TECHNICAL MEMO

Our Ref: **4452_005m_1-0_eg**

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SUBJECT: NEW LONDON CLUB - Acoustic Test Results

1 INTRODUCTION

This memo summarises the acoustic measurements carried out in the club on Weds 26th January 2022.

2 REVERBERATION TIME

The measured reverberation times in the dancefloor area were carried out using the test procedure described in the Appendix. Measurements were carried out with the space quiet and unoccupied, and furnished heavily with builders equipment in place (see photos in appendix).

Measured T_{20} reverberation times are compared to the predicted reverberation times as detailed in the appendix. Measured reverberation times agree closely with the predicted reverberation times, except at low frequency 125 Hz (where the extent of equipment and furnishings in the space would also have contributed to the reduction in predicted vs measured) reverberation time in this band). The flat reverberation time achieved across the frequency spectrum including at 125 Hz is beneficial for amplified sound use.

The results support the view discussed previously that it would be possible to apply a paint or seal finish to the Quietstone wall and ceiling finishes, which is expected to reduce the sound absorption performance at 1kHz and above, to achieve a moderate increase whilst still achieving good control of reverberation time in the space.

Table 2.1: Measured and predicted reverberation times

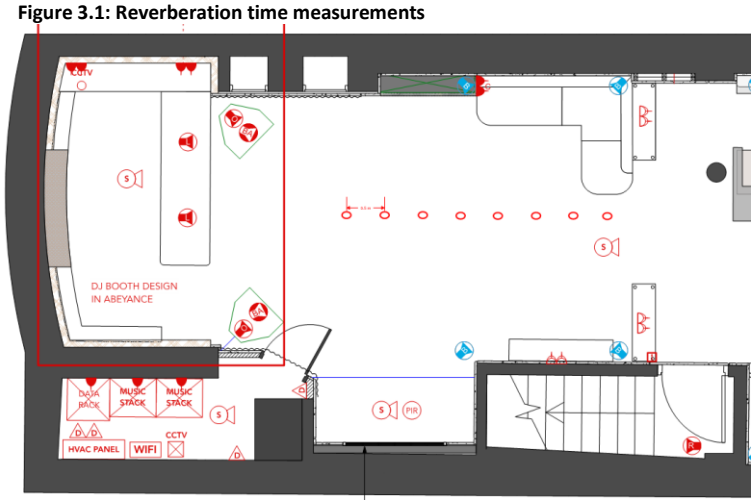
	Reverberation Time, s at octave band frequency, Hz					
	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz
Average Measured T_{20}, s	0.3	0.2	0.2	0.2	0.1	0.2
Maximum measured T_{20}, s	0.4	0.3	0.3	0.2	0.2	0.2
Predicted T, s	1.2	0.4	0.3	0.2	0.2	0.2

3 SOUND PRESSURE LEVEL

Sound pressure levels were measured in the space with a pink noise signal applied to the sound system input, with no system EQ applied, in order to look at the effect of room acoustics. Measurements were carried out at a

measurement height of 1.5 m above ground level at 0.5 m increments along a measurement line central to the loudspeakers (as verified with a laser measurement to the centre cone of each speaker), as shown in Figure 3.1. The sound pressure level measurements in each location shown were measured to be 89 dBA +/- 1 dBA, which demonstrates an even distribution of sound is achieved on the dancefloor (a variation of +/- 1.5 dBA is typically acceptable).

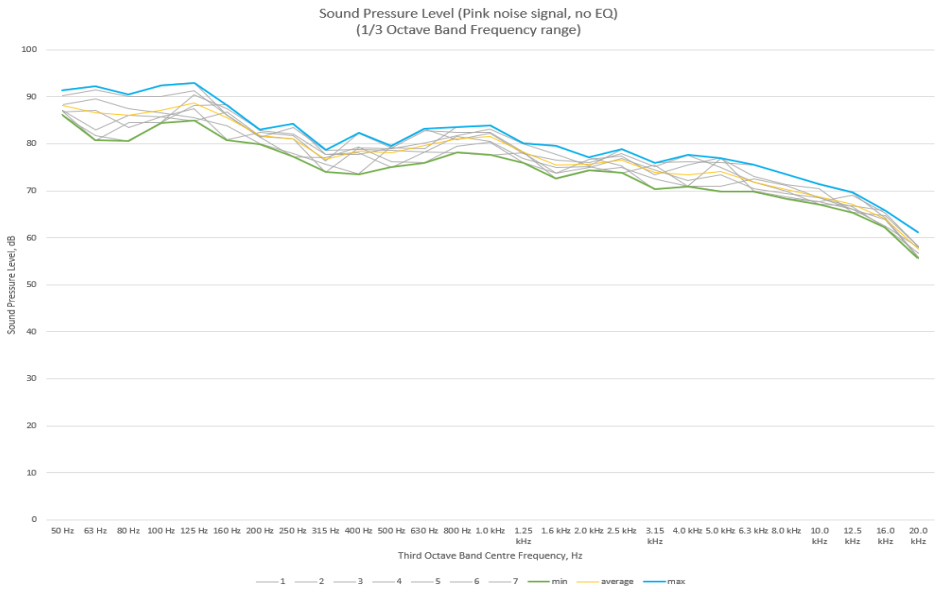
Figure 3.1: Reverberation time measurements



The measured third octave band sound levels (without EQ applied) are presented below. The levels were within +/-4 dB of the average measurement between 200 Hz and 20kHz, which is fairly consistent, with a larger variation at lower frequency. The frequency response is relatively flat (typically +/- 3dB of the mid frequency value at 500 Hz) between 250 Hz and 2.5 kHz. System applied EQ is expected to counteract the rise (up to +10 dB) at lower frequencies, and the dip at frequencies up to 8 kHz (up to -7 dB). The system has been fine tuned by the sound system provider with system EQ applied to achieve a flatter frequency response.

There is a more significant tail off at 10 kHz to 20kHz (-10 to -19 dB), and this could be dealt with be a combination of system applied EQ and reducing the sound absorption at very high frequency by coating the wall and ceiling panels with a paint or sealant finish as discussed above.

Figure 3.1: SPL measurements



APPENDIX

ACOUSTIC SURVEY

Survey Details

Date and Time of Survey

26th January 2022

Survey Personnel

Ben Pearce BMus (Hons) PGDip AMIOA

Survey and Measurement Procedure

The airborne sound insulation and reverberation time was measured according to BS EN ISO 16283-1: 2014+A1:2017. Acoustics. Field measurement of sound insulation in buildings and of building elements. Airborne sound insulation [i] and rated in accordance with BS EN ISO 717-1: 2020 *Rating of Sound Insulation in Buildings and of Building Elements. Part 1: Airborne Sound Insulation* [ii].

Hemi dodecahedron loudspeakers were used for the reverberation time and sound insulation tests. Please note that the use of these are not in strict accordance with BS EN ISO 16283-1 however they are in accordance with the previous standard BS EN ISO 140:4, and are acceptable for use in Sound insulation testing for building regulations under the UKAS scheme. They are also acceptable for reverberation time testing in accordance with ISO 3352.

The sound level meter was calibrated before and after the survey (see equipment details in Table below). No significant calibration drift was observed. Background noise levels were low throughout the duration of testing.

Equipment Details

The following equipment was used for the sound insulation testing:

Equipment Details

Equipment	Make & Model	Serial No	Calibration Item	Calibration Due	Calibration Certification Number
Sound Level Meter	Norsonic 140	1403216	BS7580	03/02/2023	U36966
			1/3 Octave	03/02/2023	U36967
			Rev Time	03/02/2023	U36967
Calibrator	Norsonic 1251	31428	-	03/02/2023	U36964
Hemi-Dodecahedron Loudspeaker[1]	Norsonic 250	31443/31475	-	-	-
Power Amplifier	Norsonic 280	2803672/2803794	-	-	-

NOTES:

[1]Use of Hemi-Dodecahedron Loudspeakers are discussed above.

Test images (SPL, RT)

Reverberation time calculation - Basement Club Dancefloor

		Volume	125 m^3													
		Target	0.5		125Hz		250Hz		500Hz		1KHz		2KHz		4KHz	
Element	Absorption data		Area	Code	a	Sa	a	Sa	a	Sa	a	Sa	a	Sa	a	Sa
Dancefloor Walls	Quietstone Standard direct fix		30	QSS	0.04	1	0.13	4	0.30	9	0.74	22	0.90	27	0.70	21
Bar Area Walls	Quietstone Standard direct fix		48	QSS	0.04	2	0.13	6	0.30	15	0.74	36	0.90	44	0.70	34
Ceiling	Quietspray 30mm Thick System		46	QS	0.20	9	0.76	35	1.00	46	0.95	44	0.85	39	0.65	30
Floor	Vinyl Tile		37	VT	0.02	1	0.03	1	0.03	1	0.03	1	0.03	1	0.02	1
Doors (x4)	doors (timber)		6	BB05	0.10	1	0.10	1	0.08	0	0.08	0	0.08	0	0.08	0
Dancefloor to DJ Booth	0.6 Absorption Coefficient		6	0.6	0.60	3	0.60	3	0.60	3	0.60	3	0.60	3	0.60	3
Air	Air Abs at 20C 50% RH		125	m^3		0		0	0.00	0	0.00	1	0.01	1	0.03	3

Total Absorption	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz
Unoccupied	17	50	75	107	116	93

Sabine RT	125Hz	250Hz	500Hz	av.	1KHz	2KHz	4KHz
Predicted	1.2	0.4	0.3	0.4	0.2	0.2	0.2

results comments

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