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1 – 5 Swan Street
Manchester

Noise assessment at
above

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4 Cumbrian Close
Shaw
Oldham

January 2014.

Introduction

AB acoustics were commissioned by AJSL Ventures Ltd to undertake a noise assessment regarding proposed alterations to the premises located at 1 – 5 Swan Street Manchester – the premises are located at the junction of Oldham Street and Swan Street Manchester.

The premises – which are vacant at the present time – are intended to be changed into a Gentleman's Club to the Basement and Ground Floor – the remaining floors which are offices are unaffected – this report is prepared to accompany a Planning Application for the above change of use.

The venue is located in a vibrant part of Manchester - the premises at the present time are vacant but in the area are a number of other entertainment venues – night clubs - pubs and food outlets .

There are residential apartments on the opposite side of Oldham Street a little way down from the proposed venue – their location is marked on the plan below – together with residential apart ments on Oldham Road – again shown on the plan.



Immediately adjacent to the proposed venue on Swan Street are Swan Street Exotic Pets – over these premises are offices which appear to have been vacant for some considerable time.

On Oldham Street immediately adjacent are further offices – these occupy the ground floor and the remaining floors of that building.

On the opposite side of Oldham Street is the Frog and Bucket and adjacent to this down Oldham Street are the nearest residential apartments to the proposed venue – these have been scaled at 20m from the Oldham Street facade.

It is understood that the ground floor of the proposed venue will consist of a Gentleman's Club – access being through a double set of access doors as shown on the enclosed plan – there are windows to both Swan Street and Oldham Street.

The Basement will also consist of a Club area – though smaller than the ground floor – access being via a door from within the ground floor area.

This report details the measurements undertaken and the calculations made to predict the external noise levels at the nearby residential properties from the proposed venue.

It is understood that only background music will be played in the proposed venue – no live music will be played.

All drinks served will be from refrigerated cabinets within the entertainment areas and therefore there will be no chiller units etc. – due to the nature of the venue no air conditioning will be employed – only heating.

Equipment Used and Measurement Method

The internal/background noise measurements were undertaken using a :

Norsonic Type 114 Real Time Octave Band Analyser (type 1 instrument)

Calibration was carried out prior to the measurements – and checked afterwards using a ;

Norsonic Acoustic Calibrator.

The measurements were carried out at the locations described at a height of 1500mm above the ground.

RESULTS

		L_{Aeq}	L_{A10}	L_{Amax}
Saturday 04.01.14				
04.30 – 04.45		57.1	59.8	79.2

Octave Band Centre Frequencies Hz

	dBA	63	125	250	500	1000	2000	4000
L_{A90}	49.7	54.1	48.6	46.5	44.9	47.3	39.6	26.0

		L_{Aeq}	L_{A10}	L_{Amax}
05.00 – 05.15		63.1	65.4	83.7

Octave Band Centre Frequencies Hz

	dBA	63	125	250	500	1000	2000	4000
L_{A90}	51.4	58.7	54.9	50.8	48.9	47.7	39.3	29.3

		L_{Aeq}	L_{A10}	L_{Amax}
05.25 – 05.40		63.2	66.1	79.6

Octave Band Centre Frequencies Hz

	dBA	63	125	250	500	1000	2000	4000
L_{A90}	56.6	59.3	56.4	54.8	52.4	53.8	46.9	35.8

Weather dry – damp roads – No wind – Ai8r Temperature = 7^0 C

The main source of noise during the above measurement was the constant traffic flow at the junction of Oldham Road / Swan Street / Great Ancoats Street.

Monday 06.01.2014

00.15 – 00.45 L_{Aeq} L_{A10} L_{Amax}

58.2 62.2 77.2

Octave Band Centre Frequencies Hz

	dBA	63	125	250	500	1000	2000	4000
L_{A90}	**55.3**	57.6	49.5	49.2	50.2	50.6	45.5	33.2

Wednesday 08.01.2014

22.00 – 22.30 L_{Aeq} L_{A10} L_{Amax}

65.2 67.9 83.6

Octave Band Centre Frequencies Hz

	dBA	63	125	250	500	1000	2000	4000
L_{A90}	**56.7**	51.2	46.9	44.7	48.6	50.8	42.8	28.4

Thursday 09.01.14

22.00 – 22.30 L_{Aeq} L_{A10} L_{Amax}

L_{A90} **55.6** 68.9 71.4 80.3

Weather – Dry – No wind – Air temperature 6^0 C – damp roads

Friday 10.01.2014

01.00 -01.15 L_{Aeq} L_{A10} L_{Amax}

L_{A90} **54.8** 57.4 59.5 76.7

01.25 – 01.40

L_{A90} **51.8** 56.9 60.0 79.9

Weather – Dry – No wind – Air temperature 7^0 C – damp roads

It is considered that the main source of noise at the present time is be that passing traffic - however they is a small contribution from passing pedestrians and smokers outside The Frog and Bucket.

Discussion

As the proposed venue's opening hours are 21.00 to 06.00 hrs the properties immediately adjoining the proposed venue can be regarded as not being noise sensitive as they are commercial premises and are unlikely to operate during the proposed opening hours.

However staff will arrive and depart prior to and after the stated times.

Due to the nature of the venue it is understood there will only be 'background' music played– typically this has been measured at a level of **82.8 dBA** at The Hey Green Hotel Marsden with approximately 35 people in the room at the time.

The octave band spectrum is detailed below:

Overall Level			Octave Band centre Frequencies					Hz
dBA	63	125	250	500	1000	2000	4000	8000
81.8	60.9	69.7	78.6	76.7	73.5	73.8	74.1	67.1

According to BS 8233 : 1999 the noise level between a talker and listener at 1m with a normal voice is 57 dB (62 dB if the voice is raised) - assuming a 'worst case situation ' of 80 people in the Club - 40 of which are talking then the calculated conversation level could be of the order of 73 dB.

This is increased to 78 dB if everyone is talking with a raised voice – which is unlikely – this is of a similar order to the measurement at The Hey Green with the addition of background music.

It is understood that access will be via an acoustic lock system for the doors – whilst the doors are to be glass the attenuation offered by them will be determined by how well – or not – they seal to the actual door frames.

From experience whilst doors can achieve attenuations of the order of 35 dB it is very likely this will be limited to the order of 20 dBA.

As the doors will be separated by some distance the overall attenuation achieved can be estimated from 0.66 x (20 + 20) = 26.66 dBA.

It is understood that the doors will be controlled by trained door personnel and therefore due to the nature of the proposed venue it is extremely unlikely that both sets of doors will be open at the same time – the minimum attenuation therefore could be of the order of 20 dBA.

Oldham Street

Ground Floor Windows

There are proposed to be six windows on the Oldham Street facade.

The total area of the windows to the Oldham Street facade is 32 sq m

The noise level radiated by the windows can be calculated using :

$L_2 = L_1 – 6 – R + 10 \log S –11 – 20 \log r + DI$

Where

L_2 = Calculated level at distance r metres

L_1 = Measured Level – from previous measurements this has been found to be of the order of **83 dBA –** this level includes background music and talking

R = the sound reduction index of the building element which in this case is R_w = **32 dB** (4 / 6 to 20mm / 6.4mm IGU's reference Pilkington's Data Sheet) .

S = Surface Area of window to Oldham Street = 32 **sq m**

.r = distance = **20m** .Reference : GoogleEarth

DI= Directivity Index = 3

Therefore $L_2 = 83 – 6 –32 + 10\log32 – 11 – 20\log20 + 3$

L_2 = 26 dBA.

The above calculation is for the overall level – below it is repeated using the octave band data available :

	Overall Level	Octave Band centre Frequencies Hz						
	dBA	63	125	250	500	1000	2000	4000	8000
Internal Level									
	81.8	60.9	69.7	78.6	76.7	73.5	73.8	74.1	67.1
	R_w	-	-21	-20	-26	-38	-37	-39	-
	10 log32	-	+15	+15	+15	+15	+15	+15	-
	20 log 20	-	-26	-26	-26	-26	-26	-26	-
Resultant			23.7	33.6	25.7	10.5	11.8	10.1	
'A' weighting			-16.1	-8.6	-3.2	0	+1.2	+1.0	
Resultant			7.6	25.0	22.5	10.5	13.0	11.1	

Overall calculated dBA = 27.3 dBA

If these calculated octave band noise levels are compared to the LOWEST measured background level the following is the result :

	Overall Level	Octave Band centre Frequencies Hz							
	dBA	63	125	250	500	1000	2000	4000	8000
	Calculated Noise Level								
	27.3		7.6	25.0	22.5	10.5	13.0	11.1	
	Lowest Measured Background Level.								
L_{A90}	49.7	54.1	48.6	46.5	44.9	47.3	39.6	26.0	
Difference to background									
	-22.4	-	-41.0	-21.5	-22.4	-36.8	-26.6	-14.9	

As can be seen from the above the calculated noise level at the residential property is well below the usual requirement that the noise generated is 5 dB BELOW the lowest measured background noise level.

The above however does not take into account the noise being radiated by the activities in the basement which are – it is understood – of a similar nature as the ground floor.

On the Oldham Street facade there are three light wells that connect with the basement – some of the glasses in these are missing.

However it is understood that the area of the light wells in the basement is to be filled with block / brick and finished with either plaster or plasterboard – the attenuation of such a wall is likely to be of the order of 45 – 50 dB and therefore the external street noise level could be of the order of 38 / 33 dBA.

As there are three of these light wells the overall level could increase to 43 / 38 dB – at a distance of 20m from the residential property this could result in a noise level of 17 / 12 dBA.

The noise from this source – with respect to the residential property on Oldham Street is therefore insignificant.

If the above is repeated for the likely noise level on the pavement (at a distance of 1.5m) then the calculated noise level is of the order of **49 (48.5) dBA.**

It is seen that the calculated pavement noise level is some 8 dBA BELOW the lowest measured L_{Aeq} and therefore again is insignificant .

Access Door

There is no access door to Oldham Street.

Swan Street

There are no residential properties in the immediate vicinity of the Swan Street facade the nearest being on Oldham Road and scaled at 48m – this facade overlooks a very busy traffic junction – Swan Street / Oldham Road / Great Ancoats Street.

Repeating the above calculation for a distance of 48m and a window area on Swan Street of 35 sq m a calculated overall noise level of 19 (18.8) dBA results.

However if one of the doors are open the noise from the door (assumed area = 6 sq m) will result in a calculated noise level of 23 (23.1) dBA.

Therefore the resultant noise level will be of the order of 19 + 23 = 25 (24.5) dBA.

As can be seen this is well below the lowest measured background level.

Calculating the possible pavement noise level for this facade.

Using the above method and assuming a distance of 1.5m then the following noise levels are calculated – windows = 49 (48.9) dBA + 53 (53.2) dBA = 54 (54.4) dBA.

This should be considered as the *worst case situation* as it has been assumed that the passer by will be subject from the noise radiated by the whole of the window area at any one time – this is very unlikely to actually be the case.

It is worth noting that this area is on the opposite side of Oldham Street from the entrance to the Frog and Bucket which at the time of some of the noise level measurements was busy with a number of people congregating outside.

The calculated 'pavement' noise level should be compared to the measured existing noise level – a minimum of 57.1 dBA - and as can be seen is 3 dBA BELOW the existing noise level.

Ventilation

Any ventilation through the facade walls should achieve a minimum attenuation $D_{n,ew}$ of 32 dB.

General

The construction work should be undertaken with great care to ensure that there are no gaps in the structure as even small holes can substantially reduce the attenuation offered by the structure – any sealers must be of high density – light weight expanding foams should not be used.

Roger Leach AMIOA

Date : January 2014.



Pilkington **Optiphon**™

	dB sound reduction index by octave band – Hz						$R_w(C;C_{tr})$	R_w	R_w+C	R_w+C_{tr}
	125	250	500	1000	2000	4000				
Configuration single glazing										
6.8 mm Pilkington **Optiphon**™	21	26	31	35	37	38	35(-1;-3)	35	34	32
8.8 mm Pilkington **Optiphon**™	24	28	34	38	37	43	37(-1;-4)	37	36	33
10.8 mm Pilkington **Optiphon**™	28	31	36	38	39	47	38(-1;-2)	38	37	36
12.8 mm Pilkington **Optiphon**™	30	32	37	39	41	51	39(-0;-2)	39	39	37
16.8 mm Pilkington **Optiphon**™	29	34	37	39	46	55	40(-0;-2)	40	40	38
Configuration Insulating Glass Unit (IGU), thickness in mm										
6 / 6 to 20 mm / 6.8 Pilkington **Optiphon**™	23	24	34	42	43	52	38(-2;-5)	38	36	33
6 / 6 to 20 mm / 8.8 Pilkington **Optiphon**™	24	26	40	48	46	54	41(-3;-7)	41	38	34
6 / 6 to 20 mm / 10.8 Pilkington **Optiphon**™	23	28	41	47	45	55	42(-3;-7)	42	39	35
6 / 6 to 20 mm / 12.8 Pilkington **Optiphon**™	20	29	43	47	46	49	42(-3;-8)	42	39	34
8.8 Pilkington **Optiphon**™ / 6 to 20 mm / 12.8 Pilkington **Optiphon**™	26	36	46	50	52	63	47(-2;-7)	47	45	40
16.8 Pilkington **Optiphon**™ / 6 to 20 mm / 16.8 Pilkington **Optiphon**™	29	40	45	47	54	68	48(-2;-6)	48	46	42

The above IGUs with Pilkington K Glass™ on one pane and a 16 mm 90 % Argon-filled cavity achieve a U value of 1.5 $W/m^2 K$
Further information on solar and thermal performance is available on the Pilkington website using the Spectrum program: www.pilkington.com/spectrum
Impact classification EN12600 Class 1(B)1 for all above Pilkington Optiphon™ products
$R_w(C;C_{tr})$ are in accordance with EN717-1

Non Pilkington **Optiphon**™ **glass products. Figures from BS EN 12354**

	dB sound reduction index by octave band – Hz						$R_w(C;C_{tr})$	R_w	R_w+C	R_w+C_{tr}
	125	250	500	1000	2000	4000				
Configuration single glazing										
4 mm Float Glass	17	20	26	32	33	26	29(-2;-3)	29	27	26
6 mm Float Glass	18	23	30	35	27	32	31(-2;-3)	31	29	28
8 mm Float Glass	20	24	29	34	29	37	32(-2;-3)	32	30	29
10 mm Float Glass	23	26	32	31	32	39	33(-2;-3)	33	31	30
12 mm Float Glass	27	29	31	32	38	47	34(-0;-2)	34	34	32
Configuration Insulating Glass Unit (IGU), Float glass, thickness in mm										
4 / 6 to 20 mm / 4	21	17	25	35	37	31	29(-1;-4)	29	28	25
6 / 6 to 20 mm / 6	20	18	28	38	34	38	31(-1;-4)	31	30	27
6 / 6 to 20 mm / 4	21	20	26	38	37	39	32(-2;-4)	32	30	28
10 / 6 to 20 mm / 4	24	21	32	37	42	43	35(-2;-5)	35	33	30
10 / 6 to 20 mm / 6	24	24	32	37	37	44	35(-1;-3)	35	34	32

Note that these are conservative figures and cover all products by European glass manufacturers.
R_w = Weighted sound reduction. This scale allows for the response of the human ear and could be used for determining a suitable product to reduce noise such as voices.
C = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from music, radio, tv, high speed traffic and other medium to high frequencies.
C_{tr} = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from urban road traffic, disco music and other noises with a large component of low frequencies.
Note that a 3 dB difference is barely discernable, 5 dB is clearly discernable and 10 dB is a doubling or halving of the noise.