REPORT REFERENCE:

IMP7948-1

SOUND INSULATION ASSESSMENT

INTERNAL NOISE

POST COMPLETION COMPLIANCE

BS EN ISO 140-4:1998

CLIENT:

Tern Restaurant

Worthing

SITE:

Tern Restaurant

Worthing

SURVEY DATE:

26th November 2025

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1 EXECUTIVE SUMMARY

1.1 Instruction

Impact Acoustics Ltd has been instructed to carry out the relevant noise assessments and calculations at proposed Tern Restaurant, Worthing with respect to proposed usage of the internal kitchen and dining area to capacity in accordance with local planning criterion.

1.2 Scope of Report

Sound Insulation Testing in accordance with ISO140-4 to determine the existing transmission loss of the structure between the commercial and the existing residential premises. British Standard 8233:2014 will be used to determine the impact of the commercial operations on the internal noise environment within the existing residential dwellings. This report aims to establish the following:

- Sound Insulation Test results of the installed structure

1.3 Summary of Report

1.4 Sound Insulation Testing

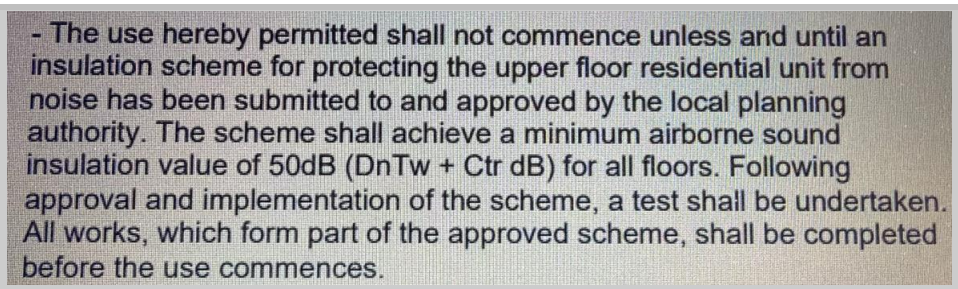
1.4.1 Airborne Test – Floors / ceilings (Post-Mitigation)

TEST NO.	FROM	TO	ACHIEVED $D_{nT,w}$ + C_{tr} dB
1	Ground Floor Commercial	First Floor Bedroom	59

1.5 Conclusions

Sound Insulation testing has been undertaken in order to meet the desired level within the proposed residential dwellings and satisfy the local council's requirements. The result assessment show that the installed sound insulation will control passage of sound from internal commercial usage between the hours of operation.

2 CRITERION



Criterion of room to room transmission of 50dB DnTw + Ctr

3 SOUND INSUALTION TESTING

Sound insulation testing was undertaken between the ground floor commercial space and the first floor residential space to understand the installed attenuation.

3.1 Testing Methodology

3.2 Airborne Sound Insulation was conducted to BS EN ISO 140-4:1998

Measurements of standardised level difference (DnT) were carried out in accordance with BS EN ISO 140-4:1998.

3.2.1 Level measurements in the Source & Receive Room (L1 & L2)

The noise was generated in the source room by placing an active loudspeaker, which produces a steady spectrum of pink noise, in the corner of the room but at least 0.5m away from any reflective surface. The noise level was measured in both the source room and receive room, sampling as much of the room as possible. The sound level meter was always kept 0.7m away from any reflective surface as to not artificially increase or decrease noise levels into the microphone. The measurements were taken at one third octave band intervals from 100 to 3150 Hertz using an average time of 30 seconds for each of the 2 sound source positions. The measurements in each room were arithmetically averaged.

3.2.2 Background Measurements in Receive Room (B2)

Where noise levels were measured in the receive room, the background noise level was also measured with the speaker turned off. This is to ensure the background noise level did not influence the result. The background noise level is measured over a time period that accurately reflects the background noise measurement at the time of the test. This is normally between 6 & 30 seconds and can vary between the first and second background measurements.

3.2.3 Reverberation Time Measurements (T2, or T20)

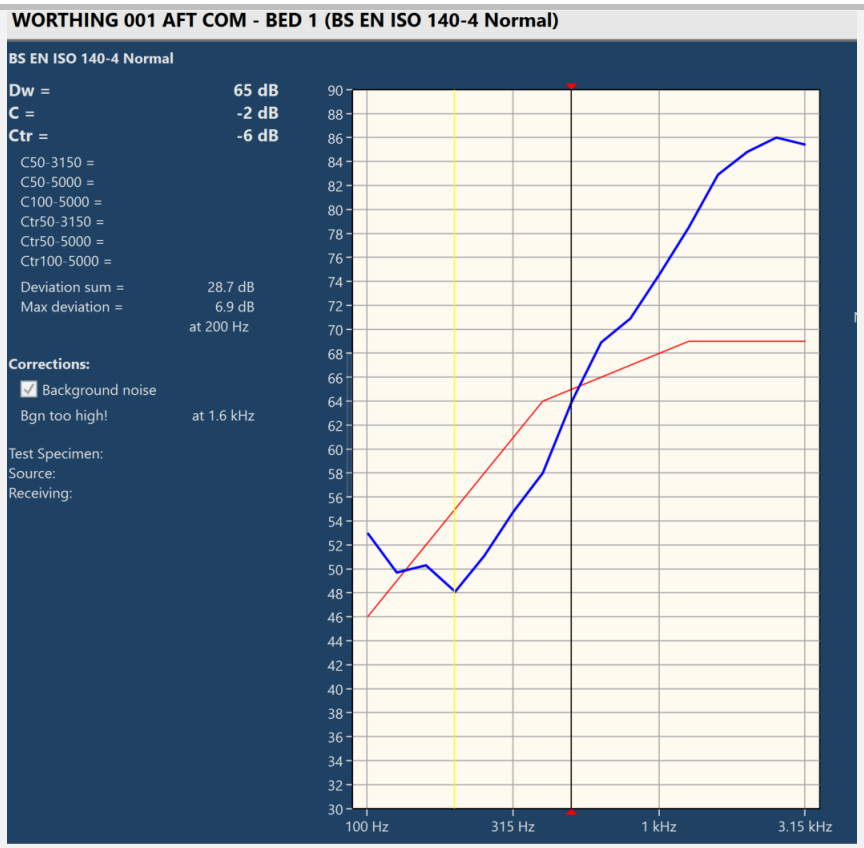
A minimum of 6 reverberation time measurements were also taken in the receive room to accurately define the level of influence the diffuse field has on the microphone. A minimum of 6 reverberation times were measured in each room using a minimum of 3 microphone positions at each of 2 loud speaker positions in accordance with BS EN ISO 354:2003 (also complies with BS EN 20354)

3.2.4 Calculation of the Airborne Sound Insulation Test Result

Any receiver room noise measurements that are within 6dB of the background measurements are corrected by logarithmically averaging the difference to correct the receive room measurement. The correction is applied up to 10dB, where a maximum correction of 1.6dB is applied. Any background noise level greater than 10dB over the L2 measurement will appear to reduce the sound insulation at that frequency. The difference between the source and 'corrected' receiver room measurement is calculated for each speaker position and 2 differences averaged to obtain 'D'. The result is normalized by taking adding 10 times the logarithm of half the reverberation time at each frequency to give the standardized level difference (DnT) at each frequency. The DnT are then compared to the standard reference line as defined in BS EN ISO 717-1:1997 to give a single figure result of DnT,w. The spectrum adaptation terms (C;Ctr) are then calculated in accordance with BS EN ISO 717-1:1997. All measurements are taken to 0.1dB precision, except reverberation times which are taken to 0.01 seconds precision.

3.3 Results

3.3.1 Airborne Test – Floors / ceilings (Post-Mitigation)



TEST NO.	FROM	TO	ACHIEVED $D_{,w} + C_{tr}$ dB
1	Ground Floor Commercial	First Floor Bedroom	59 (65-6)

4 APPENDIX A - GLOSSARY

Ambient Noise: Totally encompassing sound in a given situation at a given time usually composed of sounds from many sources near and far. [BS 4142]

Decibel (dB): a unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dB(A): decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).

Free Field: 1. A free sound field is a field in a homogeneous, isotropic medium free from boundaries. In practice it is a field in which the effects of the boundaries are negligible over the region of interest. The actual pressure impinging on an object (e.g., a microphone) placed in an otherwise free sound field will differ from the pressure which would exist at the point with the object removed, unless the acoustic impedance of the object matches the acoustic impedance of the medium.
2. An environment in which there are no reflective surfaces within the frequency region of interest.
3. A region in which no significant reflections of sound occur.
4. [BS4142] suggests that free-field environmental noise measurements need to be made at least 3.5m from any reflecting structure.

Hertz (Hz): unit of frequency, equal to one cycle per second. Frequency is related to the pitch of a sound.
$L_{A90,T}$: the A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1997 it is used to define background noise level.

$L_{Aeq,T}$: the equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq,T is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is written as Leq in connection with aircraft noise.

L_{Amax}**:** the highest A weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated.

Steady Noise: Noise that gives fluctuations over a range of not more than 5 dB on a sound level meter set to frequency weighting A and time weighting S. [BS 4142]

5 DISCLAIMER

This report was prepared by Impact Acoustics. The material in it contains Impact Acoustics best judgment in light of the information available at the time of preparation of this report. Any use which a third party makes of this report, or any reliance on, or decisions based on it are the responsibility of such third parties. Impact Acoustics accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

#END OF REPORT#