

Cathedral Square, Manchester

Noise Impact Assessment Report

Client:

Deansgate SOF Alliance Residential Co Ltd
Alliance House, Westpoint Enterprise Park,
Clarence Ave, Manchester, M17 1QS

Date:

12 December 2025

Our Ref:

22192-RP-2-R0



**JAMESON
ACOUSTICS**

Consultants in acoustics,
noise and vibration

Document Control

Revision	Date	Author	Description
0	12-12-2025	AJ	-

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Signature	
Date	12-12-2025

Executive Summary

This report presents an updated noise impact assessment in relation to the Cathedral Square residential development on Deansgate, Manchester to supplement the Section 73 application. The development comprises 300nr new dwellings within a single 27nr storey concrete frame building (plus ground and 2nr lower ground floors) with private amenities, car parking, cycle storage and a retail unit.

The assessment seeks to demonstrate that [A] noise impacts can be sufficiently mitigated to achieve acceptable acoustic conditions within residential accommodation, and [B] noise generated from the operation of the development (plant, commercial and amenity operation) can be mitigated to prevent adverse noise impacts on the locality and structurally-connected dwellings.

A baseline noise survey was carried out by Fisher Acoustics to inform the planning application (Report Ref. PR0657-REP05A-MPF '*Environmental Noise Study*' dated October 2021). Due to COVID19, it was not possible for Fisher Acoustics to carry out site-specific baseline noise monitoring, and thus their planning stage analysis was based on historic survey data (by others) at neighbouring developments and DEFRA noise maps.

With COVID19 restrictions now lifted, and Manchester City Centre operating as normal, it was deemed necessary to carry out a new baseline noise study. The results of this study are presented herein.

The assessment finds that acceptable internal noise levels within new dwellings can be achieved through the appropriate specification of façade elements and appropriate ventilation and overheating mitigation solutions. Information of the proposed project specifications has been provided. These specifications correspond to either enhanced double-glazed windows to all dwellings. Background ventilation shall be provided by whole-house ventilation systems (MVHR) and air conditioning / comfort cooling. The latter will remove any reliance on openable windows as part of the ventilation or overheating-mitigation strategy.

Our assessment of noise levels in outdoor living spaces are expected to comply with BS 8233 guideline upper noise targets across all areas.

Noise impacts from the operation of the ground floor commercial unit and residential amenity spaces within the development have been considered and the proposed noise criteria have been advised to mitigate the risk of adverse noise impacts. Plant noise emission limits have been proposed so that future plant installations do not adversely impact on the locality.

Contents

1.0 Introduction 4

2.0 Objectives 4

3.0 Site Description 5

4.0 Planning Policy, Legislation & Assessment Guides 11

5.0 Baseline Noise Surveys 13

6.0 Incident Noise Levels 22

7.0 Achieving Internal Noise Levels 23

8.0 Outdoor Living Spaces 26

9.0 Development-Generating Noise Impacts 28

10.0 Conclusions 30

Appendix A – Acoustic & Vibration Terminology..... 32

Appendix B – Planning Policy & Assessment Guides 33

Appendix C – Time History Graphs 40

1.0 Introduction

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The assessment seeks to demonstrate that [A] noise impacts can be sufficiently mitigated to achieve acceptable acoustic conditions within residential accommodation, and [B] noise generated from the operation of the development (plant, commercial and amenity operation) can be mitigated to prevent adverse noise impacts on the locality and structurally-connected dwellings.

For a description of the acoustic terminology used herein, please see Appendix A.

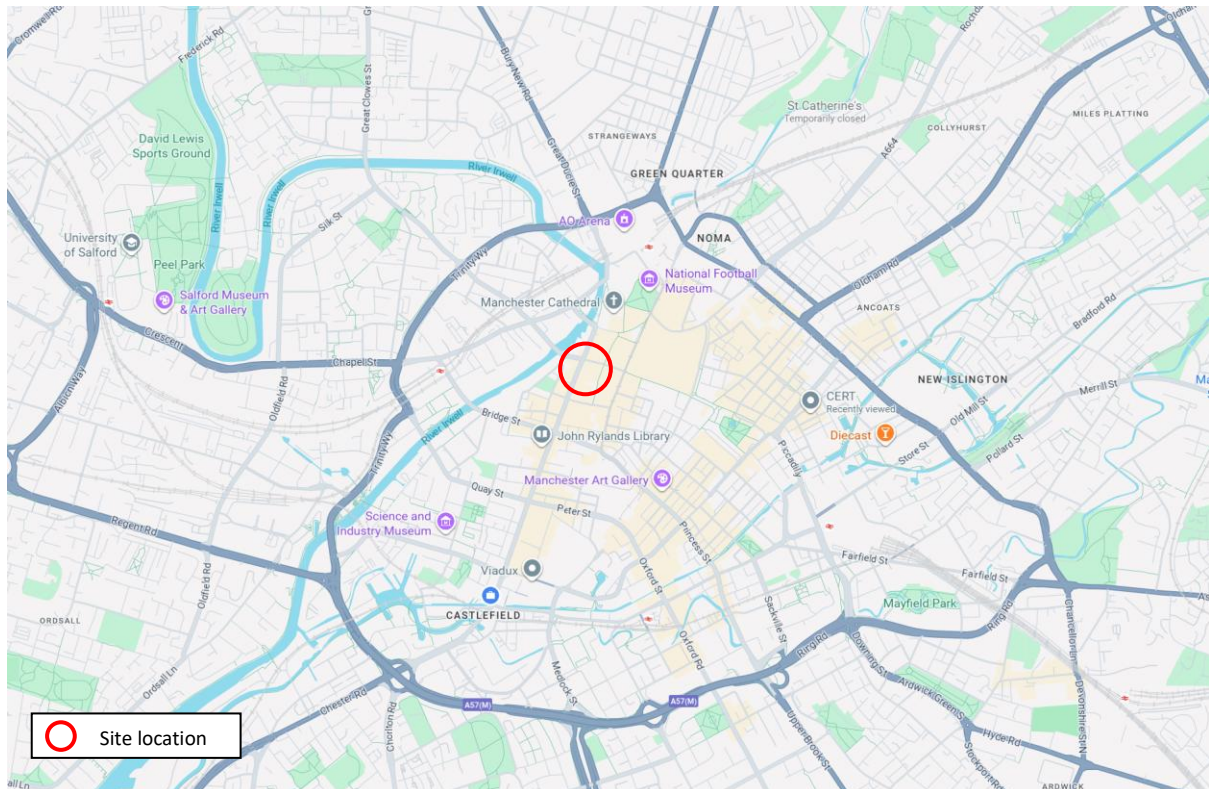
2.0 Objectives

- To review the latest national and local planning policies/requirements and relevant design standards and good practice guides that will inform the noise impact assessments.
- To carry out a detailed noise survey at the site, capturing weekday and weekend daytime and night-time noise levels at selected positions in accordance with BS 7445.
- Based on the survey data, to undertake a noise assessment for the suitability of the site for residential use in accordance with the Noise Policy Statement for England (NPSE), National Planning Policy Framework (NPPF), statutory legislation, Planning Practice Guidance (ProPG), British Standard BS8233:2014 and Local Authority guidance/requirements.
- To subsequently provide guidance on noise mitigation and façade sound insulation solutions to achieve acceptable acoustic conditions within the completed scheme.
- To set noise emission limits for the development in line with BS 4142:2014+A1:2019 with the aim of minimising the risk of the operation of new plant causing a noise nuisance to neighbours.
- To advise on sound insulation provisions to adequately control commercial and amenity noise transfer externally and to adjoining residential spaces.

3.0 Site Description

3.1 Location

The Site is located on Deansgate in Manchester City Centre and falls within the administrative boundary of Manchester City Council (MCC), as illustrated below.



Location Plan (© maps.google.co.uk)

3.2 Description

The site forms part of the wider Renaissance Hotel complex which has been a longstanding strategic regeneration priority for Manchester City Council (MCC) and is the last remaining undeveloped site within the 1999 City Centre Masterplan. It occupies the northern sector of the site, bounded to the south by the Redeveloped hotel now known as the 'the Treehouse Hotel'.

The site is located at the junction of Deansgate and Victoria Bridge Street within Manchester's central business district. At the time of the survey, the site was brownfield; an open plot of land recently cleared and now used in part for site cabins and parking which supported the recently completed Treehouse scheme.

The site is bounded to the west by the River Irwell, over which lies the Premier Inn Hotel and a large 9-storey office building.

To the east, over Deansgate, lies a shopping centre with residential apartments (No 1 Deansgate) to the south-east on the corner of Deansgate and Blackfriars Street.

Deansgate is a major road within the City Centre that is heavily trafficked with HGV's, cars and vans accessing the city. Victoria Bridge Street and Blackfriars Street are also normally heavily trafficked with HGV's, cars and buses. Deansgate, Blackfriars Street and Victoria Bridge Street are bus routes. It was noted that the section of Deansgate along the site boundary was reduced to single lane traffic by the development site hoardings. Traffic was flowing as normal, with buses continuing to use the route. However, proposals for this section of road show this will return to two lanes, albeit the entire section of road will be for one-way traffic, north to south. A suitable correction shall be applied in our assessment to account for this future road condition.

The nearest noise sensitive receptors are noted to be the Premier Inn to the north-west, Manchester Cathedral to the north, No 1 Deansgate residences to the south-east and the Treehouse Hotel to the south.

See site plan below.



Site Plan (© maps.google.co.uk)

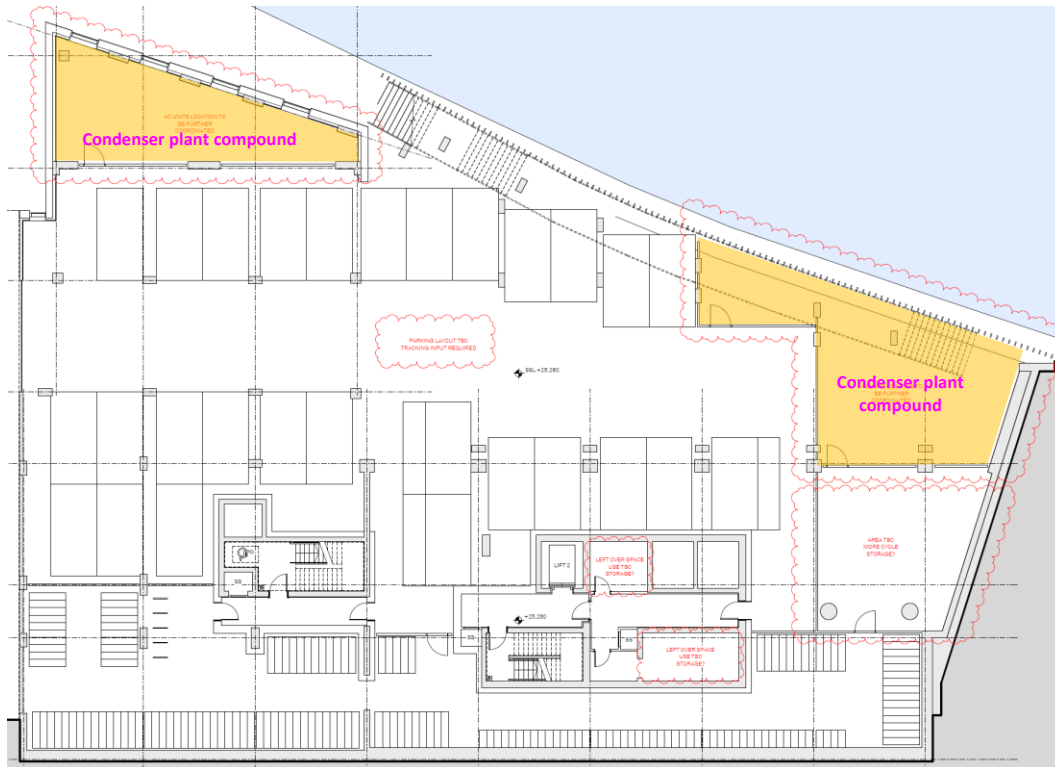
3.3 Development Proposals

The development will comprise the following:

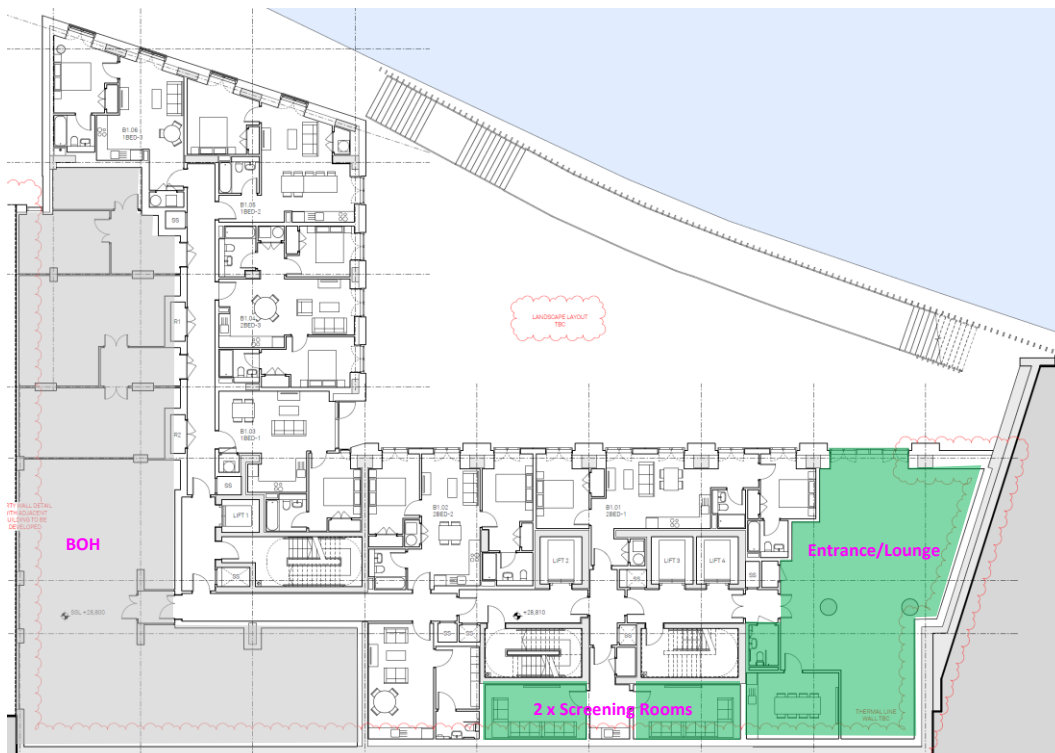
new dwellings within a single 27nr storey concrete frame building (plus ground and 2nr lower ground floors) with private amenities, car parking, cycle storage and a retail unit.

- A total of 300nr new dwellings:
 - Across a single building, stepped in height up to 27-storeys.
 - All apartments shall be comfort cooled (supplied with whole-house ventilation and air condition systems to remove any reliance on openable windows for ventilation and overheating mitigation).
 - Two lower-ground levels, forming a basement car park (and plant compounds) in B2 with residential accommodation starting from B1.
 - A single commercial unit at ground floor level, fronting onto Deansgate.
 - Shared residential amenity spaces on B1, ground and first floor. This will include large entrance/lounge spaces at B1 and ground, 2nr screening rooms at B1, and a gym & yoga studio at Level 1.
 - Shared outdoor living spaces are provided at B1 (a landscaped garden on top of the B2 podium deck, facing the River Irwell) and Level 14 (roof terrace on the shoulder block facing the River Irwell).
 - Private balconies are provided to apartments on the southern gable of the main block at upper levels, as the building steps back. These balconies are arguably not of a size that constitutes an 'outdoor living space' in the true sense of BS 8233, especially with the development providing significant shared outdoor living provisions.

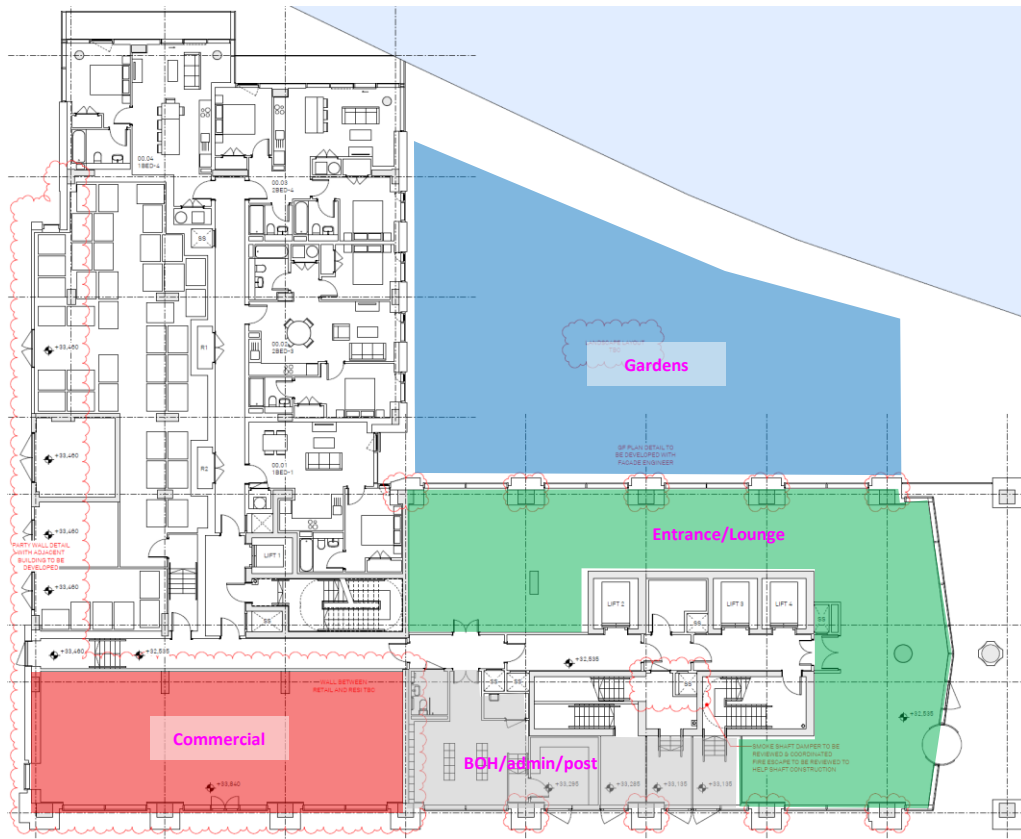
See below the proposed plans for B2, B1, ground, Level 01, typical lower apartment levels (Level 03-13), Level 14 plan (with roof terrace) and typical upper apartment levels (Level 16).



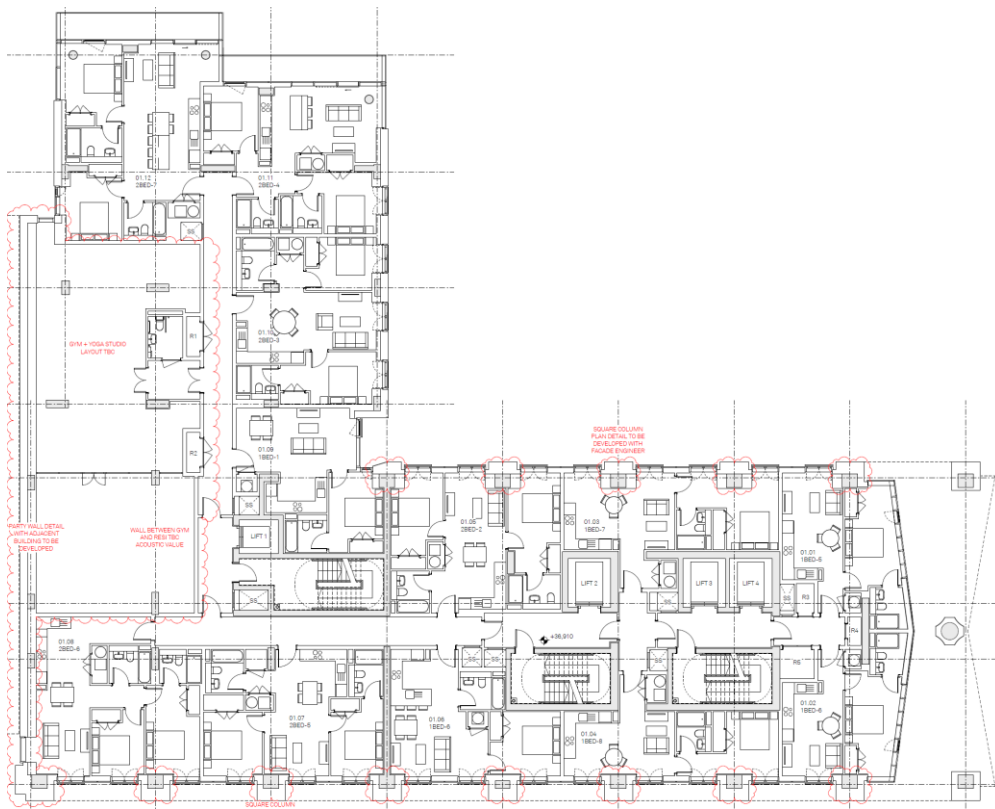
Level B2



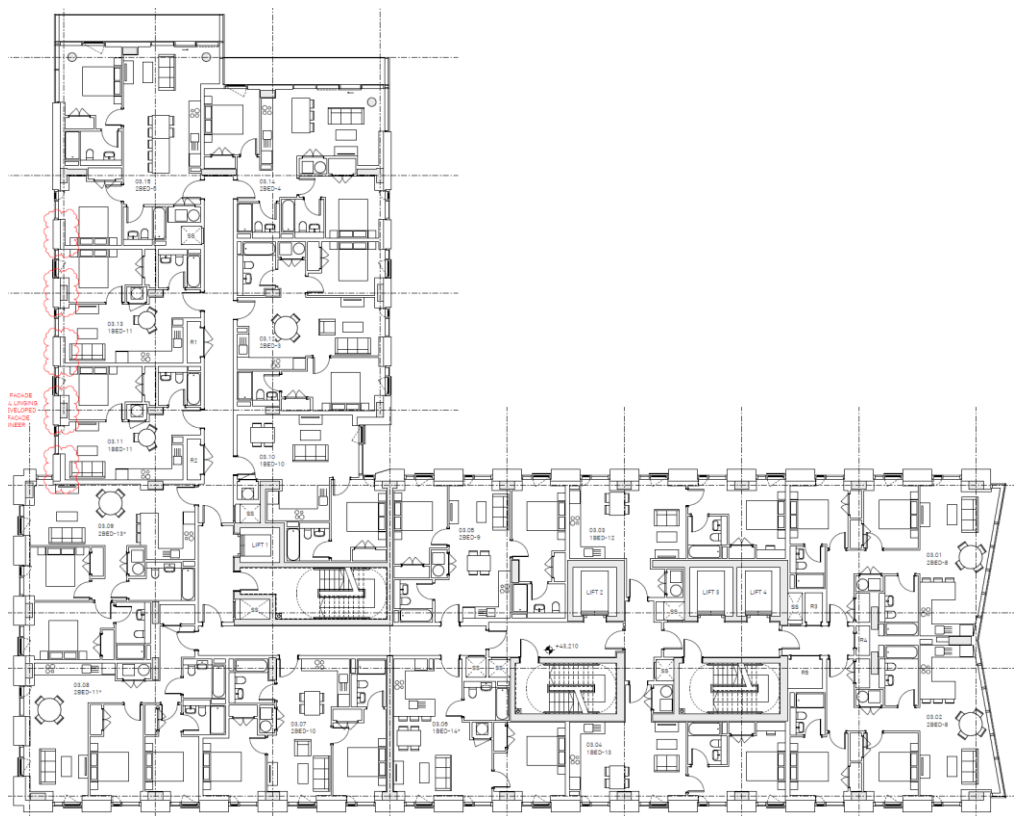
Level B1



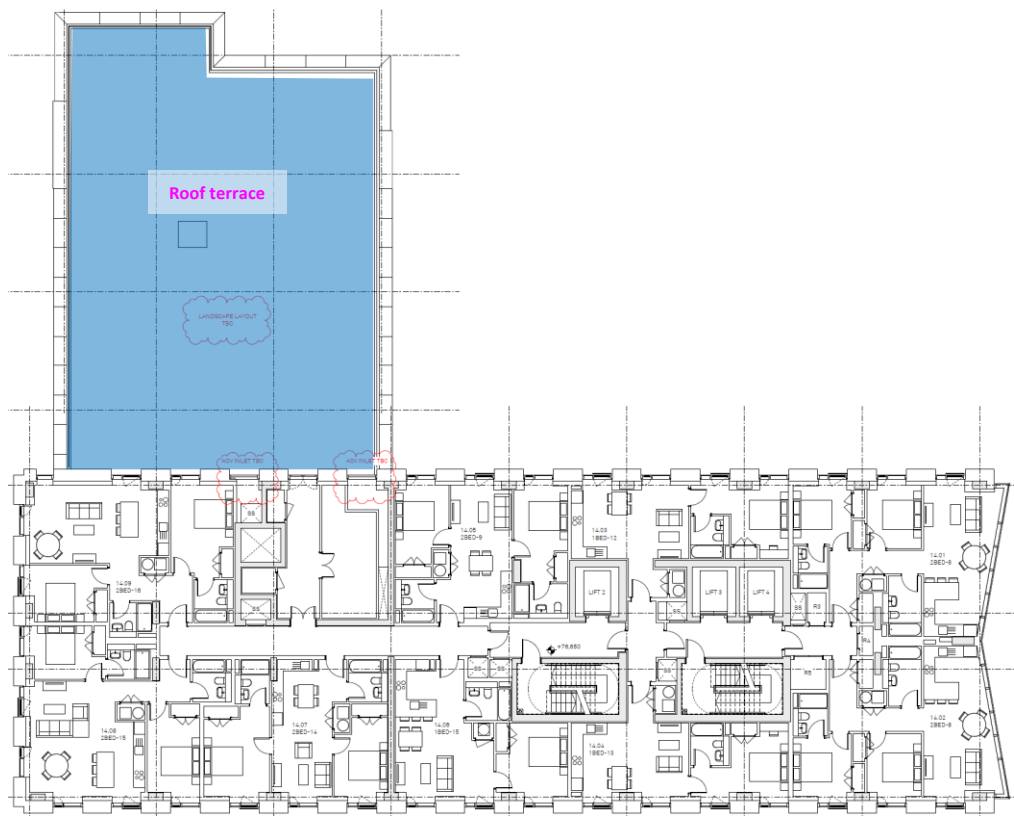
Ground Floor



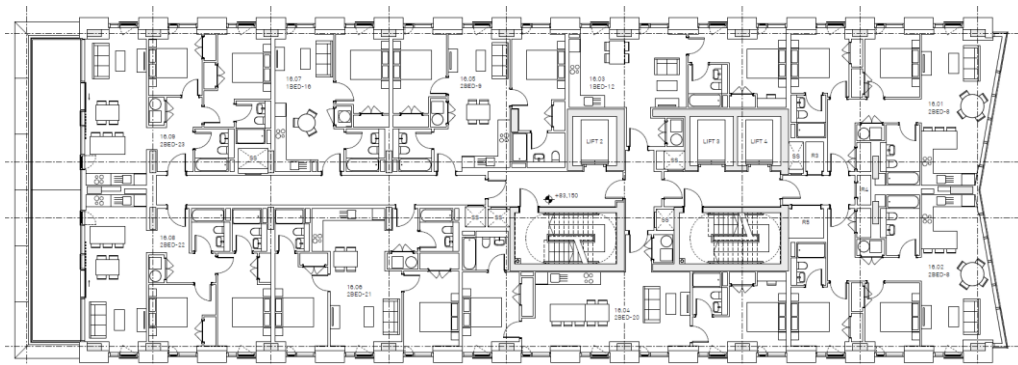
Level 01



Levels 03-13



Level 14



Level 16

4.0 Planning Policy, Legislation & Assessment Guides

4.1 National Planning Policy

National planning policies are set out in the following:

- Noise Policy Statement for England [NPSE], 2010;
- National Planning Policy Framework [NPPF], 2024;
- National Planning Practice Guidance – Noise [PPGN], 2019.

These documents provide a qualitative approach to noise assessments. See Appendix B for a detailed description of each.

4.2 Local Planning Requirements

4.2.1 Local Authority Development Plan

Manchester City Council's [MCC] Core Strategy was adopted on the 11 July 2012 and is the key document in the Manchester Local Plan. It sets out the long-term strategic policies for Manchester's future development and will form the framework that planning applications will be assessed against.

The Core Strategy requests that all new developments follow the 'Development Principles' and accord with the design guidance set out in the Supplementary Planning Documents. In accordance with Policy DM1, this includes the effects on amenity due to noise generated by a new development and, conversely for noise sensitive uses (e.g. residential), the effects of environmental noise onto the new development.

MCC's Supplementary Planning Document relating to noise is their 'Planning & Noise, Technical Guidance' published in October 2022 by their Environmental Protection Team. This document provides guidance to applicants and consultants concerning the assessment and prediction of environmental noise associated with a particular development. The key elements relevant to this development are summarised below.

4.2.2 Specific Guidance on Noise

In relation to noise affecting newly proposed residential properties, the council has adopted the following noise limits for sites affected only by environmental noise (e.g. road traffic):

- **Bedrooms (night time – 23.00 – 07.00) 30 dB L_{Aeq} (individual noise events should not normally exceed 45 dB $L_{Amax,F}$ by more than 10 times)**
- **Living Rooms (daytime – 07.00 – 23.00) 35 dB L_{Aeq}**
- **Gardens and terraces (daytime) 55 dB L_{Aeq}**

In relation to commercial noise, MCC's guidance advises that *"BS 4142 should be used to assess the likely impact of noise from industrial and commercial sources at noise sensitive premises"*.

The Council consider that new developments should contribute and enhance the area in which they are located and where possible, i.e. prevent 'noise creep', contribute to the improvement of people's health and quality of life as per the NPSE. With this in mind, the design objective should be:

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

For fixed plant, the Council advises a BS 4142 assessment that demonstrates that:

'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 (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'.

4.3 Legislation (Building Regulations)

The development will need to be built in such a way that it conforms to the Building Regulations 2010. In relation to noise and acoustics, the key documents to consider are:

- Approved Document E: 2003 Edition (amend. 2015) – Resistance to the Passage of Sound [ADE];
- Approved Document F: 2021 Edition – Ventilation [ADF];
- Approved Document O: 2021 Edition – Overheating [ADO].

ADE relates to the design of the building's internal building fabric and primarily considers the control sound transfer between adjacent spaces. In planning terms, this development will contain party walls/floors separating residential accommodation from commercial and amenity spaces. These adjacencies will need to be designed to achieve, as a minimum, the below ADE on-site sound insulation performance.

Description	Required Performance
Minimum airborne sound level difference <i>Party Wall/Floor separating dwellings from other parts of the building</i>	45 dB $D_{nT,w} + C_{tr}$

ADF includes a section on controlling noise from ventilation systems. It states that “*account should be taken of outside noise when considering whether openable windows are appropriate for purge ventilation*” and that noise from mechanical ventilation systems operating under normal conditions (not boost rates) should not exceed 30 dB $L_{Aeq,T}$ for noise sensitive rooms (e.g. bedrooms) and 45 dB $L_{Aeq,T}$ in less sensitive rooms.

ADO states that the overheating strategy should take account of the likelihood that windows will be closed during sleeping hours if noise within bedrooms exceeds 40 dB $L_{Aeq,8hr}$ (2300-0700) and 55 dB L_{Amax} more than 10 times a night.

4.4 Assessment Guides

For planning and noise, the following industry standards and assessment guides shall be considered. See Appendix B for a description of each.

- ProPG: Planning & Noise, 2017 | ProPG: Gym Acoustics Guidance (GAG), 2023.
- BS 8233: 2014 ‘Guidance on sound insulation and noise reduction for buildings’.
- World Health Organisation [WHO] Environmental Noise Guidelines, 2018.
- Acoustics, Ventilation & Overheating [AVO] Residential Design Guide, 2020.
- BS 4142: 2014+A1: 2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound’.

5.0 Baseline Noise Surveys

5.1 Overview

The baseline noise study carried out by Fisher Acoustics was limited in terms of actual site measurements due to the ongoing COVID19 epidemic at the time. Their planning stage application report was instead based on historical survey data (by others) at nearby developments as well as DEFRA national noise maps.

Upon appointment, and with COVID19 restrictions lifted, Jameson Acoustics carried out detailed baseline noise surveys of the site to inform the design. The survey readings taken are deemed more accurate/appropriate than those presented in the Fisher Acoustics report and therefore superseded all data presented in the Fisher Acoustics report.

The Fisher Acoustics report identified the potential risk of high-performance motor vehicles using the northern stretch of Deansgate for unofficial ‘meets’ on weekend evening/nights. However, no survey evidence was presented to demonstrate this to be true. The noise from these cars racing up and down Deansgate were factored into Fisher Acoustics’ façade performance analysis.

One of the aims of our survey work was to demonstrate whether or not this assumption was true. To do so, three separate noise surveys were undertaken, each over periods of at least 5nr days encompassing a weekend. This is on the basis that for any statistical analysis, three separate datasets are required to determine a pattern. The 3 x 5nr day surveys (15nr days in total) also ensured the availability of a significant amount of general traffic baseline noise level data during daytime and night-time periods for the purpose of

informing an updated façade acoustic performance assessment, and for determining true representative background noise levels through statistical analysis for setting plant noise emission limits.

This section presents the methodology, results and analysis of all three surveys.

5.2 Procedure

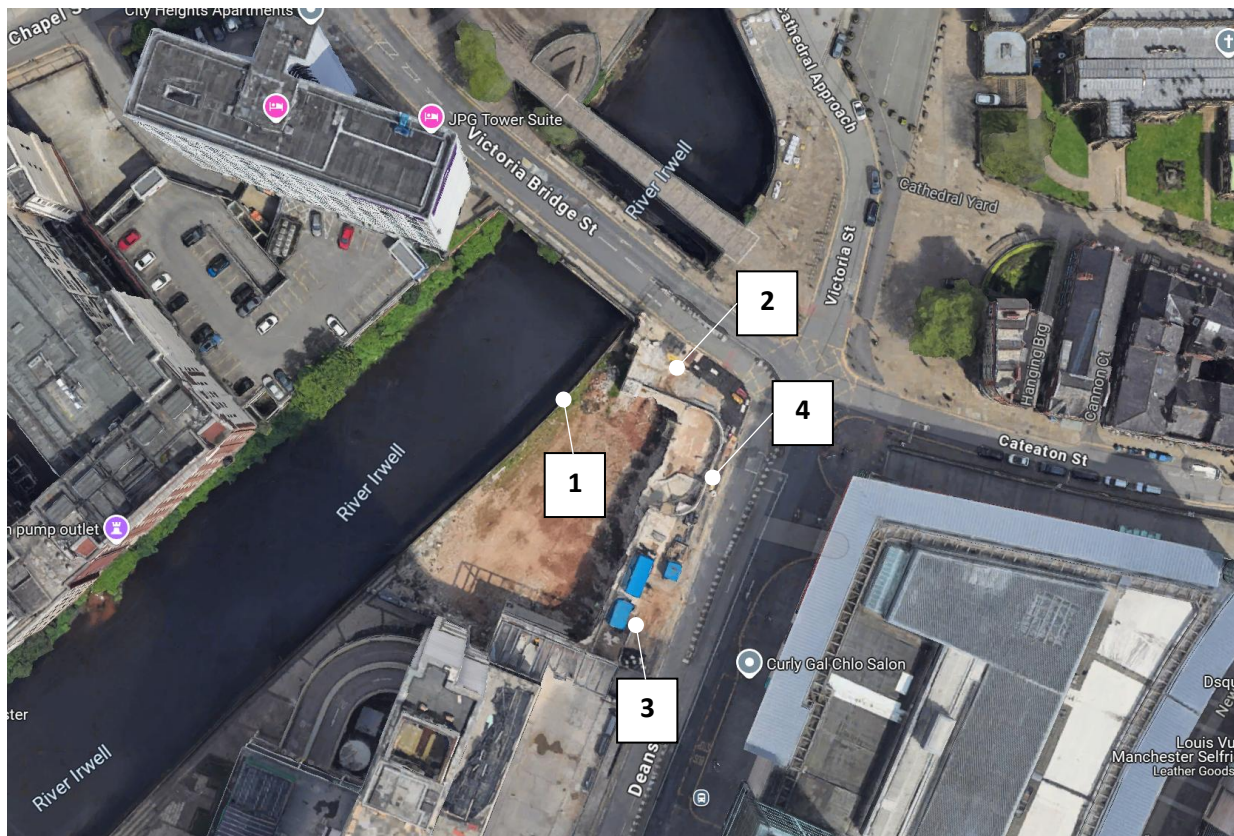
Automated noise level measurements were taken during the following periods:

1. 12:00 hr on Wednesday 15 January 2025 to 12:00 hr on Monday 20 January 2025 at 3nr positions,
2. 11:00 hr on Thursday 30 January 2025 to 08:00 hr on Wednesday 5 February 2025 at 1nr position,
3. 10:00 hr on Wednesday 5 February 2025 to 11:00 hr on Monday 10 February 2025 at 1nr position.

The positions were selected to establish the typical prevailing daytime and night-time ambient, maximum and background noise levels around the site. For survey periods 2 and 3, the purpose was primarily to determine whether atypically high L_{Amax} noise levels from potential unofficial 'meets' involving high-performance motor vehicles were evidence on weekend evening/night-time periods.

The positions were as described below.

Survey Period	Position	Type	Description
1	1	Automated	Western site boundary along the riverside. Microphone mounted to a pole approx. 2.5 m above ground in free-field conditions.
1	2	Automated	Northern site boundary, approx. 5 m from roadside edge of Victoria Bridge St. Microphone mounted to a pole approx. 2.5 m above ground in free-field conditions.
1	3	Automated	South-east corner of the site, approx. 5 m from roadside edge of Deansgate. Microphone mounted to a pole above portacabins approx. 4.5 m above ground in free-field conditions.
2 & 3	4	Automated	Eastern site boundary, approx. 5 m from roadside edge of Deansgate. Microphone mounted to a pole approx. 2.5 m above ground in free-field conditions.



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

The microphones were fitted with windshields and mounted in almost free-field conditions (corrections for reflections off site hoardings to be determined through noise mapping analysis).

The equipment was programme to continuously log all relevant A-weighted broadband (dBA) and linear spectral noise level indices, including L_{eq} , L_{90} , L_{10} and L_{max} , over 5-minute, 15-minute and 1-hour intervals. All measurements were taken in general accordance with BS 7445-1: 2003 '*Description and Measurement of Environmental Noise*'.

5.3 Instrumentation

The instrumentation used for the survey is summarised below.

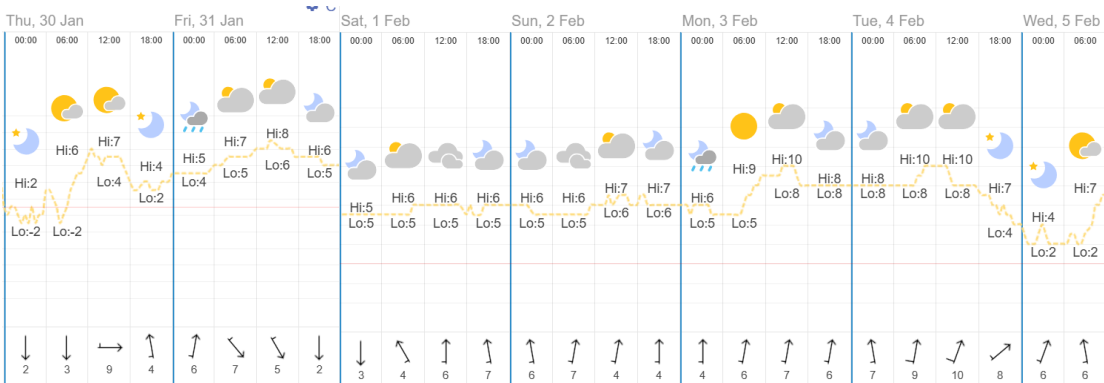
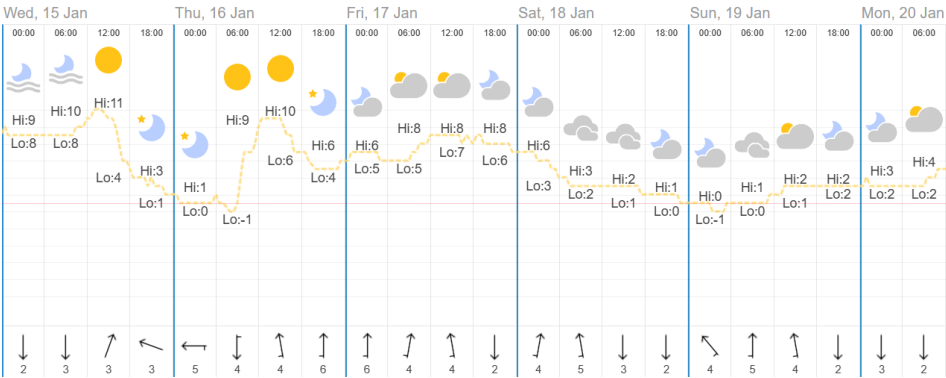
The sound level meters were hand-calibrated at the beginning and end of the survey periods, with extension cables. No significant deviations in calibration level were noted (not more than +/- 0.1 dB).

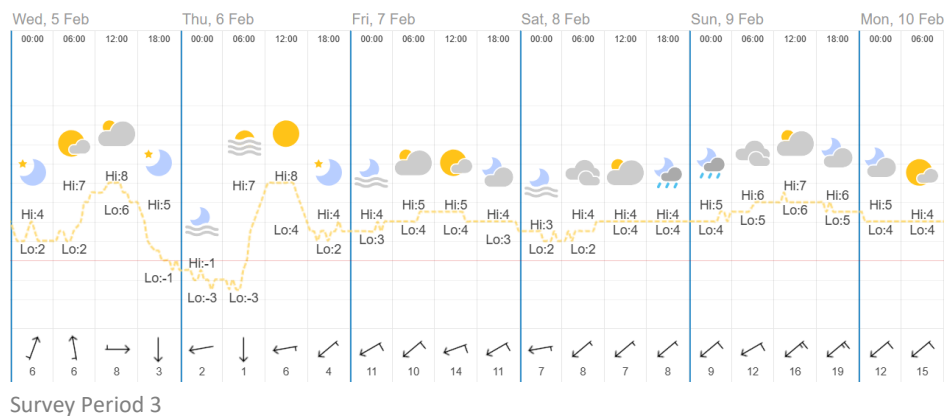
Description	Equipment	Serial Nr	Lab Calibration Expiry	Lab Calibration Certificate Nr
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	124663 (82835)	26 Aug 2026	1509611-1
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	127647 (84398)	25 Jul 2025	25 Jul 2023
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	131642 (85571)	26 July 2025	26 July 2023
Class 1 sound calibrator	Cirrus CR:515	57570	12 Nov 2025	1171319

5.4 Weather Conditions

Due to the nature of the surveys, i.e. unmanned, it is not possible to describe the weather conditions throughout the duration of each survey period. However, on install and collection, weather conditions were considered suitable for obtaining representative readings. The sky was clear with patchy cloud cover, road surfaces were dry and wind speeds were low.

Based on internet weather reports for the full duration of the survey, as shown below, conditions generally remain commensurate with the above, with no periods of severe adverse weather, albeit with some periods of brief rainfall. Wind speeds remained sufficiently low (within the tolerance of the microphone windshield) with the exception of the afternoon-evening night of Sunday 9 February 2025.





5.5 Observed Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to describe the noise climate throughout the duration of the survey period. However, on install and collection the noise climate was noted to be dominated by road traffic on Deansgate and Victoria Bridge Street.

Note, during the survey periods, sections Deansgate and Victoria Bridge Street adjacent to the site were site reduced to single lane traffic (as shown in the google image above) by means of site hoardings. Corrections shall be applied to the noise model to determine incident façade noise levels when traffic returns to two-way flow.

Construction noise was occasionally evident during normal site working hours. This was associated with ongoing works on the adjacent Treehouse Hotel development, including the construction of temporary padel courts on the Deansgate elevation.

5.6 Results & Analysis

5.6.1 Automated Survey

The results of the automated survey have been plotted on Time History Graphs 22192-1-G1 to G3, 22192-2-G4 and 22192-3-G4 enclosed in Appendix C. The graph presents the 15-minute A-weighted (dBA) L_{90} , L_{eq} and L_{max} levels at each position throughout the duration of the survey.

A summary of the results, as used to inform subsequent assessments against current guidelines, is presented in the following tables.

L_{Aeq} Ambient Noise Levels

The logarithmically-averaged 16-hour daytime and 8-hour night-time L_{Aeq} ambient noise levels

POSITION 1 – SURVEY PERIOD 1 Period Commencement (Day/Night of...) 2025	Free-Field Ambient Noise Level (dB)	
	Daytime L _{Aeq,16hr} (07:00-23:00)	Night-time L _{Aeq,8hr} (23:00-07:00)
Wed 15 Jan	56 ¹	53
Thu 16 Jan	55	52
Fri 17 Jan	55	52
Sat 18 Jan	55	52
Sun 19 Jan	53	52
Taken for Assessment	55	52

POSITION 2 – SURVEY PERIOD 1 Period Commencement (Day/Night of...) 2025	Free-Field Ambient Noise Level (dB)	
	Daytime L _{Aeq,16hr} (07:00-23:00)	Night-time L _{Aeq,8hr} (23:00-07:00)
Wed 15 Jan	61 ¹	53
Thu 16 Jan	59	53
Fri 17 Jan	59	54
Sat 18 Jan	60	54
Sun 19 Jan	57	53
Taken for Assessment	60	54

POSITION 3 – SURVEY PERIOD 1 Period Commencement (Day/Night of...) 2025	Free-Field Ambient Noise Level (dB)	
	Daytime L _{Aeq,16hr} (07:00-23:00)	Night-time L _{Aeq,8hr} (23:00-07:00)
Wed 15 Jan	66 ¹	56
Thu 16 Jan	64	55
Fri 17 Jan	64	56
Sat 18 Jan	62	57
Sun 19 Jan	62	55
Taken for Assessment	64	56

POSITION 4 – SURVEY PERIOD 2 Period Commencement (Day/Night of...) 2025	Free-Field Ambient Noise Level (dB)	
	Daytime L _{Aeq,16hr} (07:00-23:00)	Night-time L _{Aeq,8hr} (23:00-07:00)
Thu 30 Jan	62 ¹	57
Fri 31 Jan	62	55
Sat 1 Feb	60	56
Sun 2 Feb	59 *	54
Mon 3 Feb	62	54
Tue 4 Feb	60	56
Taken for Assessment	62	56

POSITION 4 – SURVEY PERIOD 3 Period Commencement (Day/Night of...) 2025	Free-Field Ambient Noise Level (dB)	
	Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
Wed 5 Feb	59 * 1	55
Thu 6 Feb	60	55
Fri 7 Feb	60	58
Sat 8 Feb	59	58
Sun 9 Feb	58	54
Taken for Assessment	60	56

¹ not full 16-hr period

* period influenced by extraneous noise periods (e.g. construction) omitted

L_{Amax} Maximum Noise Levels at Night

The 10-15th highest 5-minute L_{Amax} maximum noise level night 'event'

Position (Survey Period 1)	Maximum Noise Level (dB) At Night-time $L_{Amax,5min}$ (23:00-07:00)
1	61
2	69
3	73

The 10-15th highest 5-minute L_{Amax} maximum noise level night 'event' per night during Survey Period 2 & 3

POSITION 4 – SURVEY PERIOD 2 Period Commencement (Day/Night of...) 2025	Maximum Noise Level (dB) At Night-time $L_{Amax,5min}$ (23:00-07:00)
Thu 30 Jan	73
Fri 31 Jan	72
Sat 1 Feb	73
Sun 2 Feb	71
Mon 3 Feb	70
Tue 4 Feb	71

POSITION 4 – SURVEY PERIOD 3 Period Commencement (Day/Night of...) 2025	Maximum Noise Level (dB) At Night-time $L_{Amax,5min}$ (23:00-07:00)
Wed 5 Feb	71
Thu 6 Feb	72
Fri 7 Feb	71
Sat 8 Feb	72
Sun 9 Feb	72

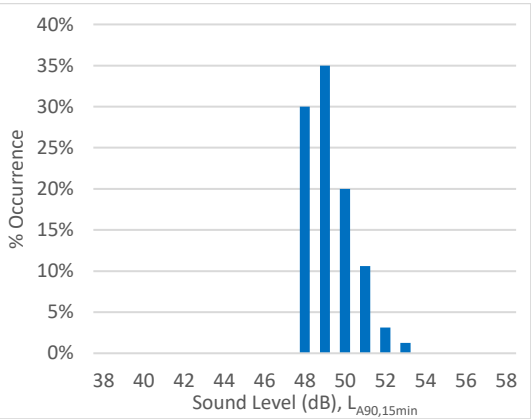
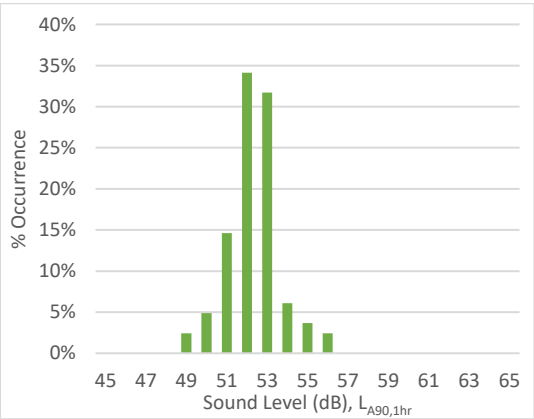
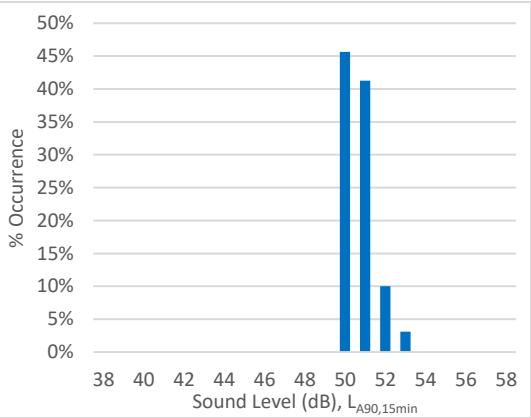
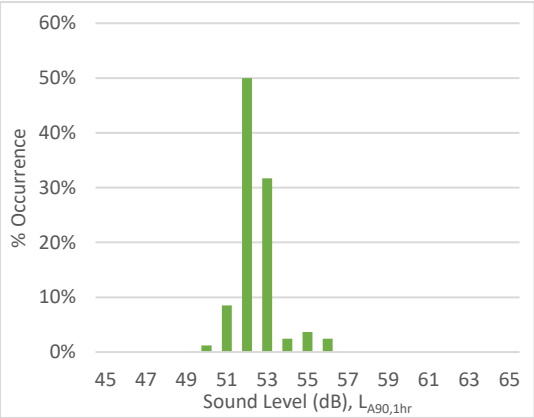
NB: The results of the survey suggest no atypical increases in weekend L_{Amax} night-time that could be attributed to unofficial 'meets' and high-performance motor vehicles on Deansgate. This 'predicted' potential risk item in the Fisher Acoustics report shall be discounted.

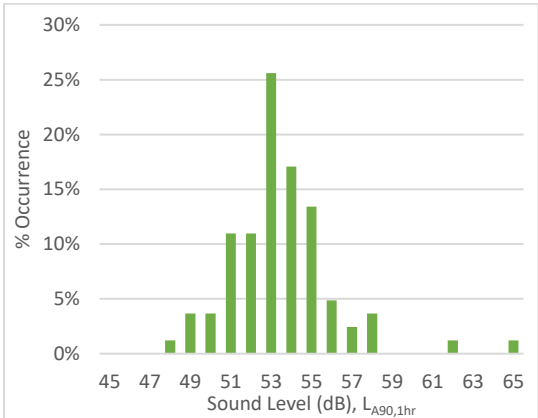
L_{A90} Background Noise Levels

The representative background determined through statistical analysis to BS 4142 (lowest significant value taken)

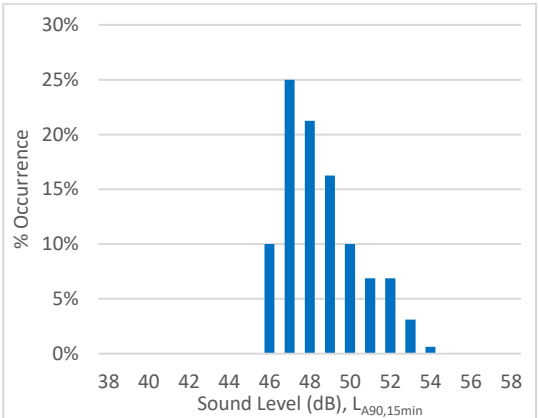
Position	Background Noise Level (dB)	
	Daytime L _{A90,1hr} (07:00-23:00)	Night-time L _{A90,15min} (23:00-07:00)
1 – Survey Period 1	52	50
2 – Survey Period 1	52	49
3 – Survey Period 1	53	47
4 – Survey Period 2	53	48
4 – Survey Period 3	52	49

See below graphs showing the % distribution of background noise levels at each position.

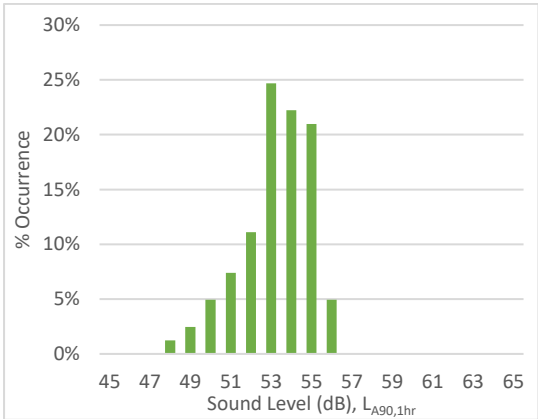




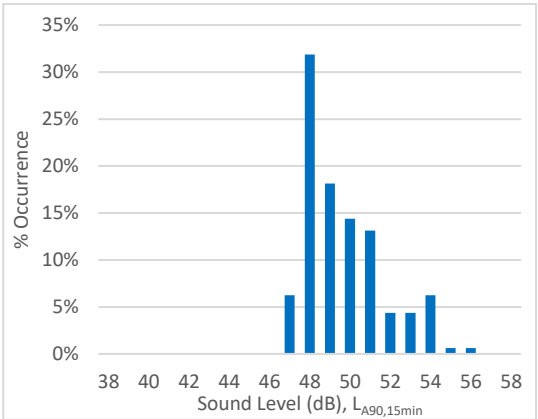
Position 3 – Daytime



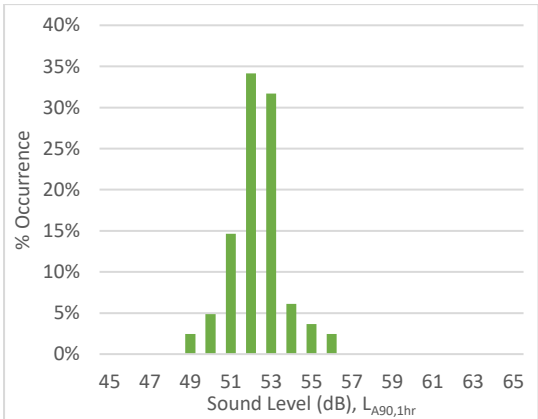
Position 3 – Night-time



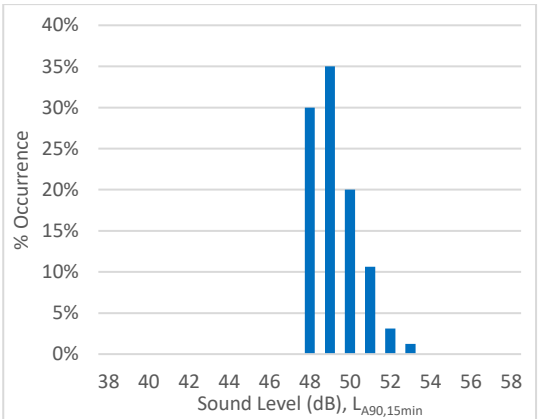
Position 4 (Period 2) – Daytime



Position 4 (Period 2) – Night-time



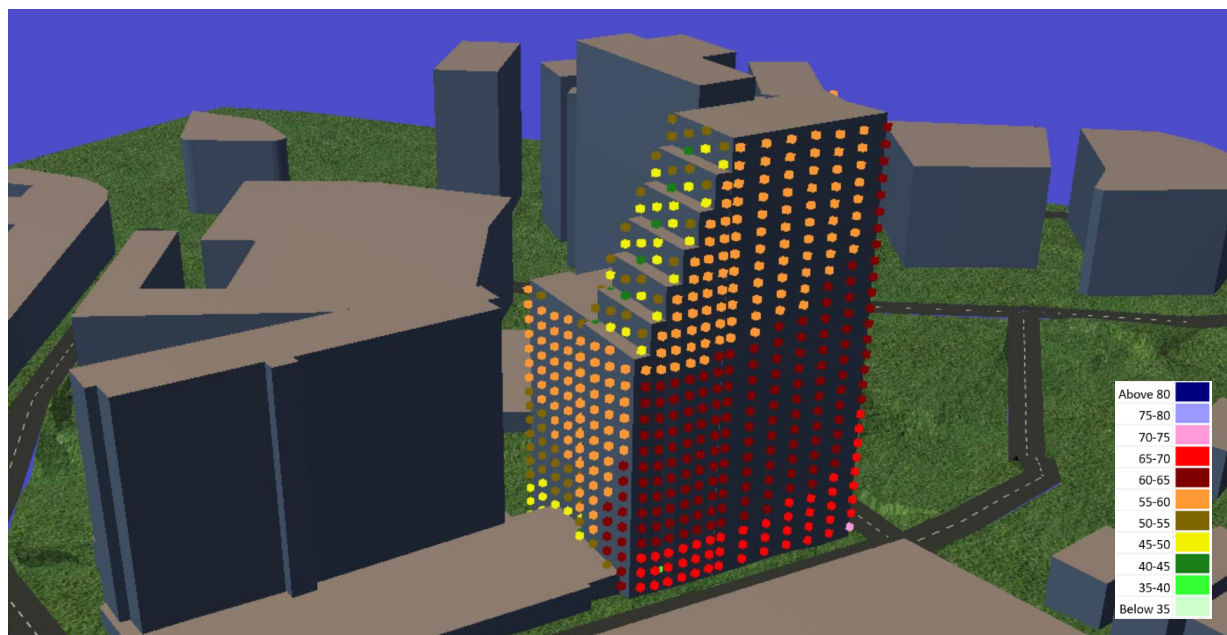
Position 4 (Period 3) – Daytime



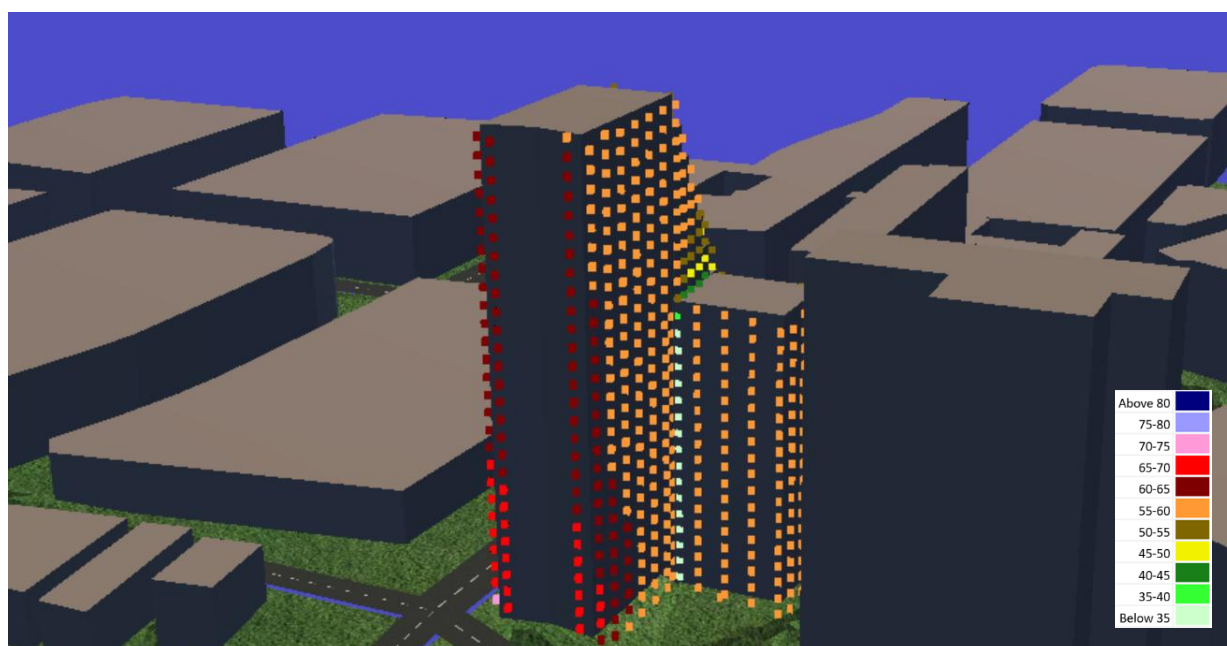
Position 4 (Period 3) – Night-time

6.0 Incident Noise Levels

A detailed noise model has been created to examine incident noise levels on all building facades. The model was first calibrated to the survey data results, with corrections then applied to account for local roads returning to two-lane flow. The following Figures present the incident noise levels during the daytime ($L_{Aeq,16hr}$) with road corrections applied. Night-time incident levels are not presented for brevity but are typically 4-6 dB lower with a similar dispersion pattern.



Daytime $L_{Aeq,16hr}$ incident noise levels (looking from Deansgate)



Daytime $L_{Aeq,16hr}$ incident noise levels (looking from Victoria Bridge Street)

7.0 Achieving Internal Noise Levels

7.1 Criteria

In line with MCC requirements, we would propose the following internal noise levels to be achieved (where feasible) within new dwellings during normal ventilation conditions.

Room	Desirable Internal Noise Level	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living Room	35 dB $L_{Aeq,16hr}$	-
Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB* $L_{A_{fmax}}$

* Noise events (5-min) - not exceeded more than 10-15 times per night

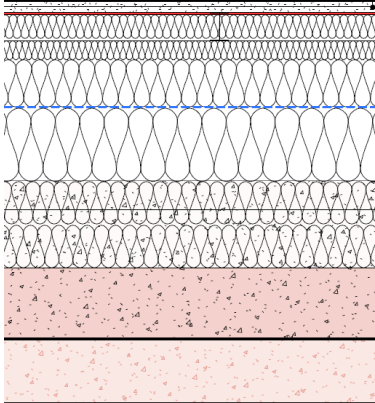
In accordance with Building Regulations ADO, criteria for the development during the “overheating condition” (when higher rates of ventilation are required) may be relaxed over those presented above. The ADO document focuses on night-time (2300-0700) noise ingress into bedrooms with open windows or other means of removing excess heat, such as ventilation louvres or ducts. Under ADO, the night-time bedroom noise limits would increase by 10 dB during the overheating conditions.

Consideration should also be given to habitable rooms (bedrooms and living rooms) during the day. ProPG states that “once L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people. Particularly, if such levels occur more than occasionally.”. This is the same uplift applied by ADO for night-time conditions in bedrooms. In addition, AVO provides an SOAEL threshold above which conditions may be considered unacceptable. A combination of the ‘+10 dB’ target and AVO’s SAOEL applied to the 16-hr average shall be applied. However, daytime overheating noise conditions do not form a statutory requirement. The criteria adopted herein for daytime overheating conditions is therefore presented for ‘guidance only’.

7.2 Building Envelope Acoustic Design

7.2.1 External Walls & Roofs

External walls to dwellings will be formed from pre-cast concrete external panels with an independent lining system internally, or with curtain walling.

Sketch	Build-Up
	Standard external wall: • ~75-300 mm thick (sloped panels) thick pre-cast concrete (Techrete) external panel (density ca. 2,300 kg/m³), • 400 mm+ deep cavity with full fill mineral wool (Rockwool RWA45, 45 kg/m³), • IWL lining – WT-17 – comprising: ○ 50 mm I-studs, ○ 50 mm Rockwool RWA45 (density 45 kg/m³), ○ 2 x 12.5 mm SoundBloc.

The above construction is expected to achieve a sound reduction performance far exceeding what will be required on this project.

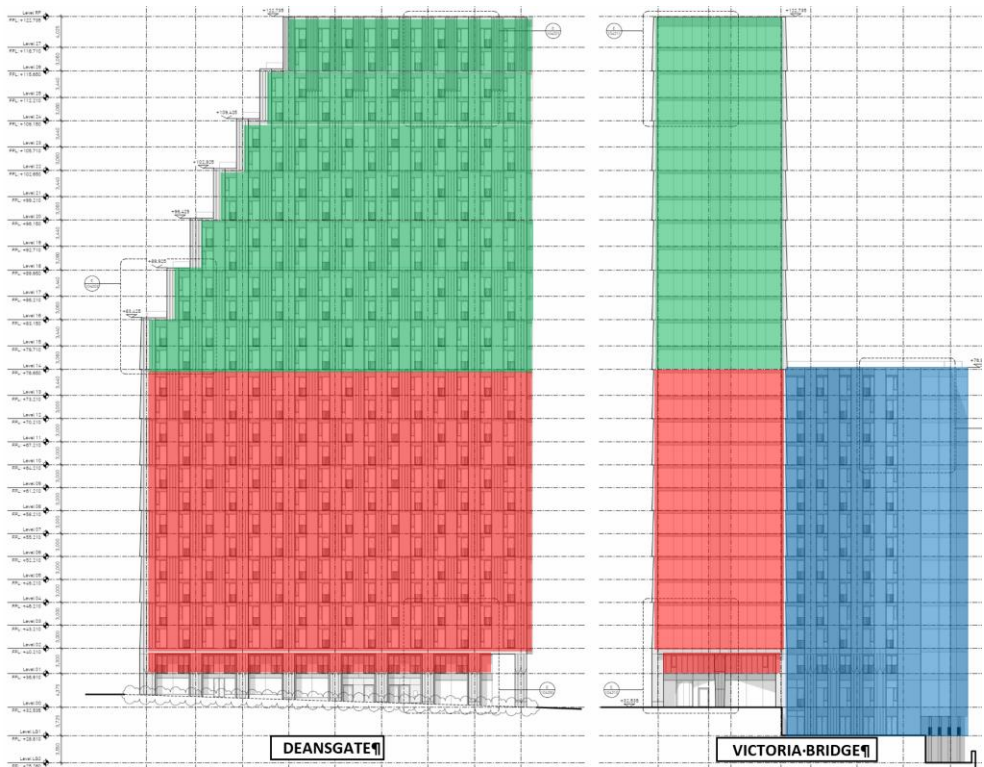
The roofing over habitable rooms will be formed from 225 mm concrete slabs (ca. 2,300 kg/m³) with MF ceilings to top floor apartments. Again, this build-up is expected to achieve a sound reduction performance far exceeding what will be required on this project.

7.2.2 Framed External Windows/Door Systems

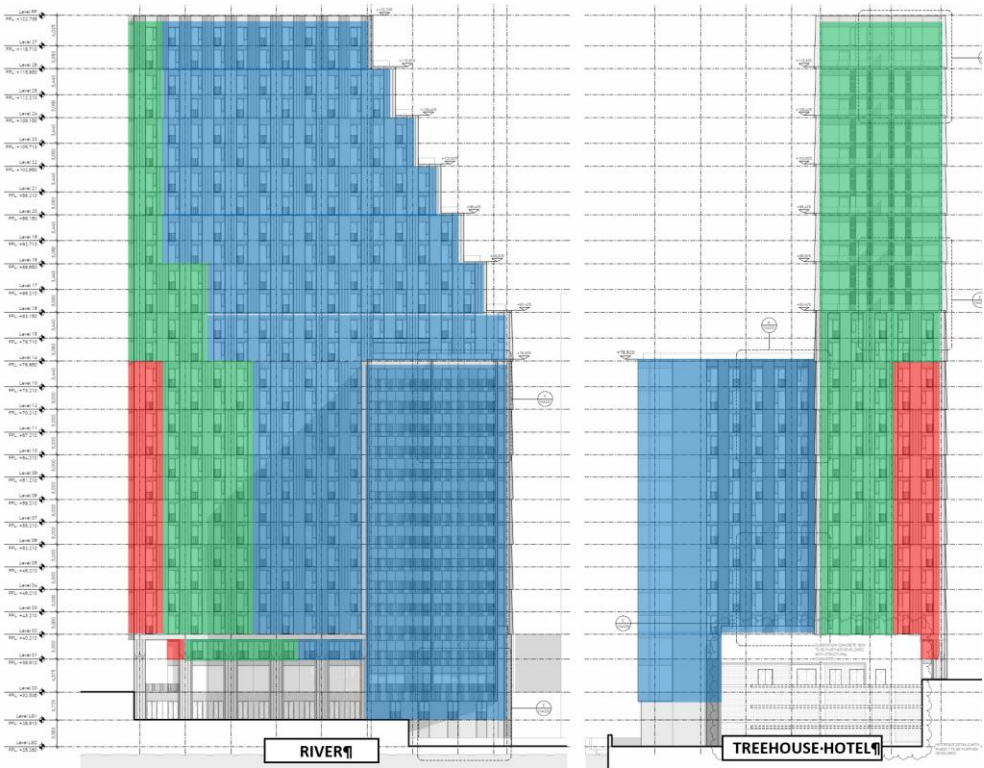
Preliminary sound insulation calculations have been carried out in order to specify the minimum sound insulation performance of the framed windows/doors. Our calculations follow BS 8233 procedures and consider the proposed apartment room dimensions and window sizes from project drawings.

Our calculations have lead to the following minimum sound reduction performance specifications for the complete framed window/door systems to residential accommodation.

Zone (ref. Figures below)	Minimum Sound Reduction, <i>R</i> (dB) at OBCF (Hz)							Weighted <i>R_w</i> + <i>C_{tr}</i> (dB)
	63	125	250	500	1k	2k	4k	
Red	26	28	34	40	43	46	46	38
Green	24	25	31	37	40	43	43	35
Blue	22	23	27	34	38	40	40	32



Acoustic façade zones (1 of 2)



Acoustic façade zones (2 of 2)

It shall be the responsibility of the cladding system supplier to ensure that the **full octave band** performance figures are achieved by complete cladding system chosen for this project, and that their associated installation methods are appropriate to achieve this. The complete framed system shall include the glass, frame, seals, spandrel panels, gaskets, opening panes/doors, etc. not just the glass.

Where structural glass or non-vision spandrel panels (including spandrel vent doors) are proposed, they shall provide sound reduction performance at least equal to that required of the cladding in order to maintain the acoustic integrity of the building envelope. Internal lining systems to spandrel panels (where applicable) can be factored in, subject to agreement with the Main Contractor.

7.2.3 Ventilation

For ventilation (and to assist with overheating), appropriately-sized MVHR heat recovery systems will be provided to each apartment. These will remove the need for trickle ventilators and/or reliance on openable windows to provide normal background ventilation (in line with Approved Document F).

Note: Noise from mechanical ventilation systems should be designed to NR 25 in bedrooms at night and NR 30 in both bedrooms and living rooms during the day.

7.3 Overheating & Noise

All apartments will be comfort cooled, ensuring there is no reliance on openable windows as part of the scheme's overheating strategy. This will ensure compliance with Building Regulations Part O (ADO) Requirement O1(2)(a).

8.0 Outdoor Living Spaces

For outdoor living spaces, BS 8233 states:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable and a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited."

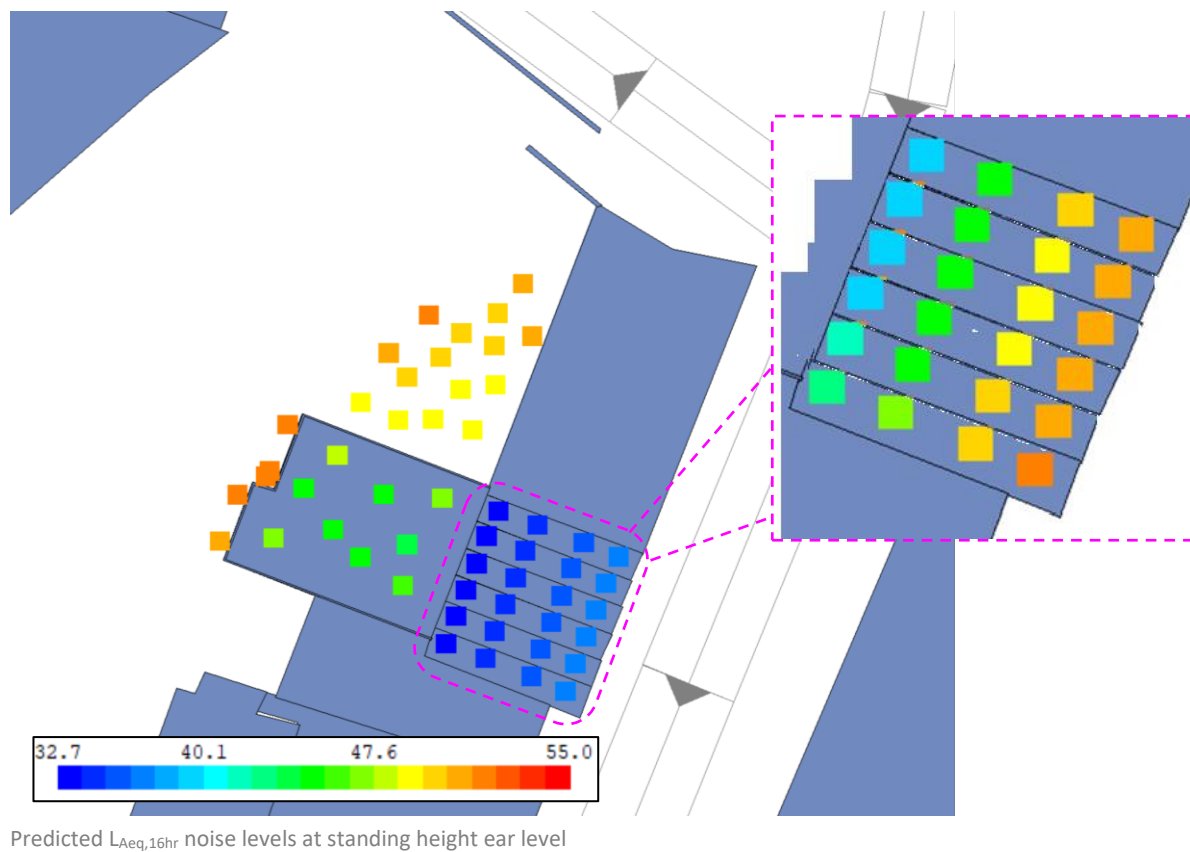
The development will contain outdoor living spaces in the form of shared gardens at Level B1, a rooftop terrace at Level 14 and various balconies.

The balconies are relatively small (and lacking in depth) which suggests they are not necessarily outdoor living spaces in the true sense of BS 8233. In this regard, BS 8233 states:

“Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses.”

Nevertheless, we have considered noise levels on all outdoor spaces, shared and private. Receptor points have been added to each zone to determine the typical daytime $L_{Aeq,16hr}$ noise levels. All receptors are set at typical standing head height (c.1.5-1.6 metre height), and all roof edges have been modelled with a typical 0.5 metre parapet. Balustrades are, at this stage, assumed to be non-acoustic (e.g. hit-and-miss railings).

The following Plan illustrates the calculated noise levels in each outdoor living space based on the results of our noise model.



It can be seen that the upper guideline target of BS 8233 (55 dB $L_{Aeq,16hr}$) is achieved throughout.

9.0 Development-Generating Noise Impacts

9.1 Plant Noise Emissions

9.1.1 Limits

Based on the results of the noise survey and the requirements of the Local Authority, we propose the following non-emergency plant noise emission limits to be achieved incident at the nearest noise sensitive windows with all landlord + retail tenant plant operating simultaneously. These limits are set to ensure plant noise does not exceed the prevailing 'representative' background noise levels in line with BS 4142.

Location	Maximum Plant Noise Rating Level, $L_{A,r,Tr}$ (dB)	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
West (over river)	47	45
North (Victoria Bridge)	47	44
East (Deansgate)	47	44
South (Phase 1 Hotel/Office)	48	42

Noise shall be assessed in accordance with BS 4142:2014+A1: 2019 with corrections applied for any plant emitting noise of a tonal or irregular quality.

We would propose that emergency plant is designed to ensure noise levels do not exceed a level 10 dB above the prevailing daytime ambient noise level during maintenance testing, provided such testing is scheduled for short periods on weekdays during social daytime hours only. This criterion has been accepted by numerous local authorities, noting that the need to schedule sensible testing hours shall take precedent.

The above limits shall be subject to the final approval of the Local Authority.

9.1.2 Plant Noise Mitigation

The development will contain heat rejection plant in the form of condensers installed in the B2 condenser plantrooms and on the roof. The condenser plantrooms will contain louvres onto the river front.

A detailed condenser noise assessment has been undertaken to inform detailed design provisions. The rooftop units are calculated to comply with the limits without any additional noise mitigation measures. For the B2 condenser plantrooms, additional acoustic treatment has been specified. This includes sound absorption to the plantroom soffits (to control reverberant noise build up) and 300 mm deep acoustic louvres to the plantroom elevations along the river front.

A detailed plant noise assessment can be provided to MCC to discharge the planning condition during the construction phase of the project. We would suggest the local authority therefore retains the condition relating to plant noise emissions.

9.2 Amenity / Commercial Unit Operational Noise

The development will contain residential amenity spaces, most notably a gym, as well as a commercial/retail units which may have the potential to generate noise depending on the intended usage. The associated operational noise may have the potential to cause adverse impacts to external noise sensitive receptors (noise breakout through facades) and to the structurally-connected new dwellings within the building (transfer through floors).

The exact uses / opening times etc. for these spaces are not known and thus, at this stage, exact operational noise levels have not been established and detailed noise control measures cannot be advised. The following sections provide the initial design guidance provided to the developer.

9.2.1 Commercial Unit

We would suggest the commercial offerings are designed as 'shell only' units that (a) satisfies minimum Building Regulations sound insulation standards to dwellings as per Section 4.3, and (b) provides a suitably acoustically-rated double-glazed curtain walling frontage that will control operational noise egress for the vast majority of prospective tenants. Appropriate operational noise limits would then need to be assigned depending on the proposed building structure. Should prospective tenants wish to exceed these limits, they would be responsible for acoustic-enhancements (e.g. mass barrier ceilings) to prevent adverse noise impacts. This would be secured through an appropriately worded clause in the AfL and the planning authority may also wish to secure this via an appropriate worded planning condition.

As an example, if a traditional café or restaurant was proposed (Class E), standard façade constructions and Building Regulations compliant floor constructions are likely to result in appropriate noise levels to accommodate anticipated operational noise. If, however, a modern bar or bustling restaurant with music was proposed, additional acoustic treatment could be required but the AfL would ensure the tenant would provide this in their fit-out works (e.g. a plasterboard ceiling to control noise to apartments above).

For external noise breakout, noise limits shall be set in the commercial units (shell) to ensure activity noise levels ($L_{eq,5min}$) achieve a level 5dB below the typical background noise level (L_{90}) in each octave band at 1m from any external noise sensitive property windows.

9.2.2 Amenity Spaces

The precise usage of the amenity spaces would need to be established, so that anticipated operational noise levels can be determined and appropriate noise mitigation solutions assigned. In lieu of known usage, we would propose the following design criteria:

- All separating constructions to neighbouring dwellings to achieve Building Regulations ADE minimum standards;
- Anticipated activity noise levels in amenity spaces ($L_{Aeq,5min}$) should be controlled to 5dB below the typical background noise level (L_{A90}) in each octave band in structurally connected habitable rooms and at 1m from any external noise sensitive property windows. E.g. For structurally connected habitable rooms,

typical background noise levels in apartments will closely match MEP services noise limits, so NR25-30 (daytime) and NR20-25 (night-time) can be assumed. Activity noise limits of NR20-25 (daytime) and NR15-20 (night-time) may then be suitable.

- For 'entertainment' amenity spaces (i.e. with music noise), noise levels in the 63 Hz and 125 Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms that are structural connected or external) absolute noise limits of 47dB and 41dB ($L_{eq,5min}$), respectively.
- For the gym, impact and structure-borne noise arising from weight drops and use of CV machinery should be controlled so as not to exceed G20 (ref. ProPG GAG) or NR 20 in bedrooms at night (23:00-07:00hr), and G25 (ref. ProPG GAG) or NR 25 in habitable rooms during the day (07:00-23:00hr) assuming typical/sensible gym usage.

For standard 'low noise' amenity spaces (e.g. residence lounge, study areas), conventional constructions achieving the minimum Building Regulations ADE requirements may be sufficient. Where noise levels may be elevated, provisions for additional acoustic treatment may be required, usually in the form of an enhanced mass-barrier plasterboard ceiling.

For 'high noise' generating amenities (namely, the gym), provisions should be made for significant additional treatment. These spaces should be positioned to avoid direct horizontal adjacencies with apartments where possible. Provisions should be made for enhanced acoustic ceilings (double layer plasterboard, mineral wool, and possibly acoustic hangers). Flanking considerations may require columns and external walls to be independently lined within the 'high noise' source rooms.

Provisions should also be made for specialist acoustic floating floor treatments to mitigate the risk of structure-borne noise and vibration transfer if free-weights (or similar 'heavy floor impact' activities) are expected. Note that, depending on the use of the gym, size of weights, etc., it may be necessary to consider a heavy weight sprung concrete floating floor system with additional rubber gym matting of an appropriate thickness.

Provisions exist to mitigate all noise and vibration risks to an acceptable standard from all commercial and residential amenity spaces. It would be prudent for MCC to retain a condition in this regard so that further information can be provided during the construction phase of the project.

10.0 Conclusions

This report presents an updated noise impact assessment in relation to the Cathedral Square residential development on Deansgate, Manchester to supplement the Section 73 application. The development comprises 300nr new dwellings within a single 27nr storey concrete frame building (plus ground and 2nr lower ground floors) with private amenities, car parking, cycle storage and a retail unit.

The assessment seeks to demonstrate that [A] noise impacts can be sufficiently mitigated to achieve acceptable acoustic conditions within residential accommodation, and [B] noise generated from the operation

of the development (plant, commercial and amenity operation) can be mitigated to prevent adverse noise impacts on the locality and structurally-connected dwellings.

A baseline noise survey was carried out by Fisher Acoustics to inform the planning application (Report Ref. PR0657-REP05A-MPF '*Environmental Noise Study*' dated October 2021). Due to COVID19, it was not possible for Fisher Acoustics to carry out site-specific baseline noise monitoring, and thus their planning stage analysis was based on historic survey data (by others) at neighbouring developments and DEFRA noise maps.

With COVID19 restrictions now lifted, and Manchester City Centre operating as normal, it was deemed necessary to carry out a new baseline noise study. The results of this study are presented herein.

The assessment finds that acceptable internal noise levels within new dwellings can be achieved through the appropriate specification of façade elements and appropriate ventilation and overheating mitigation solutions. Information of the proposed project specifications has been provided. These specifications correspond to either enhanced double-glazed windows to all dwellings. Background ventilation shall be provided by whole-house ventilation systems (MVHR) and air conditioning / comfort cooling. The latter will remove any reliance on openable windows as part of the ventilation or overheating-mitigation strategy.

Our assessment of noise levels in outdoor living spaces are expected to comply with BS 8233 guideline upper noise targets across all areas.

Noise impacts from the operation of the ground floor commercial unit and residential amenity spaces within the development have been considered and the proposed noise criteria have been advised to mitigate the risk of adverse noise impacts. Plant noise emission limits have been proposed so that future plant installations do not adversely impact on the locality.

Appendix A – Acoustic & Vibration Terminology

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.
dB(A)	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 (e.g. $L_{Aeq,T}$ in dB). Noise 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 only just perceptible.
$L_{Aeq,T}$	$L_{Aeq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time measurement period, T .
$L_{10,T}$	L_{10} is the noise level exceeded for 10% of the measurement period T (i.e. the quietest 10% of the measurement) and has, for many years, been used in the assessment of road traffic noise.
$L_{90,T}$	L_{90} is the noise level exceeded for 90% of the measurement period T (i.e. the quietest 10% of the measurement) and is often used to describe the 'background' noise level.
L_{max}	L_{max} is the maximum sound pressure level recorded over the measurement period, T . L_{max} is often used in assessing scheduled environmental noise 'events' (such as train passbys), particularly at night where such events may cause sleep disturbance.
R_w	The weighted sound reduction index, R_w , is a single figure description of sound reduction as defined in BS EN ISO 717-1. It is single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The R_w is calculated from sound insulation measurements taken in an acoustic laboratory. Sound insulation ratings derived from site measurements are invariably lower than the laboratory figures and are referred to as the apparent weighted sound reduction index, R'_w .
$D_{n,e,w}$	The weighted element-normalised level difference, $D_{n,e,w}$, is a single figure description of the sound insulation performance of small building elements, such as a trickle ventilator.
C_{tr}	C_{tr} is correction term applied against the sound insulation single-number values (e.g. R_w) to provide a weighting against low frequency performance. The reference values used within the C_{tr} calculation are based on urban traffic noise.

Appendix B – Planning Policy & Assessment Guides

Planning Policy

- **Noise Policy Statement for England (NPSE)**

The Noise Policy Statement for England (NPSE) launched in March 2010 states the long-term vision of Government noise policy is to “*promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development*”.

The long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

The NPSE introduces a three-tier concept for the assessment of noise impacts onto a receptor:

- **NOEL – No Observed Effect Level:** The level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.
- **LOAEL – Lowest Observable Adverse Effect Level:** The level above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level:** The level above which significant adverse effects on health and quality of life occur.

There are no numeric thresholds relating to each of the above. The NPSE acknowledges that the severity of noise impacts vary depending upon the type of noise, the type of receptor, the duration (on-time) of the noise, the characteristics of the noise, the time of day, the day of the week, etc.. As a result, the definition of what constitutes an SOAEL is somewhat flexible.

- **National Planning Policy Framework (NPPF)**

The National Planning Policy Framework (NPPF) was first published in 2012 and sets out the government’s planning policies for England and how these are expected to be applied.

The latest revision of the NPPF (December 2024) states that planning system should ensure that “*...developments will function well and add to the overall quality of the area. They should be sympathetic*

to local character and history, including the surrounding built environment while not preventing or discouraging appropriate innovation or change". Ref: Paragraph 135.

Paragraph 187 advises:

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

(a)-(d) [...]

*(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or **noise pollution** or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans, and*

(f) [...]"

Paragraph 198 advises:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

*b) identify and protect tranquil areas which have remained relatively undisturbed by **noise** and are prized for their recreational and amenity value for this reason; and*

(c) [...]"

The NPPF recognises 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."* Ref. Paragraph 200.

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities." Ref. Paragraph 201.

- **Planning Practice Guidance on Noise (PPG)**

The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) in March 2014 to support the NPPF and make it more accessible. It advises on how planning can manage potential noise impacts in new development. The guidance is regularly reviewed and updated and noise is listed as a specific category. The guidance is for ad hoc developments, as major infrastructure is covered by overarching National Policy Statements.

PPG provides the following tabulated summary of the effects of noise exposure (in terms of health and quality of life) associated with noise generating and sensitive developments.

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

Assessment Guides

- **ProPG: Planning & Noise**

ProPG: Planning & Noise 'Professional Practice Guidance on Planning & Noise' was issued in May 2017 with the primary goal of assisting the delivery of sustainable residential development by promoting good health and well-being through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise.

It is applicable to noise from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise). The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is "not dominant".

ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging.

The two sequential stages of the overall approach are:

Stage 1 – an initial noise risk assessment of the proposed development site; and

Stage 2 – a systematic consideration of four key elements.

Element 1 – demonstrating a "Good Acoustic Design Process";

Element 2 – observing internal "Noise Level Guidelines";

Element 3 – undertaking an "External Amenity Area Noise Assessment"; and

Element 4 – consideration of "Other Relevant Issues".

The ProPG considers suitable guidance on internal noise levels found in BS 8233 (see below) with the addition of an $L_{Amax,f}$ requirement for bedrooms at night, as below.

"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."

- **BS 8233: 2014**

British Standard 8233: 2014 'Sound insulation and noise reduction for buildings' presents the following desirable internal ambient noise levels for dwellings based on steady external noise sources (e.g. road traffic).

Activity	Location	Desirable Internal Ambient Noise Level	
		07:00 – 23:00	23:00 – 07:00
Resting	Living Rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

BS 8233 states that where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

For outdoor living spaces, BS 8233 states:

“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable and a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space.”

For commercial and amenity facilities, a design range of 35-50 dB L_{Aeq} can be interpreted depending on the intended use of the space.

- **World Health Organisation (WHO)**

The current WHO Environmental Noise Guidelines 2018 for the European Region supersede the 1999 Guidelines for Community Noise, although it does suggest that the 1999 values for indoor/outdoor noise levels for dwellings remain valid, as presented below.

Location	Critical Health Effect(s)	Noise Limit
Outdoor living area (gardens)	Serious annoyance, daytime/evening	55 dB $L_{Aeq,16hr}$
	Moderate annoyance, daytime/evening	45 dB $L_{Aeq,16hr}$
Outside bedroom window	Sleep disturbance, window open	45 dB $L_{Aeq,8hr}$

Location	Critical Health Effect(s)	Noise Limit
		60 dB $L_{Amax,f}$
Indoor living area	'Target'	35 dB $L_{Aeq,16hr}$
Indoor bedroom	'Target'	30 dB $L_{Aeq,8hr}$

¹ With regard to night-time noise “events”, WHO states “In many situations, average noise levels like the L_{den} or L_{night} indicators may not be the best to explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level (L_{Amax}) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by L_{Amax} . Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators.”

The above guideline values apply as a threshold above which “critical health effects” may occur. The values are therefore at the lowest noise limit to which any psychological or physiological effects may be triggered. With reference to the NPSE, these values are set at the Lowest Observed Adverse Effect Level (LOAEL). The WHO guidelines do not define the level above which effects would be considered significant (SOAEL). Designing for compliance with the LOAEL would, therefore, be considered the ‘ideal’ robust approach.

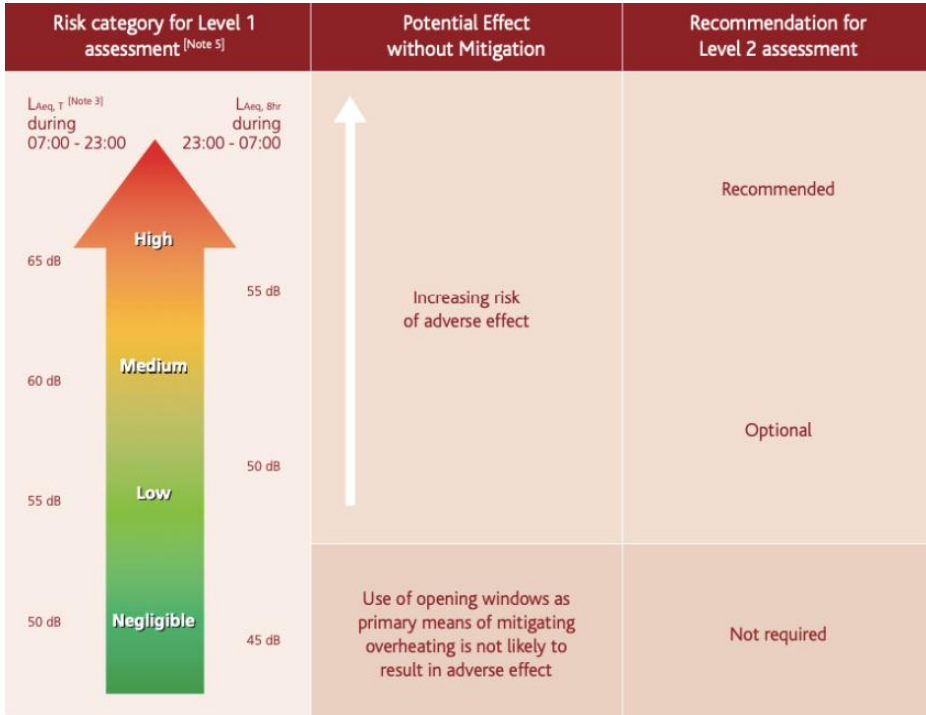
Exceedances of the WHO guideline values do not necessarily imply significant noise impact and, indeed, it may be that significant impacts do not occur until much higher degrees of noise exposure are reached.

Note that the above tend to apply to continuous noise sources, such as road/rail traffic, and hence the time base for assessment is drawn out to full day (16hr) and night (8hr) periods. When assessing more transient noise sources, a reduced time base of 1 hour is considered more appropriate.

- **Acoustics, Ventilation & Overheating Residential Design Guide**

The Acoustics, Ventilation and Overheating Residential Design Guide (Version 1.1) was issued in January 2020 by the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). This document provides guidance on the interdependence between acoustics, ventilation and overheating.

The AVO guide recommends a two-level approach to assess the potential impact of noise ingress through windows that have been opened to mitigate overheating and also noise from any mechanical services used to provide comfort cooling. The level 1 assessment relates to incident environmental noise levels across a proposed site, it is used to define “risk categories” for each building façade based on these levels. These categories are set out below:



At planning stage the level of information required to undertake a level 2 assessment in-line with the AVO guide is often not available and a level 1 assessment, which establishes the risk categories of each proposed façade, would be most suitable.

• **BS 4142:2014**

British Standard BS 4142 looks at the assessment of noise of a commercial / industrial nature. It describes methods for rating and assessing outdoor sound of an industrial and/or commercial nature “on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident”. In relation to this development, this includes sound from fixed installations, comprising M&E plant and equipment.

The assessment method is based on the difference between the measured ‘background sound level’ without the influence of any industrial noise source, and the ‘rating level’ of the industrial source, at the receiver location. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact. A difference of around +5 dB is of marginal significance, and where the rating level does not exceed the background, this is an indication of the specific sound source having a low impact.

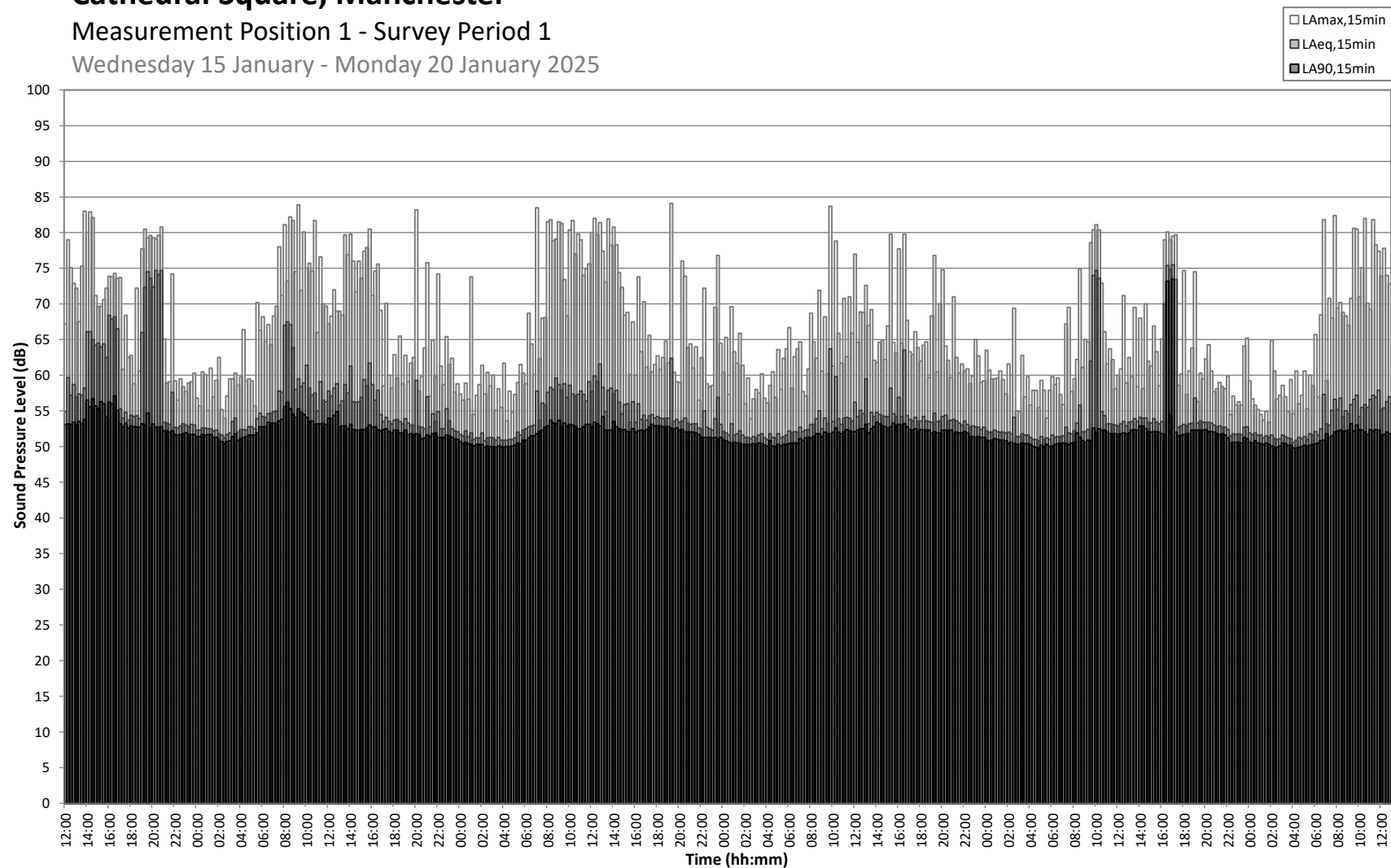
Appendix C – Time History Graphs

Cathedral Square, Manchester

Measurement Position 1 - Survey Period 1

Wednesday 15 January - Monday 20 January 2025

22192-1-G1

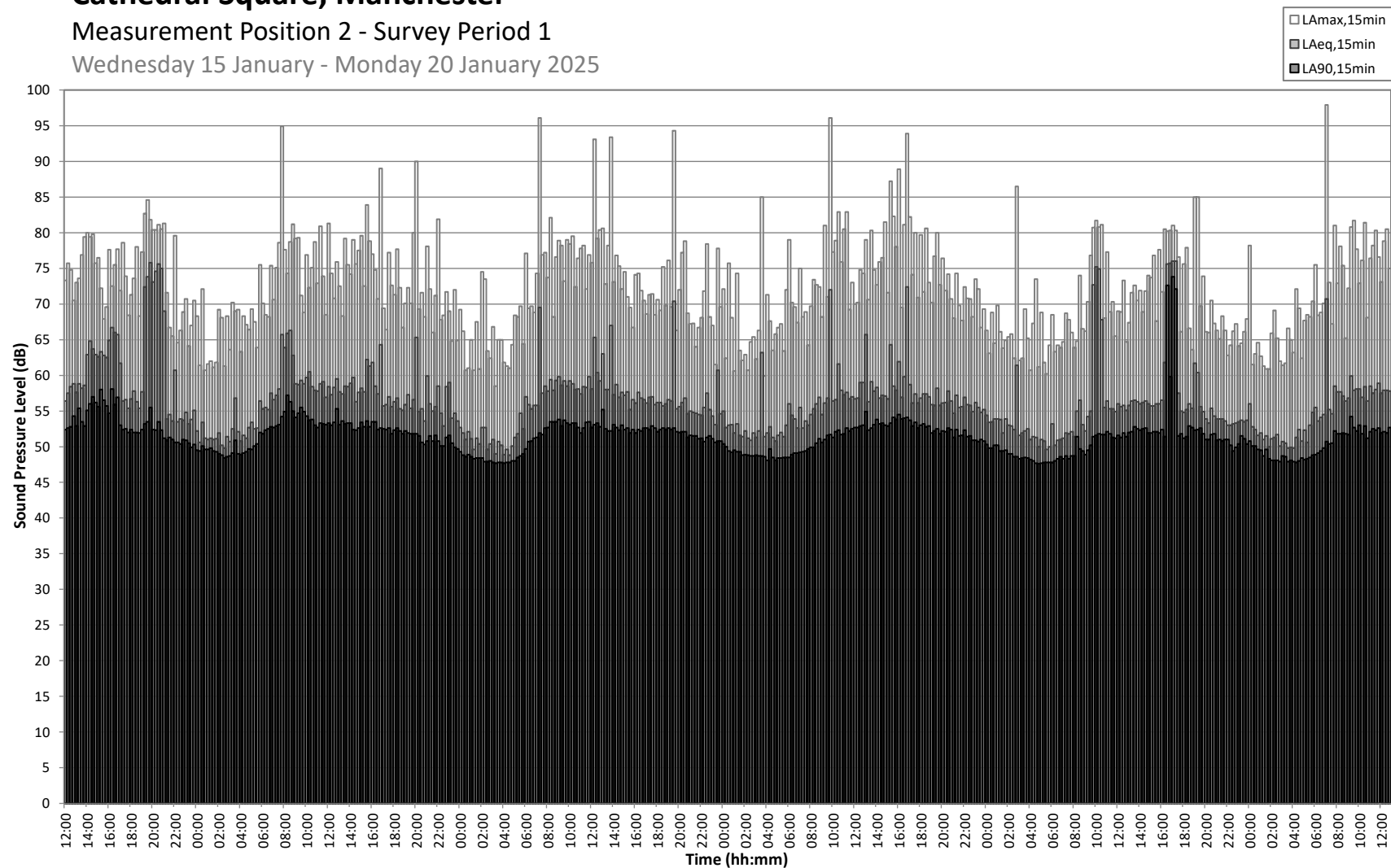


Cathedral Square, Manchester

Measurement Position 2 - Survey Period 1

Wednesday 15 January - Monday 20 January 2025

22192-1-G2

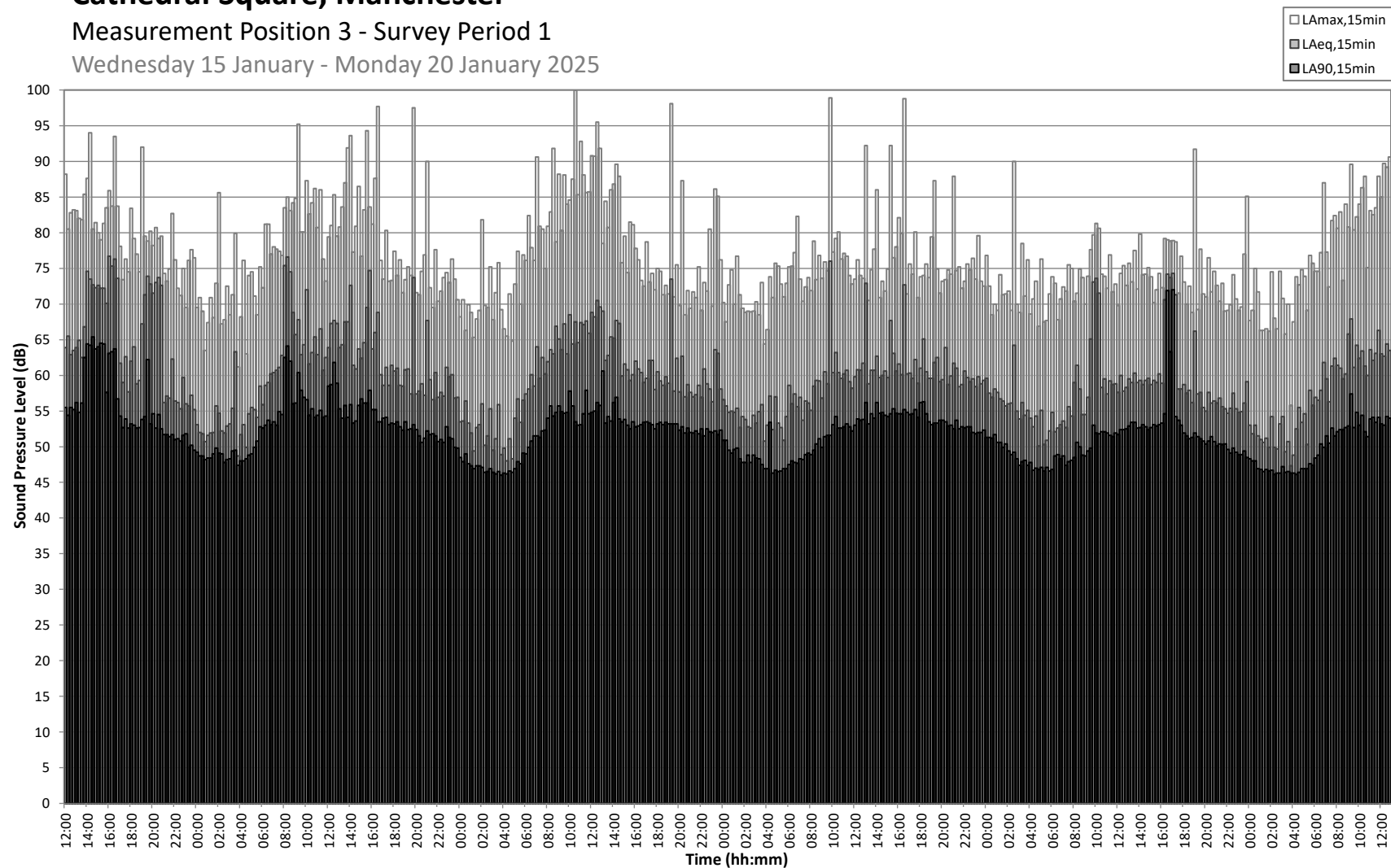


Cathedral Square, Manchester

Measurement Position 3 - Survey Period 1

Wednesday 15 January - Monday 20 January 2025

22192-1-G3

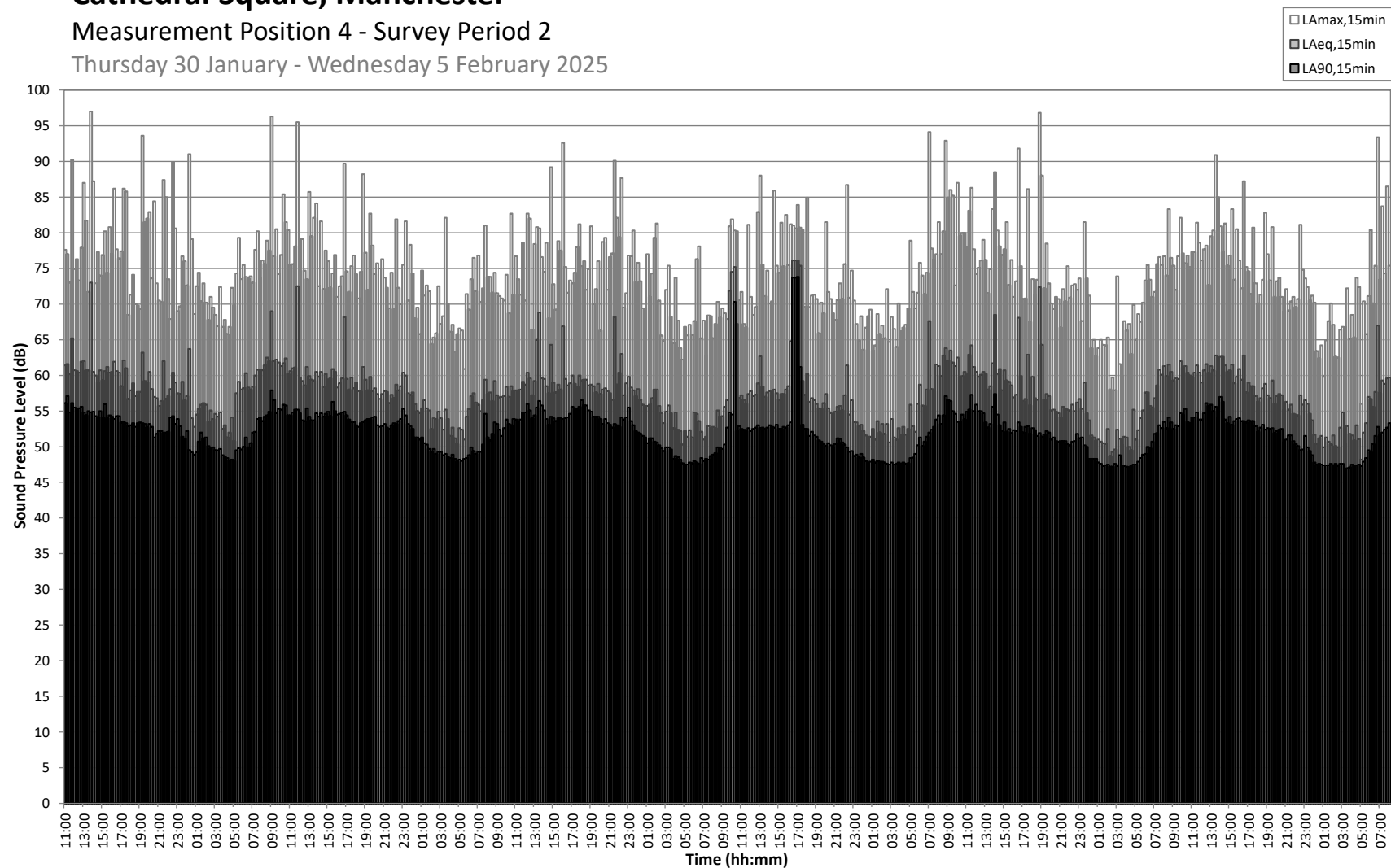


Cathedral Square, Manchester

Measurement Position 4 - Survey Period 2

Thursday 30 January - Wednesday 5 February 2025

22192-2-G4



Cathedral Square, Manchester

Measurement Position 4 - Survey Period 3

Wednesday 5 February - Monday 10 February 2025

22192-3-G4

