

**Options for Common Corridor Ventilation in
WAFTA Blocks
Woolton Views, Ashcroft Park and The Fairways
Halewood
Merseyside
L25 9RW**

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1 Overview

Due to the refurbishment works carried out (i.e. change of open deck to enclosed balconies), the travel distances are greater than those recommended in ADB. As such, a fire engineering approach has been developed to ensure that the current strategy aligns with the functional requirements of the Building Regulations. As part of this approach, an enhanced mechanical smoke ventilation system should be provided in the common corridors of the buildings (1st – 8th floors).

The system is intended to support means of escape by returning the corridor to tenable conditions within a reasonable timeframe following smoke contamination during the initial escape of occupants. The system is also intended to support firefighting by maintaining tenable conditions within the stair during fire and rescue service operations.

An Automatic Opening Vent (AOV) should also be provided at the head of the stair with a free area of 1.0m².

In the event of activation of the automatic smoke detection system within a common escape route (i.e. the communal areas), the relevant smoke extract point and natural inlet on the floor of fire origin will operate and the AOV at the head of the staircase will open.

To determine whether the proposed system can be expected to achieve a suitable level of performance and to inform the outline specification for the system, a computational fluid dynamics (CFD) based fire and smoke modelling assessment has been undertaken.

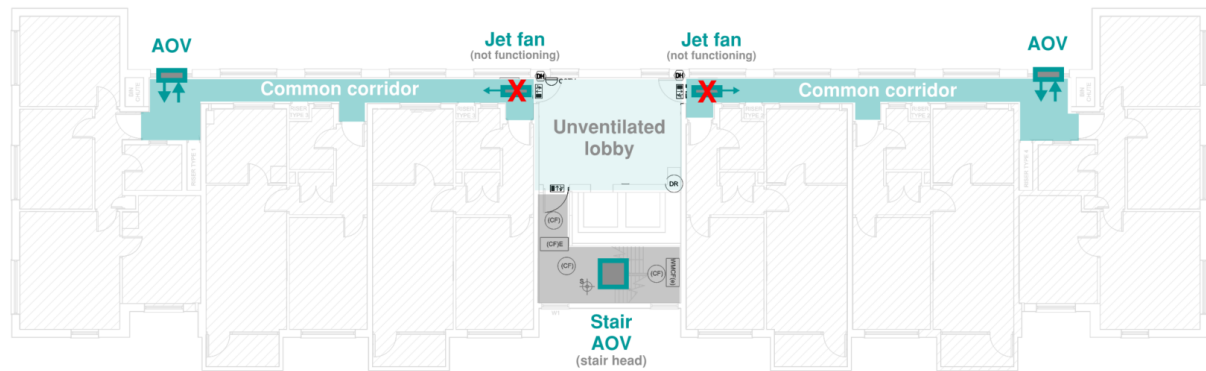
Two design options are proposed for the smoke ventilation system. Though the CFD modelling only explicitly considered Option 2, the specification determined by the modelling can be applied to both options due to their similar design, and either option is determined as being adequate.

Option 1 and Option 2 both require any existing corridor ventilation provisions, such as existing AOVs and jet fans, to be removed.

There are three purpose built blocks of flats. Each has 8 habitable floors, with 6 flats on each floor.

Each Building, therefore, has 8 floors containing 48 flats with the complex (3 blocks) providing 24 floors and 144 flats.

2 Existing Ventilation



Existing common corridor ventilation provisions

The current arrangement is as the figure above. Automatic Openable Vents (AOVs) are provided at the ends of the corridors to provide inlets and jet fans are provided for each corridor leg of the floor. On the actuation of a detector the fans operate drawing smoke from the corridor and replacement air is drawn in via the AOVs.

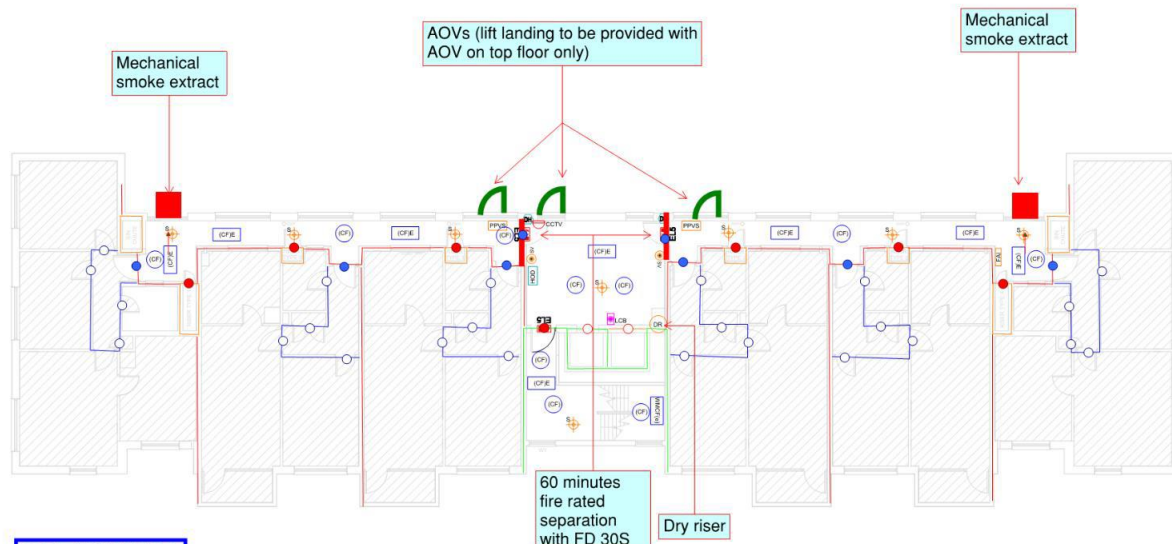
The buildings are provided with 3 blocks x 8 floors x 2 jet fans per floor = 48 jet fans and 48 AOVs.

3 New Ventilation system

Two mechanical smoke shafts should be provided at the remote ends of the common corridors to provide a means of exhaust, with natural inlet air provided by an AOV in each corridor either side of the lift lobby.

The mechanical smoke shafts should achieve a volumetric flow rate of 2m³/s at the point of exhaust, with a proposed geometric free area of 0.8m² opening into the corridor. The corridor AOVs should be located on the external elevation at the opposite end of the corridor to their respective smoke shaft and should achieve 0.8m² geometric free area.

The existing partitions enclosing the corridors either side of the lift lobby should remain. An additional AOV should be provided at the lift landing on the top floor in order to address the risk from the lift motor room which connects to the landing at this floor. This AOV should achieve a geometric free area of 1.5m².



Proposed common corridor ventilation provisions

Automatic Openable Vents (AOVs) are provided in each corridor providing a replacement air inlet and exhaust AOVs into the smoke shaft at the corridor extremities with 2 mechanical smoke ventilators at roof level. The system will operate as two separate smoke systems on each floor. One AOV will be provided on the top floor as a ventilation pathway for the staircase.

This arrangement will provide:

- A reduction in the number of mechanical vents required (currently - 48, proposed – 6)
- Only one fan will be in operation at a time, one Inlet AOV and one AOV to the smoke shaft.
- The doors will remain to the two corridors ensuring the travel distances remain at approximately 15m.
- With the retention of the doors the staircase lobby will remain, providing additional separation between flats and means of escape staircase.

The buildings will be provided with 3 blocks x 8 floors x 2 mechanical fan per building = 6 fans and 99 AOVs (48 into smoke shafts 48 inlets, 3 Stair vents).

AOVs are provided to open into smoke shafts

Note

- The doors will remain as 30 minute fire doors as they will form part of the 60 mins separation to the staircase, and they are provided for smoke separation purposes, not fire resistance
- The AOV on the top floor is to be omitted as the staircase is provided with permanent ventilation.

<https://www.colinfo.co.uk/smoke-control/building-types/residential-buildings.html>



Smoke control in
apartments and fire fi