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1st November 2024

Valery Torpey

Assessment of noise impact of the proposed change of use to a cafe at the Former Public Convenience, Withington Road, Manchester, M16 7BW

Planning Ref: 135759/FO/2022

Prepared for:-

c/o Holme Planning
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1.0 SUMMARY

At all times, the general noise climate was completely dominated by traffic on the surrounding roads, particularly Moss Lane, Withington Road and the traffic lights junction.

Based on a series somewhat extreme worst-case assumptions, including beer garden levels of activity in the external areas, the impact is likely to be negligible.

Other sources such as internal noise and mechanical equipment are also negligible and unlikely to be audible, even directly outside the building.

The permitted opening times of 08:00 to 21:00 should also be acceptable for the external areas where the impact is likely to be negligible at all times.





A R Raymond

P J Durell

2.0 INTRODUCTION

ADC was asked to carry out an independent assessment of the above site with regards to the impact of noise on the surrounding residential property.

This report begins by summarising assessment standards and, where appropriate, discusses alternative interpretations.

After a brief statement of survey details we discuss basic results and the resulting assessment. The feasibility of achieving the criteria is discussed along with any recommendations for mitigation.

3.0 ASSESSMENT STANDARDS

3.1 Planning Conditions

There are several Planning Conditions which could be considered relevant to this assessment. The most important are:-

> 5) a) The premises shall be acoustically insulated and treated to limit the breakout 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.

The condition appears to be based on noise generated inside the coffee shop. It is not clear if it is intended to include the external areas in this, or whether these are covered by Condition 6.

> 6) The external areas within the application site shall only be used in accordance with a schedule of days and hours of operation submitted to and approved in writing by the City Council as Local Planning Authority.,

Either way, this assessment covers the potential for noise generated internally and in the external areas.

Returning to Condition 5, part b is as follows:-

> b) Prior to occupation 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 have 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.

The condition is reasonable and appropriate for a development where there is a need for additional mitigation or further acoustic design work. Here, however, there is no requirement for any mitigation so we would suggest that this report should provide the verification referred to. It is

also impossible to carry out post completion testing prior to occupation. The testing done for this assessment is all that can be done so, again, we would suggest that this report should cover the requirtements.

8) a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as Local Planning Authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences or as otherwise agreed inwriting by the City Council as Local Planning Authority.

There is no externally mounted equipment proposed. All the internal equipment is very quiet and was inaudible immediately outside with doors open. A domestic-style cooker extract hood was set running and was inaudible at any external position. Part b is as follows:-

b) Prior to the operation of the scheme a verification report shall be submitted to and approved inwriting by the City Council as Local Planning Authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have 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.

Similar to our comments on 5b above, there will be nothing that a verification report can add and we would suggest that this report should cover the requirements

Other conditions which are relevant are as follows:-

3) The premises shall not be open outside the following hours:- 0800hrs to 2100hrs

We understand that the applicant is happy with this.

7) No amplified sound or any music shall be produced or played on any part of the site outside of the building.

We understand that there is no intention to have external music

3.2 <u>BS8233 and WHO</u>

BS 8233 was updated in March 2014. Its guidance is primarily intended for new buildings, but the criteria are routinely referred to for putting general noise climates into context.

The criteria in Table 4 of BS 8233 are based on WHO guidance and give the desirable criteria for indoor ambient noise levels for dwellings as follows:-

Activity	*Location*	*07:00 to 23:00*	*23:00 to 07:00*
Resting	Living Room	35 dB $L_{Aeq, 16\ hour}$	-
Dining	Dining Room	40 dB $L_{Aeq, 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16\ hour}$	30 dB $L_{Aeq, 8\ hour}$

The standard does not explicitly state criteria for bedroom noise in terms of dB L_{Amax} but the WHO Guidelines for Community Noise (or similar) are widely used with a recommendation that the noise inside bedrooms should not typically exceed 45 dB L_{Amax}, for instance no more than 10 to 15 times a night.

BS 8233 goes on to state that, where necessary, the criteria can be relaxed by up to 5 dB and still achieve reasonable conditions.

Note that the standard accepts the widely used rule of thumb that, for a partly open window, the levels just outside will be 15dB higher than those just inside. Other more recent research suggests a difference of 13 dB. The latter brings us to an external equivalent of the above table, as follows:-

Activity	*Location*	*07:00 to 23:00*	*23:00 to 07:00*
Resting	Living Room	48 dB $L_{Aeq, 16\ hour}$	-
Dining	Dining Room	53 dB $L_{Aeq, 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	48 dB $L_{Aeq, 16\ hour}$	43 dB $L_{Aeq, 8\ hour}$

Garden area criteria are 50 dB L_{Aeq} and 55 dB L_{Aeq} being considered desirable and reasonable respectively.

3.3 <u>BS 4142</u>

BS 4142 was updated in November 2014. The standard is very complicated and is not discussed in detail here as we show later that the there is no external mechanical equipment proposed and, if there were, it is covered by Condition 8a anyway.

We should highlight, however, that the standard lists several source types which it is not intended to be applied to, including:-

- *People*
- *Music and other entertainment*

3.4 <u>Other Standards</u>

There are no standards which perfectly fit the sources likely to be present here. We show later however, that the predicted levels are likely to me more or less inaudible, in which case, the choice of criteria is likely to be irrelevant.

4.0 GUIDE TO PROCESSING, CALCULATIONS AND MODELLING

4.1 Internal Noise Break-Out

This has been measured directly with a loud pink sound source inside the building and measurements made inside and at the residential locations. The difference between the internal measured levels and the levels measured at the residential locations gives us the transfer function in octave bands across the frequency range. We then use a typical internal noise climate, such as a restaurant with background music.

Internal Levels	*Frequency Band*								
	dB(A)	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
Restaurant SPLs	**77**	69	68	71	76	74	67	61	55

By applying the measured transfer function to these source levels, we can predict the levels such an environment would create at the residential locations.

4.2 Mechanical Equipment

No measurements or calculation were possible, simply because it was inaudible and unmeasurable at all external positions. It is dealt with by short discussion only.

4.3 External Areas

The only source likely to be present is voices of customers.

The speech sources are entered into our 3D model as point sources at 1.2 m above the ground. They are based on past measurements of busy pub beer gardens, including raised speech associated with outdoor drinking, but otherwise non-rowdy behaviour. Each source represents two people present.

Busy Beer Garden Voices	*Frequency Band*								
	dB(A)	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
Sound Power per 2 People	**75**	66	68	70	73	72	66	58	48

Note that the figures are not the levels of individuals talking, but the total sound power of beer gardens where some are talking and some are not, some are loud, others are quiet.

We have used the well-established CadnaA modelling software which calculates noise propagation based on the processes of *ISO 9613 : Acoustics – Attenuation of sound during propagation outdoors*. Obviously, modelling software is reliant on the inputs and assumptions. The keys ones are:-

1. The ground is mainly reflective (coefficient of 0.2 assumed).

2. Calculations are based on two orders of reflections.

3. The site building and the surrounding buildings are assumed to be mainly reflective (0.5 dB loss on reflection assumed).

4. Where fences are used, they are also assumed to be reflective the same as the buildings.

5. The surrounding trees and vegetation will provide a small degree of absorption but this has been neglected.

5.0 SURVEY DETAILS

5.1 Site times and Personnel

The surveys on the proposed site were carried out by Andrew Raymond and Mark Pimlett of ADC Acoustics.

The survey was carried out on 21st October 2024 between approximately 18:00 and 21:00. The times were chosen to cover the proposed evening opening times.

5.2 Instrumentation

Instrumentation used was two Rion NL-52 Class I sound level meters. They hold current calibration certificates and were field-calibrated as necessary with no drift noted. The meters were set up to measure short samples and continuous 5 minute samples, all in terms of dB L_{eq}, dB L_{max} and dB L_{90} in overall A-weighted terms, and in octave bands across the frequency range. See Definition of Acoustic Terms in Appendix 1.

5.3 Measurement Positions

Internal measurements were made at several positions around the inside of the building. Sample measurements with the pink sound source running were made at the position shown below (position 1) and the general background levels were made at (position 2).



The microphones were generally 1.3 m above ground and well away from other reflecting surfaces.

5.4 Survey Conditions

Weather conditions were similar on each occasion as follows :-

Rain	:	none, dry roads
Cloud	:	0%
Temperature	:	13 to 15 Celsius
Wind	:	negligible

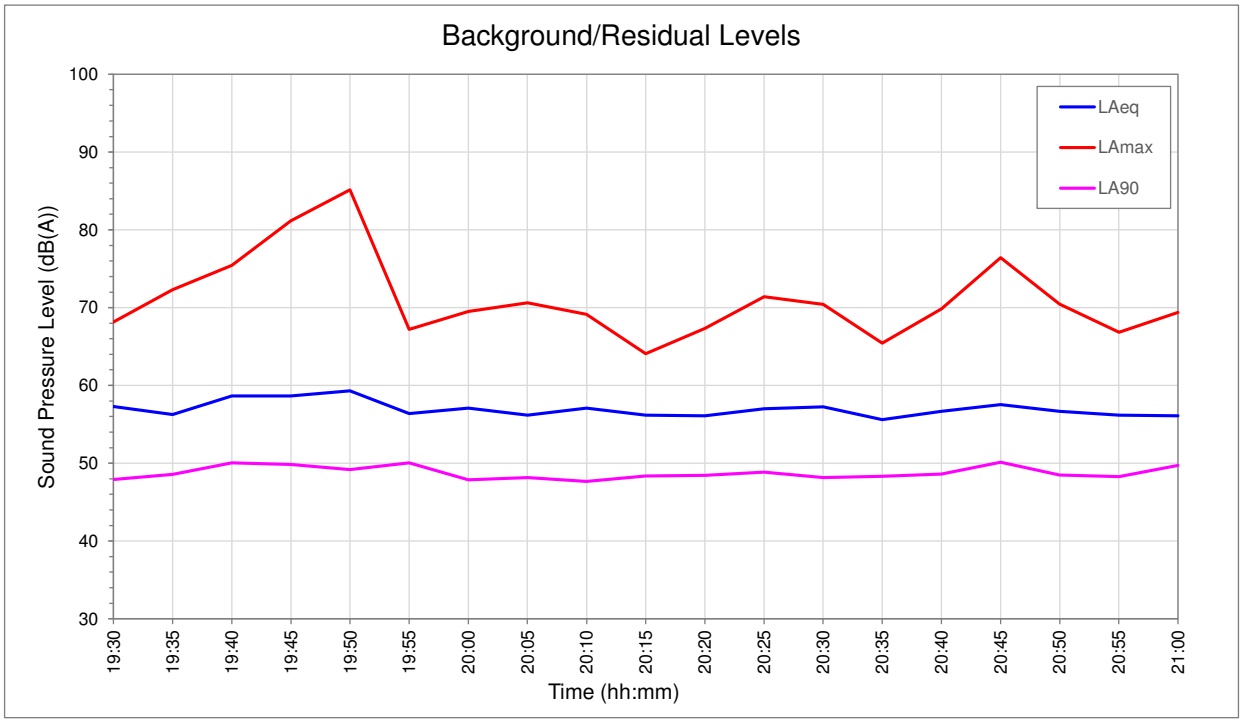
General conditions appeared to be normal and representative.

6.0 RESULTS AND DISCUSSIONS

6.1 Basic Results

At all times, the noise climate was completely dominated by traffic on the surrounding roads, particularly Moss Lane, Withington Road and the traffic lights junction.

The noise climate was assessed between approximately 19:30 and 21:00. The results are presented graphically as follows:-



The following shows a summary of the measured levels in terms of the lowest single 5-minute measurement for each index (L_{Aeq}, L_{max} and L_{90}). Very importantly, there is no requirement in any assessment standard for presenting the lowest figures, but we have done so here as to present a significantly robust case. It should more than account for the possibility of variations, for instance on different days of the week.

Time Period	*Index*	***dB(A)***
Lowest Single Measurement	Leq	**56**
	Lmax	**65**
	L90	**48**

6.2 Internal Noise Break-Out

See description of the processing in 4.1 above and full details of calculations in Appendix 2.

Based on a busy restaurant with background music playing, the levels predicted at the residential locations are around 29 dB L_{Aeq}, substantially below the lowest background levels, and likely to be completely inaudible. Even the levels associated with a packed bar with much louder music are well below background levels.

As stated in 3.1 above, it is difficult to see how a verification test could provide any further information and so we would suggest that this assessment should cover all aspects of Condition 5.

6.3 Mechanical Equipment

See description of the processing in 4.2 above.

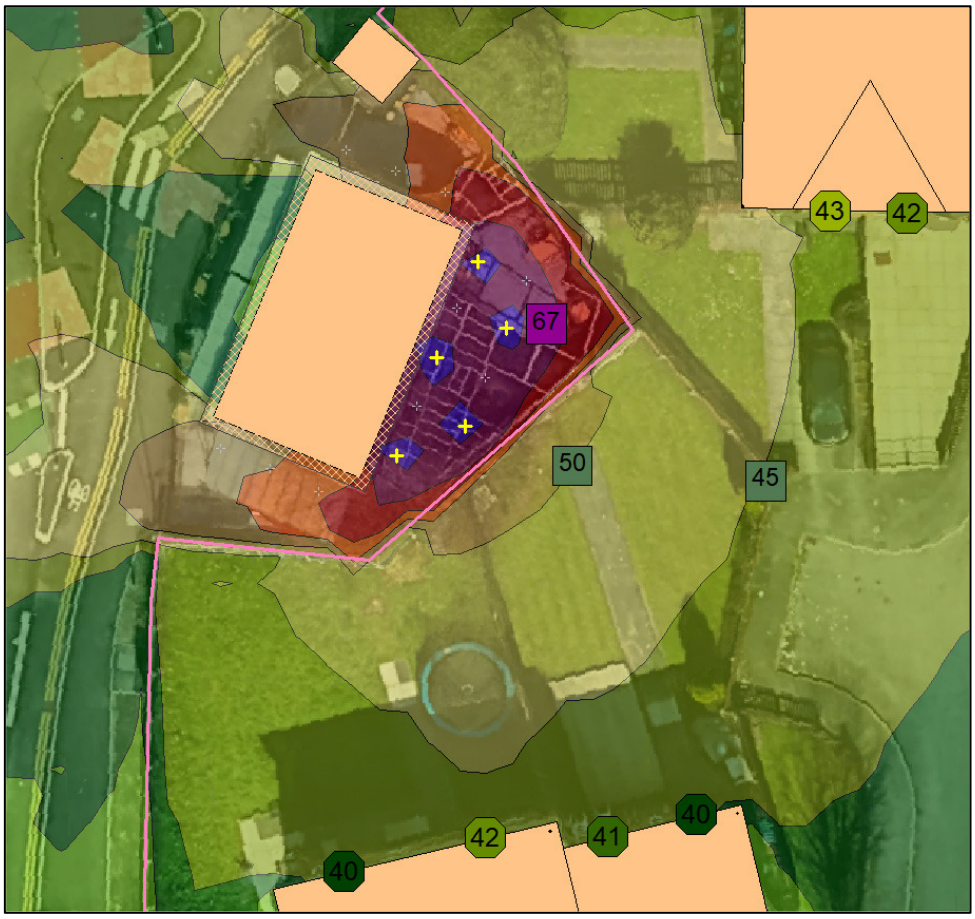
All equipment that could be operated was set running, including refrigerators, counter chiller, counter hot plate and a domestic style cooker hood. None of it could be heard outside, even with the door open and there was no position where the cooker hood extract was audible.

We are advised that no further equipment is proposed. As stated in 3.1 above, it is difficult to see how a verification test could provide any further information and so we would suggest that this assessment should cover all aspects of Condition 8.

6.4 External Areas

See description of the processing and modelling in 4.3 above.

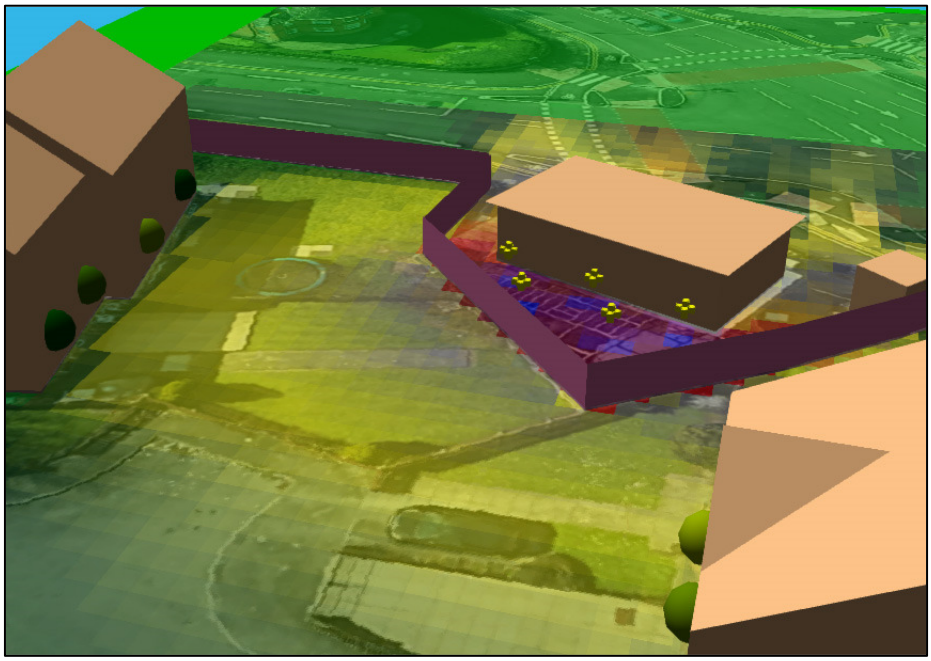
The applicant has confirmed that 10 people sitting outside would represent a maximum. This has been modelled as follows:-



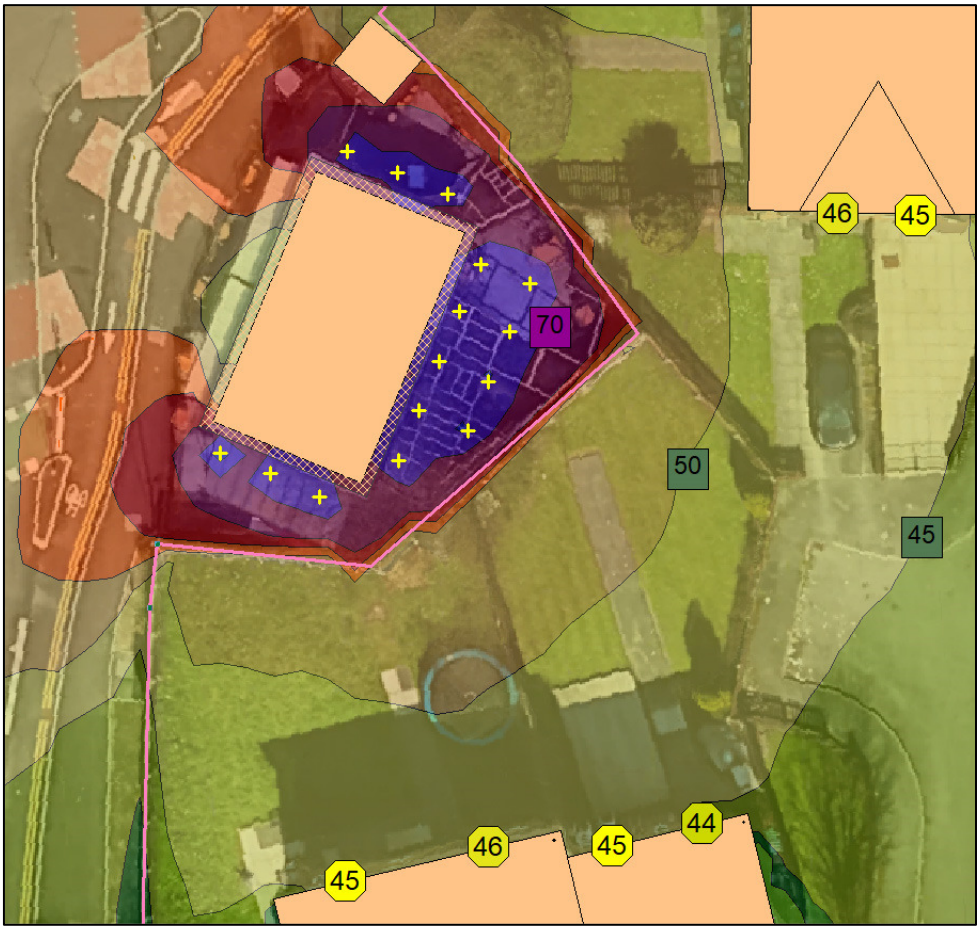
Note that:-

- The beige shapes are buildings.
- The magenta lines are walls and fences.
- The yellow crosses are the point sources of the customers. Each cross represents two people.
- The coloured octagons are the noise levels at the residential facades.
- The noise contours are shown for guidance only as to how the sound propagates. The coloured square show the noise level of the contour.

The following 3D image should help to visualise the model:-



The above modelling is based on what the applicant has confirmed is a maximum scenario of 10 people outside at any given time. For illustrative purposes only, we have also modelled the effect of an extreme scenario of 30 people outside. This is shown below:-



Please note that this is not an assessment of the proposal. It is an illustration of how much the real scenario could be exceeded and still give acceptable levels. Even here we can see that the predicted façade levels are well below the single lowest measurement of the existing levels. Garden levels right next to the boundary could conceivably reach up to 55 dB L_{Aeq} in this scenario, which is still below the existing ambient levels.

The impact is clearly negligible.

6.5 General Comments

Coffee shops and cafes are often located in much quieter areas than this and often closer to residential accommodation. We would suggest that, regardless of measurements, calculations and modelling, it is intuitively clear that the noise impact can be expected to be negligible.

As stated in several parts of this report, the external modelling is based on beer garden noise levels where there were some raised voices which would normally be associated with drinking. Clearly there is an assumption that there will be no rowdy behaviour but this is not realistically expected. It might be helpful, however, to include a

comment in a management plan about this and what action would be taken in the unlikely event that it was to occur.

Condition 6 requires a schedule of days and hours for the external area. This assessment shows that there is no reason to restrict the hours to anything less than the overall opening times. The results show that the background/ambient levels barely changed up to 21:00.

7.0 CONCLUSIONS/RECOMMENDATIONS

Based on a series somewhat extreme worst-case assumptions, including beer garden levels of activity in the external areas, the impact is likely to be negligible.

Other sources such as internal noise and mechanical equipment are also negligible and unlikely to be audible, even directly outside the building.

The permitted opening times of 08:00 to 21:00 should also be acceptable for the external areas where the impact is likely to be negligible at all times.

Our only recommendation is that you issue this report to Planners. It should be sufficient to allow the discharging of the relevant Planning Conditions. Part b of conditions 5 and 8 technically require verification reports. However, it is discussed in various parts of this report that such verification is already covered in this assessment and that it would be impossible to provide further information prior to occupation or operation.

We encourage Officers to contact us directly with any queries.

Appendix 1

Definition of Acoustic Terms

The Decibel

The decibel is the basic unit of noise measurement and is denoted dB. Technically, it is a means of expressing the difference in noise level between the measured noise and a standard level of noise. Most often the threshold of human hearing is used as the standard reference but is really should be stated. The threshold of human hearing is a sound pressure of 20□Pa or a sound power of 1pW.

A sound pressure level or SPL should be expressed in dB(re. 20□Pa). A sound power level or SWL should be expressed in dB(re. 1pW). If the reference levels are omitted, it will often (but not always) be safe to assume that they are referenced to the threshold of human hearing.

A-Weighting and dB(A)

The human hearing system responds differently to different frequencies. The A-weighting system takes account of this by emphasising mid and high frequencies more than low frequencies to give an overall level. An A-Weighted noise level, therefore, reflects the way normal, healthy hearing would perceive the overall level of the noise. The basic unit is dB(A), although other systems of expressing an A-weighted levels are discussed below.

Other weighting systems, such as C-Weighting, denoted dB(C), reflect the human hearing system's response at higher noise levels.

NR and NC Levels

NR curves and NC curves are a series of curves representing noise levels across the frequency range. A given noise climate has an NR level or NC level if it equals a point on the curve at any frequency. They are particularly, although by no means exclusively, used as a means of specifying noise limits in an indoor environment, for instance from mechanical services or traffic noise break-in from the outside. They are typically expressed as NR or NC followed by a number, e.g. NR40, NC55, etc.

Equivalent Continuous Sound Level, L_{eq}

This can be simplistically described as a way of expressing the average noise level.

The unit is dB L_{eq}. For A-weighted levels the unit is dB(A) L_{eq} or, in more modern units, dB L_{Aeq}.

Maximum Level, L_{max}

This is the maximum level reached (usually for a fraction of a second) in the measurement period.

The unit is dB L_{max}. For A-weighted levels the unit is dB(A) L_{max} or, in more modern units, dB L_{Amax}.

Statistical (Percentile) Levels, L_n

During a measurement of fluctuating noise, it is often useful to establish the levels exceed for a percentage of the time. L_n is the index representing the level exceeded for n% of the measurement period.

The unit is dB L_n. For A-weighted levels, the unit is dB(A) L_n or, in more modern units, dB L_{An}.

Common examples are as follows :-

dB L_{A90} is the A-weighted level exceeded for 90% of the time and is often used to describe the underlying background noise.

dB L_{A50} is the A-weighted level exceed for 50% of the time. Mathematically, it is the median, another kind of average.

dB L_{A10} is the A-weighted level exceeded for 10% of the time and has traditionally been used to describe the intermittent highs in the noise climate such as passing cars or aircraft.

Frequency Analysis

Here the audible frequency range is divided up into bands and the noise level is expressed in each frequency band from low pitches to high pitches.

Octave Band analysis is where the frequency range is divided into 8 bands from 63 Hz to 8kHz, or sometimes into 10 bands from 31.5 Hz to 16kHz.

1/3 Octave Band analysis provides more detailed subdivision into 24 bands from 50 Hz to 10kHz, or sometimes into 30 bands from 20Hz to 20kHz.

Narrow Band analysis takes this further with the possibility of many thousands of bands, possibly only 1Hz wide, or even less.

In all types of frequency analysis, the level in each band can be expressed in terms of L_{eq}, L_{max}, L_n, etc. as defined above.

Sound Insulation

Sound insulation is best expressed across the frequency range in octave bands or third octave bands. Often, however, in known environments such as domestic sound insulation and speech privacy, it is simpler to express the sound insulation as a single figure. A higher value means better sound insulation.

The most common ways are dB D_{nTw}, dB R_w and dB$_{(mean\ 100\text{-}3150Hz)}$. The first two are ways of expressing average sound insulation, weighted to account for speech frequencies. The third is simply an un-weighted mean value.

The Building Regulations Approved Document E (ADE) routinely refer to $D_{nTw}+C_{tr}$ The C_{tr} term is a negative number which is used to modify the D_{nTw} value for the insulation properties at lower frequencies.

ADE also uses the L_{nTw} index for impact sound transmission. It is a measure of the level of noise in the room below a room in which a standard tapping machine is being used. It represents the impact sound transfer such as footfall noise, scraping chairs, washing machines, etc. A lower value means better insulation.

Reverberation Time

The most common measure of Reverberation Time is, effectively the time taken for sound from a steady source to decay by 60 dB after it has been abruptly cut off. In practice it is often difficult to measure a 60 dB decay and so decays of 30 dB, 20 dB, or even 10 dB are often used and adjusted pro rata, although the exact measure is not quite the same.

Reverberation Time is generally expressed as RT in seconds. We may, if we are being precise, add subscripts 60, 30, etc to show whether the basis of the measure is 60 dB decay, 30 dB decay, etc. E.g. the RT_{60} = 0.52s, the RT_{30} = 0.49s, etc.

RT can be expressed in octave bands or 1/3 octave bands across the frequency range, or at central frequencies such as 500 Hz or 1kHz.

Appendix 2

Measurement and Calculation Detsils

Background/Residual/Ambient Levels

Time Period	*Index*	***dB(A)***	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
19:30	Leq	**57**	68	61	54	52	54	49	40	30
	Lmax	**68**	81	76	67	62	64	58	52	43
	L90	**48**	60	50	45	44	45	39	31	20
19:35	Leq	**56**	67	58	53	51	53	48	40	31
	Lmax	**72**	82	74	74	72	64	62	51	50
	L90	**49**	60	52	46	45	45	40	31	20
19:40	Leq	**59**	68	66	58	53	55	50	42	35
	Lmax	**75**	88	88	77	68	64	60	62	61
	L90	**50**	60	53	47	47	47	41	33	23
19:45	Leq	**59**	67	60	54	53	56	51	41	32
	Lmax	**81**	84	80	70	71	80	71	55	50
	L90	**50**	60	52	47	46	46	42	32	21
19:50	Leq	**59**	68	59	53	53	57	52	42	31
	Lmax	**85**	82	69	69	75	83	78	68	52
	L90	**49**	59	50	45	44	46	42	32	21
19:55	Leq	**56**	66	59	52	51	54	48	40	35
	Lmax	**67**	81	75	66	61	61	58	52	60
	L90	**50**	57	50	46	45	47	42	32	22
20:00	Leq	**57**	69	61	53	52	54	49	40	34
	Lmax	**70**	84	76	66	66	65	60	54	56
	L90	**48**	56	49	44	44	45	40	30	20
20:05	Leq	**56**	66	57	53	51	53	48	41	30
	Lmax	**71**	80	73	68	71	62	60	57	45
	L90	**48**	56	49	44	44	45	40	31	21
20:10	Leq	**57**	68	58	53	52	54	49	40	30
	Lmax	**69**	84	71	69	67	64	59	54	43
	L90	**48**	57	49	44	43	45	39	30	19
20:15	Leq	**56**	65	57	52	50	53	48	39	29
	Lmax	**64**	79	70	60	57	60	56	50	41
	L90	**48**	57	50	45	44	45	40	32	21
20:20	Leq	**56**	65	58	53	51	53	48	38	28
	Lmax	**67**	83	69	63	60	63	61	56	41
	L90	**48**	57	50	46	45	45	40	30	20
20:25	Leq	**57**	67	62	54	52	54	48	39	29
	Lmax	**71**	83	85	72	63	62	60	55	45
	L90	**49**	59	52	47	46	45	40	30	19
20:30	Leq	**57**	67	63	56	52	54	48	40	30
	Lmax	**70**	80	79	68	67	66	59	55	46
	L90	**48**	60	52	46	44	45	39	30	18
20:35	Leq	**56**	65	58	51	50	53	47	38	28
	Lmax	**65**	81	73	64	57	60	57	52	53
	L90	**48**	57	49	45	44	46	40	30	18
20:40	Leq	**57**	67	58	53	52	54	48	40	30
	Lmax	**70**	85	70	68	66	66	60	54	49
	L90	**49**	57	50	46	44	46	40	31	19
20:45	Leq	**58**	66	60	57	52	54	49	40	30
	Lmax	**76**	82	79	83	73	62	58	54	46
	L90	**50**	58	51	46	46	47	42	34	21
20:50	Leq	**57**	67	61	54	51	53	48	41	31
	Lmax	**70**	84	81	70	66	62	59	62	44
	L90	**48**	57	51	46	44	45	40	33	20
20:55	Leq	**56**	65	58	52	50	53	48	39	30
	Lmax	**67**	79	72	69	60	61	58	54	46
	L90	**48**	56	50	45	44	45	40	30	20
21:00	Leq	**56**	66	59	53	51	53	47	39	29
	Lmax	**69**	81	77	72	65	63	60	55	45
	L90	**50**	57	52	47	45	47	41	31	20

Time Period	*Index*	***dB(A)***	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
Lowest Single Measurement	Leq	**56**	65	58	51	50	53	47	38	28
	Lmax	**65**	81	73	64	57	60	57	52	53
	L90	**48**	57	49	45	44	46	40	30	18

Pink Sound Source Tests

Sound Source Inside Coffee Shop	*Index*	***dB(A)***	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
Internal Sound Source 1	Leq	**100**	94	101	97	95	96	92	92	88
Internal Sound Source 2	Leq	**98**	90	100	98	94	94	89	88	84
Internal Sound Source 3	Leq	**98**	91	100	97	93	94	90	89	85
Internal Sound Source 4	Leq	**97**	93	98	94	92	93	89	88	84
Internal Sound Source Overall	Leq	**99**	92	100	97	94	94	90	90	85

Sound Source Measured at Residential	*Index*	***dB(A)***	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
Residential Sound Source On	Leq	**54**	66	65	58	48	47	41	36	26
Residential Sound Source Off	Leq	**49**	65	57	50	45	45	37	30	22
Residential Sound Source Alone	Leq	**53**	54	65	57	45	44	39	34	23

Predicted Levels	*Index*	***dB(A)***	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
Restaurant Levels	Leq	**77**	69	68	71	76	74	67	61	55
	Lmax	**86**	69	69	76	85	83	78	68	64
Predicted at Residential	Leq	**29**	30	32	31	28	23	16	6	-7
	Lmax	**45**	25	19	30	42	40	40	31	31