

ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 3831

04 March 2025

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103 CRUMPSALL LANE, MANCHESTER
ENVIRONMENTAL NOISE IMPACT ASSESSMENT
ACOUSTIC CONSULTANCY REPORT ADT 3831/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
-	04 March 2025	Andrew Lockwood		first issue

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1.0 SUMMARY

Prior approval for change of use of the existing, three storey building located at 103 Crumpsall Lane from Class E – Retail into three residential apartments has been granted. The proposed layouts are shown on the attached floor plans.

Condition 3a requires a scheme of sound insulation to protect the residential dwellings from the noise from Crumpsall Lane to be submitted and approved prior to commencement of the development.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the existing ambient noise levels both outside and inside the existing building.

The sound insulation requirements for the building facades have been calculated, and minimum acoustic performance requirements for the glazing systems and any acoustic trickle vents are presented in tables 3831/T1 and T2 of this report.

The conclusion of this report is that although internal noise levels would be excessive with the windows open, external noise intrusion can readily be controlled to the levels typically required by Manchester City Council by means of suitable glazing systems, in conjunction with acoustic trickle ventilators if required.

2.0 **BASIS OF ASSESSMENT**

2.1 **Site Location**

The site is located at 103 Crumpsall Lane, Crumpsall, approximately 4 km to the north of Manchester City Centre, and 2.5 km from the M60.

The surrounding development comprises a mixture of commercial and residential properties.

2.2 **Proposed Development**

The proposal is to convert the existing building into 3 residential apartments as shown on the architectural plans appended to the end of this report.

2.3 **Assessment Criteria**

Condition 3a of the permission requires a scheme of sound insulation measures to protect the new residential dwellings from Crumpsall Lane to be submitted and approved prior to the commencement of the development.

Unusually for Manchester City Council, the condition does not stipulate what the internal noise levels should be. However, their normal requirements are typically as follows:-

Area	07:00 – 23:00	23:00 – 07:00
living rooms	35 dB $L_{Aeq,16hour}$	-
bedrooms	-	30 dB $L_{Aeq,8hour}$ / 45 L_{Amax}

With regard to the L_{Amax} requirement, it is not practical to design a building envelope to control the sound generated by every single event, irrespective of level, to a fixed internal noise level. However, relevant guidance is to be found in ProPG: Planning & Noise (2017) which says:-

“... in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night”.

The following guidance assumes that this interpretation of their L_{Amax} requirement will be acceptable to the Council.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Introduction

Unattended noise monitoring was undertaken between 14:00 hours on Thursday 13 February 2025 and 11:00 hours the following Monday to measure the typical levels of noise both outside the building at the front and rear, and also in a front facing room overlooking Crumpsall Lane.

3.2 Instrumentation

The instrumentation used for the survey is detailed in Appendix A of this report. Both meters were field calibrated at the beginning and end of the survey period. No significant drift occurred.

3.3 Procedure

Three measurement positions were selected as indicated on the attached site plan 3831/SP1.

At positions 1 and 2, the microphone was suspended on a pole approximately 1 metre external to the building facade and least 3.5 metres from any other acoustically reflective surface.

At position 3, the microphone was mounted on a tripod in the middle of the 2nd floor room.

The noise levels at all three positions were logged continuously with the sound level meters set to store the octave band and 'A' weighted 100ms short-term L_{eq} and $L_{max,F}$ for subsequent post processing.

3.4 Results

The logged data has been post processed to determine $L_{Aeq,T}$, $L_{A90,T}$ and L_{Amax} levels for each 5 minute period, and these have been plotted on the attached time history graphs 3831/TH1 to TH3 for measurement positions 1 to 3 respectively.

It will be noted from graph 3831/TH3 that the measurements inside the second floor room stopped at around 02:00 hours on the final day of the survey. This was due to the meter running out of storage space.

Please refer to Appendix B for explanation of the noise units and the A-weighting term used in this report.

3.5 Weather Conditions

At the beginning and end of the survey period, the conditions were dry and still, with similar conditions forecast for the intervening period.

There is nothing in the recorded data to indicate that the measurements were adversely affected by the weather.

3.6 Description of Existing Acoustic Environment

At the beginning and end of the survey period, the noise levels around the site were controlled by road traffic noise, emanating primarily from Crumpsall Lane. No other significant noise sources were noticed either at the beginning or the end of the survey period.

Reference to the attached time history graphs shows that the logged data generally follow the diurnal pattern typical of an urban environment controlled primarily by road traffic noise. There any evidence of any other significant noise sources in the logged data.

4.0 ASSESSMENT OF EXTERNAL NOISE INTRUSION

4.1 External Noise Levels

In the absence of any other significant noise sources, the dominant noise source impacting on the building is local and more distant road traffic.

4.2 Internal Noise Levels

The average daytime and nighttime noise levels ($L_{Aeq,T}$) measured in the 2nd floor room overlooking Crumpsall Lane were as follows:-

Location	Day (07:00 - 23:00)	Night (23:00 - 07:00)
front elevation	43 - 49	35 – 40

Additionally, during the night, the noise levels due to single events regularly exceeded 50 dB $L_{Amax,F}$.

The existing windows therefore clearly do not provide sufficient sound insulation to satisfy MCC's normal requirements.

4.3 Average Noise Levels

When assessing external noise intrusion into new dwellings and noise levels in gardens it must be borne in mind that the noise climate may change in the future. The following discussion is by necessity based on the results of the environmental noise survey described in Section 3.0 above.

Analysis of the logged data shows that the daytime and nighttime noise levels ($L_{Aeq,T}$) incident on the front and rear elevations of the building were as follows:-

Location	Day (07:00 - 23:00)	Night (23:00 - 07:00)
front elevation	63 – 67	56 – 58
rear elevation	47 - 49	40 - 43

It is generally accepted that the noise level inside a room with a partially open window is around 12 dB(A) lower than the level outside. The practical implication of this is that internal noise levels would be above MCC's normal requirements when the windows are open. Thus, an alternative form of ventilation will have to be provided to all habitable rooms to obviate the need to open the windows. This would typically be either acoustic trickle vents or some form of mechanical ventilation heat recovery (MVHR) system.

4.4 Single Event Noise Levels

As the sound insulation properties of a building façade vary with frequency, it cannot be assumed that the highest single event noise levels (L_{Amax}) inside a building will result from the highest single event noise levels outside.

It is therefore a complex procedure to estimate the likely number of exceedances of any given internal single event noise level, in this case 45 dB $L_{Amax,F}$. Whilst every effort has been made to make the predictions as accurate as possible, there is still an element of uncertainty in the analysis.

4.5 Sound Insulation Requirements – Front Elevation

Reference to the attached floor plans shows that all the rooms on the front elevation are living rooms, so the only requirement is to control noise intrusion during the daytime (07:00 – 23:00 hours).

The attached calculation 3831/C1 shows that for an external, incident noise level of 66 dB $L_{Aeq,16hour}$, a level of below 35 dB $L_{Aeq,16hour}$ inside can be achieved using Pilkington R_w40 glazing and up to 2 Greenwood EAQ42W trickle vents in the ground floor flat.

On the upper two floors, using the same glazing and trickle vents, the predicted internal noise levels are 1 – 2 dB(A) lower due to the combined effect of the smaller window sizes and the increased distance from the road.

4.6 Sound Insulation Requirements – Rear Elevation

The noise levels at the rear of the property are much lower; indeed, the internal noise levels would only be marginally above MCC's requirements if the windows were partially open.

However, the attached calculation 3831/C2 shows that for an external, incident noise level of 43 dB $L_{Aeq,8hour}$, a level of below 30 dB $L_{Aeq,8hour}$ inside can be achieved using standard hermetically sealed double glazing units (4 / 16 / 4) and up to 2 standard acoustic trickle vents in any of the rear facing bedrooms. Please note that the figures used for the acoustic trickle ventilator are generic, taken from BS 8233. The Greenwood EAQ42W would again be suitable, but there may be other, lower performance units on the market which would also provide acceptable performance.

Further analysis shows that with this level of sound insulation, there should be no more than 5 single event noise levels above 45 dB $L_{Amax,F}$ over the course of the night (23:00 to 07:00 hours).

4.7 Glazing System Selection

Most glazing system manufacturers and suppliers have a rudimentary grasp of R_w as a descriptor for acoustic performance. However, this is akin to an average; it is a single figure derived from 1/1 octave band or 1/3 octave band sound reduction indices. It does not provide a complete description of performance, and is not adequate for use in situations such as this, where the performance at different frequencies is important.

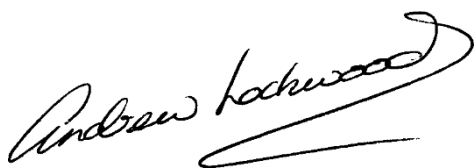
The supplier should therefore be required to provide 1/1 octave band and / or 1/3 octave band sound reduction indices for their proposed glazing systems. These should then be review by an acoustic specialist prior to their procurement and installation.

4.8 Summary

The foregoing discussion has demonstrated that external noise intrusion can readily be controlled to MCC's normal requirements.

Whilst examples of suitable products have been provided, it does not mean that those specific products must be used. Any glazing systems and trickle vents achieving the minimum performance specifications set out in tables 3831/T1 and T2 should be acoustically suitable.

If background ventilation were to be provided by a mechanical ventilation heat recovery system (MVHR), trickle vents would not be required. This would improve the sound insulation properties of the facades, so the same glazing systems would still be acoustically suitable. Indeed, there might even be scope for some reduction of the acoustic requirements for the windows on the front elevation.



FOR ACOUSTIC DESIGN TECHNOLOGY



Notes

Description

Site Plan Showing Noise Monitoring Locations

Project

103 Crumpsall Lane, Manchester

Survey Date

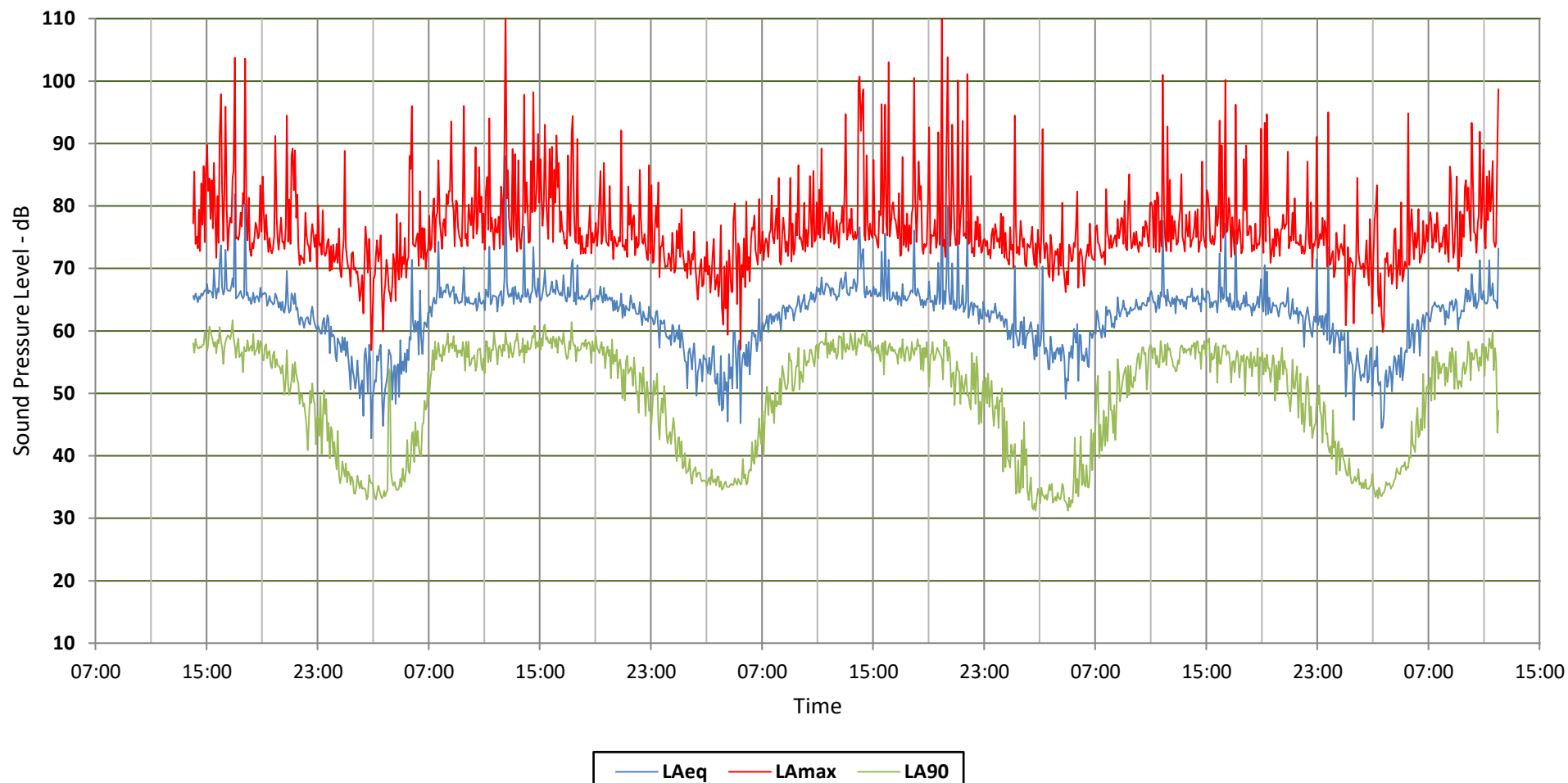
13 – 17 February 2025

Drawing No.

3831/SP1



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Notes

Description

Time History Graph – Front Elevation

Project

103 Crumpsall Lane, Manchester

Survey Date

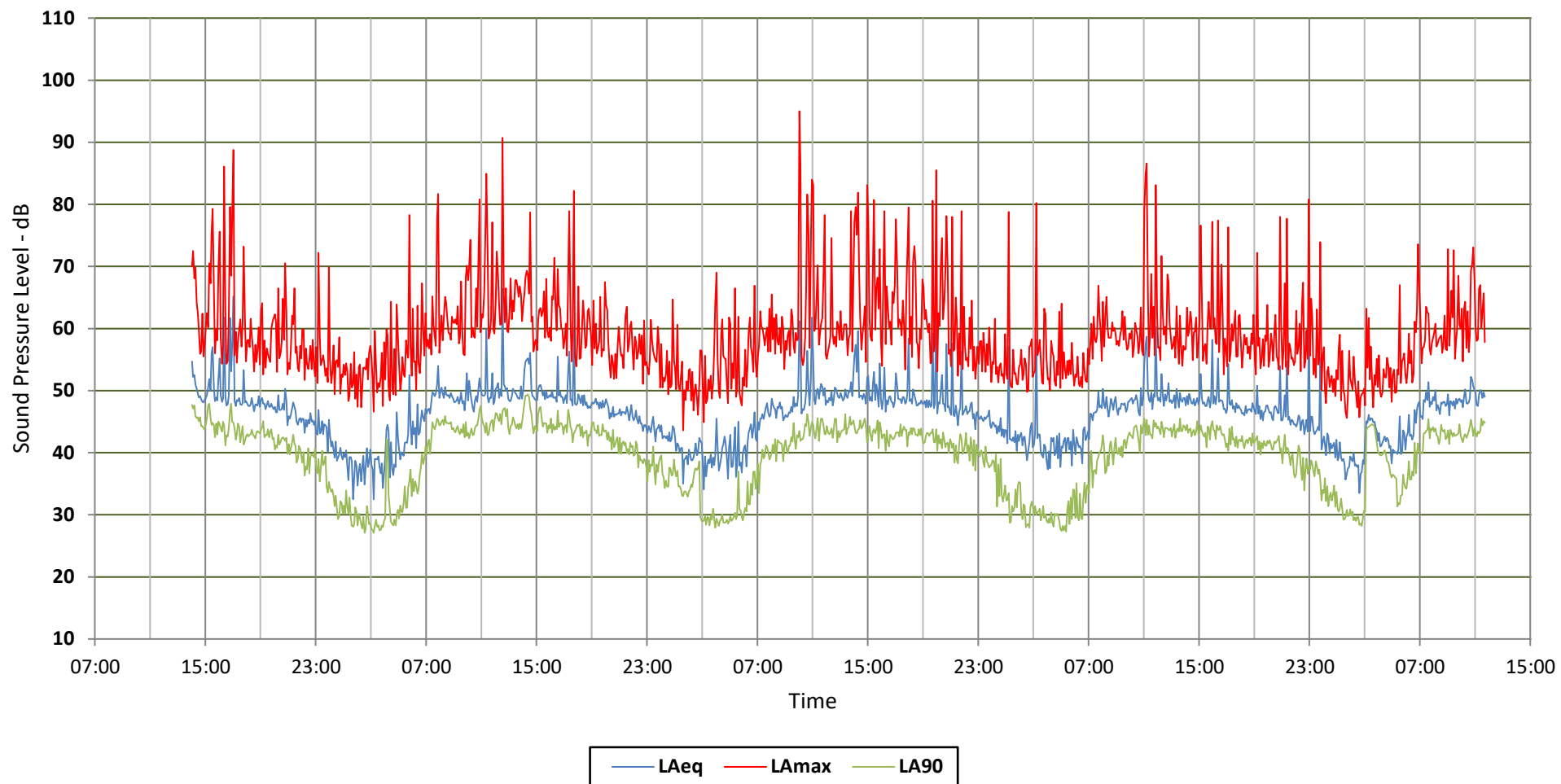
10 – 14 November 2023

Drawing No.

3831/TH1



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Notes

Description

Time History Graph – Side Elevation

Project

103 Crumpsall Lane, Manchester

Survey Date

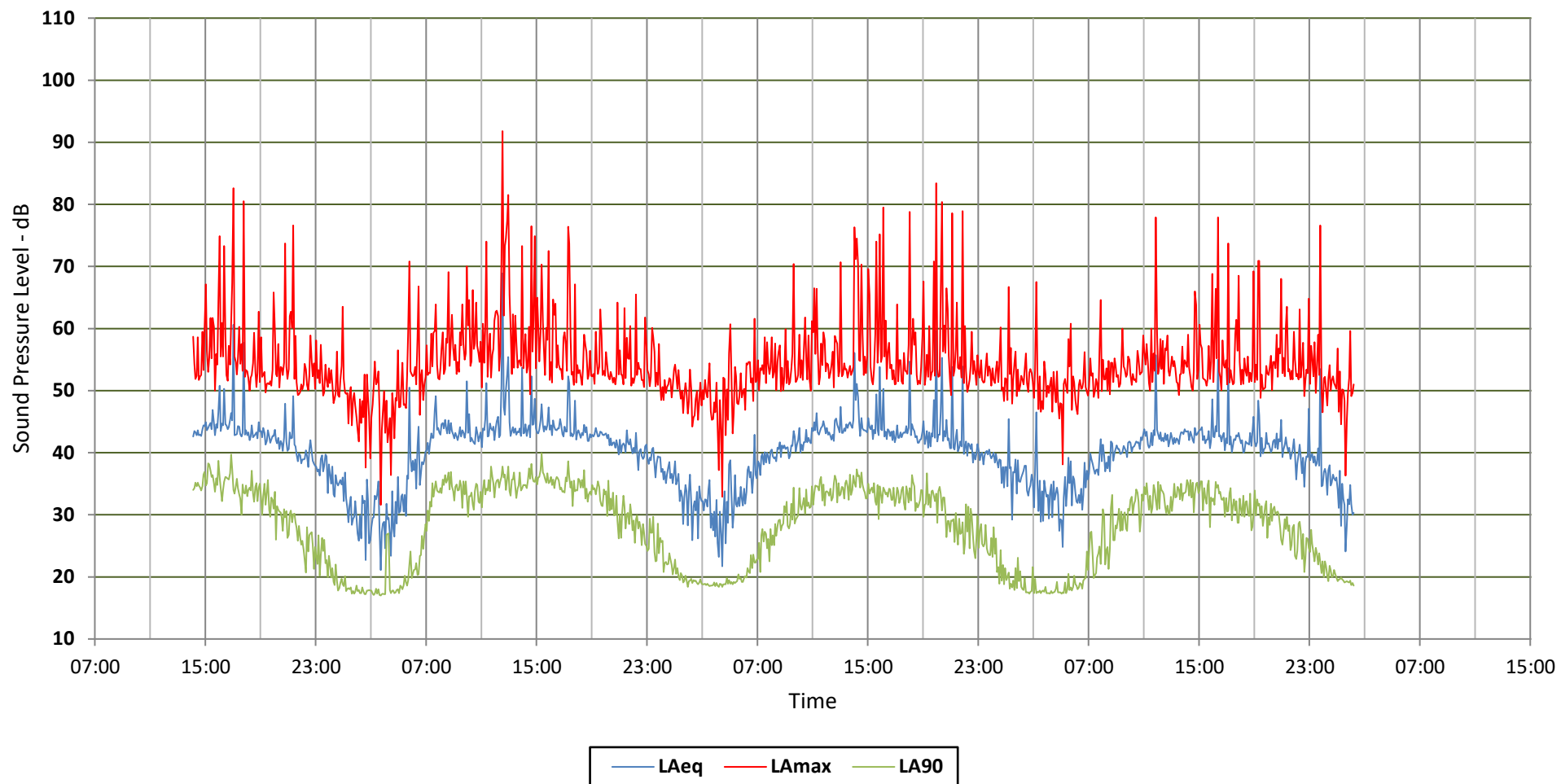
10 – 14 November 2023

Drawing No.

3831/TH2



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Notes

Description

Time History Graph – Rear Elevation

Project

103 Crumpsall Lane, Manchester

Survey Date

10 – 14 November 2023

Drawing No.

3831/TH3



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SAMPLE FAÇADE CALCULATION

Ground Floor Front Living Room

	Area	Octave Band Centre Frequency - Hz								dB(A)
		63	125	250	500	1k	2k	4k	8k	
Incident noise level		71	64	59	58	63	61	55	47	67
Direct Field										
Composite SRI of structure (from below)		-23	-27	-29	-33	-38	-40	-38	-37	
Direct L _p		48	37	30	25	25	21	17	10	30
Reverberant Field										
Composite SRI of structure (from below)		-23	-27	-29	-33	-38	-40	-38	-37	
10 log (S / A)		3	2	0	-2	-3	-4	-4	-4	
Constant (for line source)		1	1	1	1	1	1	1	1	
Reverberant L _p		52	40	31	24	23	18	14	7	31
Total L _p		53	42	34	28	27	23	19	12	34
Composite SRI Calculation										
103 mm brick + 100 mm block with ties	2.3	28	34	40	45	50	55	55	55	
10/12/6.4 R _w 40 (Pilk 1988)	9	22	27	29	36	41	42	49	58	
Greenwood EAQ42W	10	40	40	42	37	43	46	41	40	
Greenwood EAQ42W	10	40	40	42	37	43	46	41	40	
Composite SRI		23	27	29	33	38	40	38	37	

CALCULATION 3831/C1

SAMPLE FAÇADE CALCULATION

Rear Facing Bedroom

	Area	Octave Band Centre Frequency - Hz								dB(A)
		63	125	250	500	1k	2k	4k	8k	
Incident noise level		52	45	41	37	38	37	32	26	43
Direct Field										
Composite SRI of structure (from below)		-22	-27	-24	-28	-32	-30	-30	-30	
Direct L _p		30	18	17	9	6	7	2	-4	14
Reverberant Field										
Composite SRI of structure (from below)		-22	-27	-24	-28	-32	-30	-30	-30	
10 log (S / A)		3	3	3	2	0	-1	-1	-1	
Constant (for line source)		1	1	1	1	1	1	1	1	
Reverberant L _p		34	22	21	12	7	7	2	-4	17
Total L _p		35	23	22	14	10	10	5	-1	19
Composite SRI Calculation										
103 mm brick + 100 mm block with ties	6	28	34	40	45	50	55	55	55	
4/12/4 sealed (Pilkington)	2.8	18	24	20	25	35	38	35	35	
Acoustic Trickle Vent (BS 8233)	10	37	37	36	35	36	34	34	34	
Acoustic Trickle Vent (BS 8233)	10	37	37	36	35	36	34	34	34	
Composite SRI		22	27	24	28	32	30	30	30	

CALCULATION 3831/C1

ACOUSTIC SPECIFICATIONS FOR GLAZING SYSTEM

Minimum Required Sound Reduction Indices (R) for Glazing Systems dB

Location	Octave Band Centre Frequency - Hz								Possible Glazing Configuration
	63	125	250	500	1k	2k	4k	8k	
Front Elevation	22	27	29	36	41	42	45	45	6.4 lam. / 16 / 10
Rear Elevation	18	24	20	25	35	38	35	35	4 / 16 / 4

TABLE 3831/T1

ACOUSTIC SPECIFICATIONS FOR TRICKLE VENTILATORS

Minimum Required Element Normalised Level Differences (Dne) for Acoustic Trickle Vents

Rooms	Octave Band Centre Frequency - Hz								Possible Trickle Ventilator
	63	125	250	500	1k	2k	4k	8k	
Front Elevation	40	40	42	37	43	46	41	40	Greenwood EAR42W
Rear Elevation	37	37	36	35	36	34	34	34	Greenwood EAR42W

TABLE 3831/T2

APPENDIX A

Instrumentation

Manufacturer	Type and / or Model	Serial Number	Last Laboratory Calibration
01dB	(Blue) Solo Class 1 Sound Level Meter	60320	
01dB	MCE 212 ½ inch Microphone	90549	
01dB	Fusion 1 Class 1 Sound Level Meter (SML11)	15131	April 2023
01dB	Fusion MCE3 Microphone	14038	April 2023
01dB	Fusion 2 Class 1 Sound Level Meter (SML12)	15130	April 2023
01dB	Fusion MCE3 Microphone	14050	April 2023
Norsonic	Nor1251 Calibrator	35228	April 2022

APPENDIX B

Acoustic Terminology

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

A-weighting The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the A-weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the A-weighted noise level by applying certain corrections to an un-weighted spectrum.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

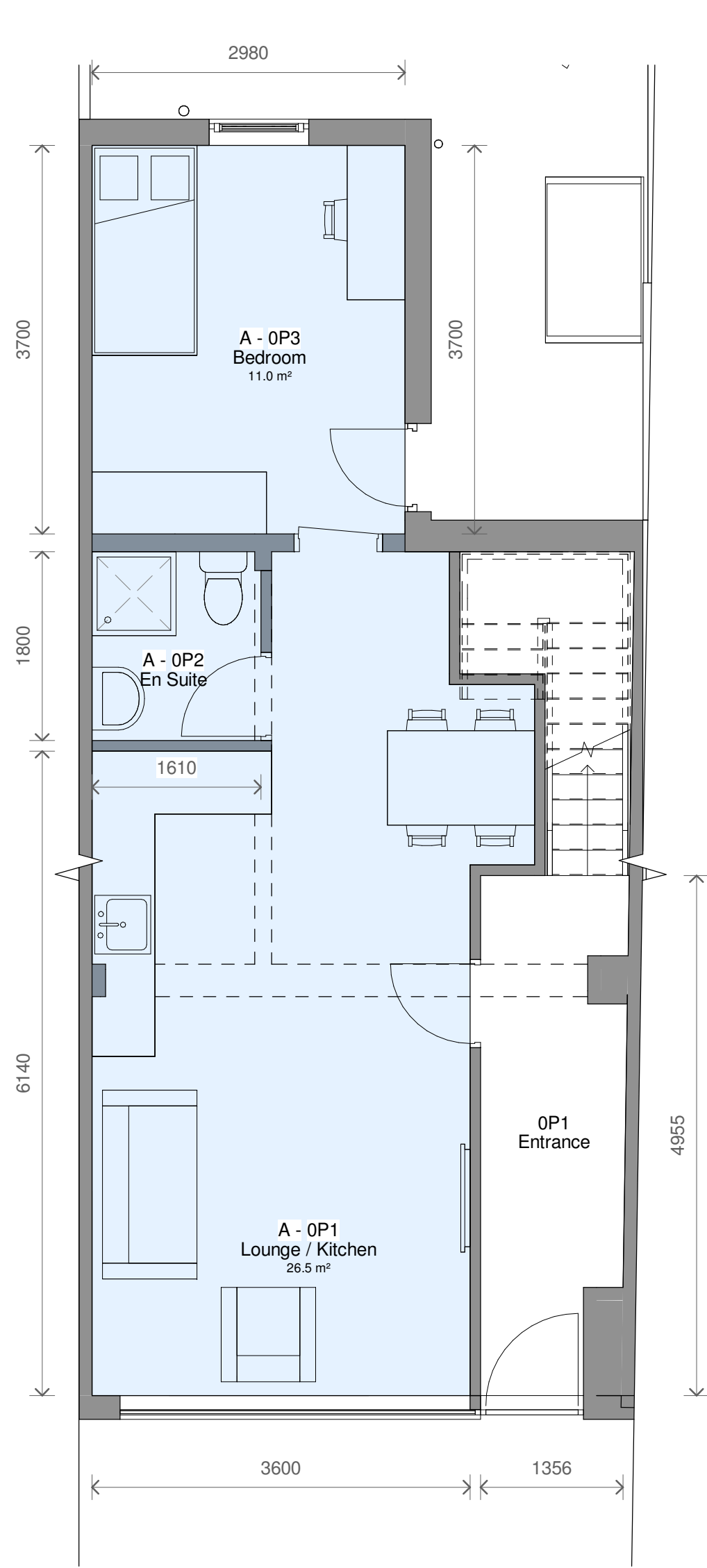
L_{10} L_{10} , being the level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} L_{90} is the level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

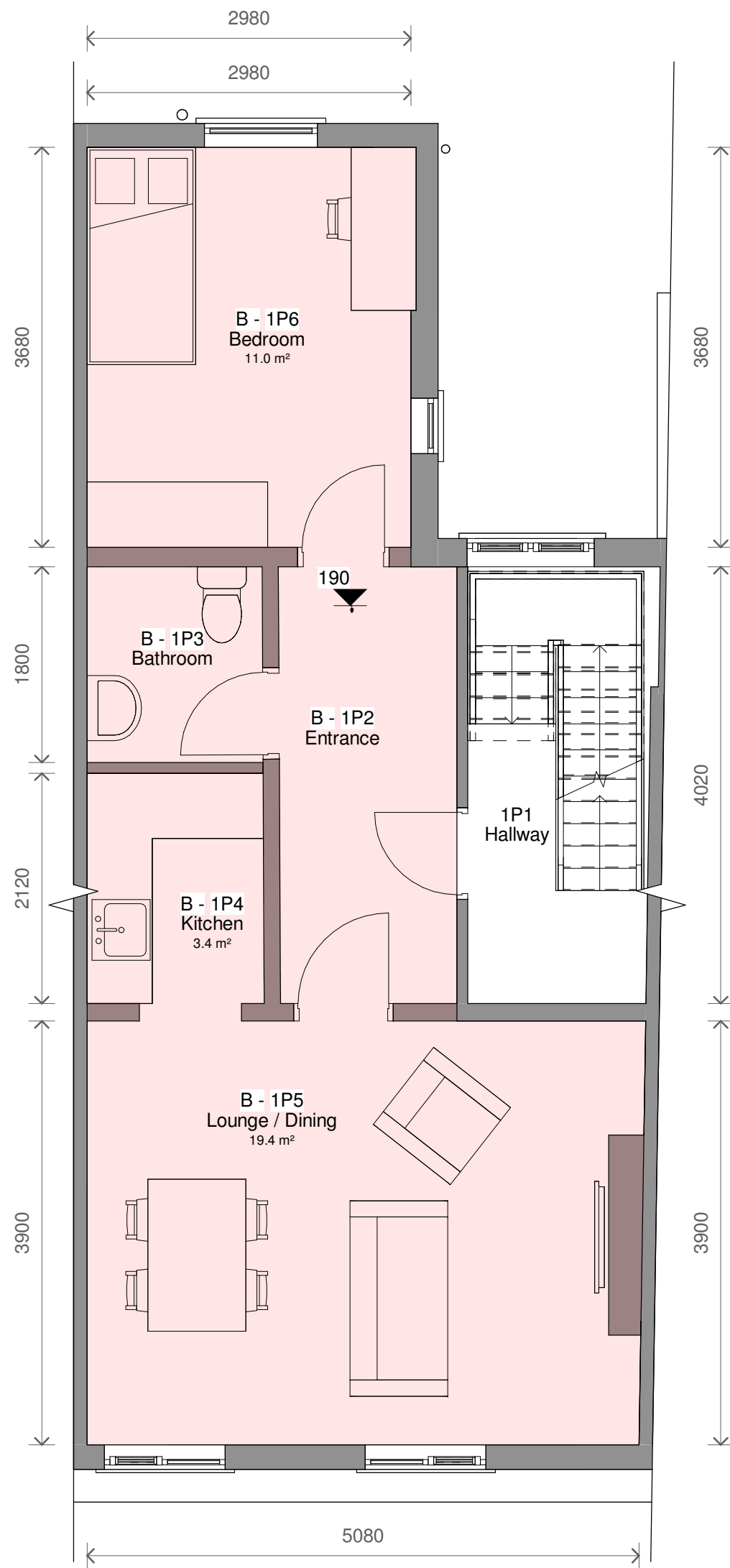
In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

$L_{eq,T}$ $L_{eq,T}$ is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period. In other words, it is a measure of the "average" noise level

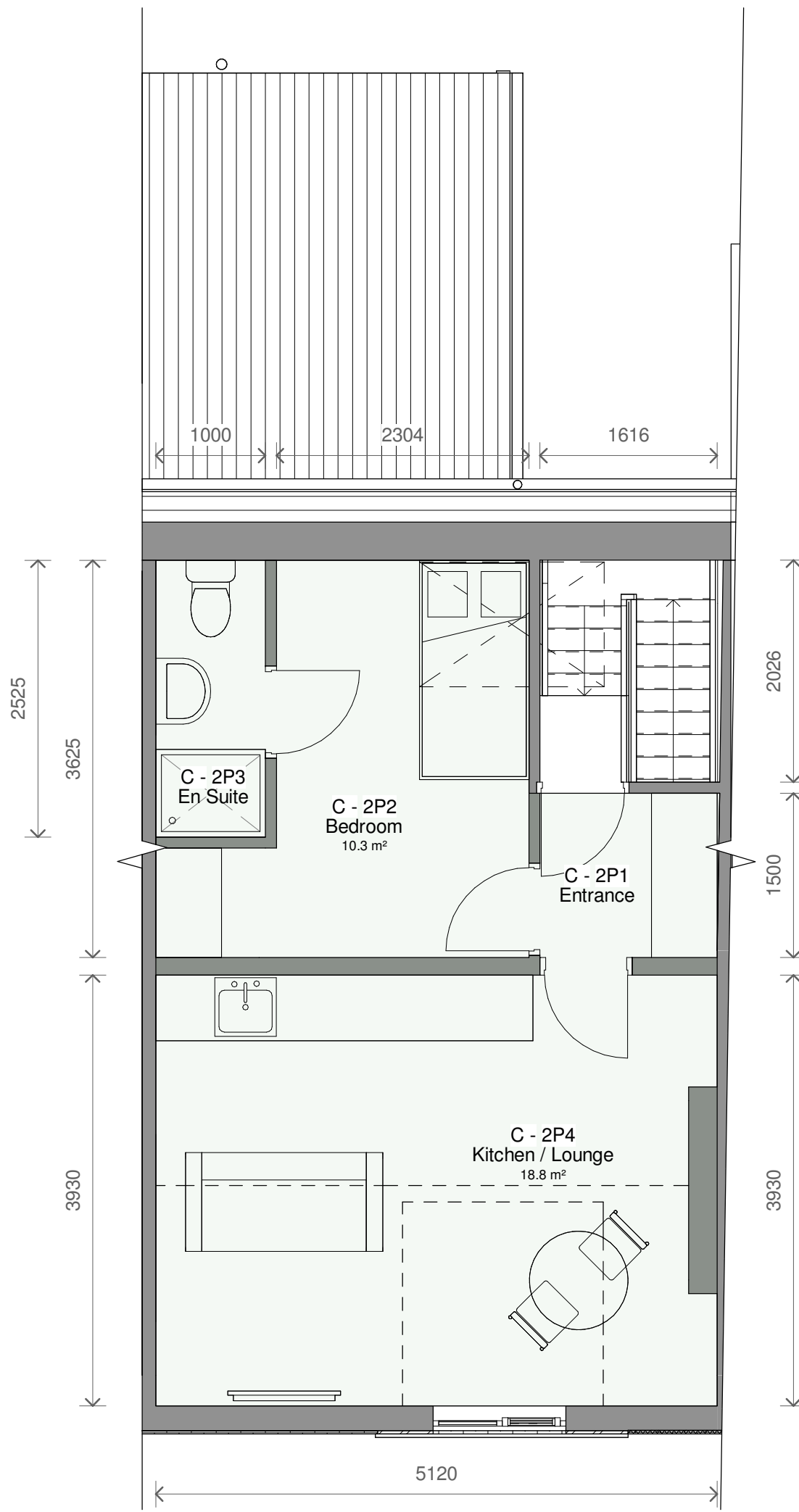
L_{max} L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period



1 Level 0 - Proposed
1 : 50



2 Level 1 - Proposed
1 : 50



3 Level 2 - Proposed
1 : 50

Flat Area Key	
	Flat A = 41m²
	Flat B = 45m²
	Flat C = 37m²



4 Front - Proposed
1 : 100



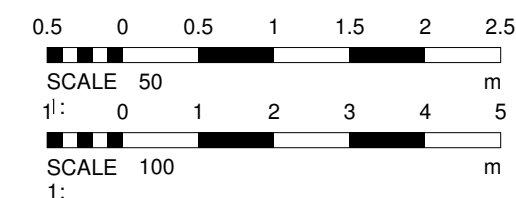
5 Left Side - Proposed
1 : 100



6 Rear - Proposed
1 : 100



7 Right Side - Proposed
1 : 100



2	Revised Shop Front	22/07/2024	CB
1	Revised Skylights	15/07/2024	CB
No.	Description	Date	Initial

PROJECT		103 Crumpsall Lane	
TITLE		Proposed Plans and Elevations	
STATUS		DESIGN	
DRAWN BY	DATE	SCALE (@ A1)	
CB	09/05/2024	As indicated	
PROJECT NUMBER	DRAWING NUMBER	REV	
GSS24049.2	003	2	
GOLD SKETCH S T U D I O S www.goldsketch.co.ukinfo@goldsketch.co.uk0161 792 9595			
NOTES			
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