

AFTER DARK CLUB READING

ACOUSTIC REPORT

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1. INTRODUCTION

Completely Sound Limited (CSL) has been appointed by After Dark Club(Reading) Limited (ADC) to provide advice on the sound insulation and noise control measures in place during live music events and club nights at the 112 London St, Reading RG1 4SJ (The Venue).

This report presents the a review of local authority correspondence provided by ADC, results of investigatory measurements, and recommendations for improving level of noise control at The Venue.

2. SITE DESPRIPTION

The Venue is situated on London St, within the administrative region of Reading Borough Council (RBC). The Venue occupies ground floor of 112 London Street. The local area consists of a mix of commercial and residential uses.

Figure 2.1 shows the location of The Venue, the worst affected residential location, and the approximate measurement positions used during testing.



Figure 2.1 – Site Location and Measurement Positions

3. STANDARDS, GUIDANCE, AND LEGISLATION

3.1 National Planning Policy Framework

The Ministry of Housing, Communities and Local Government revised the National Planning Policy Framework (NPPF) in July 2018. This framework updated the previous NPPF released in 2012 which previously replaced most national planning policy, circulars and guidance, including Planning Policy Guidance 24: Planning and Noise.

The NPPF defines the Government's planning policy for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. Paragraph 170 of the NPPF requires Local Authorities to develop local policies and make decisions which aim to prevent new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 180 of the NPPF requires that planning policies 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: '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; identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'

3.1.1 Agent of Change

Paragraph 182 of NPPF introduces the "Agent of Change" principle and states that planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities and that existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

3.2 BS8233:2014

BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' contains a number of design criteria and guideline levels for the protection of new or planned development against external noise. The guidelines are designed to achieve desirable resting/ sleeping conditions in bedrooms and good listening conditions in other rooms. Those criteria which are most relevant to residential environment are reproduced in Table 3.1, below.

Activity	Location	07:00 – 23:00	23:00 - 07:00
Resting	Living room	35 dB L _{Aeq, 16hour}	-
Dining	Dining room/area	40 dB L _{Aeq, 16hour}	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq, 16hour	30 dB LAeq, 8hour

Table 3.1: BS8233 Internal Ambient Noise Levels

It should also be noted that BS 8233:2014 states that "regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{Amax,F} depending on the character and number of events per night." However, no numerical values for internal L_{Amax,F} levels in dwellings are stated within BS 8233.

3.3 Noise From Pubs And Clubs (Phase ii) Final Report (Research By Bre & Capita Symonds On Behalf of Defra)

This document provides details of research into noise assessment methodologies and criteria for the assessment of entertainment noise from licenced premises.

The research was commissioned by the Department for Environment, Food and Rural Affairs (DEFRA) and was undertaken by Capita Symonds Ltd and BRE (Contract No. NANR 163).

The research aimed to identify the most suitable criteria and methodologies for the assessment of entertainment noise, with a focus on the ease and ability for the assessment criteria to be assessed in the field by Environmental Health Practitioners (EHP).

A notable finding during the research was that the Noise metric "Absolute L_{Aeq} " provided the best overall prediction of subjective ratings of all the entertainment noise types tested by ordinary members of the public.

Metrics and assessment methodologies that used octave band analysis provided good correlation with subjective response, however these were no more predictive that the absolute L_{Aeq} level. The study provides a table reporting various levels of entertainment noise used in the laboratory testing, along with the responses of the test subjects. This table is reproduced in Table 3.2, below.

Semantic descriptor	Score	Absolute L _{Aeq,5 min}
Clearly acceptable	1	17.0
	2	20.4
	3	23.8
	4	27.2
Just acceptable	5	30.6
Just unacceptable	6	34.0
	7	37.4
	8	40.8
	9	44.2
Clearly unacceptable	10	47.5

 Table 3.2: Semantic descriptor & Associated Value of Acceptability (Table 4 NANR 163)

It is noted that the lowest level associated with the semantic description of "just unacceptable" was 34 dB $L_{Aeq,5min}$.

3.4 Relevant Legislation

The Noise Act 1996, as amended by the Anti-social behaviour Act 2003, and the Clean Neighbourhoods and Environment Act 2005 provides powers to local authorities in England to deal with night noise emanating from licenced premises that exceeds a "permitted level" of noise, prescribed by the noise act.

The provisions of the Noise Act 1996 are intended to provide an alternative means of addressing disturbances caused by excessive noise. Previously, excessive noise could only be dealt with if it was thought to create a statutory nuisance. It is not always easy to establish such a case. Under the Noise Act 1996 an offence is committed if a person fails to ensure that any noise emitted from their premises does not exceed the "permitted level".

Paragraphs (2) and (3) of the Noise Act state that:

"(2)The permitted level is to be a level applicable to noise as measured from within any other dwelling in the vicinity by an approved device used in accordance with any conditions subject to which the approval was given.

(3)Different permitted levels may be determined for different circumstances, and the permitted level may be determined partly by reference to other levels of noise."

However guidance provided on "Noise nuisances: how councils deal with complaints" Published by the department for Environment, Food and Rural Affairs, and last updated on 21 December 2017, indicates that:

"The permitted noise level using A-weighted decibels (the unit environmental noise is usually measured in) is:

34 dBA (decibels adjusted) if the underlying level of noise is no more than 24 dBA

10 dBA above the underlying level of noise if this is more than 24 dBA"

The powers under the Noise Act 1996 are in addition to those possessed by local authorities under the Environmental Protection Act 1990 and the Noise and Statutory Nuisance Act 1993 on statutory nuisance.

Section 79 of the Environmental Protection Act 1990 places a duty on local authorities to inspect their areas periodically for statutory nuisances, and to take such steps as are reasonably practicable to investigate complaints of statutory nuisance.

The Noise Act 1996 does not require the local authority to measure the level of noise being emitted before a warning notice is issued. At the initial investigation stage it suffices for the local authority to be satisfied that the noise, if it were measured from within the complainant's dwelling, would or might exceed the permitted level.

The noise only needs to be measured if it is suspected that a warning notice is contravened and a local authority wishes to either consider:

- A. issuing a fixed penalty notice in respect of a night noise offence committed from a dwelling or other premises; or
- B. prosecution for the same offences.

It is noted that the permitted level for the night noise offence should not be taken as an indicator of whether or not the noise may also constitute a statutory nuisance.

4. BACKGROUND

After Dark club was established in 1973 and was taken over by the Khan family in 2000. In August of 2017 Mr Zahid Khan became the license holder and manager of The Venue.

In the time since taking over as manager of the venue, ADC have been in correspondence with Reading Borough Council (RBC) regarding noise breakout from the venue, and resulting disturbance reported by local residents.

A review of correspondence between ADC and RBC, as it pertains to alleged noise nuisance, along with additional comments from CSL, can be found within Appendix A.

Dates of particular note include March 2018, at which point representatives of ADC meet with stakeholders to discuss changes that had been made to in house policy and procedure in response to a noise abatement notice being served on the property.

At this time, council officers and local police were satisfied that ADC were compliant with licencing objectives, namely:

- the prevention of crime and disorder;
- public safety;
- the prevention of public nuisance; and
- the protection of children from harm.

Since the end of September 2018, when the new mixing desk and sound system were installed, it is understood that a single verified complaint has been received by RBC, on 9 February 2019.

5. SOUND INSULATION PERFORMANCE

5.1 Competency

Details within this section have been provided by Ben Groves MSc MIOA, of Completely Sound Limited. Ben is a corporate member of the institute of acoustics and holds a master's degree in Environmental Acoustics from the University of Salford.

5.2 Airborne Tests

Tests were carried out on 9 May 2019 in general accordance with BS EN ISO 140-4:1998. Results from the tests were rated in accordance with BS EN ISO 717-1:2013.

High volume "white" noise was generated through the clubs in house PA system, speakers were positioned to obtain a diffuse sound field. A spatial average of the resulting noise level was measured in one-third octave bands between 100 Hz and 3150 Hz. The results were obtained by using a moving microphone technique over a minimum period of 30 seconds.

5.3 Reverberation Time

Reverberation time measurements were taken following the procedure described below in order to correct the receiver levels for reverberant room characteristics.

The reverberation time was measured in accordance with BS 3382-2:2008 "Acoustics - Measurement of room acoustic parameters - Part 2: Reverberation time in ordinary rooms" using the integrated impulse method, using an impulse response by bursting a balloon and measuring the reverberation time in each of the one third octave bands between 100 Hz and 3150 Hz. The internal programme of the meter was used to measure the decay time of the sound in the room. This was repeated five more times in the receiver room in order to obtain an average result.

5.4 Background Noise

The background noise levels in the receiver rooms were measured during the tests and the receiving room levels corrected in accordance with BS EN ISO 140 Part 4.

The dominant source of background noise observed during tests was attributable to local traffic noise from the adjacent A327.

5.5 Instrumentation and Test Rooms

Instrument	Manufacturer and Type	Serial Number	Date of Last Calibration
Sound Level Meter	Norsonic 131	1312729	06/11/2018
Acoustic Calibrator	Landtek ND-9	N875901	27/03/2019
Microphone	GRAS 40AE	159619	06/11/2018
Preamplifier	Norsonic 1207	12151	06/11/2018

The instrumentation used during the testing can be seen below in Table 5.1.

Table 5.1 – Instrument Details

Measurement instrumentation was calibrated before and after each test with no significant drift in calibration level (<0.5 dB). The calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory (NPL).

5.6 Additional Measurements

In order to present the typical impact of a music event hosted at The Venue, high volume samples of "Club Music" were used to assess the potential impact on nearby residential properties. The song "Firestarter" by The Prodigy was selected due to its heavy bass content. It was expected that this would result in a worst case assessment.

During the completion of these additional measurements the sample of club music was played on repeat, while measurements made within The Venue, outside and within the residential property. Samples were increased from 30 seconds to 5 minutes in the case of the external measurement, and 15 minutes for internal measurements, in order to account for the fluctuation in sound level associated with the dynamic variability of club music.

Subjective impressions were also recorded in order to establish any correlation with an increased likelihood of complaint as a result of such music.

6. TEST RESULTS

This section describes the results of the testing undertaken at The Venue, based on current in house noise control practices.

6.1 Sound Insulation Test

Tests were undertaken in accordance with the procedures set out in the previous section. The room under investigation, used as the source room, was the main hall of The Venue.

Test	Source Room	Receiver Room	Airborne Noise Reduction, D _{nT,w} + C _{tr} (dB)
1	After Dark Club (main hall)	Second Floor Residential (Nelson Mews)	56 ^[1]

Table 6.1 – Acoustic Rating of Separation Between The Venue, and Residential Unit

[1] Despite measuring source levels of 100 dBA, A maximum background noise correction needed to be applied in the 1/3 octave bands between 150 – 3150 Hz.

[2] Trickle vents remained open in order to test a scenario with adequate background ventilation.

Table 6.1 shows that the measured acoustic rating if the separation was 56 dB $D_{nT,w}$ + $C_{tr.}$ As per the note to the table, due to relatively high background noise levels, a maximum background noise correction was applied to the results.

6.2 Club Music Assessment

During the second assessment, "Firestarter" by The Prodigy was played on repeat. Sound levels in the source room during the assessment were measured to be 95 dB $L_{Aeq,15m}$ one third octave band raw data for each of the measurement locations can be seen in Appendix D.

In research commissioned by the Department for the Environment, Food, and Rural Affairs the noise metric that provided the best overall prediction of subjective ratings was the Absolute L_{Aeq} . As such this metric has been assessed within the residential property.

Measurements within the residential property were completed with windows open in order to provide an example of the worst case situation.

Table 6.2 provides a summary of the music measurements made during the assessment. Frequency data for the associated measurements can be found in Appendix D.

Test	Source Room	Receiver Location	Windows Open/Closed	Internal Ambient Sound Level dB L _{Aeq,15m} *
2	After Dark Club (main hall)	Outside Nelson Mews	N/A	52
3	After Dark Club (main hall)	Second Floor Residential (Nelson Mews)	Open	42

Table 6.2 – Assessment of Club Music Within Residential Property *External measurement intervals were reduced to 5 minutes.

For reference, the report "Noise from Pubs and Clubs" published in 2005 by Salford University, on behalf of the Department for Environment Food and Rural Affairs, indicates that during busy periods,

bars playing music created internal noise levels of 90-95 dB L_{Aeq} . As such, this was deemed a reasonable level at which to assess the impact.

Subjective assessment within the property with windows open was an audible low frequency pulse attributable to the bass drum sample used within the recorded music. However the song, and any associated vocals, were not clearly distinctive during the measurements. During the period of assessment the resident commented that the noise level was below the level that she would consider unreasonable.

Management at The Venue, have implemented an in house system of regulating noise emissions based on visual feedback from a hand held sound level meter. It was commented that the recorded levels during this assessment were in excess of the levels at which they would normally operate.

With windows closed it would be expected that the internal ambient noise level would be significantly reduced. It is also noted that the resident remarked during the survey that levels were below those likely to cause disturbance.

7. SETTING CRITERIA

Based on the data provided within Table 3.2, it is noted that within research the boundary between acceptability and unacceptability when assessing entertainment noise within a residential setting was 34 dB L_{Aeq,5min}.

As such, it is proposed that this level is used in subsequent calculations, and assessments, in order to determine potential internal ambient noise level limits, below which adverse effect is not likely to occur within local residential property.

Generally accepted reductions for open windows when considering the impact from various sources can be found in NANR116: 'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows. This work was produced by The Building Performance Centre, School of the Built Environment, Napier University. The research was conducted on behalf of DEFRA. Within the resulting report it states that, for amplified music, the range of measured sound insulation ratings for a window with a free open area of 0.05m² was 15 to 20dB(A).

BS8233:2014 also provides general guidance on the expected sound insulation performance of a given building façade, with details of how various elements can affect the overall performance. Concerning windows, it states that:

"If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15dB"

The statements above imply that should windows on a façade be openable, a sound insulation value of 15dB should be applied to the whole façade to the room being assessed.

Based on the above we can calculate the acceptable internal ambient noise level limit for ADC.

Domestic internal ambient noise level limit criteria L _{Aeq,5min} (dB)	Measured noise reduction (D _{nT,w} +C _{tr}) (dB) ^[1]	Resultant ADC internal noise level limit (L _{Aeq,5min})
34	56	90

Table 7.1: Proposed internal ambient noise level limit [1] Closed window

For reference, the report "Noise from Pubs and Clubs" published in 2005 by Salford University, on behalf of the Department for Environment Food and Rural Affairs, indicates that during busy periods, bars playing music created internal noise levels of 90-95 dB L_{Aeq}. As such, it is expected that this level should be deemed acceptable to patrons of ADC.

Table 7.2, below provides an assessment criteria of an external location, 1 meter from the façade of the worst affected residential property.

Domestic internal ambient noise level criteria L _{Aeq,5min} (dB)	Expected performance of building façade ^[1] (R _w dB)	ADC breakout noise 1m from residential façade L _{Aeq,5min} (dB)
34	15	49

Table 7.2: Proposed noise level limit when assessed 1m from residential façade.[1] Assumes partially open window

From the assessment in Section 6.2, it can be expected that the noise reduction provided by the building envelope would be c. 43 dB. Suggesting that an internal ambient noise level of 90 dB would be acceptable within the residential property with partially open windows.

It should be noted that "partially open" would constitute a free open area of 0.05m². This does not equate to a fully open window.

8. PROPOSED REMEDIAL WORKS

8.1 Initial works

It was noted while onsite that several elements of the ADC building envelope were likely to be contributing to noise breakout from The Venue. Visual inspection from the exterior of The Venue highlighted open vents, and poorly sealed windows. An example of this can be seen in Figure B.1 of Appendix B.

Based on a visual inspection all gaps and acoustically weak elements (such as windows and non-acoustically treated vents) should be appropriately sealed.

Across window openings, place 17mm thick marine grade ply with a minimum density of 550kg/m3, cut to an accurate size such that the ply completely seals the opening with minimal voids at the perimeter. Any small voids to be sealed with non-hardening "acoustic" mastic. Any gaps larger than 10mm to be packed with a compressible filler (such as low density mineral wool to the full depth of the void), sealed at the outer edge with non-setting acoustic mastic and a metal angle (such as British Gypsum GA2 or GA4) used to cover the junction between the ply and the reveal.

It has been explained that further measures have been put in place to control patron noise emanating from external areas of The Venue. These include, but are not limited to:

- limiting number or people in smoking areas;
- restriction of drinks being taken outside of the venue;
- door staff to remind customers of the residential nature of the surrounding area.

It would also be recommended to isolate sub woofers from the floor by placing them on isolation mounts. These come in the form of crumb rubber or high density foam mats that can be fixed to the underside of speaker cabinets. These will minimise the transfer of vibrational energy into the structure, to be re radiated externally. These will often also improve subjective sound quality. An example isolation product is provided in Figure B2 of Appendix B.

8.2 Additional works

After investigation, should the above measured be deemed inadequate further assessment may be prudent in order to confirm areas of breakout have been sufficiently sealed, and to identify other low cost areas of improvement.

Beyond this, the first requirement will be to apply acoustic treatment to the ceiling of ADC. It has been noted by local authority officers during call out visits that sound levels appear subjectively higher at 2nd floor level, when compared to ground. Though this was not apparent during the assessment, a visual inspection of the roof/ceiling construction suggested that this was an acoustically weaker portion of the buildings envelope.

Ceiling construction should be comprised of:

- existing EPDM rubber/waterproof felt, single ply membrane roofing; above
- single layer high density plasterboard; above
- min. 200mm cavity with >100mm mineral fibre insulation; above
- 2 layers high density plasterboard (soundbloc or similar).

This would be expected to provide a significant improvement over the current ceiling make up, which constitutes light weight ceiling tiles connected directly to beams supporting the existing EPDM rubber roofing.

8.3 Noise Control

The current noise control system is based on instantaneous sound level readings captured on a handheld measurement device. Once instantaneous readings exceed a given threshold, the compression ratio built into the in house digital mixing desk is adjusted to bring the output level of the desk into an acceptable range.

The noise control system in place can be considered adequate on the basis that DJing and in house audio engineering is conducted exclusively by resident DJ s and staff of After Dark i.e. no third parties that have no incentive to abide by the Clubs licence.

This is inclusive of night run by promoters, as ADC staff will still operate the house sound system. The system is similar, but less cumbersome than the previously installed noise limiter (SL100 Sound-Level Control Unit) which would require regular adjustment to account for varying volumes of people, and does not have the capacity to react dynamically to changes in source noise level.

It should be noted that the apparent efficacy of this system will be dependent on several factors, including but not limited to:

- the level of prevailing background noise;
- changes in the frequency content of the music;
- subjective factors relating to the receiver e.g. their familiarity with the music, individual hearing/tolerance thresholds, feelings that a resident has regarding their experience with The Venue.

In order to maximise the reliability and validity of the current system, it is recommended that the device used is appropriately calibrated, and advice sought on measurement of levels over particular intervals i.e. how to use the device to measure an A-weighted equiveillance level. This will help store log and validate levels, which can be used to retrospectively assess the validity of noise complaints and draw correlation between particular activities and complaint frequency.

Additional advice can be provided regarding equipment maintenance and/or additional equipment purchase. An example of a relatively low cost sound level meter capable of storing and logging $L_{Aeq,T}$ sound levels can be seen in Figure B1 of Appendix B.

9. REVIEW OF LOCAL AUTHORITY CORRESPONDENCE

9.1 General comments

Table A in Appendix A provides a summary of correspondence between ADC and RBC between 2 October 2017 and 9 February 2019.

Of particular note is the absence of an objective assessment being undertaken during the call out visits. Although it is accepted that this is not a requirement when assessing the potential for statutory nuisance it would assist the efforts of ADC in setting internal ambient noise level limits if it was possible to set limits relative to a level known to cause annoyance to individuals affected.

9.2 Specific Local Authority Concerns

On the 5th September 2018 ADC received a request to answer specific questions relating to their current noise control practices. The questions asked were as follows:

- is the type of noise limiter suitable?;
- can it be set at a level to avoid disturbance to nearby residents from recorded and live music?;
- if no to the above, does the noise insulation at the premises need to be improved and/or does the sound system or types of music at the premises need to be changes? If so what is required.

Each of these points is dealt with in turn, below.

Is the type of noise limiter suitable?

If the system in place, as described in section 8.3, is actioned effectively there is no reason why it cannot serve as an adequate noise limiting system.

Can it be set at a level to avoid disturbance to nearby residents from recorded and live music?

The subjects of disturbance and annoyance are highly nuanced topics, no less so with regard to the perception of noise. The factors affecting levels of disturbance extend beyond the absolute sound level experienced by the individual.

That said, there is no reason why an acceptable procedure cannot be established that will significantly reduce the likelihood of disturbance at residential properties within the area.

Does the noise insulation at the premises need to be improved and/or does the sound system or types of music at the premises need to be changes? If so what is required?

As discussed in section 3.3, research would suggest that the absolute L_{Aeq} sound level showed good correlation as a predictor of disturbance. Given this, it is not clear to me that changing the types of music played at The Venue would have a meaningfully positive impact on the level of disturbance. Regardless of music types, or genres, simply agreeing a suitable L_{Aeq} based noise level limit, suitable for this context, is likely to be the most effective option.

With regard to the current levels of sound insulation there is always scope for increasing the acoustical separation between two spaces. However it should be noted that a measured level difference of 56 dB ($D_{nT,w} + C_{tr}$) would generally be considered a significant level of separation. This is equivalent to +11 dB above standard building regulation values for separation between dwellings.

Due to the subjective nature of noise perception, and the variable nature of acoustical conditions e.g. differences in prevailing ambient noise levels, levels of heat requiring the opening of windows, and the differing frequency content of music, there is no one measure, that is both reasonable and proportional, that can be put in place to eliminate sound from neighbouring properties. However, through an iterative process of discussion, collaboration and implementation there is no reason why amicable relations cannot be maintained between ADC, RBC and the neighbours previously affected.

Further to the questions above, several other points have been raised that may not be sufficiently covered above. Namely:

- the frequency content of music;
- the effect of live vs recorded music; and
- in consistency in reported disturbance does this suggest variability in noise level.

Again, these have been discussed in turn, below:

The frequency content of music

Within the study of Noise From Pubs and Clubs (Phase II), completed on behalf of DEFRA (contract ref NANR 163), 4 different noise types were used during laboratory testing, namely:

- A. Guitar Orientated Rock this style of music typically operates with peak low frequency noise levels around the 63 Hz to 125 Hz octave bands, and a developed and extended frequency spectra with additional peaks at mid to high frequency
- B. Modern Dance Music "House" and "Drum & Bass" and other modern dance music types have a reputation for persistent virtually non-stop low frequency bass thump, often peaking around the 63 Hz octave band, sometimes with significant energy in the 40 Hz and 50 Hz 1/3 octave bands, and then a pronounced and steep drop off in levels at mid to high frequency in the spectrum.
- C. Non-music entertainment noise For example, crowds watching sports games. The spectrum of this type of noise typically has a relatively flat profile with modest peaks in lower frequency octave bands.
- D. Karaoke the vocal content is often emphasised over the backing music compared to other music types and this sort of entertainment can be played at relatively high levels. The vocal element tends to be significant and the frequency spectrum of this type of noise typically has peaks at 63 Hz or 125 Hz octave bands and also in the mid frequency range of 500 Hz to 2 KHz octave bands.

Based on the assessment undertaken using the above samples is was concluded that:

"The noise metric that provided the best overall prediction of subjective ratings of all the entertainment noise types tested by ordinary members of the public was the Absolute L_{Aeq} "

As such, it is recommended that any noise level limit that is set should include a reference to an L_{Aeq} noise level, as this has a strong correlation with subjective response across different sound sources.

The effect of live vs recorded music

It is understood that all live amplified music played at the venue is routed through the same mixing desk and PA system that would be in use during DJ nights (both using resident and external DJs). This system is controlled by a member of ADC staff.

Based on this, along with the comments made in the above point, it is not clear that a distinction should be made between performance of live music and the playing of recorded music.

Consistency in reported disturbance

From reports made available to CSL, two things seem to be apparent:

- 1. 2017 was busy with complaints and the abatement notice was likely more than justified;
- 2. since the installation of new equipment at the club in September 2018, there has been one confirmed report of noise disturbance.

While there may have been an inconsistency in reported disturbance it would appear that over the last 6 – 8 months, based on available correspondence, this is variability has been reduced.

It is also difficult to comment directly on either the validity or reliability of reported disturbance without a larger degree of objective evidence. What may be seen objectively as audible low level sound, may be subjectively assessed by a complainant to be disturbing based on a range of emotive factors.

It cannot be asserted that this variability in reported disturbance is purely a function of differing maximum noise levels. It is also the case that some nights, with fewer people for example, are likely to inherently cause less noise as they require lower internal sound levels. It is not the case that ADC will ramp their internal sound levels to their maximum regardless of the event.

The variability in apparent disturbance further calls for a level of objectivism to be applied.

10. CONSLUSION

Completely Sound Limited has been appointed by After Dark Club(Reading) Limited (ADC) to provide advice on the sound insulation and noise control measures in place during live music events and club nights at the 112 London St, Reading RG1 4SJ (The Venue).

This report has provided a description of the site, a summary of national standards, guidance and legislation, and the results of a sound test carried out at The Venue and an adjacent residential dwelling.

From this, internal ambient noise level limits and externally measured noise level limits have been provided in order to assess future noise levels impacting local residential dwellings.

Initial sound insulation and noise control measures have also been provided.

10.1 Next steps

The works described in section 8.1 should be completed and a concerted effort made by ADC to remain within the noise level limits provided in section **Error! Reference source not found.**. This will both demonstrate the ability of ADC to implement their in house system of noise control, and allow retrospective adjustment of set levels to account for how effective they are at preventing nuisance.

Use of a handheld sound level meter with the functionality to log and store measured data would also help to objectify the level impact experienced, and also serve demonstrate effective implementation of the current noise control system.

Should initial works be completed, and noise levels effectively controlled, but no change occurs in the level and frequency of complaints it will be necessary to adjust noise level limits – or if this is not deemed appropriate, additional work to the external building fabric will need to be considered in order to improve the sound insulation at The Venue.

Appendix A – REVIEW OF LOCAL AUTHORITY CORRESPONDENCE

Date	Type of correspondence	Points raised	CSL Comments
02/10/2017	Email	 Fact sheet issued to ADC regarding the "investigation of commercial noise nuisance". The document refers an investigating officers process for assessing whether a noise being complained about significantly affects other people in their own premises, based on likelihood of noise being perceived as unreasonable to the average person. Factors to be considered include: The time of day the noise occurs; How long the noise goes on for; The type and source of noise; The location in which the noise occurs; How loud the noise is; How the noise affects others. 	Although on site observations indicate times of day and the nature of any audible noise, it is not clear that any attempt has been made to objectify 'how loud the noise is' and a reliance on a subjective assessment of how the noise may affect others has been the primary method of investigation. Although this is a reasonable method of investigation as per the requirements of the Environmental Protection Act 1990, an objective assessment would likely yield a more actionable result, by allowing a more reliable retrospective adjustment of permissible internal ambient noise levels within The Venue.
		Further to this, it discusses that officers may install noise monitoring equipment in the neighbourhood, which is to help record whether noise escaping from a premises is disruptive to others on their own land".	
20/10/2017	Email	Request from EHO to organise in person meeting with ADC representative.	No Comment.
28/10/2017	Call out visit and subsequent email	A visit was undertaken in response to complaint from a local resident. No evidence of a statutory nuisance was observed during visit. Hours of operation seemed to extend beyond licence period.	No Comment.

Table A1: Review of correspondence

Date	Type of correspondence	Points raised	CSL Comments
29/10/2017	Call out visit and subsequent email	Music was observed to be playing beyond the 02:00 limit for licenced activities as stated in the venues licence.	No Comment.
10/11/2017	Email	Noise abatement notice served on ADC.	
10/11/2017	Call out visit and subsequent email	Music heard between 01:30 and 02:00 that was deemed to constitute a statutory nuisance.	As alluded to above, the absence of an objective assessment limits the potential to set reliable in house noise level limits. It also removes the potential to compare the level of impact experienced during different call out visits.
16/02/2018	Call out visit	DJ night, statutory nuisance declared on the basis that music and talking were at an excessive level.	In order to develop a suitable noise level limit within the club, it would be useful to understand objectively, the level of impact witnessed.
20/02/2018	Subsequent email	Email from EHO re. complaints on 16.02. Requests information re. control of noise breakout from the premises and how this is being "reduced to background level".	It is not entirely clear what is meant by the request that noise be reduced to background levels. In acoustical terminology reference to a "background noise level" has a very specific definition. There is no reference either in legislation, or relevant standards and guidance, to the need to reduce noise levels to background level.
26/02/2018	Email	Request for confirmation that noise reduction measures have been implemented.	It is understood that the following month (march 2018), ADC were deemed to be compliant with licensing objectives, which include the prevention of public nuisance. This was as a result of changes made to in house systems and processes with regard to noise control.

Table A1: CNTD: Review of correspondence

Date	Type of correspondence	Points raised	CSL Comments
05/09/2018	Email	Request for report from acoustical consultant.	No Comment
21/09/2018	Call out visit and subsequent email	EHO call out in response to complaint. Observations between 21:55 and 22:55 indicate that music ceased before 23:00. A statutory nuisance was declared on the basis that audible guitars and drums would disturb sleep.	Guidance on the suitable internal ambient noise levels, particularly with regard to sleep disturbance, are exclusively concerned with the night time period defined as being between 23:00 and- 07:00. Research documenting the level at which sleep disturbance can be considered to be affected is available in relevant British standards and guidance (for example BS8233:2014, or WHO night noise guidelines), again it is not clear that A) any noise events occurred during this night time period; or B) that a level likely to affect the restorative process of sleep, has been breached.
Sep-18		Mixing desk with build in compressor installed to allow sound technician to mediate internal noise levels.	A system of in house regulation followed, allowing sound technicians to adjust, on the fly, the output of noise levels within the The Venue.
04/10/2018	Email	Informing ADC of complaint received on 21/09/2018.	No Comment
Dec-18		New sound system installed.	No Comment
08/02/2019	Call out visit and subsequent email	EHO attended complainants property. No noise nuisance observed.	No Comment
09/02/2019	Call out visit and subsequent email	Music faintly audible. Generally not distinguishable. Asserted that sleep disturbance likely with windows open. Conclusion was that noise would impact "normal life within the flat". It was further stated that this has caused unacceptable interference with the personal comfort or amenity of those who lived within the flat.	Significant claims that, again, would usefully be supported by some form of objective assessment. This would allow a more meaningful assessment of the required remedial action.

Table A1: CNTD: Review of correspondence

Appendix B – BUILDING ENVELOPE



Figure B.1: Example of acoustic weak point on ADC façade

Appendix C – EXAMPLE PRODUCTS

Class 2 Sound Level Meter – Approximate Cost £600

Castle 'SONUS' GA216I Combined Integrating Sound Level Meter

The Castle SONUS range of pocket sized sound level meters bring simplicity and power to the worlds of Noise at Work and Environmental sound monitoring. From a basic sound pressure meter to full data-logging, combined sound and dosemeter, the range of systems covers a wide diversity of applications.

The Castle SONUS GA216I is a feature packed instrument that is fully compliant with IEC 61672-1:2002 Class 2, IEC 60651: 1979 Type 2 and IEC 60804: 2001 Type 2. This meter gives simultaneous Leq (rms. average) and peak measurement for assessments to the Noise at Work Regulations 1989. It has a high-specification measurement microphone and is cased in tough, crack resistant ABS plastic.

> Mobility of instrumentation is essential for effective noise measurement. As the name indicates, the Castle SONUS 'Pocket Meters' pack all the necessary features into pocket sized proportions

The data-logging instruments have a USB connection and are compatible with the Castle dBdataPRO software, where data can be presented in the desired format and copied and pasted into other applications, so you don't have to change the way you have always completed your reports.

There are a number of system packages available to suit many applications from simple tasks such as alarm monitoring, to a fully weatherproof system for long-term environmental monitoring, there are also dedicated packages for Noise at Work requirements.

Applicable Standards	IEC 61672-1:2002 (Integrating, Sound Exposure and Sound Level Meters) IEC 60651:1979+A1+A2 (Sound Level Meters) IEC 60804:2000 (Integrating Function
Microphone and Preamplifier	Type 7052 Pre-Polarised ½" (13.2 mm) Free-Field, Electret Condenser Microphone: 20Hz – 8KHz ± 2dB – 32 dB ± 3 dB re 1V/Pa Custom pre-amplifier design Typical actuator to free-field correction factor (based on 500Hz=0) is as follows
Display	Back-lit LCD panel (8x1 Characters) Alpha-Numeric display for measured results
Level Range	Measuring Range: 35-140 Linear operating range (IEC61672-1): 65dB 3 Measurement Ranges (IEC61672-1): 35-100 55-120 - Reference Range 75-140
Noise Floor	Typical 'A' Weighting <32 dB(A) rms. 'C' Weighting <38 dB(C) rms
Frequency Weighting	'A' and 'C' to IEC 61672-1:2002 and IEC 60651:1979+A1+A2
Frequency Range	20 Hz - 8 kHz (including microphone) 1 Hz - 20 kHz (electrical characteristics)
Time Weighting	Slow and Fast
Instrument Response	Simultaneous rms. and Peak
Measurement Parameters	Lp (Sound Pressure Level), Leq (Equivalent Sound Level), Lmax (maximum Level), Cpeak (Max. Peak Level), LEpd (Sound Exposure Level), LAE (Single Event Sound Exposure Level) Other Displays: Elapsed time, Overload, Battery Life

Figure B1: Example Sound Level Meter for Spot Measurements

Subwoofer Isolation – Approximate Cost £50 per mat

MUSIC ISOMAT - Reduce speaker vibration & increase the quality of your music



Key Benefits

- Helps provide a clearer sound for your gig
- Can take up to 140 kg in weight.
- Helps reduce speaker vibration
- FVMS302 Fire Rated
- High density at 80kg/m³
- Ideal for home cinema use
- Available from stock

Description

The Music Isomat is a heavy duty isolation mat. It can withstand 140kg (308lb).

It is designed to isolate your home cinema subwoofer, gig or PA equipment.

The mat is 20" (508mm) by 15" (381mm) and 3.5" (89mmm thick.)

Figure B2: Subwoofer Isolation Option.

Appendix D – RAW DATA

Sound Insulation Test

		Lfeq 1/3 Octave Band																
Measurement	100	125	160	200	250	315	400	500	630	800	1.0	1.25	1.6	2.0	2.5	3.15		LAeq
	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	kHz	kHz	kHz	kHz	kHz	kHz		
L1	107.7	103.9	91.9	84.1	82	77.6	74.9	74.3	74.9	75.7	76.7	78.4	80.5	83	83.8	83.6		99.5
L2	43.7	38.2	28.9	24	20.4	19.9	18.8	18.7	18.1	19.7	22.5	21.3	16.4	12.7	10.1	9.8		32.8
Background	27	26.7	28.6	26.3	25	24.2	23.8	22.5	21.7	22.4	24.4	25	22.9	22.6	24.2	22.9		34.1

Table D1 – Sound insulation test Raw Noise Data.

*Measurements have been averaged across all positions to provide single figures for each 1/3 octave band

		1/3 Octave Band														
Measurement	100	125	160	200	250	315	400	500	630	800	1.0	1.25	1.6	2.0	2.5	3.15
	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	kHz	kHz	kHz	kHz	kHz	kHz
T20 (seconds)	0.24	0.27	0.35	0.14	0.27	0.19	0.23	0.24	0.25	0.25	0.27	0.25	0.25	0.24	0.25	0.27

Table D2 – Sound insulation test Reverberation Time data

*Measurements have been averaged across all positions

Music Measurements

Measurement Location	Duration (Min)	LAeq														Lfeq 1	L/3 O	ctave	Band	s													
			20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	10.0	12.5	16.0	20.0
			Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	Hz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz	kHz
After Dark Club	15	95	63.1	63	74	97	106	110	109	107	97	86	85	85	81	83	86	80	82	78	76	76	80	81	79	79	79	78	81	78	77	66	48
Outside Residential	5	52	62.1	62	59	63	70.9	68.2	66.6	60.6	51	46	45	44	43	41	41	39	40	41	39	38	37	35	34	32	30	29	29	27	26	23	19
Residential Property	15	42	56.3	49	42	42	56.9	57.1	52.1	46.3	44	37	36	32	35	35	33	32	31	32	30	30	31	25	23	24	20	18	16	14	13	11	10

Table D3 – Frequency Data Associated with "Club Music Measurements" in Section 6

Appendix E – SOUND INSULATION TEST CERTIFICATE

