RIDGE

Ventilation Strategy Report

Octagon House, Manchester

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OCTAGON HOUSE, MANCHESTER
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1. INTRODUCTION

The purpose of this report is to provide a description of the Ventilation Strategy for the proposed re-development at Octagon House, Manchester to support the planning application for the development. It should be read alongside the full suite of reports that have been prepared and submitted, particularly the Design and Access Statement and the Planning Statement.

2. DEVELOPMENT PLANS

2.1. Description of Development Site

The Site is currently occupied by the Octagon building with its ground floor being occupied by Fresenius Medical Care. The building comprises of approximately 1,429 sqm GIA floorspace which is approximately 6 stories in height with associated car parking on both sides. The remainder of the site south of Bax road is occupied by the X building. One story in height the building comprises of under 650 sqm GIA floorspace. North of Bax road the site is more associated car parking.

The existing Octagon building will be retained and refurbished as part of the project.



Figure 2 - View of the existing site and surrounding area

The proposed development has all major services (gas, water, telecoms and electricity) within the surrounding roads which will need to be either isolated and either diverted or disconnected to develop the project.

2.2. Project Development Plans

Full planning application for the refurbishment and extension of Octagon House and the erection of buildings of up to 11 storeys in height to accommodate a mix of uses comprising Purpose Built Student Accommodation bedrooms (205 studios and 35 apartments accommodating 255 bedrooms) (Sui Generis Use Class); Key Worker accommodation (Sui Generis Use Class) (211 units); Residential units (16 no) (Use Class C3); 2,568 sq m of healthcare use (including the retention of an existing healthcare

facility on site) (Use Class Ee); and 394 sq m of commercial or community uses (Use Classes Ea, Eb, Eciii, Ee, Ef, F1e, F2b, F2c) with associated site access, car and cycle parking and landscaping.

In terms of the key measures I have set out below this is updated as follows:

Key measurables:

- Number of student bedrooms – 455 (205 studios, 255 in cluster form contained within 35 apartments)
- Key worker units – 141 studios, 70 one and two bedroom units
- Residential units – 16
- Commercial or community unit at ground and first floor of Octagon House – 394 sq m
- Central Manchester Dialysis Unit (existing plus expansion to first floor of Octagon House) – 2,568 sq m
- Cycle parking spaces:
    - PBSA – 34
    - Key worker – 50
- Car parking
    - 19 spaces in south east part of the site currently used by staff and visitors of the Central Manchester Dialysis Unit to be retained for use by its visitors only
    - 32 new spaces to be provided for use by Central Manchester Dialysis Unit staff
    - 0 car parking across the rest of the site
    - All remaining existing car parking within the site will be removed

3. VENTILATION COMPLIANCE

All ventilation systems shall comply with the requirements of:

- Approved Documents F & B
- CIBSE Guides
- Relevant British Standards
- DEFRA Guidance Document "Guidance on the Control of odour and Noise for Commercial Exhaust Systems"
- Fire Strategy Report
- Acoustic Consultants Report

A further dictating approach in the design of the ventilation system is the criteria for overheating with adoption of CIBSE TM52 for the Amenity spaces and CIBSE TM59 for the PBSA & Key Worker residential building.
Overall, the ventilation strategy shall support the overall "well-being" and safety of the occupants and enhance the environment of the spaces, support low energy and carbon solutions.
When deemed appropriate the design shall attract relevant credits for BREEAM and promote good practice ventilation strategies throughout the development.

4. DEVELOPMENT AREAS / DEMISES

The development can be split into principle Areas/Demises being:

- PBSA
- Residential Accommodation Aimed at Key Workers

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

- PBSA

– Bedrooms & Studios – living rooms/kitchens
– Communal spaces – corridors/lobbies/staircases
– Plant & equipment spaces
– Storage, back of house and refuse

- Residential Accommodation Aimed at Key Workers

– Studios
– 1 Bed
– 2 Bed
– Communal spaces – corridors/lobbies/staircases
– Plant & equipment spaces
– Storage, back of house and refuse

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.

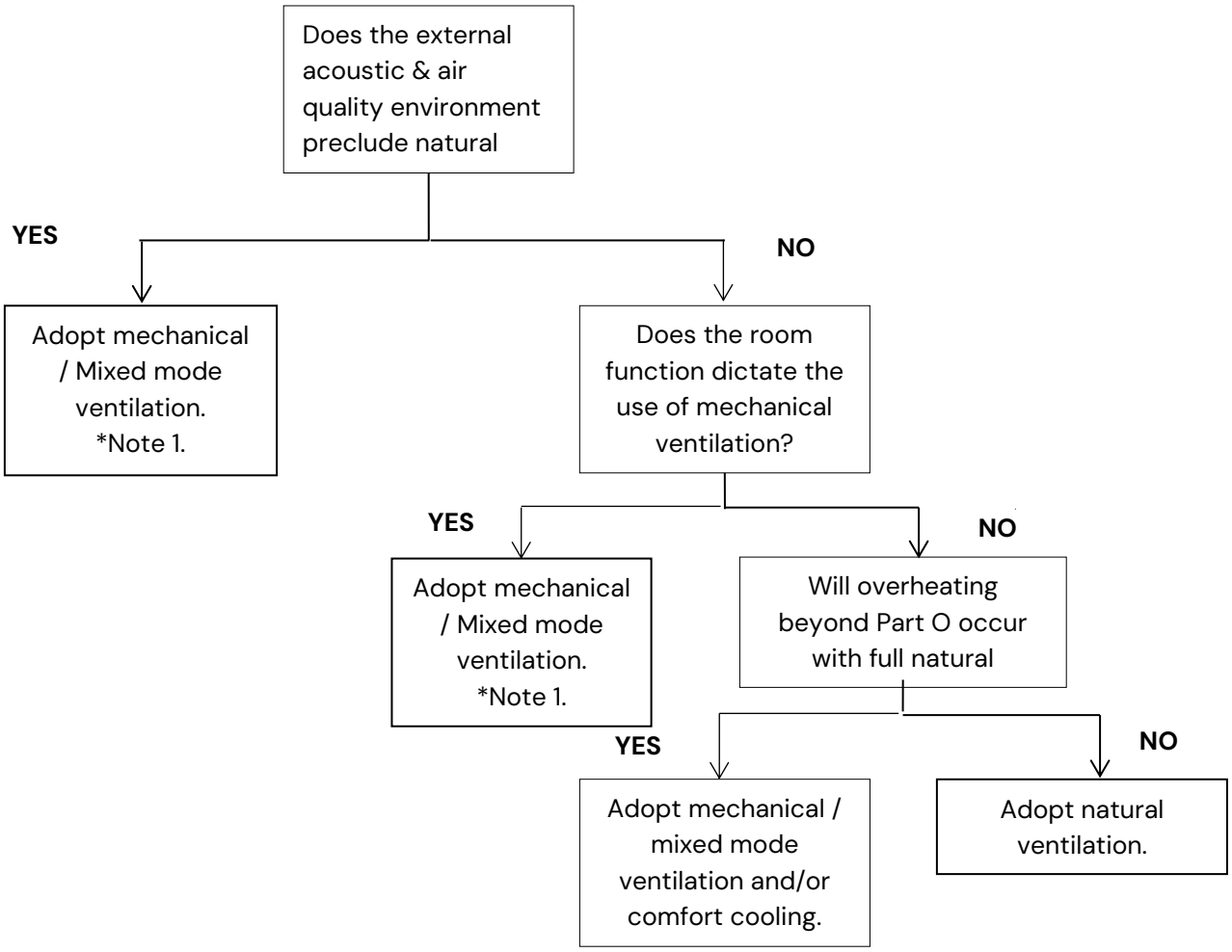
5. VENTILATION STRATEGIC DESIGN APPROACH

Whilst the principal function of the ventilation strategy is to provide sufficient fresh air and to exhaust odours, the correct ventilation strategy is crucial to minimise the energy consumed by the building – mechanical ventilation is a significant contributor of the building's electrical energy and therefore a strategy with natural ventilation is preferred.

However, mechanical ventilation is needed to the spaces that have high internal heat gains, in addition to reducing or negating external noise from traffic or other sources in accordance with the acoustic report.

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

STRATEGIC DESIGN APPROACH



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

6. VENTILATION PROPOPALS

6.1. PBSA Bedrooms / Studios

The bedrooms / studios shall be predominantly naturally ventilated through the opening panels in the façade and acoustic trickle vents within the windows. However, there are restrictions within the Acoustic report on the frequency that that panels can be opened. As a result, for the purposes of the Part O assessment, the residential apartments shall be considered as “predominantly mechanically ventilated”.

For the opening panels to be effective, an adequate amount of free area is required to be provided. The extent of glazing and the specification must be considered to reduce unwanted solar gain, thus reducing the risk of overheating.

Although natural ventilation will be adopted as the primary method of ventilation, the living / kitchen spaces, studios and bedrooms will be mechanically ventilated via a mechanical ventilation heat recovery unit system with peak lopping (MVHR) to achieve Part O compliance.

Each bedroom / studio will be served from a local MVHR unit located next to the bathroom pods in each demise, with the ductwork in the void between the ceiling and the underside of the slab. Fresh air intake and exhaust connections will be routed to connect to external louvres but designed to mitigate cross contamination.

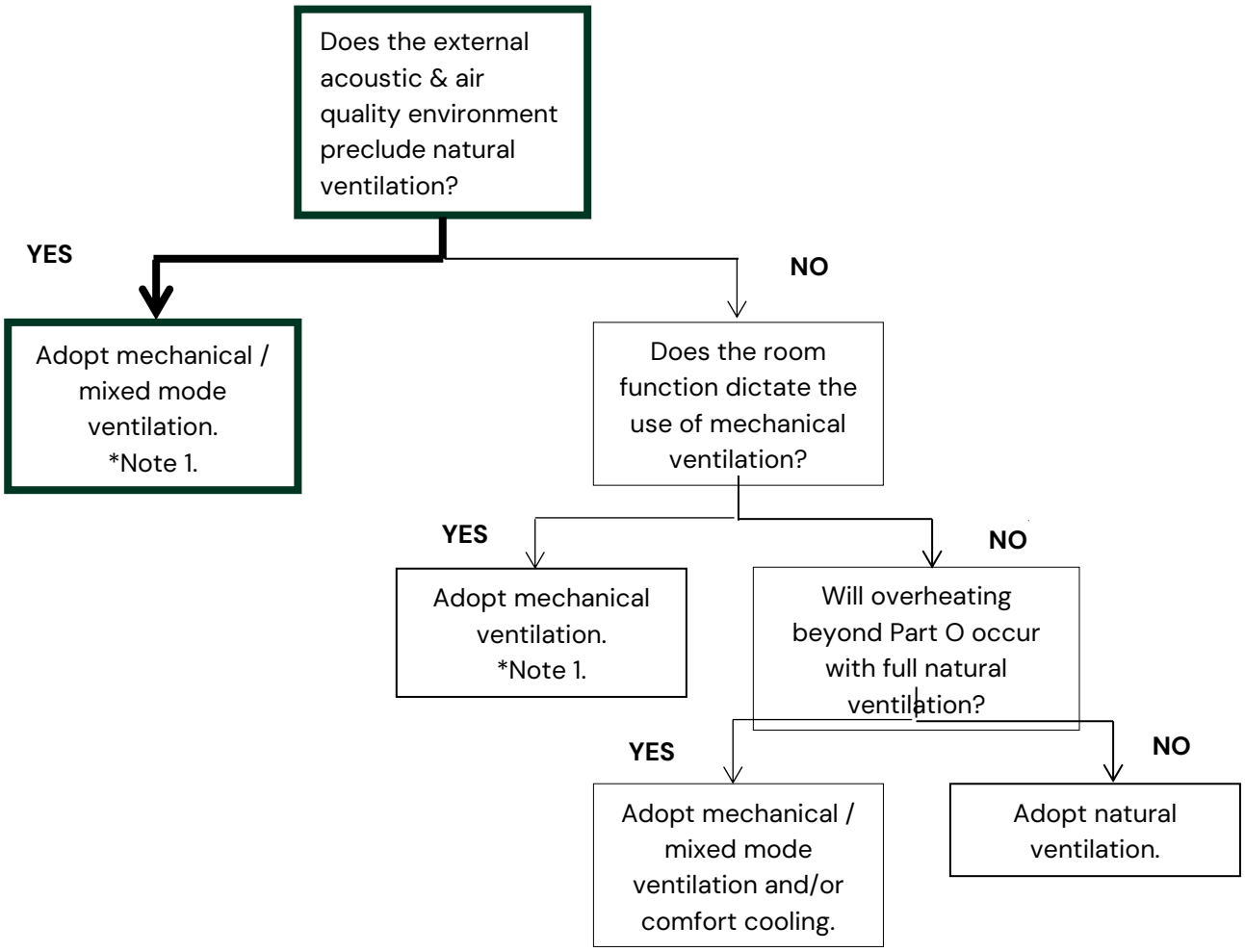
Areas will be mechanically ventilated to comply with Part F of the Building Regulations.

An initial Part O assessment will be carried out on a typical floor in accordance with the Approved Document Part O requirement to use the guidance contained within CIBSE TM59:2017 'Design methodology for the assessment of overheating risk in homes', as per section 2.3.

Due to the opening panels having restrictions on when the panels can be open as stated in the Acoustic Report, the spaces have been assessed under Section 4.3 of CIBSE TM59:2017, 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).

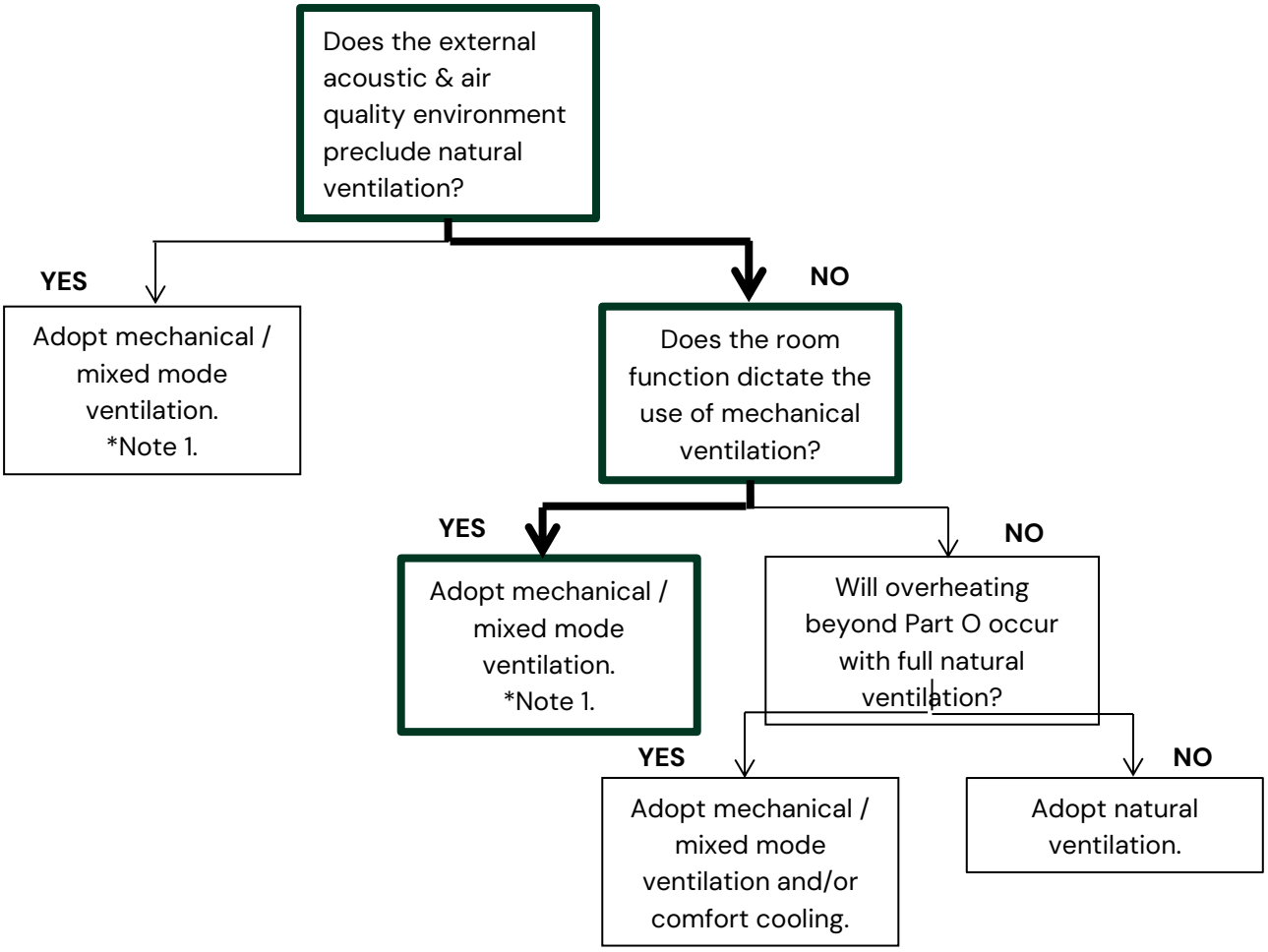
STRATEGIC DESIGN APPROACH – PBSA Bedrooms/Studios & KLD's



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

6.2. PBSA Amenity Space

STRATEGIC DESIGN APPROACH – PBSA Amenity Space



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

These types of spaces invariable 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 CO_2 levels. Therefore, mechanical ventilation is proposed in the form of local Mechanical extract ventilation heat recovery systems (MVHR).

These systems shall be located in the ceiling level of each amenity space with the fresh air and exhaust provided locally in the form of louvres. Heating and cooling will be provided in the form of reverse cycle heat pumps with indoor cooling and heating units located in the ceiling and of each room and heat rejection condensers on the roof.

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

6.3. Residential Accommodation Aimed at Key Workers

The residential apartments shall be predominantly naturally ventilated through the opening panels in the façade. However, it is anticipated that there will be restrictions on the frequency that that panels can be opened. As a result, for the purposes of the Part O assessment, the residential apartments shall be considered as "predominantly mechanically ventilated".

For the opening panels to be effective, an adequate amount of free area is required to be provided. The extent of glazing and the specification has been considered to reduce unwanted solar gain, thus reducing the risk of overheating.

Although natural ventilation will be adopted as the primary method of ventilation, the living / kitchen spaces and bedrooms will be mechanically ventilated via a mechanical ventilation heat recovery system (MVHR).

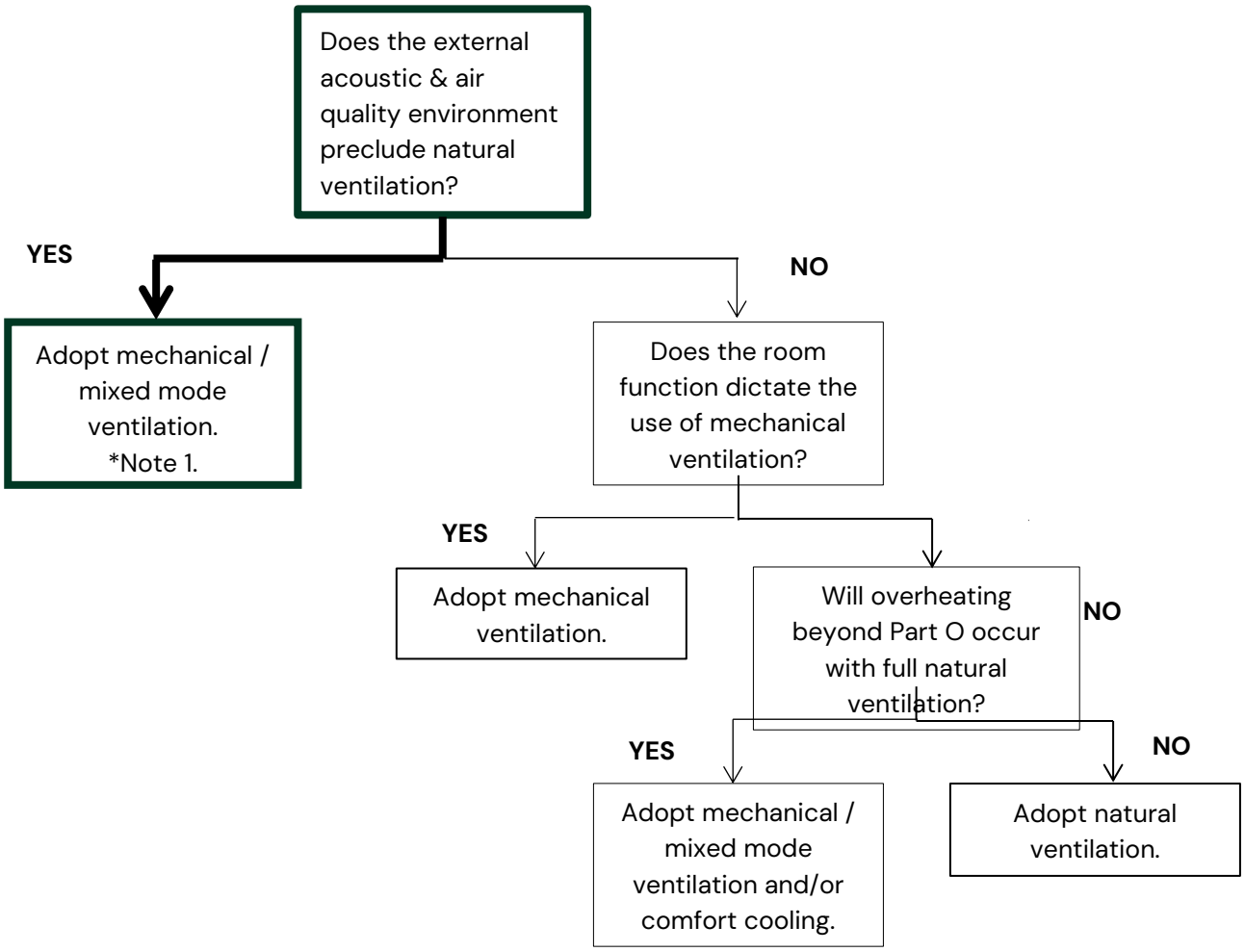
Each residential apartment will be served from a local MVHR unit located next to the bathroom pods in each demise, with the ductwork in the void between the ceiling and the underside of the slab. Fresh air intake and exhaust connections will be routed to connect to external louvres but designed to mitigate cross contamination.
Bathroom and kitchen areas will be mechanically ventilated via the MVHR to comply with Part F of the Building Regulations.

An initial Part O assessment has been carried out on a typical floor in accordance with the Approved Document Part O requirement to use the guidance contained within CIBSE TM59:2017 'Design methodology for the assessment of overheating risk in homes', as per section 2.3.

Due to the opening panels likely having restrictions on when the panels can be open, the spaces have been assessed under Section 4.3 of CIBSE TM59:2017, which requires the following criteria to be met:

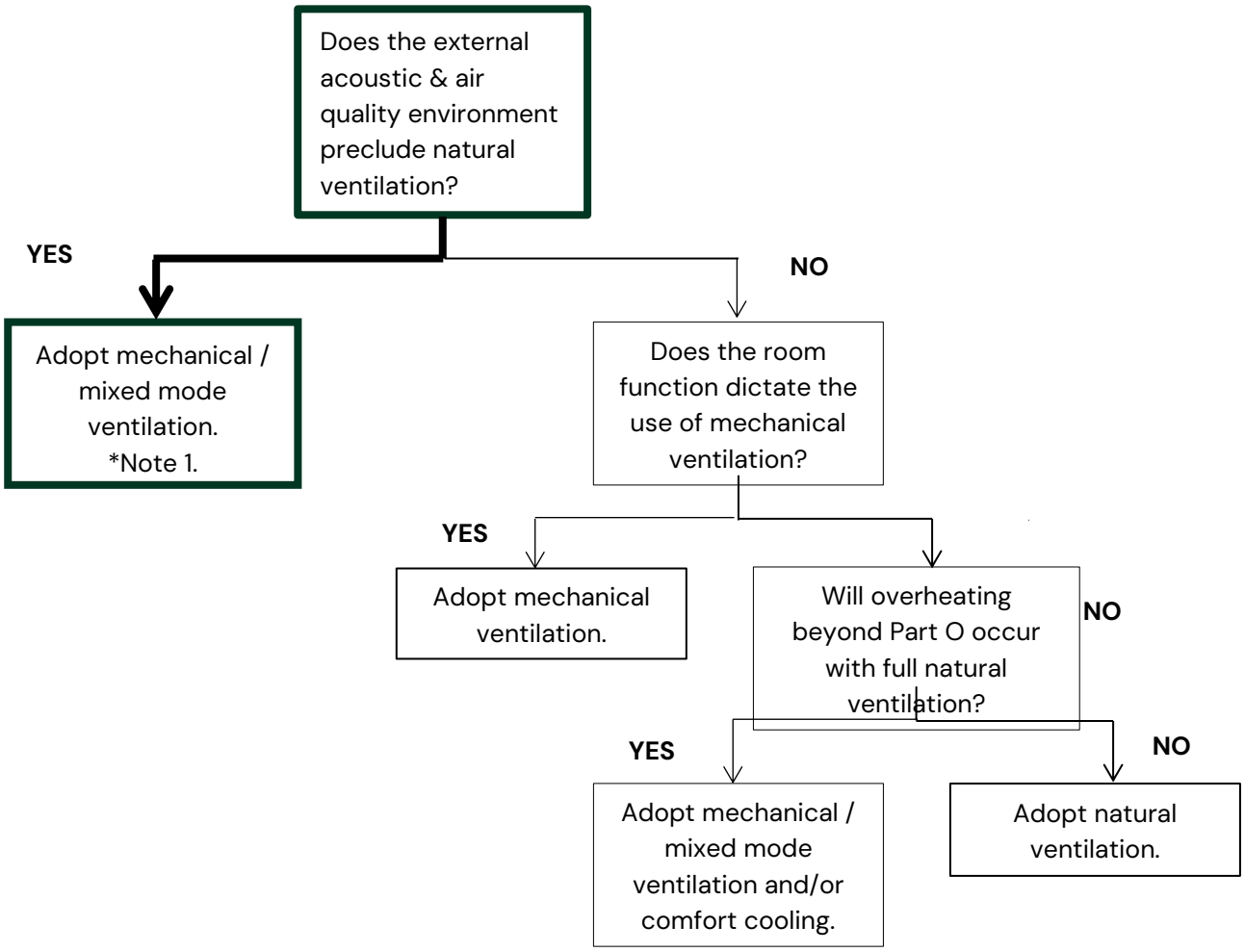
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For homes with restricted window openings, the CIBSE fixed temperature test must be followed, i.e., all occupied rooms should not exceed an operative temperature of 26 ˚C for more than 3% of the annual occupied annual hours (CIBSE Guide A (2015a)).

STRATEGIC DESIGN APPROACH – Residential Studios



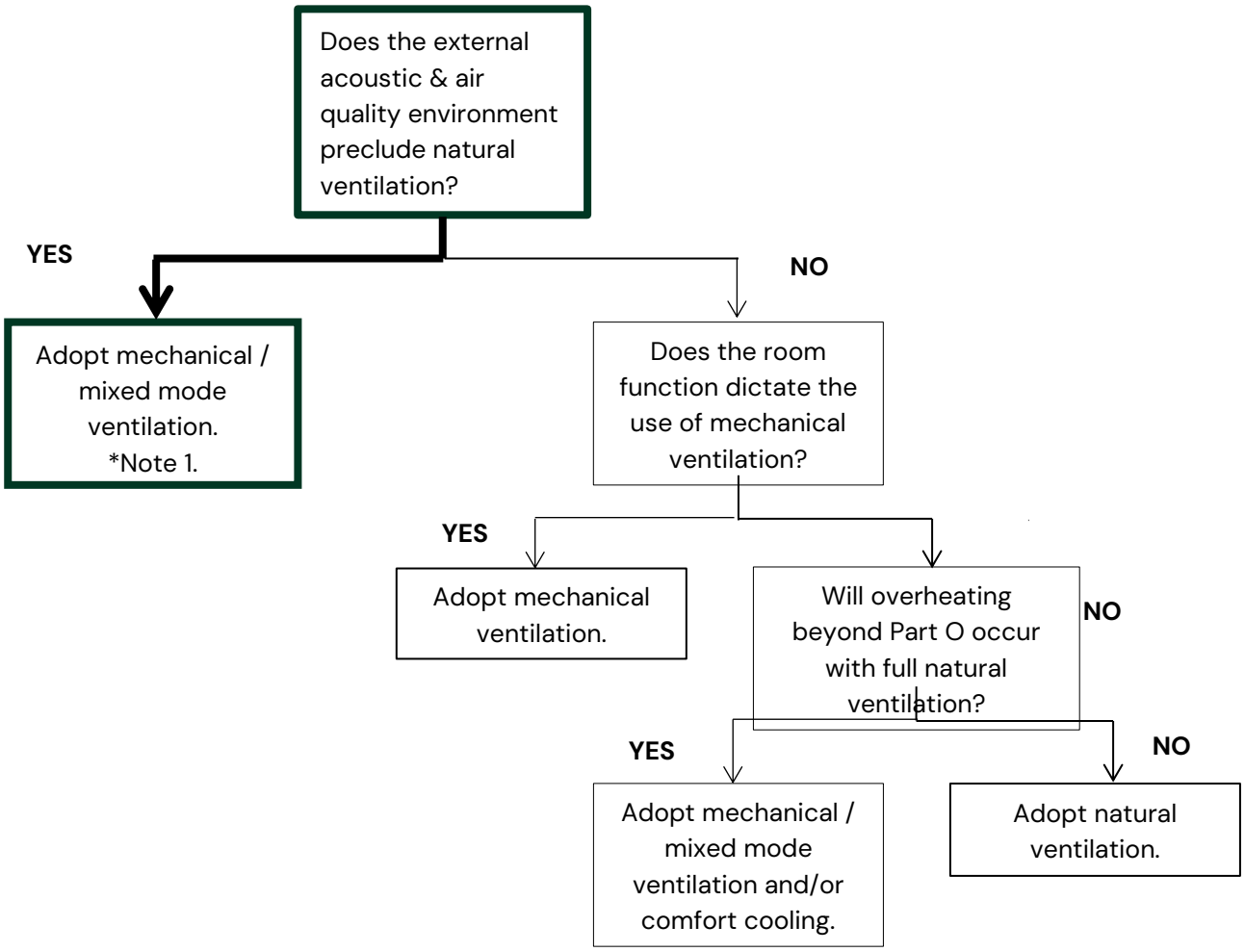
*Note 1: Utilise comfort cooling where overheating occurs and/or appropriate mechanical / mixed mode ventilation systems

STRATEGIC DESIGN APPROACH – Residential 1 Bed



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

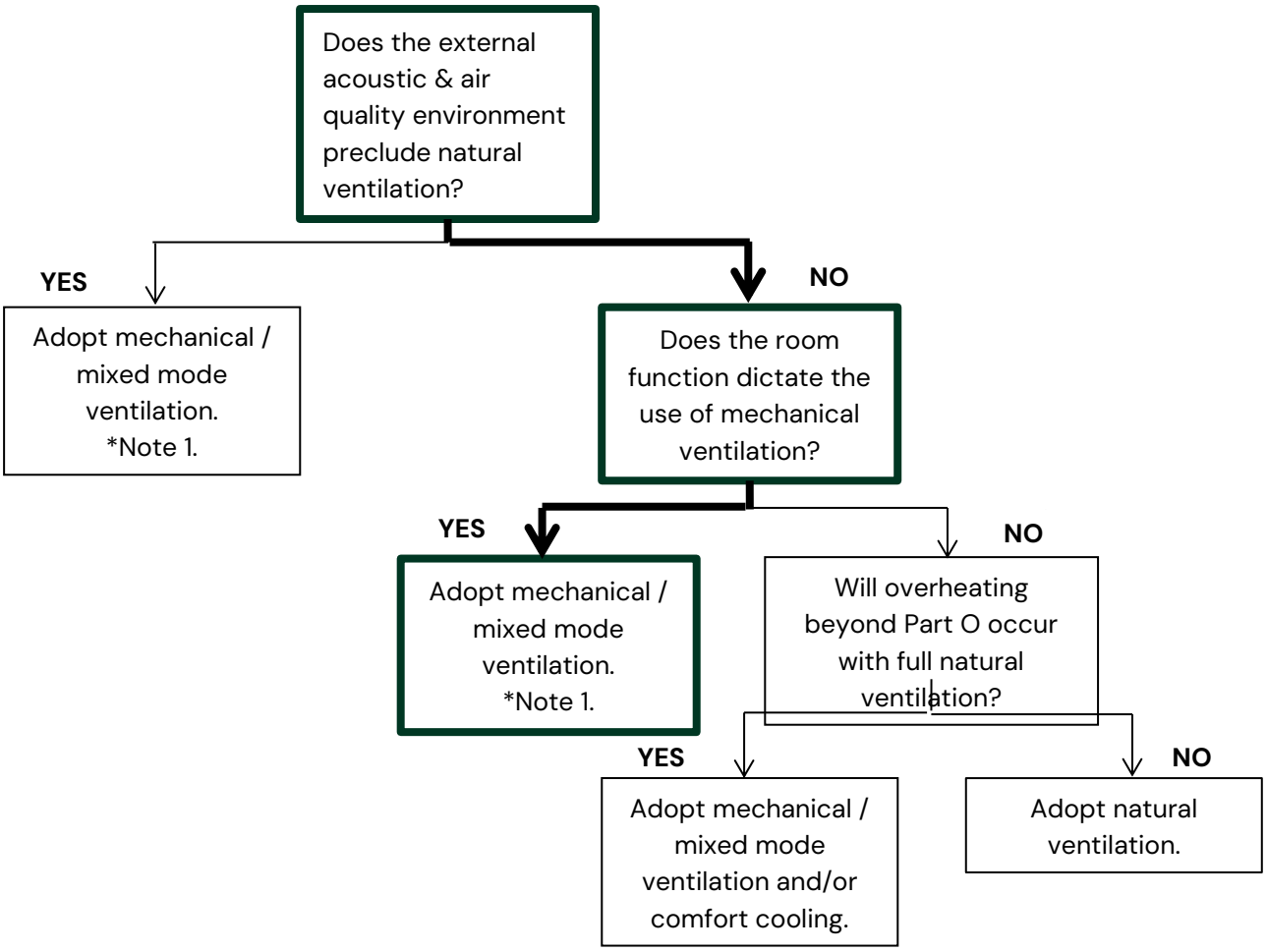
STRATEGIC DESIGN APPROACH – Residential 2 Bed



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

6.4. Residential Key Worker Amenity Space

STRATEGIC DESIGN APPROACH – Residential Key Worker Amenity Space



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

These types of spaces invariable 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 CO_2 levels. Therefore, mechanical ventilation is proposed in the form of local Mechanical extract ventilation heat recovery systems (MVHR).

These systems shall be located in the ceiling level of each amenity space with the fresh air and exhaust provided locally in the form of louvres. Heating and cooling will be provided in the form of reverse cycle heat pumps with indoor cooling and heating units located in the ceiling and of each room and heat rejection condensers on the roof.

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

6.5. Smoke Ventilation

A smoke ventilation system shall be provided in accordance with the Fire Consultants report;

Draft BS 9991 recommends that evacuation lift lobbies should be protected akin to a stair with regards to smoke ventilation. However, there is limited guidance as to how this could be achieved. It is proposed that the following should be allowed for at present:

A mechanical smoke shaft to provide inlet air into the lobby.
Actual requirements to be developed during detailed design. The above allowance provides flexibility in design.

PBSA: Each of the common corridors in the upper floors are to be provided with a mechanical smoke ventilation system. This should comprise of:

An extract smoke shaft that achieves an equivalent performance, or better performance) to a minimum of 1m2 cross sectional natural smoke shaft as defined in BS 9991.
A mechanical inlet shaft near the stair to provide supply to prevent the corridor being over-pressured when all doors in the corridor are closed.
Pressure sensors should be allowed for from a costing perspective. This may be required to help alleviate an over pressurised condition when all doors in the corridor are closed. Actual extract or supply duty required will be subject to smoke ventilation system design or coordination.

For further information, please refer to the Fire Engineers report.

7. SUMMARY OF STRATEGIES

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

AREA	PART F (GENERAL)	OVERHEATING PURGE
PBSA - Bedroom/Studios	MVHR (Local) to each demise	Openable panels
Key Worker Residential Apartments	MVHR (Local) to each demise	Openable panels or comfort cooling (VRV with ceiling concealed fan coil units)
Amenity Spaces (occupied)	MVHR (Local) to each demise	Comfort cooling (VRV with ceiling concealed fan coil units)
Plant Areas / Bin Store/ Laundry Rooms/ Storage	To Part F (General natural vent louvre)	Assisted mechanical
Retail / Commercial	Mechanical ventilation with heat recovery	Comfort Cooling (VRV exposed fan coils)

7.1. PBSA / Residential Mechanical Ventilation with Heat Recovery

The bedrooms / studios shall be provided with mechanical supply & extract ventilation from the local MVHR units and also via supply air via acoustic trickle vents to maintain fresh air quality. The air volumes shall be determined to satisfy the requirements of the Approved Document Part F of the Building Regulations. The units will be provided with a peak lopping cooling section and a boost facility to satisfy the Part O overheating criteria.

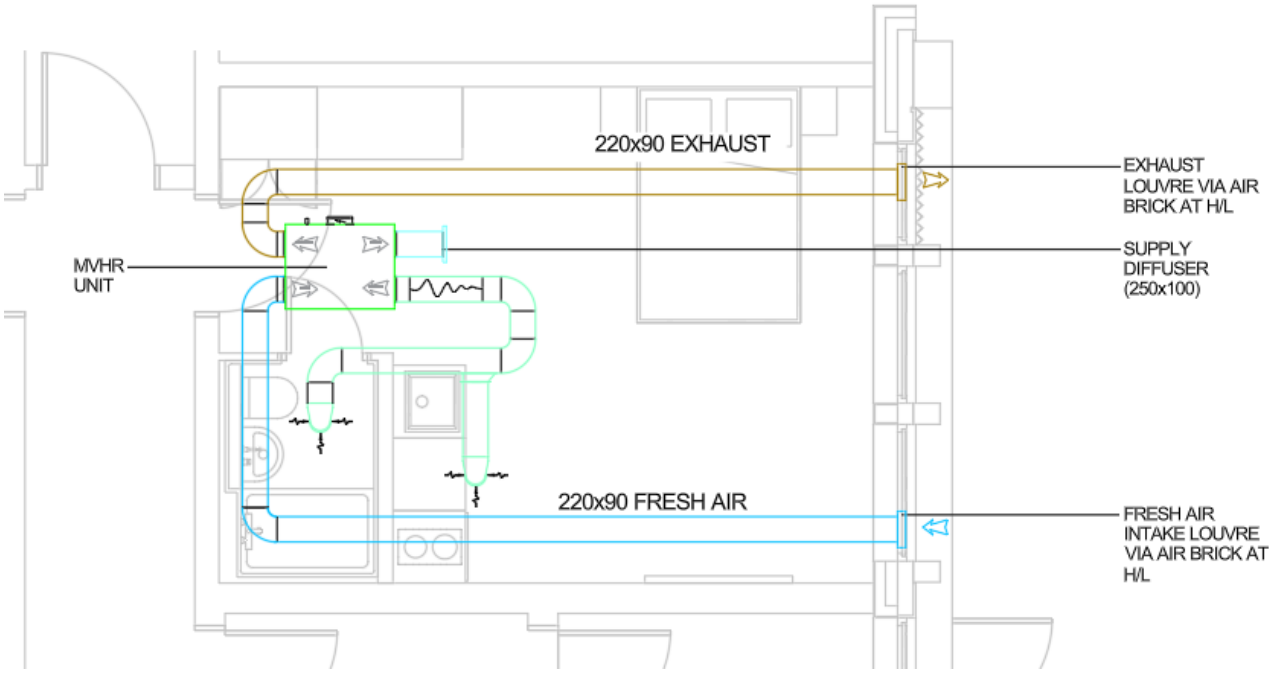
The MVHR ventilation units shall be in the ceiling void adjacent to the bathroom pod on entrance to the bedroom / studio. The supply and extract ductwork shall distribute off the unit providing supply air to the bedroom and extract air from the bathroom and kitchenette areas.



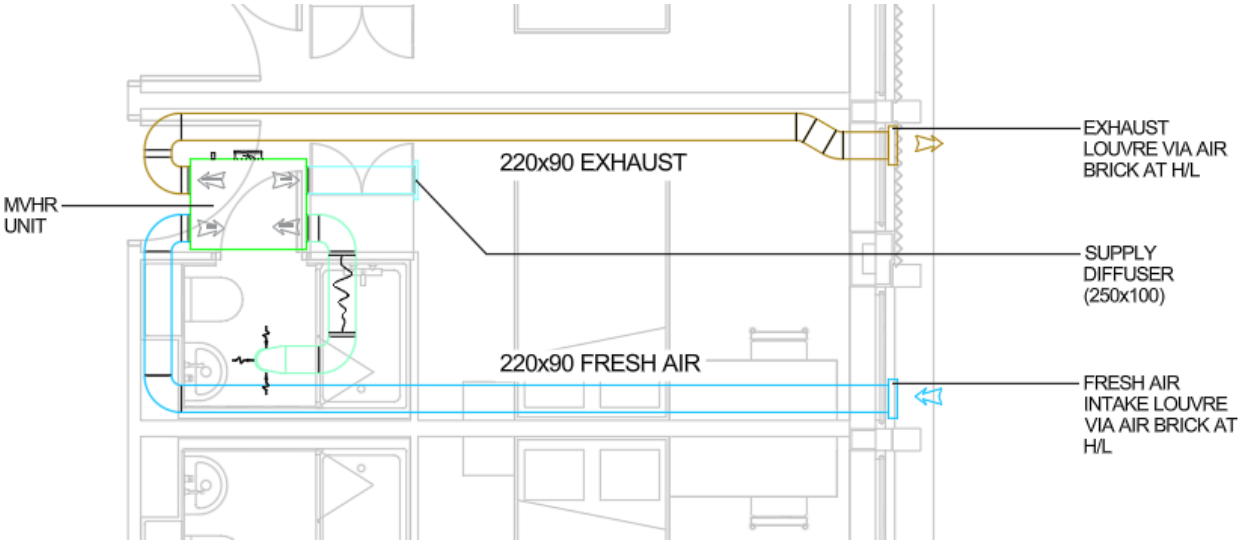
An MVHR ventilation unit will be provided to serve the kitchens and will have supply and extract provided through a system of rigid flat ducts. The air grilles shall be in the ceiling. The ventilation systems shall be designed in rooms to meet the NR level stated elsewhere within this report.

The ventilation system shall also be designed with a boost facility to meet the part F requirements.

Studio Example

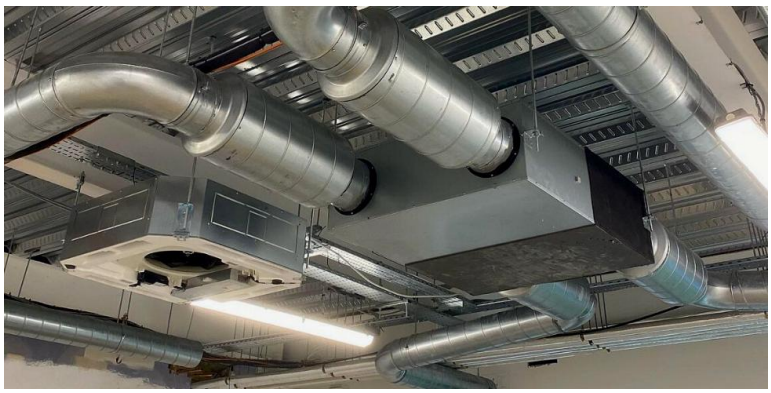


PBSA Cluster Example



7.2. Commercial Mechanical Ventilation with Heat Recovery

Commercial and Amenity spaces will be provided with mechanical ventilation heat recovery (MVHR) This shall comprise of a centralised continuous mechanical supply and extract ventilation unit, able to operate in 100% summer bypass with a high heat recovery efficiency (minimum 80%). The air volumes shall be determined to satisfy the requirements of the Approved Document Part F of the Building Regulations and CIBSE Guides.



The MVHR units shall be in the ceiling void. Each unit shall draw fresh air and discharge extract through the façade. The intake and exhaust louvers shall be separated to prevent cross contamination with a filter inside the unit near the heat exchanger to remove pollen and particulate matter.

7.3. Local Extract

Local extract will be installed in spaces such as laundry rooms, bin stores, stores and other ancillary areas.

The extract fans will be installed in the ceiling void and will have the option to operate on a temperature sensor or an occupancy sensor (PIR).

The mechanical extract installed within the bin stores will operate continuously.