

Phase 2 & 3 Newton Heath

Noise Impact Assessment Report

Client:

One Manchester
c/o Euan Kellie Property Solutions

Date:

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Our Ref:

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**JAMESON
ACOUSTICS**

Consultants in acoustics,
noise and vibration

Document Control

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0	24-05-2023	AJ	First issue
1	04-08-2023	AJ	To incorporate latest site plan.

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Executive Summary

Planning permission is sought for Phase 2 & 3 of the new-build residential development on Oldham Road in Newton Heath, Greater Manchester. The development will create 28nr new houses and 81nr apartments with associated gardens, car parking and landscaping.

The site is subject to noise from road traffic on Oldham Road and Old Church Street. Jameson Acoustics Limited has been commissioned to undertake a noise impact assessment to supplement the planning application.

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 that removes reliance on openable windows for dwellings overlooking Oldham Road and Old Church Street. Preliminary guidance on suitable specifications and solutions for framed external window/door systems has been provided. Acoustically-enhanced double glazed windows will be required for façades facing the two roads, reducing to more conventional double glazing within the centre of the site.

Plant noise emission limits have been proposed so that future plant installations do not adversely impact neighbouring noise sensitive properties. It is worth noting that there is unlikely to be significant plant associated with the development. A substation is proposed to the south-east corner and our assessment of noise output from this indicates a low risk of adverse noise impact.

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1.0 Introduction

Planning permission is sought for Phase 2 & 3 of the new-build residential development on Oldham Road in Newton Heath, Greater Manchester. The development will create 28nr new houses and 81nr apartments with associated gardens, car parking and landscaping.

The site is subject to noise from road traffic on Oldham Road and Old Church Street. Jameson Acoustics Limited has been commissioned to undertake a noise impact assessment to supplement the planning application. The assessment seeks to demonstrate that [A] noise impacts can be sufficiently mitigated to achieve acceptable acoustic conditions within new dwellings and in gardens, and [B] noise generated from the operation of the development can be mitigated to prevent adverse noise impacts on the locality.

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

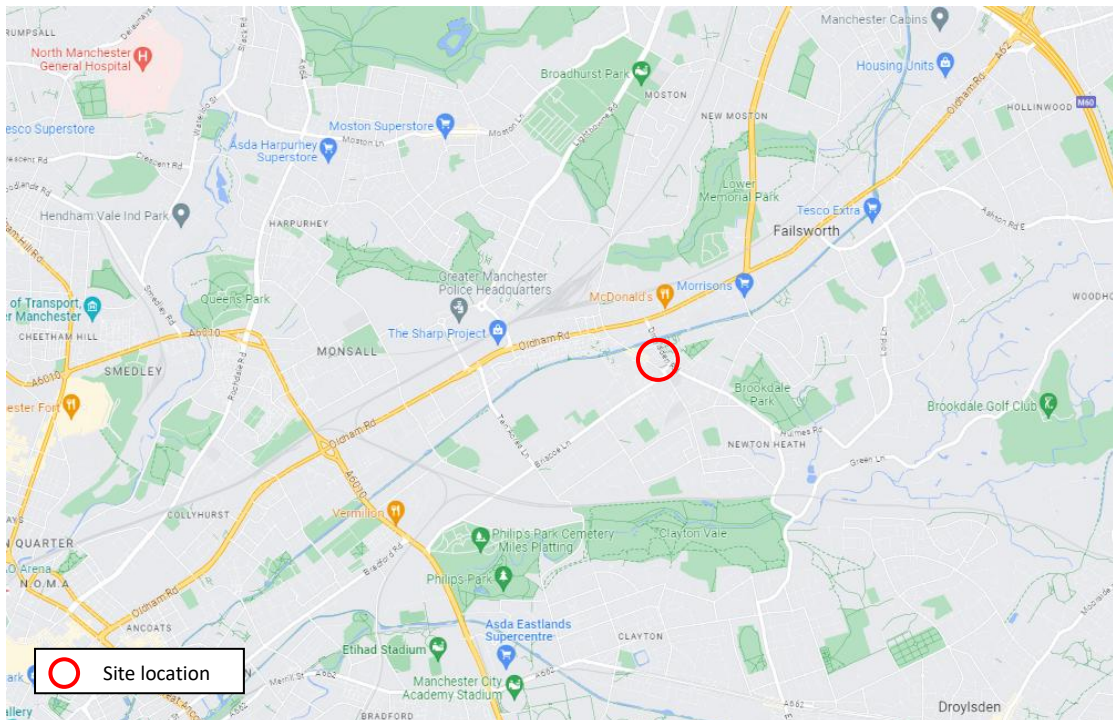
2.0 Objectives

- 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 24 hour noise survey at the site, capturing daytime and night-time noise levels at selected positions in accordance with BS 7445. This data shall supplement 2020 noise survey report for the Phase 1 site.
- 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 with the aim of minimising the risk of the operation of new plant causing a noise nuisance to neighbours.

3.0 Site Description

3.1 Location

The site is located on Oldham Road in Newton Heath and falls under the jurisdiction of Manchester City Council. See Location Plan below.



Location Plan (© maps.google.co.uk)

3.2 Description

The site is bounded by Oldham Road (A62) to the north and Old Church Street to the west. A supermarket lies to the immediate south and Phase 1 of the housing development (currently in construction) lies to the east. The surrounding area is primarily residential, with Newton Heath health centre to the west and a library to the south. The dominant noise source on site is road traffic from Oldham Road and Old Church Street.

The Phase 2 site will comprise mainly housing with a small 6nr unit apartment building to the north west corner adjacent to Oldham Road. The Phase 3 site will provide 75nr new apartments within a single 6 storey block to the north of the site, with associated car parking to the south and a winter green park.

See site plan below.



Site Plan (c/o TP Bennett)

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], 2021;
- 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 (incorporating amendments to 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 floors separating new apartments from back of house plant spaces which will need to be designed in such a way that they achieve, as a minimum, the below ADE on-site sound insulation performance.

Description	Required Performance
Minimum airborne sound level difference <i>Party Walls/Floors 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 took effect on 15 June 2022 and does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the building work is started before 15 June 2023. It requires noise to be considered as part of the development's overheating strategy in locations where external noise may be an issue. It states that the overheating strategy should take account of the likelihood that windows will be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- 40 dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
- 55 dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).

4.4 Assessment Guides

For planning and noise, the following industry standards and assessment guides shall be considered.

- ProPG: Planning & Noise, 2017;
- 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 ‘*Methods for Rating and Assessing Industrial and Commercial Sound*’.

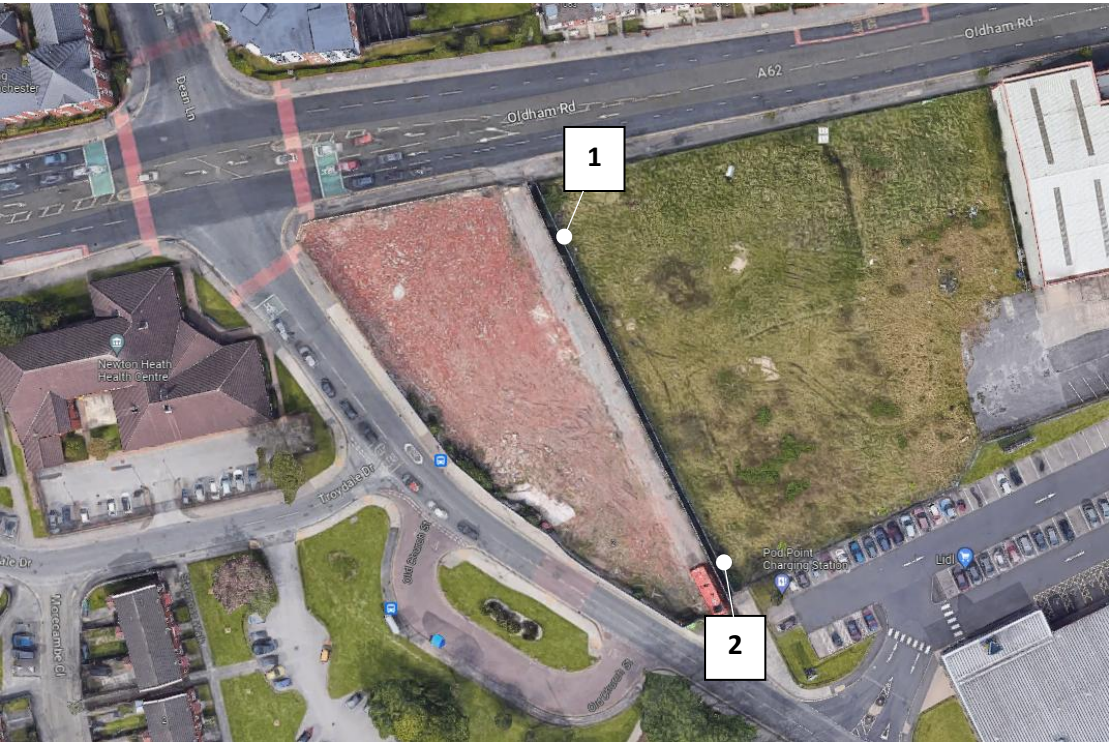
See Appendix B for a detailed description of each.

5.0 Baseline Noise Survey

5.1 Procedure

Automated noise level measurements were taken from 12:00 hours on Wednesday 10 May to 14:00 hours on Thursday 11 May 2023 at 2nr on-site positions as described below. Both positions were selected to establish the typical prevailing daytime and night-time ambient, maximum and background noise levels to the north and south sections of the development site.

Position	Type	Description
1	Automated	To the north edge of the site, approximately 14 m from the roadside edge of Oldham Road. Microphone approximately 3 m from ground with full sight of Oldham Road.
2	Automated	To the south edge of the site, approximately 14 m from the roadside edge of Old Church Street. Microphone approximately 3 m from ground with full sight of Old Church Street.



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

Each microphone was mounted on a pole and fitted to the timber site hoardings. The microphones were fitted with windshields and mounted in free-field conditions.

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 15-minute and 1-hour intervals.

All measurements were taken in general accordance with BS 7445-1: 2003 '*Description and Measurement of Environmental Noise*'.

5.2 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. No significant deviations in calibration level were noted.

Description	Equipment	Serial Nr	Lab Calibration Expiry	Lab Calibration Certificate Nr
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	124663 (82835)	11 Aug 2024	12 Aug 2022
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	131635 (85533)	1 Nov 2024	2 Nov 2022
Class 1 sound calibrator	Cirrus CR:515	57570	8 Nov 2023	182770

5.3 Weather Conditions

During the manned survey (and upon set up / collection of the automated survey), weather conditions were calm, road surfaces were dry, wind speeds were low and the sky was generally clear with patchy cloud cover. Based on internet weather reports for the full duration of the survey, conditions remained suitable for obtaining representative measurement results with only brief periods of light rainfall in the evening and around midnight. Wind speeds remained sufficiently low (less than 3 m/s) and temperatures range between 10°C and 15°C.

5.4 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 (and during the manned survey) the noise climate was dominated entirely by road traffic on Oldham Road to the north of the site and a mix of Oldham Road and Old Church Street to the south of the site.

5.5 Results & Analysis

The results of the automated survey have been plotted on Time History Graphs 22042-G1 and 22042-G2 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	Free-Field Ambient Noise Level (dB)	
	Daytime L _{Aeq,16hr} (07:00-23:00)	Night-time L _{Aeq,8hr} (23:00-07:00)
1	66	62
2	59	52

L_{A90} Background Noise Levels

The representative background determined through statistical analysis to BS 4142

Position	Free-Field Background Noise Level (dB)	
	Daytime L _{A90,1hr} (07:00-23:00)	Night-time L _{A90,15min} (23:00-07:00)
1	54	42
2	54	42

L_{Afmax} Maximum Noise Levels at Night

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

Position	Free-Field Maximum Noise Level (dB) At Night-time L _{Amax,5min} (23:00-07:00)
1	76
2	67

5.6 2020 Noise Survey Report

A detailed noise survey was carried out by Hann Tucker Associates (HTA) in November-December 2019 primarily for the Phase 1 development site but captured sufficient data to inform an assessment of the entire site. The survey consisted of automated noise monitoring at 3nr positions from 11:30 hours on Thursday 28 November to 11:00 hours on Tuesday 3 December 2019 and therefore includes weekend measurement readings.

The full methodology and results of this survey are presented in their Noise Impact Assessment Report referenced 27467/NIA1 dated 27 February 2020.

The free-field measurement positions are illustrated below.



2020 Noise Survey Report – Measurement Positions

The report does not clearly define the precise measurement locations (i.e. distances from the principal road traffic noise source), however, there is reference to equipment being installed within small security boxes fixed to lampposts. Based on google maps, we would deduce the following distances from the roads based on the location of the closest lamppost to the illustrated positions.

Position 1[2020]: Approx. 2.5 m from the roadside edge of Oldham Road

Position 2[2020]: Approx. 2.5 m from the roadside edge of Holyoak Street, and 30 m from the roadside edge of Droylsden Road

Position 3[2020]: Approx. 2.5 m from the roadside edge of Old Church Street

The results of the 2020 survey are summarised in the following table.

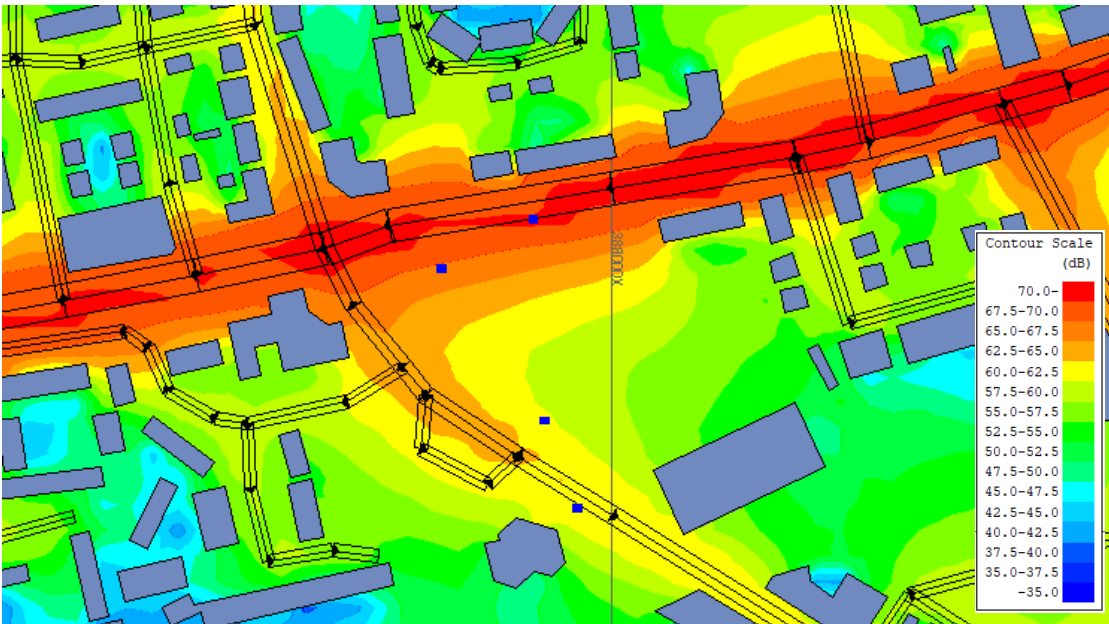
Position	Sound Level (dB)				
	Daytime (07 :00-23 :00)		Night-time (23 :00-07 :00)		
	L _{Aeq,16hr}	L _{A90,15min}	L _{Aeq,8hr}	L _{A90,15min}	L _{Amax,5min}
1[2020]	74	63	72	51	89
2[2020]	67	49	61	40	77
3[2020]	70	49	66	45	81

NB: These readings, particularly at Positions 1 & 3, are notably higher than those recording in the recent Jameson Acoustics survey owing to the relative distances from the principal road traffic noise sources (2.5 m from the roadside edge, as opposed to 14 m).

The results of both sets of surveys shall be used to calibrate our noise model of the site.

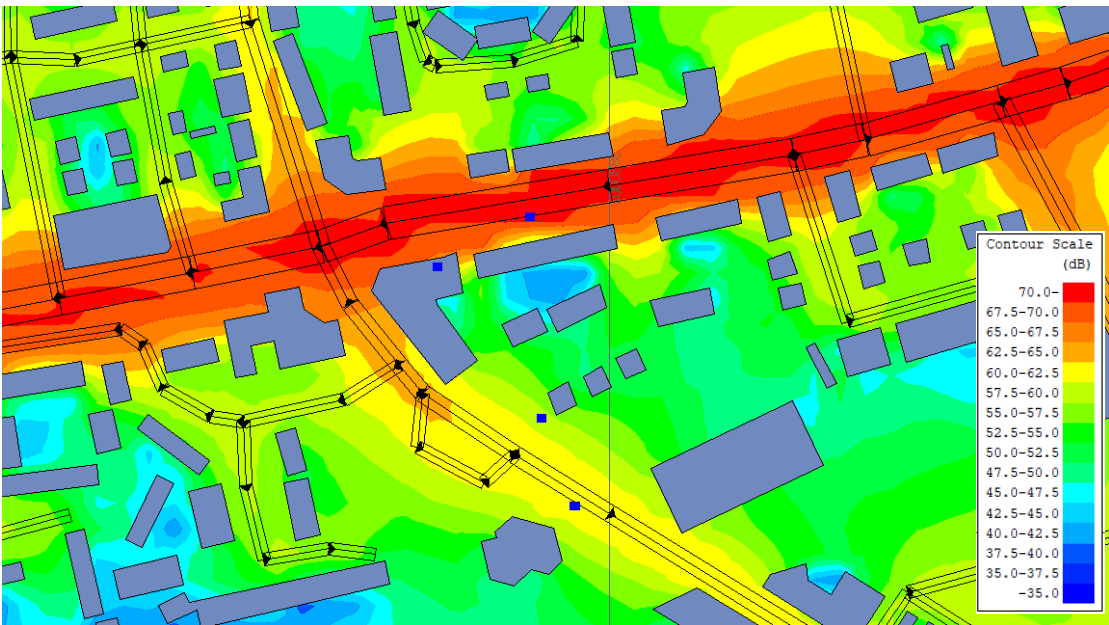
6.0 Incident Road Traffic Noise Levels

Incident road traffic noise levels onto each building façade have been analysed using 3D noise modelling software. The following plan illustrates the spread of daytime $L_{Aeq,16hr}$ traffic noise levels across the existing site.

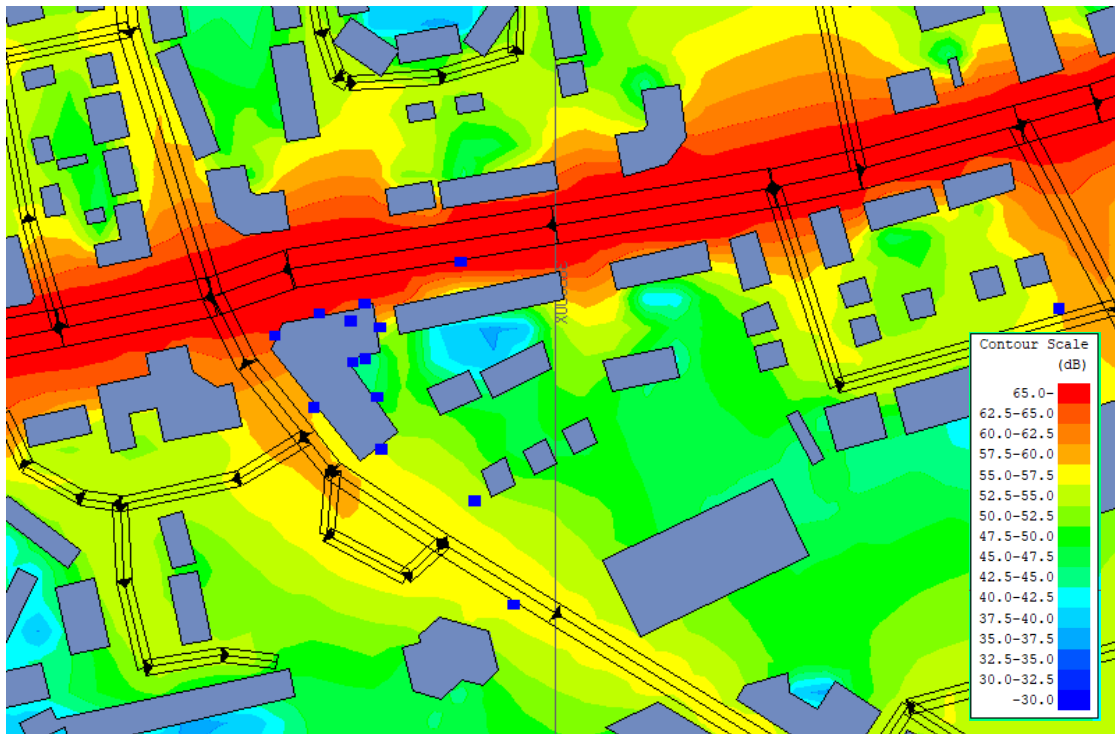


Noise Map of Existing Site – Daytime $L_{Aeq,16hr}$ traffic noise levels (3 m above ground level)

The following plans illustrate the incident daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ traffic noise levels across the proposed site respectively.



Noise Map of Proposed Site – Daytime $L_{Aeq,16hr}$ traffic noise levels (3 m above ground level)



Incident night-time L_{Amax} noise levels are calculated to be 79 dB on the lower levels of facades immediately adjacent to Oldham Road and 74 dB for the lower-level apartments facing Old Church Street, based on the noise model. Given the relatively high levels of ambient L_{Aeq} incident noise levels (70 dB $L_{Aeq,16hr}$ on Oldham Road and 65-67 dB on Old Church Street), and with due regard to the Local Authority’s standard internal noise level targets, the incident L_{Amax} noise levels are not expected to influence façade acoustic performance requirements for this scheme.

7.0 Achieving Internal Noise Levels

7.1 Criteria

In accordance with the planning requirements and assessment guides reviewed in Section 6.0, we would propose the following internal noise levels to be achieve (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_{Amax}

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

7.2 Building Envelope Acoustic Design

7.2.1 External Walls & Roofs

The façade design proposes brick/clad external walls, SFS or block inner layers with punched-in double glazed windows. The external walls will provide sufficient inherent sound reduction to achieve acceptable internal noise levels. Such a construction would be expected to provide a sound reduction performance far in excess of 45 dB $R'_w + C_{tr}$. This performance would far surpass what will be required on this site to control noise ingress.

The roof elements will be concrete (apartments) or tiled insulated cavity roofs with plasterboard ceilings (houses) which, again, will provide a sound reduction performance far in excess of what will be required (greater than 45 dB $R'_w + C_{tr}$ based on a 500 mm+ insulated cavity, roof tiles and 12.5 mm plasterboard ceiling).

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 windows. Our calculations follow BS 8233 procedures and consider the apartment room dimensions and window sizes taken from the planning stage drawings.

Our calculations suggest provisions should be made for the following specifications for the complete framed window/door systems to habitable rooms (living rooms and bedrooms). Example configurations are provided for guidance only.

Façade Zone (ref. Figures below table)	Min. Required Sound Reduction $R_w + C_{tr}$ (dB)	Example Configuration
RED	36	10.8 / 16 / 6.4 mm (aco. lam.)
ORANGE	32	8 / 16 / 6.4 mm (lam.)
BLUE	28	6 / 16 / 6 mm



Façade acoustic specification zones (all levels)

7.2.3 Ventilation

Background ventilation (to Part F rates) is usually provided by either:

- (a) openable windows,
- (b) trickle ventilators, typically installed in the head of window frames with air drawn through via constant mechanical extract ventilation fans (MEV) in bathrooms, or
- (c) whole-dwelling mechanical MVHR heat recovery systems, which remove the need for trickle ventilators in window frames.

On this scheme, option (a) 'openable windows' will not be an acceptable form of ventilation for any of the proposed dwellings as noise levels are too high across the site.

Option (b) 'MEV with trickle ventilators' could be a feasible approach for habitable rooms in the blue façade zones and, possibly, the orange zones too (with reference to the Figure above). However, the trickle ventilators will need to be suitably acoustically rated, which may necessitate the use of trickle ventilators with in-built acoustic attenuators. Such products are available, and prospective suppliers will need to demonstrate their products can achieve the following minimum element sound level difference specifications:

- Orange zone : 38 dB $D_{n,e,w} + C_{tr}$
- Blue zone : 34 dB $D_{n,e,w} + C_{tr}$

MEV with trickle ventilators is unlikely to be a suitable option for habitable rooms in the red zone. It may be possible to find a natural ventilation solution that provides sufficient sound reduction in this zone, but such vents would be specialist high performance acoustic in-wall solutions which are often difficult to incorporate into the façade design.

Instead, for habitable rooms in the red zone, a more appropriate solution would be whole-dwelling mechanical ventilation (MVHR) which do not require any acoustically-compromising direct natural ventilation openings in the façade.

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

Often the overheating strategy for residential buildings places some reliance on openable windows in the summer months. For sites where incident noise levels are high, noise should be taken into account when considering whether openable windows are appropriate for providing this extra purge ventilation to control overheating.

In accordance with the Acoustics, Ventilation and Overheating Guide (AVO), the associated risk of noise levels been deemed unacceptably high with windows open would be when incident external noise levels exceed 65 dB $L_{Aeq,16hr}$ (day) and 55 dB $L_{Aeq,8hr}$ (night). In addition, Building Regulations' Part O advises that the overheating strategy should assume windows will be closed throughout the night where incident façade noise levels exceed circa 49 dB $L_{Aeq,8hr}$ and 64 dB L_{Amax} .

On this basis, the following plan illustrates zones in which incident noise levels will be low enough whereby openable windows would be an acceptable means to mitigate overheating (in **green**) and zones in which incident noise levels will be too high (in **purple / black**).



Overheating acoustic zones:

Green = openable windows acceptable, **Purple/Black** = alternative approach required

For habitable rooms in the **black** zones, the overheating strategy shall assume occupants would have their windows closed throughout the night (23:00-07:00) and also closed during the day (07:00-19:00), and "rarely" open in the evening (19:00-23:00).

For habitable rooms in the **purple** zones, the overheating strategy shall assume occupants would have their windows closed throughout the night-time period (23:00-07:00), "rarely" open during the day (07:00-19:00) but could have them open in the evening (19:00-23:00).

Based on our experience working on similar schemes with restricted reliance on openable windows for acoustics, TM59 internal temperature targets can be maintained with a combination of suitably specified solar-rated glazing, appropriately sized windows, black-out blinds, and the use of whole-house MVHR units that have a manually operable boost function and a 'summer bypass' feature. In this case, the worst affected rooms are north facing which should will assist in achieving the TM59 targets.

Air conditioning can be considered for quality developments. However, the introduction of mechanical solutions should be considered carefully; not only with regard to cost and maintenance, but sustainability and the environment, which carry more importance for any new development within the LPA's jurisdiction.

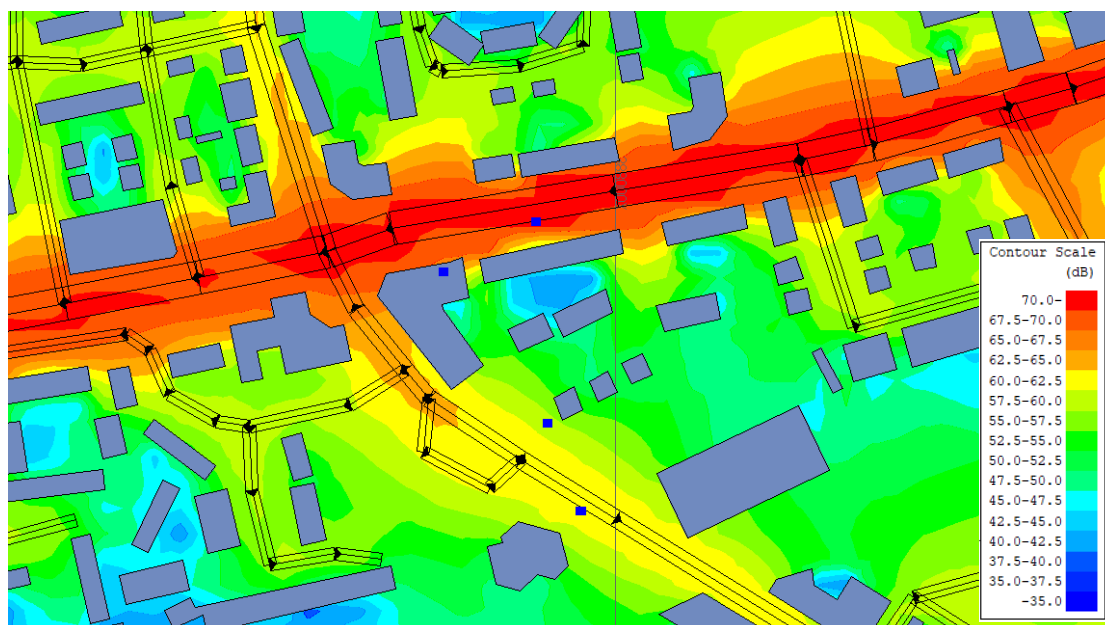
We would advise that a services engineer be consulted at an early stage to determine what provisions should be in place to ensure the overheating targets can be achieved with the above restrictions on openable windows applied.

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 55 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.”

On this scheme, gardens are all generally designed to be in the centre of the site, screened from the principal roads by the new buildings. As illustrated below, all gardens in this central zone are expected to be subject to daytime noise levels of 55 dB $L_{Aeq,16hr}$ or lower, which aligns with BS 8233.



Noise Map of Proposed Site – Daytime $L_{Aeq,16hr}$ traffic noise levels (3 m above ground level)

9.0 Development-Generating Noise Impacts

9.1 Fixed Plant & Equipment

9.1.1 Noise Limits

Based on the results of the noise survey and the requirements of the Local Authority, we propose the following plant noise emission limits to be achieved incident at the nearest noise sensitive windows with all plant operating simultaneously. These limits are 5 dB below the prevailing 'representative' background noise levels.

Receptor Location	Plant Noise Rating Limit, $L_{A,r,Tr}$ ref. BS 4142 (dB)	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Any Noise Sensitive Receptor	49	37

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

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

9.1.2 Plant Noise Mitigation

Given the nature of the development, the only significant plant is likely to be mains electricity transformers within the substation at the south edge of the Phase 3 site. For residential spaces, noise from whole-house mechanical ventilation systems (MVHR) outlets will be negligible and the central plantroom within the apartment building will contain electrical supplies and sprinkler tanks.

For the substation, full details are not yet known. However, it is common for these to comprise a circa 800-1,000 kVA transformer housed within a cavity brick and concrete roofed building. Natural airflow is provided via louvred openings within the walls/door.

The following octave band sound power levels are typical of an 800-1,000 kVA transformer, as taken from Schnieder's technical datasheets.

Item	Linear Sound Power Level (dB) at Octave Band Centre Frequency (Hz)							L_w (dBA)
	63	125	250	500	1k	2k	4k	
800-1,000 kVA Schneider Transformer	51	59	46	42	49	51	37	55

If we consider noise breakout from the frontage of the substation, through louvred doors (2nr 0.5 x 0.5 m louvres), we can calculate the resultant noise level at the nearest dwelling (house on the Phase 2 site approx. 12 m away) using the following equation. For a worst-case assessment, we shall consider 2nr transformers are to be housed.

$$SPL_{out} = SPL_{in} - SRI + 10 \log_{10} \left(\frac{S}{r^2} \right) - 14$$

Where: SRI = sound reduction of building element, R (dB), r = distance to receiver (m), S = approximate area of separating element (m²)

With appropriate acoustic feature corrections for tonality (low frequency hum), our BS 4142 calculation would be as follows.

Description	Octave Band Centre Frequency (Hz)							dBA
	63	125	250	500	1k	2k	4k	
Indoor Reverberant Lp in Plantroom (dB L _{eq})	49	57	44	40	47	49	35	52
Façade composite sound reduction (dB R) Door with louvres & brick wall	-13	-14	-15	-15	-16	-16	-17	-
Distance & radiating area propagation correction, 10m (dB)	-6	-6	-6	-6	-6	-6	-6	-
-14 (dB)	-14	-14	-14	-14	-14	-14	-14	-
Directionality correction, 0=on-axis, otherwise off-axis (dB)	-1	-2	-3	-3	-3	-3	-3	-
Reflection correction (dB)	0	0	0	0	0	0	0	-
Specific noise level at Receptor (dB L _{eq})	16	23	9	5	11	13	-2	17
Acoustic feature correction (dB)	-	-	-	-	-	-	-	+6
Noise Rating Level at Receptor (dB L _{Ar,Tr})	-	-	-	-	-	-	-	23
Night-time Plant Noise Limit (dB L _{Ar,Tr})	-	-	-	-	-	-	-	37
Compliance?	-	-	-	-	-	-	-	✓

The above demonstrates compliance with the plant noise limits proposed in Section 9.1.1.

Based on the above, it is envisaged that the risk of excessive building services noise can be comfortably mitigated through design.

10.0 Conclusions

Planning permission is sought for Phase 2 & 3 of the new-build residential development on Oldham Road in Newton Heath, Greater Manchester. The development will create 28nr new houses and 81nr apartments with associated gardens, car parking and landscaping.

The site is subject to noise from road traffic on Oldham Road and Old Church Street.

Jameson Acoustics Limited has been commissioned to undertake a noise impact assessment to supplement the planning application.

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 that removes reliance on openable windows for dwellings overlooking Oldham Road and Old Church Street. Preliminary guidance on suitable specifications and solutions for framed external window/door systems has been provided. Acoustically-enhanced double glazed windows will be required for façades facing the two roads, reducing to more conventional double glazing within the centre of the site.

Plant noise emission limits have been proposed so that future plant installations do not adversely impact neighbouring noise sensitive properties. It is worth noting that there unlikely to be significant plant associated with the development. A substation is proposed to the south-east corner and our assessment of noise output from this indicates a low risk of adverse noise impact.

Appendix A – Acoustic 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 (July 2021) states that planning system should **contribute to, and enhance**, the natural and local environment by (amongst others) *“preventing both new and existing development*

*from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or **noise pollution** or land stability.”*

The express inclusion of noise in the NPPF means that it is a material planning consideration for local planning decisions.

Paragraph 123 of the NPPF document states that planning policies and decisions should aim to:

“A. Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

B. Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

C. Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and

D. Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

NPPF advises that decisions relating to planning applications should ensure “...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.”

To achieve this, new developments should “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” and should also “identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

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.”

- **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.”

- **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 noise levels remain valid, as presented below.

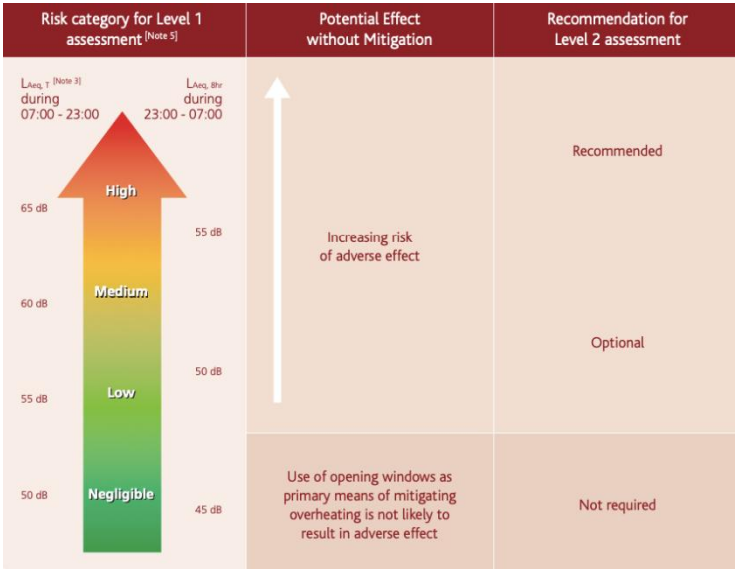
Noise Source	CNG guideline indoors all sources	ENG guideline outdoors noise from specific source only
Road traffic	35 dB $L_{Aeq, 16h}$	53 dB L_{den}
	30 dB $L_{Aeq, 8h}$	45 dB L_{night}
Railway	35 dB $L_{Aeq, 16h}$	54 dB L_{den}
	30 dB $L_{Aeq, 8h}$	44 dB L_{night}
Aircraft	35 dB $L_{Aeq, 16h}$	45 dB L_{den}
	30 dB $L_{Aeq, 8h}$	40 dB L_{night}

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 $L_{A,max}$. 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.”*

- 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.

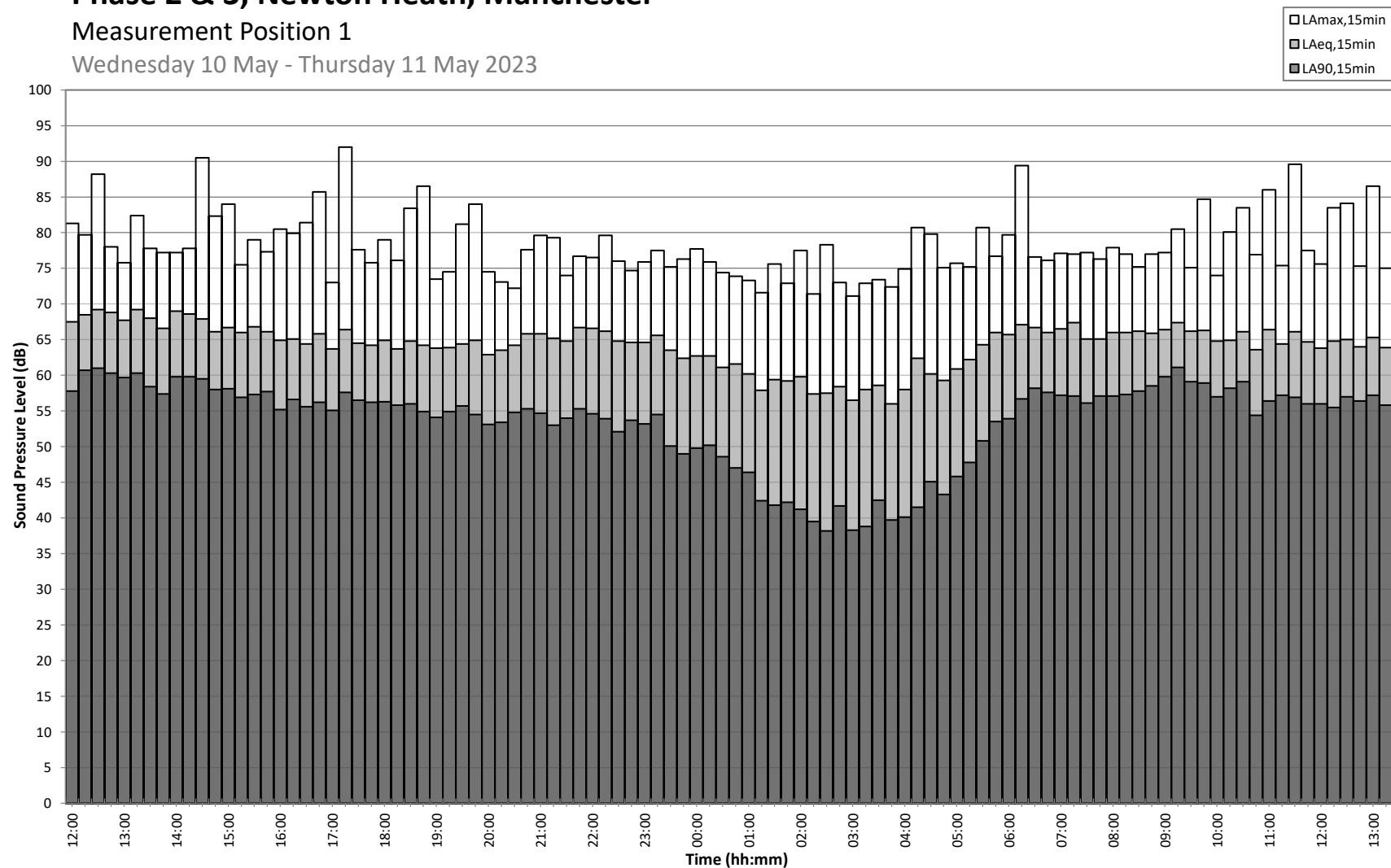
Appendix C – Noise Survey Time History Graphs

Phase 2 & 3, Newton Heath, Manchester

Measurement Position 1

Wednesday 10 May - Thursday 11 May 2023

22042-G1



Phase 2 & 3, Newton Heath, Manchester

Measurement Position 2

Wednesday 10 May - Thursday 11 May 2023

22042-G2

