

## **Noise Impact Assessment – The Loft MCR**

**New Street, Miles Platting, Manchester, M40 8AW**

REPORT REFERENCE NO. J003392-4963-CW-01

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## Document Control Sheet

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*This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.*



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## APPENDIX A – DEFINITION OF ACOUSTIC TERMS

## APPENDIX B – MEASURED NOISE LEVELS

## 1.0 SUMMARY

PDA Ltd have been commissioned by The Loft MCR Ltd to carry out noise impact assessment for the proposed 'cultural event space' in the former industrial unit at no.1 New Street in Miles Platting, Manchester, M40 8AW. The nearest noise sensitive dwellings are located approximately 100m to the south of the venue on Canada Street.

The space is licensed to operate between 12:00 – 00:00 hours Sunday – Thursday and 12:00 – 05:00 hours Friday – Saturday and will host a number of creative workshop type activities during the daytime including; Yoga Classes and Art/Film Exhibitions. In addition, nightclub events will be held during the evening. Our assessment has considered the noise impact associated with the nightclub events as this represents the worst-case in terms of noise generating activities.

A noise level survey was undertaken in the vicinity of the nearest residential dwellings to establish the existing ambient noise climate. The local noise climate was dominated by distant road traffic and plant noise from the nearby industrial units. In addition, it was noted that intermittent vehicle movements on the local road network and trains passing on the railway line had some contribution.

Further measurements were made to determine the sound insulation of the venue façade elements and the transmission loss to the dwellings. During the measurements, subjectively noise from within the venue was not readily distinguishable against the existing noise climate at the dwellings. Further analysis of the measurement data indicated that the noise level did not increase with the noise source 'on', therefore suggesting that the noise impact associated with the venue is likely to be low.

Noise propagation from the venue including internal music noise and that from patrons in the smoking area was modelled using industry standard software. The results of the model reinforced the findings of the survey, indicating that provided the internal noise level does not exceed 107 dBA then the Manchester City Council entertainment noise design criteria which stipulates that entertainment noise should be 10 dB below the background noise level in octave bands can be comfortably achieved. Furthermore, our assessment suggests that the WHO Guideline Values for internal noise will be met at the dwellings. It was also noted that the residential façade noise levels will be significantly lower than the existing ambient noise level in terms  $L_{Aeq}$  and approximately 14 dB below the existing background noise level in terms of  $L_{A90}$ . All of which indicates that the noise impact due to the proposed entertainment use will be low.

Therefore, in-line with the Manchester City Council Local Policy and the National Planning Policy Framework, on the grounds of noise we would deem this site suitable for proposed entertainment use.

General recommendations regarding mitigation and noise control procedures are given in section 6.0

## 2.0 SITE DESCRIPTION

The site is located at no.1 New Street in Miles Platting, Manchester, M40 8AW. The proposal is to convert the existing industrial unit which is currently vacant to form a 'cultural event space'. The space is licensed to operate between 12:00 – 00:00 hours Sunday – Thursday and 12:00 – 05:00 hours Friday – Saturday and will host a number of creative workshop type activities during the daytime including; Yoga Classes and Art/Film Exhibitions. In addition, nightclub events will be held during the evening.

The space is bound by existing industrial units including Omega Fire Ministry immediately to the north and Broadway Wholesale distribution centre to the south. In addition, it is noted that the surrounding area is largely industrial with Hadfield's Transport Haulage Depot located immediately adjacent to the site and a waste recycling centre to the north. The wider area includes a train line running to the north and east and the A6010 Hulme Hall Road which is a busy main road. The nearest noise sensitive dwellings to the proposed development are located approximately 100m to the south on Canada Street.

The site location and its surroundings can be seen in the Figure 1 below:

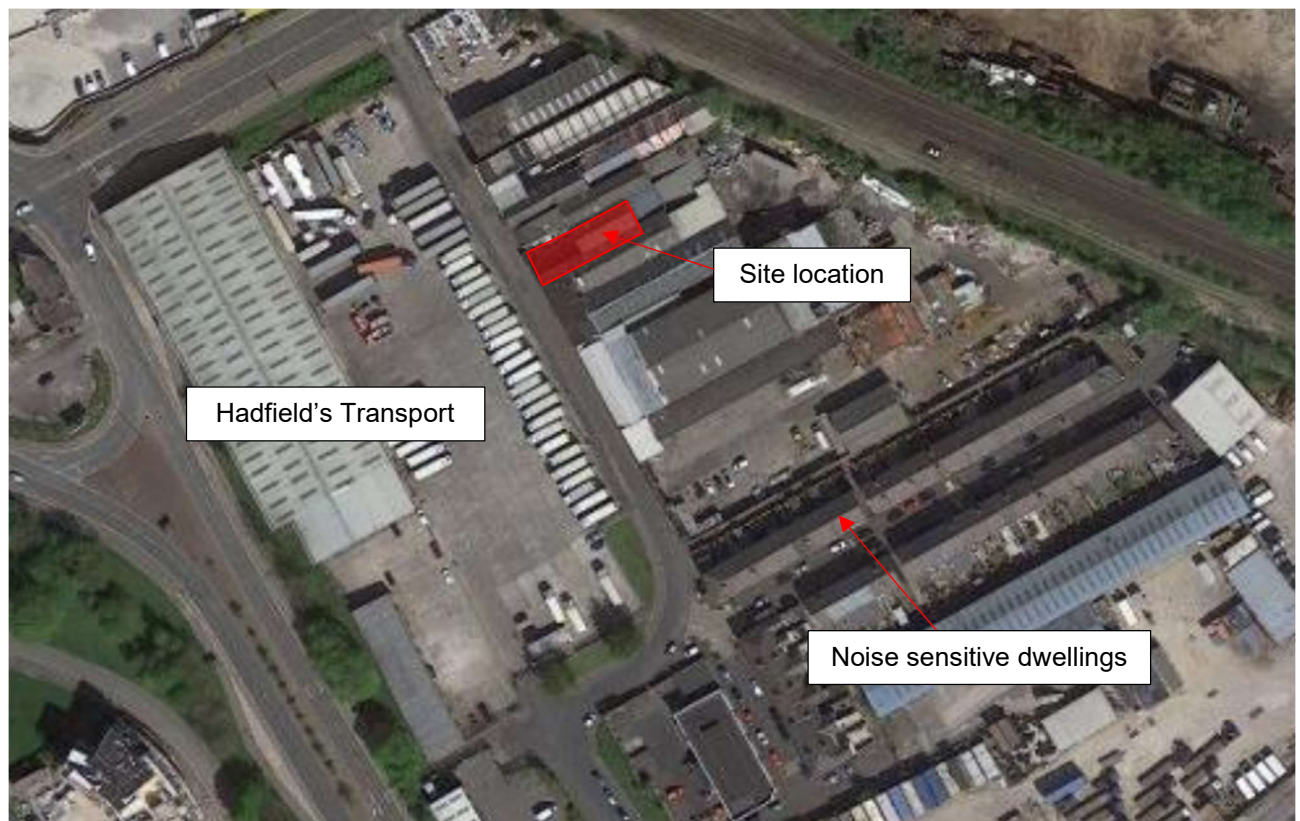


*Figure 1 – Site location and surroundings*

### 3.0 ASSESSMENT CRITERIA

#### 3.1 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 impacts 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>.

### 3.1.1 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*

| <b>Perception</b>                  | <b>Examples of Outcomes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Increasing Effect Level</b>            | <b>Action</b>                    |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------|
| <b>Not present</b>                 | No Effect                                                                                                                                                                                                                                                                                                                                                                                                                                                            | No Observed Effect                        | No specific measures required    |
| <b>Present and not intrusive</b>   | 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      |                                  |
| <b>Present and intrusive</b>       | 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 |                                  |
| <b>Present and disruptive</b>      | 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                            |
| <b>Present and very disruptive</b> | 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                          |

### 3.2 Manchester City Council, Planning & Noise, Technical Guidance 2015 (MCCPNTG 2015)

MCCPNTG 2015 sets out MCC's noise design criteria to meet requirements of the NPPF for various types of developments.

#### Entertainment Venues

'Entertainment Venues' are not strictly defined within MCCPNTG 2015, however it is inferred that venues including for the playing of recorded music should be considered as an Entertainment Venue. Further to this MCCPNTG 2015 specifies that applicants and consultants in respect of the noise impact assessment for a new venue, should consider noise levels that are 'typical' for the type of venue to be constructed, in anticipation that future owners of the venue may wish to provide some level of entertainment even if previously there was none.

The MCCPNTG 2015 considers that with regards to music, noise in the 63 Hz & 125Hz bands may be particularly disturbing to local residents exposed to it. Therefore the assessment of the noise from entertainment venues should consider the overall noise ( $L_{Aeq}$ ) and the 63 Hz and 125 Hz octave band noise levels ( $L_{eq}$ ).

The following design criteria is given for new residential developments that are structurally connected to the entertainment venue (or vice versa) .

*'Music noise levels in the 63Hz and 125Hz octave centre frequency bands ( $L_{eq}$ ) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ( $L_{eq}$ ), respectively'*

The MCCPNTG 2015 notes that the above criteria may also be applicable to new residential developments that are structurally separated from an existing entertainment venue.

In regards to a new entertainment venue that is structurally detached from other buildings, the following criteria is specified.

*'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'*

### 3.3 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

British Standard 8233:2014, *Guidance on Sound Insulation and noise reduction for buildings*, gives guidance on internal noise levels within dwellings, flats and rooms in residential use when unoccupied. The following criteria are for Living and Dining Rooms for daytime use and Bedrooms for night time.

*Table 2: BS8233 Recommended Indoor Ambient Noise Levels*

| Activity                   | Location         | 07:00 to 23:00      | 23:00 to 07:00     |
|----------------------------|------------------|---------------------|--------------------|
| Resting                    | Living room      | 35 $L_{Aeq,16hour}$ | —                  |
| Dining                     | Dining room/area | 40 $L_{Aeq,16hour}$ | —                  |
| Sleeping (daytime resting) | Bedrooms         | 35 $L_{Aeq,16hour}$ | 30 $L_{Aeq,8hour}$ |

It should however be stressed that the above criterion relates to steady noise, in this case from road traffic etc., excluding unusual noise events departing from the typical noise character of the area.

In addition, BS 8233 suggests, *'regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or  $L_{Amax,F}$ , depending on the character and number of events per night. Sporadic noise events could require separate values'*.

### 3.4 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.

## 4.0 SURVEY DETAILS & RESULTS

### 4.1 Existing Ambient Noise Levels

In order to determine the existing ambient noise climate a noise level survey was undertaken in the vicinity of residential dwellings on Canada Street. Measurements were taken from a single position on the junction of New Street and Canada street for a period of approximately 6 hours between 23:00 – 05:00 hours on Monday 24<sup>th</sup> May 2021. The measurement location and time period were deemed to be representative of the noise climate at the residential dwellings during the worst case operating hours when night-club events are likely to be taking place.

The survey was conducted using a NTi XL2 sound level meter. In accordance with IEC 61672-1:2002 the NTi XL2 has a class 1 frequency response and can operate as an integrating sound level meter with frequency analysis and statistical functions. The meter was set to measure ‘A’ weighted, broadband and octave band sound pressure levels and various statistical parameters in 15-minute intervals with 1-second logging to enable more detailed analysis of the data.

The meter was field calibrated to 1kHz at 94dB both before and after the measurement during which time no significant deviation was observed. In addition, a valid calibration certificate is held for both the meters and the calibrator. The microphone fitted with an all-weather windshield for the duration of the survey period and was mounted approximately 1.2m above ground level with a clear line of sight to the local road network and other surrounding noise sources. All measurements were made and partially attended by Mr Chris Wright BSc (Hons) MIOA of PDA Ltd.

A summary of the weather conditions during the survey periods is given in Table 4 below:

Table 4: Weather Conditions

| Measurement Date          | Temperature | Windspeed | Events |
|---------------------------|-------------|-----------|--------|
| 24 <sup>th</sup> May 2021 | 6 - 7°C     | 1 - 3 m/s | Dry    |

## 4.2 Description of Noise Sources

The local noise climate in the vicinity of the noise sensitive dwellings on Canada Street was dominated by distant road traffic and plant noise from the nearby industrial units. In addition, it was noted that intermittent vehicle movements on the local road network and trains passing on the railway line had some contribution.

## 4.3 Measured Noise Results

Full details of the measured results can be seen in the appendix included at the end of this report. A summary of the results is given in Table 5 below:

Table 5: Summary of noise measurements

| Measurement Position | Average dB $L_{Aeq,T}$<br>23:00 – 05:00 | Range of $L_{A90}$ dB<br>23:00 – 05:00 | Typical $L_{A90}$ *<br>23:00 – 05:00 |
|----------------------|-----------------------------------------|----------------------------------------|--------------------------------------|
| Canada Street        | 61                                      | 51 - 55                                | 52                                   |

Notes:

\* The typical  $L_{A90}$  was derived from statistical analysis of the measurement data. Both the mean and modal results indicated a typical noise level of 52 dB  $L_{A90}$

Manchester City Council's entertainment noise design criteria stipulates that for a new entertainment venue that is structurally detached from other buildings, the following criteria should be achieved.

*'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'*

The measured background noise level in terms of  $L_{A90}$  Octave Bands and subsequent limiting criteria are presented in Table 6 below:

Table 6: Measured Octave Band  $L_{90}$  and MCC Limiting Criteria

| Octave Bands<br>(Hz)        | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|-----------------------------|----|-----|-----|-----|------|------|------|
| Measured $L_{90}$<br>dB     | 58 | 54  | 52  | 50  | 44   | 36   | 24   |
| -10 dB Limiting<br>Criteria | 48 | 44  | 42  | 40  | 36   | 26   | 14   |

Full measurement results are included in the appendix to this report.

## 4.4 Propagation Test (Internal Measurements)

In order to assess the transmission loss between the event space and the dwellings on Canada Street a series of synchronised internal and external sound pressure measurements were undertaken. To ensure that the influence of noise from other extraneous sources was minimised measurements were undertaken during the night-time between approximately 22:50 - 23:00 hours on Monday 24<sup>th</sup> May.

A high level pink noise source (107 dBA) was driven through a sound system within the event space, the internal noise level was then measured by manually sweeping the microphone through a predetermined circular path of travel in a plane not within 10° of any room surface plane to ensure both spatial and temporal averaging of the level.

The results of the internal noise measurements are summarised in the Table overleaf:

Table 7: Internal Noise Measurement Results

| Octave Bands (Hz)    | 63  | 125 | 250 | 500 | 1000 | 2000 | 4000 | dBA |
|----------------------|-----|-----|-----|-----|------|------|------|-----|
| Internal Noise Level | 104 | 108 | 107 | 105 | 101  | 99   | 100  | 107 |

It is noted that whilst the measurements presented in Table 7 are due to a pink noise source there is significant low frequency content in the 63 – 125Hz octave bands, the levels are comparable to that of music noise in a typical night club setting. Furthermore, with regards to the overall dBA level research undertaken by the Noise Council suggests that,

*“...the music noise level in the audience by the mixer position at pop concerts is typically 100dB(A), and that levels below 95dB(A) will be unlikely to provide satisfactory entertainment for the audience”<sup>1</sup>*

As such, it can be seen that the measured level of 107 dBA will be more than sufficient to achieve a good audience experience within the venue.

In addition to the internal measurements synchronised measurements were undertaken at 2 external positions. The first was at the boundary of the yard approximately 13m to the west of the venue and the second approximately 100m to the south at the junction of Canada Street and New Street representative of the noise level incident at the residential dwellings. The measurement position in the yard was taken to enable calibration of the noise model (see section 5.1 below).

#### 4.4.1 Noise Level at Dwellings

It was noted that subjectively noise from the venue was not readily distinguishable at the measurement position at the dwellings on Canada Street despite the residual noise climate being relatively low i.e. from traffic and other sources excluding noise in the venue. This is reflected in the measurements which suggest that the noise impact due to the venue is negligible.

Between 23:00 – 00:00 hours the pink noise source was not operating, analysis of the measurement data during this period indicates that the average  $L_{Aeq}$  level was 57 dB and the typical background noise level in terms of  $L_{A90}$  was 53 dB. Analysis of the measurement data during periods when the pink noise source was ‘on’ indicates an average level of 56 dB  $L_{Aeq}$  and 53 dB  $L_{A90}$ . Note that the 1-hour period between 23:00 – 00:00 hours has been chosen as it is deemed the most representative of the residual noise climate during the period when the propagation tests were being undertaken prior to 23:00 hours.

It can be seen that the background noise level does not increase when the source is turned on and the averaged  $L_{Aeq}$  noise level decreases with the source on. Therefore, this would suggest that the source is at least 10 dB below the background and that the marginal fluctuations are due to other extraneous noise sources. Notwithstanding the above the MCC noise design criteria requires entertainment noise to be controlled to 10 dB below background in each octave band as per the limits specified in Table 6 above. Given that it is not possible to measure this at the noise sensitive dwellings a modelling exercise has been undertaken to predicted the noise egress from the proposed venue.

#### 4.5 Façade Element Sound Power Levels

The industrial unit which will house the proposed venue has solid brick work external walls circa 215mm thick and a lightweight fibreglass roof cladding. During our inspection of the site it was noted that the entrance door is a steel fire type door which is poorly sealed and has significant gaps around the jambs.

Measurements were undertaken to determine the reduction of internal to external free-field sound pressure (sound reduction) of the door. Additionally, in order to determine the noise reduction of

<sup>1</sup> Code of Practice on Environmental Noise Control at Concerts – The Noise Council (1995)

masonry wall and lightweight roof cladding, industry standard reference test results were utilised in combination with Insul® predictions.

The sound reduction for each of the elements in terms of dB R are presented in the table below:

*Table 7: Sound Reduction of Venue Building Envelope Elements*

| <b>Octave Bands (Hz)</b>         | <b>63</b> | <b>125</b> | <b>250</b> | <b>500</b> | <b>1000</b> | <b>2000</b> | <b>4000</b> |
|----------------------------------|-----------|------------|------------|------------|-------------|-------------|-------------|
| Existing Door (dB R)*            | 12        | 12         | 17         | 20         | 22          | 17          | 18          |
| Lightweight Roof Cladding (dB R) | 25        | 29         | 31         | 25         | 28          | 35          | 42          |
| Masonry Walls (dB R)             | 41        | 39         | 43         | 51         | 58          | 63          | 68          |

*\* It is proposed that the existing door is to be replaced with an acoustic lobby door system which will have a significantly higher performance than measured in this table, however the existing door is included within the model. For the purposes of this assessment this is considered to be conservative. The upgraded lobby door system is discussed further in section 6.1.*

Given that the sound insulation performance of the masonry walls is significantly greater than that of the roof/door and 2 of the 4 walls are shared with the neighbouring industrial units the dominant path for noise egress will be through the lightweight roof structure.

Based on the measured internal octave band ( $L_{p \text{ internal}}$ ) sound pressure levels, individual element sound reduction and the element surface area (S), the sound power levels ( $L_w$ ) of each façade element have been calculated such that they can be modelled. The equation used to calculate individual element sound powers is provided below;

$$L_w = L_{p \text{ internal}} - R + 10\log(S) - 6$$

Note that a -6dB correction has been applied to account for the inside (reverberant) to outside (free-field) transmission.

The calculated sound power levels for each of the façade elements are presented in terms of octave bands and dBA in the table below:

*Table 8: Calculated façade element sound power levels*

| <b>Octave Bands (Hz)</b>                       | <b>63</b> | <b>125</b> | <b>250</b> | <b>500</b> | <b>1000</b> | <b>2000</b> | <b>4000</b> | <b>dB L<sub>WA</sub></b> |
|------------------------------------------------|-----------|------------|------------|------------|-------------|-------------|-------------|--------------------------|
| Existing Door (dB L <sub>w</sub> )             | 91        | 95         | 89         | 84         | 77          | 81          | 81          | 88                       |
| Lightweight Roof Cladding (dB L <sub>w</sub> ) | 95        | 95         | 92         | 95         | 88          | 79          | 74          | 93                       |
| Masonry Walls (dB L <sub>w</sub> )             | 70        | 76         | 70         | 60         | 49          | 42          | 39          | 78                       |

## 4.6 Smoking Area

It is proposed that the yard to the front of the venue will be used as a smoking area. It is understood that music will not be played in the yard and it will be monitored by security to control behaviour, noise levels and quantities. This is good practice as in our experience noise from smoking areas can be a significant source of disturbance for local residents if it is not adequately controlled.

Based on noise levels of both male and female speakers, talking at 'raised' levels taken from "*Average Speech Levels and Spectra in Various Speaking/Listening Conditions (1977)*" - Wayne O.Olsen, the likely noise levels generated in the smoking area during busy periods has been predicted.

It is understood that the capacity of the venue is circa 200 people and the yard is approximately 85m<sup>2</sup> therefore, our calculations allow for 50 people in the smoking area speaking simultaneously with 'raised' voices and an equal male/female split. This is considered to be a conservative estimate. The cumulative noise level is included in our calculations and is summarised in Table 9 below:

Table 9: Predicted Sound Power Level of Smoking Area

| 25 males & 25 females talking with 'raised' voices | Octave band dB L <sub>w</sub> |     |     |      |      |      | dB L <sub>WA</sub> |
|----------------------------------------------------|-------------------------------|-----|-----|------|------|------|--------------------|
|                                                    | 125                           | 250 | 500 | 1000 | 2000 | 4000 |                    |
|                                                    | 80                            | 86  | 90  | 86   | 82   | 77   |                    |

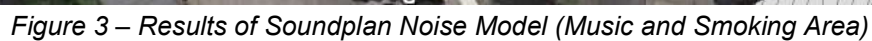
## 5.0 NOISE IMPACT ASSESSMENT

It is acknowledged that other activities including yoga classes and exhibitions are proposed to take place during the daytime however, the noise associated with these activities is expected to be significantly lower than that from the night-club events therefore, no further assessment has been undertaken.

### 5.1 Noise Modelling

In order to calculate the noise propagation from the proposed venue to the dwellings on Canada Street the site and its surroundings were modelled in Sound Plan noise propagation software. The software uses the method of ISO 9613 '*Acoustics – attenuation of sound during propagation outdoors – general method of calculation*' and takes into account geometric spreading, ground effects, air absorption, barrier attenuation and reflections from the surroundings to calculate the noise levels incident at various points. The noise model is based on the measured and predicted levels in section 4 with the roof, masonry walls and smoking area modelled as a plane source and the door as a point source. The model has been calibrated to the measurements taken at the boundary of the yard during our noise survey and showed good correlation to the measured results. Given that the dominant noise source is through the roof of the venue, noise levels at the façade of the dwellings have been predicted at 1<sup>st</sup> floor level as this is the most exposed point and therefore, represents the worst-case.

Note that 2 situations have been modelled, the first looks at music noise in isolation such that the Manchester City Council's entertainment noise design criteria which relates specifically to music noise can be assessed in octave bands. The second includes noise from both the smoking area and music within the venue in terms of overall A-weighted façade noise levels. The results of the noise models can be seen in the following Figures.



## 5.2 Discussion of Results

It can be seen from the results of the model in Figure 2 looking at entertainment noise in isolation that the worst case façade noise level at the dwellings is 38 dB  $L_{Aeq}$  (rounded to the nearest dB). The results of our noise survey indicate that the existing ambient noise climate in the vicinity of the dwellings between 23:00 – 05:00 hours when the night-club events are expected to operate is 61 dB  $L_{Aeq}$  which would suggest that noise from the venue will have a negligible contribution. Furthermore, with reference to the WHO Guidelines for Community Noise which recommend that in order to avoid sleep disturbance during the night-time the internal ambient noise level should not exceed 30 dB  $L_{Aeq}$  in bedrooms. Taking into account a -15 dB reduction for a partially open window this would result in an internal noise level of circa 23 dB  $L_{Aeq}$ , comfortably achieving the WHO guideline value for bedrooms.

In addition to this, Manchester City Council's entertainment noise design criteria require music noise to be controlled such that it is 10 dB below the background  $L_{A90}$  in each octave band. The results of our model indicate that this can be achieved. The worst-case façade noise level between 63Hz and 4kHz are presented and compared against the limiting criteria in the Table below:

Table 9: Façade Noise Levels 63Hz – 4kHz

| Octave Bands (Hz)               | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|---------------------------------|----|-----|-----|-----|------|------|------|
| MCC -10 dB Limiting Criteria    | 48 | 44  | 42  | 40  | 36   | 26   | 14   |
| Predicted Façade Level $L_p$ dB | 46 | 44  | 38  | 38  | 30   | 20   | 12   |
| Exceedance of Criteria          | -2 | 0   | -4  | -2  | -6   | -6   | -3   |

It can be seen that based on an internal noise level of 107 dBA the MCC entertainment noise criteria can be achieved at the façade of the worst affected dwellings on Canada Street. It is noted the venue has a capacity of circa 200 people and a total floor area of approximately 145m<sup>2</sup>, a noise level of 107 dBA is likely to be more than sufficient for a space of this size. The Code of Practice on Environmental Noise Control at Concerts – Noise Council (1995) suggests that typically noise levels at concerts are 100 dBA and that levels below 95 dBA are unlikely to provide satisfactory entertainment for the audience as such, our model demonstrates that the music noise levels off site can comfortably comply with the MCC requirements whilst still providing a good audience experience.

The MCC guidance also recommends that *'music noise levels in the 63Hz and 125Hz octave centre frequency bands ( $L_{eq}$ ) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ( $L_{eq}$ ), respectively'*. It can be seen that the internal noise criteria is achieved externally in the 63 Hz band and taking into account the sound reduction of the façade (*even with open windows*) is likely to be achieved in the 125 Hz band.

Figure 3 shows the noise levels at the façade of the dwellings with noise from both the smoking area and music internally simultaneously. As per the assessment of entertainment noise in isolation, the worst-case façade noise level is predicted to be 38 dB  $L_{Aeq}$  (rounded to the nearest dB) which suggests that noise from the smoking area will have a negligible contribution.

During our noise survey, it was noted that subjectively noise from the venue was not readily distinguishable against the existing ambient noise climate, this is reinforced by the results of the model which objectively demonstrate that the noise impact of the proposed event space is likely to be negligible provided that internal noise levels do not exceed circa 107 dBA and noise / number of people in the smoking area is adequately controlled.

Both our noise survey and model indicate that noise associated with the proposed venue will not increase the ambient noise level in terms of  $L_{Aeq}$  and, will be significantly lower than the background noise level ( $L_{A90}$ ) across the frequency spectrum. It is also noted that our model is based on a number of worst-case assumptions. With reference to the National Planning Policy Framework (NPPF) we would therefore, consider the proposed venue to fall into the 'NOEL – No Observed Effect Level' category. The NPPF suggests that *"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."* As such, on the grounds of noise we would consider this site suitable for the proposed development.

## 6.0 GENERAL ADVICE

### 6.1 Lobby Doors

During our inspection of the site it was noted that the existing entrance door is a steel fire type door which is poorly sealed and has significant gaps around the jambs and therefore, provides a significant acoustically weak point through which noise can escape through the building envelope of the event space.

The drawings indicate that this is to be replaced with a acoustic lobby door system, this would be the most efficient way of improving the sound insulation of these elements. The system allows for at least one set of doors to be closed at any time, to ensure that patrons are not congregating in this area and leaving both sets of doors open it is recommended door staff are utilised to enforce this.

The lobby doors should be comprised from a set of solid core well-fitting doors with full perimeter acoustic seals. The new set (sets) of doors associated with the new lobby should incorporate proprietary meeting stile door and door-set(s) that have been tested in combination as one to achieve at least 30 dB  $R_w$ . Such a door system would be a Strebord 54mm - Flush Door - Double Leaf - Single Action © 0% glazing (29-35 dB  $R_w$ ) or similar. Our calculations suggest that using such a door in the proposed lobby system would give the following improvement in terms of Sound Reduction Index Performance (R dB) when compared with the existing door set.

Table 10: Predicted improvement of proposed lobby door system

| Octave Bands (Hz)                                     | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|-------------------------------------------------------|----|-----|-----|-----|------|------|------|
| Existing door dB R                                    | 12 | 12  | 17  | 20  | 22   | 17   | 18   |
| Predicted Improvement 1 lobby door closed 1 open dB R | 11 | 15  | 12  | 7   | 7    | 19   | 24   |
| Predicted Improvement both doors shut dB R            | 32 | 40  | 40  | 32  | 35   | 53   | 65   |

Our predictions suggest that even with just one of the lobby doors closed there will be a significant improvement in to the sound insulation performance of this element.

## 6.2 Noise Limits / Monitoring during events

It is recommended that during events internal noise levels should be monitored periodically throughout to ensure that it is not exceeding 107 dBA. Where exceedances of the limiting criteria are observed it will be necessary to make an intervention, management should take action immediately to reduce the internal noise levels. In addition, we would recommend that periodic listening checks are made in the vicinity of the residential dwellings on Canada Street to ensure that noise from the venue is 'virtually inaudible/inaudible' in accordance with the MCC guidance for entertainment noise.

## 6.3 Smoking Area

Our assessment indicates that noise from the smoking area will have a negligible impact on the nearby dwellings however, as discussed in section 4.6 above the smoking area should be monitored by security staff to control behaviour, noise levels and quantities. Furthermore, live or recorded music should not be played externally.

## 7.0 CONCLUSION

PDA Ltd have been commissioned by The Loft MCR Ltd to carry out noise impact assessment for the proposed 'cultural event space' in the former industrial unit at no.1 New Street in Miles Platting, Manchester, M40 8AW. The nearest noise sensitive dwellings are located approximately 100m from the venue on Canada Street.

The space is licensed to operate between 12:00 – 00:00 hours Sunday – Thursday and 12:00 – 05:00 hours Friday – Saturday and will host a number of creative workshop type activities during the daytime including; Yoga Classes and Art/Film Exhibitions. In addition, nightclub events will be held during the evening. Our assessment has considered the noise impact associated with the nightclub events as this represents the worst-case in terms of noise generating activities.

A noise level survey was undertaken in the vicinity of the dwellings to establish the existing ambient noise climate. In addition measurements were made to determine the sound insulation of the venue façade elements and the transmission loss to the dwellings. Subjectively noise from within the venue was not readily distinguishable against the existing noise climate at the dwellings in addition, analysis of the measurement data indicated that the noise level did not increase with the noise source on therefore, suggesting that the noise impact associated with the venue is likely to be low.

In addition to the noise survey, noise propagation from the venue including internal music noise and that from patrons in the smoking area was modelled in using industry standard software. The results of the model reinforced the findings of the survey. Indicating that provided the internal noise level does not exceed 107 dBA then the Manchester City Council entertainment noise design criteria which stipulates that entertainment noise should be 10 dB below the background noise level in octave bands can be comfortably achieved. Furthermore, our assessment suggests that the WHO Guideline Values for internal noise will be met at the dwellings. It was also noted that the residential façade noise levels will be significantly lower than the existing ambient noise level in terms  $L_{Aeq}$  and approximately 14 dB below the existing background noise level in terms of  $L_{A90}$ . All of which indicates that the noise impact due to the proposed entertainment use will be low.

Therefore, in-line with the Manchester City Council Local Policy and the National Planning Policy Framework, on the grounds of noise we would deem this site suitable for proposed entertainment use.

## APPENDIX A – DEFINITION OF ACOUSTIC TERMS

### The decibel

This is the basic unit of noise, denoted dB.

### A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A)  $L_{eq}$  or 50 dB  $L_{Aeq}$ . Both mean the same thing. (See below for a definition of  $L_{eq}$ ). The dB(A) level can be regarded as the overall level perceived by human beings.

### $L_{eq}$ and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB  $L_{eq}$  or, for A-weighted figures dB(A)  $L_{eq}$  or dB  $L_{Aeq}$ . It can also be expressed in terms of frequency analysis (see later).  $L_{eq(s)}$  is the sample  $L_{eq}$  level.

### $L_n$

This is the level exceeded for n% of the time. It is denoted dB  $L_n$  or, for A-weighted figures dB(A)  $L_n$  or dB  $L_{An}$ . It can be expressed in terms of frequency analysis (see later).  $L_{90}$  is the level exceeded for 90% of the time and is a measure of the lowest level typically reached.  $L_{10}$  is the level exceeded for 10% of the time and is the highest level typically reached.  $L_{50}$  is the level exceeded for 50% of the time and, mathematically, it is the median.

### $L_{max}$

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB  $L_{max}$  or, for A-weighted figures dB(A)  $L_{max}$ , dB  $L_{Amax}$ , etc. It can also be expressed in terms of frequency analysis.

### Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g.  $L_{eq}$ ,  $L_{90}$ ,  $L_{max}$  etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.



## **APPENDIX B – MEASURED NOISE LEVELS**

**Our Ref:** J003392  
**Client:** The Loft MCR  
**Project:** The Loft Noise Impact Assessment  
**Results:** Ambient Noise Measurements

| Date       | Time     | Octave Band Centre Frequencies (Hz), dB L <sub>90</sub> |                      |                        |    |     |     |     |    |    |    |    |
|------------|----------|---------------------------------------------------------|----------------------|------------------------|----|-----|-----|-----|----|----|----|----|
|            |          | dB, L <sub>Aeq</sub>                                    | dB, L <sub>A90</sub> | dB, L <sub>AFmax</sub> | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| 24/05/2021 | 23:00:00 | 55                                                      | 52                   | 67                     | 60 | 54  | 51  | 50  | 47 | 36 | 23 | 22 |
| 24/05/2021 | 23:15:00 | 59                                                      | 53                   | 88                     | 59 | 54  | 52  | 51  | 47 | 36 | 24 | 22 |
| 24/05/2021 | 23:30:00 | 55                                                      | 53                   | 63                     | 58 | 54  | 53  | 52  | 46 | 34 | 23 | 22 |
| 24/05/2021 | 23:45:00 | 59                                                      | 53                   | 77                     | 60 | 54  | 53  | 52  | 47 | 36 | 24 | 22 |
| 25/05/2021 | 00:00:00 | 57                                                      | 53                   | 76                     | 59 | 54  | 53  | 52  | 47 | 36 | 25 | 22 |
| 25/05/2021 | 00:15:00 | 61                                                      | 53                   | 82                     | 58 | 54  | 53  | 51  | 46 | 39 | 32 | 25 |
| 25/05/2021 | 00:30:00 | 54                                                      | 52                   | 64                     | 58 | 54  | 52  | 50  | 46 | 36 | 27 | 23 |
| 25/05/2021 | 00:45:00 | 53                                                      | 51                   | 62                     | 58 | 53  | 51  | 50  | 44 | 33 | 23 | 22 |
| 25/05/2021 | 01:00:00 | 56                                                      | 52                   | 74                     | 58 | 54  | 52  | 50  | 45 | 33 | 24 | 22 |
| 25/05/2021 | 01:15:00 | 56                                                      | 52                   | 75                     | 58 | 54  | 52  | 50  | 45 | 34 | 24 | 22 |
| 25/05/2021 | 01:30:00 | 53                                                      | 51                   | 62                     | 57 | 53  | 51  | 50  | 44 | 32 | 23 | 22 |
| 25/05/2021 | 01:45:00 | 71                                                      | 51                   | 101                    | 58 | 54  | 52  | 50  | 44 | 33 | 24 | 22 |
| 25/05/2021 | 02:00:00 | 64                                                      | 52                   | 85                     | 58 | 54  | 52  | 51  | 45 | 34 | 24 | 22 |
| 25/05/2021 | 02:15:00 | 59                                                      | 51                   | 81                     | 58 | 54  | 52  | 50  | 44 | 33 | 24 | 22 |
| 25/05/2021 | 02:30:00 | 58                                                      | 51                   | 79                     | 57 | 53  | 51  | 50  | 44 | 33 | 24 | 22 |
| 25/05/2021 | 02:45:00 | 54                                                      | 52                   | 61                     | 58 | 54  | 52  | 51  | 44 | 34 | 25 | 22 |
| 25/05/2021 | 03:00:00 | 54                                                      | 52                   | 61                     | 58 | 54  | 53  | 51  | 45 | 35 | 26 | 22 |
| 25/05/2021 | 03:15:00 | 56                                                      | 54                   | 64                     | 58 | 54  | 52  | 52  | 46 | 41 | 35 | 30 |
| 25/05/2021 | 03:30:00 | 54                                                      | 51                   | 65                     | 58 | 53  | 51  | 50  | 44 | 37 | 29 | 24 |
| 25/05/2021 | 03:45:00 | 56                                                      | 52                   | 74                     | 59 | 54  | 51  | 50  | 45 | 39 | 30 | 24 |
| 25/05/2021 | 04:00:00 | 58                                                      | 55                   | 67                     | 62 | 55  | 53  | 52  | 49 | 42 | 34 | 27 |
| 25/05/2021 | 04:15:00 | 65                                                      | 53                   | 86                     | 59 | 54  | 52  | 51  | 46 | 40 | 32 | 23 |
| 25/05/2021 | 04:30:00 | 67                                                      | 54                   | 95                     | 60 | 54  | 52  | 51  | 48 | 41 | 34 | 28 |
| 25/05/2021 | 04:45:00 | 58                                                      | 53                   | 75                     | 59 | 54  | 52  | 51  | 47 | 39 | 32 | 24 |
| 25/05/2021 | 05:00:00 | 59                                                      | 53                   | 84                     | 57 | 54  | 52  | 51  | 46 | 39 | 30 | 23 |