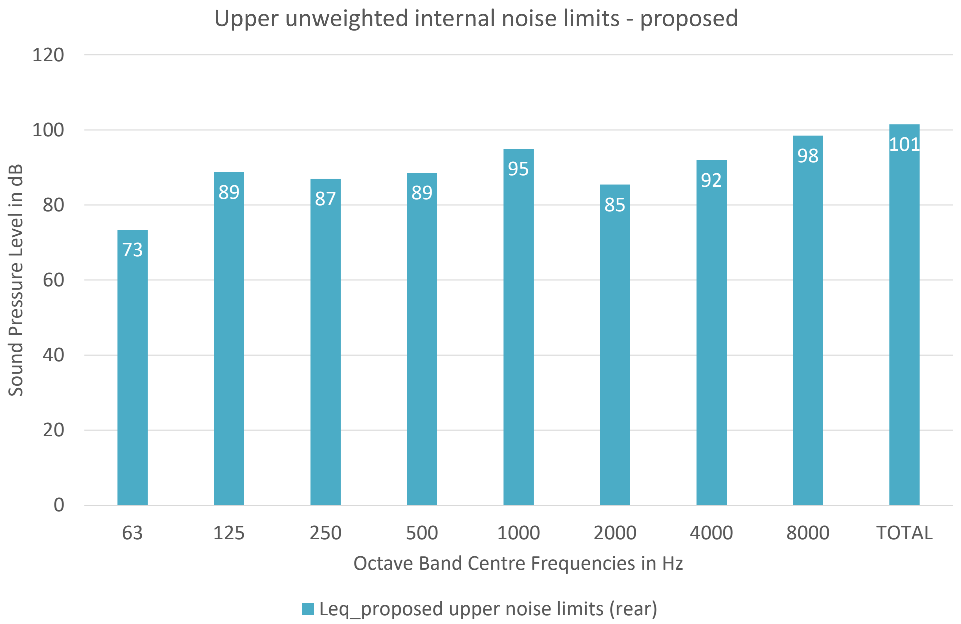

Figure 15
Proposed upper noise levels

In order for these noise levels to be achievable, there are several mitigation measures that must be implemented.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

5.1.5 Mitigation summary

The noise breakout calculation above assumes that all windows and doors are closed. Therefore, to ensure breakout noise is kept to a minimum, then the following mitigation is recommended:

- A lobbied door system should be installed to both side elevations to ensure that any access point has at least one door closed at any one time.
- The existing air conditioning systems will be repurposed so that windows and doors need not be opened for ventilation.
- The sound system should have the following specifications:
  - Loudspeakers should be smaller and frequently (i.e. more speakers rather than fewer) distributed around the space.
  - All loudspeakers should be isolated from the structure using anti-vibration mounts

5.1.5.1 Upgraded windows and doors on all elevations

All glazing (windows and doors) shall be upgraded with a minimum sound reduction index of 33 dB Rw + Ctr.

The solidcore door to the external bar area should also have a sound reduction index of 33 dB $R_w + C_{tr}$.

5.1.5.2 Upgraded ceiling

The ceiling is to be upgraded to 2 x 15mm Soundbloc on resilient bars. There should only be penetrations in the ceiling for cabling (or equivalent diameter) and then sealed with acoustic mastic.

5.1.5.3 Lobbied door system

There is currently no lobbied door system. A lobbied door system should be installed, as per the glazing performance[6] of 33 dB $R_w + C_{tr}$.. The drawings will need to be updated to reflect this.

5.1.5.4 Door seals

The lobbied doors will have acoustic seals including threshold seals. Integrity Acoustic Door Seal Range are available from Lorient Polyproducts Ltd (Tel: 01626 834 252). Recommended Lorient products are given below.

151212 Perimeter Batwing Seal

IS8020i Automatic Threshold Seal

184130 Threshold Plate 40mm wide x 4mm high

5.1.5.5 Sound system

The exact details of the music system are not known at this stage; however it is advised that the speakers should be smaller and more frequently distributed in the bar rather than one or two large speakers in one place. This is so that the audience receive more of the direct sound of their local loudspeaker and hence the overall sound level need not have to overcome the reverberation noise floor. In addition to this, smaller speakers are less able to produce potentially problematic low frequencies.

Subwoofer should not be used.

[6] Braiden Acoustics should be consulted regarding the entrance and lobbied door and structure.

5.1.5.6 Limiter

A noise limiter device will need to be installed so that noise levels do not breach those given in Figure 15.

The limiting device should also be able to limit the low frequencies, especially in the 63 and 125 Hz range.

Once installed, Braiden Acoustics will need to be on site to calibrate the system.

The limited must NOT be bypassed at any time.

6 CONCLUSION

An acoustic survey has taken place at The Loom Loft Stadium, Pendle Road, Clitheroe BB7 1LZ to assess potential noise sources.

Typical Background Noise Levels for the evening period is as follows:

Evening 41 dB L_{A90}

The nearest potential noise sensitive receptors are:

- Rear of propoeries on Shawbridge Road and
- Recently converted outbuilding of 1 Shawbrdge Road.

The noise impact assessment has revealed the following acoustic mitigation:

- The ceiling is to be upgraded to 2 x 15mm Soundbloc on resilient bars. There should only be penetrations in the ceiling for cabling (or equivalent diameter) and then sealed with acoustic mastic.
- All glazed units (doors and windows) will need to be upgraded so that each 'unit' (including frame and seals) has a sound reduction index of 33 dB Rw + Ctr.
- The solidcore doorset to the external bar should have the same Sound Reduction Index as above.
- The double doors on both side elevations should have lobby access (also with a Sound Reduction Index of 33 dB Rw + Ctr) to prevent sound leakage when the doors are opened for ingress and egress.
- Doors on the rear elevation should not be used when noise levels are high.
- All exterior doors to have acoustic seals.
- A limiter should also be installed. The assessment is based on the current typical upper noise level in the clubhouse, so, in theory, there should not be any perceived loss of noise level. It should be noted that soft furnishing / carpet etc. will have an effect on the allowable upper noise level. This unit should be calibrated by Braiden Acoustics once the build is complete.

Pending the recommendations of this report, the amenity of the local residents should be safeguarded.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

7 References

[1] BS 4142: 1997
Method for Rating industrial noise affecting mixed residential and industrial areas
British Standards Institute, 1997.

[2] BS 4142: 2014
Methods for rating and assessing industrial and commercial sound
British Standards Institute, 2014.

[3] R. Watson & O. Downey
The Little Red Book of Acoustics
Blue Tree Acoustics, 2008.

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk

Appendix

A1 Octave band calculations

Clitheroe FC clubhouse		BS 8233 Break-in calc	Rear façade - noise break out (windows CLOSED)	Octave band centre frequency							
Term	Value	Description	Details	63	125	250	500	1000	2000	4000	Total level
$L_{eq,ff}$		External free field noise level	L90_eve_typical	43.6	43.6	39.7	35.8	35.1	26.0	22.9	
$D_{n,e}$		SRI of ventilator	Trickle vent n/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
R_{wi}	5.8 m^2	SRI glazing	6 (12)10	30.0	30.0	28.0	34.0	41.0	39.1	48.0	
R_{ew}	114.2 m^2	SRI of external wall	Wall: + 1 x 10 mm Sand/Cement render (plaster) + 1 x 100 mm Concrete Block +	44.0	50.0	49.0	51.0	61.0	71.0	81.0	
R_{rr}	43.9 m^2	SRI of roof / ceiling	1 x 100 mm Kingspan KS1000 RW 80/100/120mm + Solid Joist with resilient	23.0	40.0	48.0	55.0	59.0	62.0	73.0	
SRI_{tot}		Total SRI of façade	Log sum	-25.6	-40.9	-43.1	-48.5	-55.5	-55.0	-64.2	

Clitheroe FC clubhouse		BS 8233 Break-in calc	Side façade - noise break out (windows CLOSED)	Octave band centre frequency							
Term	Value	Description	Details	63	125	250	500	1000	2000	4000	Total level
$L_{eq,ff}$		External free field noise level	L90_eve_typical	43.6	43.6	39.7	35.8	35.1	26.0	22.9	
$D_{n,e}$		SRI of ventilator	Trickle vent n/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
R_{wi}	5.3 m^2	SRI glazing (actually, door)	6 (12)10	30.0	30.0	28.0	34.0	41.0	39.1	48.0	
R_{ew}	42.6 m^2	SRI of external wall	Wall: + 1 x 10 mm Sand/Cement render (plaster) + 1 x 100 mm Concrete Block +	44.0	50.0	49.0	51.0	61.0	71.0	81.0	
R_{rr}	4.4 m^2	SRI of roof / ceiling	1 x 100 mm Kingspan KS1000 RW 80/100/120mm + Solid Joist with resilient	23.0	40.0	48.0	55.0	59.0	62.0	73.0	
SRI_{tot}		Total SRI of façade	Log sum	-38.4	-39.3	-37.3	-42.9	-50.3	-48.6	-57.6	

John Braiden BSc & MSc Acoustics, MIOA
Acoustic Consultant

0161 743 3621
john@braidenacoustics.co.uk