

ARR/C/3565.02b

17th May 2024

Luxury Living

Verification of internal noise levels for the
basement apartments at Globe House, M3 1LG.

Prepared for :-

Luxury Living
Globe House 30-34
Southall Street
Manchester
M3 1LG

Prepared by :-

Andrew Raymond

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1.0 **SUMMARY**

The measurements show that all criteria of planning condition 4 are met with a comfortable margin. This was based on a series of robust assumptions, such as a low volume room of Southall Street, with a large window, and rush hours periods assumed for the daytime and evening criteria. The MVHR was running throughout and made negligible impact on the overall levels.



A R Raymond



P J Durell

2.0 INTRODUCTION

ADC was asked to carry out an independent assessment of the above site with view to discharging Condition 4b.

This report begins by reviewing the Planning Condition and discussing where necessary. After a brief statement of survey details we discuss basic results and the resulting assessment. We sum-up and conclude at the end, along with brief recommendations.

3.0 PLANNING CONDITION 4

The condition is reproduced in full below. In terms of the required performance, Condition 4a sets out the criteria as follows:-

4) a) Prior to the commencement of the development hereby approved, a scheme for acoustically insulating the proposed residential accommodation against noise from Southall Street shall be submitted to and approved in writing by the City Council as local planning authority. There may be other actual or potential sources of noise which require consideration on or near the site, including any local commercial/industrial premises. The approved noise insulation and ventilation scheme shall be completed before any of the dwelling units are occupied.

Noise survey data shall include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary. The following noise criteria shall be required to be achieved:

Bedrooms (night time - 23.00 - 07.00)	30 dB LAeq (individual noise events shall not exceed 45 dB LAmax,F by more than 15 times)
Living Rooms (daytime - 07.00 - 23.00)	35 dB LAeq
Gardens and terraces (daytime)	55 dB LAeq

The main assessment report covering this was issue in October 2023, following by a glazing confirmation statement in March 2024.

The purpose of this assessment is to allow the discharge of part b which is reproduced below:-

b) Prior to first occupation of the residential units, a verification report shall 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 the internal 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 internal noise criteria.

The wording is clear and straight forward and we have no further comments.

4.0 SURVEY DETAILS

4.1 Site Times and Personnel

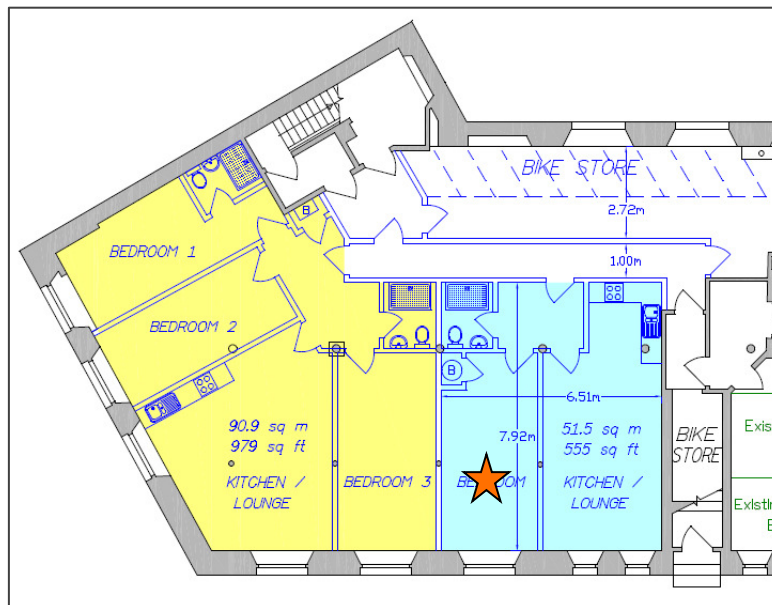
The measurements were carried out by Mark Pimlett of ADC Acoustics from shortly before 16:00 on 9th May 2024 through to shortly after 10:00 the following morning. The measurements were periodically attended.

4.2 Instrumentation

Instrumentation used was a Rion NL-52 Class I sound level meter which holds a current calibration certificate and which was field-calibrated as necessary with no drift noted. The meter was set up to measure continuous 5 minute samples in terms of dB L_{eq}, dB L_{max} and dB L₉₀ in overall A-weighted terms, and in octave bands across the frequency range. See Definition of Acoustic Terms in Appendix 1.

4.3 Measurement Positions

The main measurement position was in the basement as shown by the orange star on the following plan. The position was chosen as a small volume room with large windows, and so should represent a worst case.



The microphone was 1.3 m above ground and around 2 m from the window.

4.4 Survey Conditions

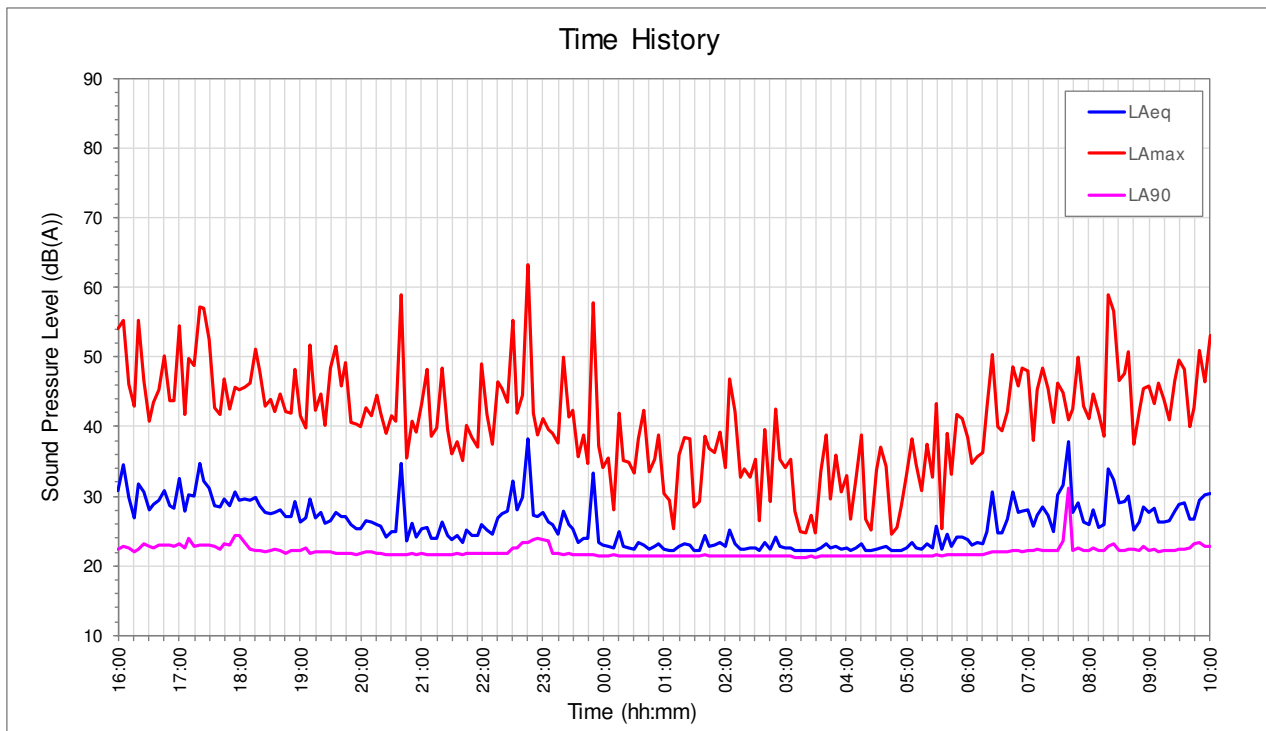
We have no reason to believe that the conditions we found on the survey were anything other than representative of normal conditions, although there was some influence from nearby construction during the morning period. As the measurements were internal, the weather was not crucial but, for the record, there was no rain and roads were dry, and there was negligible wind. Windows were closed and the MVHR was running throughout. The room was carpeted and there was bed, but no other soft furnishing.

5.0 RESULTS AND DISCUSSIONS

The noise was dominated at all times by traffic on Southall Street and other nearby roads. There was also some influence from nearby construction during the morning period. The MVHR system running but had negligible influence on the overall levels.

5.1 Basic Results

Results are presented graphically as follows:-



A summary of overall levels is as follows:-

Time Period	Index	dB(A)
Daytime	Leq*	30
	Lmax*	49
	L90*	23
Evening	Leq*	28
	Lmax*	50
	L90*	22
Night Time	Leq*	26
	Lmax*	42
	Lmax**	42
	Lmax***	41
	L90*	22

* Logarithmic mean

** Level exceeded 10 times

*** Level exceeded 15 times

5.2 Assessments

Daytime and evening levels are well within the criterion for living rooms of 35 dB LAeq. Daytime in particular is based on afternoon and morning

rush hour periods, the latter of which also included some influence of nearby construction.

The night time levels are also well within the criteria of 30 dB L_{Aeq} and 45 dB L_{Amax} (15 times a night). Even if we were to base the assessment on the noisiest 1 hour periods of the night (23:00 to 00:00 and 06:00 to 07:00), the criteria would still be met.

6.0 CONCLUSIONS/RECOMMENDATIONS

The measurements show that all criteria of planning condition 4 are met with a comfortable margin. This was based on a series of robust assumptions, such as a low volume road of Southall Street, with a large window, and rush hours periods assumed for the daytime and evening criteria. The MVHR was running throughout and made negligible impact on the overall levels.

We recommend that you issue this report to Planners and we would 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 it really should be stated. The threshold of human hearing is a sound pressure of $20\mu\text{Pa}$ or a sound power of 1pW .

A sound pressure level or SPL should be expressed in dB(re. $20\mu\text{Pa}$). 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 level are discussed below.

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

Equivalent Continuous Sound Level, L_{eq}

This is a kind of mean 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} . The Noise at Work Regulations use $L_{eq(s)}$ which refers to a sample level.

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 exceeded 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 exceeded 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.

Appendix 2

Measurements in Full

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	63	125	250	500	1k	2k	4k	8k
15:55	Leq	34	44	46	34	29	26	23	22	17
	Lmax	61	66	70	61	55	55	50	48	41
	L90	22	34	30	19	22	11	10	11	13
16:00	Leq	31	46	45	31	24	17	11	11	13
	Lmax	54	65	70	53	38	33	21	20	14
	L90	22	36	30	19	22	11	10	11	13
16:05	Leq	35	48	49	34	24	16	11	11	13
	Lmax	55	70	71	52	37	30	22	15	14
	L90	23	38	32	19	22	11	10	11	13
16:10	Leq	30	47	43	31	24	16	11	11	13
	Lmax	46	66	59	49	32	30	17	16	13
	L90	23	34	31	20	22	11	10	11	13
16:15	Leq	27	46	38	27	23	14	10	11	13
	Lmax	43	67	53	40	31	27	14	13	13
	L90	22	33	29	18	22	11	10	11	13
16:20	Leq	32	44	46	33	24	16	11	11	13
	Lmax	55	64	70	59	38	29	24	19	14
	L90	22	34	30	19	22	11	10	11	13
16:25	Leq	31	47	44	32	24	16	11	11	13
	Lmax	47	65	60	48	34	27	18	15	14
	L90	23	36	32	21	22	11	10	11	13
16:30	Leq	28	45	40	29	24	16	11	11	13
	Lmax	41	62	53	40	33	29	16	13	13
	L90	23	35	32	20	22	11	10	11	13
16:35	Leq	29	47	41	30	24	16	11	11	13
	Lmax	44	63	56	46	36	31	24	23	13
	L90	23	36	31	19	22	11	10	11	13
16:40	Leq	29	47	42	31	25	18	11	12	13
	Lmax	45	65	55	44	34	41	26	24	16
	L90	23	36	32	21	22	11	10	11	13
16:45	Leq	31	47	44	32	24	17	11	12	13
	Lmax	50	66	65	49	36	30	23	18	14
	L90	23	35	33	21	22	11	10	11	13
16:50	Leq	29	46	41	29	24	17	11	11	13
	Lmax	44	66	55	44	34	33	18	16	13
	L90	23	36	32	20	22	11	10	11	13
16:55	Leq	28	46	40	29	24	16	11	11	13
	Lmax	44	65	56	44	32	28	28	13	13
	L90	23	37	32	20	22	11	10	11	13

Time Period	Index	dB(A)	63	125	250	500	1k	2k	4k	8k
17:00	Leq	33	45	46	36	25	17	11	12	13
	Lmax	54	63	64	62	42	32	26	24	16
	L90	23	36	33	21	22	11	10	11	13
17:05	Leq	28	45	40	29	24	15	10	11	13
	Lmax	42	59	55	44	33	28	18	14	13
	L90	23	36	31	19	22	11	10	11	13
17:10	Leq	30	47	43	32	24	17	11	11	13
	Lmax	50	66	63	54	34	31	24	14	14
	L90	24	37	34	22	22	12	10	11	13
17:15	Leq	30	44	44	32	24	16	11	11	13
	Lmax	49	63	63	52	36	28	19	18	14
	L90	23	35	32	20	22	11	10	11	13
17:20	Leq	35	46	49	37	25	16	11	11	13
	Lmax	57	63	72	61	41	29	21	17	15
	L90	23	36	32	20	22	11	10	11	13
17:25	Leq	32	45	46	35	24	15	10	11	13
	Lmax	57	67	72	60	38	27	16	15	14
	L90	23	36	32	20	22	11	10	11	13
17:30	Leq	31	49	45	31	24	15	10	11	13
	Lmax	52	67	68	48	34	26	16	15	13
	L90	23	36	32	21	22	11	10	11	13
17:35	Leq	29	43	41	30	24	16	11	11	13
	Lmax	43	61	57	42	32	27	20	22	25
	L90	23	35	32	19	22	11	10	11	13
17:40	Leq	28	43	41	30	24	16	10	11	13
	Lmax	42	55	55	46	31	27	15	13	14
	L90	22	35	30	18	22	11	10	11	13
17:45	Leq	30	48	42	30	24	15	10	11	13
	Lmax	47	67	60	47	30	24	15	13	14
	L90	23	36	33	21	22	11	10	11	13
17:50	Leq	29	46	41	30	24	16	11	12	13
	Lmax	43	61	55	46	32	28	19	17	14
	L90	23	37	32	20	22	11	10	11	13
17:55	Leq	31	49	43	32	24	16	11	11	13
	Lmax	46	68	57	47	33	25	18	17	14
	L90	24	40	35	23	22	12	10	11	13
18:00	Leq	29	47	42	31	24	16	11	11	13
	Lmax	45	66	58	48	33	29	19	14	14
	L90	24	40	35	23	22	11	10	11	13
18:05	Leq	30	47	42	31	25	17	11	11	13
	Lmax	46	65	58	49	39	29	17	15	14
	L90	23	37	33	21	22	11	10	11	13
18:10	Leq	29	47	42	30	24	15	10	11	13
	Lmax	46	66	60	46	32	29	16	13	14
	L90	22	36	30	18	22	11	10	11	13
18:15	Leq	30	49	43	30	24	15	10	11	13
	Lmax	51	72	65	49	34	28	18	15	13
	L90	22	34	30	18	22	11	10	11	13
18:20	Leq	29	44	41	30	24	16	11	11	13
	Lmax	48	65	62	49	34	28	22	18	17
	L90	22	34	30	18	22	11	10	11	13
18:25	Leq	28	44	40	28	24	15	10	11	13
	Lmax	43	60	57	43	32	31	18	14	13
	L90	22	34	28	17	22	11	9	11	13
18:30	Leq	27	46	39	28	23	14	10	11	13
	Lmax	44	68	54	42	32	29	18	13	14
	L90	22	34	29	18	22	11	10	11	13
18:35	Leq	28	44	40	29	24	16	11	11	13
	Lmax	42	62	55	42	32	29	21	15	14
	L90	22	34	30	18	22	11	10	11	13
18:40	Leq	28	44	40	29	24	17	11	11	13
	Lmax	45	62	58	47	37	34	22	14	13
	L90	22	34	29	18	22	11	10	11	13
18:45	Leq	27	43	38	28	24	16	11	11	13
	Lmax	42	56	52	47	36	34	22	17	13
	L90	22	33	28	16	22	11	9	11	13
18:50	Leq	27	45	38	28	24	16	11	12	13
	Lmax	42	65	52	45	30	28	20	16	14
	L90	22	34	29	18	22	11	10	11	13
18:55	Leq	29	45	42	31	24	16	11	12	13
	Lmax	48	61	62	52	34	29	20	18	14
	L90	22	34	29	17	22	11	10	11	13

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
19:00	Leq	26	43	37	27	23	15	10	12	13
	Lmax	41	61	53	45	32	31	22	22	17
	L90	22	34	30	18	22	11	10	11	13
19:05	Leq	27	43	39	28	24	15	11	12	13
	Lmax	40	59	53	41	32	27	24	18	15
	L90	23	35	31	20	22	11	10	11	13
19:10	Leq	30	45	44	28	24	15	11	12	13
	Lmax	52	65	67	46	37	29	18	13	13
	L90	22	32	28	16	22	11	10	11	13
19:15	Leq	27	44	38	27	24	14	10	12	13
	Lmax	42	63	56	41	31	26	17	16	15
	L90	22	33	28	17	22	11	10	11	13
19:20	Leq	28	46	40	27	24	15	10	11	13
	Lmax	45	66	57	43	33	31	19	13	14
	L90	22	33	28	17	22	11	10	11	13
19:25	Leq	26	43	37	26	24	14	10	11	13
	Lmax	40	59	53	43	31	28	17	14	13
	L90	22	35	28	17	22	11	9	11	13
19:30	Leq	27	42	39	27	23	14	10	12	13
	Lmax	48	63	63	50	30	27	15	15	14
	L90	22	35	28	16	22	11	10	11	13
19:35	Leq	28	43	38	31	24	17	11	12	13
	Lmax	51	60	64	56	42	38	29	21	14
	L90	22	35	27	16	22	11	9	11	13
19:40	Leq	27	44	39	27	24	16	11	12	13
	Lmax	46	65	60	45	36	33	23	18	14
	L90	22	34	28	16	22	11	9	11	13
19:45	Leq	27	42	39	28	23	14	10	11	13
	Lmax	49	63	61	55	32	30	19	21	15
	L90	22	33	27	16	22	11	10	11	13
19:50	Leq	26	43	37	26	23	15	10	11	13
	Lmax	41	61	52	43	30	28	17	13	13
	L90	22	33	27	16	22	11	9	11	13
19:55	Leq	25	40	36	25	23	14	10	11	13
	Lmax	40	56	55	40	30	27	16	12	13
	L90	22	32	27	16	22	11	9	11	13
20:00	Leq	25	40	36	25	23	15	10	11	13
	Lmax	40	58	52	42	33	31	20	14	13
	L90	22	33	28	16	22	11	9	11	13
20:05	Leq	27	44	38	27	24	15	10	12	13
	Lmax	43	65	54	43	34	29	22	25	17
	L90	22	33	28	17	22	11	10	11	13
20:10	Leq	26	42	38	27	24	15	11	11	13
	Lmax	42	60	55	42	34	26	17	14	13
	L90	22	32	28	17	22	11	10	11	13
20:15	Leq	26	42	36	27	23	14	10	11	13
	Lmax	44	65	53	50	33	30	23	19	15
	L90	22	33	28	17	22	11	10	11	13
20:20	Leq	26	42	37	25	23	13	10	11	13
	Lmax	42	60	55	44	32	28	18	14	13
	L90	22	32	27	16	22	11	9	11	13
20:25	Leq	24	40	33	23	23	12	10	11	13
	Lmax	39	59	49	44	33	22	14	13	13
	L90	22	32	27	16	22	11	9	11	13
20:30	Leq	25	41	36	24	23	13	10	11	13
	Lmax	42	59	55	45	32	24	20	12	13
	L90	22	33	27	16	22	11	9	11	13
20:35	Leq	25	39	35	25	23	15	10	11	13
	Lmax	41	61	53	40	35	32	21	14	14
	L90	22	32	27	16	22	11	9	11	13
20:40	Leq	35	45	50	33	24	14	10	11	13
	Lmax	59	72	74	58	36	27	23	18	15
	L90	22	32	27	16	22	11	9	11	13
20:45	Leq	23	39	32	20	23	11	10	11	13
	Lmax	35	57	48	34	27	21	13	13	13
	L90	22	33	26	15	22	11	9	11	13
20:50	Leq	26	44	37	27	24	14	10	11	13
	Lmax	41	61	52	44	32	29	16	14	14
	L90	22	34	27	16	22	11	10	11	13
20:55	Leq	24	42	33	21	23	12	10	11	13
	Lmax	39	62	52	37	28	20	12	12	13
	L90	22	34	26	15	22	11	9	11	13

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	63	125	250	500	1k	2k	4k	8k
21:00	Leq	25	44	35	25	23	13	10	11	13
	Lmax	43	65	54	47	37	26	21	16	14
	L90	22	34	27	16	22	11	9	11	13
21:05	Leq	26	42	37	24	23	13	10	11	13
	Lmax	48	70	61	46	32	26	17	13	13
	L90	22	33	27	15	22	11	9	11	13
21:10	Leq	24	41	32	22	23	13	10	11	13
	Lmax	39	61	49	38	32	28	18	13	13
	L90	22	34	27	16	22	11	9	11	13
21:15	Leq	24	39	34	22	23	12	10	11	13
	Lmax	40	58	54	40	27	22	13	12	14
	L90	22	33	26	15	22	11	9	11	13
21:20	Leq	26	42	37	29	23	13	10	11	13
	Lmax	48	65	58	55	30	26	15	13	13
	L90	22	32	27	15	22	11	9	11	13
21:25	Leq	24	39	34	23	23	14	10	11	13
	Lmax	40	57	54	37	31	27	17	14	13
	L90	22	31	27	16	22	11	9	11	13
21:30	Leq	24	38	33	22	23	12	10	11	13
	Lmax	36	53	49	38	29	25	17	12	13
	L90	22	32	27	16	22	11	9	11	13
21:35	Leq	24	40	34	23	23	13	10	11	13
	Lmax	38	58	50	39	31	25	14	12	13
	L90	22	32	27	16	22	11	9	11	13
21:40	Leq	23	38	31	21	23	12	10	11	13
	Lmax	35	55	47	36	30	24	14	13	13
	L90	22	32	26	15	22	11	9	11	13
21:45	Leq	25	41	35	25	23	14	11	11	13
	Lmax	40	61	52	41	32	30	20	16	14
	L90	22	33	28	16	22	11	9	11	13
21:50	Leq	24	39	34	23	23	13	10	11	13
	Lmax	38	56	51	39	31	28	18	16	14
	L90	22	33	28	16	22	11	10	11	13
21:55	Leq	24	40	34	23	23	13	10	11	13
	Lmax	37	57	50	37	30	25	15	15	14
	L90	22	34	27	16	22	11	10	11	13
22:00	Leq	26	42	37	26	23	14	10	11	13
	Lmax	49	61	64	51	35	29	20	14	13
	L90	22	34	27	16	22	11	9	11	13
22:05	Leq	25	42	35	24	23	13	10	11	13
	Lmax	42	63	55	41	29	28	17	13	13
	L90	22	34	27	16	22	11	9	11	13
22:10	Leq	25	40	34	24	23	14	10	11	13
	Lmax	37	57	49	39	31	29	19	13	13
	L90	22	34	27	16	22	11	9	11	13
22:15	Leq	27	41	40	27	23	13	10	11	13
	Lmax	46	59	61	47	31	29	19	13	13
	L90	22	33	27	16	22	11	9	11	13
22:20	Leq	27	42	40	29	23	14	10	11	13
	Lmax	46	60	60	48	30	26	16	14	13
	L90	22	32	27	16	22	11	10	11	13
22:25	Leq	28	47	40	28	24	15	11	11	13
	Lmax	44	68	54	41	33	26	17	14	13
	L90	22	34	28	16	22	11	10	11	13
22:30	Leq	32	50	46	32	24	16	11	12	13
	Lmax	55	71	70	54	36	27	18	16	14
	L90	23	36	31	19	22	11	10	11	13
22:35	Leq	28	45	40	29	24	15	11	11	13
	Lmax	42	64	54	43	30	28	17	13	13
	L90	23	35	31	20	22	11	10	11	13
22:40	Leq	30	47	43	31	24	16	11	12	13
	Lmax	45	61	59	45	31	27	18	16	14
	L90	23	36	33	22	22	12	10	11	13
22:45	Leq	38	49	52	42	31	19	12	12	13
	Lmax	63	69	75	69	56	44	35	26	15
	L90	23	38	33	21	22	11	10	11	13
22:50	Leq	27	46	39	27	24	13	11	12	13
	Lmax	42	59	55	44	36	23	25	22	17
	L90	24	41	33	21	22	11	10	11	13
22:55	Leq	27	46	39	26	23	13	10	12	13
	Lmax	39	62	51	36	28	21	14	14	13
	L90	24	40	35	22	22	11	10	11	13

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	63	125	250	500	1k	2k	4k	8k
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	L90	24	40	34	21	22	11	10	11	13
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	Lmax	40	60	53	41	27	22	13	12	16
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23:10	Leq	26	44	37	25	23	14	10	11	13
	Lmax	39	59	52	39	30	27	17	13	13
	L90	22	33	27	16	22	11	10	11	13
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	Lmax	38	60	48	40	30	24	14	13	13
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	L90	22	33	26	16	22	11	9	11	13
23:25	Leq	26	40	38	25	23	14	10	11	13
	Lmax	41	55	54	45	32	31	19	13	13
	L90	22	33	26	16	22	11	9	11	13
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	L90	22	33	26	15	22	11	9	11	13
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	L90	22	33	26	15	22	11	9	11	13
23:45	Leq	24	37	34	22	23	12	10	11	13
	Lmax	35	54	47	36	28	24	14	13	13
	L90	22	33	26	15	22	11	9	11	13
23:50	Leq	33	51	47	35	23	12	10	11	13
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	L90	21	31	26	15	22	11	9	11	13
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	L90	21	31	26	15	22	11	9	11	13
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	L90	21	31	26	15	22	11	9	11	13
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	L90	22	32	27	15	22	11	9	11	13
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	L90	21	30	26	15	22	11	9	11	13
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	Lmax	33	54	45	34	26	19	12	12	13
	L90	21	31	26	15	22	11	9	11	13
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	L90	21	31	26	15	22	11	9	11	13
00:40	Leq	23	35	31	20	23	11	10	11	13
	Lmax	42	54	57	44	27	20	27	23	16
	L90	21	31	26	15	22	11	9	11	13
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	L90	21	31	25	15	22	11	9	11	13
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	L90	21	31	26	15	22	11	9	11	13
00:55	Leq	23	37	31	19	23	12	10	11	13
	Lmax	39	55	53	39	30	27	23	21	16
	L90	21	31	25	15	22	11	9	11	13

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
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	L90	21	32	26	15	22	11	9	11	13
01:10	Leq	22	35	27	16	23	11	10	11	13
	Lmax	25	40	32	20	26	13	11	12	13
	L90	21	32	26	15	22	11	9	11	13
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	L90	21	31	26	15	22	11	9	11	13
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	L90	21	30	25	15	22	11	9	11	13
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	L90	21	30	25	15	22	11	9	11	13
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	Lmax	29	44	43	28	26	12	11	12	13
	L90	21	30	25	15	22	11	9	11	13
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	L90	22	31	26	15	22	11	9	11	13
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	L90	21	32	26	15	22	11	9	11	13
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Time Period	Index	dB(A)	63	125	250	500	1k	2k	4k	8k
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	L90	21	30	25	15	22	11	9	11	13
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	Lmax	25	38	32	19	26	12	11	12	14
	L90	21	30	25	15	22	11	9	11	13
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	L90	21	30	25	15	22	11	9	11	13
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	L90	21	30	25	15	22	11	9	11	13
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	L90	21	30	25	15	22	11	9	11	13
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	L90	21	31	26	15	22	11	9	11	13
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	L90	21	31	25	15	22	11	9	11	13
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Time Period	Index	dB(A)	63	125	250	500	1k	2k	4k	8k
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	L90	21	31	26	15	22	11	9	11	13
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	L90	21	30	26	15	22	11	9	11	13
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	Lmax	31	52	42	30	26	16	14	14	14
	L90	22	31	26	15	22	11	9	11	13
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	Lmax	33	52	43	34	28	24	15	12	13
	L90	21	31	26	15	22	11	9	11	13
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	L90	22	32	27	16	22	11	9	11	13
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	Lmax	25	40	34	21	26	12	11	12	13
	L90	22	32	26	15	22	11	9	11	13
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	Lmax	39	58	51	39	34	30	19	13	13
	L90	22	33	27	16	22	11	9	11	13
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	L90	22	32	27	16	22	11	9	11	13
05:50	Leq	24	37	35	23	23	12	10	11	13
	Lmax	42	58	56	44	28	22	22	17	14
	L90	22	32	27	15	22	11	9	11	13
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	Lmax	41	55	55	41	34	33	21	15	13
	L90	22	31	27	15	22	11	9	11	13
06:00	Leq	24	39	33	22	23	13	10	11	13
	Lmax	39	58	50	40	31	30	19	16	14
	L90	22	31	27	16	22	11	9	11	13
06:05	Leq	23	36	31	19	23	12	10	11	13
	Lmax	35	54	46	35	29	26	16	13	13
	L90	22	31	27	16	22	11	9	11	13
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	L90	22	31	27	16	22	11	9	11	13
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	Lmax	36	53	49	36	31	27	20	14	14
	L90	22	32	28	16	22	11	9	11	13
06:20	Leq	25	38	37	24	23	12	10	11	13
	Lmax	43	54	57	44	34	26	20	17	14
	L90	22	32	28	16	22	11	9	11	13
06:25	Leq	31	42	45	31	23	14	11	12	13
	Lmax	50	61	66	50	31	29	20	17	13
	L90	22	33	28	17	22	11	10	11	13
06:30	Leq	25	42	35	23	23	12	10	11	13
	Lmax	40	61	53	40	31	27	16	13	15
	L90	22	34	29	17	22	11	9	11	13
06:35	Leq	25	41	35	23	23	13	10	11	13
	Lmax	39	58	52	39	33	29	20	16	14
	L90	22	33	29	17	22	11	9	11	13
06:40	Leq	27	44	38	26	23	15	11	11	13
	Lmax	42	63	55	41	31	29	19	17	14
	L90	22	34	29	17	22	11	10	11	13
06:45	Leq	31	48	44	31	24	15	11	12	13
	Lmax	49	64	63	48	38	31	24	18	14
	L90	22	34	30	18	22	11	9	11	13
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	Lmax	46	63	59	47	41	29	23	21	16
	L90	22	34	30	18	22	11	9	11	13
06:55	Leq	28	45	41	26	23	14	10	11	13
	Lmax	48	67	63	45	40	27	20	13	13
	L90	22	34	29	17	22	11	9	11	13

<i>Time Period</i>	<i>Index</i>	<i>dB(A)</i>	<i>63</i>	<i>125</i>	<i>250</i>	<i>500</i>	<i>1k</i>	<i>2k</i>	<i>4k</i>	<i>8k</i>
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	L90	22	35	30	18	22	11	10	11	13
07:05	Leq	26	42	37	25	23	14	10	11	13
	Lmax	38	58	51	39	30	27	18	13	13
	L90	22	34	30	18	22	11	10	11	13
07:10	Leq	27	44	40	26	23	14	10	11	13
	Lmax	45	60	61	42	32	26	17	14	13
	L90	22	35	30	18	22	11	10	11	13
07:15	Leq	28	43	41	30	24	15	11	12	13
	Lmax	48	63	63	49	37	32	29	23	14
	L90	22	35	30	18	22	11	9	11	13
07:20	Leq	27	45	39	27	24	15	11	11	13
	Lmax	45	69	57	45	34	29	19	16	13
	L90	22	35	30	18	22	11	10	11	13
07:25	Leq	25	41	35	24	23	13	10	11	13
	Lmax	41	65	48	38	32	24	16	13	13
	L90	22	34	30	18	22	11	10	11	13
07:30	Leq	30	52	42	29	24	16	12	12	13
	Lmax	46	68	59	44	37	34	26	17	14
	L90	22	34	30	18	22	11	10	11	13
07:35	Leq	32	56	40	28	24	16	11	11	13
	Lmax	45	65	58	45	31	29	20	16	14
	L90	24	43	31	20	22	11	10	11	13
07:40	Leq	38	64	38	26	23	13	10	11	13
	Lmax	41	66	49	37	28	25	17	17	14
	L90	31	57	34	23	22	11	10	11	13
07:45	Leq	28	49	37	27	24	15	11	11	13
	Lmax	43	66	53	43	32	29	20	16	13
	L90	22	35	30	18	22	11	10	11	13
07:50	Leq	29	44	42	30	25	17	12	12	13
	Lmax	50	64	64	52	39	36	28	29	15
	L90	23	35	31	19	22	11	10	11	13
07:55	Leq	26	43	38	25	23	15	11	12	13
	Lmax	43	62	57	40	36	29	20	14	13
	L90	22	34	29	18	22	11	10	11	13
08:00	Leq	26	43	37	25	23	14	10	11	13
	Lmax	41	61	55	38	31	27	18	14	14
	L90	22	34	30	18	22	11	10	11	13
08:05	Leq	28	43	41	29	24	15	11	12	13
	Lmax	45	60	58	47	37	29	18	18	14
	L90	23	35	31	19	22	11	10	11	13
08:10	Leq	26	42	37	25	23	14	10	11	13
	Lmax	42	63	55	38	32	29	17	14	13
	L90	22	34	30	18	22	11	10	11	13
08:15	Leq	26	41	37	26	23	15	11	11	13
	Lmax	39	58	51	40	30	28	19	19	13
	L90	22	34	30	18	22	11	10	11	13
08:20	Leq	34	47	48	35	27	18	12	12	13
	Lmax	59	69	74	57	49	39	29	20	14
	L90	23	35	32	20	22	11	10	11	13
08:25	Leq	32	45	46	34	24	16	11	12	13
	Lmax	57	63	71	61	37	30	21	22	13
	L90	23	37	33	21	22	11	10	11	13
08:30	Leq	29	43	43	30	23	14	11	11	13
	Lmax	47	60	61	49	32	28	19	17	13
	L90	22	34	30	18	22	11	10	11	13
08:35	Leq	29	47	42	30	24	15	11	11	13
	Lmax	48	68	61	48	38	31	21	16	14
	L90	22	35	29	18	22	11	10	11	13
08:40	Leq	30	49	43	31	24	15	11	12	13
	Lmax	51	73	62	52	37	29	20	20	13
	L90	22	35	30	18	22	11	10	11	13
08:45	Leq	25	42	36	25	23	13	10	12	13
	Lmax	37	59	48	38	29	27	25	18	14
	L90	22	35	30	18	22	11	10	11	13
08:50	Leq	26	43	38	26	23	14	11	12	13
	Lmax	42	59	56	44	30	26	19	15	14
	L90	22	35	29	18	22	11	10	11	13
08:55	Leq	29	45	41	29	24	16	11	12	13
	Lmax	46	61	59	47	38	32	21	18	19
	L90	23	36	32	20	22	11	10	11	13

Time Period	Index	dB(A)	63	125	250	500	1k	2k	4k	8k
09:00	Leq	28	47	39	27	24	14	11	12	13
	Lmax	46	69	57	46	33	26	27	19	15
	L90	22	35	30	18	22	11	9	11	13
09:05	Leq	28	44	41	29	24	15	11	11	13
	Lmax	43	62	57	45	36	29	19	15	13
	L90	22	35	30	19	22	11	10	11	13
09:10	Leq	26	46	37	25	23	14	10	11	13
	Lmax	46	69	59	42	30	27	17	16	14
	L90	22	33	29	17	22	11	9	11	13
09:15	Leq	26	43	37	27	23	15	10	11	13
	Lmax	44	62	56	48	30	28	17	14	13
	L90	22	34	30	18	22	11	10	11	13
09:20	Leq	26	41	38	27	24	15	10	11	13
	Lmax	41	60	53	43	34	31	19	14	13
	L90	22	34	30	18	22	11	10	11	13
09:25	Leq	28	44	40	29	24	15	11	11	13
	Lmax	47	62	58	52	37	30	20	23	14
	L90	22	34	30	18	22	11	10	11	13
09:30	Leq	29	42	41	29	25	18	13	12	13
	Lmax	50	59	61	50	44	44	37	30	18
	L90	22	33	30	18	22	11	10	11	13
09:35	Leq	29	43	42	32	24	14	11	12	13
	Lmax	48	61	62	52	36	24	21	19	16
	L90	22	34	30	18	22	11	10	11	13
09:40	Leq	27	46	38	27	23	14	10	11	13
	Lmax	40	61	51	42	31	28	17	13	13
	L90	23	36	31	18	22	11	10	11	13
09:45	Leq	27	45	39	26	23	14	10	11	13
	Lmax	43	56	58	43	31	27	17	14	13
	L90	23	41	32	19	22	11	10	11	13
09:50	Leq	29	46	43	30	24	14	10	11	13
	Lmax	51	62	66	52	38	28	16	15	13
	L90	23	42	32	20	22	11	10	11	13
09:55	Leq	30	49	43	31	24	16	11	12	13
	Lmax	46	67	59	48	34	30	20	16	14
	L90	23	38	31	20	22	11	10	11	13
10:00	Leq	30	44	37	27	26	22	22	23	19
	Lmax	53	61	54	49	46	44	46	48	43
	L90	23	38	31	20	22	11	10	11	13

Time Period	Index	dB(A)	63	125	250	500	1k	2k	4k	8k
Daytime	Leq*	30	49	42	30	24	16	11	12	13
	Lmax*	49	65	63	51	37	32	29	29	25
	L90*	23	40	31	19	22	11	10	11	13
Evening	Leq*	28	43	41	29	24	14	10	11	13
	Lmax*	50	64	63	53	40	31	22	17	14
	L90*	22	34	29	17	22	11	9	11	13
Night Time	Leq*	26	46	36	23	23	12	10	11	13
	Lmax*	42	61	56	43	31	26	18	15	14
	Lmax**	42	62	55	44	33	30	22	18	14
	Lmax***	41	60	54	41	32	29	20	17	14
	L90*	22	38	27	16	22	11	9	11	13

* Logarithmic mean

** Level exceeded 10 times

*** Level exceeded 15 times