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404 Wilbraham Road, Manchester

15 July 2026

20711-EBF-01-AA-R1

External Building Fabric Report

Project Number
20711

Issued For
Mr Peter Armistead, APL

Company registered in England & Wales no. 07958744
UKAS accreditation is only applicable to pre-completion sound insulation testing services for building regulations and is not linked to the endorsements and certifications shown above

EXECUTIVE SUMMARY

This assessment has been undertaken so external building fabric elements can be specified in order to meet appropriate internal noise criteria at 404 Wilbraham Road, Manchester.

The assessment adheres to the Local Authority requirements, the principles provided by the *National Planning Policy Framework*: 2024 (NPPF) and internal noise criteria stated within BS 8233: 2014 *'Guidance on sound insulation and noise reduction for buildings'.*

The Institute of Acoustics' *Professional Guidance on Planning & Noise*: 2017 (ProPG) recommended approach for determining site risk due to environmental noise has also been adopted.

The site currently comprises an unused site. Proposals include the construction of a four storey (ground plus three) building providing 8 flats, with access, informal amenity space, landscaping and associated works

A noise survey has been undertaken as detailed in the report, in order to establish the prevailing environmental noise levels at the site.

A subsequent detailed analysis has been carried out of road traffic noise intrusion through the external building fabric. Sound insulation performance specifications have been proposed for glazing systems to be installed in conjunction with the proposal to use a mechanical ventilation system.

The assessment has demonstrated that appropriate internal noise levels should be achievable with the installation of high performing glazing systems and mechanical ventilation.

It is essential that certificated performances should be sought from the manufacturers of the proposed glazing systems.

This report is designed to be suitable to discharge typical noise planning conditions, as per our original scope of work. The report should not be relied upon for further reasons, such as the detailed design of mitigation measures.

Clement Acoustics has used all reasonable skill and professional judgement when preparing this report. The report relies on the information as provided to us at the time of writing and the assumptions as made in our assessment. This report contains confidential information and should not be disclosed to third parties.

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20711-SP1	Indicative Site Plan
20711-TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	ProPG Initial Site Risk Assessment Guidance

REVISION HISTORY

Issue	Date of Issue	Author	Reviewed	Authorised
R1	15/07/2026	**Jamie Newton** Senior Consultant BEng (Hons) MIOA	**Duncan Martin** Director BSc (Hons) MIOA	**Duncan Martin** Director BSc (Hons) MIOA

Issue	Comment
R0	First Issue
R1	Updated to Clarify Proposed Ventilation Solutions

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Mr Peter Armistead, APL to assess the suitability of the site at 404 Wilbraham Road, Manchester for residential development.

Full planning permission is sought for the construction of a building for 8 flats, with access, informal amenity space, landscaping and associated works.

This report presents the results of environmental noise surveys undertaken in order to measure prevailing background levels and details the proposed internal noise level criteria.

Full details of necessary mitigation measures in order to meet the proposed criteria are also provided.

2.0 SITE DESCRIPTION

The site is in a mixed residential and commercial area facing on to Wilbraham Road, a street largely populated by residential flats, commercial retail units and restaurants. The site is bound by a residential house (1 Egerton Road North) to the north, Egerton Road North to the east, Wilbraham Road to the south and a mixed residential and commercial building (410 Wilbraham Road) to the west.

The proposed development site is currently unused, and full planning permission is sought for the construction of a building for 8 flats, with access, informal amenity space, landscaping and associated works. The 8 dwellings will be provided in a new-build 4-storey (ground plus three) construction.

At the time of the survey, the background noise climate was dominated by road traffic from Wilbraham Road.

3.0 ARCHITECTURAL ASSUMPTIONS

3.1 Drawings

The following Simon James Architect drawings have been used in our assessment:

- 117-404W-PL-SV1 to SV2 – Street View Elevations
- 117-404W-PL-GA1 to GA5 – Floor Plans
- 117-404W-PL-EL1 to EL4 - Elevations

3.2 Room Volume and Window Dimensions

Based on the above drawings we have based our calculations on the following worst case living room and bedroom and window dimensions:

Living Room

- Room Volume: 67 m^3
- Window Area: 9.6 m^2

Bedroom

- Room Volume: 26 m^3
- Window Area: 4.8 m^2

3.3 Room Finishes

Our assessment assumes that bedrooms and living rooms will contain typical amounts of soft furnishings, including sofas, chairs, beds and curtains.

4.0 CRITERIA

4.1 National Planning Policy Framework: 2024 (NPPF)

The NPPF, which was first published in 2012 with the latest revision in December 2024, outlines the Government's environmental, economic and social policies for England. The NPPF aims to enable local authorities to produce their own distinctive local and neighbourhood plans, which should be applied in order to meet the needs and priorities of their communities.

Paragraph 187 of The *Conserving and enhancing the natural environment* section of the NPPF includes references to noise stating that:

> *'Planning policies and decisions should contribute to and enhance the natural and local environment by: …*
>
> *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;…'*

Paragraph 198 of The *Ground Conditions and Pollution* section of the NPPF includes references to noise stating that:

> *'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…'

4.2 BS 8233: 2014 Internal Noise Criteria

BS 8233: 2014: '*Guidance on sound insulation and noise reduction for buildings*' describes recommended acceptable internal noise levels for residential spaces during daytime and night-time hours. These levels are shown in Table 4.1.

Activity	Location	Design Range $L_{eq,T}$	
		Daytime (07:00 - 23:00)	Night-time (23:00 – 07:00)
Resting	Living Room	35 dB(A)	-
Dining	Dining Room/Area	40 dB(A)	-
Sleeping	Bedroom	35 dB(A)	30 dB(A)

Table 4.1 BS 8233: 2014 recommended internal background noise levels

4.3 World Health Organisation Guidelines

The World Health Organisation (WHO) document on *'Guidelines for Community Noise'* 1999 states the internal noise level guidelines as summarised in Table 4.2.

Specific Environment	Critical Health Effects	$L_{eq,T}$	$L_{max,\ F}$
Dwelling, Indoors	Speech Intelligibility and moderate annoyance, daytime and evening	35 dB(A)	-
Inside Bedrooms	Sleep disturbance, night-time	30 dB(A)	45 dB(A)

Table 4.2 WHO Internal noise level guidelines

The document also states:

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dBA LAmax more than 10-15 times per night, (Vallet & Varnet 1991)."

4.4 Proposed Noise Level Criteria

On the basis of Sections 4.1 to 4.3 above, Table 4.3 presents our proposed minimum design targets to be achieved in the worst affected dwellings.

Location	Period	Design Target	
		$L_{eq, T}$	$L_{max, F}$
Living Rooms	Daytime (07:00-23:00 hours)	35 dB(A)	-
Bedrooms	Night-time (23:00-07:00 hours)	30 dB(A)	45 dB(A)*

Table 4.3 Proposed noise level criteria

***Please note that this is not an absolute limit, however, $L_{max, F}$ 45 dB(A) should not be regularly exceeded.**

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

4.5 Professional Guidance on Planning & Noise (ProPG)

The Institute of Acoustics' *Planning & Noise: Professional Practice Guidance on Planning and Noise: New Residential Development*: 2017 (the ProPG) provides a recommended approach for dealing with noise within the planning process, specifically in relation to new residential developments.

The ProPG follows 2-stage risk assessment approach. The two stages are as follows:

- Stage 1 - an initial assessment where external noise is rated against the risk of adverse effect; and
- Stage 2 – consideration of key elements to determine the suitability of the site for a residential dwelling.

The results of the initial Site noise risk assessment will determine the appropriate risk of developing the site and therefore how appropriate it is from a noise perspective.

Appendix B presents the Initial Site Risk assessment as presented in ProPG.

Stage 2 attempts to determine that good acoustic design principals have been incorporated into the design so that suitable internal noise levels can be achieved in habitable rooms and that suitable external noise levels can be achieved in outdoor amenity space.

4.6 Guidance on Ventilation

Guidance on ventilation and associated acoustic considerations is given in Acoustic Ventilation and Overheating – Residential Design Guide [AVO] issued jointly by the Association of Noise Consultants and the Institute of Acoustics.

In this guide, the need for ventilation (which falls under the requirements of Approved Document F [ADF]) are covered in three main requirements as follows:

- Whole Dwelling Ventilation
    - General ventilation – continuous ventilation of rooms or spaces at a relatively low rate
- Extract Ventilation
    - Removal of air from a space or spaces (typically stale air from bathrooms or kitchens) to outside
- Purge Ventilation
    - Manually controlled removal of air at a high rate to eliminate fumes and odours, e.g. during painting and decorating or from burnt food. May be provided by natural or mechanical means.

Four main template systems for providing each of the above ADF ventilation requirements are summarised in the AVO guide as shown in Table 4.4.

Ventilation System	Method of Whole Dwelling Ventilation	Method of Extract Ventilation	Method of Purge Ventilation
System 1 [Background ventilators and intermittent extract fans]	Background ventilators (trickle vents)	Intermittent extract fans	Typically provided by opening windows
System 2 [Passive Stack]	Background ventilators (trickle vents) & passive stack	Continuous via passive stack	Typically provided by opening windows
System 3 [Continuous Mechanical Extract (MEV)]	Continuous mechanical extract (low rate), trickle vents provide fresh air	Continuous mechanical extract (high rate), trickle vents provide fresh air	Typically provided by opening windows
System 4 [Continuously mechanical supply and extract with heat recovery (MVHR)]	Continuous mechanical supply and extract (low rate)	Continuous mechanical supply and extract (high rate)	Typically provided by opening windows

Table 4.4 Summary of template systems for ADF ventilation requirements

Where possible, natural forms of ventilation are typically preferred. However, in high noise areas, it may be necessary to recommend System 4, in order to minimise penetrations through the external building façade, which weaken the overall sound reduction performance.

Ventilation requirements will be assessed with consideration to the above systems.

5.0 ENVIRONMENTAL NOISE SURVEY

5.1 Unattended Noise Survey Procedure

Measurements were undertaken at one position as shown on indicative site drawing 20711-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the proposed development.

The surroundings and position used for the monitoring location are described in Table 5.1.

Position No.	Description
UN1	The microphone was mounted on tripod 2 m above ground level, in the south-west corner of the site. The microphone was positioned 1 m in front of a vertical reflective barrier. [1]]

Table 5.1 Description of unattended monitoring locations

Note [1]: The position was not considered to be free-field according to guidance found in BS 8233: 2014, and a correction for reflections has therefore been applied. Based on the presence of the reflective surface and the nature of surrounding noise sources, a correction for reflections of 3 dB has been applied, in line with the recommendations of the standard.

Continuous automated monitoring was undertaken for the duration of the survey between 15:00 on 8 January 2026 and 09:00 on 12 January 2026. It should be noted that a weekend period was selected in order to ensure any noise due to worst case operations at Wilbraham Saint Ninian's United Reformed Church would be inherently considered by the assessment.

The measurement procedure generally complied with ISO 1996-2: 2017: '*Description, measurement and assessment of environmental noise'*.

5.2 Weather Conditions

At the time of set-up and collection of the monitoring equipment, the weather conditions cool and dry with light winds. It is understood that the weather conditions during the unattended survey were generally cool and dry, with occasional light showers through the evening of 8 January as well as the morning of 11 January. It is understood that wind speeds throughout the survey were below 5 m/s.

It is considered that the weather conditions did not significantly adversely affect the measurements and are therefore considered suitable for the measurement of environmental noise.

5.3 Equipment

The equipment calibration was verified, by means of a field verification check, before and after use and no abnormalities were observed.

The equipment used was as summarised in Table 5.2.

Position	Instrument	Manufacturer	Type
UN1	Class 1 sound level meter[1]	Svantek	957
All	Class 1 sound level meter calibrator[1]	Norsonic	1251

Table 5.2 Instrumentation used during the survey

Note [1]: Calibration certificates available upon request

5.4 Unattended Noise Survey Results

The $L_{Aeq:\,5min}$, $L_{Amax:\,5min}$, $L_{A10:\,5min}$ and $L_{A90:\,5min}$ acoustic parameters were measured at the location shown in site drawing 20711-SP1.

Measured noise levels are shown as a time history in Attachment 20711-TH1. A summary of the measured noise levels is presented in Table 5.3.

Position	Time Period	Average ambient noise level $L_{Aeq:\,T}$, dB	Maximum noise level $L_{AFmax:\,5min}$, dB
UN1	Daytime (07:00 - 23:00)	66	-
	Night-time (23:00 - 07:00)	61	82

Table 5.3 Average ambient and maximum noise levels

The levels presented in Table 5.3 are as expected considering the sites location on a main high street in an area occupied by bars, pubs, restaurants and take-aways. Outline mitigation measures are described in Section 7.0 of this report.

Maximum noise levels shown in Table 5.3 are deemed to be 'not regularly exceeded' as required for maximum internal noise level specification purposes.

6.0 PROPG INITIAL SITE RISK ASSESSMENT

The environmental noise survey has determined the onsite noise levels. Table 5.3 shows the calculated day and night-time noise levels to be used in the noise assessment.

With reference to the ProPG risk assessment guidance presented in Appendix B, Table 6.1 shows the identified risk level of this site.

Position	Period	Measured Noise Level	ProPG Noise Risk	ProPG Action Guideline
UN1	**Daytime** [07:00 - 23:00]	66 dB(A)	Medium	See Note [1]
	Night-time [23:00 - 07:00]	61 dB(A)	Medium to High	See Note [1] and [2]

Table 6.1 ProPG initial site risk assessment

Note [1]: Medium – 'As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrates that a significant adverse noise impact will be avoided in the finished development.'

Note [2]: High – 'High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.'

In consideration of the above, we would therefore recommend that assessing the site according to the guidance of British Standard 8233: 2014 will demonstrate that the impacts of noise can be suitably mitigated to avoid an adverse impact.

Provided adequate mitigation measures are put in place during the design and construction phase of the development, recommended internal noise levels can be achieved. Outline mitigation measures are described in Section 7.0 of this report.

7.0 EXTERNAL BUILDING FABRIC ASSESSMENT

7.1 External Building Fabric - Non Glazed Elements

It is currently assumed that the non-glazed external building fabric elements of the proposed development would be comprised of a standard masonry and roof construction. This would contribute towards a significant reduction of ambient noise levels in combination with a good quality window configuration, as shown in Section 7.2.

All non-glazed elements of the building facades should be designed to provide a sound reduction performance of at least the figures shown in Table 7.1 when tested in accordance with BS EN 10140-2: 2021.

Element	Octave band centre frequency SRI, dB					
	125	250	500	1k	2k	4k
Masonry Walls	41	43	48	50	55	55
Roof Construction[1]	27	37	43	48	52	52

Table 7.1 Minimum required sound reduction performance from non-glazed elements

Note [1]: Performance achieved through a construction of:

- **Tiled / Slate Roof**
- **200 mm Cavity with 100 mm Mineral Wool Infill**
- **25 mm Plasterboard Ceiling**

7.2 External Building Fabric - Specification of Glazed Units

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed elements in order to achieve recommended internal noise levels shown in Table 4.3. This specification therefore presents the most robust assessment, for BS 8233: 2014 criteria for internal noise levels in a bedroom at all affected facades.

The minimum sound reduction index (SRI) value required for all glazed elements to be installed is shown in Table 7.2. **The performance is specified for the whole window unit, including the frame and other design features.**

Facade	Ventilation Type to be used alongside	Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)						$R_w + C_{tr}$
		125	250	500	1k	2k	4k	
All Facades	Mechanical (System 4)	25	27	34	44	45	52	34

Table 7.2 Required glazing performance

Note 1 The $R_w + C_{tr}$ should be considered an indication of the overall performance of the glazing. The minimum performance values per octave bands must be achieved.

Where non-vision spandrel panels and external doors are proposed within habitable spaces, they should provide sound reduction performance at least equal to that required of the glazing in order to maintain the acoustic integrity of the external building fabric.

It is essential that prospective glazing system suppliers can demonstrate compliance with the acoustic performance detailed in our specification rather than simply offering a generic glazing configuration. The complete glazing system should achieve the performance requirements stated in Table 7.2 when tested in accordance with BS EN 10140-2: 2021.

It is essential that the performance presented in Table 7.2 is met. However, glazing with a configuration of 8.4 mm Laminated Glass / 12 mm Air / 8 mm Glass would typically be considered suitable.

Please note that the above guidance only considers acoustic performance. Other disciplines, which consider thermal, safety, durability etc. should be consulted to ensure suitability.

7.3 External Building Fabric - Specification of Trickle Ventilators

As stated in the Energy Statement & Sustainability Planning Report, issued by MD&J, proposals are to use System 4 ventilation as summarised in Table 4.4.

As such, passive ventilation (e.g. trickle vents) through the façade would not be required, which will help maintain a high level of sound insulation from the external façade,

It should be ensured that all mechanical extract and supply ventilation is designed to not exceed the internal noise criteria stated in Table 4.3.

7.4 Summary of Predicted Internal Noise Levels

With the proposed mitigation measures as stated within this report, including non-glazed and glazed façade elements and mechanical ventilation, the predicted noise levels are as presented in Table 7.3.

Location	Period	Criteria	Predicted Noise Level	Complies
Living Rooms	Daytime (07:00-23:00 hours)	$L_{eq,\,T}$ 35 dB(A)	$L_{eq,\,T}$ 29 dB(A)	Yes
Bedrooms	Night-time (23:00-07:00 hours)	$L_{eq,\,T}$ 30 dB(A) $L_{max,\,F}$ 45 dB(A)	$L_{eq,\,T}$ 23 dB(A) $L_{max,\,F}$ 44 dB(A)*	Yes

Table 7.3 Predicted noise levels

*** $L_{max,\,F}$ 44 dB(A) not exceeded more than 10 times per night-time period**

As indicated in Table 7.3, the predicted noise levels meet the proposed criteria. It should be noted that these are the predicted noise levels in the worst affected room at the front of the site. Other areas of the development would be more distant and/or better screened from the main sources of noise, resulting in lower internal ambient noise levels.

8.0 OVERHEATING CONSIDERATIONS

Through the proposed external façade and glazing configurations detailed in Sections 7.1 and 7.2, in combination with the mechanical ventilation summarised in Section 7.3, it can be demonstrated that acceptable internal noise levels will be achieved with windows closed and background ventilation provided in accordance with System 4 ventilation as summarised in Table 4.4.

Purge ventilation can typically be provided through openable windows, as during periods when purge ventilation is required, internal noise levels are less critical.

Further consideration has also been given to possible overheating requirements. As the overheating strategy is not currently known, consideration has been given to the worst case scenario of openable windows being used.

Overheating noise criteria are presented in Approved Document O [ADO] which states the following:

> ***Noise***
>
> *3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.*
>
> *a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).*
>
> *b. 55dB LAFmax, more than 10 times a night (between 11pm and 7am).*
>
> *3.4 Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants' Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.*

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020).

This assessment also considers the guidance of *'ADO Noise Guide 2024'* [ADO Guide], issued by the Association of Noise Consultants [ANC]. The ADO Guide details methodologies to determine the allowable equivalent open area for bedroom windows on different facades, according to the apparent noise level in that location.

Based on the distance to identified noise sources and screening of intermediate building envelopes (existing and proposed), the development has been divided into two 'zones'. The identified high noise Zone A comprises the south and east facades overlooking Wilbraham Road and Egerton Road North, while Zone B comprises the north and west facades.

Calculations have also been undertaken based on room volumes as proposed.

Calculations have been undertaken according to Equation 2 of the ADO Guide, with established allowable equivalent open areas for windows in bedrooms during night-time hours summarised in Table 8.1.

Façade	Night-time External Incident Noise Level		Room Type	Total Night-time Equivalent Area
	Ambient noise level: $L_{Aeq,8hr}$, dB	Typical maximum noise level: L_{AFmax}, dB		
Zone A	61	82	Double Bedroom	0.01 m^2
Zone B	51	72	Double Bedroom	0.10 m^2

Table 8.1 Summary of equivalent open area allowance for bedroom windows

Where the allowable openable area is not sufficient to support the proposed overheating strategy, this would indicate that openable windows would not be an acceptable solution to overheating and an alternative solution should be investigated. This could include using a mechanical means of cooling.

9.0 CONCLUSION

An environmental noise survey has been undertaken at 404 Wilbraham Road, Manchester in order to measure ambient noise levels in the area.

Measured noise levels have allowed an assessment of the level of exposure to noise of the proposed development site to be made.

Outline mitigation measures, including a glazing specification and the use of appropriate ventilation have been recommended and should be sufficient to achieve recommended internal noise levels for the proposed development according to BS 8233: 2014 and WHO.



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Description:
Indicative site plan showing noise monitoring position

Not to scale

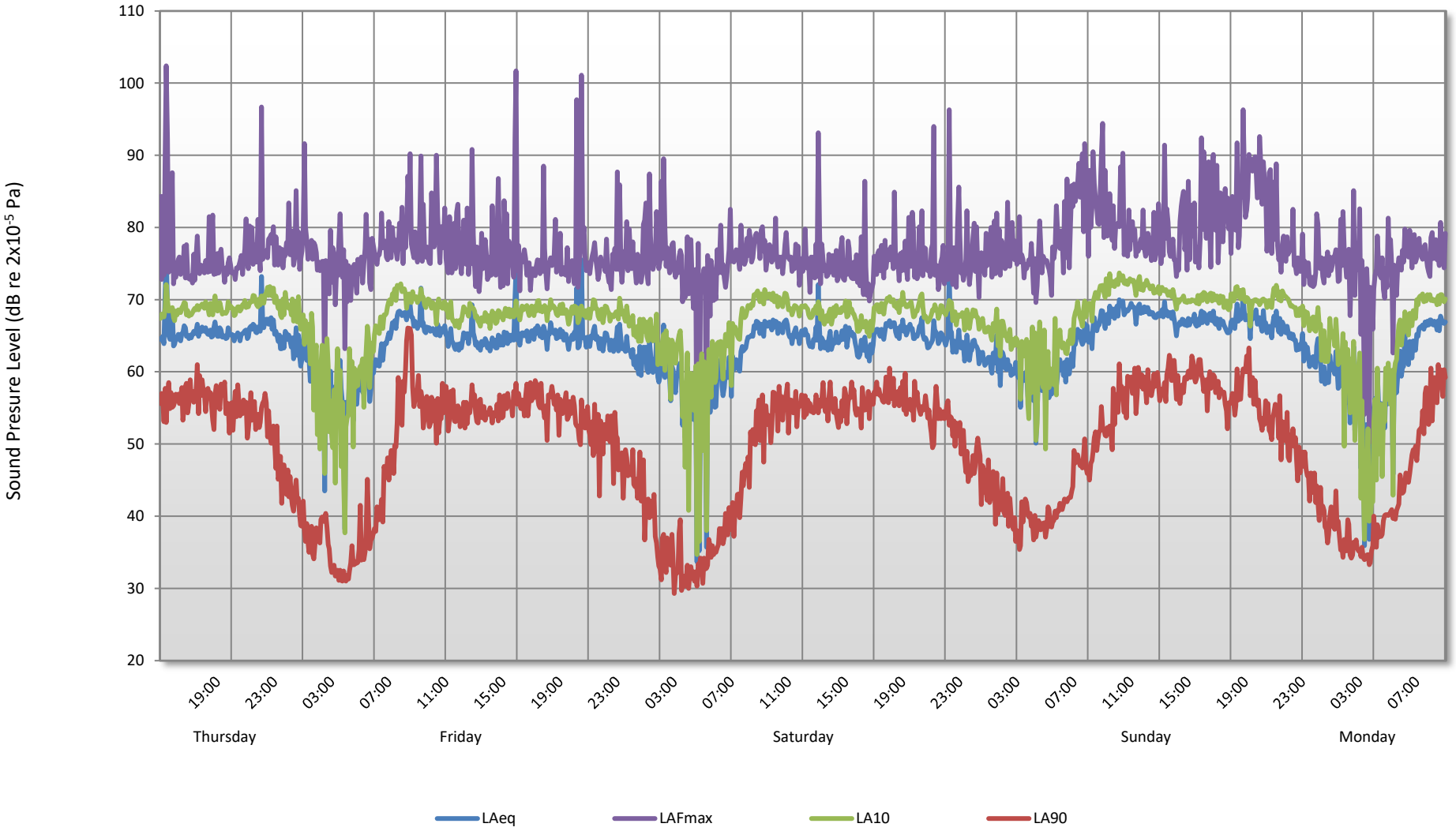
Date	15 July 2026
Reference	20711-SP1
Project Name	404 Wilbraham Road, Chorlton, Manchester
Image ©	Google Earth

Key:	
	Unattended Noise Survey Position
	Indicative Site Location

404 Wilbraham Road, Chorlton, Manchester

Position UN1

Environmental Noise Time History
08 January 2026 to 12 January 2026



APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

Absorption Coefficient α	The absorption coefficient of a material, usually measured for each octave or third-octave band and ranging between zero and one. For example, a value of 0.85 for an octave band means that 85% of the sound energy within that octave band is absorbed on coming into contact with the material. Conversely, a low value below about 0.1 means the material is acoustically reflective.
Acceleration	The rate of change of velocity, often measured in ms^{-2}. Commonly used to assess human response to vibration and for machine condition monitoring.
Accelerometer	A vibration transducer sensor that is used to measure acceleration.
Airborne noise	Noise which is fundamentally transmitted by way of the air and can be attenuated by the use of barriers and walls placed physically between the noise source and receiver.
Ambient Vibration	The all-encompassing vibration occurring at a given location, at a given time, composed of all vibration sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal hearing in a typical young adult detects ranges from 20 Hz to 20 kHz, although some people can detect sound with frequencies outside these limits. Typically, as a person ages their audible hearing range decreases.
A-Weighting	A filter applied to the sound recording made by a microphone to approximate the response of the human ear.
Axis	A fixed reference line for the measurement of vibration in a particular direction. Vibration is commonly measured in transverse (T), longitudinal (L) and vertical (V) axes (or X, Y and Z).
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation. The L_{90} parameter, i.e. the level exceeded for not more than 90% of the time is often used as a descriptor of "background noise" for environmental impact studies.
Background Vibration	The underlying level of vibration in the ambient environment, measured in the absence of the vibration sources of interest.
Continuous Vibration	Vibration that continues uninterrupted over a defined period.
dB(A)	The human ear is less sensitive to low (below 125 Hz) and high (above 16 kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).
Decibel [dB]	The unit that sound is measured in. Decibels are a logarithmic scale hence two equally intense sound sources operating together produce a sound level which is 3 dB higher than one alone and 10 identical, uncorrelated sources produce a 10 dB higher sound level.
Distance Attenuation	Sound which propagates from a point source in free air attenuates by 6 dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3 dB for each doubling of distance.
$D_{nT,w}$	Weighted Standardised Field Level Difference A measure of sound insulation performance of a building element. It is characterised by the difference in noise level on each side of a wall or floor. It is measured in-situ. It is a field measurement that relates to the R_w laboratory measured value but is not equal to it because an in-situ space is not of the same quality as a laboratory space. The value is indicative of the level of speech privacy between spaces. The higher its value the better the insulation performance.
Flanking	Flanking is the transfer of sound through paths around a building element rather than through the building element material directly. For example, sound travelling through a gap underneath a door or a gap at the top of a wall.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch, and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz. In the case of vibration, frequency is the number of oscillations that occurs per second. Frequency is measured in units of Hertz (Hz).
Ground-Borne Noise	Vibration propagated through the ground and then radiated as noise by vibrating building elements such as wall and floor surfaces. This noise is more noticeable in rooms that are well insulated from other airborne noise. An example would be vibration transmitted from an underground rail line radiating as sound in a bedroom of a building located above.
Impact Noise	Impact noise / structure-borne noise is generated when an object impacts with a separating element, causing that element to vibrate and re-radiate as noise in the receiving room. Common domestic examples of impact noise include footsteps and dropping objects.
Impulsive Noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.

APPENDIX A

Impulsive Vibration	Vibration that rapidly builds up to a peak followed by a damped decay. May consist of multiple impulsive events, typically less than two seconds in duration.
Intermittent Noise	The level suddenly drops to that of the background noise several times during the period of observation.
Intermittent Vibration	Either interrupted periods of continuous vibration or repeated periods of impulsive vibration.
L_{10}	This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise
L_{90}	This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.
L_{eq}	The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.
L_{max}	This is the maximum sound pressure level that has been measured over a period.
$L_{nT,w}$	Weighted Standardised Field Impact Sound Pressure Level As for $L_{n,w}$ but measured in-situ and therefore subject to the inherent accuracies involved in such a measurement. The equivalent measurement in a laboratory is the $L_{n,w}$. A lower value indicates a better performing floor.
Noise	Unwanted sound.
Octave	An octave represents a doubling or halving in frequency. Noise or vibration levels across a frequency spectrum are commonly given in octave or one-third octave frequency bands.
PPV	Peak Particle Velocity. The absolute maximum value of the vibration velocity signal measured in any axis during a given time interval.
Reflection	Sound wave reflected from a solid object obscuring its path.
R_w	Weighted Sound Reduction Index A measure of the sound insulation performance of a building element. It is measured in very controlled conditions in a laboratory. The related field measurement is the $D_{nT,w}$. The higher the value the better the acoustic performance of the building element.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound Absorption	The ability of a material to absorb sound energy by conversion to thermal energy.
Sound Insulation	Sound insulation refers to the ability of a construction or building element to limit noise transmission through the building element. The sound insulation of a material can be described by the R_w and the sound insulation between two rooms can be described by the $D_{nT,w}$.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Power Level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 pico watt.
Sound Pressure Level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone referenced to 20 micro Pascal.
Structure-borne Noise	Audible noise generated by vibration induced in the ground and/or a structure. Vibration can be generated by impact or by solid contact with a vibrating machine. Examples of structure-borne noise include the noise of trains in underground tunnels heard to a listener above the ground, the sound of footsteps on the floor above a listener and the sound of a lift car passing in a shaft.
Subjective Impression of Noise	Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

APPENDIX A

Tonal Noise	Sound containing a prominent frequency and characterised by a definite pitch.
Transmission Loss	The sound level difference between one room or area and another, usually of sound transmitted through an intervening partition or wall. Also the vibration level difference between one point and another. For example, if the sound level on one side of a wall is 100 dB and 65 dB on the other side, it is said that the transmission loss of the wall is 35 dB. If the transmission loss is normalised or standardised, it then becomes the R_w or R'_w or $D_{nT,w}$.
VDV	Vibration Dose Value. A measure of tactile vibration levels used to assess intermittent vibration.
Velocity	The rate of change of vibration displacement, usually measured in mms^{-1}.
Vibration	A mechanical phenomenon whereby oscillations occur about an equilibrium point; a periodic back-and-forth motion of an elastic body or medium, commonly resulting when almost any physical system is displaced from its equilibrium condition.

APPENDIX B

ProPG Initial Site Risk Assessment Guidance

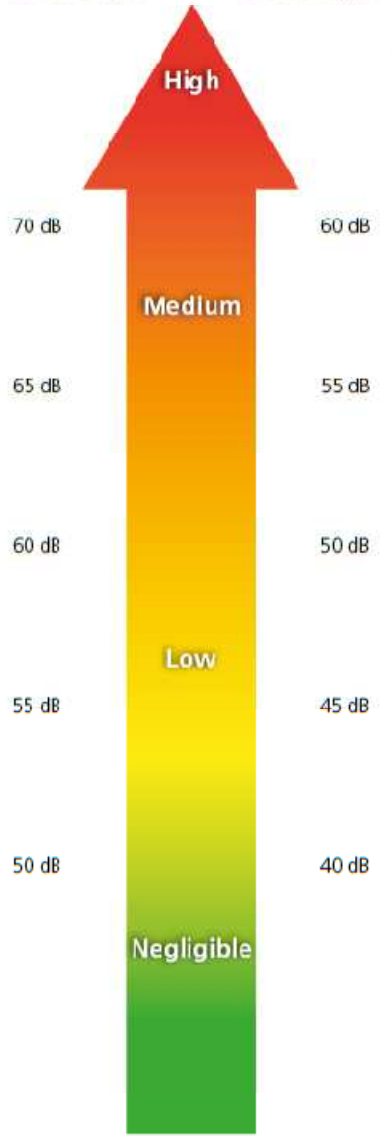
NOISE RISK ASSESSMENT	POTENTIAL EFFECT WITHOUT NOISE MITIGATION	PRE-PLANNING APPLICATION ADVICE
Indicative Daytime Noise Levels $L_{Aeq,16hr}$ / Indicative Night-time Noise Levels $L_{Aeq,8hr}$  	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

Figure 1 Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".

c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.

d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as negligible risk.

Figure 1. Stage 1– Initial Site Noise Risk Assessment

ProPG – Figure 1 – Initial Site Risk Assessment