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PROJECT TECHNICAL MEMORANDUM

JOB TITLE : 60 Oldham Street
REF : HT: 30509/PTM1/R2
DATE : 9 March 2023
FROM : Joe Sinker
ISSUED TO : P & M Harrison Holdings Ltd

RE: 60 OLDHAM STREET, MANCHESTER COMMERCIAL FIT-OUT - NOISE TRANSFER ASSESSMENT

1.0 Introduction

We understand that the new tenant of the commercial premises basement and ground floor levels of 60 Oldham Street intend to continue to operate the unit as a bar. As there is an existing residential premises at first floor the new tenant has requested guidance from Hann Tucker Associates on the correct specification of the ground floor ceiling and glazed frontage such that operational noise transfer is suitably controlled within the first floor residential unit in line with the licensing conditions.

The licensing conditions state the following:

1. *Prevent the transmission of audible noise or perceptible vibration through the fabric of the building or structure to adjoining properties.*
2. *Noise shall be inaudible at the nearest noise sensitive premises.*
16. *No noise shall emanate from the premises nor vibration be transmitted through the structure of the premises that gives rise to a nuisance.*

The above licensing conditions do not give an objective means of assessment of noise transfer or egress from the proposed bar, as such we propose to demonstrate compliance using the previously accepted method of assessment used to discharge Condition 5 that was attached to the planning application for the unit under the reference 120878/FO/2018.



Planning Condition 5 stated the following concerning the control of noise transfer and egress from the proposed bar unit:

“Prior to any commencement of an A3 / A4 use a post completion report to verify that all of the recommended mitigation measures have been installed and effectively mitigate any potential adverse noise impacts affecting the residential accommodation within the building (in line with the criteria set out in points 1 and 2 above) from noise from the A3/ A4 use within the building, must be formally submitted to and approved in writing by the City Council as local planning authority.”

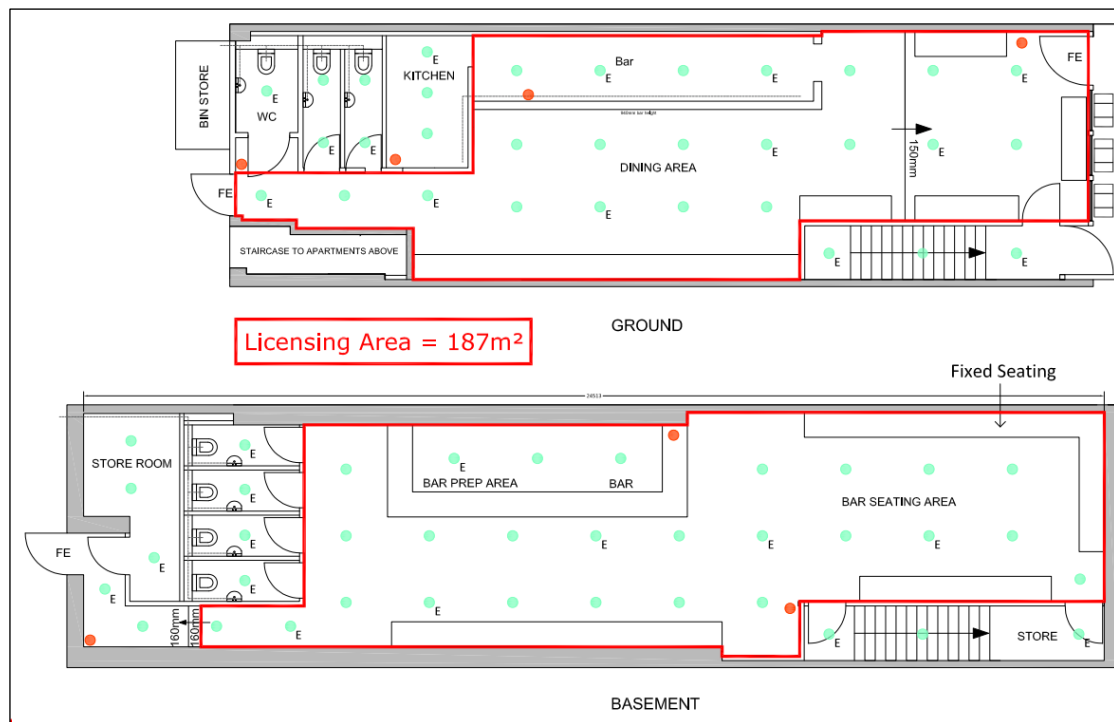
It is noted that the first floor unit is also being purchased by the tenant to facilitate a “live-in” manager for the commercial unit below so the risk of complaint is low, however, it should be ensured that noise transfer levels are controlled in line with the requirements of Manchester City Council should the first floor unit later be occupied by another party.

Hann Tucker Associates have therefore visited the site to establish the baseline performance of the floor separating the ground and first floor and the approximate performance of the existing glazed frontage of the ground floor commercial unit.

2.0 Proposed Operation

Most recently the commercial unit has operated as a late-night cocktail bar during the daytime (07:00-23:00) and night-time (23:00-02:00). The tenant proposes to continue to operate the unit as a bar akin to other nearby ground floor commercial units along Oldham Street.

We understand that the proposed bar will operate during the daytime (11:00-23:00) and night-time hours (23:00-04:00). Please see below plan showing the proposed basement and ground floor layout.



3.0 Baseline Sound Insulation Testing

3.1 Separating Floor Sound Insulation Test

3.1.1 Overview

Hann Tucker Associates attended site on 10th February 2023 to undertake an airborne sound insulation test across the separating floor between the ground floor commercial and first floor residential units.

3.1.2 Instrumentation

The instrumentation used to carry out the measurements is presented in the table below:

Equipment	Model	Serial Number	Calibration Date
Precision Sound Analyser Meter	Brüel & Kjær Type 2250	2600445	02/12/2022
Sound Level Calibrator	Brüel & Kjær Type 4231	2115545	02/12/2022
Sound Source	Custom made, un-ported sealed cabinet type	N/A	N/A

The sound level meter was calibrated prior to and on completion of the measurement schedule. No significant deviation had occurred (no more than 0.3 dB).



3.2 Methodology

The sound insulation tests were undertaken by generating a broad band, random diffuse sound field within the source room. A spatial average of the resulting 1/3 octave band noise levels was obtained within the source room from measurements undertaken over a time period of a least 30 seconds. The measurement procedure was repeated in the receive room.

The sound level differences were determined by generating a broad band, random diffuse sound field within the source room. A spatial average of the resulting 1/3 octave band noise levels was obtained within the source room from measurements undertaken over a time period of a least 30 seconds. The measurement procedure was repeated in the receive room. A second speaker position was then selected in the source room and the measurement procedure was repeated.

The receive levels were corrected for background noise where necessary as follows:

Where the measured background noise level in each 1/3rd octave band was more than 6dB but less than 10dB below the receive level, the following formula was applied:

$$L = 10 \log \left(10^{\frac{L_{SB}}{10}} - 10^{\frac{L_B}{10}} \right) \text{ dB}$$

where

L is the adjusted signal level in decibels;

L_{SB} is the level of the signal and background noise levels combined, in decibels;

L_B is the background level in decibels.

Where the measured background noise level was less than 6dB below the receive level, a correction of 1.3dB was applied (corresponding to a level difference of 6dB) and the $\geq$ symbol was added to the results to show that the reported values are the limit of measurement.

The corrected receive levels are subtracted from the source levels to determine the level differences over the frequency range 50-10kHz from each source position. The level differences for each source position are arithmetically averaged at each frequency band to give the level difference, D .



3.3 Results

The on-site measured level differences of the separating floor are presented in the table below.

Description	Measured Sound Level Difference D (dB) at Octave Band Centre Frequency (Hz)								D _w
	63	125	250	500	1k	2k	4k	8k	
TEST 1 – Ground Floor Commercial Unit to First Floor Living Room / Kitchen	34	42	51	52	58	59	62	61	57
TEST 2 – Ground Floor Commercial Unit to First Floor Bedroom	34	46	50	50	56	60	61	61	56

3.4 Discussion

From review of previous reports prepared on the behalf of the previous tenant we understand that the current floor build-up between the ground and first floor units comprises the following:

- Plywood structural deck (assumed);
- 421mm deep posi-joists;
- Double-board to the underside of the joists with 2No. layers of 12.5mm plasterboard with 50mm mineral wool between the joists;
- A suspended ceiling on resilient hangers with a minimum 200mm cavity with 2No.layers of 15mm SoundBloc board and 50mm mineral wool laid in the cavity above the suspended ceiling.

We understand that the fit-out proposals of the tenant include for remedial works to the ground floor ceiling if required and surface mounting a decorative 5mm corrugated fibre board finish.

4.0 Assessment of Noise Transfer through Separating Floor

In order to appraise whether enhancement of the existing ceiling should be required we have assessed noise transfer through the existing separating floor in line with the requirements of the Local Planning Authority as set out below.



4.1 Assessment Criteria

Based on MCC guidance, music noise levels in the 63 Hz and 125 Hz octave centre frequency bands (L_{eq}) is suggested to be controlled such as not to exceed (in bedrooms) 47 dB and 41 dB, respectively. It is also appropriate to set a broadband limits based on achieving at least 5dB below the corresponding BS 8233:2014 internal noise target. These limits would apply any time the ground floor unit is operational, day or night.

4.2 Source Noise Levels

In order to inform our assessment Hann Tucker Associates have drawn on historic source noise data. The following levels were recently measured in a similarly sized bar (with moderate amplified music) during a busy late-evening service on Oldham Street.

Metric	Typical Highest Reverberant Noise Level (dB) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
L_{Aeq}	69	74	74	76	74	71	64	55	79

4.3 Source Noise Levels

The following table presents a summary of the predicted noise levels in the first floor living room/kitchen and bedroom based upon the results of the airborne sound insulation test and the typical noise level as set out above.

Description	Octave Band Centre Frequency (Hz) dB							dBA
	63	125	250	500	1k	2k	4k	
Source Room Level (Ground Floor Unit), L_{eq} (dB)	69	74	74	76	74	71	64	79
Measured Level Difference to Bedroom, D , (dB)	34	46	50	50	56	60	61	-
Predicted Receive Room Level in Bedroom, L_{eq} (dB)	35	28	24	26	18	11	3	25
Proposed Receive Room Limits, $L_{eq,5min}$ (dB)	47	41	-	-	-	-	-	25
Exceedance (Bedroom) (dB)	-	-	-	-	-	-	-	0

The above assessment predicts that the anticipated operational noise transfer levels, based on the results of the testing of the existing floor/ceiling installation separating the ground and first floor, should not exceed the limits set in line with the guidance of the Local Planning Authority.



5.0 Noise Breakout

5.1 Façade Sound Reduction Performance

Whilst on site to undertake baseline sound insulation testing of the separating floor, Hann Tucker Associates attempted to establish an approximate level difference of the existing commercial unit frontage, however due to the ambient noise climate it was not possible to do so reliably.

From review of previous reports prepared on the behalf of the previous tenant we understand that the current frontage comprises the following elements and composite sound reduction performance:

- 14m² 10 / 16 / 6 mm thermal double glazing;
- 2.2m² access door;
- 4m² brick façade.

Estimated Sound Reduction Index R (dB) at Octave Band Centre Frequency (Hz)								R _w
63	125	250	500	1k	2k	4k	8k	
27	26	28	33	33	31	30	30	33

5.2 Criteria

MCC recommends that noise (L_{eq}) breaking out through the building frontage of an entertainment venue should not exceed 5 dB below the background noise level (L₉₀) at all octave band frequencies at the nearest noise sensitive windows. For this development, the nearest residential receptor is window of the first floor apartment.

On the basis of baseline noise levels previously measured by Hann Tucker Associates (ref 25743/NIA1 dated 31 July 2018). We therefore propose the following noise limits when measured at 1m from nearby noise sensitive windows.

These limits are 5 dB below the typical lowest night-time (23:00-07:00) background noise levels at each octave band and are subject to the final approval of MCC.



Entertainment Noise Level Limit (dB L _{Aeq,5min}) at Octave Band Centre Frequency (Hz)						
63	125	250	500	1k	2k	4k
38	36	35	32	30	24	22

5.3 Assessment

We have assessed noise breakout to the nearest receptors based on standard calculation procedures for reverberant noise breakout and source noise levels in Section 5.1. The resultant external noise level has been calculated using the following equation.

$$SPL_{out} = SPL_{in} - SRI + 10\log_{10}\left(\frac{S}{r^2}\right) - 14$$

Where:

SRI estimated sound reduction performance of façade element

r distance from radiating element to receptors

S approximate area of radiating element

The tables presented below outline summary calculation for operational noise breakout to the first floor apartment window above.

Assessment to Residential Receptor	Octave Band Centre Frequency (Hz)						
	63	125	250	500	1k	2k	4k
Internal noise level (dB L _{eq}) <i>SPL_{in}</i>	69	74	74	76	74	71	64
Estimated composite SRI of façade	27	26	28	33	33	31	30
Distance & radiating area propagation correction (dB) $10\log_{10}\left(\frac{S}{r^2}\right)$	1	1	1	1	1	1	1
Screening Loss (dB)	-5	-5	-5	-5	-5	-5	-5
Internal diffuse field to external free-field hemispherical radiation correction (dB) -14	-14	-14	-14	-14	-14	-14	-14
External noise level at nearest receptor (dB L _{eq}) <i>SPL_{out}</i>	24	30	28	25	23	22	16
Criteria at nearest receptor (dB L _{eq})	38	36	35	32	30	24	22
Exceedance	-	-	-	-	-	-	-

The above demonstrates that the existing façade should be capable of suitably controlling operational noise breakout from the proposed bar.



6.0 Conclusion

The sound insulation performance of the existing separating floor construction between the ground floor commercial and first floor residential units has been established by means of on-site testing.

Based on historic source noise data previously measured in similar units operation noise transfer levels in the first floor apartment have been predicted to meet the requirements of the local planning authority as per the previous condition discharge and therefore the licensing conditions.

Based on the understanding of the build-up of the existing frontage based upon the previous tenant's planning application and baseline noise levels previously measured by Hann Tucker Associates at the site, calculation has been undertaken to demonstrate that the existing frontage should suitably control operational noise egress in line with the requirements of the local authority.

Yours sincerely

Joe Sinker
for HANN TUCKER ASSOCIATES