



2 Swallow Street, Manchester – Overheating Assessment

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Criteria

The requirements for whole dwelling (background) and purge ventilation, are presented in Approved Document F 'Ventilation' (ADF) (2022). Details on how the proposed development has been designed to provide whole dwelling (background) and purge ventilation and achieve suitable internal noise level limits is outlined in AEC report ref: P4589/R01a/RDC, dated 07 June 2022.

In relation to ventilation being provided to a development to remove excess heat, guidance relating to appropriate internal noise levels is presented in the following documents:

- Approved Document O '*Requirement 01: Overheating Mitigation Regulations: 40B*' (statutory requirement) (ADO)
- Manchester City Council Planning & Noise Technical Guidance (June 2022) (PNTG)
- Association of Noise Consultants document, '*Acoustics Ventilation and Overheating – Residential Design Guide*' (AVO)

According to ADO of the Building Regulations, "*Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel to a) limit unwanted solar gains in summer; b) provide an adequate means to remove heat from the indoor environment*". In addition to this, PNTG states that in relation to overheating affecting a development, that guidance within AVO is also followed.

Please note that this assumes that overheating is a possibility at the proposed development and this would need to be confirmed by others.

Night-time - ADO

ADO states that that in locations where external noise may be an issue, (e.g. buildings close to busy roads) '*it is unlikely that windows would be opened by an occupant and therefore the minimum free areas of the simplified method cannot be met*'. As a result, the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (2300 to 0700h).

Based on this, ADO states that windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits:

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

As a result, ADO provides guidance in order to assess the overheating implications of a development and the dwelling(s) within, and this is detailed further in the '*Simplified Method*' of the document.

In order to assess whether openable windows can be utilised to remove excess heat, ADO places the development into a risk category depending on its location in England. As the site is located in Manchester, it falls within the moderate risk category. Therefore, ADO stipulates that the minimum free area in the external façade of a bedroom should equal at least 4% of the floor area of the room. This typically equates to an external to internal noise level reduction of around -9dB.

Daytime - AVO

ADO does not provide overheating guidance during daytime hours, therefore, in accordance with PNTG, AEC has considered the noise level limits presented in AVO. Based on this guidance, it is indicated that an external noise level above approximately 63dB_{L_{Aeq,16h}}, could create an '*increasing risk of adverse impact*'. Therefore, this has been selected as the external daytime noise level limit for which open windows cannot be relied upon for the control of overheating.

AVO indicates that a reduction in noise levels of around 13dB can be expected across a window that is partially open for ventilation purposes (approximately 2% of the floor area for a room).

Summary

Based on the above, the free-field external noise level limits for which openable windows cannot be relied upon as an overheating strategy are presented in Table 1, below. The minimum free area of the floor area of the room is presented in each case for clarity.

Table 1 – Noise Level Limits Above Which Openable Windows Should Not be Used for Overheating

Period	Minimum Fraction of Floor Area Required	Resulting External – Internal Level Difference, dB	Noise Level Limit, dB	
			External Free-field	Internal
Daytime Ambient, L _{Aeq,16h}	2%	-13	63	50
Night-time Ambient, L _{Aeq,8h}	4%	-9	49	40
Night-time Maximum, L _{Amax,F} *			64	55

*Please note that this figure can be exceeded 10 times during the 8-hour period.

Assessment

As stated above, AEC measured noise levels around the site in April 2022 and the external free-field noise levels affecting the proposed development were determined and these are reproduced in Table 2, below.

Table 2 – Determined Free-Field External Noise Levels

Facade	Floor	Noise Levels, dB		
		Daytime Ambient, L _{Aeq,16h}	Night-time	
			Ambient, L _{Aeq,8h}	Maximum, L _{Amax,F}
Eastern	All	≤ 60	≤ 55	≤ 70
Southern	All			
Western	Lower Ground - First	≤ 55	≤ 50	≤ 70
	Second / Third			≤ 74
Northern	All	≤ 50	≤ 45	≤ 60

In order to determine if windows can be partially opened to remove excess heat, a comparison of the external noise levels presented in Table 2 with the external noise level criteria presented in Table 1 has been completed and the results are shown in Table 3, below.

Table 3 – Use of Openable Windows as Overheating Strategy

Facade	Period	
	Daytime	Night-time
Eastern	✓	✗
Southern	✓	✗
Western	✓	✗
Northern	✓	✓

Based on the above assessment, the removal of excess heat can be provided by a partially opened window to all habitable rooms during the daytime on all façades. During the night-time periods on all facades excluding the northern, an alternative means of ventilation method to openable windows must be provided to combat periods of overheating. This could be in the form of a mechanical ventilation with heat recovery system and will need to be confirmed by others.