ACOUSTIC CONSULTANTS LTD

Noise Assessment

The Other Place
Ynisderw Road, Pontardawe

Reference: 9771/JA/BL

Client:	Local Authority:
HD PUB INVESTMENTS LTD	Neath Port Talbot County Borough • Bwrdeistref Sirol Castell-nedd Port Talbot •

Document Control

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1.0	First Issue	25/10/2022	James Abbass	Blake Lucas
RevA	Text amendments	10/11/2022	James Abbass	Blake Lucas
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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Acoustic Consultants Limited (ACL) have been appointed to provide acoustic advice with the aim of reducing the impact of noise on nearby residential premises from recorded and live music due to live music events at The Other Place, Ynisderw Road, Pontardawe.

Noise complaints have been received from nearby dwellings to the venue and a noise abatement notice (Live/1337/RM/1) has been served on management of The Other Place, a pub owned by Red Dragon Pubs. The noise complaints and the associated abatement notice relate to live and recorded music from inside the venue only, as we understand.

ACL have undertaken an attended noise survey at the site with a live band playing within the event space of the venue. Local Authority Environmental Health Officers were also in attendance during the survey, Rachel Matthews being one, who has been ACL's point of contact to arrange the survey.

The data obtained is presented within this report along with noise control measures to aid in reducing, as far as feasible, and using best available techniques (BAT), the impact of noise at the nearby dwellings. It should be noted that noise control measures may not reduce the noise level outside of the event space to the Local Authority's criteria provided in this report, on every occasion. Our proposals therefore also include for a sound limiter to be installed within the premises to minimise this risk.

The author of this report is an Associate Member of the Institute of Acoustics (AMIOA), has four years' experience in the field of noise and is considered suitably qualified to undertake this noise impact assessment. This report has been checked by a Member of the Institute of Acoustics (MIOA) and Director of the company with over 13 years' experience in the industry.

2. The Site

The Other Place is set in a residential road, Ynisderw Road, flanked by the A4067 to the south-east, and the A474 to the north. Road noise from the two A-roads makes up most of the ambient noise in the area. The venue is in the immediate vicinity of residential dwellings on Ynisderw Road, and Francis Street. We understand that complaints have been received from a few dwellings in these areas.

The following figure provides context of the site and surrounding area. The event space used by the pub is highlighted in yellow, and is set at the rear of the existing pub. All buildings in the streets the pub is located on are residential dwellings and are therefore classed as NSRs.

Figure 1: The Other Place, Pontardawe - Site Location

3. Local Authority Requirements

3.1. Premises License

The Other place operates under Premises License PREM-0322. This license allows operation of live and recorded music at the premises between the following hours:

- Sunday to Thursday: 08:00 to 23:00 hours
- Friday & Saturday: 08:00 to 01:00 hours
- New Year's Eve: Until 02:00 hours

The license states in Annex 2:

"2. Ensure that all windows and doors are kept closed whilst amplified music is being played."

"4. Provide a sound limitation device which is operational whenever amplified music is being played."

3.2. Abatement Notice

The Section 80 Abatement Notice was served on the 14th of September 2022, reference number Live/1337/RM/1, in respect of Statutory Nuisance.

The abatement notice does not give full details or clarity of the nuisance to abate or the level to abate too. However, from our discussions with the Local Authority the noise in question is from live and/or recorded music within the event space to the rear of the pub. This is the source of complaints from nearby residents.

3.3. Local Authority Agreement

Discussions and meetings have been held with Neath Port Talbot (NPT) Local Authority (LA). An online meeting was held on Wednesday the 28th of September 2022.

During the meeting, NPT informed ACL and our client that their preferred method of assessment for the noise was a subjective assessment. This was agreed upon by ACL.

It was agreed that a noise level at the nearby sensitive receivers (NSRs) would be deemed acceptable subjectively by NPT LA. The acceptable noise level forms the design noise level at the NSRs for noise control proposals.

To complete a subjective assessment, ACL proposed to attend site during a noise survey with NPT LA in attendance. Noise levels of a live band would be turned down within the venue until the levels at nearby noise sensitive receivers (NSRs) were deemed acceptable by the LA.

During a noise survey at the site with LA in attendance on the 11th of October 2022, the survey method that was agreed upon during the Teams meeting was discussed and confirmed to be carried out that evening. This entailed:

- Undertaking internal noise level measurements with the band playing at their typical level
- Carrying out external measurements around the building during typical internal music levels (for noise control design purposes)
- Turning the live band volume down inside the venue, until a subjectively acceptable level of music noise was agreed by LA at locations representative of the NSRs in the vicinity
- Once the subjective level was agreed upon by LA and ACL, a noise measurement would be carried out by ACL, at the same location as the subjective assessment. This would form the design criteria level at the façade of the NSRs

From our site survey detailed below, the design noise criteria to achieve as far as feasible, external to the NSRs is 45 dB(A).

As discussed with site management and LA, our assessment will endeavour to achieve this external noise level without hindering the operational noise levels within the venue when a band or recorded music is being played, as far as feasible.

4. Code of Practice for Noise Control at Concerts

We would consider the noise from amplified sound from these premises to fall under the criteria for noise from concerts, subject to number of events per year. It should be noted to follow the below guidance there should be no more than **12 events per year** with amplified sound.

Guidance is given in the "Code of Practice on Environmental Noise Control at Concerts" published by the Noise Council in 1995.The document provides guidance on noise levels at the nearest noise sensitive properties in terms of the Music Noise Level (MNL). This is the equivalent noise level due to music from the venue measured over a 15 minute period.

Table 1 in Section 3.0 of the Code of Practice provides guidelines for events based on the type of venue and number of concert days per calendar year. The relevant portion of the table for the proposed site is as follows:

Table 1: Relevant Noise Criteria for Music

Concert days per calendar year, per venue	**Venue Category**	**Guideline**
1-3	Other Urban and Rural Venues	The MNL should not exceed 65 dB(A) over a 15-minute period.
4 to 12	All Venues	The MNL should not exceed the background noise level by more than 15 dB(A) over a 15-minute period.

The Music Noise Level (MNL) is defined as the A-weighted equivalent noise level determined by music and vocals during a concert and not affected by other local noise sources. The criteria above is applicable to an event until 23:00 hours.

Guideline 3.4 states that by solely assessing the noise in terms of dB(A) can underestimate the intrusiveness of low frequency noise. Consequently, the individual octave frequency bands at 65 and 125 Hertz may need to be monitored, and neither of these should exceed 70 dB.

5. Noise Monitoring

An attended noise monitoring exercise was undertaken at the site on the 11th of October 2022. The survey was attended by Local Authority and site management.

5.1. Monitoring Procedure

A three-piece band were arranged to attend the survey. The band consisted of:

- Bass guitar and lead vocals
- Electronic drum kit
- Electric guitar and vocals

One song was chosen to play repeatedly by the band that they knew well, the song was 'I Would Walk 500 Miles', by The Proclaimers. The LA EHOs in attendance agreed with this song choice.

One fixed monitoring location was stationed within the event space. This was located centrally, at approximately 4 metres from the front of the stage and a height of 1.5 metres above the ground. The microphone was in a free-field position.

Attended measurements were undertaken within the event space; once at the beginning with the band's typical level, and once at the end with the reduced volume that resulted in a subjectively acceptable level at the façade of the NSR.

Attended measurements were also undertaken at several locations around the building with the music being played. These locations were at set and measured distances from The Other Place's building façade. Distance measurements were taken with a laser measure for accuracy. All external attended measurements were free field, at a height of 1.5 metres above the ground.

Attended measurements were undertaken within the garden of a property the LA had identified to subjectively measure from. These measurements were free field at a height of 2 metres (to clear the height of the garden wall). This location was the LA's agreed subjective assessment location, and the location deemed agreeable between ACL and LA to base the design criteria from.

5.1.1. Measurement Locations

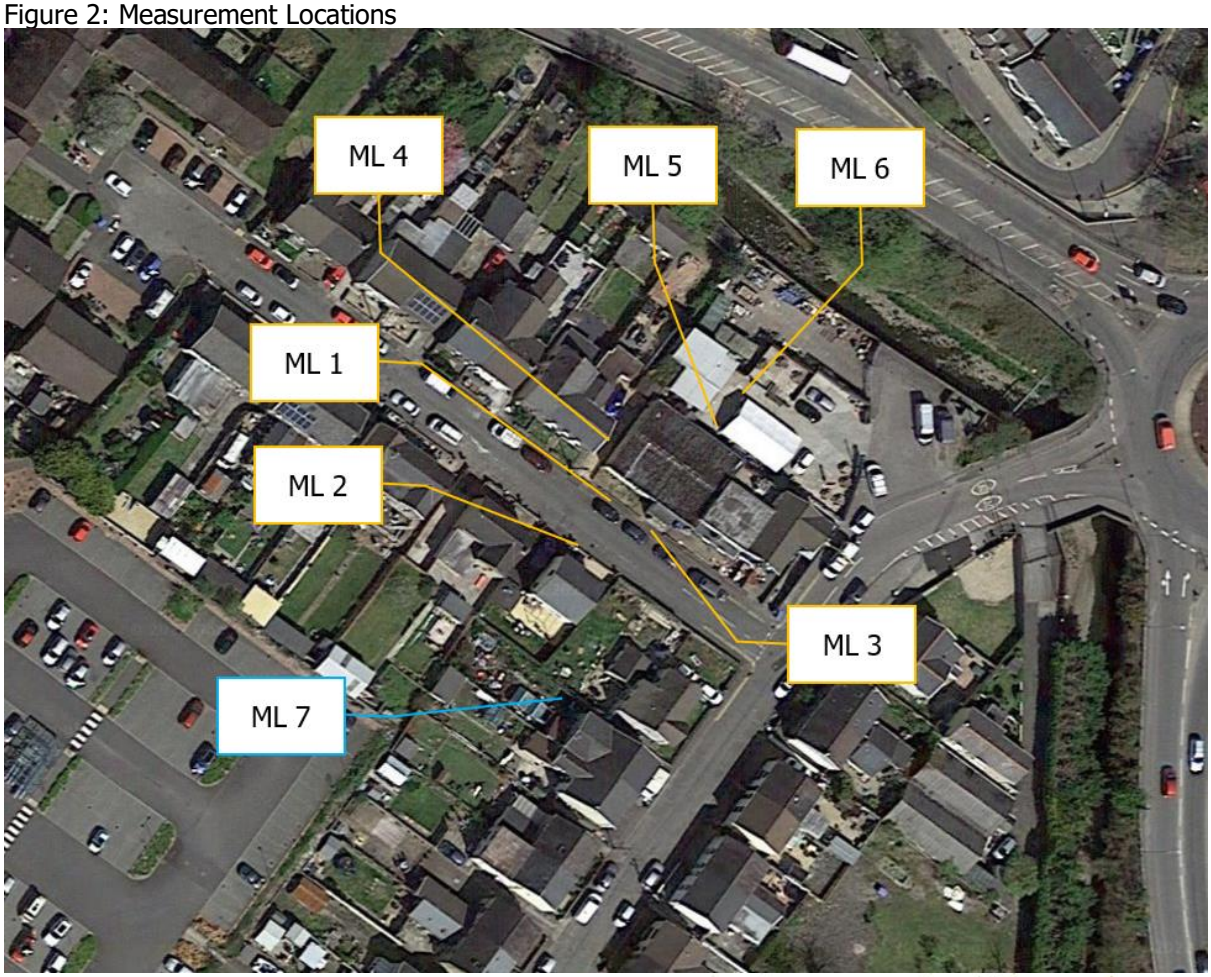
The following report will reference the measurement locations as provided in the following table and figure.

Table 2: Measurement Location Description & Distances

Measurement Location (ML)	Location Description	Distance from Venue Façade (m)
1	Francis Street windows	3.5
2	Francis Street windows	11
3	Lobby fire door	0.6
4	Rear façade of adjacent NSR	2.7
5	Courtyard window	2.2
6	Courtyard window	6.8
7	Subjectively Acceptable	~33*

*The noted distance measurement is approximate due to the distance and line of sight to the venue – the laser measure could not be used from this location. The distance measurement is taken from Google Earth

Figure 2: Measurement Locations



5.2. Monitoring Equipment

Sound Pressure Levels were measured using an NTI XL2 sound level meter with a half-inch condenser microphone. The equipment is checked annually using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2005 and in accordance with British Standard EN 10012:2003 and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection. Table 3 provides the equipment and calibration status.

Table 3: Equipment and Calibration Status

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-09705-E0	23/09/2021	39023
Pre-Amp, NTI, MA220	5332	23/09/2021	39023
Microphone, NTI, MC230A	A14374	23/09/2021	39022
SLM, Svantek, 977A	69510	03/09/2022	1501934-1
Pre-Amplifier, Svantek, SV12L	73650	03/09/2022	1501934-1
Microphone, ACO Pacific, 7052E	70151	03/09/2022	1501934-1
Calibrator, Larson Davis, CAL200	17892	03/09/2022	1501934-2

The measurement systems were calibrated before use with the noted calibrator. The measurement systems were checked after the survey for calibration drift. A drift of 0.0dB was measured on both systems after the survey. The measured calibrations are not expected to adversely impact the measured data.

5.3. Weather Conditions

The weather conditions are as follows and are not expected to have adversely affected the measured data.

Table 4: Weather Conditions During Survey

Wind Speed (m/s)	Prevailing Wind Direction	Air Temperature Range (°C)	Precipitation (time/hrs)	Cloud Cover (%)
4	S	~13	0	15

5.4. Measured Noise Levels

5.4.1. Internal Music Noise Level of Typical Band Level

The measured internal octave band data obtained when the band were playing at the typical internal level is as follows.

Table 5: Measured Octave Band Noise Levels (Free-Field Levels): Internal Level of Band

Measurement Location	Measured $L_{eq,1min}$ / Octave Band (Hz), dB								dB(A)
	63	125	250	500	1000	2000	4000	8000	
Central in Venue	106	102	96	94	91	90	86	81	97

5.4.2. External Measurements of Typical Band Level

The measured external octave band data obtained when the band were playing at the typical internal level is as follows.

Table 6: Measured Octave Band Noise Levels (Free-Field Levels): External Measures of Band

Measurement Location	Measured $L_{eq,1min}$ / Octave Band (Hz), dB								dB(A)
	63	125	250	500	1000	2000	4000	8000	
1	76	74	67	63	55	48	35	23	65
2	71	71	61	56	51	44	34	27	59
3	77	77	61	57	52	44	37	30	63
4	72	74	68	64	56	49	36	26	65
5	76	75	70	62	55	48	37	27	65
6	74	67	65	58	53	48	36	28	61

5.4.3. Subjectively Acceptable Levels

The following provides the measured external noise level of music at an NSR. The location was decided upon by the LA to assess the impact of noise subjectively. Once the level of noise was at an acceptable level confirmed by the LA, a 1-minute noise measurement was carried out at the location. This noise data forms the basis of the design criteria.

The measured octave band data obtained when the band were playing at the reduced internal level is as follows. These are the levels obtained when LA had deemed external noise levels at the NSRs acceptable.

Table 7: Measured Octave Band Noise Levels (Free-Field Levels): Agreed Subjective/design Noise Levels

Measurement Location	Measured $L_{eq,1min}$ / Octave Band (Hz), dB								dB(A)
	63	125	250	500	1000	2000	4000	8000	
7	59	46	42	41	42	34	24	16	45

The measured internal noise level of music to achieve the external level noted above was 84 dB(A).

5.5. Observations of Measurements

During the monitoring exercise the following observations and assessments were made:

- Existing windows facing on to Francis Street and The Other Place's smoking courtyard weak point (main transmission path)
- Building wall of event space is weak point (also a main transmission path): the walls are constructed with low density block
- Soffits of the event space are a weak point
- Roof of the event space is a weak point
- The lobbied fire doors are not fitted or sealed well
- The lobbied fire doors do not have a high enough mass to reduce noise levels
- The event space walls have several vents and flues which are creating holes in the façade

The existing external walls of the event space are not lined with any plasterboard (or similar). From our visit we consider the walls to be skimmed with plaster.

5.6. Baseline Noise Measurement

During the survey a baseline noise measurement was undertaken when the band were not playing. This was determined by road traffic. The results are tabulated below.

Table 8: Measured Baseline Octave Band Noise Levels (Free-Field Levels)

Measured $L_{eq\ 1min}$ / Octave Band (Hz), dB								dB(A)
63	125	250	500	1000	2000	4000	8000	
52	52	52	47	46	38	28	15	50

6. Music Noise Control

6.1. Music Noise Limits

Following the site survey, and considering the Code of Practice, the following operational noise limits could be applied for the scheme. This considers the baseline noise climate, frequency of events and time of events, and local authority noise limits.

Table 9: Relevant Noise Criteria for Music based on number of events

Music events per calendar year	Criteria at Dwelling
1-3	$\leq$65 dB $L_{Aeq(15min)}$ and no greater 70 dB $L_{eq(15min)}$ at 63 and 125 Hz
4 to 12	$\leq$65 dB $L_{Aeq(15min)}$ and no greater 70 dB $L_{eq(15min)}$ at 63 and 125 Hz[1]
>12	$\leq$45 dB $L_{Aeq(15min)}$[2]

1 15dB above the baseline.
2 limits are also as per frequency band, as noted in Section 5.4.3 above.

6.2. ≤3 events per year

Based on no more than 3 events the typical music noise level as surveyed during the site visit can be applied for up to 3 events per year, without any mitigation to the building façade and these limits can be normally achieved.

This also demonstrates that acoustic music (open-mic night style) (i.e., acoustic guitar/piano/keyboard and vocals) could be acceptable for up to 3 events per year.

6.3. 4-12 events per year

For 4-12 events, the typical music noise level as surveyed during the site visit can be applied for up to 12 events per year, without any mitigation to the building façade and these limits can be normally achieved.

This also demonstrates that acoustic music (open-mic night style) (i.e., acoustic guitar/piano/keyboard and vocals) could be acceptable for up to 12 events per year.

6.4. >12 events per year

For >12 events, the internal music noise level could consist of controlled background music typically (including controlled levels of live acoustic guitar or piano for example). For any high noise generating event (such as the one measured in the survey) the building façade will need to be upgraded, this is discussed further in Section 7 below.

7. Noise Control Measures for >12 Events per Year

The following section provides the proposed noise control measures required to control the level of noise egress from the event space, as far as feasible for more than 12 events per year.

The sections also provide the existing building fabric considered in our noise modelling, which have been calibrated to external noise level measurements noted above.

The noise control measures aim to achieve, as far as feasible, an external noise level at the NSRs due to music of 45 dB(A) at the façade of the dwellings.

7.1. Existing Building Construction

The following noise model considers the existing building fabric elements having the sound reduction indices noted in the following table.

Table 10: Existing Building Fabric SRI Considered

Existing Building Fabric Element	Sound Reduction Index / dB per Octave Band (Hz)								R_w (dB)
	63	125	250	500	1k	2k	4k	8k	
External Walls	--	30	35	30	40	46	51	--	38
Event Space Roof	10	12	17	19	17	20	24	--	19
Existing Windows	17	22	24	26	31	26	26	26	28
Existing Lobby Fire doors	--	12	13	14	16	18	24	--	17

7.2. Proposed Building Improvements

To reduce noise egress from the event space the following should be applied.

7.2.1. Existing Vents & Flues

There are several holes in the building structure from vents and flues. These must be fully closed and sealed with block (minimum density 1900 kg/m^3) and mortar. This should follow the existing cavity wall, and each block should be 100mm thick each. There must be no unattenuated vents/flue holes in the building structure.

Therefore, any flues that are unable to be blocked (e.g., for the gas boiler) will require appropriate in-line attenuation installed. Any attenuators required must achieve a minimum insertion loss of 55 dB.

Please note that this is a high insertion loss requirement for such an element.

7.2.2. Existing Windows

All existing windows in the event space must be blocked up with a high-density block (minimum 1900 kg/m^3). This should follow the existing cavity wall, and each block should be 100mm thick each.

All gaps and joint work must be fully filled with mortar. There must be no gaps left in the structure. Gaps must not be filled with expanding foam.

7.2.3. Lobbied Doors

The lobbied door sets facing on to Francis Street must be upgraded. The access door sets out to the smoking area courtyard of The Other Place must also be upgraded.

The existing external lobby door set at both sides of the building must be upgraded to achieve the following sound reduction index as a minimum:

Table 11: Minimum SRI of Upgraded External Lobbied Fire Doors

Sound Reduction Index / dB per Octave Band (Hz)						R_w (dB)
125	250	500	1k	2k	4k	
34	37	38	38	41	42	40

This can be achieved with a steel acoustic door set with well fitted perimeter and threshold seals.

The internal set of lobbied doors at both sides of the building must be upgraded to achieve the following:

Table 12: Minimum SRI of Upgraded Internal Lobbied Doors

Sound Reduction Index / dB per Octave Band (Hz)						R_w (dB)
125	250	500	1k	2k	4k	
21	24	27	37	39	38	34

7.2.4. Roof

The existing ceiling could be upgraded as follows:

- 2x 15mm plasterboard (total 25 kg/m^2) [e.g., British Gypsum Soundbloc], staggered and sealed on a metal frame hung from resilient fixings from existing joists with a minimum cavity of 85mm
- 2x 15mm plasterboard (total 25 kg/m^2) [e.g., British Gypsum Soundbloc] screwed directly onto underside of existing joists
- 100mm mineral wool (minimum density 10kg/m^3) in top cavity between joists and existing roof

The above construction is expected to achieve the following minimum sound reduction index.

Table 13: Minimum SRI of Upgraded Roof

Sound Reduction Index / dB per Octave Band (Hz)							R_w (dB)
63	**125**	**250**	**500**	**1k**	**2k**	**4k**	
30	41	47	52	55	51	66	53

7.2.5. External Walls

The walls could be upgraded as follows:

- 2x 15mm plasterboard (total 25 kg/m^2) [e.g., British Gypsum Soundbloc], staggered and sealed on head and base tracks and a frame that is independent of the external wall
- 100mm mineral with cavity (minimum density 10kg/m^3)
- 90mm metal stud at 600mm centres
- 2x 15mm plasterboard (total 25 kg/m^2) [e.g., British Gypsum Soundbloc], staggered and sealed
- 50mm mineral within the cavity (minimum density 10kg/m^3)

The above construction is expected to achieve the following minimum sound reduction index.

Table 14: Minimum SRI of Upgraded External Walls

Sound Reduction Index / dB per Octave Band (Hz)							R_w (dB)
63	**125**	**250**	**500**	**1k**	**2k**	**4k**	
35	45	47	55	60	59	68	57

The plasterboard partition should abut the underside of the proposed plasterboard ceiling (below) and be fully sealed with a non-setting mastic (NOT FOAM).

7.2.6. Ventilation

As part of the Premises License, the venue is required to keep all windows and external doors closed during live or recorded music events. ACL propose to block up all windows in the event space. The lobbied doors will aid in keeping doors closed.

There must be no unattenuated ventilation measures installed in the building façade. Any ventilation measures implemented must achieve a minimum inside to outside sound reduction value of 55 dB.

7.2.7. Noise Limiter

It cannot be guaranteed that the noise levels due to live and recorded music will meet the LA's agreed level during every event, when measured at the façade of the NSRs.

We would therefore advise that site management install a noise limiter within the event space to ensure that levels from live and recorded music do not exceed an internal level of 97 dB(A) at any time. ACL consider this internal noise level appropriate for such a venue and the typical high volume events that could be held there. The Local Authority EHOs could assist in setting the noise limiter on site once installed.

7.3. Effect of Noise Control Measures

7.3.1. Noise Modelling Parameters

The noise emission has been modelled in the noise modelling software Cadna:A by DataKustik. The modelling software calculates sound levels based on the inputted sound emission values, source and receiver locations, and primarily distance, barrier and ground attenuation. Calculations are undertaken using the General Method of Calculation from ISO 9613.

The parameters within the Cadna:A model are as follows and are considered reasonable assumptions with simplified geometry of the buildings:

- The building heights are based on site visit observations and Google Earth imagery.
- The order of reflections is 3, and all buildings are reflective.
- The ground across the site and surrounding area is considered hard and reflective.
- Topography of the site is considered flat.
- The predictions are based on the measured data provided above.
- The noise model has been calibrated to the external monitoring locations noted.
- The existing building construction has been modelled with the noted sound reduction indices above.
- The event space has been input as a radiating building at 4m high.

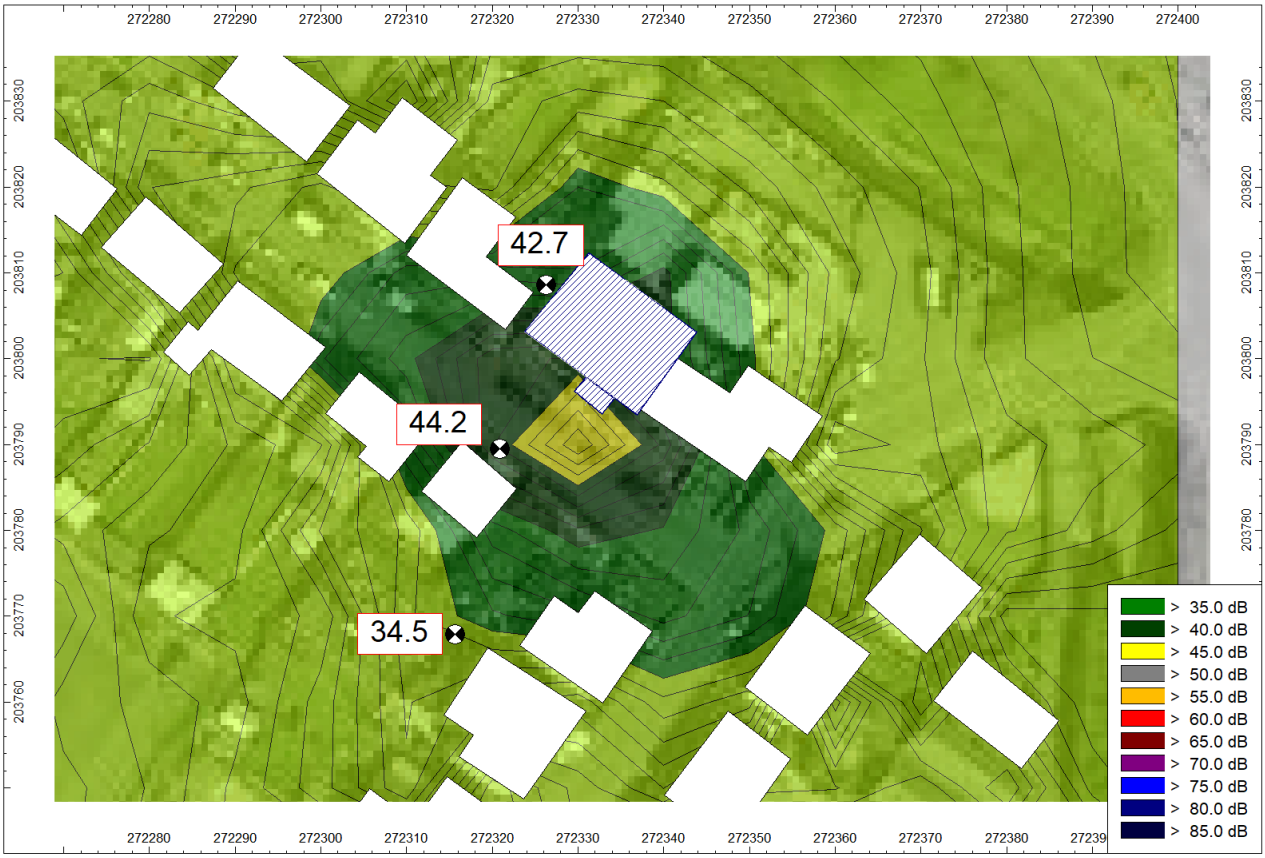
- Table 5, these have been input into the radiating building within the noise model.

The noise model has been calibrated to the measured levels noted above. The calibrated model can be provided upon request.

7.3.2. **Noise Modelling Results**

The following noise map provides the predicted level due to music within the event space at ML 2, directly in front of the venue building, ML 4, the nearest dwelling to the rear of the building and ML 7, the garden that was subjectively assessed by the LA during the site survey. The noise map is calculated with the proposed building fabric upgrades noted above considered.

Figure 3: Noise Map of Predicted Noise Levels due to Music



The predicted levels across the site indicate that with good workmanship, and management of the event space, noise levels from live and recorded music can be played at a high level for more than 12 events per year and meet the local authority criteria.

7.4. **Summary of Internal & Predicted External Music Noise Levels**

The table below presents the predicted noise levels against the LA criteria, if only individual noise control measures were undertaken. The Local Authority agreed criteria for the music noise level (assumed to be for more than 12 Events) at the nearest dwelling should not exceed the levels in Table 7 above.

Table 15: Effects of Different Mitigation

Mitigation Approach	Noise Control Measures Undertaken	Predicted External Level	Maximum Indoor Level*
All	*All noted in Initial Report*	*45 dB*	*97 dBA*
None	*None*	45 dB	77 dBA*
1	Blocking up Windows and Vents Only	45 dB	81 dBA
2	Blocking up Windows and Vents Only **+ Upgrading All Lobby and External Doors**	45 dB	81 dBA
3	Blocking up Windows and Vents Only + Upgrading All Lobby and External Doors **+ Proposed Roof/Ceiling Upgrade**	45 dB	85 dBA
4a	Blocking up Windows and Vents Only + Upgrading All Lobby and External Doors + Proposed Roof/Ceiling Upgrade **+ Proposed West & South Wall Linings**	45 dB	96 dBA
4b	Blocking up Windows and Vents Only + Upgrading All Lobby and External Doors + Proposed Roof/Ceiling Upgrade **+ All Proposed Wall Linings**	45 dB	97 dBA
5	Blocking up Windows and Vents Only + Upgrading All Lobby and External Doors **+ All Proposed Wall Linings *(i.e., No Roof/Ceiling Upgrade)***	45 dB	83 dBA

* The maximum indoor level is subject to façade, ventilation and sound spectrum internally. In some cases a higher (or lower) dBA level maybe permitted and the external limits be met (not met). This is also on the basis the windows and doors are closed at all times.

These predictions are based on the data obtained of the live band during the noted survey, provided in Table 5. Frequency noise levels and overall noise levels will differ from band to band. The predicted noise levels are subject to installation, noise sources and detailing of the noted works.

8. Summary & Conclusions

Acoustic Consultants Limited (ACL) have been appointed to provide acoustic advice with the aim of reducing the impact of noise on nearby residential premises from amplified and live music due to live music events at The Other Place, Ynisderw Road, Pontardawe.

Noise complaints have been received from nearby dwellings to the venue and a noise abatement notice (Live/1337/RM/1) has been served on management of The Other Place, a pub owned by Red Dragon Pubs. The noise complaints and the associated abatement notice relate to live and recorded music from inside the venue only, as we understand.

A noise survey has been carried out to obtain data that informs our noise modelling and advice. The details of the noise survey and monitoring locations are provided in the report. Neath Port Talbot Local Authority attended the survey to set subjectively acceptable noise levels externally to surrounding dwellings. ACL took a noise measurement in the noted location alongside LA once the EHOs had agreed upon the subjective assessment.

Following the survey this report provides noise limits based on the number of events (up to 12 per year) and other relevant guidance.

This report also provides the agreed noise limits with the local authority and noise control advice to control amplified noise to within this limit for >12 events per year where needed.

Based on the measured live band noise data, a summary is provided of predicted external noise levels against only certain structural noise control measures being undertaken and the maximum internal music noise level that is predicted to accommodate this.

9. Detailing, Workmanship & Verification

Noise control predictions have been based on the constructions as listed in this report with no allowance made for weak points. Small weaknesses in the fabric design and/or installation are likely to significantly reduce the predicted noise control performance. Predictions are based upon the best available information with regards to the performance of the building materials and systems.

It is therefore necessary to ensure that all detailing is carefully designed so that there are no weak points present. All brick and blockwork joints should be completely in-filled with mortar. It is also necessary to provide comprehensive site construction checks to ensure that the installation matches the design intent. In general terms it should also be noted that there should be no gaps in the constructions and that all components should be carefully sealed airtight using suitable dense non-setting mastics (NOT FOAM) where appropriate. All walls, unless noted otherwise, should run the full height up to the slab soffit or underside of the roof. The details at these joins will require careful consideration.

All the elements should be constructed in accordance with the manufacturer's recommendations.

In terms of achieving the acoustic requirements of particular elements as noted in this report, the only contractual link is between the Contractor (the Builder) and Supplier. As such, it is very important that all purchase contracts include for the particular elements to comply with the acoustic requirements as noted in this report. The verification should be in accordance with the appropriate British Standard or International Standards Organisation Standards. Weighted sound reduction indices (Rw) should be measured in accordance with British Standard EN ISO 10140-1:2010 and rated in accordance with British Standard EN ISO 717-1:2013. Sound absorption coefficients should be in accordance with ISO 354:2003 and rated in accordance with British Standard EN ISO 11654.1997.

10. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 μPa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{AeqT} = 10\lg_{10}\left\{(1/T)\int_{t_1}^{t_2}[p_A(t)^2/p_0^2]dt\right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μPa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

Head Office: 194 West Street, Bedminster, Bristol, BS3 3NB
T: 0117 986 2956

www.acoustic-ltd.co.uk

Registered Office: 194 West St, Bristol, BS3 3NB Registered No: 8544901