ACOUSTIC CONSULTANTS

MARY & ARCHIE BAR / RESATAURANT
200 BURTON RD, M20 2LW

NOISE IMPACT ASSESSMENT

architectural

environmental

occupational

industrial

noise control at work

project management

planning

legal services

expert witness

For:
Willed Limited
Edenfield
One Oak Lane
Wilmslow
Cheshire
SK9 2BL

By:
Jack Perry
PDA Ltd
3 Bridgewater Court
Barsbank Ln
Lymm
WA13 0ER

Philip Dunbavin Acoustics Ltd.
3 Bridgewater Court · Barsbank Lane · Lymm · Cheshire WA13 0ER
Tel: 01925 759380 · www.pdaltd.com
Directors : P. R. Dunbavin • J. A. Dunbavin • M. de Salis • E. Evenden • R. Grant
Registered Number 2302847 England
Registered Office: 3 Bridgewater Court · Barsbank Lane · Lymm · Cheshire WA13 0ER

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Report prepared by	Jack Perry	
Position	Trainee Consultant	
Report checked by	Richard Cookson PhD, BSc(Hons), MIOA	
Position	Principal Consultant	

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1.0 SUMMARY

PDA Ltd were commissioned by Willed Limited to carry out a noise impact assessment of Mary & Archie bar on Burton Road, M20 2LW to support a planning application for the installation of new bifold doors on the right-hand side elevation of the building on Orchard Street.

Measurements were taken using broadband A-Weighted and Octave Band parameters, both are reported within.

Noise levels inside the bar were taken whilst the bar was in operation to represent 'typical' noise levels from music, customers etc.

An environmental noise survey was carried out over a period considered to be representative of the quietest time that the bar would be in operation, i.e. the time with the lowest levels of background noise contributed by other sources excluding the bar.

The current planning condition for the bar states *"All windows and doors shall be kept closed except for access and egress after 10:00pm until the premises close."*.

Calculations were carried out in order to assess the likely noise egress from the bar to the closest noise sensitive receiver. Noise levels at the receiver for when the doors are open and closed were calculated for *'pre 10pm levels'* and '*post 10pm levels'*.

The calculated noise egress from the open window (prior to 10pm) to the nearest noise sensitive property was 41 dB(A) which is 1dB below the lowest measured L_{A90} background level at the noise sensitive property. In terms of octave frequency bands, the calculated noise egress was below the octave band L_{90} in frequencies below 2000 Hz but exceeded the L_{90} in the bands from 2000Hz upwards.

However, it should be noted that the calculated overall L_{Aeq} at the receiver is 41 dB, therefore with an estimated 15dB reduction of sound through a partially open window, the noise level inside the property would be around 26 dB(A) which would be unlikely to cause signficant disturbance indoors during the daytime when the doors to the bar are permitted to open.

It should be noted that the above assessment is very much worst case, with background noise levels likely to be significantly higher during the rest of the daytime period.

For the post 10pm period, when the doors are closed, the calculated L_{eq} levels are well below the Manchester City Council guidance of the octave band L_{eq} levels being 10dB below the L_{90} levels in all frequency bands.

Therefore, when the doors are closed, it is likely that the noise egress from the bar will be inaudible at the receiver position and will have no impact on the residents of 2 – 6 Orchard Street or any other surrounding properties.

2.0 BRIEF FOR CONSULTANCY

PDA Ltd were commissioned to carry out the following:

A. We will travel to site and carry out an ambient noise survey to assess the current level of ambient environmental sound incident upon the nearby noise sensitive residences on Orchard Street. The measurement and assessment will include for noise from the adjacent road network, and other local sources.

B. We would propose to undertake manned measurements between the hours of 21:30 – 00:00 representative of the likely quietest period of operation of the bar / restaurant.

C. If practicable, we will also take a short measurement of the internal sound level within the bar / restaurant.

D. We will carry out all noise surveys in accordance with the provisions of BS7445 *"Description and Measurement of Environmental Noise"*. The measurements made will include both dBA and octave band noise levels including L_{eq}, L_{max} & L_{90} parameters.

E. We will calculate the noise break-out from the bar / restaurant to the nearby noise sensitive residences on Orchard Street via the proposed open bifold doors on Orchard Street. The calculated level will be compared with the criterion of the Local Planning Authority for entertainment noise, or any other suitable criteria of your choice.

F. Where the noise levels do not meet the selected criterion, we will specify suitable remedial measures such as the criterion may be achieved. Please note that the remedial measures in this case are likely to be limited to setting a time after which the bifold doors will need to be closed.

G. The results of our assessment will be presented in a full technical report suitable for submission to the Local Authority in support of your planning application.

3.0 ASSESSMENT CRITERIA

National Planning Policy Framework

National Planning Policy is guided by the National Planning Policy Framework (NPPF) updated in June 2019. With regard to Noise the Framework states the following;

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

The terms '*significant adverse impact*' and '*adverse impact*' are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE) which states;

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

The notes also offer an explanation of the term 'other adverse impacts' as follows;

… refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

Although no specific noise limits for LOAEL and SOAEL have been defined, in 2014 the UK Government published a planning practice guidance document for noise which indicates where these limits fall with relation to the perception of noise. A summary is reproduced in Section 3.2 below; the full document is published at https://www.gov.uk/guidance/noise--2.

Planning Practice Guidance – Noise

The UK Planning Practice Guidance on noise offers further guidance on the typical levels which constitute the NOEL, LOAEL and SOAEL and is reproduced in the table below;

Table 1: Planning Practice Noise Level Guidance

Perception	***Examples of Outcomes***	***Increasing Effect Level***	***Action***
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	

Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following noise levels are applicable to residential dwellings.

Table 3: WHO Guidelines for Community Noise Criteria

Specific Environment	***Critical Health Effect(s)***	***L_{Aeq} dB***	***Time Base (hours) ****	***L_{AFMAX} dB***
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime & evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45

* Typically taken to be daytime/evening - 07:00 – 23:00 hours and night time 23:00 – 07:00 hours.

The WHO guidelines state that, *"it is recommended that $L_{Aeq,T}$ be used to evaluate more-or-less continuous environmental noises. Where the noise is principally composed of a small number of discrete events, the additional use of L_{Amax} or SEL is recommended."* The guidelines recommend that for a good sleep, the indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10 – 15 times.

Manchester City Council Planning and Noise – Technical Guidance 2015

The Manchester City Council guidance for new entertainment noise sources indicates that:

> *'Entertainment noise (L_{Aeq}) should be controlled to 10dB below the background noise level (L_{A90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location'.*

4.0 SURVEY DETAILS

Survey Personnel

All measurements were carried out and attended by Mr Jack Perry of PDA Ltd on 12/10/2020 between 21:30 – 00:00.

Equipment

The equipment used throughout the survey consisted of an NTi XL2 sound level meter and calibrator for which calibration certificates are held. The NTi XL2 is a class 1 sound level meter in accordance with IEC 61672-1 and IEC 61260.

For the short internal noise measurement of the bar, the sound level meter was handheld in one position approximately 1.5 meters above the ground and at least 3 meters away from any other reflective surfaces.

Throughout the ambient environmental noise survey, the sound level meter was mounted on a tripod approximately 1.5 meters above the ground and 1 meter away from the façade of the nearest noise sensitive receiver.

A field calibration was carried out on the sound level meter both before and after the survey, during which time no significant deviation from the calibrated level was observed.

Site Details

Mary & Archie Bar is situated on Burton Road approx. 22 meters away from the nearest noise sensitive receiver with line of sight view of the façade of the proposed bifold doors located across the road to the north west (2 – 6 Orchard Street). It should be noted that there is an existing property attached to the rear of the bar on Orchard Street assumed to be residential, and more properties on the same side of the street that are of a similar distance to that of 2 – 6 Orchard Street, however, these properties are shielded from line-of-sight propagation from the bar by other buildings and an alley way between the rear of the bar and the first detached residence. Hence noise levels at these properties are likely to be lower than those calculated at 2 – 6 Orchard Street.

Orchard Street is a relatively quiet road in terms of traffic activity, however, Burton Road which is located to the west is relatively busy with traffic. Burton Road is the source of some background noise, however L_{A90} parameters allow for the contributions of background noise.

5.0 INTERNAL NOISE MEASUREMENT

Measurement

A short, 5-minute measurement was taken inside the bar whilst in operation at 21:34 – 21:39. Low level background music was playing in the bar with 3 tables of no more than 3 customers seated inside throughout the measurement.

Results

The results from the internal noise measurements are shown in **Table 1** below. The A-weighted broadband and Octave Band results have been included for both L_{Aeq} and L_{A90}.

Table 1 – *A-weighted broadband and octave band internal noise levels*

	Broadband [dB(A)]	Octave Band Centre Frequency [Hz]							
		63	125	250	500	1k	2k	4k	8k
L_{eq} [dB]	72.2	69.1	65.9	67.1	69.1	67.0	65.6	61.7	56.6

The internal octave band L_{Aeq} levels are shown in the octave band spectrum in ***Fig.1*** below.

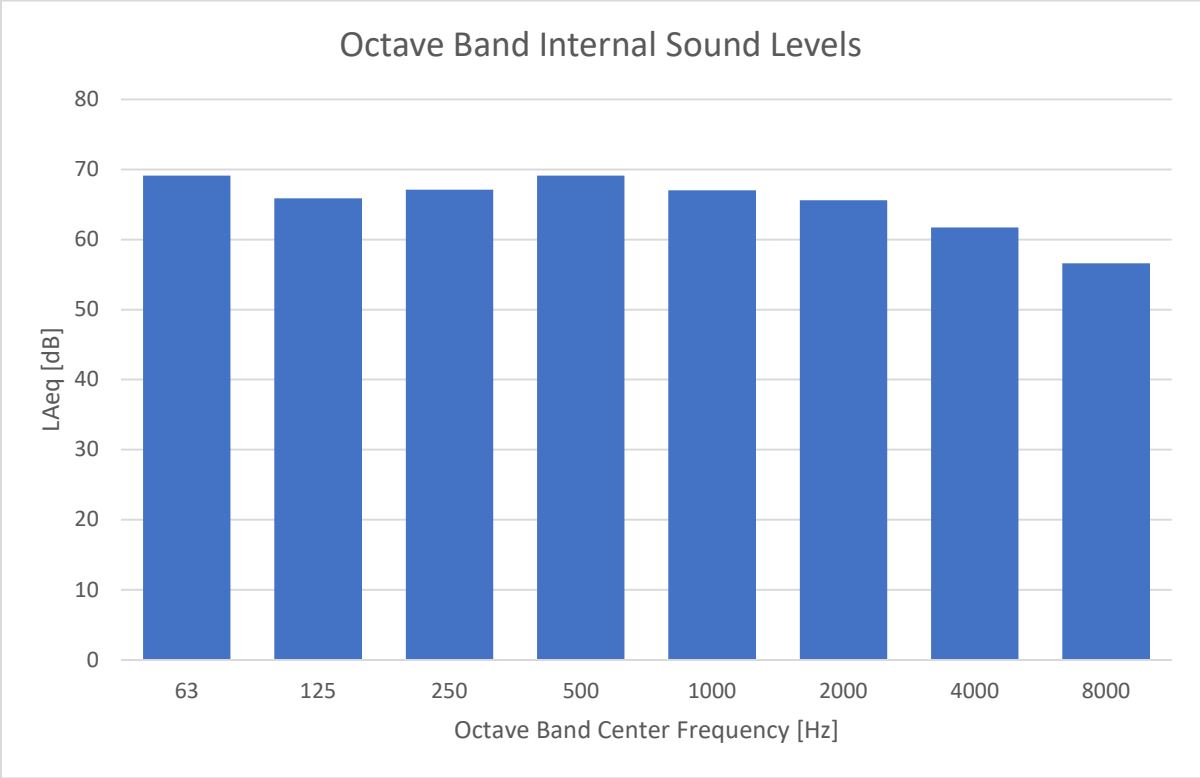

Fig. 1 – *Internal noise octave band spectrum*

These levels were used in the calculation of the expected noise egress from the bar via the bifold doors as the source noise from the bar.

6.0 ENVIRONMENTAL NOISE SURVEY

Weather

During the ambient environmental noise survey, the weather was dry and clear with a temperature of 9°C and wind speeds of < 1 m/s.

Measurement

A façade measurement was carried out between 21:45 – 00:00 at the closest line-of-sight noise sensitive receiver 2 – 6 Orchard Street.

L_{A90} measurements have been reported to show typical background noise of the vicinity of Mary & Archie Bar and the nearby noise sensitive properties, which includes road traffic noise and other contributing sources.

A map of the survey site location and measurement position are shown in ***Fig.2*** below.



Fig.2 – *Survey measurement position and surrounding site layout*

Results

The A-weighted broadband measurements recorded from the survey are shown below in **Table 2**. Both L_{Aeq} and L_{A90} parameters have been included.

Table 2 – *Broadband results for ambient noise measurement**

Time	L_{Aeq} [dB]	L_{90} [dB]
21:45 – 22:00	48.7	41.7
22:00 – 22:15	51.1	41.7
22:15 – 22:30	49.7	41.7
22:30 – 22:45	46.7	41.4
22:45 – 23:00	48.0	36.9
23:00 – 23:15	45.7	36.0
23:15 – 23:30	44.7	36.5
23:30 – 22:45	44.6	33.9
23:45 – 00:00	44.0	33.1

[R1]

***note** – the levels have been façade corrected by -3dB.

The overall L_{Aeq} for the measurement period was 47.7dB.

Since L_{A90} parameters give the noise level that was exceeded for 90% of the measurement time, there is no way to get a singular overall L_{A90} for the night due to the fact that as it gets

later there is generally less activity on the roads and from other nearby sources therefore the L_{A90} changes as time goes on.

For the purpose of this assessment, representative time periods have been selected for the octave band L_{A90} levels to represent:

a. **Pre 10pm –** when the bar would be operating, and the doors & windows are permitted to be open as per the planning condition.

b. **Post 10pm –** when the bar will be operating but the doors and windows must be closed as per the planning condition.

The octave band spectrums for each of these time periods are shown in ***Fig.3 & 4*** below. Comprehensive results are shown in the appendix section.

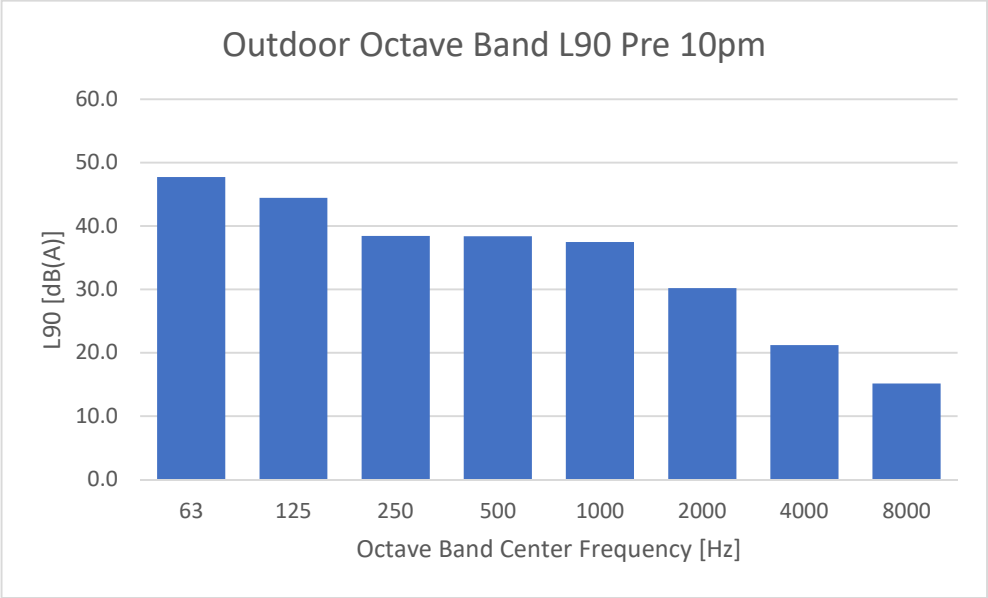

Fig. 3 – *Octave band L_{A90} noise levels from time period 21:45 – 22:00*

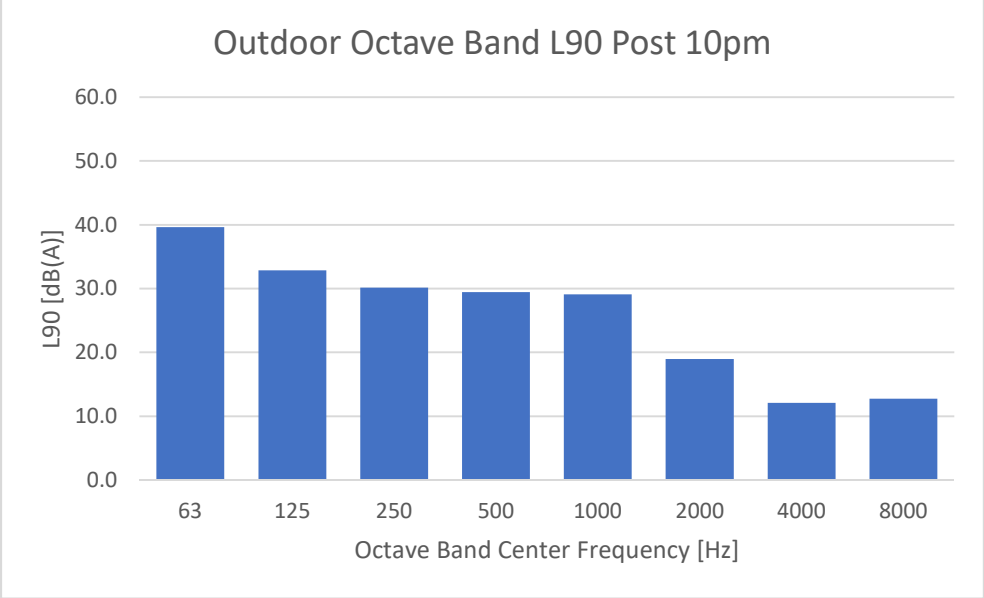

Fig.4 – *Octave band L_{A90} noise levels from time period 23:00 – 23:15*

The octave band spectrums for these time periods were compared to the calculated noise levels incident on the closest noise sensitive receiver from the Mary & Archie Bar.

Note that a 3dB reduction was applied to the noise levels to account for façade measurement at the receiver position.

7.0 NOISE IMPACT ASSESSMENT

Since no information was available describing the type of window to be used in the bifold doors, an assumption was made for a most likely case.

Sound reduction information was taken from the PDA database for a 6mm glass, 12mm cavity, 6mm glass window. The sound reduction data for this specification of window is shown in octave bands in **Table 3** below.

Table 3 – *Sound reduction data for a 6mm glass, 12mm cavity, 6mm glass window in octave bands.*

		Octave Band Centre Frequency [Hz]							
	Rw	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Sound Reduction [dB]	35.0	*23.0*	*23.3*	*22.6*	*29.8*	*38.5*	*36.0*	*43.1*	*43.1*

The sound reduction was applied to the internal L_{Aeq} levels from the bar in each octave band.

A further -6dB correction factor was applied to the internal L_{Aeq} levels measured inside the bar to account for the change from reverberant field inside the bar to the free field outside the proposed bifold doors.

The sound power in octave bands was calculated for the bifold doors, and treating them as a point source, the sound transfer from the bar to the closest noise sensitive receiver was calculated by applying a correction for geometric spreading across the 22 meters between the receiver and source.

Pre 10pm Assessment

For calculating the noise egress from the bar pre 10pm, i.e. with the proposed bifold doors open, the sound reduction of the doors was set to 0. The calculated L_{Aeq} sound levels incident on the closest line-of-sight noise sensitive receiver are shown in **Table 4** below.

Table 4 – *Calculated L_{eq} sound levels at the receiver pre 10pm*

Location	**L_{Aeq} ([dB]**								
	Overall	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**
2 – 6 Orchard Street	40.7	37.5	34.4	35.6	37.5	35.5	34.1	30.2	25.1

The octave band L_{Aeq} spectrum of the calculated levels are shown in ***Fig. 5*** below.

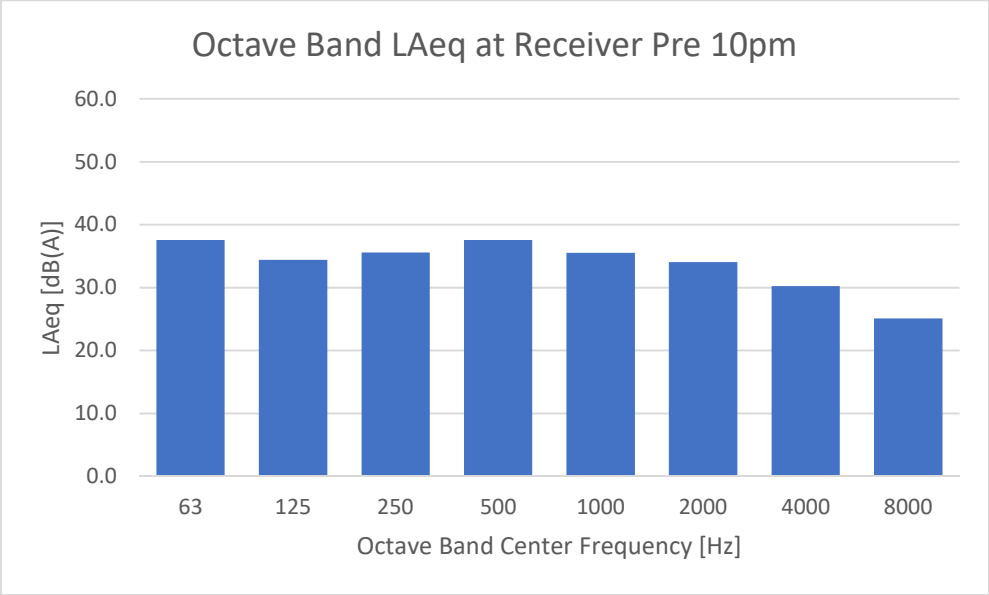

Fig. 5 – *Octave band L_{Aeq} levels pre 10pm*

When compared to the background L_{A90} for the pre 10pm time period, the calculated L_{Aeq} levels from the 500Hz octave band upwards do not meet the Manchester City Council guidance of the L_{Aeq} being 10dB below the L_{A90}.

However, it should be noted that the calculated overall L_{Aeq} at the receiver is 41dB, therefore with a 15dB reduction of sound through a partially open window, the noise level inside the property will be around 26dB(A) which is unlikely to cause significant disturbance with respect to daytime / evening noise levels within the property prior to the doors being closed at 10pm.

Post 10pm Assessment

The noise egress post 10pm, i.e. with the doors closed, was calculated using the noise reduction data for the window shown in **Table 3**. The calculated L_{Aeq} sound levels incident on the closest line-of-sight noise sensitive receiver are shown in **Table 5** below.

Table 5 – *Calculated L_{eq} sound levels at the receiver post 10pm**

Location	L_{Aeq} ([dB]								
	Overall	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8 kHz**
2 – 6 Orchard Street	9.7	15.5	12.1	14.0	8.7	< 0	< 0	< 0	< 0

*note that actual values calculated from 1 – 8kHz were negative and so were set to 0.

The octave band L_{Aeq} spectrum of the calculated levels are shown in ***Fig.6*** below.

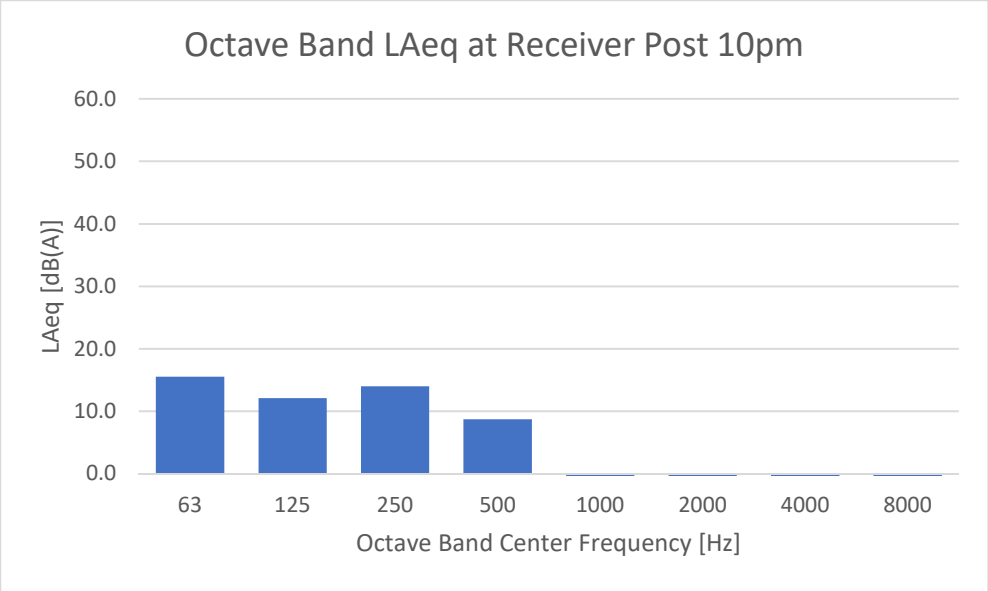

Fig.6 – *Octave band L_{Aeq} levels post 10pm*

When compared to the background L_{A90} for the post 10pm period, the calculated L_{Aeq} levels are well below the Manchester City Council guidance of the octave band L_{Aeq} levels being 10dB below the L_{A90} levels.

Therefore, when the doors are closed, it is likely that the noise egress from the bar will not be signficantly audible at the receiver position and will have no impact on the residents of 2 – 6 Orchard Street or any other surrounding properties.

8.0 CONCLUSION

PDA Ltd were commissioned by Willed Limited to carry out a noise impact assessment of Mary & Archie bar on Burton Road, M20 2LW to support a planning application for the installation of new bifold doors on the right-hand side elevation of the building on Orchard Street.

Measurements were taken using broadband A-Weighted and Octave Band parameters, both are reported within.

Noise levels inside the bar were taken whilst the bar was in operation to represent 'typical' noise levels from music, customers etc.

An environmental noise survey was carried out over a period considered to be representative of the quietest time that the bar would be in operation, i.e. the time with the lowest levels of background noise contributed by other sources excluding the bar.

The current planning condition for the bar states *"All windows and doors shall be kept closed except for access and egress after 10:00pm until the premises close."*.

Calculations were carried out in order to assess the likely noise egress from the bar to the closest noise sensitive receiver. Noise levels at the receiver for when the doors are open and closed were calculated for *'pre 10pm levels'* and '*post 10pm levels'*.

The calculated noise egress from the open door (prior to 10pm) to the nearest noise sensitive property was 41 dB(A) which is 1 dB below the lowest measured L_{A90} background level at the noise sensitive property. In terms of octave frequency bands, the calculated noise egress was below the octave band L90 in frequencies below 2000 Hz but exceeded the L_{90} in the bands from 2000Hz upwards.

However, it should be noted that the calculated overall L_{Aeq} at the receiver is 41 dB, therefore with an estimated 15dB reduction of sound through a partially open window, the noise level inside the property would be around 26 dB(A) which would be unlikely to cause signficant disturbance indoors during the daytime when the doors to the bar are permitted to open.

It should be noted that the above assessment is very much worst case, with background noise levels likely to be significantly higher during the rest of the daytime period.

For the post 10pm period, when the doors are closed, the calculated L_{eq} levels are well below the Manchester City Council guidance of the octave band L_{eq} levels being 10dB below the L_{90} levels in all frequency bands.

Therefore, when the doors are closed, it is likely that the noise egress from the bar will be inaudible at the receiver position and will have no impact on the residents of 2 – 6 Orchard Street or any other surrounding properties.

APPENDIX – SURVEY MEASUREMENTS AT NEAREST NOISE SENSITIVE FACADE

Full Octave Band Background L90 Levels

		Octave Band Centre Frequency [Hz]							
Time	**Broadband dB(A)**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
21:45:00	44.7	50.8	47.4	41.4	41.4	40.5	33.2	24.2	18.1
22:00:00	44.7	49.8	46.3	43.6	40.1	40.5	32.6	20.9	16.8
22:15:00	44.7	48.8	45.3	43.9	39.8	40.5	32.6	20.9	16.8
22:30:00	44.4	47.8	43.1	42.8	39.8	39.9	32.7	21.9	17.1
22:45:00	39.9	45.4	40.1	36.8	35.4	36.7	27.3	18.1	16.1
23:00:00	39	44.1	39.1	36.1	34.8	35.5	25.2	16.1	16.1
23:15:00	38.5	44.1	38.3	35.4	34.4	35.1	26.5	18.1	16.1
23:30:00	36.9	43.1	37.3	34.1	32.4	33.3	24.0	15.4	15.8
23:45:00	36.1	42.6	35.8	33.1	32.4	32.1	22.0	15.1	15.8