

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Postal Street, Manchester

Planning noise report

London, Manchester, Edinburgh, Birmingham, Leeds, Bristol

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A	28 Oct 25	Draft issue for comment	TS	MH
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Summary

Sandy Brown has been commissioned by Atkins Realis UK Limited to provide acoustic advice in relation to a proposed new residential development at Postal Street in Manchester.

An environmental noise survey has been carried out to determine the existing sound levels in the area. The noise survey was performed between 28 November 2024 and 3 December 2024. Additional noise survey work to further quantify the noise egress level from Stage & Radio is proposed to be carried out.

An assessment has been carried out to determine required acoustic performances for the facades and provide guidance on the ventilation strategy to ensure that noise ingress to the residential dwellings is suitably controlled. The noise ingress criteria recommended are in line with the requirements of Manchester City Council. The findings of the assessment indicate that a high-performance facade construction will be required for residential facades close to the Stage & Radio premises to suitably control amplified sound ingress. Example facade constructions and glazing configurations are provided.

Mechanical ventilation systems are proposed to control overheating throughout the development. Assessment carried out by Hannan Associates shows that compliance with ADO2021 can be achieved by mechanical ventilation.

Plant noise egress limits have been set which are applicable outside the nearby noise sensitive premises. These have been set to be 5 dB below the measured background noise levels in line with the requirements of Manchester City Council. The limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied.

An assessment of plant noise egress has been carried out. The predicted noise levels at nearby noise sensitive receptors due to plant noise egress comply with the requirements of Manchester City Council.

An assessment of operational noise transfer has been carried out from the ground floor commercial units to the residential spaces on Level 1 and nearby noise sensitive premises. Operational noise limits in the commercial units have been established.

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1 Introduction

Sandy Brown has been commissioned by Atkins Realis UK Limited to provide acoustic advice in relation to the proposed residential development at Postal Street, Manchester.

An environmental noise survey has been carried out to establish:

- background sound levels around the site and by nearby noise sensitive premises
- ambient and maximum noise levels at the site.

Ambient and maximum noise levels are used to assess building envelope sound insulation requirements to achieve appropriate internal noise levels for residences. These follow standards set in accordance with Manchester City Council guidelines.

The background sound levels measured during the survey are used as the basis for setting limits for noise emission from proposed building services plant. These limits are set in accordance with the requirements of Manchester City Council.

This report provides details of the noise survey including measurement results, an assessment of plant noise egress, and commentary on facade sound insulation and overheating.

2 Development proposals

The proposed development includes a new-build residential building providing 126 dwellings and associated plant items. Commercial units and residential amenity spaces are proposed on the ground floor.

The proposed hours of the commercial units are not yet known and will be provided as a shell and core only provision within the development, with fit out by a tenant at a later date.

The potential noise sources associated with the scheme can be broadly divided into two categories:

- Building services plant
- Internal activity in commercial units.

The potential impact of these sources has been assessed and mitigation measures have been proposed to minimise impact on existing noise sensitive premises around the development.

3 Site description

3.1 The site and its surroundings

The site currently comprises unmade ground with a 2.4 metre hoarding around the perimeter of the site.

The site is located in central Manchester, bound to the north-west by Newton Street, to the north-east by Postal Street, to the south-east by Dean Street, and to the south-west by Faraday Street.

The site location in relation to its surroundings is shown in Figure 1.

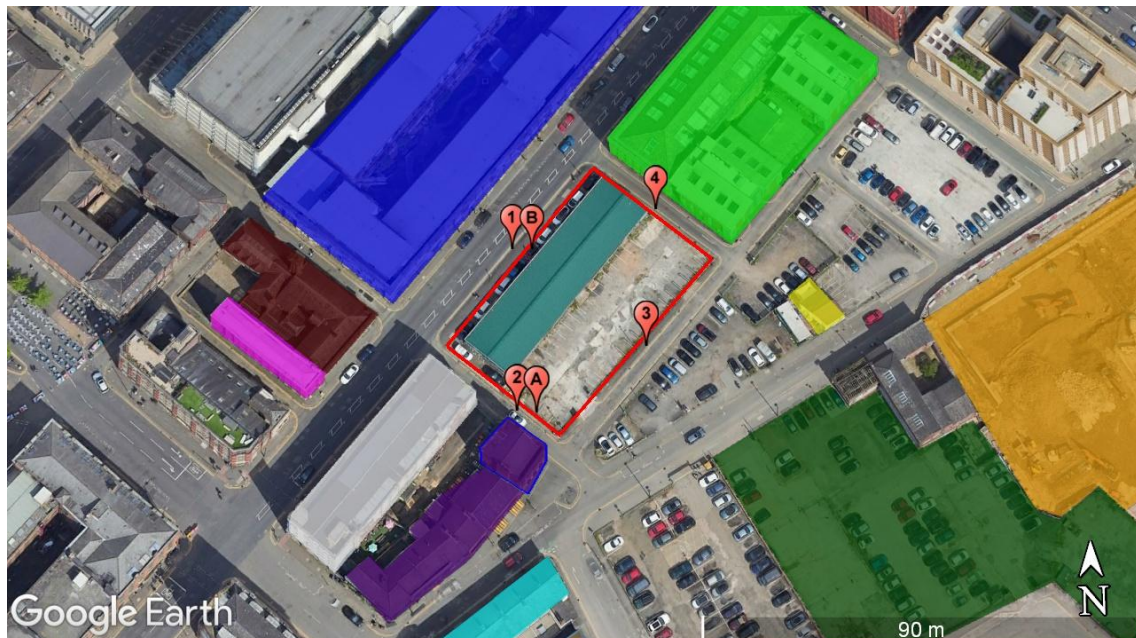


Figure 1 Aerial view of site (courtesy of Google Earth Pro)

3.2 Adjacent premises

The site is adjacent to the following existing noise sensitive premises:

- The Wentwood apartments, highlighted in light green in Figure 1.
- The Sorting House on Newton Street (predominately residential use with commercial uses at ground floor level), highlighted in blue in Figure 1.
- The Hacienda Slp holiday home (residential) on Port Street highlighted in yellow in Figure 1.
- A flat above Stage & Radio highlighted in purple and outlined in blue in Figure 1.

The following nearby residential developments are also either planned or under construction at the time of this report:

- Residential development under construction (planning ref: 132489/FO/2021), highlighted in orange in Figure 1.
- Two residential apartment buildings under construction (planning ref: 135675/FO/2022), shown in dark green in Figure 1.

The following existing commercial uses are located near the site:

- Stage & Radio, which is a bar, night club and live music venue, the Port Street Beer House, and the Crown and Anchor public house highlighted in purple in Figure 1.
- Marlsbro House, an unoccupied Grade II listed commercial building, highlighted in white in Figure 1.
- Greater Manchester Police Museum & Archives, highlighted in brown in Figure 1.
- The Cow Hollow Hotel, highlighted in pink in Figure 1.
- Commercial premises on Port Street, highlighted in light blue in Figure 1.

4 Assessment criteria

4.1 NPPF and NPSE

The National Planning Policy Framework, December 2024 (NPPF) sets out the UK government's planning policies for England. It supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers.

The NPPF, clause 198 states:

'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:

- *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.*
- *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 clause 200 states:

'Planning policies and decisions should ensure 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.'

The NPSE states that its aims are as follows:

'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 and*
- *Where possible, contribute to the improvement of health and quality of life.'*

As such, neither document sets out specific acoustic criteria for new residential developments, but they require consideration of the effect of existing noise on the new development and the effect of noise from the development on the surroundings.

4.2 ProPG

ProPG *Planning & Noise (Professional Practice Guidance on Planning & Noise), New Residential Development, 2017* provides guidance to the management of noise within the planning system in England. It is restricted to consideration of new residential developments that will be exposed predominantly to airborne noise from transport sources.

The two stages of the approach are given below

- Stage 1 – Initial noise risk assessment of the proposed development site
- Stage 2 – 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"
 - Element 4 – Consideration of "Other Relevant Issues".

Following this approach, there are four possible recommendations, the choice of recommendation is as follows:

- Grant without conditions
- Grant with conditions
- Avoid
- Prevent.

Guidance provided in ProPG has been used to assess the proposed development site and recommend mitigation measures to reduce noise levels.

4.3 Noise egress

4.3.1 Standard guidance

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at the nearest noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background sound level, it is an indication of having a low impact.

If the noise contains ‘attention catching features’ such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

4.3.2 Local Authority criteria

Manchester City Council (MCC) provides guidance in relation to plant noise emissions in Planning and Noise Technical Guidance document dated October 2022 states the following in relation to plant noise egress:

‘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’

Corrections for tonal or attention catching characteristics would need to be applied to the rating level in accordance with BS4142: 2014.

4.4 Noise ingress

4.4.1 Local Authority requirements

Manchester City Council (MCC) stipulates the criteria provided in Table 1 with regards to internal noise in residential developments under background ventilation conditions.

Table 1 Manchester City Council internal noise criteria for residential developments

Internal space	Internal noise limit, L_{Aeq} (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
Living rooms	35	-
Bedrooms	-	30

It is also stipulated that individual noise events in bedrooms should not exceed L_{AFmax} 45 dB by more than 15 times.

MCC also require the following, in relation to low frequency noise from amplified music where new residential developments are structurally connected to entertainment venues or are structurally separate from an existing entertainment venue, 'Music noise levels in the 63Hz and 125Hz octave centre frequency bands (L_{eq}) should be controlled so as not to exceed (in habitable rooms) 47dB and 41dB ($L_{eq,5min}$), respectively'.

4.4.2 British Standard guidance

Guidance on acceptable internal noise levels in residential dwellings is given in BS 8233:2014 *Sound insulation and noise reduction for buildings*. The guidance limits are shown in Table 2.

These internal levels are based on annual average data and do not have to be achieved in all circumstances. It is normal to exclude occasional events, such as fireworks night or New Year's Eve.

Table 2 Internal noise criteria for sleeping/resting

Internal space	Indoor ambient noise level, L_{Aeq} (dB)	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Living rooms	35	-
Dining room	40	-
Bedrooms	35	30 ^[1]

^[1] BS 8233 notes that individual noise events can cause sleep disturbance, and that a guideline value may be set depending on the character and number of events per night, although no specific limit is provided. For regular events, such as scheduled aircraft or passing trains, a guideline value may be set in terms of SEL or $L_{Amax,F}$. Sporadic noise events could require separate values.

The standard states that where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

It is understood that there are no external amenity areas proposed to the development. The following requirements are provided for reference.

For external amenity areas, such as gardens and patios, the standard states:

'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. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, 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.'

4.4.3 ProPG

Internal noise ingress criteria in ProPG are the same as in BS 8233:2014 but additional guidance is provided. In relation to regular individual noise events the following additional guidance is provided:

'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 45dB $L_{Amax,F}$ 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.'

4.4.4 Approved Document O – Overheating

Approved Document O 2021 Edition (to the Building Regulations 2010) states the following in relation to noise ingress during overheating periods:

'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 (23:00-07:00 hours).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a. $L_{Aeq,T}$ 40 dB average over 8 hours (between 23:00-07:00)
- b. L_{AFmax} 55 dB more than 10 times a night (between 23:00-07:00).'

The above applies to residential dwellings, institutional residential accommodation, and other types of residential accommodation, such as student accommodation.

4.4.5 Acoustics, ventilation and overheating

Guidance on external noise levels from transport noise sources and the assessment of risk in an overheating condition is given in the Association of Noise Consultants *Acoustics Ventilation and Overheating, Residential Design Guide* (AVO Guide). The guidance for internal noise levels during the night for an overheating condition set out in AVO Guide is superseded by the requirements set out in ADO2021 and therefore is provided for information only.

A Level 1 assessment comprises assessing the external free-field noise levels to guideline thresholds. External noise levels and the associated risk categories for a Level 1 assessment are adapted and summarised in Table 3, though consideration also has to be given the duration and frequency of any overheating periods.

Table 3 Guidance for Level 1 assessment of noise from transport sources relating to overheating condition

Risk category for Level 1 assessment	External free-field noise level	
	Day (07:00 – 23:00)	Night (23:00 – 07:00)
Negligible	$L_{Aeq} \leq 52$ dB	$L_{Aeq} \leq 47$ dB
Low	$L_{Aeq} > 52$ dB and $L_{Aeq} \leq 57$ dB	$L_{Aeq} > 47$ dB and $L_{Aeq} \leq 52$ dB
Medium	$L_{Aeq} > 57$ dB and $L_{Aeq} \leq 62$ dB	$L_{Aeq} > 52$ dB and $L_{Aeq} \leq 55$ dB
High	$L_{Aeq} > 62$ dB	$L_{Aeq} > 55$ dB

If a Level 1 assessment finds that the development falls into a ‘Medium’ or ‘High’ risk category a Level 2 assessment should be carried out, assessing the expected internal noise levels for an overheating condition and the associated risk of adverse effect. The Level 2 assessment would consider the following:

- Duration of period where additional ventilative cooling is required (to be assessed by others, typically part of a CIBSE TM59 assessment)
- How wide the external windows would need to be open to control overheating (to be assessed by others, typically part of a CIBSE TM59 assessment).

The guidance for suitable internal noise levels in order that noise ingress can be suitably controlled for an overheating condition are provided in AVO Guide. These are adapted and summarised in Table 4, though are not supposed to be taken as limits, rather guidelines to be assessed while also considering the adverse effect of any overheating (duration and severity).

The lowest observed affect level (LOAEL) and the significant observed affect level (SOAEL) for increased noise levels associated with controlling overheating are specific to each project as these depend on the magnitude of the increased internal noise levels and the duration for which they occur.

Table 4 Guidance for Level 2 assessment of noise from transport sources relating to overheating condition

Effect level	Internal noise level from transport sources		
	Day (07:00 – 23:00)	Night (23:00 – 07:00)	
LOAEL (noise can be heard, but does not cause any change in behaviour)	$L_{Aeq} \leq 35$ dB	$L_{Aeq} \leq 30$ dB	L_{AFmax} 45 dB not normally exceeded
SOAEL upper limit for longer overheating durations	$L_{Aeq} > 35$ dB and $L_{Aeq} \leq 40$ dB	$L_{Aeq} > 30$ dB and $L_{Aeq} \leq 35$ dB	-
SOAEL upper limit for shorter overheating durations	$L_{Aeq} > 40$ dB and $L_{Aeq} \leq 50$ dB	$L_{Aeq} > 35$ dB and $L_{Aeq} \leq 42$ dB	-
Exceeds SOAEL (noise causes a material change in behaviour)	$L_{Aeq} > 50$ dB	$L_{Aeq} > 42$ dB	L_{AFmax} 65 dB normally exceeded

The AVO Guide illustrates that there is a link between adverse effects, increasing internal ambient noise levels and the duration of exposure to noise for an overheating condition. These are indicated in Figure 2.

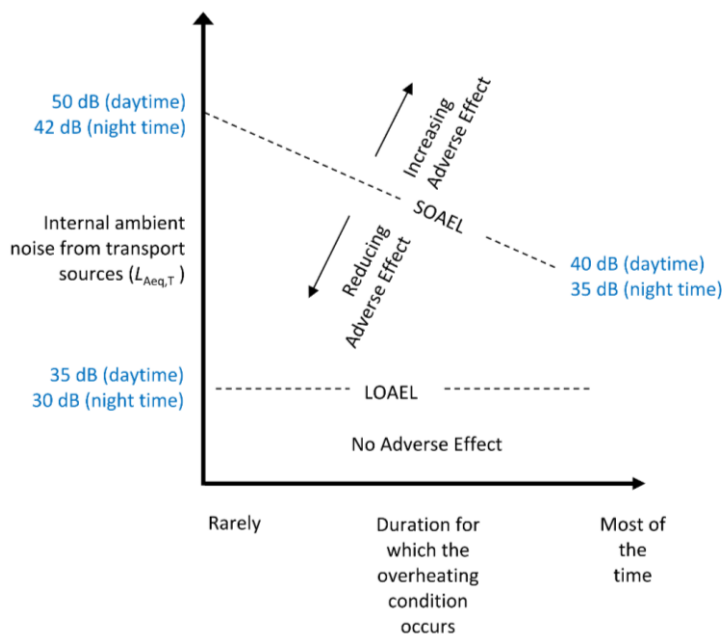


Figure 2 Internal ambient noise levels and increasing adverse effects for an overheating condition

When internal noise levels are above Significant Observed Adverse Effect Level (SOAEL), it is likely that there will be a high potential for an adverse outcome. These adverse outcomes will include:

- Material change in behaviour and/or attitude, eg 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 and difficulty in getting back to sleep
- Quality of life diminished.

As illustrated, the potential for adverse risk increases with the duration of exposure to noise, ie, a shorter exposure will result in a lower risk of adverse outcomes.

4.5 Operational noise egress

MCC *Noise and Planning Guidance* dated October 2022 states the following:

‘Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5 dB below the typical background noise level (L_{A90}) in each octave-band at the nearest noise sensitive location.’

Noise sensitive locations are not formally defined by MCC. ‘Housing, schools, hospitals or similar activities’ are provided as example noise sensitive developments in MCC *Noise and Planning Guidance* dated October 2022.

5 Environmental noise survey

5.1 Methodology

The survey included unattended and attended noise measurements between 28 November 2024 and 3 December 2024.

The measurements and information provided in this report are in accordance with requirements of BS 7445, as referenced in Appendix A.

5.1.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 6 days.

The unattended measurements were taken over 15-minute periods between 16:00 on 28 November 2024 and 09:00 on 3 December 2024.

The measurement positions used during the survey is indicated in Figure 1, denoted by the letter's 'A', and 'B'. Photographs showing the measurement positions are provided in Figure 3 and Figure 4. These positions were chosen to be reasonably representative of noise levels at the site and outside the nearest noise sensitive premises.

At each position the microphone was installed just over the top of the site hoarding in the free-field at an approximate height of 2.8 m.

Details of the equipment used and the noise indices measured are provided in Appendix A.



Figure 3 Measurement position A (Faraday Street)



Figure 4 Measurement position B (Newton Street)

Based on available information online, the survey was undertaken during the following events at Stage & Radio.

Table 5 Summary of events at Stage & Radio previously surveyed with long term monitoring equipment

Date	Show	Time	Venue/Format
Thu 28 Nov	OJ Sessions	18:00 – 20:30	Bar
	Oneda, Superlative + More	19:00 – 22:00	Basement/Live
	Sonic Rebellion	23:00 – 04:00	Club
Fri 29 Nov	The Greenskeepers Jam	19:00 – 23:00	Bar
	RAW! w/ POMONA	19:00 – 22:00	Basement/Live
	FADE 006: Free Party	23:00 – 04:00	Club
Sat 30 Nov	Lucid Juice w/ Nah Eeto	19:00 – 22:00	Basement/Live
	Oneforty w/ Junki Inoue	23:00 – 04:00	Club

5.1.2 Attended measurements

Attended sample measurements were taken at four positions around the site during both the day and night periods. These are indicated in Figure 1 as positions 1 to 4.

The day measurements were carried out on Thursday 28 November 2024, 6 x 5-minute measurements were undertaken at each position.

The night measurements were carried out on Friday 29 November 2024, 6 x 5-minute measurements were undertaken at positions 1, 3, and 4. At position 2 there were 12 x 5-minute measurements undertaken. This night was selected to capture a representative amplified sound event at the adjacent Stage and Radio. At each position the microphone was mounted on a tripod approximately 1.5 m above the ground level and at 1 m distance from the closest reflective surface. As such, the measurements are considered to be facade levels. Details of the equipment used and the noise indices measured are provided in Appendix A.

Dominant noise sources occurring during the measurements were noted. Photographs of the measurement positions are shown in Figure 5 to Figure 12.

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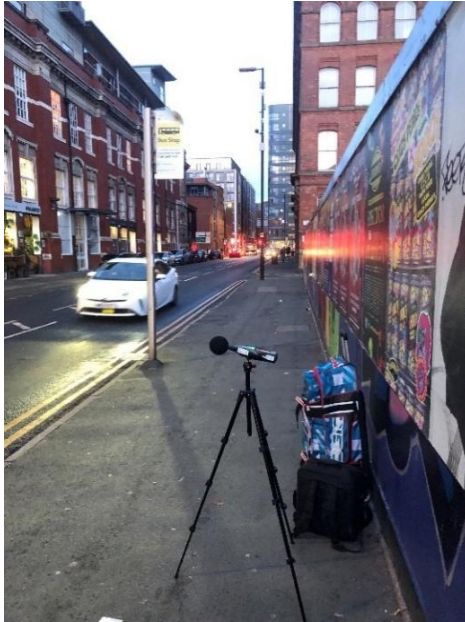


Figure 5 Measurement position 1 – Day

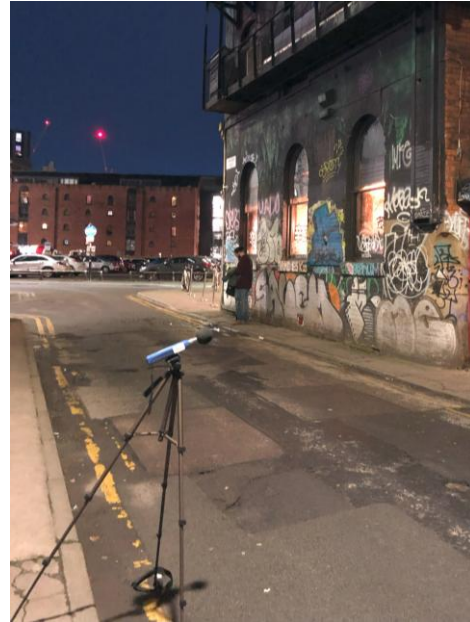


Figure 6 Measurement position 2 – Day



Figure 7 Measurement position 3 - Day

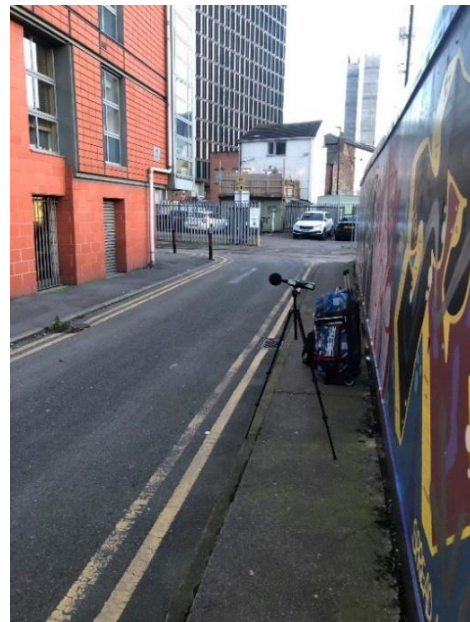


Figure 8 Measurement position 4 – Day

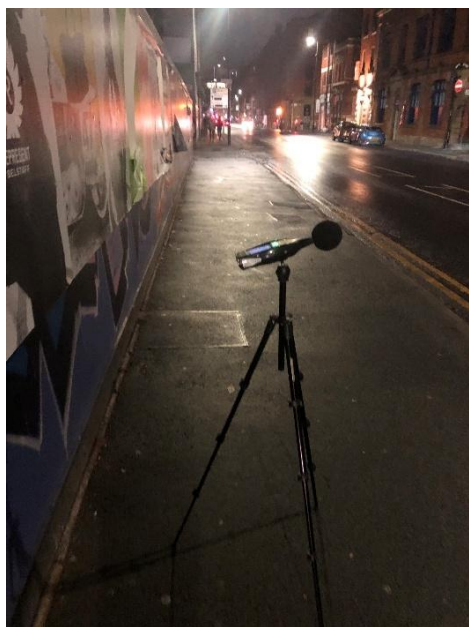


Figure 9 Measurement position 1 - Night

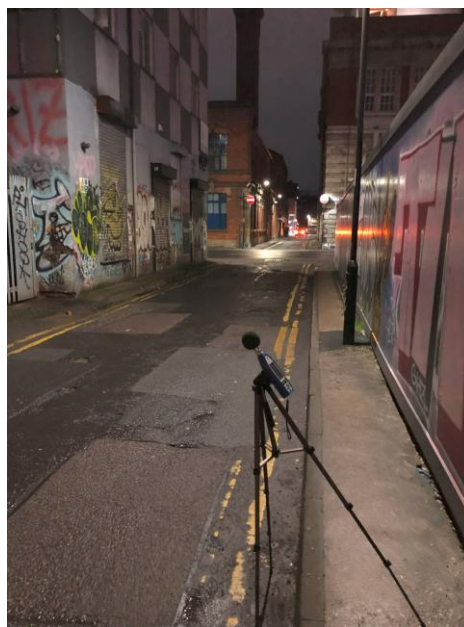


Figure 10 Measurement position 2 - Night

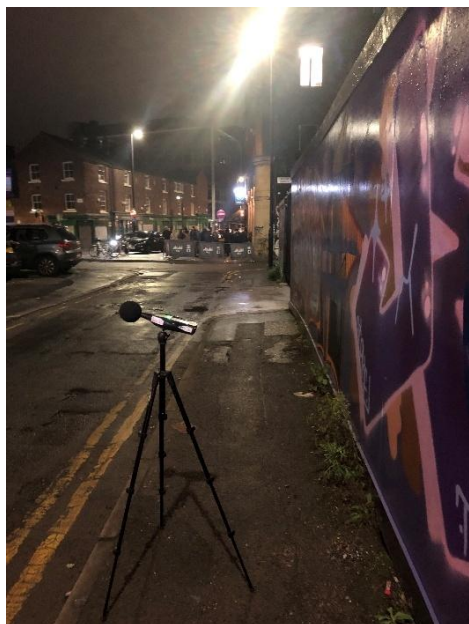


Figure 11 Measurement position 3 – Night



Figure 12 Measurement position 4 - Night

5.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Measurement results

6.1 Observations

The dominant noise sources observed at the site during the survey were from road traffic on Newton Street and Port Street during both the day and night. Noise from a construction site located at 1 Port Street was noted during the day sample measurements.

Additional significant noise sources during the night measurements included amplified music breakout from the adjacent Stage & Radio and patrons talking outside.

6.2 Noise measurement results

6.2.1 Unattended measurement results

A graph showing the results of the unattended measurements is provided in Appendix B.

Ambient noise levels measured at position A during the unattended survey are presented in Table 6.

Table 6 Ambient noise levels measured during the unattended survey – Position A

Date	Day (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 28 November 2024	61 ^[1]	63
Friday 29 November 2024	64	61
Saturday 30 November 2024	61	64
Sunday 1 December 2024	58	55
Monday 2 December 2024	63	54
Tuesday 3 December 2024	60 ^[1]	-
Average	62	59

^[1] Measurement not made over full period due to monitoring start and end time (the measurement on 28 November 2024 was over 7 hours, and on 3 December 2024 over 1 hours); not included in the average.

In line with the methodology outlined in Appendix A of MCC Noise and planning guidance, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Day and night statistical analysis of representative values for the site are given in Figure 13 and Figure 14.

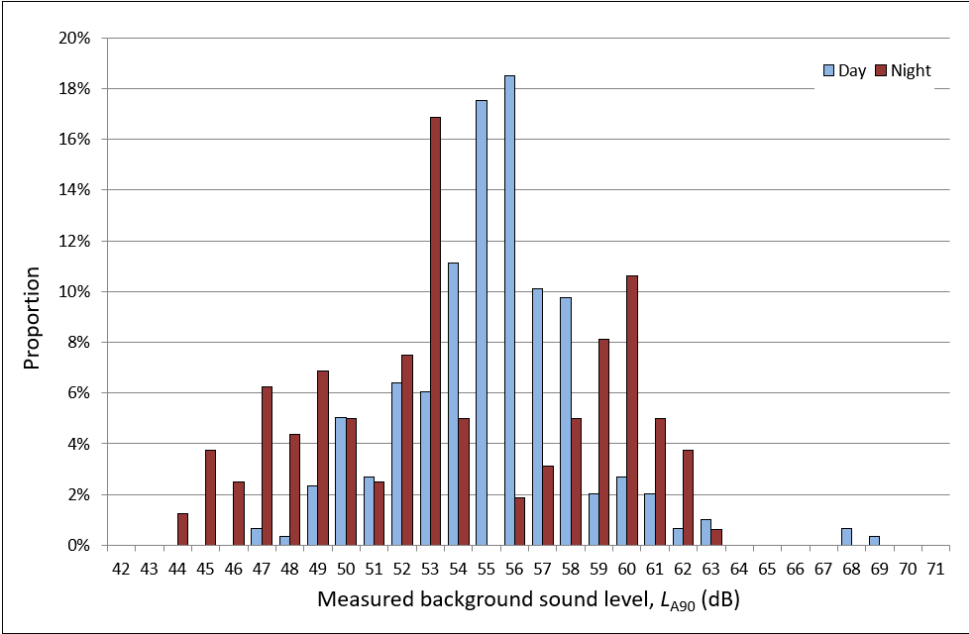


Figure 13 Background sound level histogram – Position A

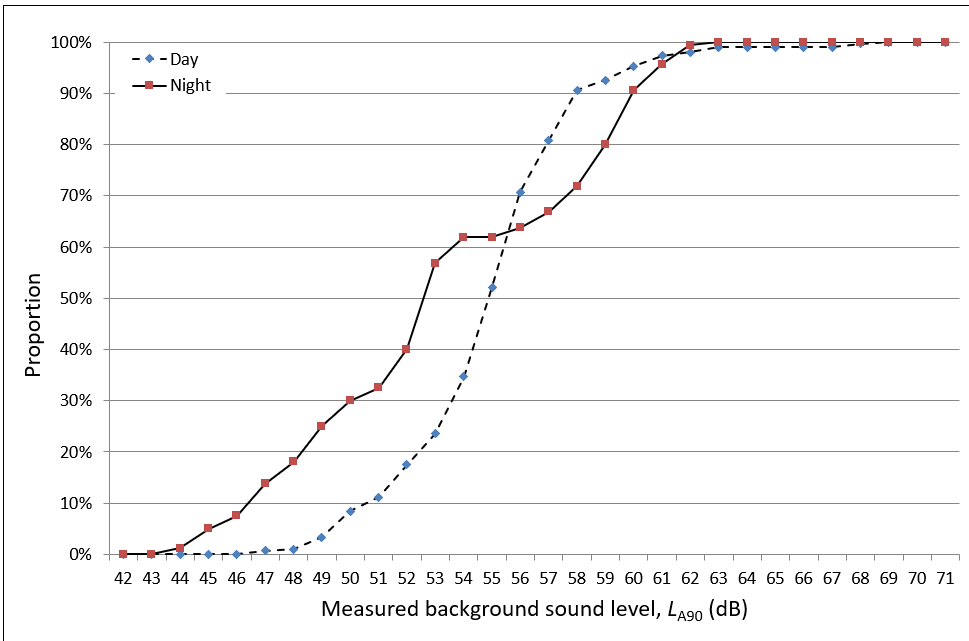


Figure 14 Cumulative background sound level – Position A

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 53 dB during the day and $L_{A90,15min}$ 50 dB at night. The measured typical background noise level is presented in each octave band in Table 7.

Table 7 Typical octave band background noise level measured at position A

Time of day	Typical background noise level, L_{90} (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Day - L_{A90} 53 dB	58	54	52	49	49	43	35
Night - L_{A90} 50 dB	55	50	49	47	45	41	35

Analysis of maximum noise levels at night indicates that the level not normally exceeded 10 times a night is $L_{AFmax,2min}$ 85 dB at the weekend and $L_{AFmax,2min}$ 83 dB during the week.

Ambient noise levels measured at position B during the unattended survey are presented in Table 8.

Table 8 Ambient noise levels measured during the unattended survey – Position B

Date	Day (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{Aeq,16h}$ (dB)	$L_{Aeq,8h}$ (dB)
Thursday 28 November 2024	63 ^[1]	59
Friday 29 November 2024	67	62
Saturday 30 November 2024	63	70
Sunday 1 December 2024	65	59
Monday 2 December 2024	67	57
Tuesday 3 December 2024	64 ^[1]	-
Average	66	61

^[1] Measurement not made over full period due to monitoring start and end time (the measurement on 28 November 2024 was over 7 hours, and on 3 December 2024 over 2 hours); not included in the average.

In line with the methodology outlined in Appendix A of MCC Noise and planning guidance, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Day and night statistical analysis of representative values for the site are given in Figure 15 and Figure 16.

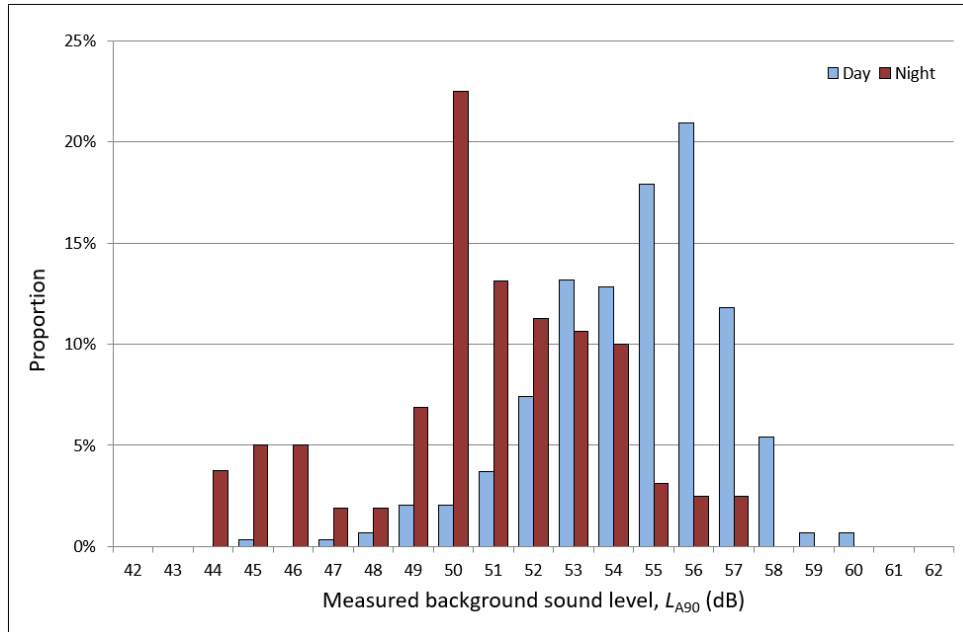


Figure 15 Background sound level histogram – Position B

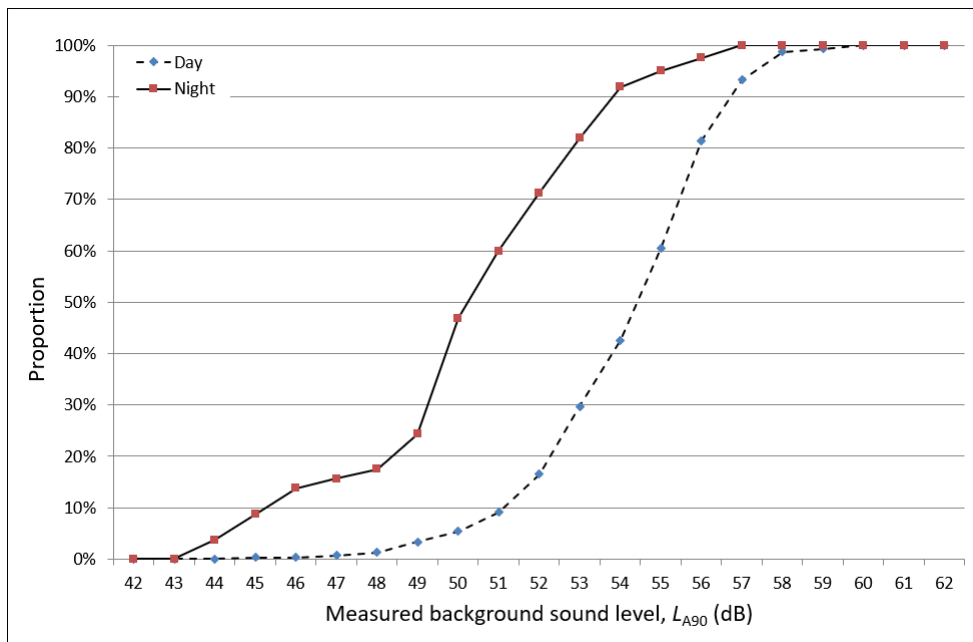


Figure 16 Cumulative background sound level – Position B

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 52 dB during the day and $L_{A90,15min}$ 49 dB at night.

The measured typical background noise level is presented in each octave band in Table 9.

Table 9 Typical octave band background noise level measured at position B

Time of day	Typical background noise level, L_{90} (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Day - L_{A90} 52 dB	56	51	51	49	48	43	37
Night - L_{A90} 49 dB	53	48	48	45	45	40	32

Analysis of maximum noise levels at night indicates that the level not normally exceeded 10 times a night is $L_{AFmax,2min}$ 80 dB at the weekend and during the week.

6.2.2 Attended measurement results - day

Noise levels and key sources recorded during the attended measurements in the day are summarised in Table 10. All levels presented are facade measurements.

Table 10 Noise levels and key noise sources from attended measurements during the day

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$	
1	16:10	67	81	57	Road traffic on Newton Street is dominant, cars idling, public walking and talking, impulsive reflections of construction noise from opposite building facade. Maximum noise levels were driven by car passbys and honking on Newton Street.
	16:15	67	79	57	
	16:20	68	95	58	
	16:50	65	78	56	
	16:55	67	75	58	
	17:00	66	78	57	
2	16:10	63	77	57	Equal contributions from road traffic on Port Street and Newton Street, car passbys on Faraday Street dominant during occurrence, construction noise. Maximum noise levels were driven by car passbys on Faraday Street.
	16:15	62	74	57	
	16:20	63	79	58	
	16:50	63	81	57	
	16:55	51	62	46	
	17:05	63	78	57	

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{A90,5min}$	
3	15:50	61	70	59	Road traffic on Faraday Street and Port Street, construction noise from site on Port Street, generator on construction site. Maximum noise levels were driven by banging from the construction site.
	15:55	61	67	59	
	16:00	62	76	59	
	16:30	61	72	59	
	16:35	61	77	59	
	16:40	62	76	59	
4	15:50	65	76	64	Plant noise from Wentwood apartments is dominant, infrequent road traffic on Postal Street, road traffic on Newton Street, noise from construction to the south. Maximum noise levels were driven by car passbys on Postal Street.
	15:55	64	78	63	
	16:00	64	70	63	
	16:30	65	71	64	
	16:35	65	72	64	
	16:40	66	73	64	

6.2.3 Attended measurement results – night

Noise levels and key sources recorded during the attended measurements at night are summarised in Table 11. All levels presented are facade measurements.

Table 11 Noise levels and key noise sources from attended measurements at night

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
1	23:15	67	78	55	Road traffic on Newton Street is dominant, people talking in the street, sirens & car horns, just audible low frequency music noise from Stage & Radio. Maximum noise levels were driven by vehicle passbys and rowdy pedestrians.
	23:20	65	76	56	
	23:25	67	81	58	
	23:45	65	76	56	
	23:50	66	79	55	
	23:55	68	88	58	

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
2	23:00	64	78	60	Vehicle passes on Faraday Street dominant during occurrence, road traffic on Newton Street, clearly audible low frequency music breakout from Stage & Radio on ground level and from an upper level seems to be radiating from the front facade, people outside the rear of various bars chatting, pedestrian passbys on Faraday Street. Maximum noise levels were driven by vehicle passbys on Faraday Street.
	23:05	66	83	61	
	23:10	64	75	61	
	23:15	63	71	61	
	23:20	64	79	61	
	23:25	64	78	61	
	23:45	63	75	60	
	23:50	65	79	60	
	23:55	64	78	60	
	00:05	64	76	60	
	00:15	67	85	61	
	00:20	63	72	61	
3	23:00	61	67	60	Generator inside hoarding on Dean Street drives background noise levels, people talking outside front of Stage & Radio, car passbys on Dean Street and Faraday Street. Maximum noise levels are driven by car passbys on Dean Street.
	23:05	62	81	60	
	23:10	62	76	60	
	23:30	63	78	61	
	23:35	62	69	61	
	23:40	62	68	61	

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
4	23:30	63	85	55	Road traffic from Newton Street dominant during occurrence, people talking in the streets, distant generator, quiet MVHR terminations from Wentwood apartments. Maximum noise levels are driven by car passbys on Postal Street.
	23:35	61	78	54	
	23:40	60	74	55	
	00:05	61	76	54	
	00:10	58	68	52	
	00:15	60	74	51	

6.2.4 Music noise from Stage & Radio

Music from Stage & Radio at ground floor level was clearly audible and mainly of low frequency content, this appeared to be radiating from the front of the building rather than the side facing the proposed development. The window on this front facade appeared be single glazing at ground level.

Music could also be heard radiating from the facade facing the proposed development, it is believed this was from a room on Level 1 of Stage & Radio in which the windows were bricked up. The music was noted to dominate the ambient noise level at the closest measurement position.

Chatter from people outside various bars and beer gardens/smoking areas to the rear of commercial premises on Port Street.

7 Facade sound insulation – noise ingress

This section describes an assessment of facade sound insulation to control noise ingress to the residential dwellings within the proposed development. The required facade specification largely depends on the external noise levels and the internal noise criteria.

The following assessment is based on suitably controlling noise ingress to achieve the internal noise levels recommended in BS 8233 and required by Manchester City Council, which are set out in Section 4.3.

7.1 External noise levels

7.1.1 Comments on measured external noise levels

The environmental noise survey measurement results presented in Section 6 have formed the basis of this assessment. Temporary noise sources, such as those associated with nearby construction, have not been considered as part of the assessment.

The maximum noise levels measured at the unattended measurement positions at night were predominantly caused by vehicle passes close to the measurement position.

7.1.2 3D acoustic modelling

A 3D environmental noise model of the site has been produced using the computational acoustic modelling package CadnaA.

The software carries out calculations using a ray tracing technique, and considers the effects of topography, reflections, screening and distance attenuation for noise sources to predict noise levels in three dimensions. Calculations are carried out in accordance with ISO 9613 *Attenuation of sound during propagation outdoors*.

A screenshot from the model is provided in Figure 17.

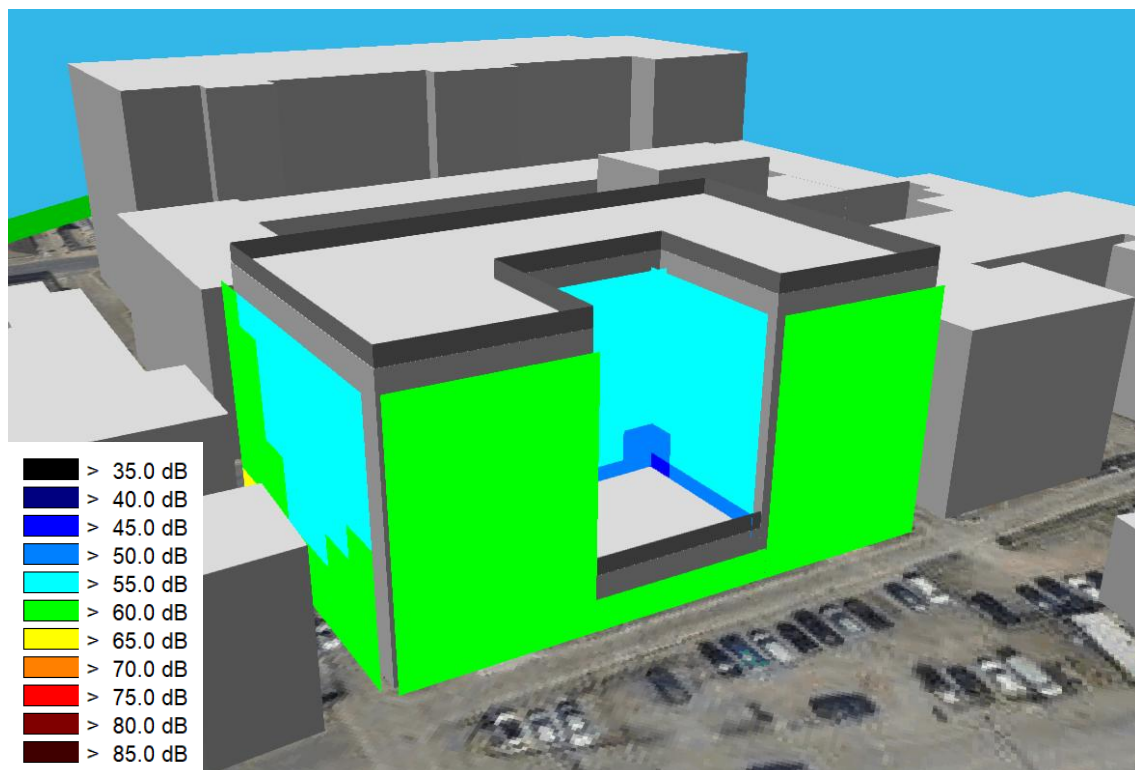


Figure 17 Screenshot from 3D environmental noise model

7.1.3 Predicted external noise levels

The predicted noise levels at 1 m from the facade of the proposed development are presented in Table 12. The predicted typical maximum noise levels at night are based on the 10th highest $L_{AFmax,2min}$ measurement results at the unattended measurement positions.

Table 12 Predicted external noise levels

Facade	Predicted external noise level at 1 m from the facade		
	Day ambient (07:00-23:00), L_{Aeq}	Night ambient (23:00-07:00), L_{Aeq}	Night maximum (23:00-07:00), L_{AFmax}
North-west (Newton Street elevation)	65-71 dB	60-65 dB	84 dB
North-east (Postal Street elevation)	60-70 dB	56-66 dB	74 dB
South-east (Dean Street elevation)	61-65 dB	59-64 dB	72 dB
South-west (Faraday Street elevation)	58-66 dB	56-63 dB	87 dB
Courtyard elevations	53-61 dB	52-59 dB	62 dB

The Dean Street and Faraday Street elevations are exposed to amplified sound from Stage and Radio . As such, low frequency noise ingress needs to be appropriately controlled to meet the Manchester City Council guidelines. The predicted low frequency amplified sound levels at 1 m from these facades are up to:

- L_{eq} 84 dB at 63 Hz octave band
- L_{eq} 76 dB at 125 Hz octave band.

7.2 Facade sound insulation

Minimum overall and low frequency facade sound insulation requirements for the facades, under the background ventilation conditions are given in Table 13. These have been determined to achieve the internal noise criteria for bedrooms and living areas using the predicted external noise levels at the facades. Minimum sound insulation performances for the windows and recommended constructions for other elements forming the facade are also provided, based on the latest elevations and window types setting out.

At this site, the facade performance requirements are driven by the ambient noise levels during the day for living rooms, and either night ambient noise levels or night maximum and low-frequency noise levels for bedrooms dependent on location. A correction for dual facade rooms has been accounted for in the facade zones presented in Table 13.

Where the ambient noise level determines the facade performance, an uplift of 3 dB is included to allow for equal contribution from internal building services noise (eg, noise from MVHR units assuming these are proposed and no reliance upon vents/ openings to the facade to provide background ventilation).

Mark-ups of the minimum facade sound insulation performance requirements are provided in Appendix D.

Table 13 Facade sound insulation performance requirements

Room type and facade zone	Minimum cumulative facade sound insulation performance Overall, 63 Hz, 125 Hz (dB)
Facade zone A 	
Living rooms ^[1]	R_w+C_{tr} 45, R_{63Hz} 40, R_{125Hz} 37
Facade zone B 	
Living rooms	R_w+C_{tr} 45, R_{63Hz} 40, R_{125Hz} 37
Bedrooms	R_w+C_{tr} 45, R_{63Hz} 40, R_{125Hz} 37
Facade zone C 	
Living rooms	R_w+C_{tr} 42, R_{63Hz} 37, R_{125Hz} 34
Bedrooms	R_w+C_{tr} 42, R_{63Hz} 37, R_{125Hz} 34
Facade zone D 	
Living rooms	R_w+C_{tr} 42, R_{63Hz} 34, R_{125Hz} 31
Bedrooms	R_w+C_{tr} 42, R_{63Hz} 34, R_{125Hz} 31
Facade zone E 	
Living rooms	R_w+C_{tr} 42
Bedrooms	R_w+C_{tr} 38
Facade zone F 	
Living rooms	R_w+C_{tr} 36, R_{63Hz} 25, R_{125Hz} 22
Bedrooms	R_w+C_{tr} 36, R_{63Hz} 25, R_{125Hz} 22

Room type and facade zone	Minimum cumulative facade sound insulation performance Overall, 63 Hz, 125 Hz (dB)
Facade zone G 	
Living rooms	R_w+C_{tr} 34
Bedrooms	R_w+C_{tr} 38
Facade zone H 	
Ground floor	30 ^[2]

^[1] There are no bedrooms proposed in facade zone A. Whilst, the facade sound insulation requirements for zones A and B are the same, the window area in zone A is restricted to achieve the required internal noise levels.

^[1] Facade zone H covers spaces on the ground floor only. Noise egress from plant rooms on the ground floor will need to be suitably controlled and will be assessed separately.

The performance required by each element will depend on the relative areas of glazed and non-glazed elements, and the ventilation strategy. If applicable, this includes the acoustic performance of trickle ventilators and the number of ventilators per room.

The windows, including glazing, frames, seals, etc. shall be constructed on site so as to ensure that the laboratory sound insulation performance is not degraded.

7.3 Guidance on facade construction and glazing

The following constructions are provided based on the proposed relative areas of elements and are given as examples that are capable of meeting the minimum facade sound insulation requirements set out in Table 13. Other constructions that cumulatively meet the requirements set out in Table 13 would also be suitable.

7.3.1 External wall construction

An example facade construction that is suitable for facade zones A-C is:

- 102.5 mm brick ($\geq 1600 \text{ kg/m}^3$), $\geq 150 \text{ mm}$ cavity, 150 mm mineral wool insulation ($\geq 100 \text{ kg/m}^3$), 15 mm cement particle board ($\geq 1150 \text{ kg/m}^3$), 150 mm SFS with full fill mineral wool insulation ($\geq 48 \text{ kg/m}^3$), 3 x 12.5 mm sound rated dense plasterboard on independent studs.

The following construction is expected to be suitable for facade zones D-H:

- 102.5 mm brick ($\geq 1600 \text{ kg/m}^3$), $\geq 150 \text{ mm}$ cavity, 150 mm mineral wool insulation ($\geq 33 \text{ kg/m}^3$), 15 mm calcium silicate board/cementitious board, 150 mm SFS with full fill mineral wool insulation ($\geq 33 \text{ kg/m}^3$), 2 x 12.5 mm standard density plasterboard on independent studs.

7.3.2 Window type 2 side panel

A side panel is proposed as part of window type 2. Example build-ups are presented below. Window type 2 does not occur in facade zone F or zone H.

A recommended construction that would be suitable for facade zones A-E is set out below:

- 3 mm aluminium rainscreen cassette, 270-320 mm cavity with rainscreen bracketry with 210 rainscreen mineral wool insulation in the cavity, 140 mm blockwork ($\geq 1850 \text{ kg/m}^3$), 150 mm SFS with full fill mineral wool insulation ($\geq 48 \text{ kg/m}^3$), 3 x 12.5 mm dense plasterboard on independent studs.

The following side panel construction is expected to be suitable for facade zone G:

- 3 mm aluminium rainscreen cassette, 270-320 mm cavity with rainscreen bracketry with 210 rainscreen mineral wool insulation in the cavity, 12.5 mm sheathing board, 150 mm SFS with full fill mineral wool insulation ($\geq 48 \text{ kg/m}^3$), 2 x 12.5 mm standard density plasterboard on independent studs.

7.3.3 Example glazing configurations

Example glazing configurations for each of the facade zones are presented in Table 14.

Table 14 Example glazing configurations

Minimum sound insulation performance for window ^[1]	Example glazing configuration
Suitable for facade zones A-C	
R_w+C_{tr} 49 dB	16.8 mm acoustic laminate / 20 mm air gap / 14.8 mm acoustic laminate double glazing unit with 16.8 mm acoustic laminate secondary glazing unit spaced 200 mm away with a sound absorbent reveal (Class A - $\alpha_w \geq 0.90$).
$R_{63\text{Hz}}$ 35 dB	
$R_{125\text{Hz}}$ 41 dB	
Suitable for facade zone D	
R_w+C_{tr} 39 dB	10 mm glass / 10 mm cavity / 4 mm glass / 12 mm cavity / 8.8 mm acoustic laminate
$R_{63\text{Hz}}$ 31 dB	
$R_{125\text{Hz}}$ 27 dB	
Suitable for living rooms in facade zone E	
R_w+C_{tr} 38 dB	12.8 mm acoustic laminate / 20 mm cavity / 10 mm glass
Suitable for facade zone F	
R_w+C_{tr} 32 dB	8.8 mm acoustic laminate / 15 mm cavity / 8.8 mm acoustic laminate.
$R_{63\text{Hz}}$ 21 dB	
$R_{125\text{Hz}}$ 18 dB	

Minimum sound insulation performance for window ^[1]	Example glazing configuration
Suitable for zone G and bedrooms in zone E	
R_w+C_{tr} 32 dB	8 mm glass / 16 mm cavity / 10.8 mm acoustic laminate.
Suitable for zone H	
R_w+C_{tr} 28 dB	Standard thermal double glazing (e.g. 6 mm glass/16 mm cavity/6 mm glass)

^[1] The minimum sound insulation performance for the window includes all elements of the window such as the glazing, frames and seals.

7.3.4 Additional guidance on low frequency requirements

It should be noted that it is difficult to get reliable sound insulation data at low frequencies, in particular in the 63 Hz octave frequency band. The 63 Hz octave band is below the frequency range of most standard test facilities. Proposed glazing systems should be tested to achieve suitably reliable results from 50-160 Hz.

It is anticipated that the ductwork and attenuators will need to be acoustically lagged and boxed in with plasterboard with mineral fibre in the cavity to control noise breakout. An attenuator will be required at the facade line to control both noise from the equipment itself and noise breaking back into the apartment. Attenuators up to 900 mm will likely be needed to areas where there is a low frequency performance requirement. This design will be developed alongside the MEP engineer.

8 Acoustics, ventilation and overheating

ADO2021 sets out requirements for internal noise levels in bedrooms during the night, and therefore takes precedence over AVO Guide. For living rooms during the day, the guidance in AVO Guide has been used to inform the recommendations provided.

8.1 Approved Document O 2021 (during the night)

Although demonstrating compliance with ADO2021 is not strictly a requirement of planning, achieving the requirements will likely have implications on the building's design. This may include impacts on the appearance of the facade and requirements for additional building services plant (eg, external heat rejection plant, mechanical ventilation with/without cooling units within apartments).

The results of noise survey and acoustic modelling have been used to assess external noise levels at night, which are summarised in Table 12.

When compared with the levels set out in Section 3.2 of ADO2021, the results indicate that noise in all bedrooms will be such that windows will likely be closed overnight.

Therefore, open windows in bedrooms at night can likely not be relied upon as a method to remove excess heat, and the 'dynamic thermal modelling method' (eg, a CIBSE TM59 assessment) will need to be used to demonstrate compliance with the requirements of ADO2021.

8.1.1 Recommendations

Based on the results of the ADO2021 simplified assessment open windows in bedrooms at night will likely need to be closed.

It is recommended that measures other than the use of opening windows, are to be incorporated within the design that reduce overheating within the apartments. Typically, these measures will include:

- Minimising internal heat generation through energy efficient designs
- Reducing the amount of heat entering the building by:
 - Reducing the proportion of glass and/or adjusting the depth of window reveal
 - Reducing the glazing's G-value
 - Installing internal blinds
 - Utilising fixed shading devices, eg, shutters, external blinds, overhangs, awnings.
- Exposing thermal mass within the apartments
- Removing exceed heat via:
 - Ventilation louvres in external walls
 - A mechanical ventilation system
 - A mechanical cooling system (mechanical cooling is expected only to be used where insufficient heat is capable of being removed via openings).
- Providing shared amenity which will be comfort cooled.

An assessment of overheating to confirm compliance with ADO2021 has been carried out separately by Hannan Associates. It is understood that mechanical ventilation will be required to control overheating at night in bedrooms, which is proposed.

8.2 Acoustics, ventilation and overheating assessment (during the day)

It is understood that mechanical ventilation is proposed to control overheating during the day and therefore openable windows are not required for overheating.

Previously, the results of noise survey and acoustic modelling were used to carry out a Level 1 assessment of noise ingress during an overheating condition for living rooms during the day in line with Association of Noise Consultants *Acoustics Ventilation and Overheating, residential Design Guide*.

The Level 1 assessment indicated that the proposed development falls into the 'medium' and 'high' risk categories and therefore a Level 2 assessment would be recommended if there is openable windows are to be considered to control overheating during the day.

9 Plant noise egress

9.1 Representative background sound levels

The representative background sound levels measured during the survey have been determined to be:

- $L_{A90,15min}$ 53 dB for day and $L_{A90,15min}$ 50 dB for night (measured at position A)
- $L_{A90,15min}$ 52 dB for day and $L_{A90,15min}$ 49 dB for night (measured at position B).

Plant noise limits have been set for normally operating and emergency plant based on the requirements of Manchester City Council in the following sections of the report.

9.2 Normally operating plant noise limits

The cumulative noise level from the operation of all new normally operating plant should not exceed the limits set out in Table 15. These have been set to be 5 dB below the representative background noise levels measured outside the nearby noise sensitive residential receptors in line with the requirements of Manchester City Council.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as free-field levels.

Table 15 Plant noise limits at 1 m from the nearest noise sensitive premises for normally operating plant

Noise sensitive receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
Wentwood Apartments	47	44
The Sorting House on Newton Street	47	44
Hacienda Slp holiday home	48	45
Marlsbro House	47	44
Residential development under construction (planning ref: 132489/FO/2021)	48	45
Future residential apartments (planning ref: 135675/FO/2022)	48	45

Noise sensitive receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
Stage & Radio (including flat above)	48	45
Commercial premises on Port Street	48	45

^[1] The limits set out in Table 15 do not include any attention catching features. Penalty corrections for attention catching features may be significant and will need to be considered as the building services design progresses. This is discussed in Appendix C.

9.3 Emergency plant noise limits

It is proposed that the cumulative noise level from the operation of all new emergency plant should not be more than 10 dB higher than the representative background sound levels, as set out in Table 16.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as free-field levels.

Table 16 Plant noise limits at 1 m from the nearest noise sensitive premises for emergency plant

Noise sensitive receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
Wentwood Apartments	62	59
The Sorting House on Newton Street	62	59
Hacienda Slp holiday home	63	60
Marlsbro House	62	59
Residential development under construction (planning ref: 132489/FO/2021)	63	60
Future residential apartments (planning ref: 135675/FO/2022)	63	60

Noise sensitive receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)	
	Day (07:00-23:00)	Night (23:00-07:00)
Stage & Radio (including flat above)	63	60
Commercial premises on Port Street	63	60

- [1] The limits set out in Table 16 do not include any attention catching features. Penalty corrections for attention catching features may be significant and will need to be considered as the building services design progresses. This is discussed in Appendix C.

9.4 Assessment

All building services plant will be designed to achieve the noise limits set out in Table 15 and Table 16, including any corrections for attention catching features.

For the purposes of the assessment, a 3D environmental noise model of the site has been produced using the computational acoustic modelling package CadnaA.

The software carries out calculations using a ray tracing technique, and considers the effects of topography, reflections, screening and distance attenuation for noise sources to predict noise levels in three dimensions. Calculations are carried out in accordance with ISO 9613 *Attenuation of sound during propagation outdoors*.

A screenshot from the model is provided in Figure 18.

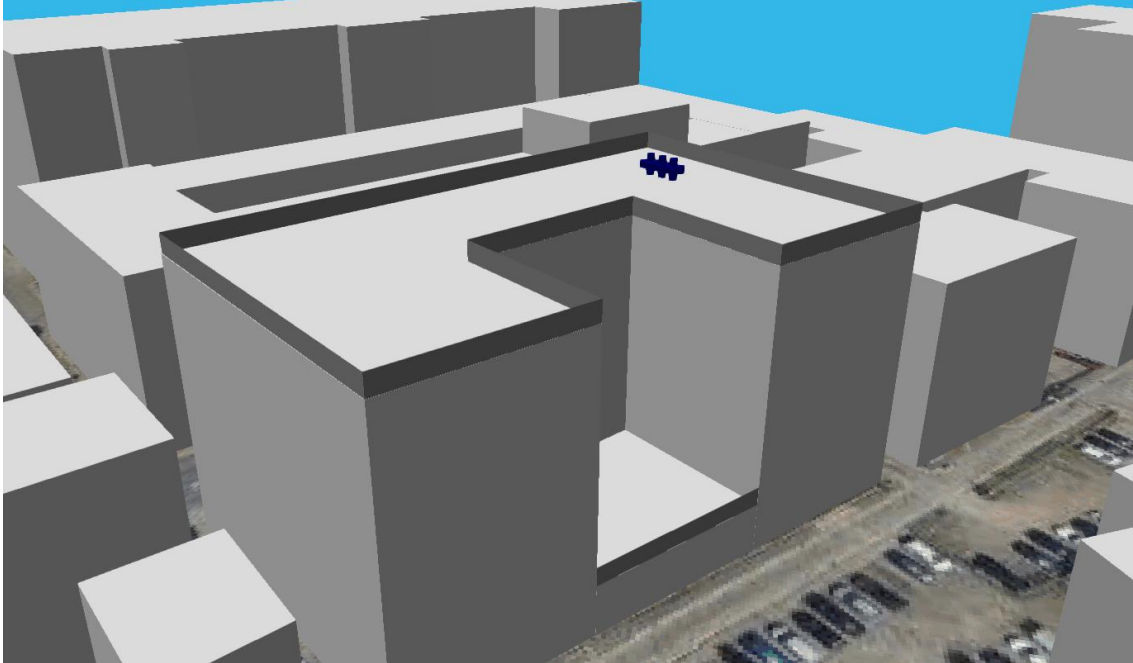


Figure 18 Screenshot from the plant noise egress assessment 3D environmental noise model

9.4.1 Normally operating plant

A full assessment of noise egress from normally operating plant has been carried out.

It is understood that three external condensers are proposed to the rooftop. Their locations are highlighted in blue in Figure 19.



Figure 19 Drawing of proposed condenser units' location within the site

The following indicative condenser unit selections have been used as the basis of this assessment:

- 1 x Mitsubishi PUHY-M300YNW-A1
- 2 x Mitsubishi PUZ-ZM50VKA2.

Sound pressure level data at 1 m for each of the indicative condenser unit types is presented in Table 17.

Table 17 Normally operating plant sound pressure level data at 1 m

Unit/mode	Sound pressure level at 1 m, L_{eq} (dB)							
	Octave-band centre frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
<i>PUHY-M300YNW-A1</i>								
Heating – standard	75	69	66	63	58	54	50	47
Heating – low noise mode	60	58	52	49	44	40	39	41
Cooling – standard	76	63	63	60	54	50	45	40
Cooling – low noise mode	52	53	48	46	40	35	33	33
<i>PUZ-ZM50VKA2</i>								
Heating	58	51	45	44	40	47	32	31
Cooling	50	45	43	42	39	36	28	23

The results of the plant noise egress assessment are shown in Table 18. It has been assumed that the plant is operational during the day and night. The results are presented as free-field levels to allow for comparison against the criteria in Table 15.

Table 18 Normally operating plant noise assessment results against plant noise limits at 1 m from the nearest noise sensitive premises

Noise sensitive receptor	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,15min}$ (dB)
	Day (07:00-23:00) and night (23:00-07:00)
Wentwood Apartments	35
The Sorting House on Newton Street	38
Hacienda Slp holiday home	28
Marlsbro House	26
Residential development under construction (planning ref: 132489/FO/2021)	38
Future residential apartments (planning ref: 135675/FO/2022)	36
Stage & Radio (including flat above)	31
Commercial premises on Port Street	28

The indicative condenser selections meet the noise egress limits for normally operating plant during the day and at night.

9.4.2 Emergency plant

The emergency generator is highlighted in red in Figure 19.

The closest receptors have been identified as Wentwood Apartments, The Sorting House on Newton Street, Residential development under construction (planning ref: 132489/FO/2021) and the flat above Stage & Radio.

As spectral data could not be provided, a typical generator spectrum has been used within the assessment. The unit P220-3 has a sound pressure level of 79 dB at 1m and 64 dB at 15m. The typical generator spectrum data have been adjusted to meet these values, as seen in Table 19.

Table 19 Typical generator spectrum used in assessment

	Typical generator spectrum, sound pressure level (dB)								
	Octave-band centre frequency (Hz)								
	63	125	250	500	1000	2000	4000	8000	dBA
Typical generator spectrum	97	98	97	89	80	72	65	62	90
Adjusted spectrum for 1 m	85	86	85	77	68	60	53	50	79
Adjusted spectrum for 15 m	70	71	70	62	53	45	38	35	64

The 15 m spectrum has been used for the purpose of this assessment. Table 20 summarises the plant noise egress assessment. The predicted noise levels and criteria are given in terms of free-field sound pressure levels.

Table 20 Summary of the assessment results at the nearest noise sensitive receptors

Noise sensitive receptor	Predicted plant noise level L_{Aeq} (dB)	Day plant noise egress criteria L_{Aeq} (dB)	Night plant noise egress criteria L_{Aeq} (dB)
Wentwood Apartments	53	62	59
The Sorting House on Newton Street	54	62	59
Residential development under construction (planning ref: 132489/FO/2021)	57	63	60
Residential flat above Stage & Radio	38	63	60

The following assumptions have been made within the assessment:

- Wentwood Apartments height of 22 m
- Mixed use residential building on Newton Street of 25 m
- Residential development under construction (planning ref: 132489/FO/2021) height of 29 m
- Parapet height of 1.165 m above finished roof level.

The assessment includes both distance and screening attenuation from the parapet/roof edge.

This assessment has been calculated for the four worst locations on the basis that if these receptors are within the criteria, then further receptors will meet the criteria.

The assessment indicates that the predicted generator plant noise levels meet the day and night criteria.

10 Operational noise egress

10.1 Noise transfer from commercial units to proposed dwellings

Commercial units are located within the proposed development on the ground floor with apartments directly above. The commercial units will be provided as shell and core only within the development proposals, with fit out by the tenant at a later date. It is possible that tenants may wish to have amplified sound within their units.

Operational noise transfer from commercial units to the proposed residential spaces on Level 1 will need to be controlled in line with the internal noise level requirements set out in Section 4.4.1.

Noise from the commercial units shall be controlled to 10 dB below environmental noise ingress in each octave band so that the cumulative noise level does not exceed the MCC requirements. A minimum sound insulation performance requirement of $D_{nT,w} + C_{tr}$ 53 dB has been established between the ground floor (shell and core) commercial units and the residential spaces on Level 1.

Operational noise limits within the shell and core commercial units have been established on this basis. These are presented in Table 21 and apply at any time of day.

Table 21 Operational noise limit in commercial units based on controlling noise transfer to the dwellings above

	Operational noise limit in commercial units, L_{eq} (dB)						
	Octave band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Internal amplified sound limit	70	72	72	67	70	72	73

The above would allow for background music only with no loud or live amplified music.

Maximum operational noise levels (L_{Fmax}) should be limited to 10 dB above those set out in Table 21.

If higher noise levels are required by the tenant, then the enhancement works to improve the sound insulation performance of the separating floor and building envelope will be required.

10.2 Noise breakout to nearby noise sensitive premises

As per the requirements of MCC, set out in Section 4.5, entertainment noise egress to nearby noise sensitive premises shall be controlled to be 5 dB below the typical background noise level in each octave band.

Based on the typical background noise levels at the unattended measurement positions, the operational noise limits set out in Table 22 are proposed. These limits apply at 1 m from the facade of nearby noise sensitive premises, which include the Sorting House and The Wentwood apartments, both highlighted in Figure 1. The limits in Table 22 are presented as free-field noise levels.

Table 22 Amplified sound egress limits at 1 m from the facade of nearest noise sensitive premises

Time of day	Amplified sound egress limits at 1 m from noise sensitive premises, $L_{eq,5min}$ (dB)						
	Octave-band centre frequency (Hz)						
	63	125	250	500	1000	2000	4000
Day (07:00-23:00)	56	51	51	49	48	43	37
Night (23:00-07:00)	53	48	48	45	45	40	32

Based on a minimum facade sound insulation performance of $R'_w + C_{tr}$ 30 dB for the commercial units and the operational noise limits set out in Table 21, the predicted noise level at the worst affected nearby noise sensitive premises is at least 10 dB below the criteria set out in Table 22 in each octave band.

As the operational noise limits, set out in Table 21, are determined by noise transfer to the residential spaces on Level 1, a revised assessment of operational noise egress to nearby noise sensitive premises will be required if higher noise levels are required by the tenant. Possible enhancements to the building envelope may be required including introduction of lobbied entrance door sets.

11 ProPG Acoustic Design Statement

11.1 Stage 1 assessment

The predicted external ambient noise levels, as detailed in Section 7.1, indicate that the site would be exposed to a low risk to high risk of adverse noise effects.

11.2 Stage 2 assessment

This section discusses the assessed external noise levels at the facades of the proposed development and the good acoustic design processes adopted so that appropriate conditions for a residential development (internal noise levels and external noise levels in amenity areas) are provided.

11.2.1 External noise level evaluation

The existing environmental noise sources in the vicinity of the proposed development comprise:

- Road traffic noise from Newton Street and Port Street
- Noise traffic noise from surrounding minor roads
- Amplified music noise from Stage & Radio
- Patron noise from Stage & Radio and other venues on Port Street.

The environmental noise survey indicates that due to the geometry of the building, there are areas of the development that will be exposed to higher noise levels (Newton Street facade), and areas with low risk of adverse noise effect (facades overlooking the courtyard on the Dean Street side).

11.2.2 Noise levels in the vicinity of the residential development

Based on the predicted noise level across the site, the external noise levels at 1 m from the facade during the daytime fall between L_{Aeq} 53-71 dB, and between L_{Aeq} 52-66 dB at night.

The measured not-normally exceeded maximum noise levels at night range between $L_{AFmax,2min}$ 71-85 dB on Faraday Street and $L_{AFmax,2min}$ 76-80 dB on Newton Street.

These levels need to be controlled to achieve internal noise level in line with the requirements of Manchester City Council, BS 8233: 2014 and ProPG.

11.2.3 Element 1 – Good Acoustic Design

Acoustic 3D modelling has been undertaken to predict noise levels across the scheme and specific facade requirements have been developed for each residential space. Detailed guidance has been provided including reduction of window areas for facades most affected by low frequency noise and indicative glazing configurations have been recommended.

11.2.4 Element 2 – Internal noise levels

Based on the measured and assessed external noise levels and internal noise criteria presented in Section 4.4, the facade sound insulation requirements can be determined. Compliance with Section 4.4 criteria will meet Element 2 requirements of the Stage 2 assessment.

11.2.5 Element 3 – External amenity area noise levels

Element 3 is not applicable to the proposed development as there are no external amenity areas proposed.

11.2.6 Element 4 – Assessment of other relevant issues

Overheating assessments are presented in Section 8. An enhanced standard of sound insulation has been recommended to control noise transfer from commercial units to residences above. This is set out in Section 10.

11.2.7 Recommendation to the decision maker

When considering the good acoustic design process that has been followed and demonstrated within this statement, it is recommended that consent be granted with conditions associated with noise ingress to the proposed residences.

12 Conclusion

An environmental noise survey has been carried out at the site.

An assessment has been carried out to determine required acoustic performances for the facades and provide guidance on the ventilation strategy. A very high level of sound insulation will be required to residential facades close to Stage & Radio.

Mechanical ventilation systems are proposed to control overheating throughout the development. Assessment carried out by Hannan Associates shows that compliance with ADO2021 can be achieved by mechanical ventilation.

Plant noise limits at the worst affected existing noise sensitive premises have been set in line with the requirements of Manchester City Council. An initial assessment of the proposed plant items associated with the development has been carried out. The predicted noise levels at nearby noise sensitive receptors due to plant noise egress comply with the requirements of Manchester City Council.

An assessment of operational noise transfer has been carried out from the ground floor commercial units to the residential spaces on Level 1 and nearby noise sensitive premises. Operational noise limits in the commercial units have been established.

Appendix A

Survey details

Reference standards

- BS 7445 Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*
- BS 7445: Part 2: 1991 *Description and measurement of environmental noise, Part 2. Guide to the acquisition of data pertinent to land use.*

Equipment

The unattended noise measurements were taken using NL-52 sound level meters and attended noise measurements were taken using an NL-52 sound level meter and a B&K 2250 sound level meter, respectively.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	2250/3011964	Brüel & Kjær	11 Sep 25	UCRT23/2163 UCRT23/2167
Microphone	4189/3100176	Brüel & Kjær	11 Sep 25	UCRT23/2163 UCRT23/2167
Pre-amp	ZC0032/26376	Brüel & Kjær	11 Sep 25	UCRT23/2163 UCRT23/2167
Calibrator	4231/3019123	Brüel & Kjær	11 Sep 25	UCRT23/2162
Sound level meter	NL-52/00932326	Rion	24 Apr 26	TCRT23/1806
Microphone	UC-59/09251	Rion	24 Apr 26	TCRT23/1806
Pre-amp	NH-25/32354	Rion	24 Apr 26	TCRT23/1806
Calibrator	NC-74/34536129	Rion	24 Apr 26	TCRT23/1576
Sound level meter	NL-52/01143564	Rion	15 Dec 24	TCRT22/1766
Microphone	UC-59/10153	Rion	15 Dec 24	TCRT22/1766
Pre-amp	NH-25/43581	Rion	15 Dec 24	TCRT22/1766
Calibrator	NC-74/34257023	Rion	15 Dec 24	TCRT22/1765

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/01010788	Rion	20 Sep 25	TCRT23/1666
Microphone	UC-59/20416	Rion	20 Sep 25	TCRT23/1666
Pre-amp	NH-25/11436	Rion	20 Sep 25	TCRT23/1666
Calibrator	SV30A/10559	Svantek	20 Sep 25	TCRT23/1665

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS 7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*.

Weather conditions

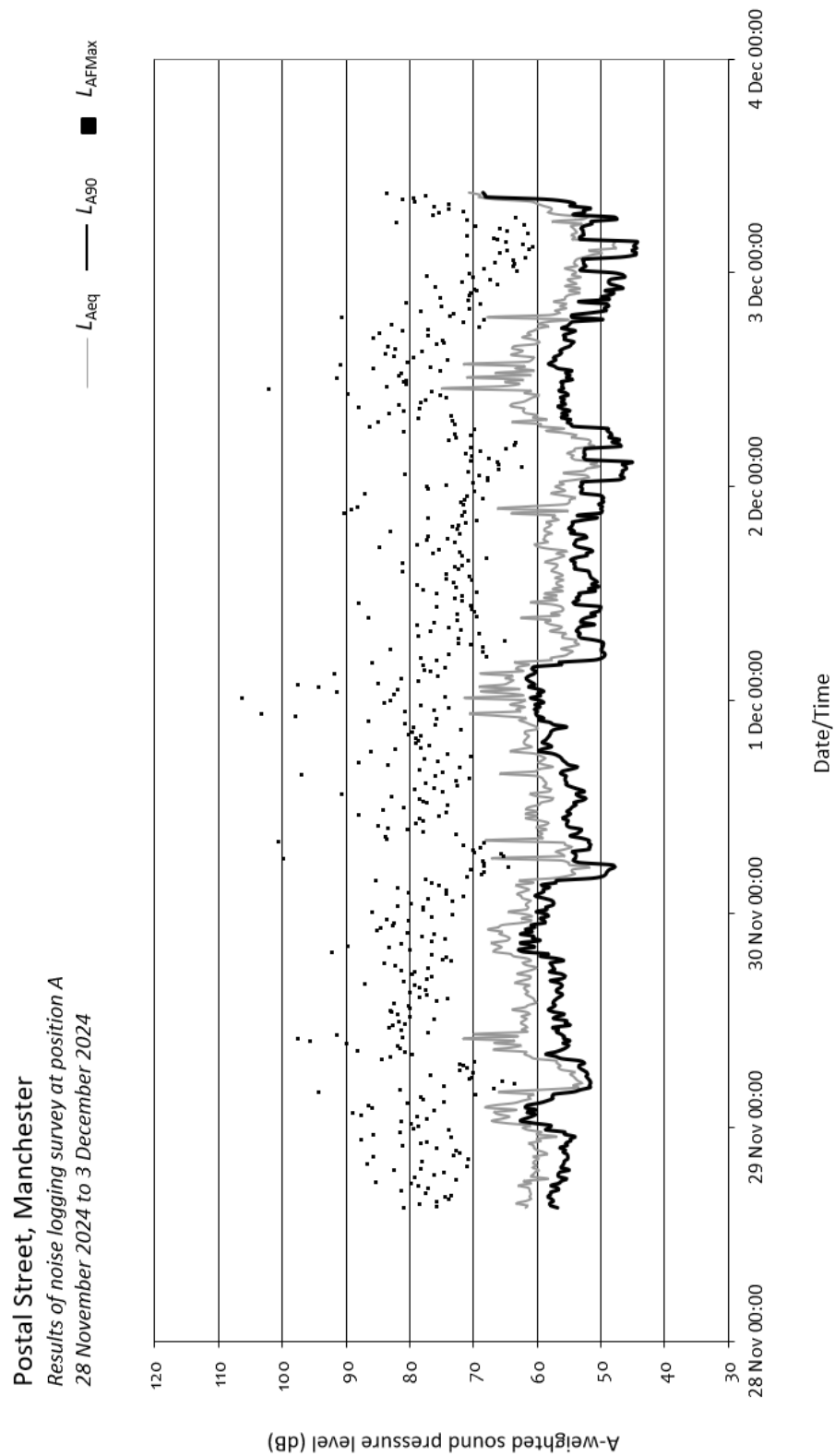
During the unattended noise measurements, weather reports for the area indicated that temperatures varied between 2°C at night and 13°C during the day, and the wind speed was less than 4 m/s.

During the attended noise measurements, the weather was generally clear and dry and no rain occurred. Wind speeds were measured at each position and varied between 3 m/s and 4 m/s.

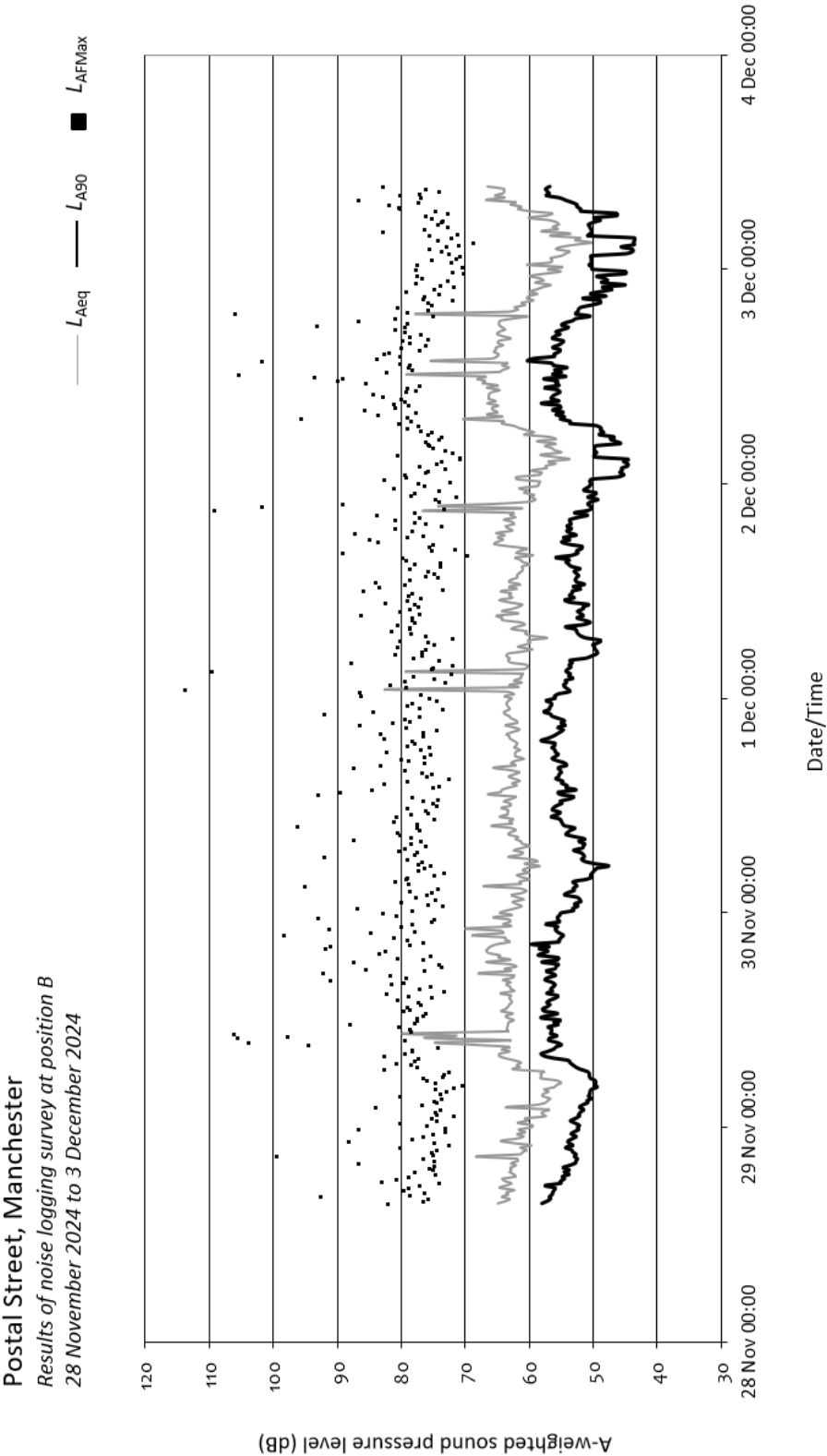
These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Position A



Results of unattended measurements at Position B



Appendix C

BS 4142 corrections for attention catching features

The following applies where plant noise is assessed in accordance with BS 4142:2014+A1:2019.

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), penalty corrections should be applied based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible.

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible.

For noise which is equally both impulsive and tonal, then both features can be accounted for by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment of tonality is not appropriate, an objective assessment can be made by analysis of time-averaged, third-octave band sound pressure levels. A noise source is deemed to be tonal if the level in a third-octave band exceeds the level in adjacent third-octave bands by the level differences given below:

- 15 dB in the low frequency third-octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency third-octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency third-octave bands (500 Hz to 10000 Hz).

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.

Appendix D

Facade sound insulation performance requirements

Title	Facade sound insulation mark-ups
Project	Postal Street, Manchester
Project no.	21549
Version	G
Marked-up by	JP
Reviewed by	MJH
Date	6 November 2025

Facade zones

A

B

C

D

E

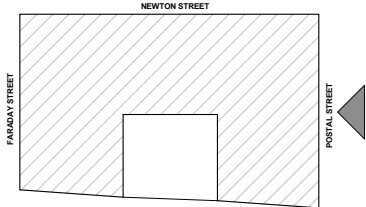
F

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Rev	Description	Date
P01	Issued for Coordination	21.02.2025
P02	Issued for Planning Submission Review	28.02.2025
P03	Issued for Planning Submission Review	19.03.2025
P04	Issued for Planning	21.03.2025
P05	Issued for Planning	26.03.2025
P06	Issued for Review and Comment	31.10.2025

KEY

1. Handset brickwork grey multi with complementary grey mortar, stretcher bond
2. Handset brickwork grey multi with complementary grey mortar, stretcher bond, recessed
3. Feature brickwork grey multi with complementary grey mortar, Flemish bond with expressed headers
4. Feature brickwork, coloured, (glazed or textured TBC), stretcher bond
5. Red anodised aluminium vertical panel with perforations recessed in brickwork opening
6. Red anodised aluminium panel with perforations set above and within the glazed openings
7. Red aluminium framed doorset and bespoke Juliette balustrade in PPC 'special' finish to match anodised aluminium
8. Red aluminium framed openable window in PPC 'special' finish to match anodised aluminium
9. Glazed curtain walling, capped, red aluminium in PPC 'special' finish to match anodised aluminium
10. Glazed entrance door set in curtain walling
11. Red anodised aluminium panel with perforations set in curtain walling
12. Red anodised aluminium service door
13. Red louvred substation door in PPC 'special' finish to match anodised aluminium
14. Public art installation applied over metal panels and doors
15. Precast parapet coping
16. Metal cladding/screening to rooftop overruns and plant enclosures
17. Building naming signage fixed back to brickwork
18. Commercial signage set behind glazing

Note:
All colours, material specifications, perforation design, and finishes to be agreed upon discharging conditions.

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Drawing
Proposed Postal Street Elevation

Scale @ A1
1 : 100

Date
February 2025

Drawn By
HECW

Checked By
JT

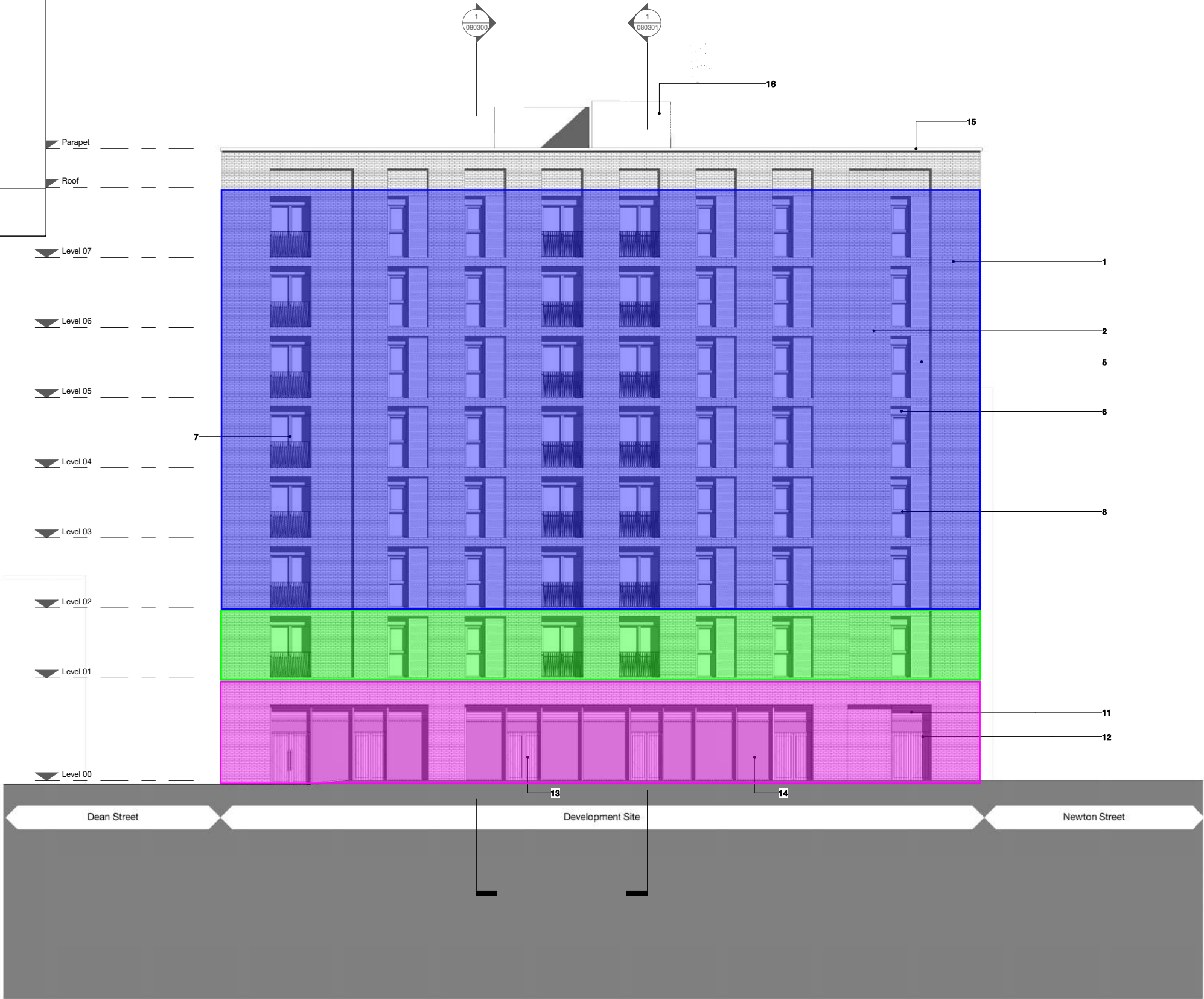
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Rev
P06



Proposed Postal Street Elevation
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Title	Facade sound insulation mark-ups
Project	Postal Street, Manchester
Project no.	21549
Version	G
Marked-up by	JP
Reviewed by	MJH
Date	6 November 2025

Facade zones

- A
- B
- C
- D
- E
- F
- G
- H

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- perforations recessed in brickwork opening
6.
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Note:
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Drawing
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Scale @ A1
1 : 100

Date
February 2025

Drawn By
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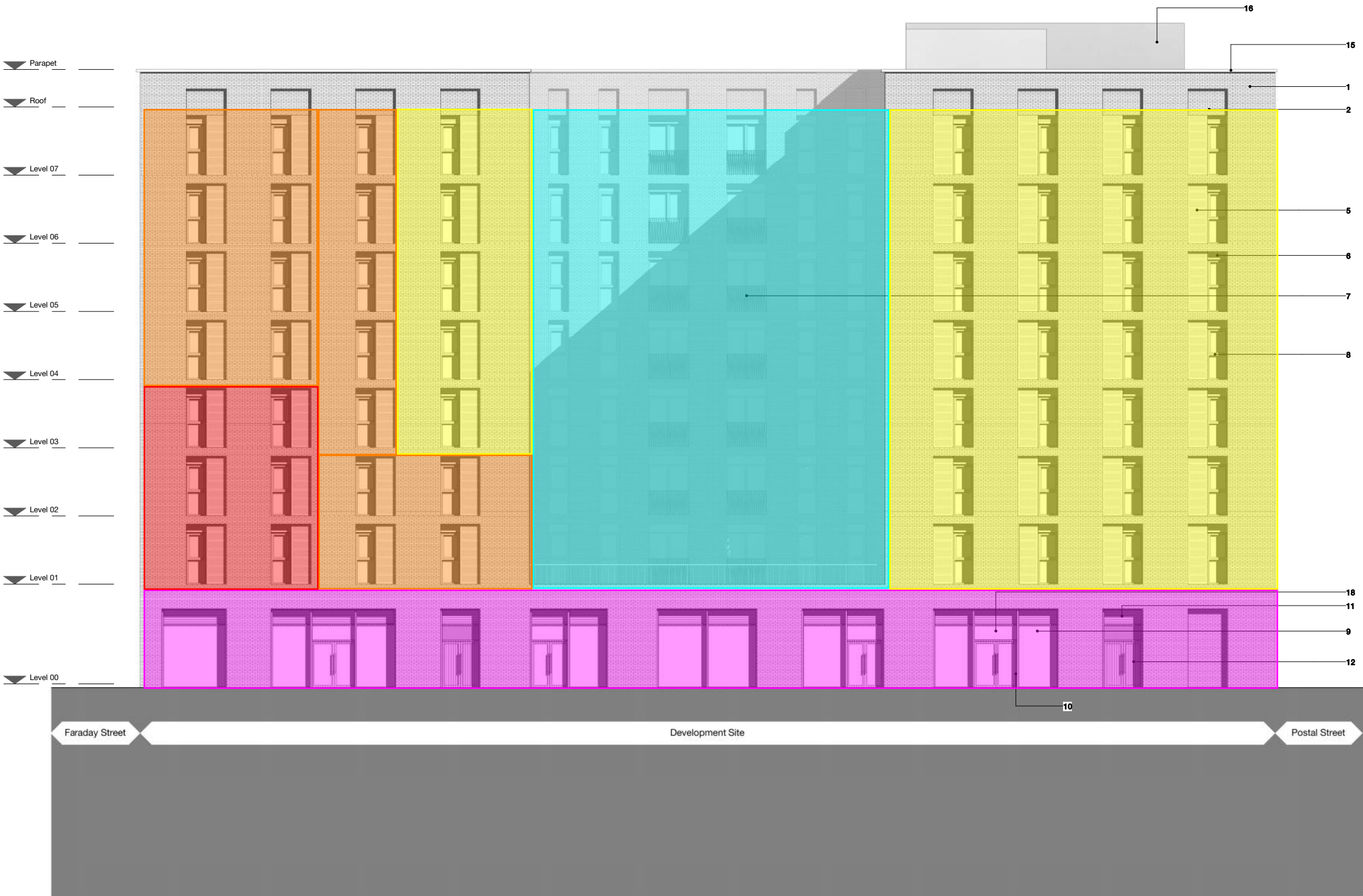
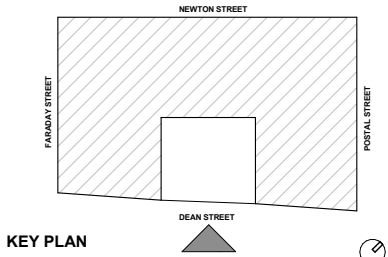
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Proposed Dean Street Elevation
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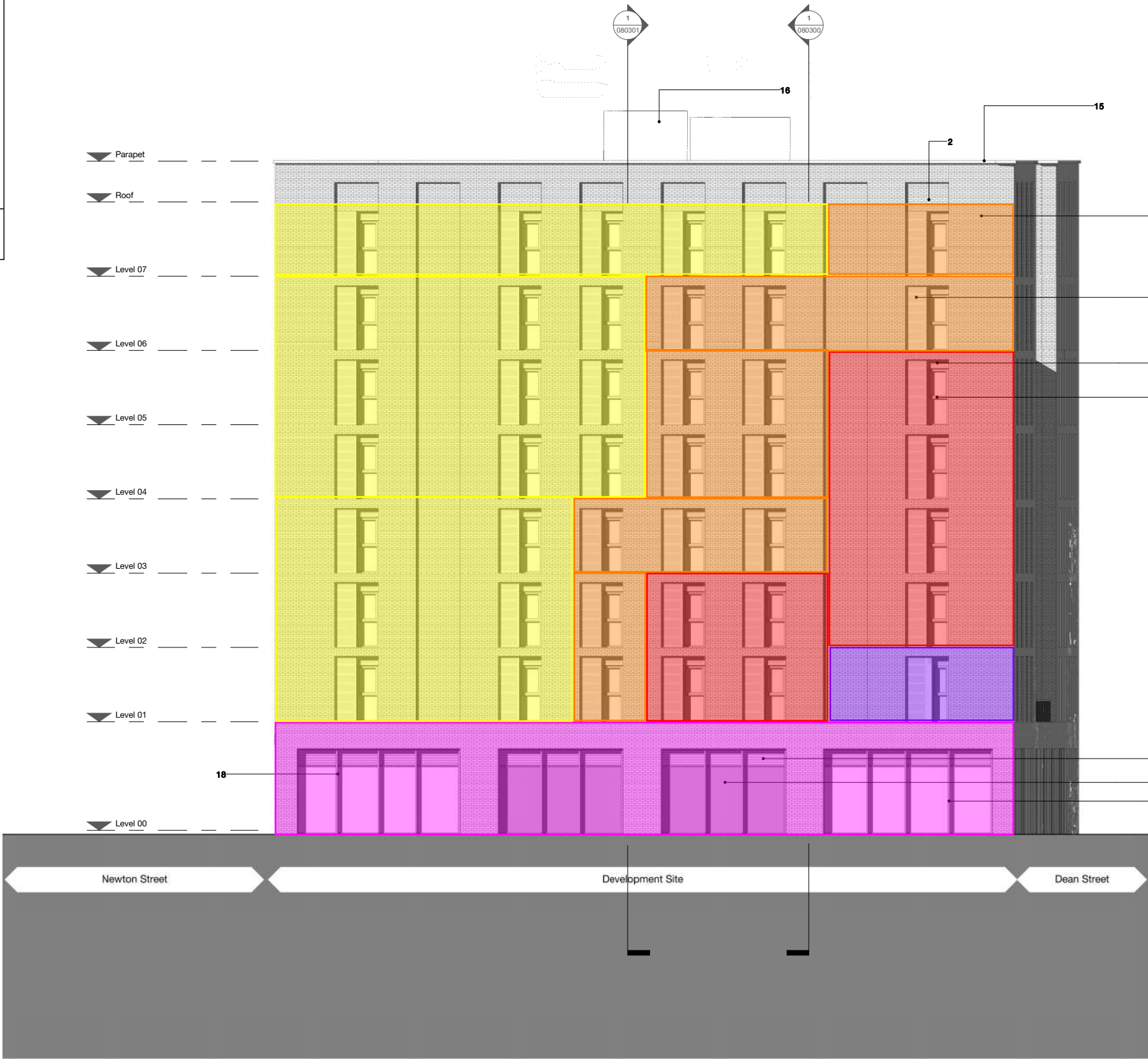


Title	Facade sound insulation mark-ups
Project	Postal Street, Manchester
Project no.	21549
Version	G
Marked-up by	JP
Reviewed by	MJH
Date	6 November 2025

Facade zones

- A
- B
- C
- D
- E
- F
- G
- H

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Proposed Faraday Street Elevation
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P06	Issued for Review and Comment	31.10.2025

KEY

- Handset brickwork grey multi with complementary grey mortar, stretcher bond
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- Glazed curtain walling, capped, red aluminium in PPC 'special' finish to match anodised aluminium
- Glazed entrance door set in curtain walling
- Red anodised aluminium panel with perforations set in curtain walling
- Red anodised aluminium service door
- Red louvred substation door in PPC 'special' finish to match anodised aluminium
- Public art installation applied over metal panels and doors
- Precast parapet coping
- Metal cladding/screening to rooftop overruns and plant enclosures
- Building naming signage fixed back to brickwork
- Commercial signage set behind glazing

Note:
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Drawing
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Elevation

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Date
February 2025

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Rev
P06

Title	Facade sound insulation mark-ups
Project	Postal Street, Manchester
Project no.	21549
Version	G
Marked-up by	JP
Reviewed by	MJH
Date	6 November 2025

- Facade zones**
- A —
 - B —
 - C —
 - D —
 - E —
 - F —
 - G —
 - H —

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- perforations recessed in brickwork opening
- Red anodised aluminium panel with perforations set above and within the glazed openings
 - Red aluminium framed doorset and bespoke Juliette balustrade in PPC 'special' finish to match anodised aluminium
 - Red aluminium framed openable window in PPC 'special' finish to match anodised aluminium
 - Glazed curtain walling, capped, red aluminium in PPC 'special' finish to match anodised aluminium
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Elevation

Scale @ A1
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Date
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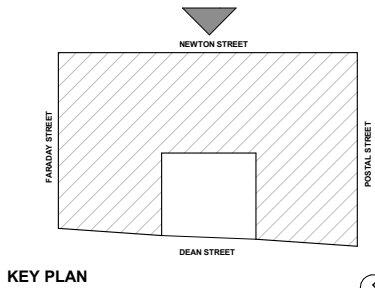
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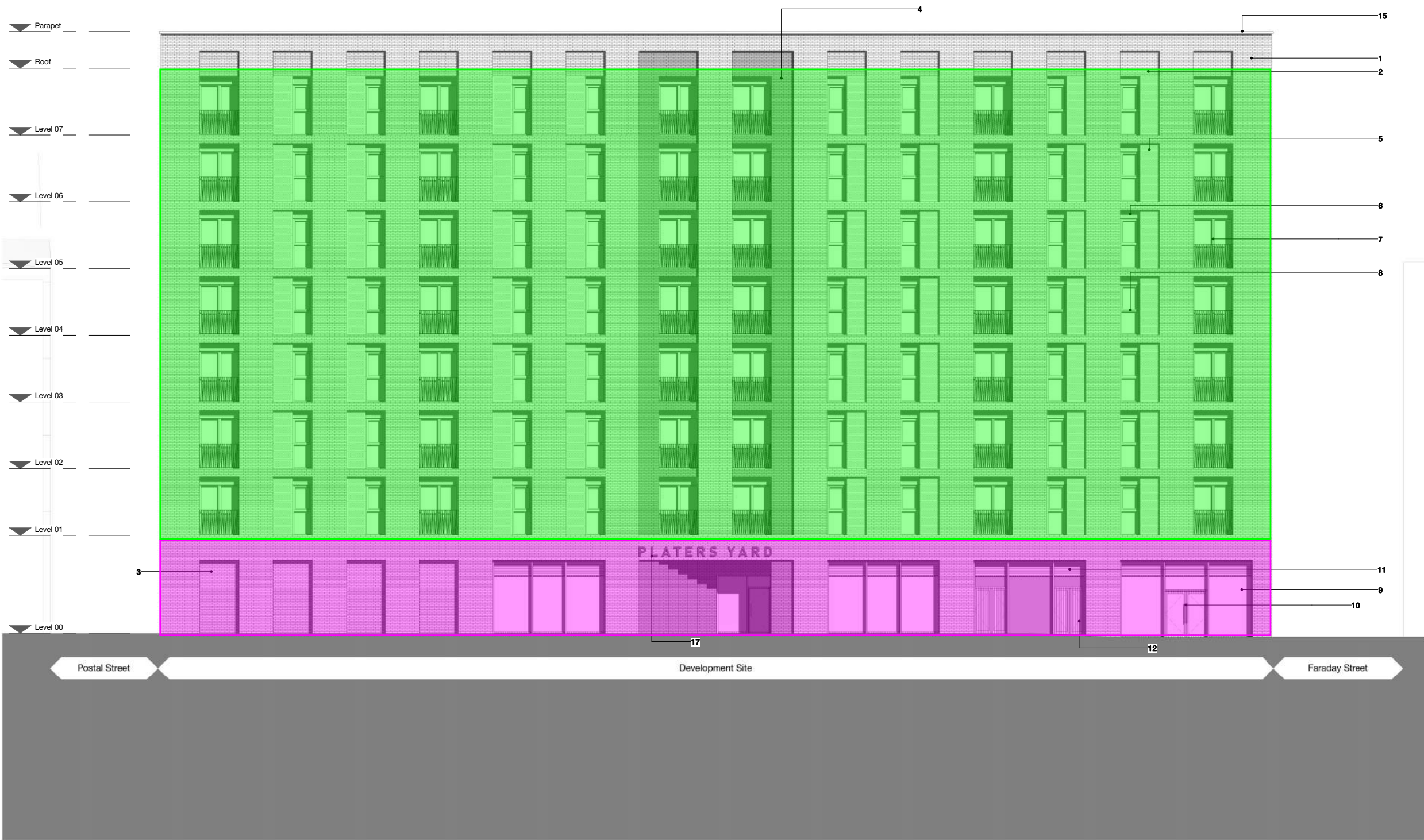
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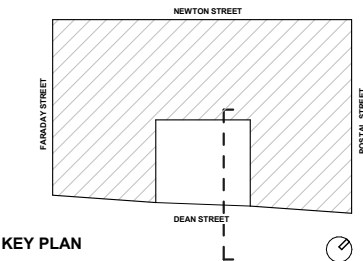


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Title	Facade sound insulation mark-ups
Project	Postal Street, Manchester
Project no.	21549
Version	G
Marked-up by	JP
Reviewed by	MJH
Date	6 November 2025

Facade zones	
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P01	Issued for Review and Comment	31.10.2025



Proposed West Courtyard Elevation
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Drawing
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Elevation

Scale @ A1 1 : 100	Date October 2025
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Job Number 210258	Status S3	Purpose of Issue Review & Comment
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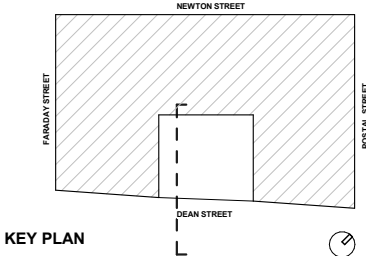
Title	Facade sound insulation mark-ups
Project	Postal Street, Manchester
Project no.	21549
Version	G
Marked-up by	JP
Reviewed by	MJH
Date	6 November 2025

Facade zones	
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Proposed East Courtyard Elevation
1 : 100



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Drawing
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Section

Scale @ A1 1 : 100	Date October 2025
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