Former 1761 & Lilys Bar
Booth Street
Manchester

Noise Impact Assessment Report

27622/NIA1

21 February 2020

For:

The Hut Group
c/o Euan Kellie Property Solutions
Landmark House
Station Road
Cheadle Hulme
SK8 7BS

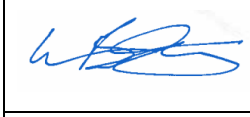
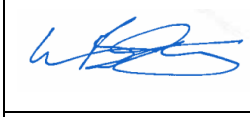
Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk

Hann Tucker Associates

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Document Control

Rev	Date	Comment	Prepared by	Checked By	Authorised by
0	21/02/2020	-			
			Will Bailey Assistant Consultant PhD, MSc, BA(Hons), AMIOA	Jake Howarth Senior Consultant BEng(Hons), MIOA	Andrew Jameson Director BSc(Hons), MIOA, MIET
1	21/02/2020	Updated conclusions based on client comments			
			Will Bailey Assistant Consultant PhD, MSc, BA(Hons), AMIOA	Jake Howarth Senior Consultant BEng(Hons), MIOA	Andrew Jameson Director BSc(Hons), MIOA, MIET

This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

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1.0 Introduction

A new gymnasium and spa is proposed at the former 1761 Restaurant and Lilys Bar on Booth Street, Manchester.

Hann Tucker Associates have therefore been commissioned to conduct an environmental noise survey to set noise egress limits in relation to future fix plant installations and to assess operational noise breakout from the proposed gym to surrounding noise sensitive receptors.

This report presents the noise impact assessment and our advice on further mitigation measures, where/if necessary.

2.0 Objectives

To undertake a review of relevant national and local planning policies, guidelines and industry standards to establish requirements in relation to:-

- Noise breakout from the operation of ground floor retail/leisure units.
- Noise emissions from new items of plant and equipment.

To establish, by means of manned and fully automated environmental noise monitoring, sufficient baseline environmental noise levels to inform the above noise impact assessments, with measurements undertaken in accordance with BS 7445.

To set suitable noise emission limits for the development for new items of landlord/tenant plant.

To assess gym operational noise egress based on the intended use/operational hours of the commercial unit and comment upon the acceptability.

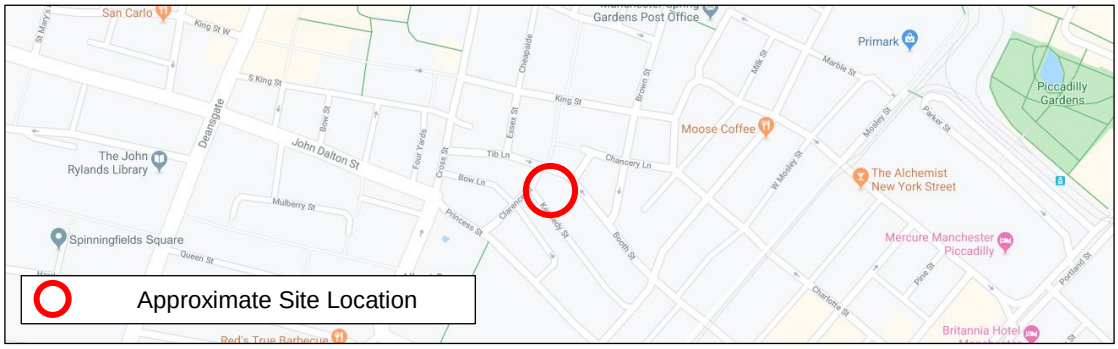
3.0 Acoustic Terminology

Please refer to Appendix A for an explanation of acoustic terminology used herein.

4.0 Site Description

4.1 Site Location

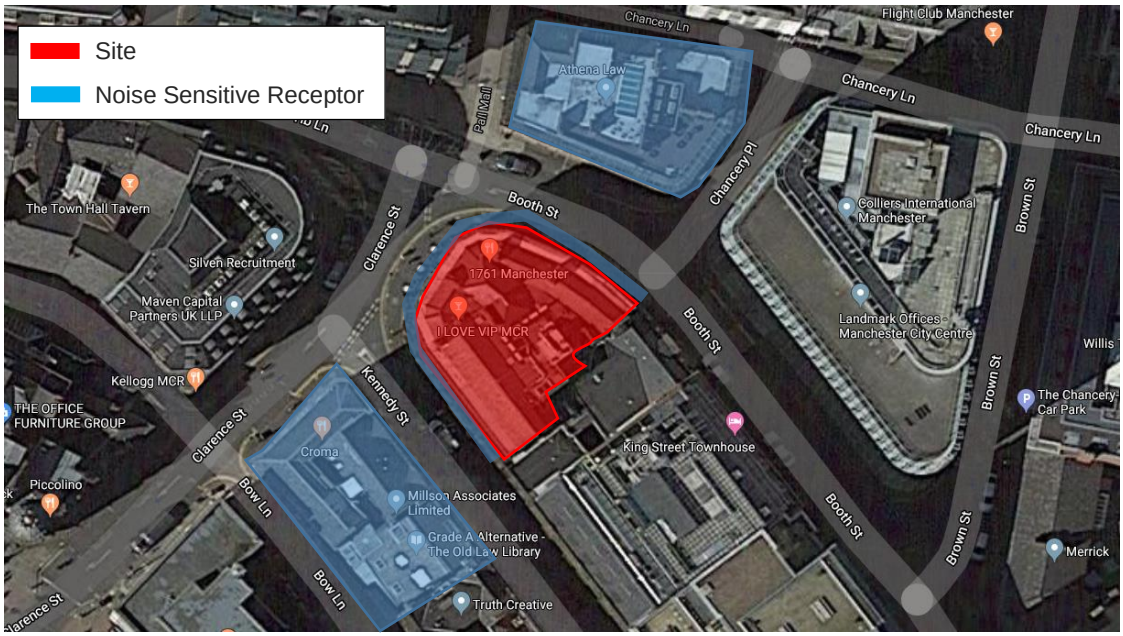
The site is located on Booth Street in Manchester city centre. The site falls under the jurisdiction of Manchester City Council (MCC). See site location plan below.



Site Location (© maps.google.co.uk)

4.2 Site Description

The site is within Manchester city centre and is a corner building which is bounded by Booth Street, Clarence Street and Kennedy Street. The area being converted consists of the ground floor and basement of the building and are situated beneath existing residential units, which are considered to be the nearest noise sensitive receptors. Additionally, residential and commercial properties are situated directly across both Booth Street and Kennedy Street. It is understood that existing plant is situated on the roof of the property. See the site plan below.



Site Plan (© maps.google.co.uk)

5.0 Project Proposals

The ground floor and basement of the property are to be converted into a gymnasium and spa which is likely to operate between the hours of 06:00 and 22:00.

It is understood that the facility is intended to be for the use of patrons with an exclusive membership and thus heavy use is not anticipated. However, it has been advised that the proposed uses for the ground floor gymnasium space will include general weight lifting, including free weights and general resistance training, aerobic training with machines and gym classes. It is also understood that music will be played in the facility, however, we have been advised that the levels are likely to be low due to low anticipated occupancy of the facility.

6.0 Acoustic Standards & Guidelines

6.1 National Planning Policy Framework

The following paragraphs are from the NPPF (revised February 2019):

180. 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.

182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Paragraph 180 also references the Noise Policy Statement for England. This document does not refer to specific noise levels but instead sets out three aims:

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

6.2 BS 4142:2014

BS 4142: 2014 describes methods for rating and assessing the effects of outdoor sound levels, of an industrial and/or a commercial nature, "*on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident*".

The impact of a specific sound is indicated by subtracting the existing background noise level from the rating level (i.e. noise level from the proposed items of plant/machinery/etc plus any acoustic feature corrections). The standard states that:

- *"a difference of around +10dB or more is likely to be an indication of a significant adverse impact"*;
- *"a difference of around +5dB is of marginal significance is likely to be an indication of an 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"*.

The noise from the new development is expressed in terms of a rating level and given as a $L_{Aeq, T}$ noise level. The existing background noise level is expressed in terms of a $L_{A90, T}$ noise level. T is the assessment time interval, which is 1-hour for operations during daytime hours (07:00 to 23:00 hr) and 15-minutes for operations during night-time hours (23:00 to 07:00 hr).

BS 4142:2014 states that if a noise source contains an 'acoustic feature', such as tonality, intermittency or impulsiveness, an appropriate penalty should be applied.

6.3 Local Planning Requirements

Manchester City Council (MCC) has adopted standard planning requirements with regard to noise and vibration. The MCC requirements are outlined in Section 3.0 of Manchester City Council's Planning & Noise Technical Guidance document (December 2015).

6.3.1 Fixed Plant Noise Emissions

Section 3.6.1.5.1 outlines that the noise assessment for fixed plant should be based on BS 4142:2014 and the assessment must demonstrate that:

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location."

6.3.2 Entertainment Noise

Section 3.6.1.2 offers the following guidance regarding entertainment noise, which may be applicable for the commercial spaces within the proposed development.

"Noise from entertainment venues e.g. noise from recorded music, live bands, or karaoke, can be particularly annoying for local residents and businesses if it is not adequately contained within the venue. When considering the potential impact of a proposal for an entertainment venue consultants should consider the overall noise level (L_{eq}) and the 63 Hz and 125 Hz octave band noise levels (L_{eq})."

The document then proposes the following assessment criteria for structurally connected uses, although this only makes reference to the impact on habitable rooms (not offices):

"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".

In relation to noise egress MCC state that planning applications should:

"demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

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

6.3.3 Commercial Noise Breakout

Section 3.6.1.5 outlines that the noise assessment for commercial uses should be based on BS 4142:2014 and the design objective should be:

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

7.0 Baseline Noise Survey

7.1 Procedure

Noise measurements were undertaken at 3No positions using attended noise monitoring from 11:25 to 13:32 on Thursday 13th February 2020 and automated noise monitoring equipment from 11:00 on Thursday 13th February 2020 to 11:00 on Friday 14th February 2020 to establish the prevailing noise climate.

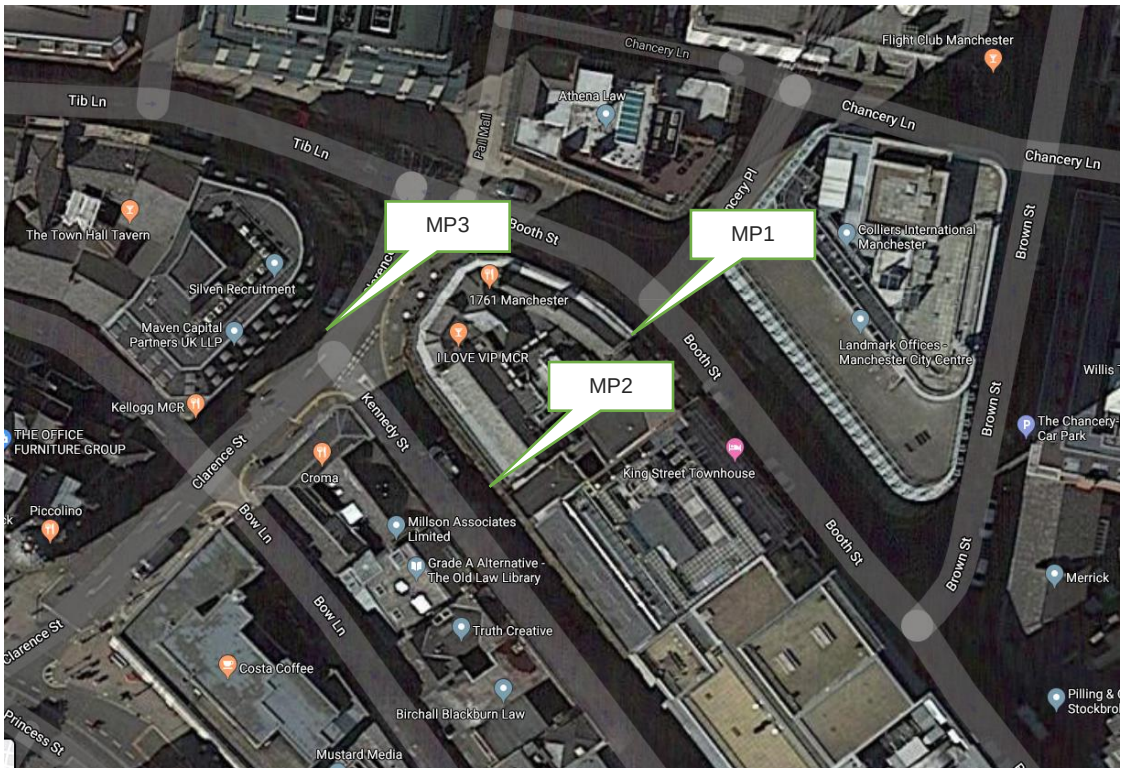
All measurements performed obtained A-weighted and octave band L_{90} and L_{eq} sound pressure levels over discrete 15 minute periods. Measurements were undertaken in general accordance with BS 7445-1:2003. Description and Measurement of Environmental Noise.

7.2 Weather Conditions

During the manned survey, weather was generally overcast. However, wind was negligible and atmospheric conditions were relatively calm. Due to the nature of the automated survey, i.e. unmanned, it is not possible to accurately describe the weather conditions throughout the entire survey period. However, internet weather reports indicate no significant periods of adverse weather, low to light wind speeds and no significant rainfall.

7.3 Measurement Positions

Manned noise level measurements were performed on Thursday 13th February 2020 and were undertaken at 2No. positions as illustrated below.



Site Plan showing manned measurement positions (© maps.google.co.uk)

Attended and unattended noise level measurements were undertaken at 3No. positions as described in the table below.

Position	Description
MP1	Attended free-field measurement located on Booth Street approximately 1.2m above ground.
MP2	Attended free-field measurement located on Kennedy Street approximately 1.2m above ground.
MP3	Unattended free-field measurement located on Clarence Street approximately 3m above ground.

7.4 Instrumentation

A summary of the instrumentation used during the survey is presented in the table below.

Description	Manufacturer	Type	Serial Number	Calibration
Type 1 Data Logging Sound Level Meter	Larson Davis	LXT	5103	16/08/2019
Type 1 Data Logging Sound Level Meter	Larson Davis	LXT	4568	06/08/2019
Type 1 Calibrator	Larson Davis	CAL200	3083	23/04/2019

The sound level meter used in the manned survey was affixed to a tripod located approximately 1.2m above local ground level and at least 3m from any other reflective surface. The sound level meter used in the unmanned survey was installed inside a small security box with the microphone protruding approximately 6cm out of the box. The security box was then fixed to a lamp post.

Both sound level meters were calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1dB).

7.5 Results

7.5.1 Attended Measurement Results

A summary of the results of the attended noise survey are presented below.

Position	Measurement Start Time	Measured Sound Pressure Levels (dB)	
		$L_{Aeq,15min}$	$L_{A90,15min}$
MP1	11:25	61	57
	12:23	61	55
	13:01	61	58
MP2	11:42	66	56
	12:48	60	58
	13:17	57	55

7.5.2 Unattended Measurement Results

The results of the unattended noise survey have been plotted on Time History Graph 27622/TH1 enclosed. The graph present the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} levels at MP3 throughout the duration of the survey

A summary of the results from unattended are presented below.

Position	Sound Pressure Level (dB)			
	Daytime (07:00 – 23:00 hrs)		Night-time (23:00 – 07:00 hrs)	
	$L_{Aeq,16h}$	Representative $L_{A90,15min}$	$L_{Aeq,8h}$	Representative $L_{A90,15min}$
MP3	65	52	61	51

The representative lowest octave band background noise levels, L_{90} are presented below.

Time	Background, L_{90}, Sound Pressure Level (dB) at Each Octave Band Centre Frequency (Hz)						
	63	125	250	500	1000	2000	4000
Daytime (07:00-23:00)	50	41	40	41	41	34	28
Night-time (23:00-07:00)	50	37	36	37	32	32	28

7.6 Discussion of Noise Climate

During the measurements taken in the attended survey, the noise climate was noted to be dominated be plant noise emitted by plant on the roof of King Street Townhouse, the property adjacent to the site, and ventilation extraction from the property opposite the site on Kennedy Street. In addition, road traffic noise was noted from vehicles using Booth Street, Tib Lane, Clarence Street and Kennedy Street.

Due to the nature of the unattended survey, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However, during our survey set up and collection visits, noise levels were noted to be dominated by distant road traffic from Princess Street and Cross Street, construction noise from Albert Square. Less significant was noise arising from pedestrian activity in the general area and intermittent traffic using Booth Street, Tib Lane, Clarence Street and Kennedy Street.

8.0 Assessment Overview

The following sections present the findings of the assessments that form the basis of this Noise Impact Assessment Report:

Plant Noise Emission Limits: Determining noise emission criteria for which new items of fixed building services plant are to be assessed against.

Commercial noise breakout assessment: Assessing potential impact from operational breakout via gym frontage to most affected noise sensitive receptor.

To inform our assessment of noise breakout from the gym we have drawn upon previously measured noise levels within a mid-sized, commercial gymnasium under normal use. The typical highest 15 minute noise levels do not exceed the below.

Description	Reverberant Noise Level (dB $L_{eq,15min}$) at Octave Band Centre Frequency (Hz)							dBA
	63	125	250	500	1k	2k	4k	
Gymnasium	75	80	80	80	80	80	80	86

9.0 Plant Noise Egress Limits

9.1 Plant Noise Limits

Based on the results of our noise survey, and the typical requirements of Manchester City Council, we would propose the following plant noise emission criteria. The following limits are to be achieved at 1 m from residential windows, and are presented as facade noise limits.

Period	Plant Noise Limit, $L_{Ar,Tr}$ (BS 4142 Rating Level)
Daytime (07:00-23:00)	47
Night-time (23:00-07:00)	46

The above limits shall be subject to the final approval of Manchester City Council.

9.2 Assessment

No noise data has yet been supplied for proposed plant, so assessment of noise impact cannot be carried out at this time. Future assessment of noise impact from fixed plant shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality. Emergency plant items (e.g. smoke extract equipment) should be subject to more relaxed criteria.

10.0 Commercial Noise Breakout

It is understood that the ground floor of the redevelopment is intended to be used as a gymnasium and the activities that are expected to be carried out within the space, as discussed in Section 5.0. As such, an assessment of noise break-out via the building facade to the nearest noise sensitive premises is required to ensure the levels of noise break-out are in line with MCC guidance during the night time period (ie between 06:00 and 07:00).

With this in mind, the assessment has been performed using the internal reverberant field levels as provided in Section 8.0 and based on the external envelope consisting of standard thermal double glazing achieving a performance of 27 dB $R_w + C_{tr}$ and the overall façade achieving an octave band composite sound reduction set out in the table below.

Operational Noise Breakout assessment To the Nearest Residential Window (Distance Approx. 14m)

Assessment	Octave Band Centre Frequency (Hz)						
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**
Internal noise level (dB L_{eq}) *SPL_{in}*[1]	75	80	80	80	80	80	80
Building fabric composite sound reduction (dB *R*) *SRI*	15	20	22	25	28	30	30
Distance & radiating area propagation correction (dB) $10log_{10}\left(\frac{S}{r^2}\right)$	-18	-18	-18	-18	-18	-18	-18
Internal diffuse field to external free-field hemispherical radiation correction (dB) *-14*	-14	-14	-14	-14	-14	-14	-14
Screening Loss (dB)	0	0	0	0	0	0	0
External noise level (dB L_{eq}) *SPL_{out}*	**28**	**28**	**26**	**23**	**20**	**18**	**18**
Night-time Background (L_{90})	50	37	36	37	37	32	28
Night-time Criteria (dB L_{eq})	**47**	**41**	**26**	**27**	**27**	**22**	**18**
Excess Above Background (dB)	**-19**	**-13**	**0**	**-4**	**-7**	**-4**	**0**
Night-time Compliance Note	✓	✓	✓	✓	✓	✓	✓

1. In the absence of actual noise data, values which are deemed to be representative of likely levels from similar use cases have been used.

Based on the above, provided the façade consists of standard thermal double glazing achieving a minimum performance of 27 dB $R_w + C_{tr}$ should be capable of controlling gym noise break-out to achieve local authority noise requirements.

11.0 Conclusions

A detailed environmental noise survey has been undertaken in order to establish the prevailing noise climate at the development site.

Based on the results of the noise survey, noise emission limits have been set for new items of fixed plant related to the development.

In terms of operational noise, our assessment indicates that noise breakout from the gymnasium and spa to the nearest noise sensitive premises should be in line with MCC guidance, based on standard thermal double glazing being proposed.

Appendix A – Acoustic Terminology

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

L_p — Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

L_w — Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Booth Street Manchester

A-weighted Sound Levels at Automated Measurement Position (MP3)

Thursday 13 February - Friday 14 February 2020

27662/MH1

