ACOUSTIC CONSULTANTS LTD

Noise Impact Assessment

The Little Door & Co
200 Deansgate, Manchester, M3 3NN

Reference: 12007/OP

Client
PSE Associates

Document Control

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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

Table of Contents

1.	Introduction	4
2.	Site and Location	5
3.	Planning and Noise	6
4.	Assessment Criteria	11
5.	Noise Monitoring	14
6.	Plant Noise Assessment	17
7.	Summary and Conclusions	28
8.	Appendix 1 – Glossary of Acoustic Terminology	29

1. Introduction

PSE Associates appointed Acoustic Consultants Limited (ACL) to undertake a noise impact assessment in relation to a proposed bar 'The Little Door & Co' to be located at 200 Deansgate, Manchester, M3 3NN.

This report provides a noise impact assessment of the proposed external plant associated with the development.

The noise impact assessment is based on the results of an on-site survey and sound level predictions using manufacturers plant data.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG), British Standard 4142:2014+A1:2019 (BS4142), British Standard 8233:2014 (BS8233) and Manchester City Council Planning and Noise Technical Guidance.

2. Site and Location

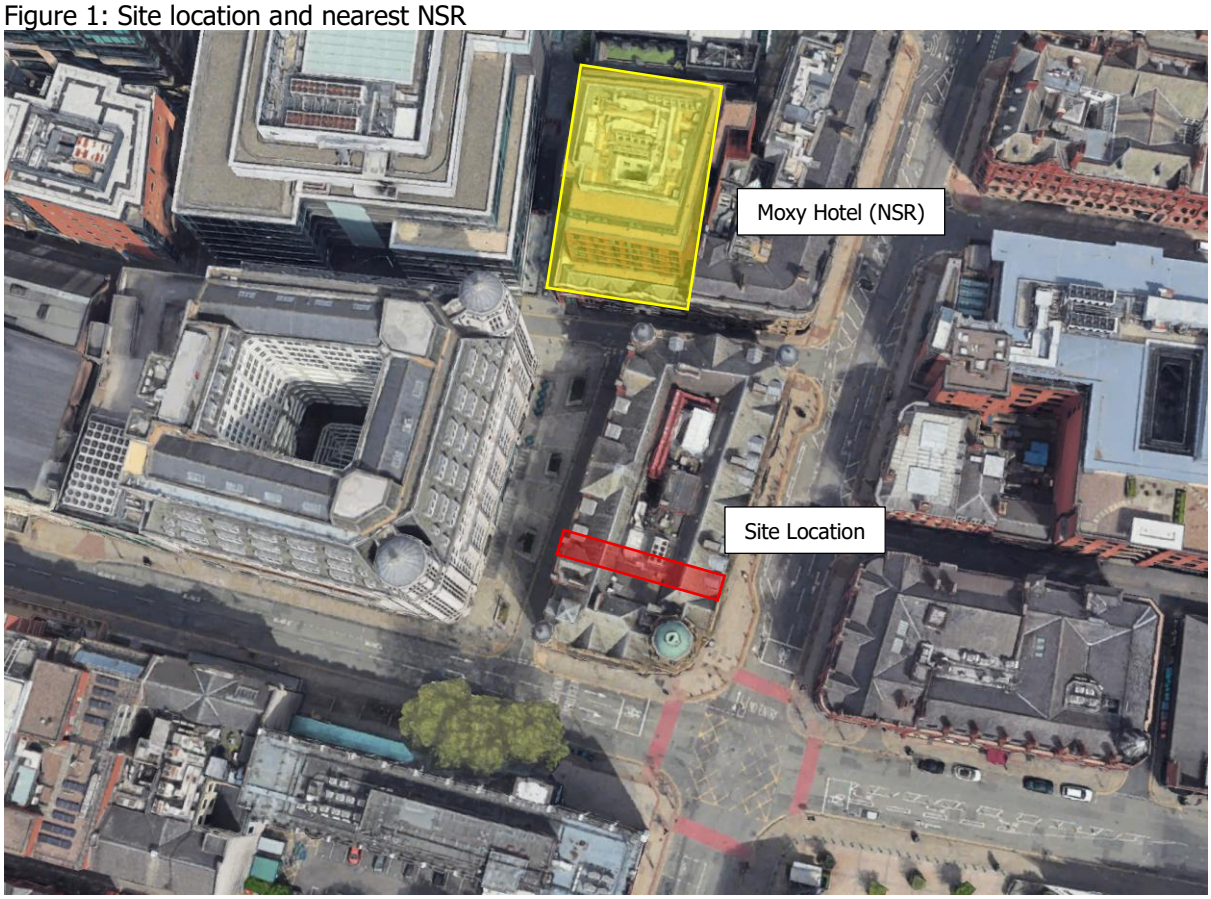
The proposed site is located at 200 Deansgate and situated between 'Flat Iron' and 'Pieminister', directly above is existing office accommodation.

The bar shall be situated on the Ground and Basement floors of 200 Deansgate.

External condenser units associated with the development are to be located on the roof, all atmosphere connections for the HVAC shall be ducted to the rear of the premises onto Little Quay Street via louvres.

The nearest noise sensitive dwelling receptors are believed to be located at the Moxy Hotel on Atkinson Street. There is office accommodation directly above the premises and across the road in Sunlight House.

Figure 1: Site location and nearest NSR



3. Planning and Noise

3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was published in March 2012 and revised in December 2024. Section 15 entitled 'Conserving and enhancing the natural environment' addresses noise as a requirement of planning. Paragraph 187 states:

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

e) 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and."

Paragraph 198 states:

"198. 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:

a) 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
b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation. "

The document does not prescribe any assessment methodology or criteria to assess the adverse effect of noise and refers you to the NPSE.

3.2. Noise Policy Statement for England

The NPPF refers to the Noise Policy Statement for England (NPSE). This was published in March 2010 and aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion and applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise.
The NPSE sets out the long term vision of Government noise policy. This long term vision is supported by three noise policy aims as follows:

"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; and*
- *where possible, contribute to the improvement of health and quality of life."*

The NPSE introduces the concept of "Significant adverse" and "Adverse" impacts of noise which relate to the noise policy aims. These are applied as follows:

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.

SOAEL – Significant Observed Adverse Effect Level

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

The Noise Policy Statement for England (NPSE) states that noise levels above the Lowest Observed Adverse Effect Level are acceptable in planning where reduced to a minimum.

With regard to where there is potential for noise impact it states the following in relation to the second noise policy aim:

"The second aim of the NPSE 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."

The NPSE does not provide any assessment criteria for the noted effect levels and each case must be considered on its merits.

The NPSE does, however, emphasise that in dealing with noise Local Planning Authorities are required to take a balanced approach in considering the benefits of development as against any adverse effects which arise. Paragraph 2.18 of the NPSE is particularly relevant in this respect and states:

"There is a need to integrate consideration of the economic and social benefits of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors."

The planning need is outside the scope of noise and acoustics and will need to be addressed by others.

3.3. Planning Practice Guidance, Noise

The Planning Practice Guidance (PPG) on noise referred to here is based on the current version (July 2019) as provided on the Planning Guidance Website. It states that, *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

It provides generic guidance on how to determine the noise impact and what factors could be a concern.

It includes the option types to mitigate any adverse effects of noise stating that there are four broad types of mitigation. These are engineering, layout, using planning conditions or obligations and noise insulation.

Paragraph 5 of the PPG provides a table identifying the effect level and examples of effect relating to the impact effect levels provided in the NPSE. The table is duplicated below:

Table 1: PPG Noise – Perception of Effect Levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The table does not provide any objective assessment which equates to the noted effect levels. However, the PPG identifies that where noise is audible, it is not necessarily intrusive. The effect and impact on people are based primarily on the level of noise.

3.4. Manchester City Council Planning and Noise

The Manchester City Council (MCC) guidance aims to provide help and advice in relation to noise in a planning context to encourage good acoustic design. It outlines what is expected in relation to current guidance and policy with the aspiration that new developments achieve the highest possible standards without compromising the health and wellbeing of people that live and work within the City of Manchester.

It states that any '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.'

4. Assessment Criteria

4.1. British Standard 4142:2014

The following section identifies guidance which is considered to provide noise criteria equivalent to or below the LOAEL described in the PPG and NPSE, i.e. *"Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life."*

For industrial and commercial noise, the most relevant guidance is provided within British Standard 4142:2014+A1:2019. The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes.

The initial estimate principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'. The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours). Clause 9 entitled 'Rating Level' states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location. In Clause 11 of the Standard, entitled 'Assessment of the Impacts', it states:

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *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."*

Based on the initial assessment outcomes of BS4142, and depending on context, it is our opinion that the NOEL, LOAEL and SOAEL levels stated in the Noise Policy Statement for England would generally fall within the following categories when considered in conjunction with the effect levels of the PPG Noise.

Table 2: BS4142 Difference in Relation to Effect Levels

BS4142 Assessment Difference	Corresponding Effect Level*	Action*
≤-10 dB	No Observed Effect	No specific measures required
-9.9 dB to 0 dB	No Observed Adverse Effect	No specific measures required
	Lowest Observed Adverse Effect Level	
0.1 dB to 5 dB	Observed Adverse Effect	Mitigate and reduce to a minimum
	Significant Observed Adverse Effect Level	
5.1 dB to 10 dB	Significant Observed Adverse Effect	Avoid
≥10.1 dB	Unacceptable Adverse Effect	Prevent

* BS4142 states that "where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration". Therefore, the assessment levels and effect levels above are not definitive and can be modified due to context.

It should be noted that the numerical outcome only represents the initial estimate of impact, as stated in the first paragraph of Clause 11, and that contextual matters should be considered before determining what the potential impact is. This paragraph states:

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9).

NOTE 1 More than one assessment might be appropriate.

The second part of Clause 11 sets out three contextual matters that should be taken into account once the initial numerical estimate has been determined. It is important to note that the three listed are not exhaustive and all pertinent factors should be considered. BS 4142:2014 states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

1) *Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*

2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

   NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

4.2. **Proposed Assessment Methodology**

Our proposed methodology is to assess the cumulative rating level of all noise associated with the external plant to BS 4142:2014 during a single worst-case hour at the nearest dwellings. Absolute/residual levels will be considered for the adjacent commercial premises not covered by BS 4142:2014.

5. Noise Monitoring

A noise monitoring exercise was undertaken at the site between 22:00hrs and 23:45hrs on Wednesday 22nd April 2026.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 3: Equipment Used and Calibration Dates

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL3	A3A-02236-F0	06/01/2026	UK-26-001
Pre-Amp, NTI, MA230	2369	06/01/2026	UK-26-001
Microphone, NTI, MC230A	A32951	06/01/2026	UK-26-001
Calibrator, Cirrus Research, CR:515	84377	16/08/2024	220541

The measuring systems were checked for calibration before and after the tests and had no significant drift.

5.2. Weather Conditions

The weather during the survey was dry, the temperature was approximately 6 degrees Celsius. Wind speed typically ranged from 3-5 m/s.

The weather conditions are not expected to have adversely affected the measured noise data.

5.3. Monitoring Procedure

An attended noise survey was undertaken between 22:00hrs and 23:45hrs on Wednesday 22nd April 2026 to determine the background sound levels in a location representative of the nearest NSRs.

The measurement was undertaken on Little Quay Street using a microphone mounted on a tripod at a height of 1.5m. The main noise source in the surrounding area originated from road traffic along Quay Street and Deansgate which are located approximately 50 and 40 metres away from the measurement position respectively.

The monitoring location is given in the figure below:

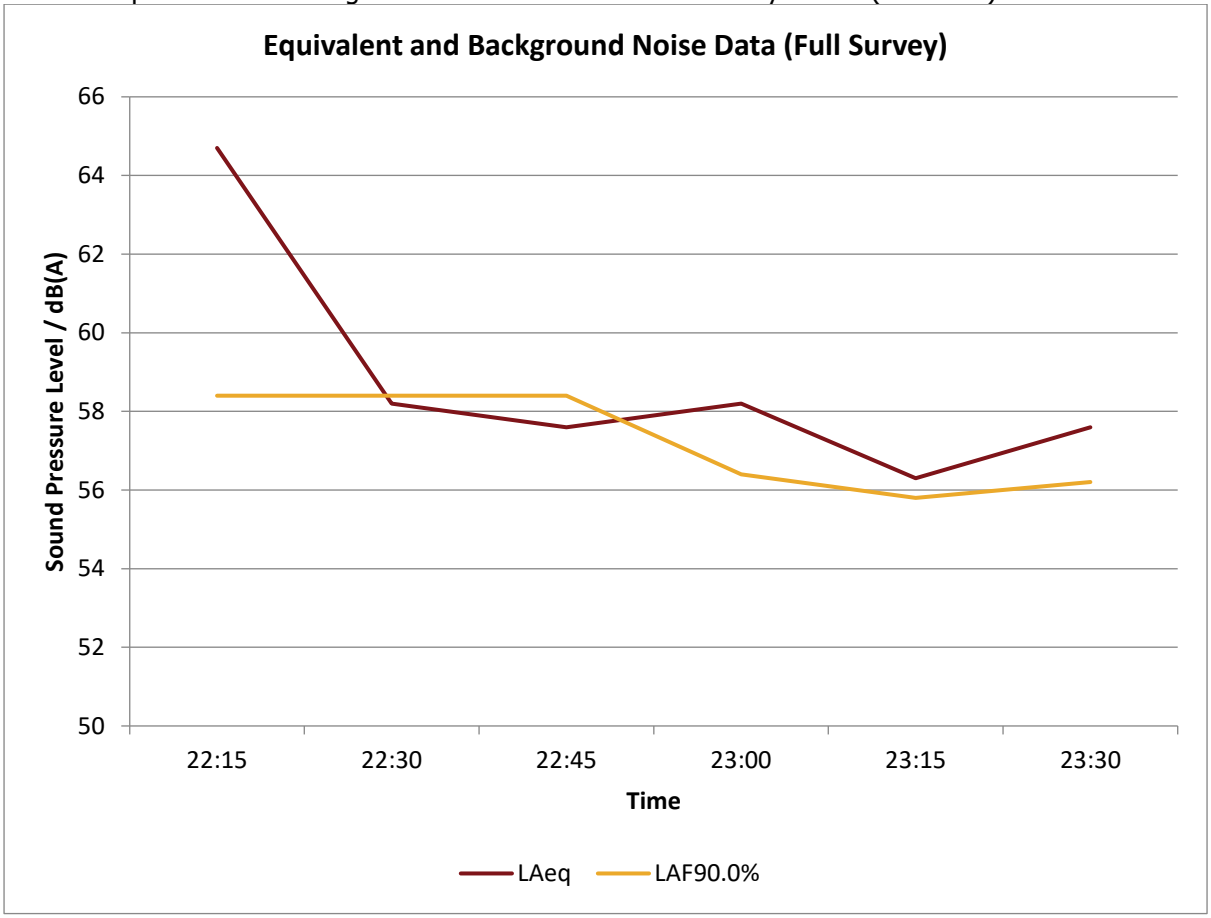
Figure 2: Monitoring Location



5.4. Measured Baseline Noise Levels

The chart below details the measured background and equivalent noise levels over the duration of the survey period.

Chart 1: Equivalent and Background Noise Levels Over the Survey Period (free-field)



The summary of measured data for the baseline noise survey consists of the equivalent noise level ($L_{Aeq,15min}$) and background noise level ($L_{A90,15min}$) in dB. These results are displayed in the table below.

Table 4: Measured Range and Modal Values of the Equivalent and Background (free-field level)

Period	dB $L_{A90,15min}$		dB $L_{Aeq,15min}$	
	Range	Mode	Range	Mode
Daytime (07:00-23:00)	58-58	58	58-65	58
Night-time (23:00-07:00)	56-56	56	56-58	57

We have determined a representative background sound level of 58 dB $L_{A90(1hour)}$ during the daytime and 56 dB $L_{A90(1hour)}$ during the night-time at the nearest NSR believed to be the Moxy Hotel.

6. Plant Noise Assessment

6.1. Location of Plant

There is 1no. external condenser unit proposed which shall be located on the flat roof of the building.

Figure 3: Location of rooftop condenser unit and ground floor HVAC plan

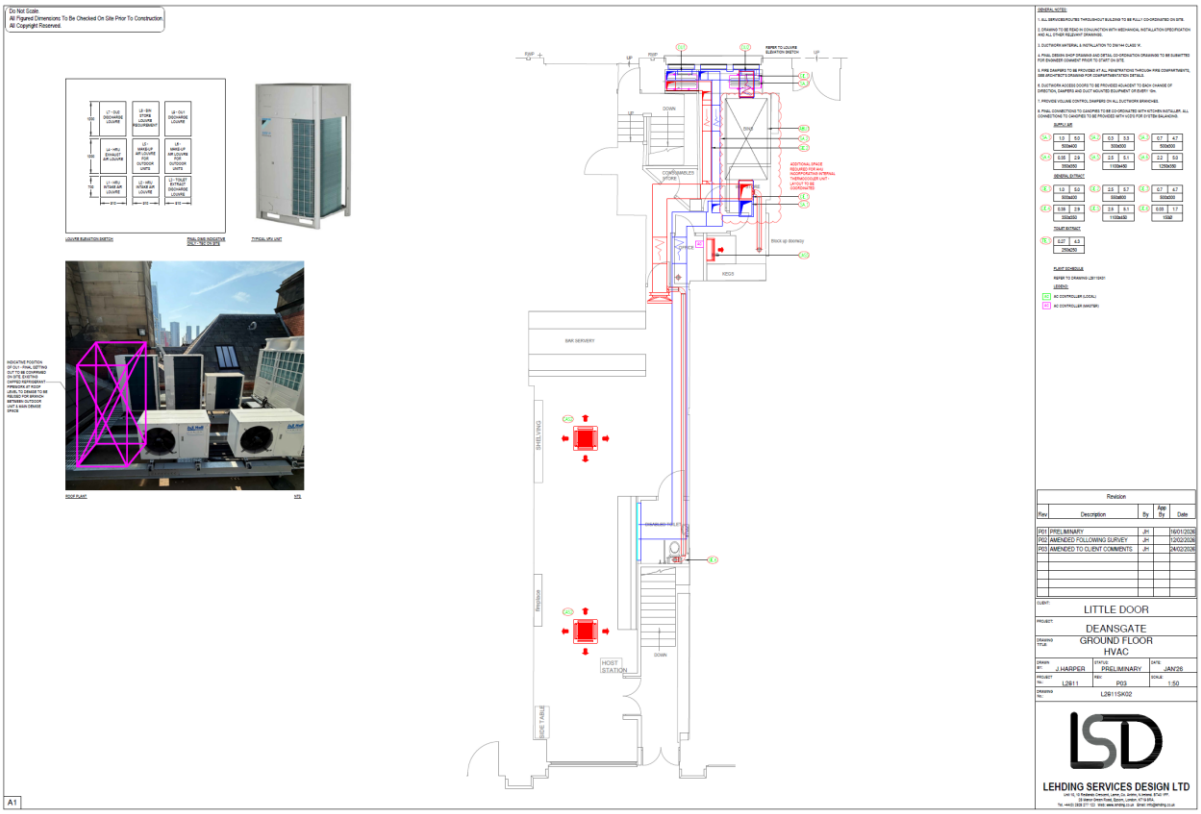
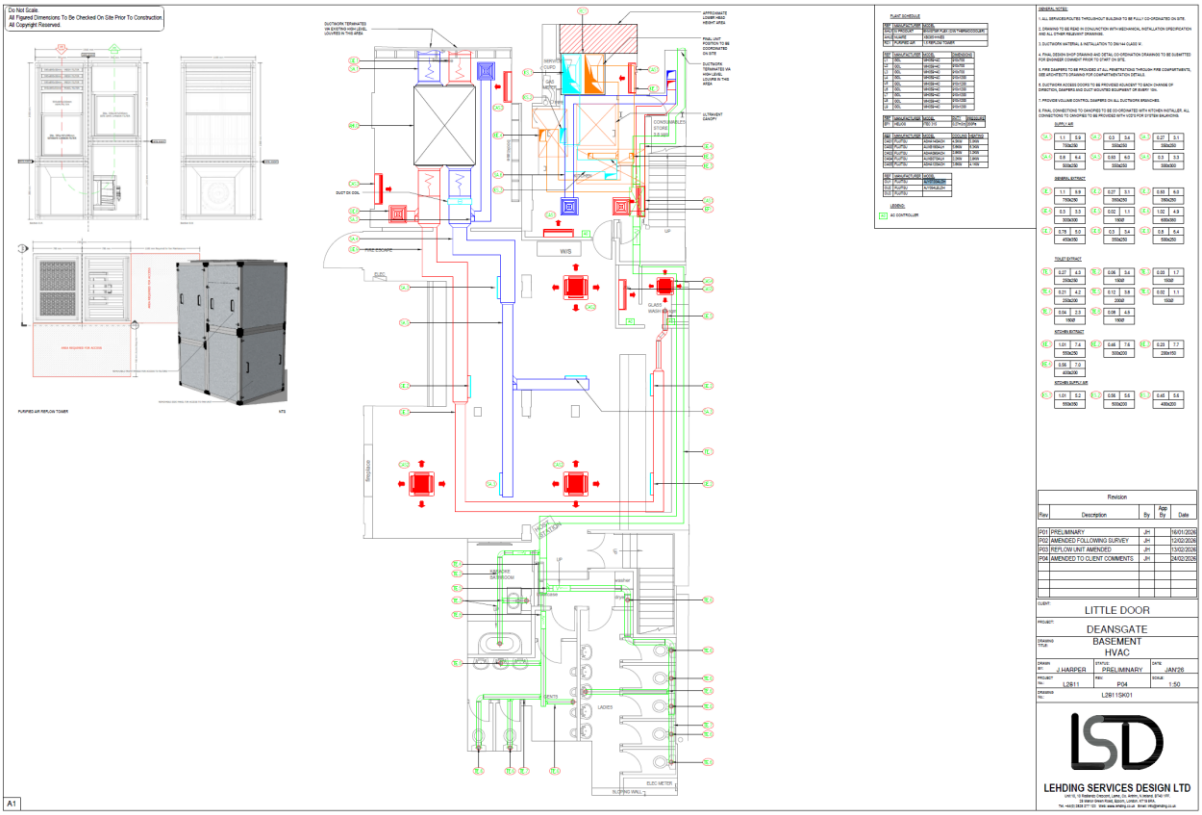


Figure 4: Basement HVAC plan



HVAC equipment shall be ducted to the rear elevation of the building onto Little Quay Street. See louvre elevation below.

Figure 5: Louvre elevation



6.2. **Proposed Plant**

The following table shows the make, model and octave band sound power level for the proposed HVAC equipment units. All noise levels relate to plant operating at full capacity.

Table 5: Proposed plant sound power levels

Unit	Location	Octave Band Sound Power Level								LwA dB
		63	125	250	500	1k	2k	4k	8k	
IV Produkt Envistar Flex Intake (AHU1)	Rear Elevation	56	64	54	54	45	39	28	16	54
IV Produkt Envistar Flex Discharge (AHU1)		63	75	68	73	70	65	59	54	74
Nuaire XBC85-H-NES Induct Intake (AHU2)	Rear Elevation	84	85	89	88	85	82	77	73	99
Nuaire XBC85-H-NES Induct Discharge (AHU2)		94	94	95	94	96	91	85	77	90
Helios ITEC 315 (EF1)	Rear Elevation	-	43	64	65	65	66	62	53	72
Fujitsu AJY072GALDH (OU1)	Rear Elevation and Roof	-	-	-	-	-	-	-	-	82
Fujitsu AJY054LELDH (OU2)	Rear Elevation	-	-	-	-	-	-	-	-	69

6.2.1. Silencers

In order to reduce noise levels at the nearest noise sensitive locations, AHU intake and discharge ducts should be fitted with silencers achieving the following minimum insertion loss.

Table 6: Proposed silencers for AHU atmosphere connections

Unit	Octave Band Insertion Loss (dB)							
	63	125	250	500	1k	2k	4k	8k
Typical 900mm Silencer	3	8	15	24	32	37	40	34

The resultant AHU sound power levels with the silencers, as modelled, are shown below.

Table 7: AHU resultant sound power levels with silencers

Unit	Octave Band Sound Power Level								LwA dB
	63	125	250	500	1k	2k	4k	8k	
IV Produkt Envistar Flex Intake with Silencer (AHU1)	53	56	39	30	13	2	-12	-8	41
IV Produkt Envistar Flex Discharge with Silencer (AHU1)	60	67	53	49	38	28	19	30	53
Nuaire XBC85-H-NES Induct Intake with Silencer (AHU2)	81	77	74	64	53	45	37	53	68
Nuaire XBC85-H-NES Induct Discharge with Silencer (AHU2)	91	86	80	70	64	54	45	49	79

6.2.2. Acoustic Louvres

As well as the inclusion of the splitter silencers to AHU atmosphere connections, the exhaust air louvres for the Fujitsu units (2no.) and the exhaust/intake louvres for AHU2 should be acoustically rated to achieve an overall sound reduction index of min. 10dB.

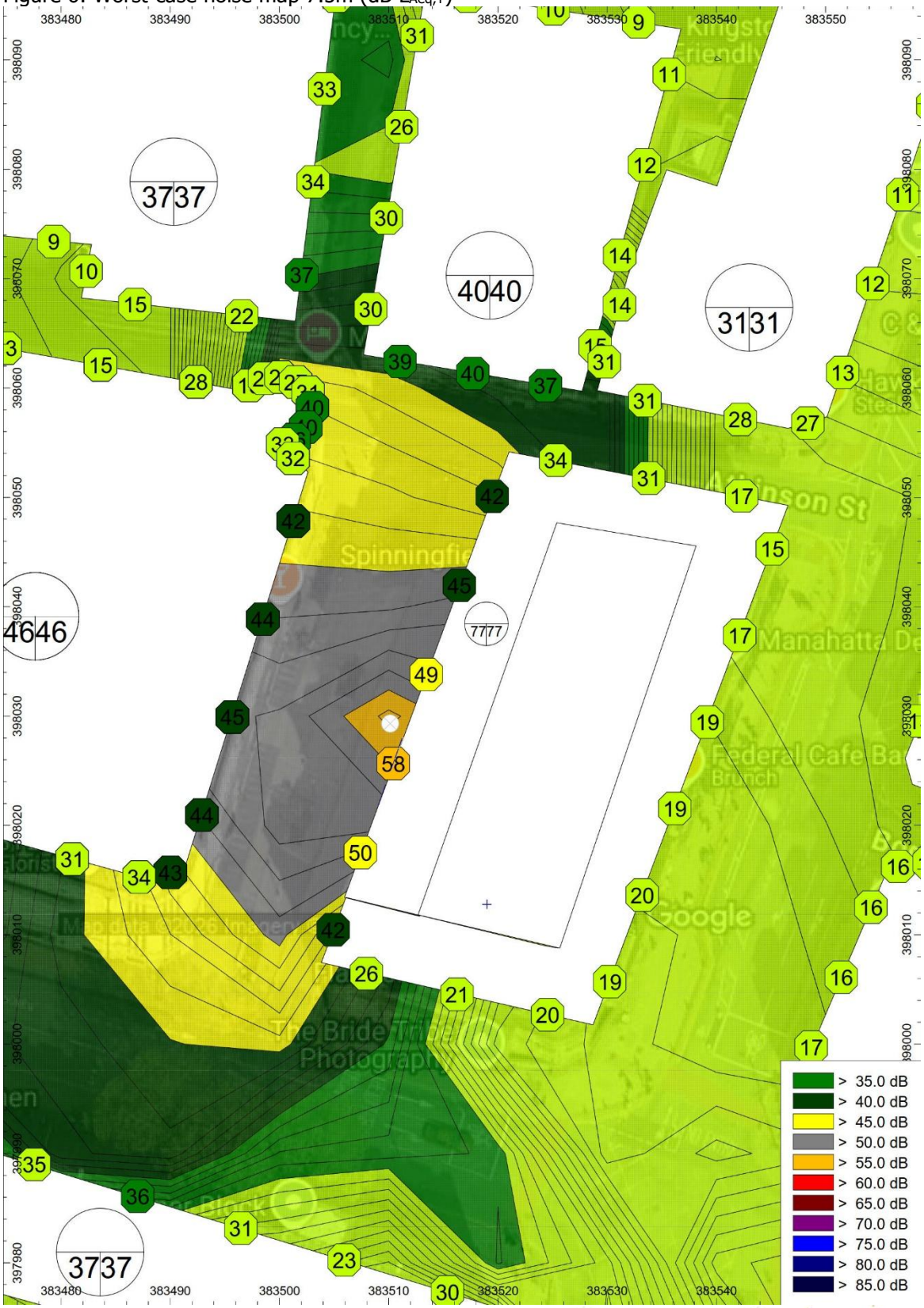
6.3. Noise Modelling

To determine noise levels across the site, noise modelling has been undertaken using computer modelling package Cadna:A by DataKustik and the plant noise data noted above. The following parameters have been used in the model:

- All buildings are considered reflective, and third order reflections have been calculated.
- The heights of the buildings are based on the provided drawings, Google Earth 3D imagery and on-site observations.
- The ground surrounding the site has been modelled as hard and reflective.
- The predicted noise map is at 7.5 metres above ground.
- The building evaluation is showing the maximum level at the façade of the NSRs.
- All plant has been considered to be operating continuously at full capacity to produce a worst-case scenario.
- Model includes all silencers and acoustic louvres as referenced above.

The following figure shows a noise map of the cumulative plant specific sound levels (dB $L_{Aeq,T}$):

Figure 6: Worst-case noise map 7.5m (dB $L_{Aeq,T}$)



6.4. Noise Assessment (Residential)

Plant has been modelled to operate continuously at 100% capacity to produce a worst-case scenario. We understand this is unlikely to be the case, if plant operates at a lesser capacity then the overall impact shall be less.

6.4.1. Initial Estimate of Impact

Background Sound Level

We have determined a representative background sound level of 58 dB $L_{A90(1hour)}$ during the daytime and 56 dB $L_{A90(1hour)}$ at night at the nearest NSR believed to be the Moxy Hotel located ~35m from the external louvre elevation.

Predicted Specific Sound Level

The predicted specific sound level of the plant is 40 dB $L_{Aeq,T}$ at the most noise-sensitive dwellings located in the Moxy Hotel. This is the level with no character corrections applied.

Character Corrections

Character corrections should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The corrections are as follows:

Tonality – Plant of this type is not normally tonal in our experience. The supplier should ensure this is the case for the installed plant.

Intermittency – We have not included a correction for intermittency. We have considered all plant to be operating continuously for our assessment.

Impulsivity – Plant of this type is not normally impulsive in nature.

Other Sound Characteristics – We do not believe any correction is necessary for other sound characteristics. The specific character of plant noise is not new to the area considering the previous plant in the same location.

Initial Estimate of Impact

A British Standard 4142:2014 assessment has been undertaken using the quietest measured background level at the nearest noise sensitive location, the initial estimate is as follows:

Table 8: British Standard 4142:2014 initial estimate for NSR

Parameter	Sound Level / dB
Background Sound Level, $L_{A90,1hour}$	56
Specific Sound Level, $L_{Aeq,1hour}$	40
Character Correction	0
Rating Sound Level, $L_{Ar,1hour}$	40
Excess of Rating Over Background Level	-16

This means that the plant rating noise level will have no noise impact when assessed to British Standard 4142:2014+A1:2019. The rating level also complies with the MCC target of 5dB below background at the nearest noise sensitive location.

6.4.2. Context

With regard to context, British Standard 4142:2014+A1:2019 states:

Absolute Levels

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following".

> *"1) Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse."*

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014. Section 7.7.2 Table 4 of the British Standard provides internal ambient noise levels for dwellings from noise sources 'without a specific character' and are based on existing guidelines issued by the World Health Organisation in 1999. We would advise the rating level is considered to allow for the character of the source. Internally to a dwelling during the day, the internal ambient noise levels should not exceed 35 dB $L_{Aeq(16hr)}$.

The internal level is approximately 15 dB quieter than the external free-field level (as stated by the BS8233:2014 and WHO 1999) allowing for the attenuation of a partially open window. Therefore, based on the predicted rating levels noted above, the internal absolute levels are as follows.

Table 9: Assessment of night-time impact against BS8233/WHO Internal Noise Criteria

Predicted External Rating Level dB $L_{Ar(T)}$	Open Window Correction dB(A)	Predicted Internal Level dB(A)	Within Criteria?
40	-15	25	Yes

As can be seen from the table above, the internal rating sound level is below the British Standard 8233:2014 equivalent noise level with the criteria for night-time rooms. We would therefore consider plant noise to be of an acceptable level when absolute levels are considered.

6.4.3. Residual Sound Levels

British Standard 4142:2014+A1:2019 also states:

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following".

1) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

   NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

The night-time typical free-field residual sound level is 57 dB $L_{Aeq(15min)}$. The specific sound level is 40 dB $L_{Aeq(T)}$, this is 17dB dB below the residual sound level. As such, we would consider that the plant noise would not be audible at the nearest NSR window during night-time operational hours.

6.5. Noise Assessment (Commercial)

Commercial receptors are not strictly covered by BS 4142:2014 as such we have assessed the noise impact at the offices directly above the louvre elevation using the absolute and residual levels only with plant operating continuously at 100% capacity.

6.5.1. Absolute Levels

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014. Section 7.3 Table 2 of the British Standard provides internal ambient noise levels for spaces when they are unoccupied and privacy is also important. We would advise the rating level is considered to allow for the character of the source. Internally to an open plan office during the day, the internal ambient noise levels should not exceed 50 dB $L_{Aeq(T)}$.

The internal level is approximately 15 dB quieter than the external free-field level (as stated by the BS 8233:2014 and WHO 1999) allowing for the attenuation of a partially open window. Therefore, based on the predicted rating levels noted above, the internal absolute levels are as follows.

Table 10: Assessment of daytime impact against BS8233 Internal Noise Criteria

Predicted External Rating Level dB $L_{Ar(T)}$	Open Window Correction dB(A)	Predicted Internal Level dB(A)	Within Criteria?
58	-15	43	Yes

As can be seen from the table above, the internal rating sound level is below the British Standard 8233:2014 equivalent noise level with the criteria for daytime offices. We would therefore consider plant noise to be of an acceptable level when absolute levels are considered.

6.5.2. Residual Sound Levels

The daytime typical free-field residual sound level is 58 dB $L_{Aeq(15min)}$. The specific sound level is 58 dB $L_{Aeq(T)}$, this is equal to the residual sound level. As such, we would consider that the plant noise may be audible at the nearest NSR window but not easily distinguishable during daytime operational hours with plant operating at full capacity.

6.6. Summary of Assessment

The cumulative plant rating level is -16dB below the quietest representative background sound level (night-time) at the nearest dwellings (Moxy Hotel) with plant operating continuously at 100% capacity. When this level is compared to the representative background sound level, and contextual matters are considered, the plant noise results in no significant adverse noise impact when assessed to BS4142:2014.

Commercial receptors are not strictly covered by BS4142:2014, as such noise has been assessed against the absolute and residual levels with plant operating continuously at 100% capacity. Plant noise will be of an acceptable level when absolute and residual levels are considered.

7. Summary and Conclusions

PSE Associates appointed Acoustic Consultants Limited (ACL) to undertake a noise impact assessment in relation to a proposed bar located at 200 Deansgate, Manchester, M3 3NN.

This report provides a noise impact assessment of the proposed plant at the nearest existing noise sensitive receivers (NSRs). These receptors are located at the Moxy Hotel and adjacent office accommodation.

The noise impact assessment has been undertaken in accordance with the guidance in the National Planning Policy Framework (NPPF), Noise Policy Statement for England (NPSE), Planning Practice Guidance (PPG), British Standard 4142:2014+A1:2019 (BS4142), British Standard 8233:2014 (BS8233) and local authority guidance.

The cumulative plant rating level at the Moxy Hotel is at least 16dBA below the representative background sound level. When this level is compared to the representative background sound level, and contextual matters are considered, the plant noise results in no significant noise impact when assessed to BS 4142:2014. The rating level complies with MCC target criteria.

Commercial receptors are not strictly covered by BS4142:2014, as such noise has been assessed against the absolute and residual levels with plant operating continuously at 100% capacity. Plant noise will be of an acceptable level when absolute and residual levels are considered.

8. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 µPa)

Background sound level, $L_{A90,T}$– A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{AeqT} = 10\lg_{10}\left\{(1/T)\int_{t_1}^{t_2}[p_A(t)^2/p_0^2]dt\right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 µPa); and
$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).



Head Office: 194 West Street, Bedminster, Bristol, BS3 3NB
T: 0117 986 2956

www.acoustic-ltd.co.uk

Registered Office: 194 West St, Bristol, BS3 3NB Registered No: 8544901