



Noise Impact Assessment of a Restaurant and Take Away Development

Client: Pegasus Group

Address: 75 Deansgate
Manchester
M3 2BW

Date: 06/08/2020



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Executive Summary

An environmental noise survey and noise impact assessment have been undertaken to assess the potential increase in noise levels from the proposed restaurant and takeaway at 75 Deansgate, Manchester, M3 2BW. The measured background sound levels have allowed an entertainment noise assessment to be carried out.

The entertainment noise assessment shows that the predicted noise levels at the NSR, due to background music and patron noise breakout, are significantly below the background noise level in all octave frequency bands. This is compliant with the requirements of condition 8 of the Decision Notice document and is classed as 'NOEL' (No Observed Effect Level) when assessed with the NPSE and NPPF.

An overview of the results and recommendations can be seen in the table below.

Results and Recommendations Overview

- The noise levels at the NSR due to background music and patron noise are predicted to be a minimum of 15 below the background noise level in all octave frequency bands. It is stated in Condition 8 of the Decision Notice document that the noise emissions must be a minimum of 10 dB below the background noise level, and as such, the development is deemed compliant.
- Where possible all windows and doors should remain closed during operation.
- The assessment has been completed considering the effects of background music and patron noise only. If the restaurant/takeaway has live performances or particularly loud music, then the development may have to be reassessed.

The findings of this report will require written approval from the Local Authority prior to work commencing.



1. Introduction

1.1 Overview

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for the entertainment noise associated with a proposed Restaurant and Takeaway ('the Proposed Development') at 75 Deansgate, Manchester, M3 2BW ('the Site').

The Applicant has submitted a conditionally approved planning application, ref. 124440/FO/2019 ('the Application') to Manchester City Council.

Accordingly, the following technical noise assessment has been produced to accompany the Application to the Local Authority.

This report details the existing background sound climate at the nearest receptors, as well as the sound emissions associated with the Proposed Development.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.2 Scope & Objectives

The scope of the noise assessment can be summarized as follows:

- Baseline sound monitoring survey to evaluate the prevailing sound levels at the nearest sensitive receptor ('NSR') to Site;
- Detailed sound modelling, acoustic calculation and analysis in accordance with ISO9613 – 1 prediction methodology to predict sound levels at the NSR;
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the proposed sources; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England and Wales, Entertainment Noise Legislation, and other relevant standards.

1.3 Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy, and guidance.

- National Planning Policy Framework (2019)
- Noise Policy Statement for England
- IEMA Guidelines on Noise Impact Assessments
- ISO 9613-2 Attenuation of sound during propagation outdoors
- BS EN 12354-4 Building Acoustics
- Entertainment Noise Legislation

2. Site Description & Background Information

2.1 Site & Surroundings

The site is located at 75 Deansgate, Manchester, M3 2BW. The surrounding area is a mix of residential and commercial properties and is typical of a busy central urban location. The closest commercial units are located on Deansgate Road, with operating times varying from 7 am to 11 pm. The upper floors of the proposed development are occupied as offices, however, there are assumed to be residential dwellings on the third floor of the property directly adjacent, facing Barton Square. Due to their proximity to the site, these flats will be classified as the closest Noise Sensitive Receptor (NSR) in the subsequent assessment.

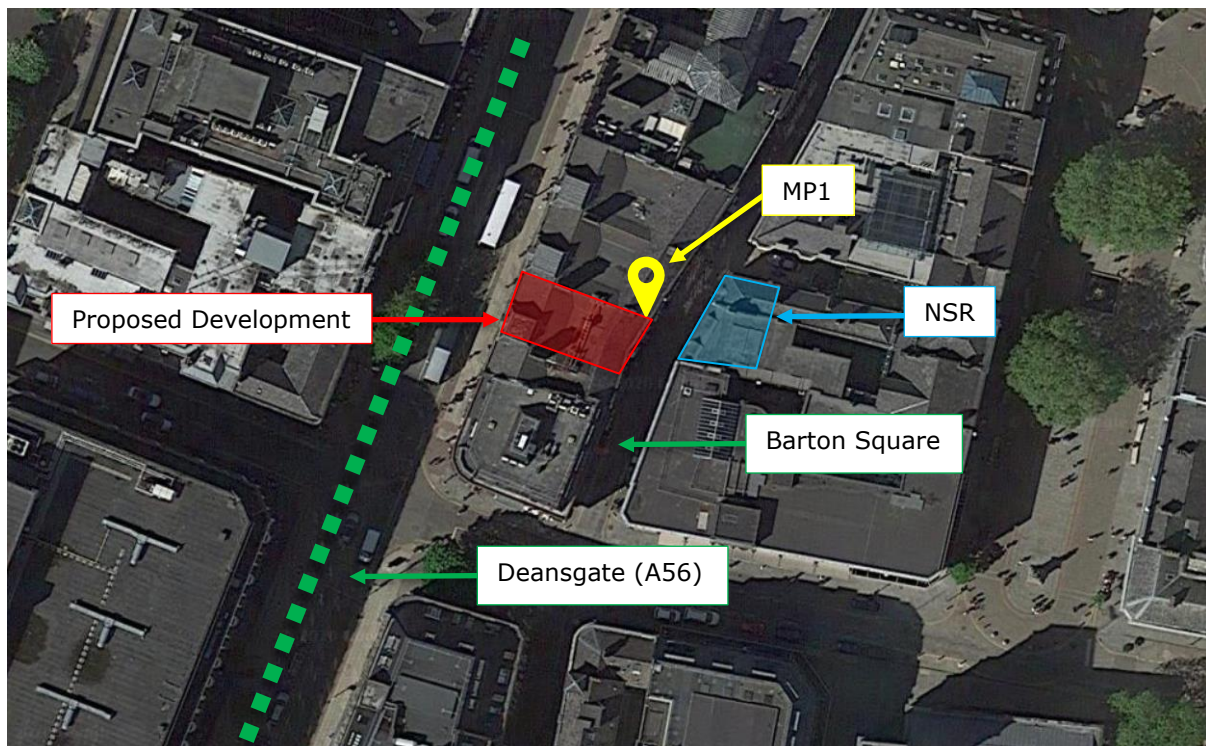


Figure 1.0 - Site and Surroundings

2.2 Background

The applicant has received conditional planning approval for the change of use of the existing site from retail space (class A1) to restaurant/takeaway (class A5). It is intended for the development to have 2no. ceiling mounted speakers in the front of house area of the restaurant providing background music. The proposed operational hours are 09:00 – 00:00, Monday to Sunday. It is stated in condition 8 of the Decision Notice document that,

"Prior to first occupation, the premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use commences or as otherwise agreed in writing by the City Council as local planning authority."

Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 10dB below the LA90 (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.

Upon completion of the development a verification report will be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria has been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To safeguard the amenities of the occupiers of nearby properties in accordance with saved policy DC26 of the Unitary Development Plan for the City of Manchester and policies SP1 and DM1 of the Core Strategy."



3. Environmental Noise Survey

To characterise the sound profile of the area of the proposed development, a long-term environmental sound survey has been used from a previous report undertaken by NOVA Acoustics. The long-term measurement was carried out at the neighbouring property, 73 Deansgate, from the 28th September 2018 to the 1st October 2018.

3.1 Measurement Methodology

The measurement was undertaken at 3rd-floor level, and the microphone was positioned protruding through a window at the rear of the building, facing Barton Square. The monitoring location was chosen to collect representative sound levels of the area during the week and weekend day time and night time periods. This position was also representative of the sound levels at the NSR. The measurement position can be found in Figure 1.0.

3.2 Measurement Equipment

Piece of Equipment	Serial No.	Calibration Deviation
CESVA SC420 Class 1 Sound Level Meter	T246458	≤0.5
CESVA CB006 Class 1 Calibrator	901927	

Table 1.0 – Measurement Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.5 dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

3.3 Weather Summary

As the environmental noise survey was carried out over a long un-manned period no localized records of weather conditions were taken. However, during the setup and collection of the monitoring equipment, the weather conditions were calm with wind speeds of less than 5m/s and no precipitation. All measurements have been compared with met office weather data of the area, specifically the closest weather station at Chadderton, 5 km away. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather Conditions, Chadderton - 28/09/18 to 01/10/18				
Time Period	Air Temp (°C)	Rainfall mm/h	Prevailing Wind Direction	Wind Speed (m/s)
28/09/18 – 00:00 – 23:59	5.9 – 14.1	0.0	ESE	0.0 – 1.8
29/09/18 – 00:00 – 23:59	4.1 – 13.4	0.0	SSW	0.0 – 5.2
30/09/18 – 00:00 – 23:59	6.7 – 12.1	0.0 – 0.5	W	0.0 – 5.7
01/10/18 – 00:00 – 23:59	4.1 – 10.7	0.0 – 0.5	SW	0.0 – 7.8

Table 2.0 – Meteorological Data

3.4 Results

3.4.1 Summary Results

The following table shows a summary of the sound survey results; L_{Aeq} , L_{Amax} , L_{A90} and the L_{A10} for the measurement period.

Measurement Position MP1				
Measurement Time Period ('t')	$L_{Aeq,t}$	$L_{Amax,t}$	$L_{A90,t}$	$L_{A10,t}$
Day 1 – 28/09/18 – 13:25 – 23:00	59.0	88.0	54.0	62.0
Night 1 – 28/09/18 – 23:00 – 07:00	62.0	102.0	52.0	64.0
Day 2 – 29/09/18 – 07:00 – 23:00	59.0	98.0	55.0	60.0
Night 2 – 29/09/18 – 23:00 – 07:00	57.0	86.0	52.0	60.0
Day 3 – 30/09/18 – 07:00 – 23:00	56.0	88.0	53.0	57.0
Night 3 – 30/09/18 – 23:00 – 07:00	63.0	105.0	51.0	60.0
Day 4 – 01/10/18 – 07:00 – 09:45	62.0	92.0	56.0	65.0

Table 3.0 – Sound Survey Summary Results

3.4.2 Background Sound Level Summary Results

The following tables show a summary of the background sound level results during the most sensitive operational period of the restaurant (21:00 – 00:00).

Measurement Position MP1				
Operational Period ('t')	L _{A90,t}	Statistically most Repeated L _{A90,t}	Min. L _{A90,t}	Max. L _{A90,t}
28/09/18 – 21:00 – 00:00	53.0	53.0	52.0	54.0
29/09/18 – 21:00 – 00:00	55.0	55.0	54.0	55.0
30/09/18 – 21:00 – 00:00	51.0	51.0	50.0	51.0

Table 4.0 – Background Sound Level – Sensitive Operation Hours

Measurement Position – MP1							
Operational Period ('t')	Z-weighted Octave Band Sound Pressure Level, Hz (dB)						
	63	125	250	500	1k	2k	4k
28/09/18 – 21:00 – 00:00	59.0	54.0	52.0	51.0	49.0	44.0	35.0
29/09/18 – 21:00 – 00:00	60.0	56.0	54.0	53.0	50.0	45.0	38.0
30/09/18 – 21:00 – 00:00	57.0	53.0	52.0	49.0	45.0	40.0	33.0

Table 5.0 – Background Sound – Octave Band – Sensitive Operational Hours

3.5 Subjective impression & Context

Whilst on site it was noted that the surrounding acoustic environment was of a high level. The traffic noise from Deansgate Road and St. Ann Street was found to be the dominant source of the noise. After analysing the data collected it was found that noise levels during night time remain similar to those during the day, this is primarily due to the lively city centre location and existing plant in the area.



4. Noise Assessment

In the following section, the music and patron noise breaking out of the proposed development is assessed. It is assumed that all music will be used for background purposes only.

4.1.1 Background Music Level

The predicted music and patron noise level within the restaurant has been taken from a report compiled by RBA acoustics for a similar restaurant development (ref. 6851/AAR). The measurement was taken in the centre of a dining area located equidistant between two ceiling-mounted Bose speakers playing background music. The measurement was taken during a peak operating period with a full dining area. A 30-minute measurement was taken in the restaurant, and the loudest 5 minutes can be seen in the table below. To present a robust assessment and allow for uncertainty, a +3 dB correction has been applied to the octave band and overall A-weighted measurements.

Description	Z-weighted Octave Band Sound Pressure Level, Hz (dB)							Overall (A)
	63	125	250	500	1k	2k	4k	
Measured Internal Noise Levels	65.0	72.0	75.0	81.0	80.0	75.0	71.0	83.0

Table 6.0 – Predicted Internal Noise Level

4.1.2 Background Sound Level

The background sound level is the underlying level of sound over a period, T, and is indicative of the relative quietness at a given location. It does not reflect the occurrence of transient and/or higher sound level events and is generally governed by continuous or semi-continuous sounds.

To ensure the background sound level values used within the assessment are reliable and suitably represent both the particular circumstance and periods of interest, efforts have been made to quantify a 'typical' background sound level for a given period. The table below outlines a summary of the lowest average L_{90} values from 21:00 – 00:00.

Measurement Position MP1							
Operational Hours ('t')	Z-weighted Octave Band Sound Pressure Level, Hz (dB)						
	63	125	250	500	1k	2k	4k
30/09/18 - 21:00 - 00:00	57.0	53.0	52.0	49.0	45.0	40.0	33.0

Table 7.0 – Summary of Background Sound Levels – Octave Band

The following table shows a summary of the statistically most repeated global L_{A90} values for the same period.

Measurement Position MP1				
Operational Hours ('t')	L _{A90,t}	Statistically most Repeated L _{A90,t}	Min. L _{A90,t}	Max. L _{A90,t}
30/09/18 - 21:00 - 00:00	51.0	51.0	50.0	51.0

Table 8.0 – Summary of Background Sound Levels – Overall L_{A90}

4.1.3 Background Music Breakout Assessment

The calculated background music level at the NSR is compared with the 'typical' background sound level during the most sensitive operational period of the restaurant. The breakout has been calculated considering the following assumptions:

- The glazing is the weakest part of the façade in terms of sound reduction
- The glazing will be a minimum of 4mm single pane
- Doors and windows will remain closed during operational hours
- The closest NSR is approximately 7m from the rear of the building
- There is a 6 dB difference between internal reverberant conditions and external non-reverberant conditions

The predicted noise level due to breakout noise from the restaurant is shown in the table below.

NSR 1								
Music Breakout Assessment	Z-weighted Octave Band Sound Pressure Level, Hz (dB)							Overall (A)
	63	125	250	500	1k	2k	4k	
Predicted Internal Noise Level	65.0	72.0	75.0	81.0	80.0	75.0	71.0	83.0
Sound Reduction of 4mm Single Glazing (R _w)	15.0	17.0	21.0	26.0	30.0	33.0	30.0	30.0
External Façade Noise Level (Internal – R _w – 6)	44.0	49.0	48.0	49.0	44.0	36.0	35.0	47.0
Distance Correction to NSR (7m)	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Predicted Noise Level at NSR	27.0	32.0	31.0	32.0	27.0	19.0	18.0	30.0
Background Noise Level (L ₉₀)	57.0	53.0	52.0	49.0	45.0	40.0	33.0	51.0
Exceedance of Background	-30.0	-21.0	-21.0	-17.0	-18.0	-21.0	-15.0	-21.0

Table 9.0 – Amplified Music Breakout Assessment

Discussion

As can be seen in the table above, the noise levels at the NSR due to the music and patron noise breakout from the restaurant are predicted to be a minimum of 15 dB below the background noise level in all octave frequency bands. This is compliant with Condition 8 of the Decision Notice document.



Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa (20x10 ⁻⁶ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
L _{eq,T}	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L _{max,T}	A noise level index defined as the maximum noise level during the period T. L _{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L _{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L _{90,T}	A noise level index. The noise level exceeded for 90% of the time over the period T. L ₉₀ can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L _{10,T}	A noise level index. The noise level exceeded for 10% of the time over the period T. L ₁₀ can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

A

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10} , the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the

time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq} .

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1\text{hour}}$ dB and $L_{A90,15\text{mins}}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms.



Appendix B – Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

National Planning Policy Framework (2019)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2019. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 11, Conserving and enhancing the natural environment, paragraph 109, it states:

The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability;

Paragraph 180 states and Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impact on health and quality of life arising from noise from new development, including using conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.*

Noise Policy Statement for England

Paragraph 180 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life;*
- *Where possible, contribute to the improvement of health and quality of life.*

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that “significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development”.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.”

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. This can be related to the third aim above, which seeks: “where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.”

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

IEMA Guidelines on Noise Impact Assessments

The IEMA Guidelines for Environmental Noise Assessment address the key principles of noise impact assessment and are applicable to all development proposals where noise effects may occur. The guidelines set out key principles for noise impact assessment relevant to all types of project regardless of size. The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed. The guidance recognizes that the effect associated with a noise impact will be dependent on a number of factors including but not limited to the sensitivity of the receptor, frequency and duration of the noise source and time of day. The Guidelines accept that a simple change in noise levels using a single noise indicator may fail to adequately reveal the actual noise impact of the proposal. The character of the noise must be considered and the Guidelines suggest comparing several noise indicators such as the LAeq, L_Amax and LA90 as a more rigorous approach.

Absolute levels such as those set out in WHO Guidelines are also considered and the Guidelines suggest that a change in noise levels in an area where the existing levels are above WHO Guidelines should be considered as having more of an adverse effect than a change in noise levels in an area where existing levels are well below.

The Guidelines stop short of providing specific assessment criteria which developments should achieve but instead suggests that the methodology adopted should be selected on a site by site basis regarding relevant national and local standards.

The Guidelines contain effect descriptors for changes in noise levels and for noise effect levels. These are summarized below:

Effect Descriptors	
Very substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

Table 10.0 – IEMA Guidelines Effect Descriptors

Noise Effect Level		
Time	Lowest Observed Adverse Effect Level	Significant Observed Adverse Effect Level
07:00 - 23:00	50 dB $L_{Aeq,16\text{ hour}}$	60 dB $L_{Aeq,16\text{ hour}}$
23:00 - 07:00	40 dB $L_{Aeq,8\text{ hour}}$	55 dB $L_{Aeq,8\text{ hour}}$
	60 dB L_{AFMax} (at the facade)	80 dB L_{AFMax} (at the facade)

Table 11.0 – IEMA Guidelines Noise Effect Level

The Guidelines are not prescriptive as to how a noise impact assessment should be carried out, and allow assessors to consider factors such as frequency spectra, days and times of operation, frequency of operation and any other factor which allows the noise to be assessed in context.

ISO 9613-2 Attenuation of sound during propagation outdoors

The ISO 1996 series of standards specifies methods for the description of noise outdoors in community environments. Part 2 of ISO 9613 is intended to enable noise levels in the community to be predicted from sources of known sound emission. The method is general in the sense that it may be applied to a wide variety of noise sources, and cover most of the major mechanisms of attenuation.

This standard provides guidance on the outdoor propagation of sound. It is widely used to establish the different attenuations that occur during the transmission of the sound from the sources to the receivers. The total attenuation is the sum of the following: geometrical divergence, atmospheric absorption, ground effect, barriers, and miscellaneous other effects.

Entertainment Noise Legislation

Noise from entertainment venues, e.g. noise from recorded music, live bands or karaoke, can be particularly annoying for residents and business if it is not adequately contained within the venue. When considering the potential impact of a proposal for a entertainment premises or residential near to entertainment premises a consideration for the overall noise level (L_{Aeq}) and the 63Hz and 125Hz octave band noise levels. Music noise in the 63Hz and 125Hz octave bands, which is described as 'bass noise' is particularly difficult to contain and the impulsive and non-steady character of low frequency music noise is particularly disturbing for residents exposed to it.

A lively city centre bar can operate around 95 dB L_{Aeq} and nightclubs can be even higher at 105 dB L_{Aeq} . The range of level of 63Hz and 125Hz octave bands is wider than the a-weighted levels and can be up to 115 dB L_{eq} and 110 dB L_{eq} respectively (Davies et al 2005).

There is a lack of consensus on an assessment method for noise levels within habitable rooms regarding entertainment noise. The design aim should be to design to 'inaudible*'. The building structure is therefore key, and will usually involve a high performing solution in either the music venue or residential premises. Existing noise standards/criteria are not appropriate for evaluating low frequency noise; in almost all other situations the established noise descriptors are based on the A-weighted sound level (dBA) which effectively filters out low frequency sound (Moorhouse et al 2011).

**Noise is considered to be inaudible when it is at a sufficiently low level such that it is not recognizable as emanating from the source in question and it does not alter the perception of the ambient noise environment that would prevail in the absence of the source in question. The DEFRA report 'Noise from Pubs and Clubs – Phase 1', which, on page 17 reproduces the Institute of Acoustics (IOA) working group guidance to achieve music noise levels which are 'virtually inaudible' inside a residential property.*

When dealing with noise control, especially at the lower frequencies it is usual to look at the octave band data as a Z-weighting (linear) and not the A-weighting, due in main to the amount you have to 'take off', resulting in meaningless data (-26.2dB at 63Hz) and also with respect to the sound insulation performance of various constructions materials. Rather than just A-weighted levels being assessed e.g. internal noise levels as per BS8233:2014; a low frequency band analysis should be carried out (McCullough et al 2004).

In the 'Procedure for the assessment of low frequency noise complaints – Revision 1', Moorhouse et al (2011) use limits for low frequency noise levels in 1/3 octave bands between 10Hz and 160Hz. For the assessment of low frequency music noise, it is more practical to consider the 63Hz and 125 Hz octave bands. The Noise Council's Code of Practice on 'Environmental Noise Control at Concerts' suggests limits on both these octave bands. The DEFRA report 'Noise from Pubs and Clubs – Phase 1' suggests limits on 1/3 octave bands. However, the problem with this suggestion, and one of the

reasons it is not widely used, is due to the difficulty in obtaining 1/3 octave band sound insulation performance data for various construction materials. With regards to assessing music noise at the 63 Hz and 125 Hz octave band levels a good correlation is shown between the NR 15 curve and Moorhouse curve at low frequencies. See Figure 2.0.

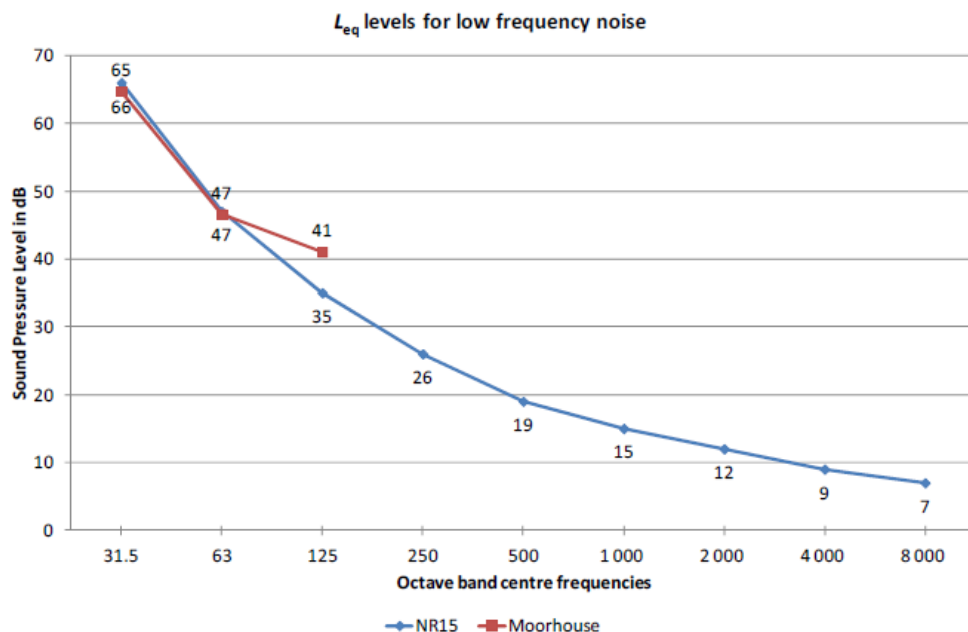


Figure 2.0 – Moorhouse Low Frequency Noise Rating Curve

However, The NR curve may be too stringent at mid and higher frequencies and may be lower than background noise levels in habitable spaces. Further, the NR curve is most commonly used to set limits for mechanical services noise in buildings i.e. steady, continuous noise sources. Music noise has distinctive characteristics and as such can be described as unsteady and non-continuous in comparison. Even though the Moorhouse curve does not specifically relate to entertainment noise (as per the caveat in the revised edition) these levels provide a good practical basis to assess low frequency music noise. They also provide a workable prediction for planning applications and a measurement method and assessment for in-situ low frequency issues in existing habitable spaces. Therefore, a criterion that would achieve a condition of 'inaudible' / 'virtually inaudible' which is applicable for new residential developments that are structurally connected to entertainment venues (or vice versa) would be: *'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'.* This criterion may also be applicable for new residential developments that are structurally separate from an existing entertainment venue.

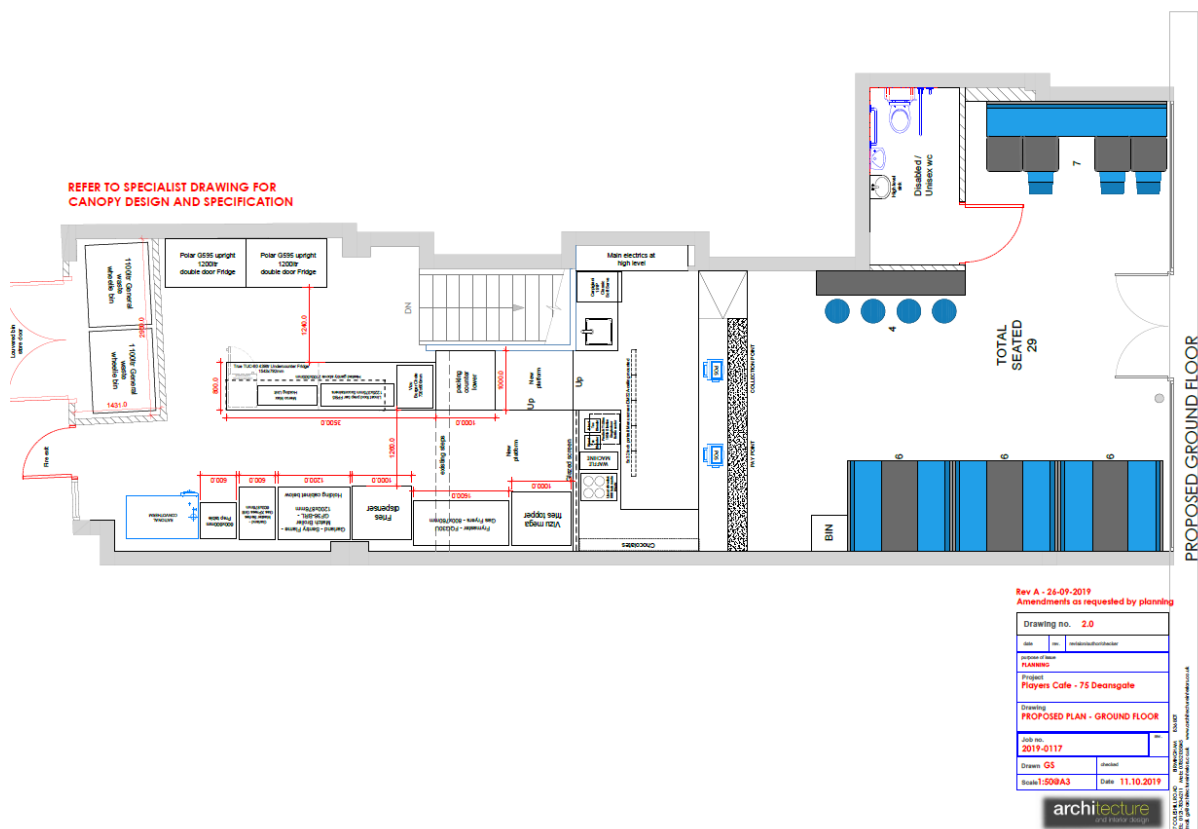
References:

- i) Institute of Acoustics (2002) – Good practice guide on the control of noise from pubs and clubs – Draft Annex 2.
- ii) McCullough et al (2004) A practical evaluation of objective noise criteria used for the assessment of disturbance due to entertainment music

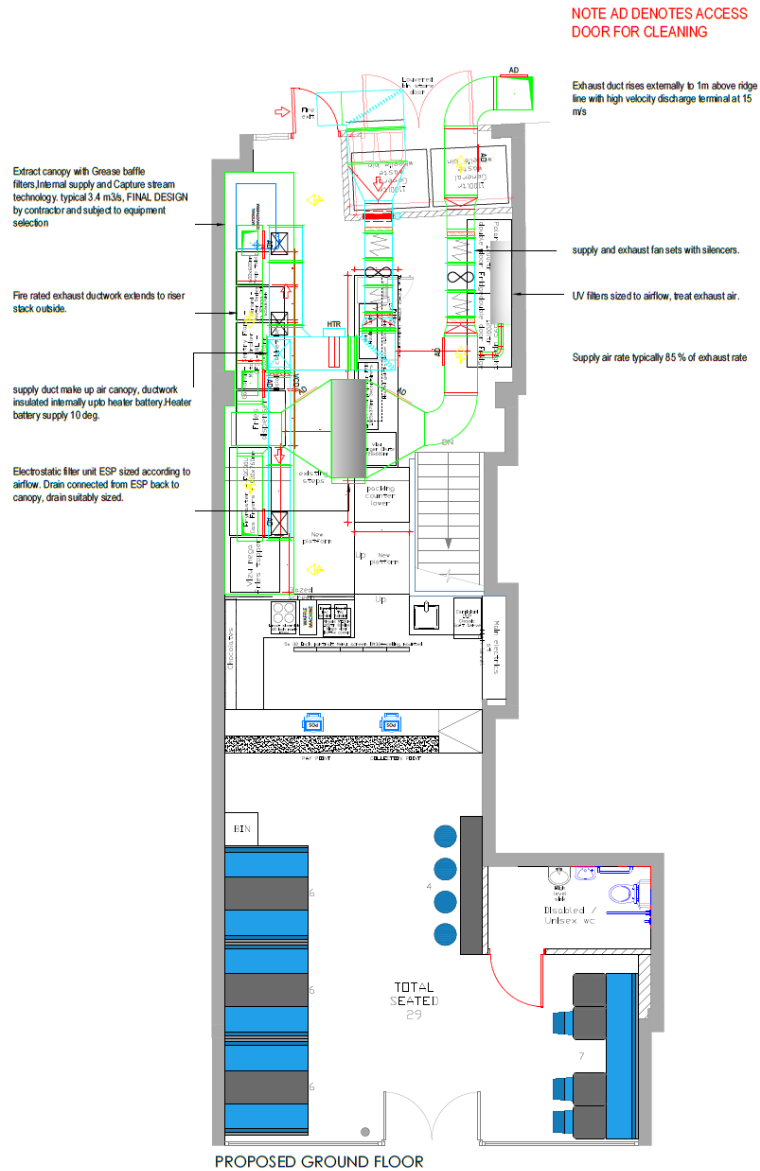
Moorhouse et al (2005) Proposed criteria for the assessment of low frequency noise disturbance, Defra (updated in 2008 and 2011).



Appendix C – Site Plans



NOVA



NOVA



PROPOSED REAR ELEVATION

**REFER TO SPECIALIST DRAWING FOR
CANOPY DESIGN AND SPECIFICATION**

Drawing no. 5.0		
date	rev.	revision/author/checked
purpose of issue FLANNING		
Project Project Cate - 75 Deansgate		
Drawing PROPOSED REAR ELEVATION PLAN		
Job no. 2019-0117		rev.
Drawn KA		checked
Scale 1:509A3		Date 11.10.2019

architecture
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Appendix D – Environmental Sound Survey

