



RIDGE

Ventilation Strategy Report
House of Social 1 Ltd First
Street Manchester
19th January 2023

VENTILATION STRATEGY, HOUSE OF SOCIAL FIRST STREET



HOUSE OF SOCIAL MANCHESTER FIRST STREET STUDENT ACCOMMODATION VITA GROUP

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Prepared for

House Of Social 1 LTD

Horseshoe Farm
Elkington Way
Alderley Edge,
SK9 7GU

Prepared by

Ridge and Partners LLP
Belvedere House, 5th Floor
12 Booth Street
Manchester
M2 4AW
Tel: 0161 833 9579

Contact

Cain McGilloway
Building Services Engineer
cainmcgilloway@ridge.co.uk
07810 031 326

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1. INTRODUCTION

The purpose of this report is to provide a description of the Ventilation Strategy for the proposed development of House of Social First Street in Manchester City Centre to support the planning application for the development. The proposed development shall consist of a 13-storey Purpose Built Student Accommodation (PBSA) building and ground floor market food hall, together with new public realm along Wilmott Street.

2. SITE DESCRIPTION

The Site known as Plot 10b First Street is located in Manchester and is bound by River Street to the North, River Street and vacant land to the east, Hulme Street to the South, and the development of Plot 10a to the West. There are no permanent structures on the Site. There are no trees on or adjacent to the Site.

The site has all major services (water, telecoms and electricity) within the surrounding roads which may require diverting or disconnections to develop the project.

3. THE PROPOSAL

The Vita Group intend to develop 576 with bedspaces alongside a market food hall in a new purpose built student accommodation with a brand name of House of Social via the erection of a 13 storey building (plus rooftop plant) at the site known as Plot 10b, First Street in Manchester. The building will feature student accommodation, and a food hall including: back of house areas, offices and kitchen areas including, pot wash, walk-in-refrigeration, and dry store. The development will provide 18,904m² GIA (Gross Internal Floor area) over 13 floors with a roof top plant.

4. VENTILATION COMPLIANCE

All ventilation systems shall comply with the requirements of:

- Approved Documents B, F & O
- CIBSE Guides
- Relevant British Standards
- DEFRA Guidance Document "Guidance on the Control of odour and Noise for Commercial Exhaust Systems"
- DW172 Specification for kitchen ventilation systems

A further dictating approach in the design of the ventilation system is the criteria for overheating in accordance with Approved Document Part O for the student accommodation.

Overall, the ventilation strategy shall support the overall "well-being" and safety of the occupants and enhance the environment of the spaces, supporting low energy and carbon solutions.

Where deemed appropriate, the design shall attract relevant credits for BREEAM and promote good practice ventilation strategies throughout the development.

5. DEVELOPMENT AREAS / DEMISES

The development will consist of Purpose Built Student Accommodation (PBSA) in addition to a market food hall.

These areas and demises can also be split down into different functions being:

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- Student accommodation
 - Gym
 - Back of House
 - Bedrooms
- Market food hall including:
 - Dining areas
 - Kitchens
 - Back of house areas

All these different types of spaces require specific ventilation strategies to meet the requirement for the health and wellbeing of the occupants and functionality of the spaces to meet the requirements and criteria set out in section 4 of this report.

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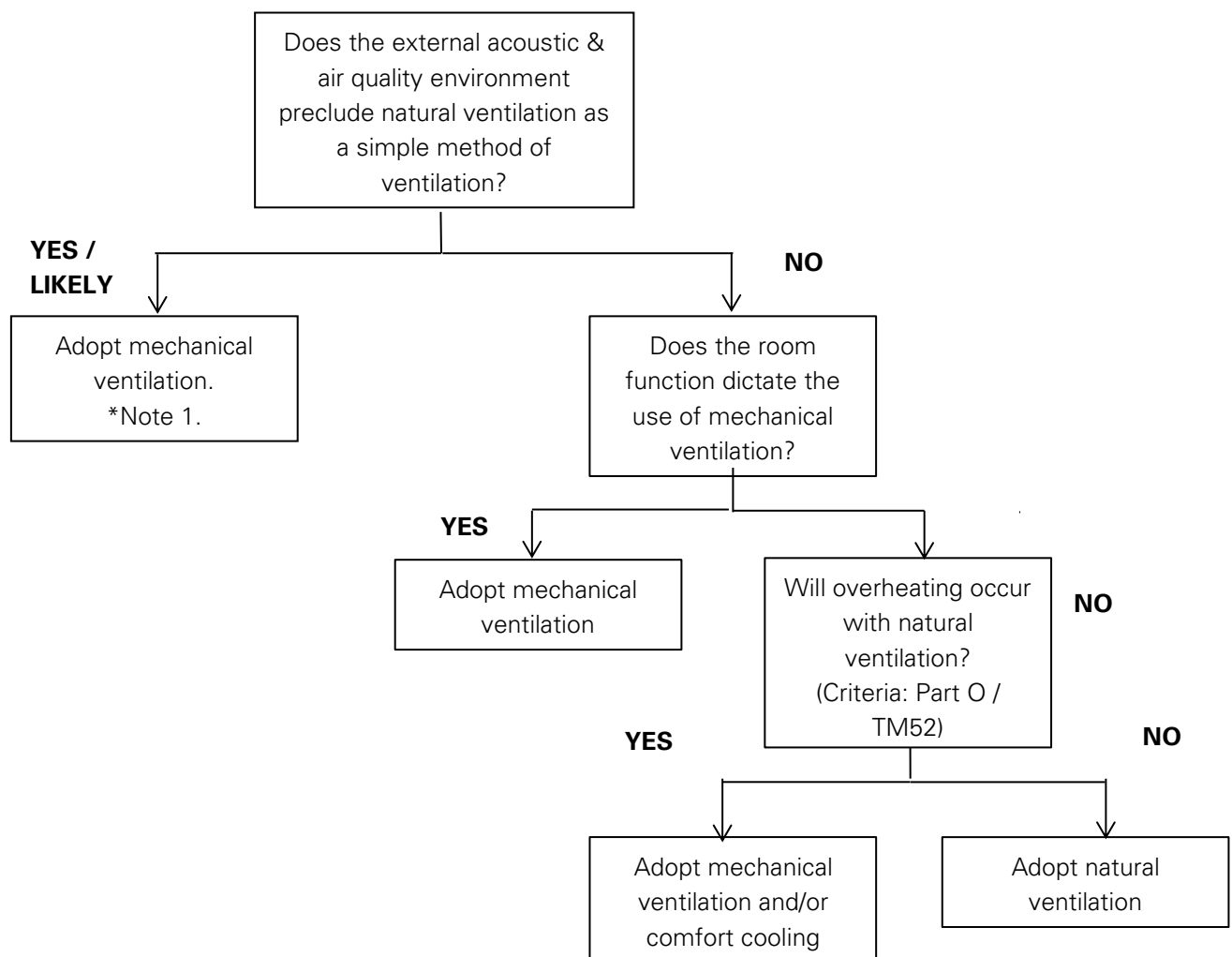
6. VENTILATION PROPOSALS

6.1. The Overall Ventilation Strategy Approach

The overall ventilation strategy is driven by the requirements set out as in Section 4 of this report with each of the different demises and room functions demanding specific approaches. Overall, the primary objective will be to naturally ventilate the spaces however where this cannot be achieved, mechanical ventilation and/or comfort cooling will be adopted.

The design methodology taken to establish the ventilation type has followed a strategic route:

STRATEGIC DESIGN APPROACH - EXAMPLE



Note 1: Utilise comfort cooling where overheating occurs and/or appropriate mechanical ventilation systems.

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6.2. Student Accommodation Bedrooms and Kitchen / Living Space

The primary requirement for the bedrooms is to provide a naturally ventilated solution, this being the most desirable solution for residential use.

However, due to the requirement to avoid summertime overheating as per Part O of the Building Regulations and noise constraints, supplementary mechanical ventilation will be required.

Mechanical ventilation will be adopted in the bedrooms and kitchen / living space in accordance with Approved Document Part O and Part F.

Openable windows (Figure 1) with a 100mm window restrictor, have been proposed by the architect in both the bedrooms and the kitchen / living rooms to satisfy both the summertime overheating (Part O of the Building Regulations) and purge ventilation requirements (Part F of the Building Regulations). The windows have been simulated to be open for 5 hours per day from 6pm – 11pm, as this is the period that covers the peak equipment and occupancy heat gain and is a reasonable period to align with AVO guidance, following Manchester City council confirming that the AVO guide is to be followed on this scheme. The window opening strategy is as per Approved Document Part O:

- i. *Start to open when the internal temperature exceeds 22°C.*
- ii. *Be fully open when the internal temperature exceeds 26°C.*
- iii. *Start to close when the internal temperature falls below 26°C.*
- iv. *Be fully closed when the internal temperature falls below 22°C*



Figure 1 - Window Illustration

The windows have to provide sufficient free area opening to offer air movement. Each opening window panel will have an openable area of 0.18m². The extent of glazing and the specification of the glass are also important factors to balance the extent of natural daylight whilst at the same time reducing unwanted solar gain to avoid overheating. For the Part O assessment, the glazing G-value has been set to 0.4.

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A Part O assessment has been carried out on a representative accommodation room sample (typical bedroom cluster on a south facing elevation) based on the current design of the spaces to ensure they meet the requirements for naturally ventilated spaces.

The Part O overheating criteria for naturally ventilated spaces is:

Compliance is based on passing both of the following two criteria:

- For living rooms, kitchens and bedrooms: the number of hours during which DT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).*
- For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a fail)*

The habitable rooms have passed Part O of the Building Regulations based on a combination of openable windows and the use of MVHR units.

For the standard bedrooms and living spaces, the MVHR unit is located in a cupboard within the cluster kitchen and is shared between the 6 person cluster room and all standard rooms as shown in Figure 2.

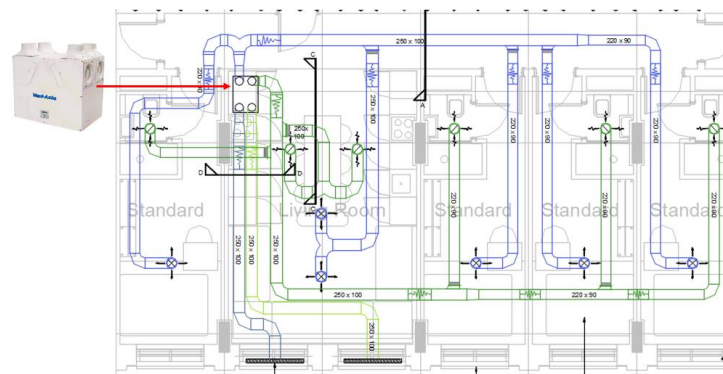


Figure 2 - Standard Room and Living Room MVHR Layout

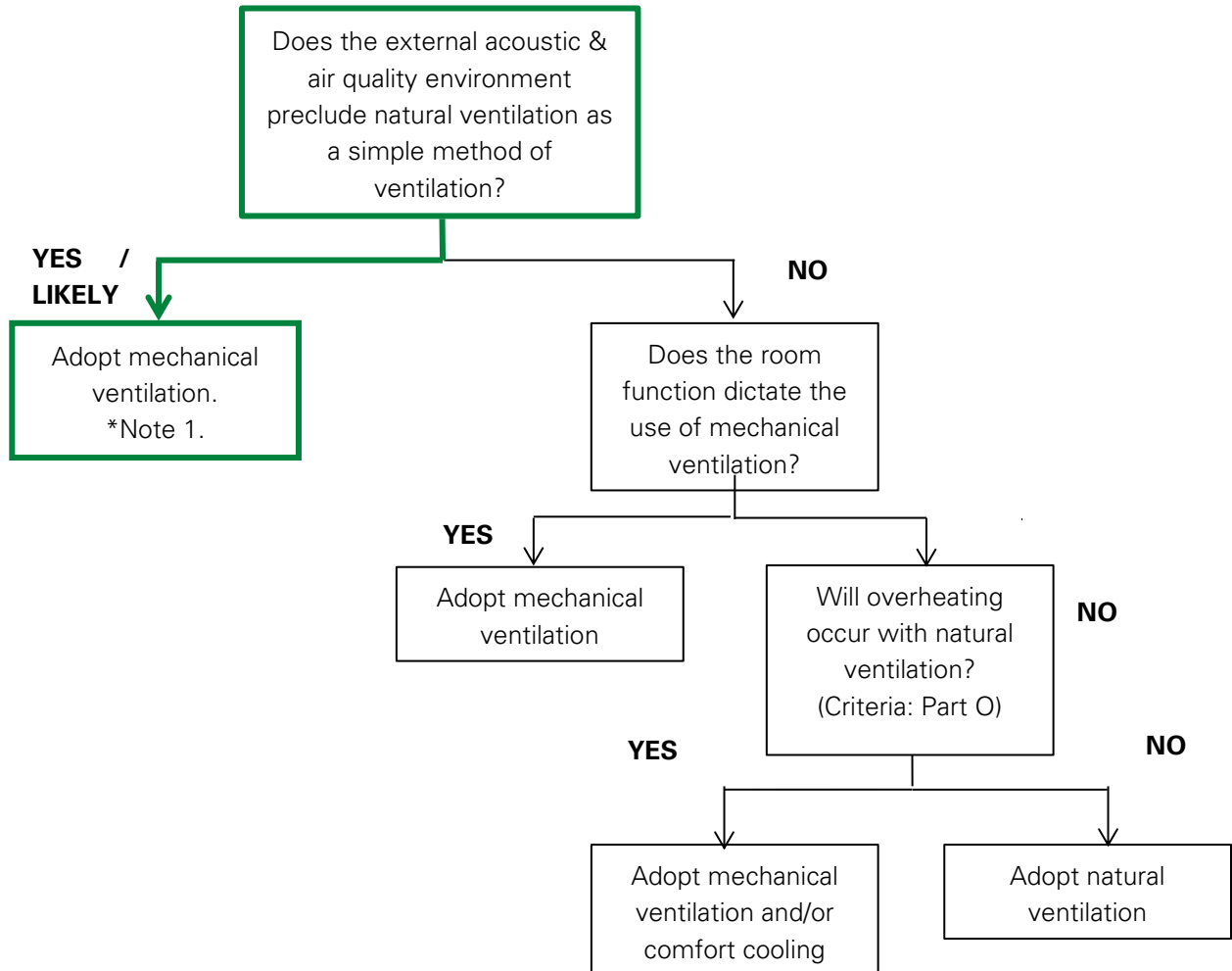
For the enhanced rooms, the MVHR unit incorporates cooker hood and is situated in the cupboard above the hob as shown in figure 3.



Figure 3 - Enhanced Room MVHR Layout

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STRATEGIC DESIGN APPROACH – STUDENT ACCOMODATION BEDROOMS & KITCHEN / LIVING ROOMS



*Note 1 – Openable windows proposed for avoidance overheating with MVHR

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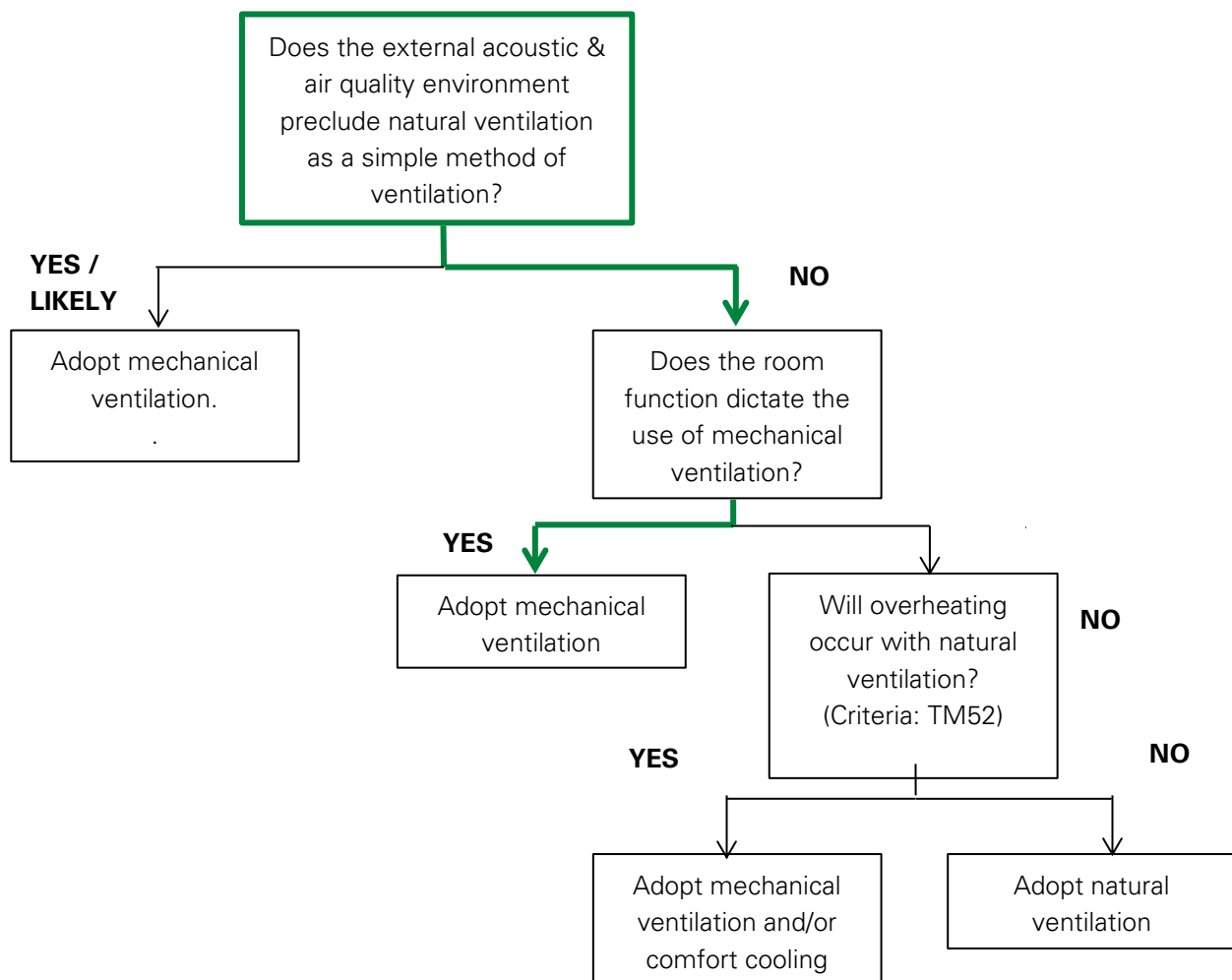
6.3. Market Food Hall

The spaces within the market food hall experience high peaks of occupancy and subsequent heat gains and fresh air requirements. On that basis natural ventilation alone cannot accommodate these 'spikes' in heat gains and CO₂ levels. Therefore, mechanical ventilation is proposed in the form of local Mechanical Ventilation Heat Recovery systems (MVHR).

These systems shall be hidden in the ceiling void with the fresh air and exhaust provided locally in the form of louvres. Heating and cooling will be provided via a VRF heat pump system with the MVHR units recovering heat from the space.

The plant, storerooms and back of house areas will be provided with extract ventilation to meet the requirements of Part F.

STRATEGIC DESIGN APPROACH – MARKET FOOD HALL



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6.4. Gym

It is important that gym areas are well ventilated to provide fresh air for the occupants due to the nature of activity that occurs. Mechanical ventilation will therefore be adopted for the gym in accordance with Approved Document Part F.

These types of spaces experience high peaks of occupants and subsequent heat gains and fresh air requirements. On that basis, natural ventilation alone cannot accommodate these 'spikes' in heat gains and CO₂ levels. Therefore, mechanical ventilation is proposed in the form of local Mechanical Ventilation Heat Recovery systems (MVHR). Heating and cooling will be provided by fan coil units connected to a VRF heat pump system with the MVHR units recovering heat from the space. See figure 4 below for equipment arrangement.

These systems shall be hidden in the ceiling void with the fresh air and exhaust provided locally in the form of louvres.

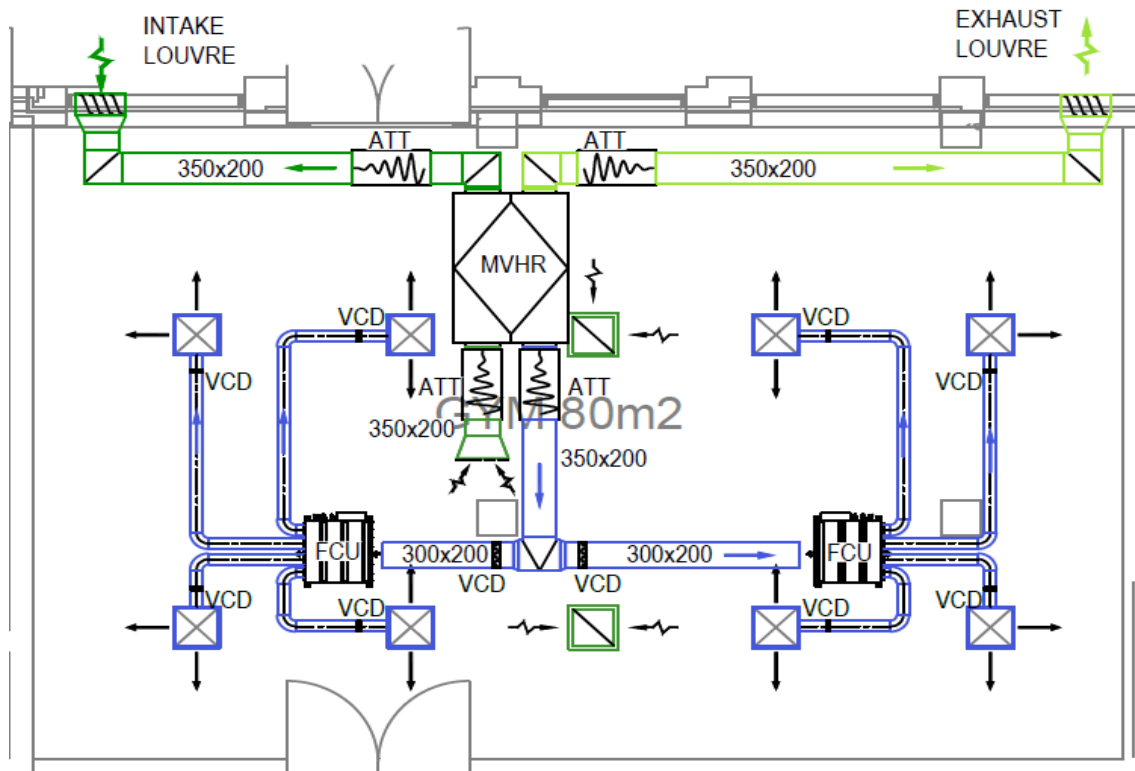
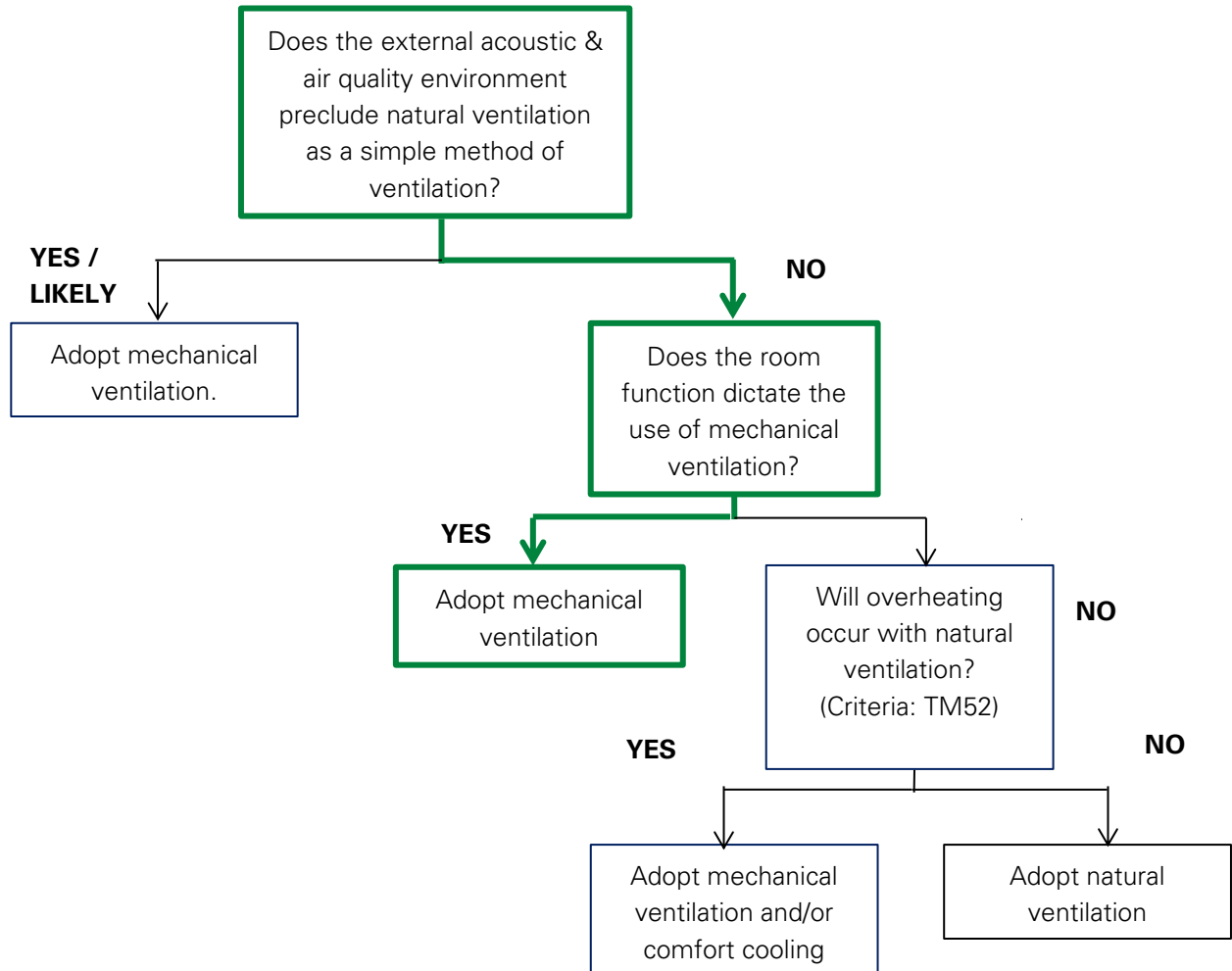


Figure 4 - Gym Ventilation Strategy

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STRATEGIC DESIGN APPROACH – GYM SPACE



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7. SUMMARY OF STRATEGIES

A strategic approach has been adopted to ascertain the most appropriate ventilation strategy for each type of space. This has taken account of environmental factors; energy efficiency and the risk of overheating. The outcomes are summarised in the table below:

AREA	PART F (GENERAL)	PART O / TM52 (OVERHEATING)
Gym	Mechanical ventilation with heat recovery and mechanical extract ventilation	Comfort Cooling (VRV with fan coils)
Toilets	Mechanical extract ventilation	N/A
Student Accommodation (Bedrooms and Kitchen / Living Spaces)	Natural Ventilation with extract to wet areas (Bathroom & Kitchen) supplemented with mechanical ventilation heat recovery	Openable windows with mechanical ventilation
Staff office	Mechanical extract ventilation	N/A
Kitchen Prep Areas	Dedicated kitchen extract ventilation with electrostatic precipitator and UV treatment to neutralise grease and odours	N/A
Lobby	Mechanical ventilation with heat recovery and mechanical extract ventilation	Comfort cooling (VRV with ceiling concealed fan coil units)
Comms room	DX AC wall mounted unit	N/A
Back Office	Mechanical ventilation with heat recovery	N/A
Parcel Store	Mechanical ventilation with heat recovery	N/A
Dry Store / Fridge	Mechanical extract ventilation	N/A
Pot Wash	Mechanical extract ventilation	N/A
Back of house including stores	Mechanical extract ventilation	N/A
Laundry	Mechanical Ventilation	N/A
Water tank room	Mechanical extract ventilation	N/A
Private dining	Mechanical ventilation with heat recovery	N/A

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8. APPENDIX 1 – STUDENT ACCOMODATION OVERHEATING ANALYSIS – PART 0

As detailed within Section 4 of this report, for the living, kitchen and bedrooms to achieve compliance with Approved Document Part O, the criteria given within CIBSE TM59:2017 must be achieved.

Because the bedrooms and kitchen / living spaces within the proposed development have a restriction on the number of hours the windows can open and have a 100mm opening restrictors, Section 4.3 of CIBSE TM59:2017 applies, which requires the following criteria to be met:

4.3 Criteria for homes predominantly mechanically ventilated

For homes with restricted window openings, the CIBSE fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26 °C for more than 3% of the annual occupied annual hours (CIBSE Guide A (2015a)).

The table below shows the predicted thermal comfort results against the mechanical ventilation criteria for each of the assessed rooms within the proposed Vita Manchester development using the Manchester CIBSE DSY 1 2020's high emissions 50th percentile range weather file.

ROOM NAME	OCCUPIED HOURS	NO. HOURS > 26°C	% ANNUAL HOURS > 26°C	PASS/FAIL
Accessible Single (North East)	3672	0	0	Pass
Enhanced (North East)	3672	0	0	Pass
Enhanced (South West)	3672	5	0.14	Pass
Kitchen Dining (North East)	1989	0	0	Pass
Kitchen Dining (South West)	1989	23	1.16	Pass
Single Bed (North East)	3672	0	0	Pass
Single Bed (South West)	3672	0	0	Pass

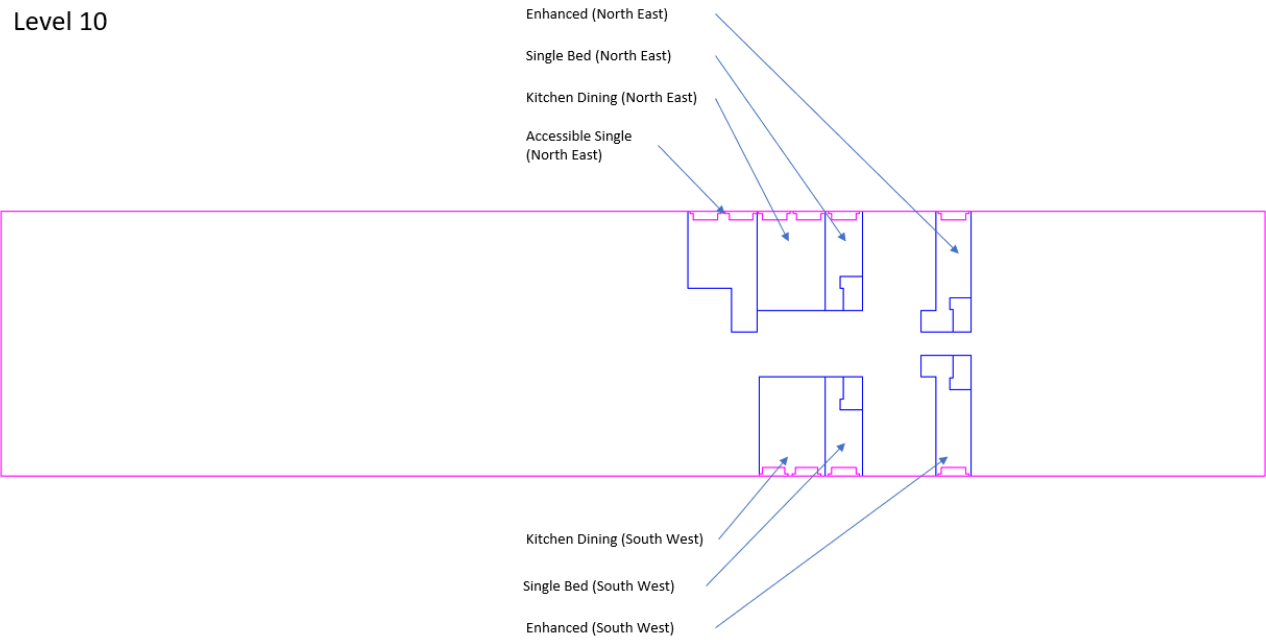
Based on the modelling conducted, the results show that all habitable rooms for the sample bedspaces comply with the thermal comfort criteria as set out by Approved Document Part O 'Overheating'.

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9. APPENDIX 2 – AREA OF PART 0 ASSESSMENT

Appendix 2 shows the assessed rooms within the proposed development.

Level 10





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