



BRAIDEN ACOUSTICS LTD

Innovation Forum | 51 Frederick Road | Salford | Manchester | M6 6FP

NOISE IMPACT ASSESSMENT (RESTAURANT / BAR)

Prepared For : Up North Architects

Date : 11 Jan 2023

Site : Ground Floor, 113-115 Portland St., Manchester

Report No. : 11101revA

1 INTRODUCTION

Braiden Acoustics has been commissioned by Up North Architects to undertake an acoustic survey at the site of the Ground Floor, 113-115 Portland St., Manchester to support planning application 135243/FO/2022 which proposes:

"Refurbishment of upper and lower ground floor levels and external courtyard at 113-115 Portland Street, as new restaurant, bar and karaoke facility. The site was formerly a bar and restaurant."

In order to validate the planning application, a noise impact assessment (NIA) is required. In a letter from Manchester City Council (MCC) dated 2 November 2022, it states:

1) *An acoustic study identifying ambient noise levels during daytime, night time and weekends along with an indication of noise levels that you propose to achieve within the accommodation and details of the acoustic glazing and acoustically treated ventilation you propose to use; In terms of the proposed uses the acoustic study should identify the acoustic treatment and measures that will limit the breakout of noise in accordance with a noise study of the premises and a scheme of acoustic treatment. The scheme proposed shall include measures such as acoustic lobbies at access and egress points of the premises, acoustic treatment of the building structure, sound limiters linked to sound amplification equipment, and specified maximum internal noise levels."*

3) *An Operating Schedule for the outdoor area and dispersal procedure for the premises (prevention of crime and disorder, prevention of public nuisance). Details of a strategy for managing smokers, in particular noise from smokers. Please provide opening hours for the outside area.*

1.1 AIM

This report shall investigate all pertinent noise sources that may affect surrounding 'sensitive receptors' and propose any mitigation, where necessary, so that noise levels are within relevant guidelines.

2 DESCRIPTION OF SITE

The application site comprises of two adjacent units at upper and lower ground floor levels.

The overall building itself is a converted warehouse dating back to the late 19th century.

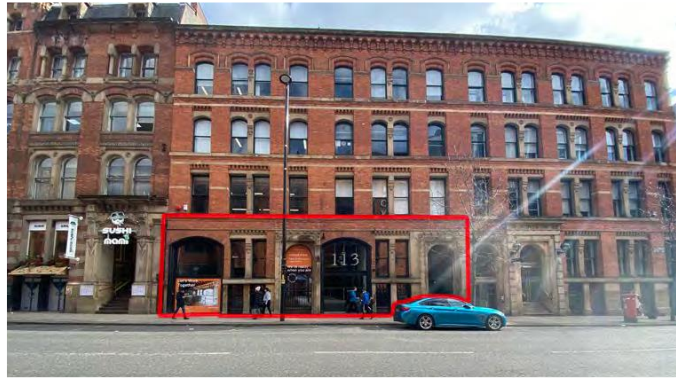
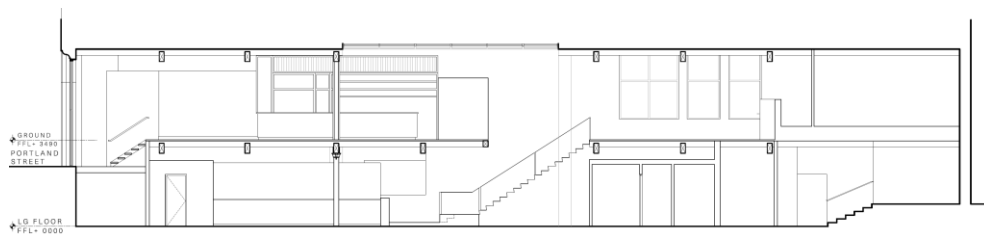


Figure 1
Street view of site

2.1 DESCRIPTION OF PROPOSED UNIT

The proposed site is the lower and upper ground floors of 113-1115 Portland Street. The site has been stripped back to its shell.



2.1.1 Lightwells

There are two lightwells within the space:

1. At lower ground level between 115 and 113 Portland Street
2. At upper ground level between 113 and 111 Portland Street.



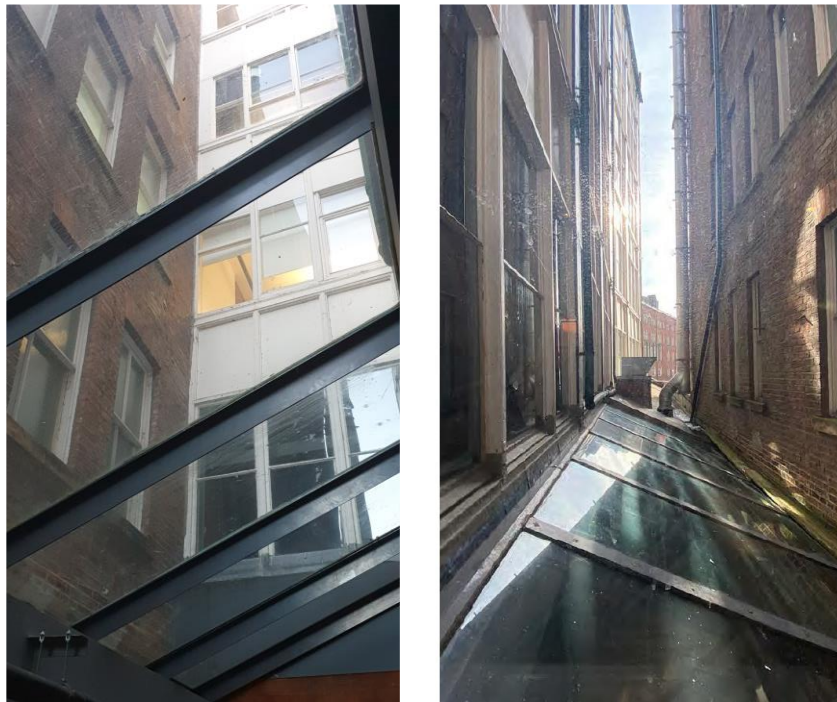
Figure 2
Site edge red showing lightwells (LW)

Above the two lightwells are offices at first floor level.



Initially it was assumed that the glazing is 10/12/6mm as stipulated in the Buro Happold report¹ that supported the previous planning application, number 107739/FO/2014/C2 for the “Change of use of basement and ground floor to Class A3 / Class A4 Use (Sui Generis)”. However, from inspection, it seems that the lightwells are single glazed and likely to be 16mm laminated glazing.

The lightwells are denoted ‘L W’ in Figure 2.



*Figure 3
Photos of lightwells in lower ground (left) and upper ground (right)*

Figure 3 shows the lightwells from inside (lower ground lightwell) and outside (upper ground lightwell).

2.2 SITE LOCATION AND SURROUNDING USES

The site is within Manchester town centre with Portland Street to the north west (front); the site is otherwise bounded by the demises of adjacent buildings. Details of the adjacent and nearby uses are given below.

¹ There was an acoustic survey in 2015 from the previous planning application where the use was changed from a gallery to a restaurant / bar called Leaf. Calculations were “Based on 10/12/6 sealed glazing to rooflight”.





Figure 4
Site location and surrounding uses

- | | | |
|----|--------------------------------|---|
| 1. | 113-115 Portland St.
above. | Proposed site at lower and upper ground floors (including courtyard), offices |
| 2. | 117 Portland St. | Bruntwood – Offices |
| 3. | 21 Dickinson St. | Novotel – Hotel |
| 4. | 111 Portland St. | Ground Floor: Panda Mami – Restaurant, offices above |
| 5. | 2 Harter St. | Residential |
| 6. | 1 Harter St. | Residential |
| 7. | Dickinson St. | Linley House – Offices |

2.3 EXISTING USE

The site was previously occupied by 'Leaf', which was a restaurant / bar.

2.4 PROPOSED USE

It is proposed to use the lower and upper ground floors as a restaurant and karaoke bar.

2.4.1 Ground Floor

The ground floor will comprise of the following:

- arrival bar with seating
- open kitchen and back of house kitchen
- dining area
- private dining area with additional karaoke room
- toilets.



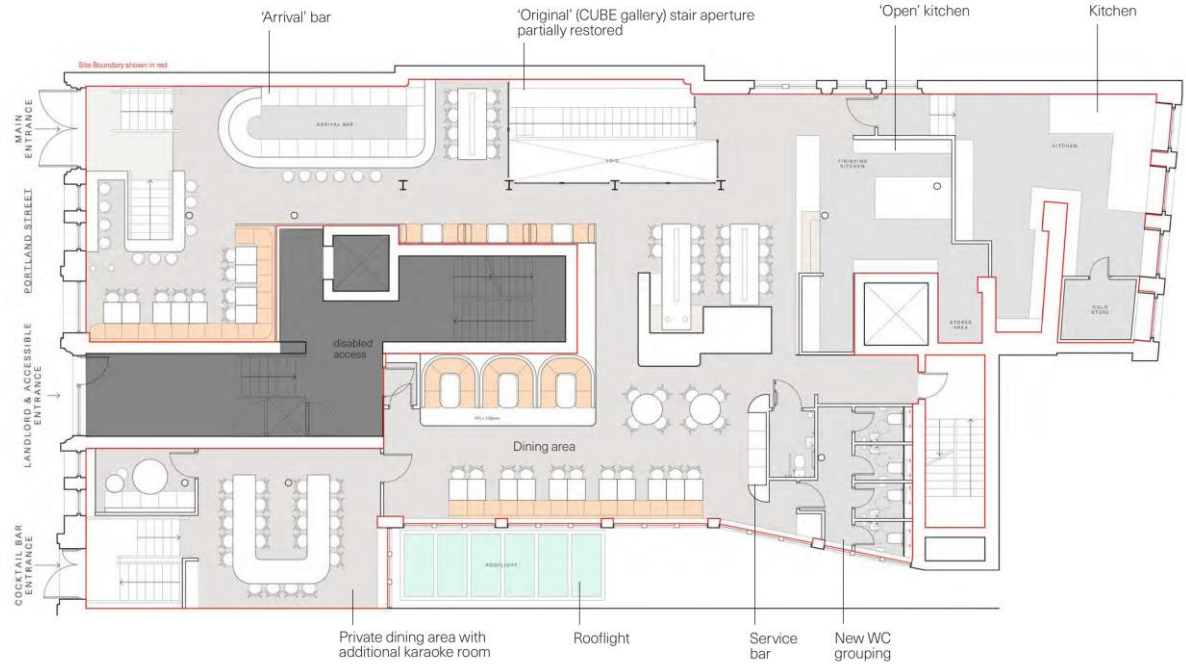


Figure 5
Proposed Upper Ground level

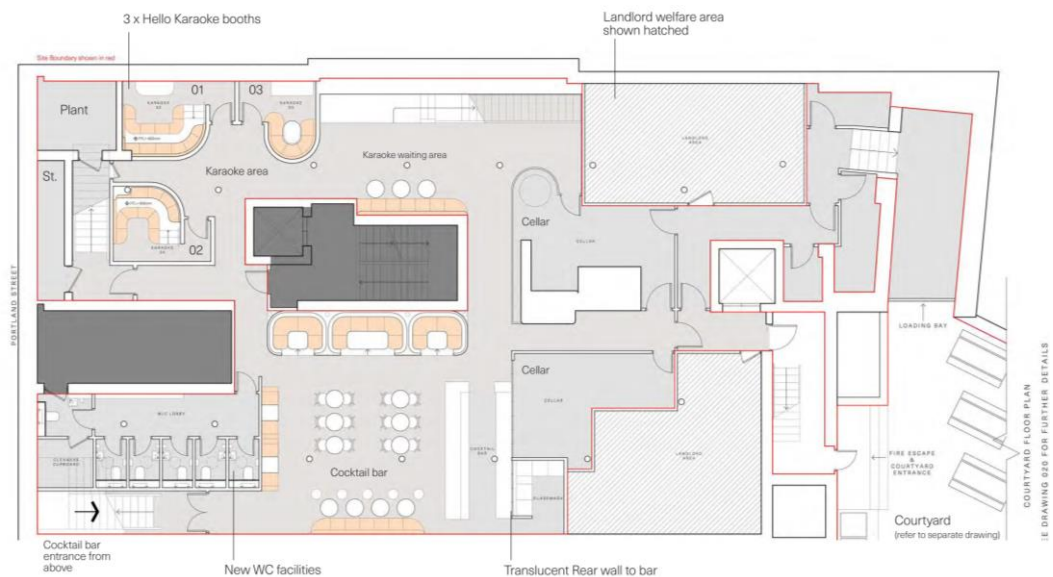


Figure 6
Proposed lower ground layout

The basement (lower ground) will comprise of :

- toilets
- cocktail bar
- cellars
- 3no. karaoke booths
- access to rear courtyard.



2.4.2 Courtyard

The courtyard will comprise of:

- 4no. existing floor mounted condensers
- 5no. proposed AC wall mounted condensers
- bike racks
- customer seating
- wall mounted type condensers: 1no. existing & 2no. proposed (AC & cellar cooling)

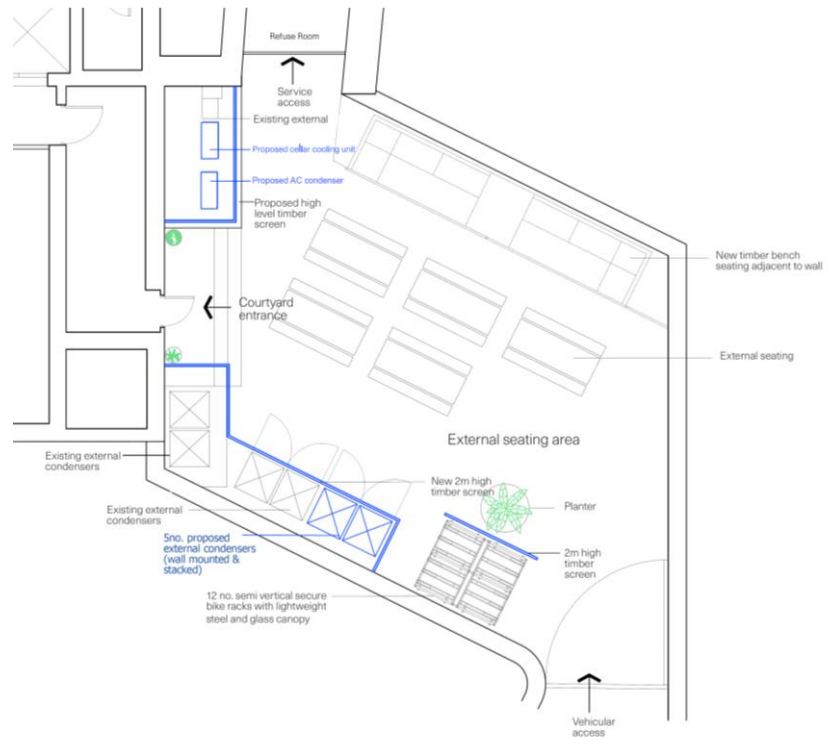


Figure 7
Proposed courtyard layout

2.4.3 Opening hours

Main trading area

Sunday – Wednesday	11:30 - 22:00
Thursday – Saturday	11:30 - 02:00

Courtyard

Sunday – Wednesday	11:30 - 22:00
Thursday – Saturday	11:30 - 22:00

2.4.4 Building services

The external plant comprises of kitchen ventilation as well as external condenser units for air conditioning and cellar cooling.

2.4.4.1 Kitchen Ventilation

There will be a fresh air supply via three openings in the windows on the rear elevation.



The extract duct will rise vertically to 1m above the eaves.

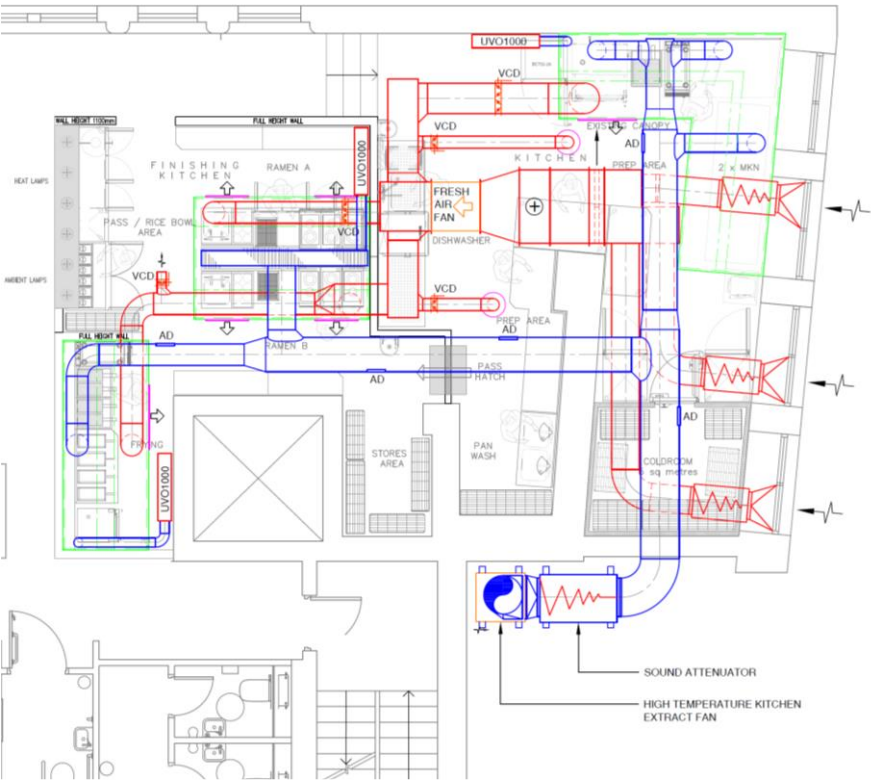


Figure 8
Kitchen ventilation layout

Kitchen Extract
Estoc Targe (PowerBox) 102-630-3

👉	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	115	82	85	81	82	84	79	72	115	71
Outlet*	118	90	88	87	86	85	81	72	118	74
Breakout*	101	82	78	69	69	63	56	50	101	57

* Lw dB re 10⁻¹² W
** dBA re 2x10⁻⁵ Pa
Sound data at requested duty.

Figure 9
Extract fan sound power data

Extract Silencer
790 Ø 2D unpodded - CDA.2D from Figure 10



STANDARD CIRCULAR SILENCER INSERTION LOSS DATA

@ +20oC and 5m/sec FACE VELOCITY

SILENCER SIZE	CODE	P.A	OCTAVE BAND CENTRE FREQUENCIES (Hz)							
			63	125	250	500	1K	2K	4K	8K
200-550 dia	CDA.1D	ALL	2	4	6	10	14	10	7	8
		A	4	8	13	17	23	17	12	11
		B	4	8	12	17	23	17	12	10
	CDA.2D	C	4	7	10	15	19	16	12	9
		A	4	6	8	12	21	21	18	15
		B	4	6	8	11	18	19	17	14
	CDAP.1D	C	4	6	8	11	14	16	11	10
		A	7	10	12	24	29	29	27	23
		B	7	10	12	21	26	26	24	22
	CDAP.2D	C	7	10	11	18	21	20	17	15
		ALL	3	4	9	15	15	8	7	6
		A	6	8	13	22	23	14	13	9

EXTRACT FAN

Figure 10
Extract silencer insertion loss data

The supply air will be via 3no. inlets via window louvres.

Kitchen Supply

ePowerBox 80-630-3-4 (7NA)

	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	-	87	81	79	74	73	70	66	89	61
Outlet*	-	92	89	85	81	78	73	68	95	67
Breakout*	-	83	75	60	55	52	48	44	84	50

* Lw dB re 10⁻¹² W

** dBA re 2x10⁻⁵ Pa

Sound data at requested duty.

Figure 11
Supply fan acoustic data

Supply Silencer

550mm Ø 2D unpodded - CDA.2D

STANDARD CIRCULAR SILENCER INSERTION LOSS DATA

@ +20oC and 5m/sec FACE VELOCITY

SILENCER SIZE	CODE	P.A	OCTAVE BAND CENTRE FREQUENCIES (Hz)							
			63	125	250	500	1K	2K	4K	8K
200-550 dia	CDA.2D	ALL	2	4	6	10	14	10	7	8
		A	4	8	13	17	23	17	12	11
		B	4	8	12	17	23	17	12	10
		C	4	7	10	15	19	16	12	9

FRESH AIR FAN

Figure 12
Supply silencer insertion loss data

The kitchen ventilation system will only operate during opening hours.

2.4.4.2 External Condenser units

Cellar cooling unit

CC1/CU J&E Hall J5LC28C

Air Con Condensers

AC1/CU	MIDEA	MDV-V80W/DN1	(single figure noise level)
AC2/CU	MIDEA	MOE30U-55HFN8-R	(Octave bands)
AC3/CU	MIDEA	MOD30U-42HFN8-QRD0	(Octave bands)
AC4/CU	MIDEA	MOX330U-18HFN8	(Octave bands.jpg)
AC5/CU	MIDEA	MOE30U-55HFN8-R	(Octave bands)
AC6/CU	MIDEA	MDV-V105W/DN1	(single figure)



2.4.5 Sound system

As the proposed use is primarily for a restaurant, then the sound system will be modest and only playing background music.

The loudspeakers are likely to be similar to ones used in another House of Fu site in Leeds.



Figure 13
Proposed loudspeakers

2.4.5.1 Karaoke pods

The exact design of the karaoke pods is not yet known; however they will be fully sound insulated in order to minimise sound leakage into the restaurant to avoid disturbing other patrons.

3 ACOUSTIC CRITERIA AND METHODOLOGY

3.1 BS 4142

BS 4142:1999 “Method for rating industrial noise affecting mixed residential and industrial areas” [1] assesses industrial noise with regards to nearby residential dwellings. The guidance is commonly used to compare the equivalent noise from an industrial source only (*specific noise level*), L_{Aeq} , to the background noise level, L_{A90} , at the nearest sensitive receptor (NSR).

This Standard has been recently updated, BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” [2]. Whereas the old standard added 5dB ‘penalty’ to the Specific Noise Level (SNL) if the noise source has a ‘character’ that can draw attention that may be described as tonal, intermittent or impulsive, the new standard gives clearer guidance on noise ‘character’. Furthermore, the previous Standard gave only one 5 dB penalty whereas the new Standard may not. When added to the specific noise level it forms the *rating level*. The new Standard gives the guidance for the following types of noise character:

Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.

NOTE 1 The prominence of tonal or impulsive sound from a source can be masked by residual sound. In many cases the amount of masking varies as the residual sound changes in level and possibly character. The source’s tonal and/or impulsive characteristics could also vary with time.

Consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.

Tonality



For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Once a penalty for noise character is added to the Specific Noise Level then this is termed the *Rating Level*.

The background level is then compared to the rating level. It is usual that the rating level due to the source should be below the background noise level at the nearest sensitive receptor; indeed BS 4142 states:

“The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

3.1.1 Council BS4142 criterion

Hitherto, there has been no mention of a BS4142 noise criterion.

However, section 11 d) of BS 4142:2014 says

“Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact”

Therefore, minimally, the Rating Level should not exceed the Background Level to ensure any potential noise has a low or no impact.

3.2 BS 8233: 2014

3.2.1 Residential

The British Standard BS 8233:2014 “Guidance on sound insulation and noise reduction for buildings” gives guidance on recommended indoor ambient noise levels for residential dwellings.



Room	Criterion	$L_{Aeq,T}$	
		night	day
Bedroom	Sleeping	30	35
Dining Room/Area	Dining	--	40
Living Room	Resting	--	35

Table 1

Recommending indoor ambient noise level thresholds from anonymous noise (taken from Table 4, BS 8233:2014)

Internal levels are simply predicted by the subtraction of the estimated sound reduction index (SRI) of the building façade from the external free field noise measurements. When considering the SRI of a particular façade it is usual to only consider the glazing as this is the weakest element acoustically.

3.2.2 Offices

Table 2 in BS 8233:2014 give a range of target noise levels for a variety of internal spaces, such as offices. The upper limits should not be breached in order for the occupants of the space to not be disturbed. However, for open-plan offices for example, a minimum noise level can be useful to provide masking for acoustic privacy.

Table 2 Indoor ambient noise levels in spaces when they are unoccupied and privacy is also important

Objective	Typical situations	Design range $L_{Aeq,T}$ dB
Typical noise levels for acoustic privacy in shared spaces	Restaurant	40 – 55
	Open plan office	45 – 50
	Night club, public house	40 – 45
	Ballroom, banqueting hall	35 – 40
	Living room	35 – 40

NOTE See Noise control in building services [28] and BS EN ISO 3382.

Table 2

Target internal noise levels of unoccupied spaces

As Table 2 above shows, the noise levels within an open plan office should be between 45 – 50 dB(A).

3.3 COUNCIL NOISE CRITERIA

Guidance on noise and planning is given in the Manchester City Council's (MCC) document "Planning and Noise Technical Guidance" [3].

3.3.1 Residential noise criteria

Section 3.7.1.1 of the Planning & Noise Technical Guidance document [3:§ 3.7.1.1] states the following:

The Council has adopted the following noise limits for residential properties:

- **Bedrooms (night time 23.00 - 07.00) 30 dB L_{Aeq} (individual noise events should not normally exceed 45 dB $L_{Amax,F}$ by more than 10 times)**
- **Living Rooms (daytime 07.00 - 23.00) 35 dB L_{Aeq}**
- **Gardens and terraces (daytime) 55 dB L_{Aeq}**

These criteria have been adopted for the following reasons:



- BS 8233: 2014 recognises these levels as a good standard for resting/sleeping conditions.
- The WHO document 'Guidelines for Community Noise' recommends an internal L_{Aeq} of 30dB for optimal sleep conditions (and no more than 35dB for internal rooms during daytime).
- The performance of acoustic insulation schemes can often be below that specified, according to the quality of installation, materials, noise spectrum and deterioration / wear and tear of building elements. A high design specification introduces a 'safety margin' should building elements not perform as well as expected ('on-site' performance).
- Performance specification for glazing does not usually take into account the detrimental effect of vents on the sound insulation. Even 'acoustic' vents will reduce the performance of the facade insulation, as they will inherently contain a free open area for air exchange.
- There is a general increase in urban noise levels, which can in the future be reasonably accommodated by these standards.
- The standards support the Local Authority corporate objective to prevent ill-health and improve local peoples' health and well-being. Bedrooms (night time - 23.00 - 07.00) 30 dB L_{Aeq}

3.3.2 Industrial noise criteria

With regards to industrial noise, from external plant for example, [3:§ 3.7.1.5] states:

BS 4142 should be used to assess the likely impact of noise from industrial and commercial sources at noise sensitive premises (section 3.5). One of the indications of the impact of a BS 4142 assessment is the lower the Rating Level is relative to the measured Background Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Level, this is an indication of the specific sound source having a low impact, depending on the context.

The Council considers that new developments should contribute and enhance the area in which they are located and where possible, contribute to the improvement of people's health and quality of life as per the NPSE. With this in mind, the design objective should be:

'The development should be designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.'

Where this criterion cannot be achieved, the various noise control measures considered as part of the assessment should be fully explained (i.e. relocation of noise sources, use of quieter equipment, enclosures, screening, restriction of the hours of operation) and the achievable noise level should be identified. This information will allow a judgement to be made concerning the application and its likely impact on the surrounding area.

In addition to the above, maximum noise levels should also be adequately controlled. Where particular uses generate high noise levels of a short duration (e.g. loud bangs) on a regular basis, these should aim to be controlled so as not to exceed 60 dB (L_{Amax}) at the façade of noise sensitive premises nearby in accordance with the recommendations of the WHO (section 3.6).

4 MEASUREMENT DETAILS

In order to assess the noise levels from the plant, background noise levels have been taken at the rear of the site.

For measuring background noise levels, BS 414 states:

"Ensure that the measurement time interval is sufficient to obtain a representative value of the background noise level."

In order to obtain a worse case methodology, noise measurements were made at a relatively quiet time of week.



4.1 VISIT 1 – EXTERNAL REAR BACKGROUND NOISE

4.1.1 Monitoring details

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Weather: 5-8 °C; <5ms⁻¹ wind; ~40-60% cloud; some light precipitation.

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

The sound level meter was calibrated before after the measurements with no drift reported.

Monitoring was unmanned.

4.1.2 Monitoring location

The location of the monitoring was 1m above the boundary wall, as shown in Figure 14.



Figure 14
Monitoring location 'ML'

4.1.3 Noise monitoring results

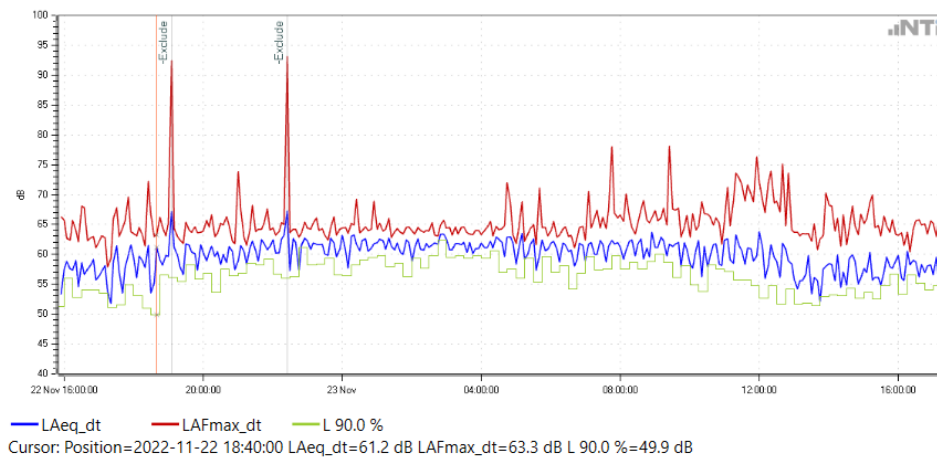


Figure 15
Measured noise levels

The lowest 15-minute background noise level is 49.9 dB(A). The relatively high background noise levels are due to existing external plant to the rear of the commercial buildings and the city centre location. This background noise level will be used as baseline for the BS4142 assessment for external plant noise.

4.2 INTERNAL NOISE MONITORING

Noise monitoring of the typical internal restaurant / bar noise took place whilst visiting a similar site. The sound level meter was placed on a table with the microphone only 20cm from the table surface. Whilst the



close proximity of the microphone to a reflecting surface is not ideal, it was felt that this would give a 'worst case scenario' result.

4.2.1 Monitoring details

Personnel: John Braiden, BSc & MSc Acoustics, MIOA.

Weather: n/a.

Equipment: NTi XL2 integrated real time analyser & B&K 4231 calibrator.

Date: Fri 05/04/2019

The sound level meter was calibrated before after the measurements with no drift reported.

Monitoring was manned.

4.2.2 Monitoring results

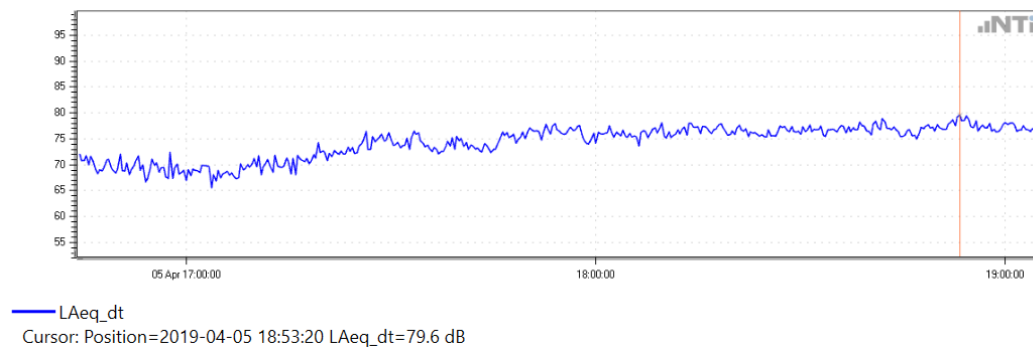


Table 3
Summary of internal noise monitoring results

The maximum internal noise level was 79.6dB(A).

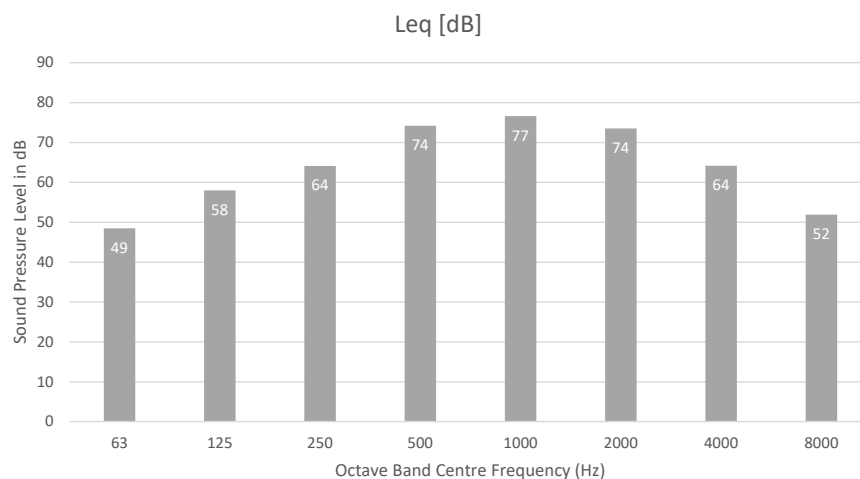


Figure 16
Octave band centre frequencies for highest internal noise level

The octave band data shows that there are no predominant low frequencies, as would be expected from a restaurant / café style venue when the dominant noise source is speech.



4.3 SOUND INSULATION TEST RESULT

A sound insulation test was undertaken of the separating floor between lower and upper ground, as part of the Burro Happold survey in 2015. The sound reduction index of the separating floor is at least:

$$41\text{dB } D_{nT,w}$$

5 ACOUSTIC ASSESSMENT

The potential noise issues to be assessed are:

1. Noise egress
 - a. via lightwells to 1st floor offices.
2. Noise transmission via the separating floor.
3. Noise from external plant
 - a. kitchen ventilation system
 - b. external condenser units.

5.1 NOISE EGRESS

Noise egress, at its weakest point, will be via the glazing of the lightwells.

It is estimated that the glazing is two leaves of 8mm glazing with a laminated construction. The sound reduction index of the glazing has been calculated in Insul sound insulation software.

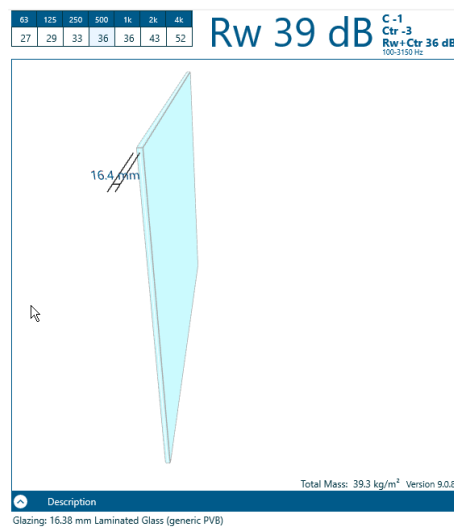


Figure 17
Glazing spec

Noise egress from internal to external is calculated by:



$$SPL_{ext} = SPL_{int,rev} - SRI + 10 \log S + DI - A_{dist} - 17 \quad (1)$$

where SPL_{ext} = external open air sound pressure level (SPL), dB

$SPL_{int,rev}$ = internal reverberant SPL, dB

SRI = sound reduction index of building element, dB

S = area of building element, m²

A_{dist} = attenuation due to distance, dB

DI = directivity index (due to adjacent reflective surfaces)

The above equation takes into account:

1. Internal reverberant noise level
2. sound reduction index of the partition
3. area of the partition
4. directivity due to adjacent reflecting surfaces
5. distance to the receiver
6. correction for reverberant to free field noise level.

5.1.1 Via lightwells

From daytime internal noise measurements at a similar site, it has been shown that daytime noise levels within the restaurant should not exceed 80dB(A). In order to find the likely noise levels within the nearby office spaces, Equation (1) is used in order to determine noise levels in the nearest office space, taking into account the distance and the sound reduction index of an open (office) window.

5.1.1.1 Lower ground lightwell

Using Equation (1) and a distance of 5m to the nearest office window from the lower ground lightwell, the internal noise level in the nearest office has been calculated to be:

29 dB(A).

Therefore, the breakout of noise from the lower ground lightwell is within reasonable limits.

5.1.1.2 Upper ground lightwell

The same procedure was followed for the upper ground floor lightwell, except this time, the distance to the nearest office window is only approximately 1m (see Figure 3).

The predicted internal noise level in the nearest office has been calculated to be:

43 dB(A).

Therefore, the breakout of noise from the upper ground lightwell is also within reasonable limits; in fact, the higher noise level will provide some acoustic privacy due to masking.

5.1.2 Noise transmission via separating floor

Noise egress via the separating floor between upper ground and first floor is more straightforward.



The internal noise level during office hours of the upper ground floor should not exceed 80dB(A). The separating floor provides 41 dB sound insulation. Therefore, the noise level in the office during daytime hours will simply be the difference of the two:

39 dB(A).

Noise transmission via the separating floor results in adequate noise levels in the office above.

5.2 EXTERNAL PLANT NOISE

The most sensitive receptors to ventilation noise are the residents on Harter Street which are between 4 and 19 metres from the various external plant.

Typical specification of the external plant is given in Section 2.4.4. This has yet to be finalised. Nevertheless, the Rating Level of the external plant must not exceed 5dB below the Background Level. Therefore, the Rating Level of any item of plant, at the nearest sensitive receptor must not exceed:

45 dB(A).

5.3 COURTYARD NOISE

The courtyard should not be used after 10pm so that noise egress from the courtyard does not affect local residents.

6 CONCLUSION

An initial acoustic survey has taken place at Ground Floor, 113-115 Portland St., Manchester.

A detailed description of the proposal has been given.

Noise transmission from the site has been assessed and noise levels to the offices on the upper floors is within acceptable noise limits.

The specification of the external plant is only indicative at this stage. However, the Rating Level of any item of plant should not exceed 45 dB(A) at the nearest sensitive receptor.

A full BS 4142 assessment will be carried out once the specification of the external plant has been confirmed.

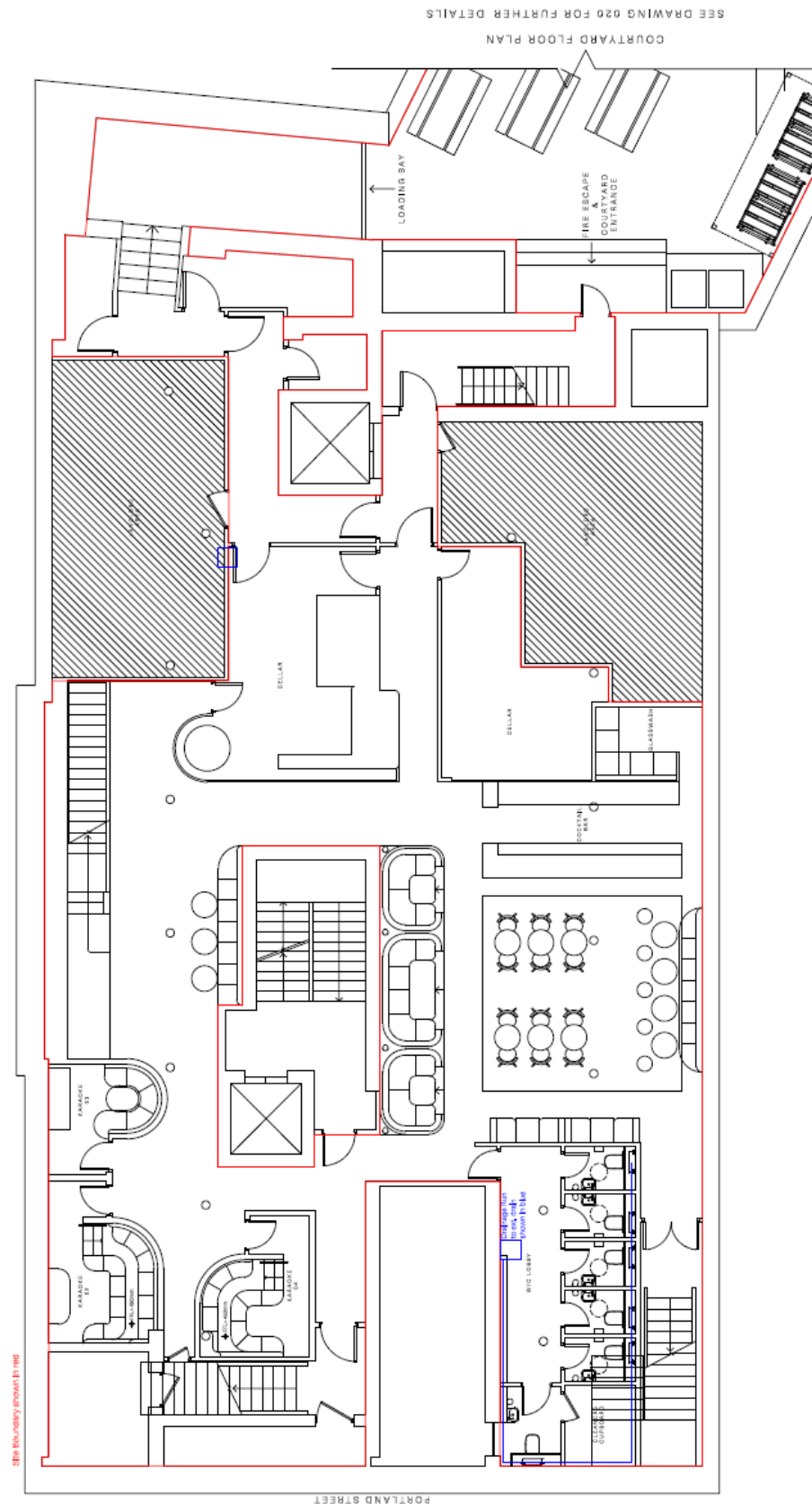
7 REFERENCES

- [1] BS 4142: 1997
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British Standards Institute, 2014.
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Manchester City Council, October 2022.



Appendix





Revisions All deviations are to be checked on site, any discrepancies are to be reported to the K&B/03/022 - Added full boundary, notes, and north point Any errors before work commences, Do not re-use from R&B drawings. This drawing is to be used in conjunction with all relevant consultants and specialist drawings/ documents, any discrepancies are to be reported to the Architect before the attached work commences. All structural components shown are in-situ only. Do not / re-use (re-use of structural members are to be provided by the Structural Engineer). THE DRAWING IS NOT FOR CONSTRUCTION		Project location: 113-115 Portland Street, Manchester REBA Vantage 3 - Spatial Coordination Drawing purpose For information	Up North Architects 113 North Ardwick Lane, Five Towns, Oldham Street, Manchester, M4 1LS Company No: 14537066 TEL 0161 237 1071 EMAIL info@upnortharchitect.com <table><tr><th>Client</th><th>House of Fu</th><th>Drawing no.</th><th>Revision</th><th>Scale</th><th>Drawing title</th><th>Proposed L3 Floor Plan</th></tr><tr><td>M861</td><td>010</td><td>010</td><td>L</td><td>1:100 @ A3</td><td>Date</td><td>Mar 2022</td></tr></table>	Client	House of Fu	Drawing no.	Revision	Scale	Drawing title	Proposed L3 Floor Plan	M861	010	010	L	1:100 @ A3	Date	Mar 2022
Client	House of Fu	Drawing no.	Revision	Scale	Drawing title	Proposed L3 Floor Plan											
M861	010	010	L	1:100 @ A3	Date	Mar 2022											

A2 EXTERNAL PLANT NOISE LEVELS

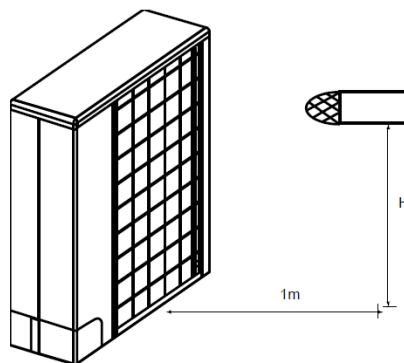
A2.1 Cellar Condenser - J&E Hall J5LC28C

Outdoor Sound pressure levels @ 1m

	1/1 Octave Sound Pressure Level (dB, ref 20µPa)							Overall A-weighted Sound Pressure Level (dBA)
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Model J5LC20C	49	48	46	45	40	35	27	49
							Total	49

A2.2 Air Con Condenser – Midea MDV-V80W/DN1 & V105W/DN1

9. Sound Levels

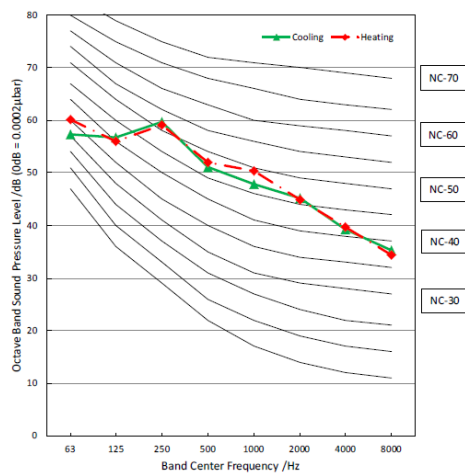


Model	Noise level dB(A)	Height (m)
MDV-V80W/DN1	54	1.0
MDV-V105W/DN1	54	1.0
MDV-V120W/DN1	57	1.2
MDV-V140W/DN1	57	1.2
MDV-V160W/DN1(B)	57	1.2

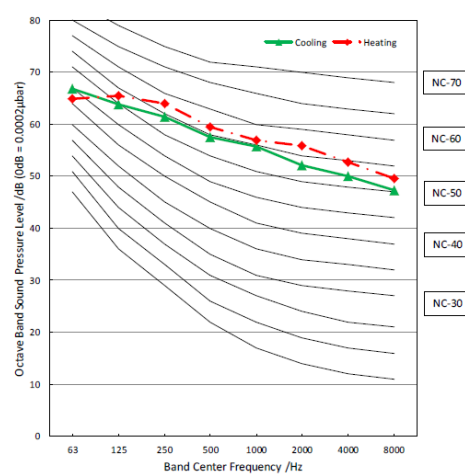


A2.3 Air Con Condenser – Midea MOD30U-42HFN8 & MOE30U-55HFN8

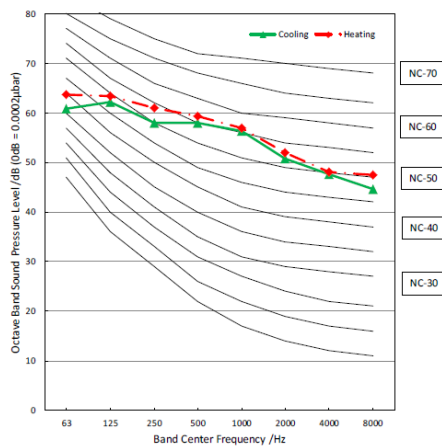
MOD30U-30HFN8-QRD0



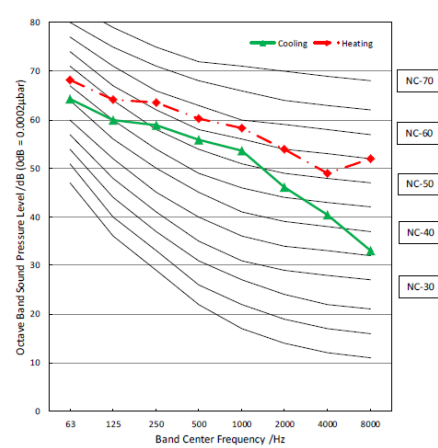
MOD30U-42HFN8-QRD0



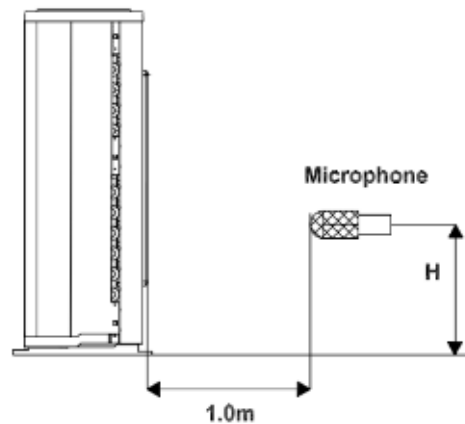
MOE30U-48HFN8-RRD0



MOE30U-55HFN8-RRD0



4. Noise Criterion Curves

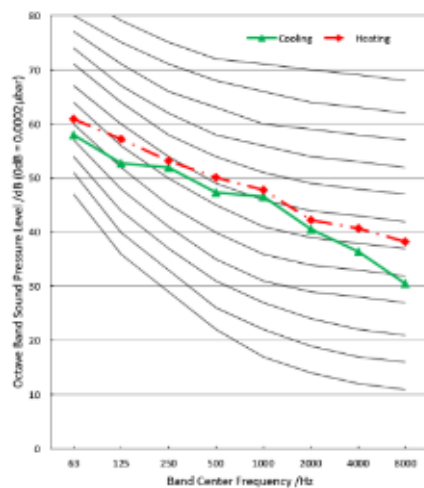


Note: $H = 0.5 \times \text{height of outdoor unit}$

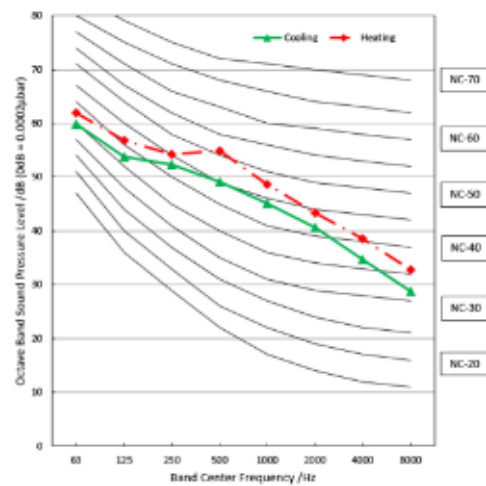
Notes:

- Sound measured at 1.0m away from the center of the unit.
- Data is valid at free field condition
- Data is valid at nominal operation condition
- Reference acoustic pressure $\text{OdB} = 20\mu\text{Pa}$
- Sound level will vary depending on arrangement of factors such as the construction (acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.

MOX230-12HFN8-QRD0W(GA)



MOX330U-18HFN8-QRD0W(GA)



◀ Outdoor Unit 20 ▶

