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Mr Nick Watterson
Barbarella's Wine Bar Ltd
7 The Quadrant
Buxton
SK7 6AW

Sent by email only: barbarellaswinebar@live.com

Dear Sir

SOUND INSULATION TESTING AND NOISE MEASUREMENTS
BARBERELLA'S WINE BAR, NO. 7 THE QUADRANT, BUXTON

1.00 *INTRODUCTION*

1.01 Please find herewith the findings of the sound insulation testing and noise measurements at Barbarella's Wine Bar, No. 7 The Quadrant, Buxton.

1.02 A glossary of acoustic terms is contained in Appendix 1 and a site plan is contained in Appendix 2 for reference.

2.00 AIRBORNE SOUND INSULATION TEST OF THE SEPARATING FLOOR BETWEEN 1ST FLOOR WINE BAR AND 2ND FLOOR DWELLING FLAT

2.01 Airborne sound insulation testing was undertaken for all third octave frequency bands between 100–3150 Hertz. Two source positions were used. The spatial average sound pressure level was obtained for each source position in both source and receiving rooms using a swept microphone technique (continuously moving). An averaging time of 30 seconds was used for each microphone sweep. Reverberation time measurements were undertaken using one loudspeaker position and an interrupted source. The average of six decay measurements for each frequency band was determined from three fixed microphone positions with two readings in each case. The measurement system calibration was verified immediately before the commencement of the measurement sessions and again at the end, with no drift in calibration level noted.

2.02 The airborne sound insulation of the existing separating floor is summarised in the following table.

Table 1 – Sound Insulation Test Results of Separating Floor

Source Room	Receiving Room	$D_{nT,w}$	Comment
First Floor Wine Bar	Second Floor Flat (Bedroom)	64	Airborne sound insulation of separating floor very high; minor flanking via external windows
First Floor Wine Bar	Second Floor Flat (Living Room)	(>) 60*	Airborne sound insulation of separating floor very high; *measurement limited by ingress of road traffic noise

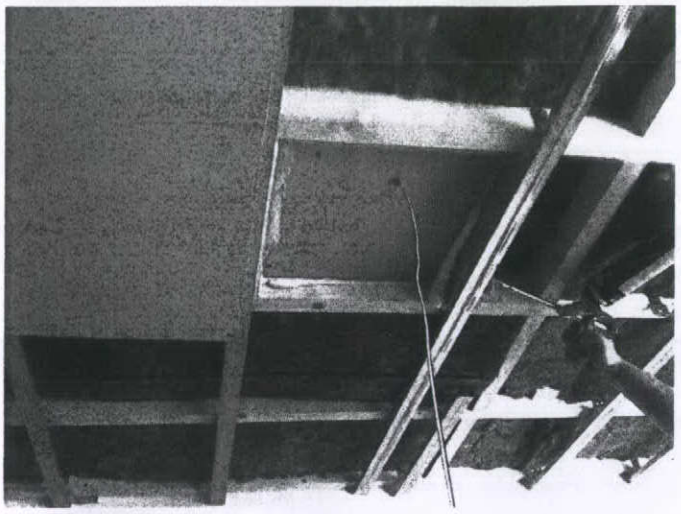
2.03 For reference, $D_{nT,w}$ is a single-number quantity which characterizes the airborne sound insulation between rooms as defined in BS EN ISO 717-1 (note: T is the reverberation time measured in the receiving room).

2.04 *In summary, the airborne sound insulation of the separating floor exceeds 60 dB* $D_{nT,w}$.

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3.00 ASSESSMENT OF NOISE FROM AMPLIFIED MUSIC SYSTEM INSTALLED AT 1ST FLOOR

3.01 Three circular speakers have been placed within the lower independent ceiling at first floor level (for reference, two beneath the living room and one beneath the bedroom of the overlying dwelling flat). It is understood, however, that the speakers have been 'boxed-in', as shown in the following photograph.



3.02 For the purpose of the subjective assessment, the licensee played amplified music through all three speakers set within the first floor suspended ceiling with the music noise level set at a level which the licensee considered to represent the maximum desired volume which, for reference, corresponded to the volume dial being turned to 9 'o' clock on the amplifier.

3.03 Although the corresponding music noise level in the first floor wine bar area was not measured (as this was not the primary purpose of subjective exercise), it was considered that the music was moderately loud (circa 80 to 85 dB(A)) as normal conversation would have been difficult under such circumstances.

3.04 The (bass element of the) music was faintly audible in the bedroom of the overlying dwelling flat during lulls in all other noise, such as distant traffic. The music was inaudible in the living room of the overlying dwelling flat due to masking noise from the outside. The noise measurements taken in the bedroom of the overlying dwelling flat are reproduced in the following table.

Table 2 – Noise Measurement Data Re: Music Transmission Through Separating Floor

Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{Ceq} (dB)	Comment
1256–1301	28	22	51	Traffic noise through poorly insulated closed sash window is dominant; (bass beat of) music very faintly audible during lulls in traffic noise only
1352–1357	26	22	50	Traffic noise through poorly insulated closed sash window is dominant; music off

3.05 The noise measurement data corroborates the subjective aural observations that, with the volume dial being turned to 9 'o' clock on the amplifier serving the first floor speakers, there was no measurable increase in noise levels in the bedroom of the overlying dwelling flat.

3.06 Both the background noise level and the noise level with music (volume dial turned to 9 'o' clock) within the bedroom of the overlying dwelling flat were very low, circa 22 dB $L_{A90,T}$ (note: the $L_{Aeq,T}$ metric being attributable to road traffic noise). To put these levels into context, BS 8233:1999 'Sound Insulation and Noise Reduction for Buildings' states that good resting and sleeping conditions occur with noise levels less than 30 dB(A). Although it is accepted that these conditions are stated in the context of transportation noise, it is considered that the noise levels within the bedroom of the overlying dwelling flat remain very low with the volume

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dial being turned to 9 'o' clock on the amplifier serving the first floor speakers.

3.07 With reference to the guidance to local authorities in England on the powers available to them to deal with night time noise emanating from dwellings and licensed premises under the Noise Act 1996 as amended by the Clean Neighbourhoods and Environment Act 2005, it is evident that the noise levels within the bedroom of the overlying dwelling flat with the volume dial being turned to 9 'o' clock on the amplifier serving the first floor speakers is significantly below the 'permitted level' as described in the aforementioned guidance.

3.08 Notwithstanding the above, considering that the above was based on a shortened test during the daytime, it is recommended that:

- The volume dial to the amplifier serving the first floor speakers is set at less than (quieter than) 9 o'clock
- The permitted music noise level associated with the amplifier serving the first floor speakers should be set in conjunction with Environmental Health Officers from the Local Planning Authority. Management controls should be adopted to ensure that the permitted *music noise level is not exceeded. In the event that the permitted music noise level is* exceeded, the Local Planning Authority may insist upon the installation of an electronic sound limiting device (to avoid any reliance on management controls alone).

4.00 ASSESSMENT OF NOISE FROM HAND DRIERS INSTALED IN 1ST FLOOR TOILETS

4.01 A hand drier has been installed in both the male and female WCs at first floor level, which is beneath the kitchen, bathroom and landing area of the overlying dwelling flat.

4.02 The noise level of the hand drier was measured to be of the order of 80 to 82 dB(A) in the WCs.

4.03 For the purpose of the subjective assessment, the licensee operated the hand driers, which were audible in the kitchen of the overlying dwelling flat. Subjectively, it was considered that the audibility of hand driers was due to the character of the noise, being akin to the sound of a domestic hoover in use in a neighbouring property, rather than being significantly loud.

4.04 The noise measurements taken in the kitchen of the overlying dwelling flat are reproduced in the following table.

Table 3 – Noise Measurement Data Re: Hand Driers

Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{Ceq} (dB)	Comment
1227–1232	31	26	49	Traffic noise through poorly insulated closed sash window is dominant; hand driers not in
1234–1235	29	25	46	Traffic noise through poorly insulated closed sash window is dominant; hand driers audible due to character but no measurable change in level

4.05 Both the background noise level and the noise level with the operational hand driers within the kitchen of the overlying dwelling flat were very low, circa 25 to 26 dB $L_{A90,T}$ (note: the $L_{Aeq,T}$ metric being attributable to road traffic noise). To put these levels into context, BS 8233:1999 'Sound Insulation and Noise Reduction for Buildings' states that good resting and sleeping conditions occur with noise levels less than 30 dB(A). Although it is accepted that these conditions are stated in the context of transportation noise, it is considered that the noise levels within the bedroom of the overlying dwelling flat remain very low with the operational hand driers.

4.06 Notwithstanding the above, it is considered that the acceptability or otherwise of the noise associated with the hand driers in the first floor WCs should be agreed with Environmental Health Officers from the Local Planning Authority.

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5.00 ASSESSMENT OF NOISE FROM EXTERNAL CHILLER UNIT AT REAR OF PREMISES

5.01 A chiller unit has been installed to the rear of the premises. It is understood that the chiller unit operates on demand, but during the course of the survey was noted to operate for circa 2 minute duration every 10 minutes. The frequency of operation of the chiller unit during the night time period is not known.

5.02 The noise level of the chiller unit (over the course of an operation cycle) was measured at 56 dB(A) at a distance of 2 metres in front of the chiller.

5.03 No line of sight exists between the chiller and the bedroom window of the overlying dwelling flat due to the 'lean-to' structure at the rear of the wine bar.

5.04 Based on point source propagation (with a 6 decibel reduction per doubling of distance) and an attenuation of at least 15 decibels due to the existing 'lean-to' structure, the resultant noise level from the chiller unit is roughly estimated to be less than 30 dB(A) incident upon the 2nd floor bedroom window.

5.05 For the purpose of the subjective assessment, noise measurements were taken in the bedroom of the overlying dwelling flat (firstly with the bedroom window open and then with the bedroom window closed); at no stage was the operational chiller audible. The noise measurements taken in the bedroom of the overlying dwelling flat are reproduced in the following table.

Table 4 – Noise Measurement Data Re: External Chiller

Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{Ceq} (dB)	Comment
1412–1417	30	26	50	Traffic noise through partially open sash window is dominant
1419–1424	29	26	50	Traffic noise through partially open sash window is dominant; chiller unit operating (resident observing unit) but not audible in bedroom
1352–1357	26	22	50	Traffic noise through poorly insulated closed sash window is dominant
1427–1437	25	21	49	Traffic noise through poorly insulated closed sash window is dominant; chiller unit operating (resident observing unit) but not audible in bedroom
1429–1431	24	22	49	Chiller unit operating between 14:29 and 14:31 (resident observing unit) but not audible in bedroom and no measurable difference in noise level

5.06 As stated, at no stage was the operational chiller audible in the bedroom of the overlying dwelling flat (it is accepted, however, that this survey was undertaken in the daytime period when background noise levels at the rear of the Quadrant may be higher than those at night, although based on allowances for distance and screening corrections, the resultant noise level from the chiller is likely to be relatively low).

5.07 Notwithstanding the above, it is considered that the acceptability or otherwise of the noise associated with the night time operation of the external chiller unit should be agreed with Environmental Health Officers from the Local Planning Authority.

6.00 MISCELLANEOUS

6.01 The occupant of the overlying dwelling flat commented that the sound of tables and chairs being moved was audible. Although it is highly unlikely that the degree of any impact transmission is greater than that permitted under Building Regulations Approved Document E, the provision of soft foam pads to table and chair legs would eliminate any such noise.

6.02 It is considered that the acceptability or otherwise of the noise associated with tables and chairs being moved, and thus the provision of soft foam pads, should be agreed with Environmental Health Officers from the Local Planning Authority.

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I trust the foregoing is to your satisfaction. If you have any queries please do not hesitate to contact me.

Yours sincerely

Jonathan Rigg (MEng, MIOA)
Development Director
Environmental Noise Solutions Limited

cc File

Appendix 1
Glossary of Acoustic Terms

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_0)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μPa).

A-weighting Network

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{AF\ max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, no matter how long the event actually took. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Weighted Airborne Sound Insulation ($D_{nT,w}$)

Single number quantity which characterises the airborne sound insulation between rooms.

Appendix 2
Drawings

