



fds consult uk

Mulberry Court, Hampton Wick



RIBA Stage 4 Fire Strategy Report
Issue 03

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[DOCUMENT CONTROL AND MANAGEMENT]

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This report has been prepared for the sole benefit, use and information of Circ Construction Management for this project only and the liability of FDS Consult Limited, its Directors and Employees in respect of the information contained in the report will not extend to any third party.

Issue	Date	Amendment details	Author	Checked
Issue 01	24/04/2020	Initial report for Design Team comment	GH	XX
Issue 02	12/05/2020	Including DT comments	GH	JH
Issue 03	15/10/2021	Including project variations	GH	JS
Distribution				
Paul Taylor - Circ Construction Management Nick Stoyles- Circ Construction Management John O'Neill - Lifestyle Residences Design Team members				

Note: all amendments and modifications made after the preceding fire strategy report submission will be indicated with a vertical line in the right hand margin of the paragraph concerned as demonstrated here.

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This report is formulated on the basis that the information, guidance and experience available at the time of preparation. It is applicable to the above-mentioned project only in accordance with the Client’s instructions.

The contents held within this report is only valid provided no other modifications are made other than those for which a formal opinion has been sought and given by FDS Consult Limited.

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1.0 INTRODUCTION

1.1 REPORT SCOPE AND OBJECTIVES

- 1.1.1 FDS Consult(UK) Ltd has been appointed by Circ Construction Management to produce the RIBA Stage 4 design fire strategy for the project known as Mulberry Court, Hampton Wick.
- 1.1.2 The fire strategy is intended for discussion between the design team and to assist the design team in gaining approval in principle from the relevant Approving Authorities. The objective of this report is to detail the arrangements for both means of escape and firefighting while ensuring internal and external fire spread is adequate to meet the Building Regulations requirements. Specific requirements on property protection for client / insurers brief have not been instructed.
- 1.1.3 The overall strategy detailed within this report follows the appropriate guidance where applicable, however in some specific areas, fire engineering has been used to demonstrate and justify deviations from the guidance. Such deviations are explained in each section as appropriate with the intention of meeting the functional requirements of the Building Regulations. These deviations are risk items until approved by the Approving Authorities and are summarised within the subjective Design Risk Register (Section 10.0).
- 1.1.4 Typically the adoption of a fire engineering approach can result in a greater design freedom or flexibility and reduced project and building lifetime costs, whilst maintaining or often exceeding the level of fire safety inferred by the various design guidance of the Building Regulations.
- 1.1.5 The findings and opinions expressed are based on the conditions encountered and / or the information reasonably available at the date of issue of this document, and shall be applicable only to the circumstances envisaged herein.
- 1.1.6 As this document forms a design concept approach for fire matters, the Project Team (in full) must ensure the approved contents of the report are incorporated in the building design development and construction as the project progresses across the various RIBA Stages.

1.2 PROJECT DESCRIPTION

- 1.2.1 The development consists of a building of Ground plus two and three floors providing residential accommodation and a single-level basement of car parking and ancillary facilities.
- 1.2.2 The accommodation is provided for residents that are retired and / or elderly and the ground floor also includes for shared residents facilities. The project is shown in the figure below.

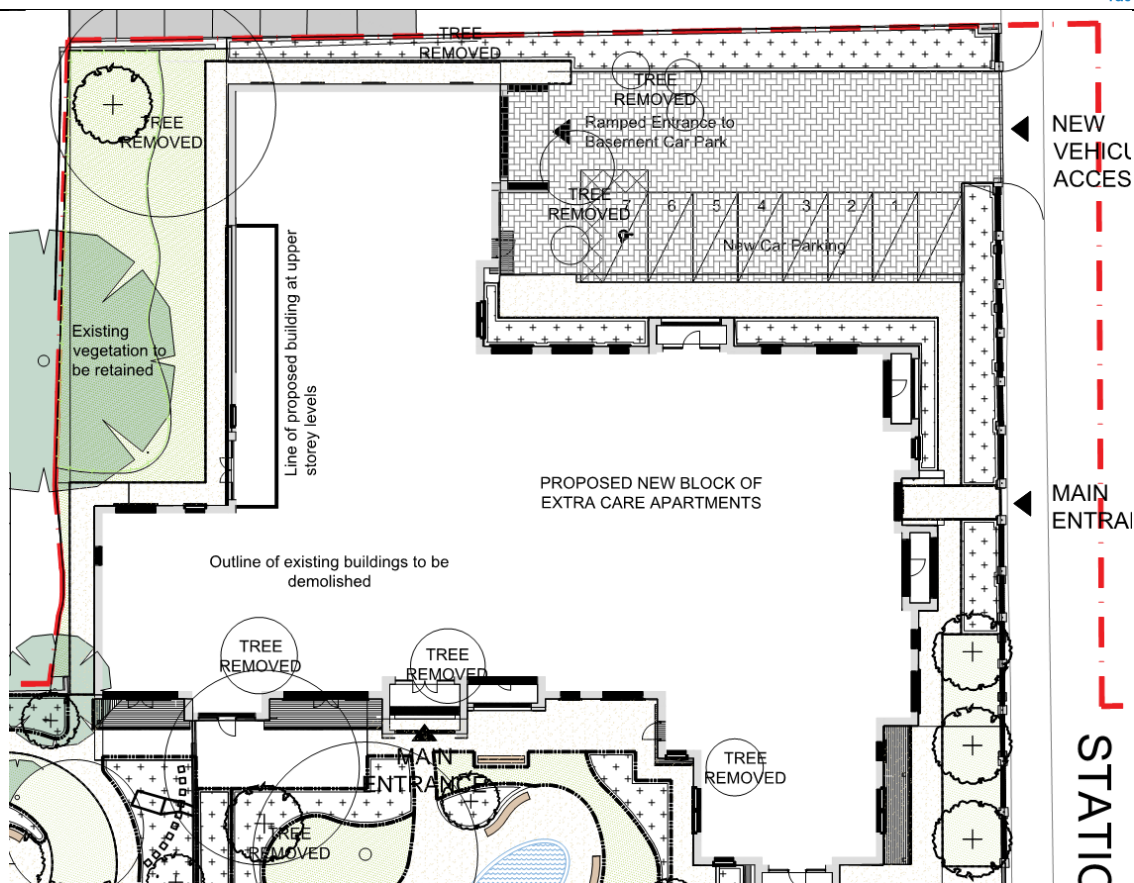


Figure 1 - Mulberry Court, site location

1.2.3 Vehicle access to the site is provided along Station Road with pedestrian access throughout the site at ground floor. Service of the accommodations is granted via two staircases serving from Basement to Second floor and a continuation of Stair 1 only to the Third floor. The use and number of levels vary for the blocks, which are shown in the table below.

Stair	Type of accommodation	Floor level	Height of top floor
Stair 1	Ancillary accommodation and car park	Basement level only	Ground – Third floor (>5m but <18m)
	Mixed use residential and shared common facilities	Ground floor only	
	Residential accommodation only	First – Third floor	
Stair 2	Ancillary accommodation and car park	Basement level only	Ground – Second floor (>5m but <18m)
	Mixed use residential and shared common facilities	Ground floor only	
	Residential accommodation only	First – Second floor	

1.3 DESIGN INFORMATION AVAILABLE

1.3.1 FDS Consult has attended a fire related workshop and responded to design team queries to discuss and agree the key aspects of the project fire strategy. The following details the referenced drawings used as part of the design review to produce this report.

- C102-PRC-01-DR-AR-30003-C03-PDF.pdf
- C102-PRC-02-DR-AR-30004-C03-PDF.pdf
- C102-PRC-03-DR-AR-30005-C04-PDF.pdf
- C102-PRC-B0-DR-AR-30001-C04-PDF.pdf
- C102-PRC-GF-DR-AR-30002-C04-PDF.pdf
- C102-PRC-RF-DR-AR-30006-C03-PDF.pdf
- C102-PRC-RF-DR-AR-13006-C05.pdf
- C102-PRC-03-DR-AR-13005-C10.pdf
- C102-PRC-03-DR-AR-13023-C04.pdf

- C102-PRC-03-DR-AR-19016-C07.pdf
- C102-PRC-03-DR-AR-19019-C02.pdf
- C102-PRC-03-DR-AR-30005-C04.pdf
- iMist M&E-Q21-10432 - Rev 0-0-PH - Type 10 Mulberry Court.pdf
- iMist M&E-Q21-10432 - Rev 0-0-PH - Type 9 Mulberry Court.pdf

1.3.2 Full and final fire strategy drawings will be produced by the Principal Designer with input given by FDS Consult.

1.4 PURPOSE GROUPS

1.4.1 The different uses within the development are classified in the following Purpose Groups under Approved Document B:

Accommodation	Purpose Group
<i>Residential accommodation</i>	1(a)
<i>Assembly and recreational accommodation (community area)</i>	5
<i>Plant rooms / general storage facilities (ancillary accommodation)</i>	7(a)
<i>Car parking accommodation</i>	7(b)

1.5 FIRE STRATEGY EXECUTIVE SUMMARY

1.5.1 The proposals outlined in this document demonstrate a level of fire safety equal to or greater than the general standard implied by compliance with the recommendations in Approved Document B. However, as the occupancy group for this building will be the over 65's, the design principles from BS 9991 - Fire safety in the design, management and use of residential buildings - Code of practice:2015, will be adopted as this guides includes recommendations for specialized housing pertinent to the occupation by residents who are likely to be less mobile. This level of safety therefore satisfies the functional requirements of the Building Regulations relating to fire safety.

1.5.2 The fire strategy described in this report can be summarised as follows:

- Means of escape will be based on each apartment / dwelling (fire affected) evacuating independently in the residential accommodations. For the recreational accommodation, car park and plant / ancillary accommodation, it is proposed to adopt a simultaneous evacuation approach upon activation of the respective automatic fire alarm and detection system.
- The design elements such as travel distances and exit widths etc. comply with the recommendations of BS 9991.
- A system of smoke clearance via 1.5m² Automatic Opening Vents (AOV) and a 0.6m² Mechanical Smoke Ventilation System (MSVS) is proposed for residential the corridors. Each communal residential stair will include a 1.0m² Automatic Opening Vent at the head of the stair.
- The fire alarm and detection system within various sections of the building will be:
 - Within residential apartments Grade D1/D2 - LD1 to BS 5839-6
 - Within residential communal areas -L5 (detection system only) to BS 5839-1
 - Within shared recreational accommodation L3 to BS 5839-1
 - Within plant facilities / ancillary accommodation L3 coverage (detection and alarm)
 - Within car park L3 coverage (detection and alarm)
- A residential watermist system to BS 8458: 2015 will be provided to the penthouse apartments as a compensation for the extended travel from the garden rooms.
- Structural fire protection will be in accordance with Table 4 of BS 9991. Compartment floors will be provided throughout the residential accommodation and each specified Purpose Group or occupancy will be separated from the adjacent occupancy via separation affording similar resistance to that of the associated elements of structure.

-
- The external fire spread assessment demonstrates that the site is proposed with adequate distances from the facades to the neighbouring buildings.
 - Both stairs will be designed as protected stairs. Access will be given to all parts of the floor plate from the outlet from a fire main to be located in Stair 1. Where the hose distance cannot be achieved to all apartments from a Stair 1, a second fire main should be provided within Stair 2.
 - The inlet to the fire mains should be with 18m of the fire service vehicle parking position and located where it can be easily seen from the fire appliance. This is typically adjacent to the entrance to the associated cores.
 - All parts of the basement car park can be reached with 45m from the lobby in Stair 1, therefore it is proposed to extend the fire main in this stair to serve the basement areas.
 - The basement level car park will be provided with a mechanical smoke extract system, with replacement air via the car park ramp to achieve both smoke and environmental ventilation

2.0 LEGISLATION

2.0.1 The construction or modification of any building in England needs to comply with the statutory requirements of the Building Regulations. These regulations deal with the minimum standards of design and building work for the construction of domestic, commercial and industrial buildings. The Building Regulations contain a list of requirements, referred to as Schedules, which are designed to ensure the health and safety of occupants in and around buildings. There are 14 Parts, which cover subjects such as structure, fire safety, ventilation, drainage, etc.

2.1 BUILDING REGULATIONS 2010

2.1.1 In the case of fire safety, the Regulations are dealt with under the functional requirements: B1 to B5 of Schedule 1 of the Building Regulations. There are a number of prescriptive documents, which can be adopted to show compliance with the Schedules. These include the Approved Document B and various British Standards (BS) such as BS 9991 and BS 9999, which are considered adequate to provide general guidance for the more common approaches in building design and where scenarios move away from traditional approaches from Approved Document B.

- B1 – Means of Warning and Escape
- B2 – Internal Fire Spread (Linings)
- B3 – Internal Fire Spread (Structure)
- B4 – External Fire Spread
- B5 – Access and Facilities for the Fire Service

2.1.2 An alternative approach is to adopt Fire Safety Engineering, which integrates fire engineering calculations, life safety systems, inherent building features and professional judgement, to produce a bespoke conceptual fire strategy that achieves appropriate levels of safety to a specific building and use.

2.1.3 This document forms a concept approach for fire matters. The design team must ensure the contents of this report are confirmed and incorporated in the building design and construction. This concept will not prevent a fire occurring and good housekeeping will be encouraged to reduce the overall risk of fire. This strategy is primarily concerned with safe occupant evacuation and providing measures, where necessary, to assist the fire fighters in their access and operations.

2.1.4 The concept is only valid where the systems are designed correctly and maintained in an operating condition relevant to the intended use. If there is a failure in the management approach and a fire occurs, this concept will not reduce the impact on contents and building damage.

2.1.5 Until key aspects held within this report are formally agreed with the Approving Authorities (both the approving Building Control and Local Fire Authority), the content should only be used as preliminary information to assist the design team.

2.2 PRIMARY APPLIED GUIDANCE

2.2.1 The content of this strategy follows the guidance in BS 9991, as areas of the development also contains design elements that are not covered under the specific guidance of the Approved Document.

2.3 REGULATORY REFORM (FIRE SAFETY) ORDER 2005

2.3.1 The Fire Safety Order is the primary piece of legislation relating to fire safety in existing, non-domestic premises, and is enforced by the Local Fire Authority.

2.3.2 The duty of ensuring that the requirements of the Order are met rests with the Responsible Person, who must undertake a risk assessment for the purpose of identifying the fire precautions he / she needs to take.

2.4 STATUTORY CONSULTATION

- 2.4.1 During the Building Regulations application process, the Building Control body is required to formally consult with the Local Fire Authority. The purpose of this consultation is to give the Fire Authority the opportunity to make observations with respect to the Building Regulations and to provide an opportunity to make the applicant aware of action that may have to be taken to meet the requirements of the Fire Safety Order.
- 2.4.2 The consultation should allow both parties to reach mutually compatible views on whether the building meets the requirements of both pieces of legislation. In the exceptional event that the Fire Authority propose to require physical changes to the building to meet the requirements of the Fire Safety Order, the Building Control body should make the applicant aware.

2.5 CONSTRUCTION, DESIGN AND MANAGEMENT REGULATIONS 2015

- 2.5.1 Projects undertaken in the UK are subject to the requirements of the Construction (Design and Management) Regulations 2015, or within the European Union, that particular country's interpretation of the European Union Directive.
- 2.5.2 This report defines the strategy for meeting the functional and performance requirements for fire safety in the finished building. It is intended to form part of the submission for approval under the Building Regulations, Part B (Fire Safety). Where any conclusions or recommendations contained within this report specify particular materials, products or forms of construction these will have been assessed, in accordance with Construction, Design and Management Regulations 11 and 18 (duties for designers).
- 2.5.3 In the event that these involve significant residual risks or health and safety critical assumptions, this information will be made available to the Principal Designer. Where the architect or other consultants use all or part of this report to specify works, they are understood to be competent in alerting the Client, Principal Designer, Designers, Contractors and Building Occupier of issues arising under the Construction, Design and Management Regulations.

2.6 PROJECT COMPLETION

- 2.6.1 Following final handover, the developer / management of the premises is required under current legislation to carry out a fire risk assessment to the common parts.
- 2.6.2 This document will be developed following completion of the fit out works and will form part of the fire manuals developed for the premises (Section 9 of BS 9991 and also Section 9 of BS 9999 provides appropriate guidance in this area). The risk assessment should be documented and made available to the Fire Authority for inspection if requested.

3.0 MEANS OF ESCAPE

- 3.0.1 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B1, Means of Warning and Escape:

“The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times.”

- 3.0.2 The following discusses the implications of the proposed building designs and seeks to demonstrate that a satisfactory standard of fire safety is achieved.

3.1 GENERAL PRINCIPLES

- 3.1.1 The general philosophy for the means of escape of occupants is that there is satisfactory means of giving warning of a fire and travel distances (normally in a single direction) are limited. The principles of an escape strategy are that in the event of a fire, people can turn their back on exposure to a fire and make their way to a place of intermediate safety (e.g. a protected route or stair core) without additional assistance from other occupants or fire fighters. A place of intermediate safety must always give direct access to a place of ultimate safety (e.g. ground (access) level at the front of the building) and escaping occupants should not have to leave the place of intermediate safety to reach the place of ultimate safety. Occupants should then be freely able to move away from the building to a place of final safety.
- 3.1.2 Once outside the accommodation door, occupants are in a place of relative safety, with the fire in an enclosure behind them and can make their exit unhindered until reaching the outside as a place of ultimate safety. This is achieved by providing alternative escape routes where necessary, limiting travel distances, providing sufficient exit widths and escape routes that, depending upon the use of the building, will have specified periods of fire resistance.
- 3.1.3 Residential means of escape is somewhat different to many other types of buildings and is based on a stay-put policy. This is where only the particular apartment that is affected by fire is immediately evacuated with the remainder of the occupants being unaware. The reasoning behind this is due to the level of compartmentation between each of the apartments and to reduce false alarms affecting all the people within the building.
- 3.1.4 The Fire Service carries out an evacuation of the other apartments if deemed to be necessary and is carried out by the attending fire crew manually. This philosophy is reflected by the stand-alone detectors / sounders, which are required in each apartment or dwelling but not necessarily in the common corridors or escape routes. A smoke detection system can be required within the common areas but this is only to operate the life safety systems within that area if required i.e. Automatic Opening Vents.
- 3.1.5 As specified within this document, where non-residential accommodations are reliant upon shared means of escape routes, the activation of the automatic fire alarm and detection system will interlink with the associated accommodation(s) to invoke simultaneous occupant egress in multiple accommodations.
- 3.1.6 For areas of the development that include shared residential accommodation, ancillary accommodation / plant facilities or car parking areas, it is proposed that these areas adopt a simultaneous evacuation approach as they are considered completely independent of the residential elements.

3.2 TRAVEL DISTANCES

- 3.2.1 The travel distances for the different accommodations of the buildings on the site should be in accordance with the travel distances recommended in BS 9991 (as indicated in the table below).

Occupancy	Accommodation	Travel within	Maximum travel distance	
			1 direction	1+ direction
Residential	Apartments	Protected hallway	9m	N/A
	Common areas	Common areas / corridor	7.5m	30m
Shared residential facility	Café, salon, library, multi-function room	Room or space	18m	45m
Storage	Plant room / ancillary unit	Escape within room	9m	18m
		Enclosed escape route	18m	45m
Storage	Car park	Car parking area	18m	45m

3.3 ESCAPE WITHIN THE RESIDENTIAL APARTMENTS

3.3.1 The design provides for single-level apartments only and are covered in detail within the following section however the below table indicates a summary of the measures to be applied.

Area	Dwelling	Internal provisions		
Throughout	Single-level apartment	LD1 fire alarm and detection system Internal protected hallway	Cooker location to be 1.8m distance from internal means of escape route (from bedrooms / balconies)	External sounders and beacons provided to balcony areas

3.3.2 Each apartment will feature an automatic fire alarm and detection system, designed and installed in accordance with BS 5839 Part 6 to be an LD1 Standard – Grade D1/D2 i.e. detection / sounders in each habitable room with detection / sounders in the hall or stair landing where applicable.

3.3.3 Where apartments are to be rented, BS 5839-6:2019 recommends that the fire alarm system should be a Grade D1 system. That is one which includes the provision of tamper-proof batteries in the detectors. All other (privately owned) apartments can feature Grade D2 systems.

3.3.4 The proposed single level dwellings generally conform to the above requirements with kitchens remaining enclosed from the internal escape route from the bedroom spaces. The internal hallways should be constructed of materials which achieve a minimum of 30 minutes fire resistance and FD30 doors.

3.3.5 Care should be taken to ensure that the kitchen is located remote from the escape route such that internal means of escape from the balconies are not impeded by the kitchen / cooker hob location.

3.3.6 In all instances, the cooker hob location is considered remote from the internal means of escape pathway.

3.3.7 Where tenants are to be provided with private access to large terraced areas where travel is in excess of 7.5m from the furthest point to the apartment door, with no clear visual sight of the rooms within the apartment, it is recommended under BS 9991 that the terraced areas are provided with external sounders, strategically positioned to alert occupants in the event of a fire.

3.3.8 The Penthouse apartments (Apt 27 and Apt 28) at Level 3 feature large terraces which are enclosed at the sides due to the building design. They will also feature a Garden room at the remote end of the terrace. The Garden room to Apt 28 includes a low-height storage area. This area is unsuitable for general occupation and is designated for a storage use only.

3.3.9 The overall travel distance from the Garden room to the apartment entrance is approximately 25m in Apt 27 and 27m in Apt 28. The escape route from both the apartments are via kitchen dinner area.

3.3.10 The cooker hob is located to provide 1.8m from an escape route, with the route being a further 1.6m in Apt 27 and 1.3m in Apt 28.

3.3.11 BS 9991: 2015 provides a travel distance up to 20m in an open plan apartment to the entrance door where the following requirements are met, apartment is installed with an LD1 Standard fire alarm and

detection system and a residential sprinkler system to BS 9251: 2014 is provided. Table 10 in BS 9991: 2015 also notes that a Residential Water Mist system to BS 8458: 2015 can also be provided. The system specified by the client is from I-Mist Ltd and will be provided through the apartments. The Exova Warringtonfire Test Report for the system is provided in Appendix B.

3.3.12 The Penthouse apartments will be provided with an internal protected hallway and taking the travel to this point (rather than the entrance) reduces the travel to 21.6m in Apt 27 and 24.6m in Apt 28 (see Figure below).

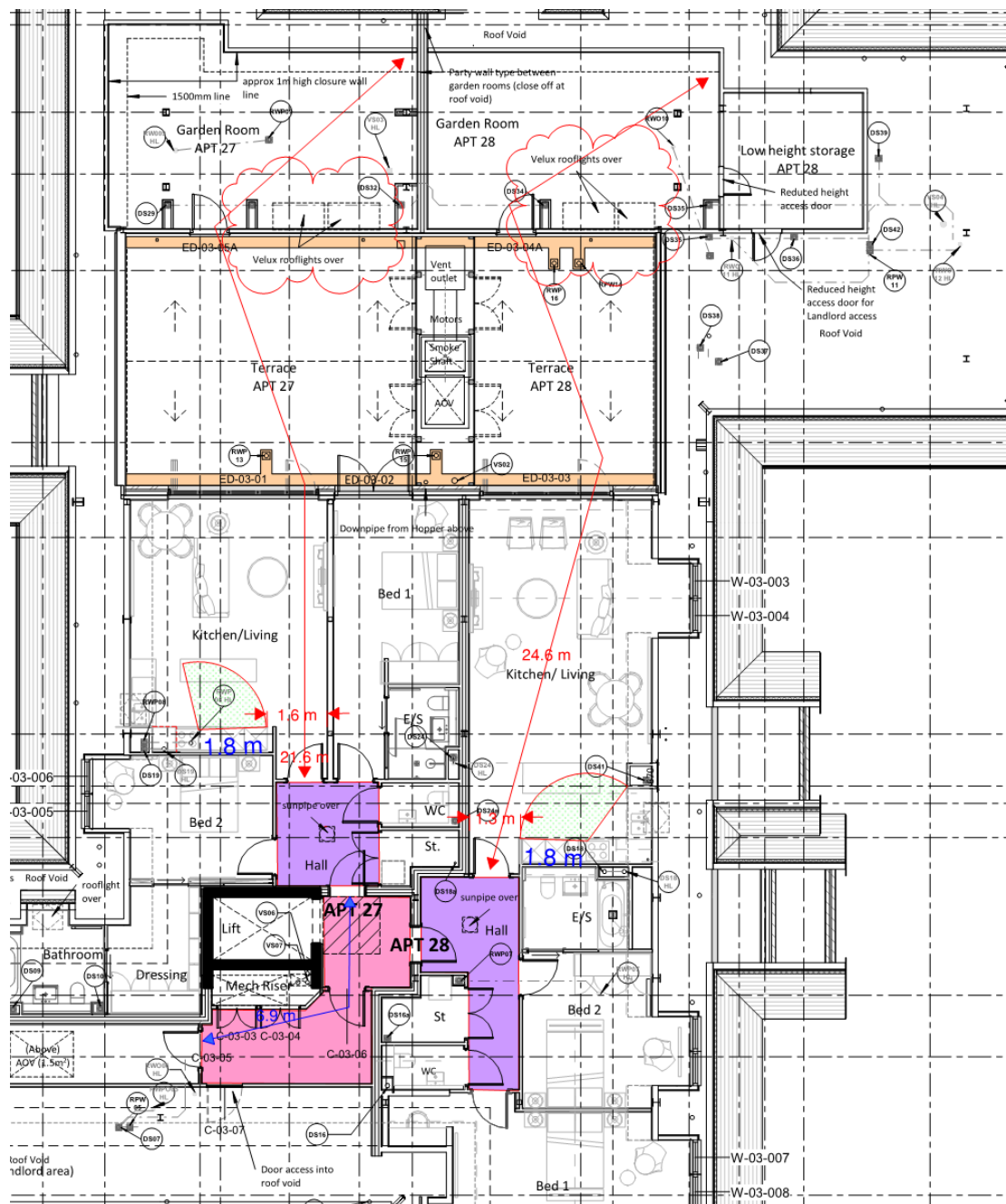


Figure 2 - Penthouse apartment layouts with Garden rooms

3.3.13 As described the travel distance is still more than recommended in BS 9991, however this is to the apartment entrance. It can be considered that once the occupier has entered the protected hallway, the risk from a fire occurring on the hob will be diminishing and the FD30 hall door will provide additional shielding. However, this arrangement should be considered a risk until agreed with the approving authorities.

3.4 ESCAPE WITHIN RESIDENTIAL COMMUNAL AREAS

- 3.4.1 'Small-single-staircase' buildings are up to 11m in height from the access level, with up to three storeys above access floor. When the travel distance from an apartment front door to a stair door is 4.5m or less, then only the stair requires either a 1.0m² Openable Vent at each stair landing or alternatively a vent at the head of the stair. The vent is for manual operation by the Fire Service if required.
- 3.4.2 However, where the travel distances within the common corridors are up to 7.5m in a single direction of escape and 30m where escape is available in more than one direction, the common corridor should be provided with automatic smoke venting to assist means of escape.
- 3.4.3 Smoke ventilation for the common residential corridors at Mulberry Court will be via 2 x Mechanical Smoke Ventilation (MSVS) systems.
- 3.4.4 The design parameters of the MSVS should be provided by the designated smoke venting contractor when appointed however a brief overview for both venting specifications is given in Section 3.14 of this report.
- 3.4.5 Travel distances within each common corridor of the residential blocks and the proposed venting have been discussed in detail within the following sections. However, the table below summarises the travel distances and proposed smoke venting within the common corridors.

Core	Level	Maximum travel distance within corridor	Type of venting proposed ¹
Stair 1	First - Second floors	[Single direction] <7.5m in un-ventilated corridor; [More than one direction] <30m in unvented central corridor	1 x 0.6m ² MSVS
	Third floor	[Single direction] 7.5m in unvented section to vented sterile lobby (7.5m max)	1 x 1.5m ² ceiling AOV 1 x 1.0m ² AOV at head of stairs
Stair 2	First - Second floors	[Single direction] <4.5m in un-ventilated corridor; [More than one direction] >30m in unvented central corridor	1 x 0.6m ² MSVS 1 x 1.0m ² AOV at head of stairs

¹The proposed ventilation listed above satisfies the requirements for ventilation to the residential common corridor only. Further ventilation may be applicable, under separate requirements, to satisfy other accommodations / floors.

Stair 1 - First to Second floors

- 3.4.6 Access to the common corridors at the First and Second floors served by Stair 1 provides for travel in a ventilated section adjacent to the stairs up to 7.5m. This section of the corridor will be ventilated with a 0.6m² MSVS. To provide a replacement air path, the stair door is reversed to open into the corridor.
- 3.4.7 A secondary route is provided through an unvented section to the ventilated area served by Stair 2. As the travel distance in the unvented section does not exceed 30m, and as no apartment has a travel distance exceeding 7.5m to either the stair door or a cross-corridor door, this is consistent with the approach in BS 9991 Figure 7.

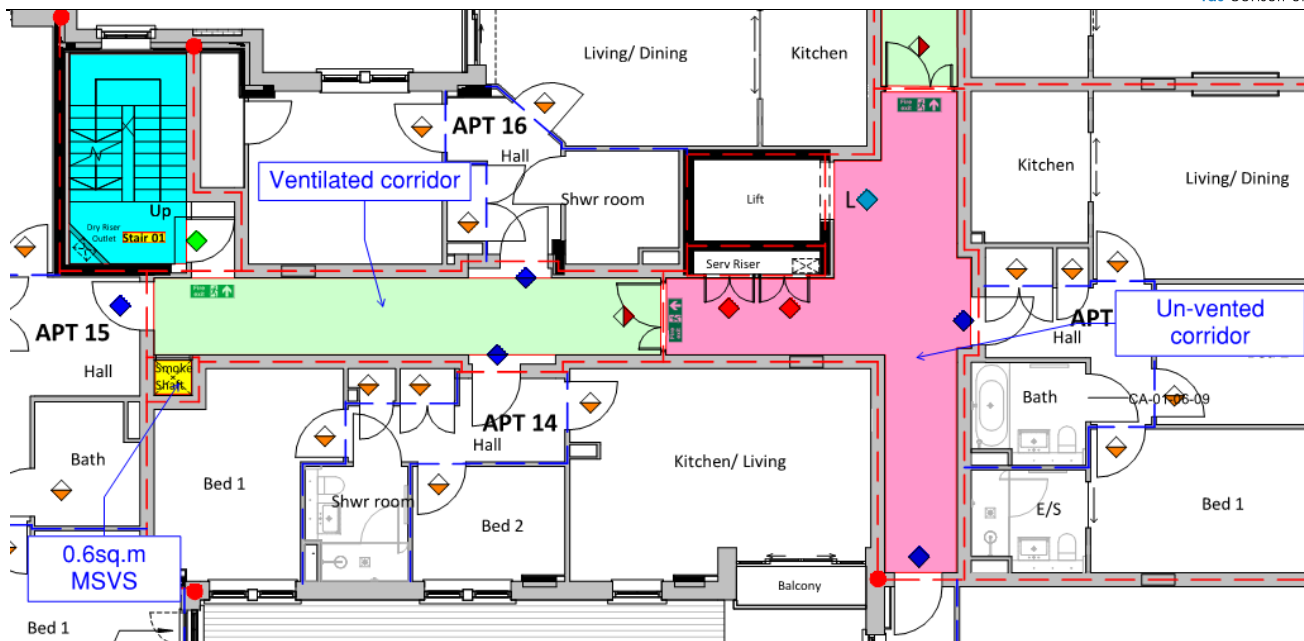


Figure 3 - Ventilation arrangement to common corridor - Stair 1

3.4.8 BS 9991 in Section 8 with reference to specialized housing recommends that where occupants are not capable of independent evacuation from their flat without external assistance, the protected enclosures and protected corridor layouts should be planned such that no person would have to travel more than 7.5m from the flat entrance along a corridor before reaching a fire door accessing either a protected stairway enclosure or another protected corridor.

3.4.9 In this case, the travel in the unvented section is 9.4m to the ventilated corridor to Stair 1 and 9.8m to the ventilated corridor to Stair 2. It is proposed that this is acceptable for the following reasons. Although the building is for the over 65's it is not primarily designed to include occupants who will require assistance to evacuate and the provision of additional doors to divide the corridor further to meet the 7.5m travel to a further section in the corridor would result in a significant number of doors that would hamper circulation in the normal day-day use of the building. This principle has been agreed with the building control officer.

Stair 1 - Third floor

3.4.10 The Third floor is served by Stair 1 only. The door shown in the unvented corridor should be relocated to the door shown in Red below so that the travel in a single direction in the unvented lobby does not exceed 7.5m and the travel in the vented sterile corridor is also not more than 7.5m to the door to Stair 1.

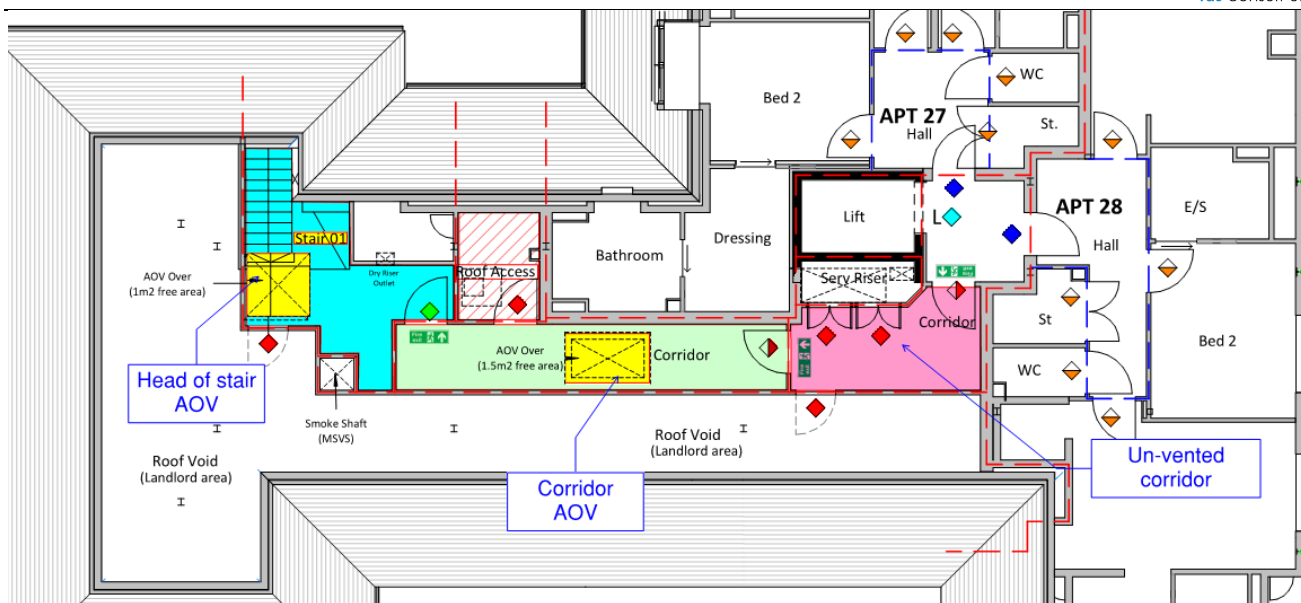


Figure 4 - Stair 1, Third floor

3.4.11 The corridor here is provided with a 1.5m² ceiling mounted AOV with a 1.0m² AOV provided to the head of the stair.

Stair 2 - First to Second floors

3.4.12 The maximum travel distance from any apartment to either the door to Stair 2 or the cross-corridor door to the unvented corridor by the lift is less than 7.5m.

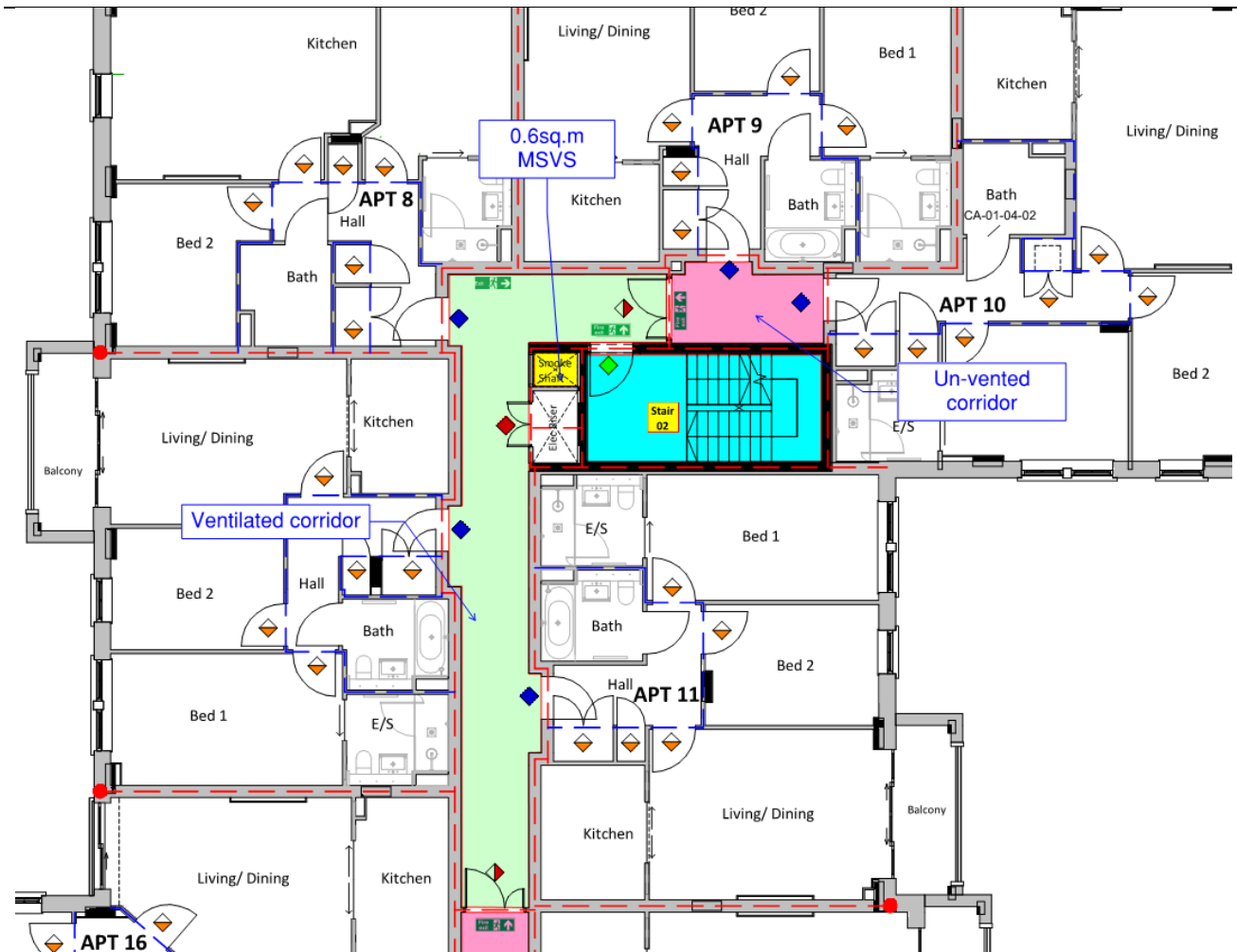


Figure 5 - Ventilation arrangement for Stair 2

- 3.4.13 The travel in the unvented section is 8.5m which as described above, is more than the 7.5m recommended in BS 9991 for specialized housing. The justification described above is also applicable here.
- 3.4.14 Access to Stair 2 from Apartments 09 and 10 is also provided from a small unvented lobby. The travel distance here is less than 4.5m to the ventilated section of the corridor therefore this is proposed to be acceptable, given that the main corridor is provided with an MSVS. The make-up air will be from the stair and as the door opens into the stair, the fan will be controlled by pressure sensors on the stair door so that the corridor is not excessively depressurised.

Basement

- 3.4.15 At Basement, the access for both stairs is through a protected lobby which should be provided with a 1.0m² permanent vent direct to external air, in accordance with BS 9991.
- 3.4.16 In this case, it is proposed that as the basement car park is provided with a mechanical smoke ventilation system, it will be demonstrated that the smoke extraction system sufficiently depressurises the car park to create a flow out of the lobbies when the door to the car park is open and so prevent smoke ingress to the lobbies and into the stair. This has been discussed and agreed in principle with the Building Control Officer and a CFD analysis has been carried out by a 3rd party to demonstrate the principles of the system.

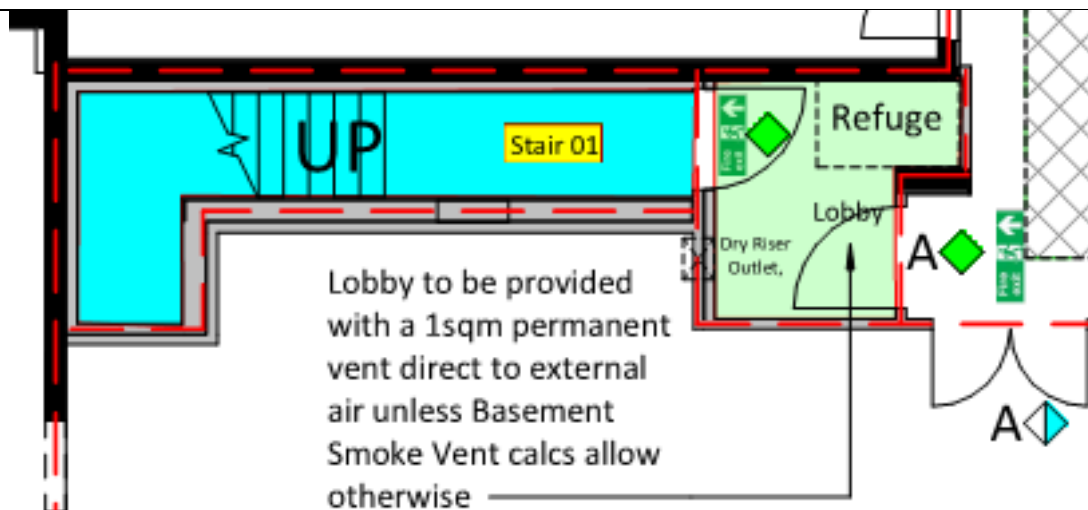


Figure 6 - Lobby to Stair 1, Basement

3.4.17 The lift serving the basement will be provided with a protected lobby, in accordance with BS9991.

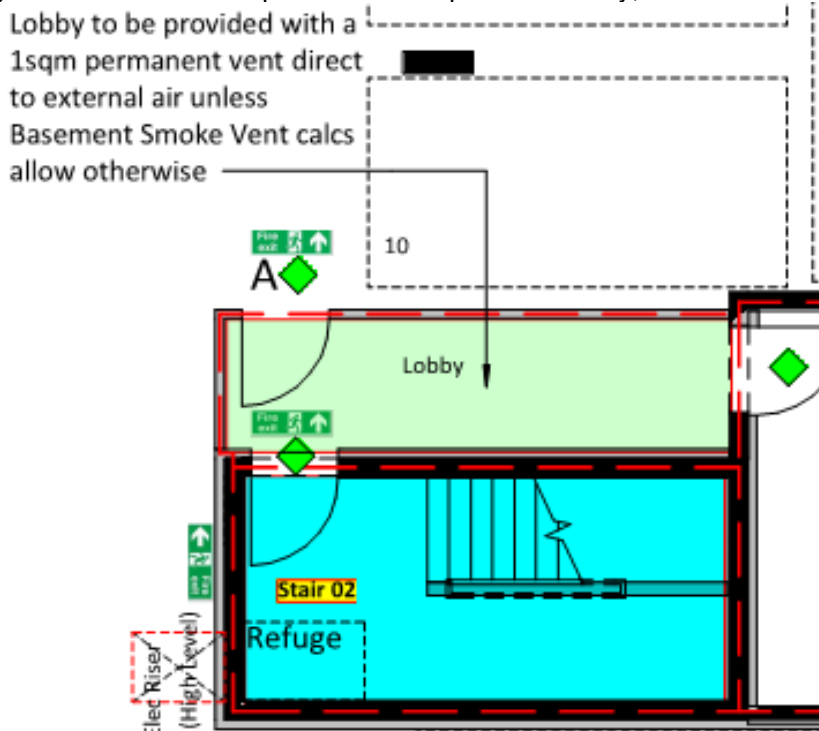


Figure 7 - Lobby to Stair 2, Basement

3.4.18 The lobby to Stair 2 also provides access to the Bicycle store. It is proposed that the extract fans for the car park mechanical smoke extract system will be located at high-level in the bicycle store. Further details will be provided by the smoke control contractor.

3.4.19 BS 9991 recommends that where there are more than one stair in a building, at least one of the stairs should terminate at Ground level. In this case, the basement stairs are also separated by a door at the head from the stairs serving the upper floors, therefore both of the stairs can be considered discontinuous to the section serving the basement.

Ground Floor

3.4.20 At Ground level, Flat 00-06 is located on a section of corridor between the main entrance and the exit through Stair 1. The corridor is unvented however a secondary exit direct to external is provided by way of a corridor. The travel distance from the flat to the protected hallway is less than 4.5m

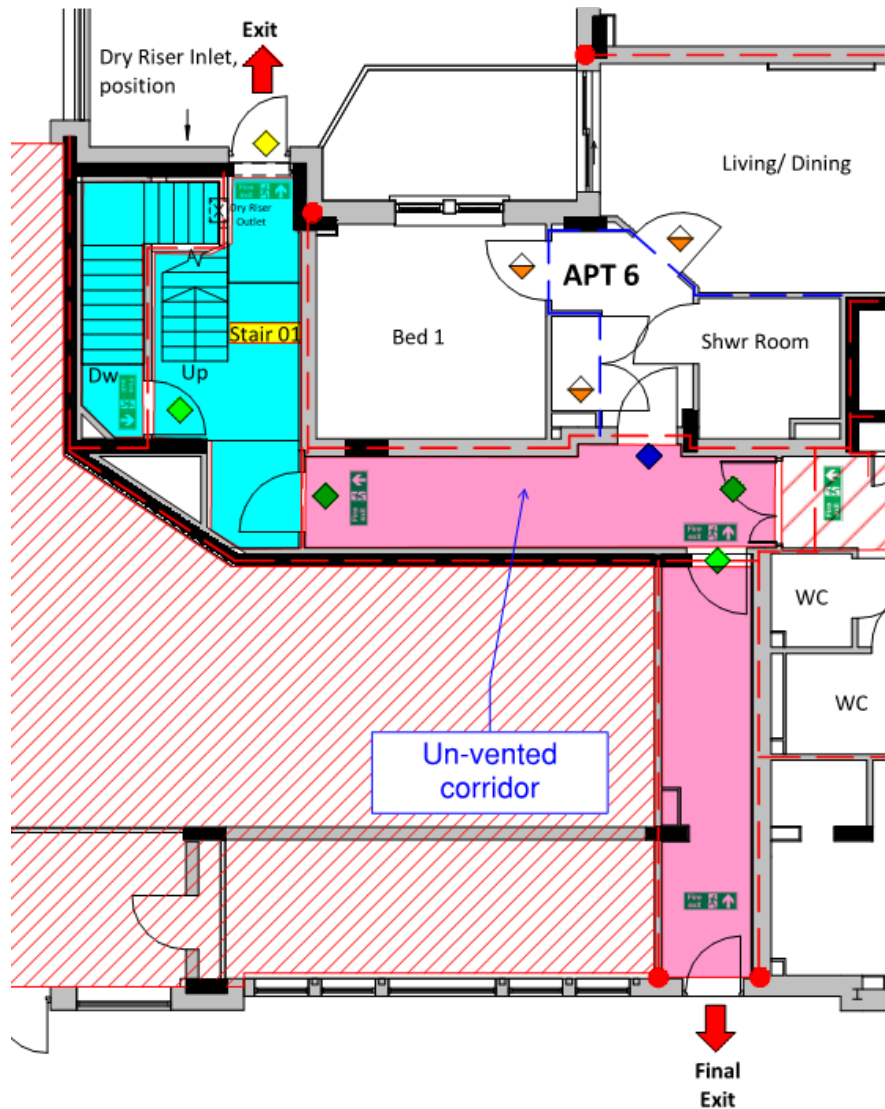


Figure 8 - Escape corridor from Ground floor lobby

3.4.21 The lift in Mulberry Court is open to the main entrance lobby, therefore could be a route for smoke spread to the residential corridors above. The lift will be provided with FD60 doors with a smoke seal to mitigate against smoke spread.



Figure 9 - Ground floor layout, smoke seals provided to lift doors

3.4.22 Apartments 01 and 05 are accessed from the ventilated corridor adjacent to Stair 2.

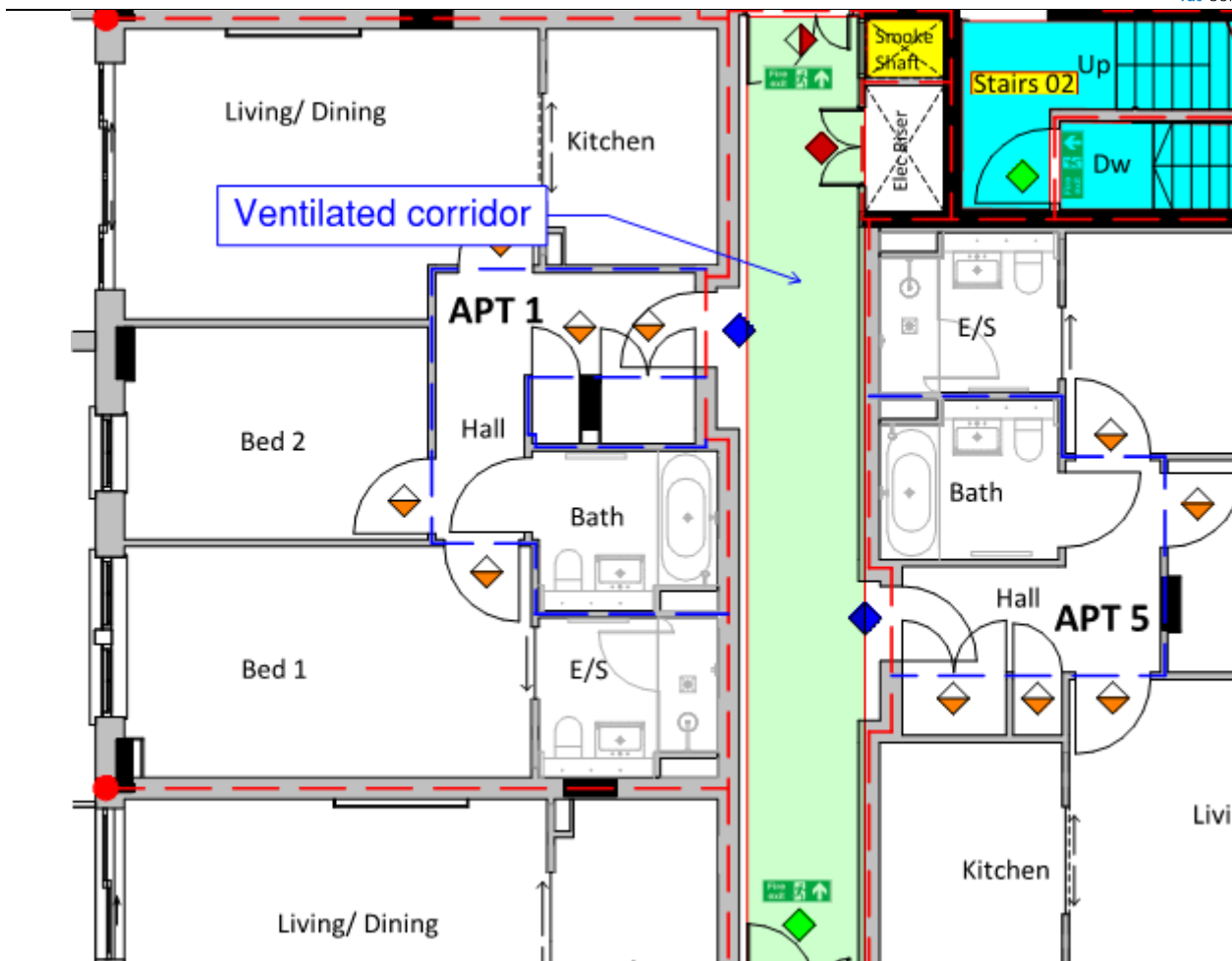


Figure 10 - Apartments 01 and 05 with ventilated corridor

3.4.23 The layout for the access to apartment 03 means that the exit route takes it through the base of Stair 2. The arrangements could allow smoke from a fire in Apartment 03 to impact on the stair at the first and second floors and the escape from the apartments located in the short dead-end there.

3.4.24 It is proposed that this is acceptable as

- The basement stair opening into the base of Stair 2 will be provided with a lobby at basement (either which will be depressurised by the car park smoke venting system to prevent smoke ingress), and a door at the head of the basement stair, thereby providing 3-door separation between the basement and the upper floor.
- At the First and Second floors, the alternative exit route through to Stair 1 can be accessed without having to pass through Stair 2.
- Smoke from a fire in Flats 03 and 04 which does migrate to the stair will be cleared by the AOV at the head of Stair 2.
- The travel distance from Flat 04 is 7.5m to the entrance of the ventilated central section of corridor and 7.6m to the final discharge corridor serving Flat 00-02

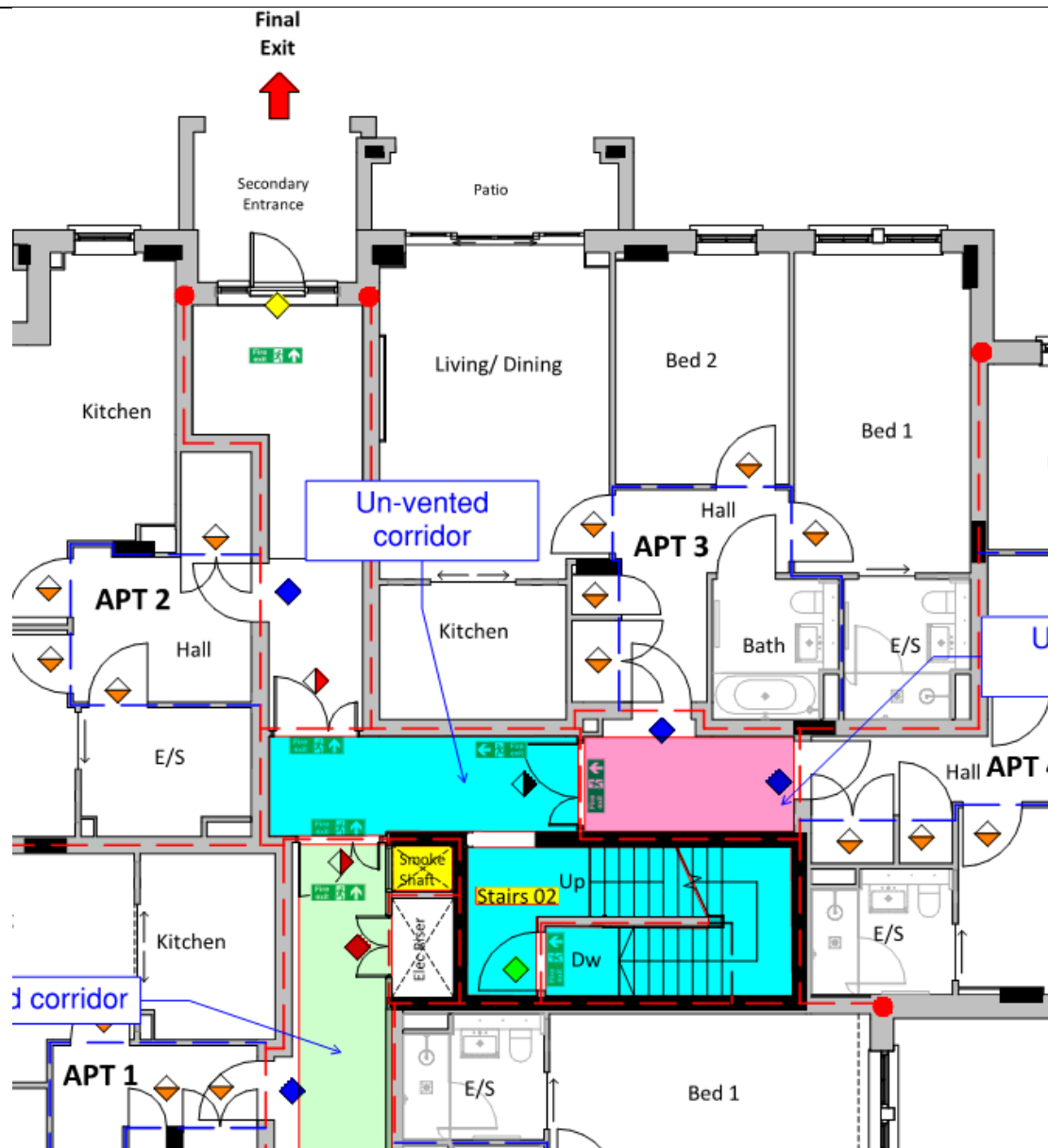


Figure 11 - Escape from Flats 03 and 04

3.4.25 This arrangement gives an alternative exit route to apartments 00-03 and 00-04 through the ventilated corridor to the main lobby.

3.4.26 **FINAL RESIDENTIAL MEANS OF ESCAPE**

3.4.27 BS 9991 requires that any discharge paths from the staircase must be along a protected route with any access into adjacent accommodation being by way of a protected lobby or to discharge straight to outside space.

3.4.28 Where a stair core includes direct occupant discharge to the outside space, no further consideration is necessary, however where a single protected route is formed (i.e. entrance lobbies), this escape path should be maintained sterile of fire load ensuring any furniture located within these areas are of non-combustible materials and does not impede means of escape. Any postal areas should also be of either non-combustible construction or enclosed in a fire rated element affording at least 60 minutes fire resistance.

3.4.29 Direct occupant escape has been achieved from Stair 1 at Ground level. With the arrangement as described above, Stair 2 is open to a sterile lobby which gives access to a corridor to external, and which also serves Apartment 02, or through the ventilated lobby serving Apartments 02 and 05, and

which leads to the main entrance lobby and the shared community area. The layout has been discussed and reviewed by the building control office and agreed as acceptable on this project.

3.5 GENERAL RESIDENTIAL ESCAPE REQUIREMENTS

- 3.5.1 All escape routes should be designed with a clear escape height of 2.0m to be maintained across the entire escape pathway (with the exception of door frames).
- 3.5.2 Horizontal means of escape is based on occupants reaching a place of relative safety. The floors used for means of escape should be non-slippery and even surfaces. Ramps along the horizontal evacuation pathway should not exceed 1:12.
- 3.5.3 Residential stair escape doors should be swung in the direction of escape where practical. In the scenario of Stair 2, as the right-hand side stair door is used as a replacement-air source for a mechanical ventilation system, it should be reoriented to open towards the corridor to allow the air flow to be established. Alternatively, a pressure switch (or door proximity switch) should be provided to control the speed of the extract fan to avoid excessive depressurisation of the ventilated lobby as this would result in the apartment doors and stair doors being held in the closed position.
- 3.5.4 Security doors forming part of the means of escape route should be linked with the fire alarm system to disengage the door to fail 'openable' with a manual override provided on the escaping side, adjacent to the door.
- 3.5.5 Cross corridor doors can be held open using magnetic hold-open devices (or similar) but these should be linked with the fire detection system to disengage upon the activation of relevant proximate smoke detection. Stair doors are not permitted to be held-open.

Lift shafts are generally not to be used for evacuation purposes. The lift at Mulberry Court is accessible directly from the entrance area and residential amenity space at Ground floor, therefore the lifts doors will be upgraded to FD60 and will include for smoke seals at each level served by the lift.

- 3.5.6 General plant and maintenance access is proposed for the final roof level. Roof access and re-entry should not be compromised by a fire below. In this case, the roof access is from a recessed area located in the ventilated sterile lobby adjacent to Stair 1, and this is acceptable.

3.6 ESCAPE WITHIN NON-RESIDENTIAL ACCOMMODATION

Shared Residential Facilities (Ground floor)

- 3.6.1 The development includes several shared residential facilities at Ground level, comprising of a café, salon, library and multifunction rooms, all accessed from the main entrance lobby / reception.
- 3.6.2 The café and multifunction rooms are also linked with the library, and all three spaces are provided with exits direct to external, therefore have two directions of escape.
- 3.6.3 The salon is the only space that can be considered an inner room to the lobby area. The escape route from the salon is either through the main lobby, or library, or through the Ground floor ventilated corridor leading to the exit by Stair 1, therefore the travel distances and escape routes here are satisfactory.

Basement Car park

- 3.6.4 As described earlier, the basement is served by extensions of both stairs which are lobbied at basement. The lift also serves the basement and is provided with a protected lobby at that level. It is not expected that the lift will be used to evacuate occupants from a fire in the car park. Disabled refuges are provided in the base of Stair 1 and 2.
- 3.6.5 The fire alarm system within the Shared Residential facilities should be designed in accordance with BS 5839 Part 1 and be of at least an L3 Standard and include manual call points adjacent to the entrance / exits. This will form part of the completed condition of the accommodation.

3.7 ESCAPE WITHIN THE ANCILLARY ACCOMMODATION

Plant, storage and general ancillary accommodation (relevant to the residential accommodation only)

- 3.7.1 Ancillary accommodation is included within the development at basement level and ground floor and are relevant to the primary use of the building.
- 3.7.2 The travel distances requirements from plant rooms are broken down into two stages i.e. escape within the room itself and the overall escape route. In this case the maximum respective single and multiple direction travel distance within the plant room itself should be 9m and 35m. Where the plant room is designated as a place of special fire hazard, travel in two directions should be limited to 18m. The maximum overall travel distances from the furthest point in the plant room to a storey or final exit should be 18m in a single direction or 45m where there is more than one direction of escape. The above is achieved in the plant facilities at Mulberry Court.
- 3.7.3 For areas of cycle storage, Approved Document B refers to appropriate travel distances dependant on the level of associated fire hazard. On this basis, the travel distance for the cycle store units should be limited to 25m in a single direction of escape and 45m when more than one direction of escape is available.
- 3.7.4 The fire alarm system within these areas will also be designed in accordance with the BS 5839 Part 1 and be of at least an L3 Standard coverage. A single control panel for fire alarm and smoke ventilation purposes (for the common parts of the building) is therefore to be provided at the ground floor entrance.

Car park (relevant to the residential accommodation only)

- 3.7.5 The development contains one level of car park located at the basement floor level. Travel distances in the car park should be limited to 25m where escape is in a single direction and 45m where escape is possible in more than one direction. Means of escape within the car park is considered acceptable as more than one direction of escape is possible and travel distances are within 45m.
- 3.7.6 BS 9991 recommends that any common staircase which forms part of the only escape route from an apartment should not also serve the car park. In this case, both stair serve the car park area which is a deviation from the recommendations. It is therefore proposed to introduce a physical break, provided at basement level through a lobby approach or stair separation that any heat or smoke affecting the basement cannot spread to the upper sections of the staircase. This achieves three FD30S doors (minimum).
- 3.7.7 The lobbies sharing access within the car park and the residential stairs are required to be provided with a minimum of 1.0m² natural ventilation, following BS 9991. This should be achieved via a duct connection to atmosphere. As discussed earlier, it is proposed to demonstrate by CFD analysis that the car park ventilation system is capable of creating a negative flow at the entrance to the lobbies from the car park to mitigate against smoke ingress as an alternative to the lobby vents. This will be provided by a third-party engineering consultancy.
- 3.7.8 The car park will be separated from the residential accommodation by means of 60 minutes fire rated construction.
- 3.7.9 The fire alarm system within the car park will also be designed in accordance with the BS 5839 Part 1 and be of an L3 Standard with detection and sounders throughout the car park and ancillary spaces at basement level. Manual call points should be provided adjacent to the specified escape routes. Upon activation of detection within the car park, the mechanical smoke clearance system within the car park will operate. A single control panel for fire alarm and smoke ventilation purposes (for the car park only) is therefore to be provided at the ground floor entrance.
- 3.7.10 As the development features alarm and detection systems which are from BS 5839--1 for the communal areas and BS 5839-6 for the apartments, it is recommended that details of the alarms and expected resident's actions should be included in the tenant pack provided to the occupiers.

3.8 HORIZONTAL EXIT AND ESCAPE REQUIREMENTS

- 3.8.1 The requirements of horizontal exit widths depend on the type of the accommodation, size of accommodation and subsequent type of evacuation philosophy adopted.
- 3.8.2 The general recommendations are described in detail below and should follow Diagram D1 of Approved Document B; 2019 i.e. clear widths between door stops and projecting ironmongery (for doors $\leq 90^\circ$ opening) or clear width between door stops and door leaves (for doors $> 90^\circ$ opening).

Residential accommodation

- 3.8.3 The defend-in-place evacuation strategy for residential evacuation revolves around the fire affected dwelling being evacuated only. On this basis, it can be assumed for design purposes that the occupancy levels would be less than 60 persons.
- 3.8.4 As such, the following horizontal escape guidance should be applied.

Building area	Minimum exit width	Comment
Apartment (internal)	Minimum of 750mm for escape throughout	See other Approved Documents (i.e. Part M) for potential larger requirements
Apartment (access / egress door)	Minimum of 750mm	
Communal corridor		
Staircase door	Minimum of 850mm	For occupancy evacuating only ¹ Door swing as necessary for ventilation ²
Common amenity space	Relevant to expected occupancy	See following section

¹750mm required across the escaping occupant pathway. Use of doors not to restrict 750mm of escaping occupant only

²Door swing as necessary for ventilation purposes (applicable for mechanical ventilation strategy)

- 3.8.5 Cupboards and service risers are areas for general and maintenance use only and are accessible from the communal spaces without committing occupants within the used space. In this case, there are no minimum requirements for egress as these areas will not include for a defined occupancy. In any event where personnel are expected to enter the “accommodation”, exits widths should adhere to the following section.

Non-residential accommodation - Shared Residents Facilities

- 3.8.6 Each non-residential accommodation will adopt a simultaneous evacuation strategy. Where simultaneous evacuation is adopted, the building is generally designed with the exit widths and minimum number of exits shown in the tables below. See below for details on required door widths to be provided.

Maximum number of persons	Minimum number of escape routes / exits	Minimum exit widths
0-59 persons	1	750mm
60-599	2	2 x 850mm
		2 x 1050mm
		2 x (5mm per person)
600+	3 ¹	3 x (5mm per person)

¹Where more than 2 exits are available, it is reasonable to assume that upon a fire impeding a single escape route, the accommodation occupancy splits to evacuate evenly via the remaining two (or more) doors (subject to travel distances)

- 3.8.7 Stores and plant room occupancies tend to be very small and infrequent due to the maintenance access only usage, however Approved Document B recommends a conservative occupancy load factor of 30m² per person in each area. On this basis, any plant or general storage rooms served by a single exit door with a clear width of 750mm (subject to the above travel distances being achieved). Plant rooms larger than this require two exits with a clear width of 850mm.
- 3.8.8 The ancillary accommodation satisfies the above requirements.
- 3.8.9 Using floor space factors within Approved Document B (as a worst-case scenario) results in the following occupancy for the non-residential units.

Accommodation	Area (m ²)	Occupancy load factor	Occupancy	Minimum required exit width	Available exit width
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Cafe	27.5	2m ² /person	14	1 x 750mm	1 x 1300mm 1 x 1800mm
Multifunction Room	52.4		26	1 x 850mm	1 x 850mm 2 x 1800mm 1 x 1300mm
Library	81		41	1 x 850mm	3 x 1800mm 1 x 1300mm
Salon	10.4	-	4 (max occupants)	1 x 850mm	1 x 900mm

3.8.10 The occupancy load of the car park is calculated based on 2 persons per car parking space with the resultant necessary exit widths given in the table below. For means of escape, it is proposed to assess the proximate exits without considering means of escape via the adjacent car parking area(s).

Parking spaces	Occupancy	Minimum required exit width	Available exit width
23	46	2 x 750mm	2 x 900mm

3.8.11 The car park accommodation satisfies the above requirements.

3.8.12 The escape stair serving the car park is required to include a minimum clear width of 1000mm with the final means of escape door sized at least 850mm.

3.9 VERTICAL EXIT AND ESCAPE REQUIREMENTS

3.9.1 The requirements of vertical exit widths depend on the type of the accommodation and subsequent type of evacuation philosophy adopted.

Residential accommodation

3.9.2 The staircase and exit widths for the residential accommodation should be in accordance with the table below.

3.9.3 Similar to the horizontal evacuation policy for the residential accommodation, as the expected occupancy shall be less than 60 persons, the following vertical escape guidance should be applied.

Building area	Minimum exit width	Comment
Residential staircase – Core 1	800mm ¹	Protected staircase
	1000mm	(Basement section)
Residential entrance lobby	800mm	Maintained protected egress route without compromised by furniture
Final means of escape door	800mm	-
Residential staircase – Core 2	800mm	Firefighting stair
	1000mm	(Basement section)
Residential entrance lobby	850mm ²	Maintained protected egress route and firefighter access route without being compromised by furniture
Final means of escape door	850mm	-

¹Assuming the handrails do not protrude more than 100mm into the stair (Approved Document B: Appendix C)

²Where firefighter access shares the sole means of escape route from the stair

Non-residential accommodation

3.9.4 The means of escape stair from the basement level should be afforded with a minimum stair width (between walls / balustrade) of 1000mm and with a final exit door of 850mm at ground floor level.

3.9.5 The general requirements for escape stairs are as follows:

- Stairs should be at least as wide as the exits (clear width of initial escape door) opening onto them,
- The stairs should remain the width throughout the building (i.e. they should not narrow as they approach the final exit),

- The final exit routes from the stairs and the final exit doors should at least be as wide as the stair, and
- Approved Document M (ADM) should be consulted as this may result in larger stairs than those required for means of escape under Approved Document B.

3.9.6 The accommodations above satisfy the minimum number of exits and their associated widths.

3.10 DISABLED EVACUATION MEANS OF ESCAPE

3.10.1 The residential sections of the building(s) are proposed to be provided with disabled refuges due to the potential nature of the occupants in the building.

3.10.2 Escape from the Shared Residents Facility areas is available from most of the rooms direct to external, with the Salon provided with two escape routes, and therefore provisions for disabled refuges are not considered to be required at Ground level.

3.10.3 The basement level car park is afforded with two directions of escape to either Stair 1 or Stair 2, however a dedicated location of disabled refuges is provided within both stairs at basement level.

3.10.4 The disabled bay indicated on the basement drawing is accessible within 25m to the primary escape stair affording the disabled refuge and therefore is akin to a basement car park served only by a single storey exit. On this basis, a single disabled refuge is considered to be required, however, refuges are provided in both stair lobbies. It is also noted that the pedestrian egress route adjacent to the vehicular entrance is Part M compliant.

3.10.5 A disabled refuge is a notional space measuring 1400mm x 900mm located outside the path of means of escape within the protected staircase or protected lobby. In accordance with BS 9999 and Approved Document B, the refuge should contain a means for occupants to communicate with the Building Management that they are in need of assistance. This Emergency Voice Communication System in accordance with BS 5839-9 will need to be provided within the refuge with an indication at a suitable management area such as within the managed entrance lobby (or suitable alternative). Suitable signage and lighting under BS 9999 should be reflected to suite this arrangement.

3.10.6 A management strategy will need to be developed for the accommodation by the developer / building management and will incorporate details of how the building satisfies the requirements of the Equality Act. The management strategy should include information on staff training, how disabled occupants will be evacuated in the event of a fire and identify key roles in ensuring they are assisted in a fire situation.

3.11 MEANS OF ESCAPE SMOKE VENTILATION

3.11.1 The residential corridors and staircases are proposed to include life safety ventilation systems to support occupant evacuation and firefighting. Full details should be provided by the designated smoke venting contractor when appointed however brief summaries of the expected venting requirements are given below.

3.11.2 As part of the ventilation system, an override break glass should be provided adjacent to the Automatic Opening Vent from the corridor and located at the top and bottom of the staircase to operate the Automatic Opening Vent at the head of the stair.

Mechanical ventilation

3.11.3 The purpose of mechanical ventilation is to provide an equivalent level of protection (or better) than natural means and to maximise floor area use. Mechanical Smoke Ventilation Systems are fire engineered solutions and therefore deviate away from Approved Document B. Guidance should be applied from the Smoke Control Association Guidance and BS EN 12101 Part 6.

3.11.4 The mechanical smoke shafts will be constructed to have a minimum cross-sectional area of 0.6m² with a minimum critical dimension of 600mm. The enclosed shaft will have a maximum leakage rate of 3.8m³/hour/m² at 50Pa and exclude any shaft obstruction or protrusions.

- 3.11.5 0.6m² Automatic Opening Vents (as high as practical) will be provided onto each vented corridor with a duct connection into the roof fan set at the termination head of the smoke shaft.
- 3.11.6 The fan set will comprise of a duty fan and standby fan capable of achieving the necessary flow rate at the most aerodynamically worst-case vent from the corridor.
- 3.11.7 Replacement air for the mechanical depressurisation system will be based on inlet supply via the staircase shaft 1.0m² Automatic Opening Vent during both means of escape and firefighting. The staircase lobby doors / cross corridors doors shall be orientated as such to allow the pressure difference of the smoke depressurisation system to passively open the doors into the common corridors and stair enabling the replacement air to serve the Mechanical Smoke Ventilation System. This is critical to the operability of the mechanical ventilation system.
- 3.11.8 As part of the Mechanical Smoke Ventilation System, manual controls will be provided at ground floor level at the entrance to each core to allow the Fire Service to override the system. This will be located adjacent to a status panel that will be provided within the entrance lobbies, which will inform on the location of fire (via dedicated floor). Manual firefighter controls may be required on each floor level.

Other ventilation

- 3.11.9 As included earlier within this report for escape within the other and ancillary accommodation, further forms of ventilation are also required for means of escape requirements under Approved Document B.
- 3.11.10 Car parking accommodation will be provided with a protected lobby between the residential means of escape pathway i.e. staircase or common corridor which will be depressurised by the car park smoke extract system.
- 3.11.11 Where provided, smoke control ducts should be classified as non-combustible and adhere to BS EN 12101 Part 7 as well as BS EN 1366 Part 1.

3.12 RESIDENTIAL APARTMENT FIRE ALARM AND DETECTION SYSTEM

- 3.12.1 The fire alarm and smoke detection within the dwellings will be designed in accordance with the BS 5839 Part 6 and be of a Grade D1/D2 LD1 Standard (where specified) – Grade D2: mains-powered supply with integral standby supply. Grade D1 includes the provision of tamper-proof batteries
- 3.12.2 For a typical LD2 system, each dwelling will be provided with a single sounder / smoke detector in the internal landing of the stairs, with an additional heat detector / sounder installed in the kitchen and smoke detector / sounder in the principal habitable room i.e. the living room / lounge area. For an LD1 system, detection is provided in all habitable rooms. Given the occupancy group proposed for this development, an LD1 system is recommended.
- 3.12.3 The Penthouse apartments feature a large terrace area and Garden rooms which are remote from the dwellings. Additional sounders will be provided to the terrace and the rooms.
- 3.12.4 Coverage of a heat detector will be limited to 5.3m radial coverage while smoke detector coverage will be limited to 7.5m radial coverage. BS 5839 Part 6 mounting design parameters should be adhered to.
- 3.12.5 The sounders will be capable of delivering 85dB(A) through the open doorway to each room and be hardwired with a self-contained battery backup.
- 3.12.6 Further details of the automatic fire alarm and detection systems will be provided by the designated fire alarm specialist when appointed.

3.13 COMMUNAL RESIDENTIAL FIRE ALARM AND DETECTION SYSTEM

- 3.13.1 The residential common corridors will be provided with an L5 Standard, zoned smoke detection system only to activate the proposed and associated life safety systems. Design of the L5 Standard detection-only system will adopt applicable design parameters under BS 5839 Part 1.
- 3.13.2 Smoke detection should be provided in all common corridors accessible by apartments. No sounders or manual call points will be provided in these areas. Smoke detection coverage will maintain a 7.5m radial coverage.
- 3.13.3 Operation of the fire detection system will shut down all HVAC systems (if applicable). Detectors should not be mounted within 1.0m from either air extract / supply positions.
- 3.13.4 In the event of a detected fire, the lift will fail to the access floor position in accordance with BS EN 81 Part 73. Should a fire originate at access floor level, the lift should stop at the adjacent level to the access floor. Doors will fail open upon final position.
- 3.13.5 Any cross corridor doors (excluding staircase doors) can be held open using magnetic hold-open devices but these should be interlinked with the fire detection system to disengage upon the activation of smoke detection. Detection coverage should then be amended from BS 5839 Part 1 to BS 7273 Part 4 and include smoke detection on either side of the associated door(s) within 0.5m – 1.5m.
- 3.13.6 The smoke detection panel should be provided at Fire Service access level and be visible / fully accessible by the attending fire crew upon building entry. It is proposed that the panel is located within the main entrance lobby
- 3.13.7 Further details of the L5 detection system within the common corridors of the residential sections of the building(s) will be provided by the designated fire alarm specialist / smoke venting contractor when appointed.

3.14 NON-RESIDENTIAL FIRE ALARM AND DETECTION SYSTEM

Shared Residents Facility

- 3.14.1 The shared residents facility should be provided with a minimum of an L3 Standard fire alarm and detection system to BS 5839 Part 1 with manual call points provided but this is subject to the requirements of the tenant and the associated fit out design, outside the scope of this report.
- 3.14.2 Linkage between the shared facilities and above residential accommodation is not considered to be required.

Ancillary accommodation

- 3.14.3 In general, ancillary accommodations within the building are arguably small in area with clear visual sight across the immediate vicinity and involve relatively small occupancies who would be made aware of a fire before automatic detection and alarm. However, given the potential hazardous contents, inner-room scenarios and risk to occupants remaining within the building, it is proposed that the ancillary accommodations throughout the development will include automatic fire alarm and detection.
- 3.14.4 A land-lord roof space is shown at the Third floor level. This is accessed from the Apt 28 Garden room low-height storage area. As this is a convoluted route, it is proposed that the alarm system from Apt 28 is extended to the land-lord roof area to give early warning to any maintenance personnel there of a fire which could compromise their escape route back through the apartment.
- 3.14.5 The ancillary areas will adopt L3 smoke / heat detection coverage with sounders.
- 3.14.6 Fire alarm sounders and beacons will be provided to ensure an audibility level of 65dB(A) or 5dB(A) above background noise level (whichever is greater) is achieved in these areas.
- 3.14.7 Operation of the fire alarm and detection system will shut down all HVAC systems.

Car park accommodation

- 3.14.8 The car park will be provided with an L3 fire alarm and detection system with smoke / CO detectors and sounders. Manual control points will be provided on the designated storey exits from the car park. Security doors will disengage upon smoke detection.
- 3.14.9 As ancillary units are accessed directly from the car park, in the event of an activated fire alarm and detection system within the car park, evacuation should also be invoked within the ancillary units by way of interlinked sounders.
- 3.14.10 The fire alarm panel for the car park will need to be provided. The location of the fire alarm panel will need to be confirmed by the smoke venting contractor in liaison with the Fire Service, however at this stage it is proposed to provide this within the main entrance as it is envisioned that the attending fire crew can gain all relevant firefighting information from this location.
- 3.14.11 Further details of the individual fire alarm and detection systems within the non-residential sections of the building(s) will be provided by the designated fire alarm specialist / smoke venting contractor when appointed.

Cause and effect of fire alarm and detection system

- 3.14.12 Based on the above, the following fire alarm cause and effect principles are summarised in the table below.

Accommodation	Fire alarm system	Cause	Effect
Residential accommodation – apartments	Grade D1/D2 - LD1 system – BS 5839:2019 Part 6	Single smoke / heat detector activated within apartment	<ul style="list-style-type: none"> Alarm sounds throughout the affected apartment, invoking immediate evacuation. Terraced areas sounders activate. No interlinks are proposed for any other accommodation. NB - Sounder linked Apt 28 fire alarm system to be provided to the landlord roof space
Residential accommodation – common areas	L5 zoned smoke detection system – BS 5839 Part 1	Single smoke detector activated within the common corridor	<ul style="list-style-type: none"> Any environmental venting systems will shut down (if applicable). Associated AOV at the head of the stair will open. Associated AOV / MSVS on affected floor will operate. Interlink with associated stair entrance panel. No alarm raised. Lifts will ground (where applicable). Security doors override. Door retainers release.
Shared Residential Facilities	Independent L3 system – BS 5839 Part 1	Single smoke detector activated or manual call point engaged	<ul style="list-style-type: none"> Alarm signals throughout unit invoking immediate evacuation of the premise concerned. Lift will hold at First floor Interlink with associated fire alarm panel. Interlink proposed to notify local Fire Service.
Ancillary accommodation	Independent L3 system – BS 5839 Part 1	Single smoke / heat detector activated or manual call point engaged	<ul style="list-style-type: none"> Alarm signals throughout ancillary unit invoking immediate evacuation of all the ancillary area. Interlink with associated stair entrance panel. No interlinks proposed to any other accommodation. Security doors override.
Car park	Independent L3 System – BS 5839 Part 1	Single combi-detector activated or manual call point engaged	<ul style="list-style-type: none"> Alarm signal sounds throughout car park and associated ancillary units. Interlink with fire alarm panel (where provided). Car park ventilation system operates (as applicable). Security doors override.

- 3.14.13 Further details of the final applicable cause and effect matrix will be developed and provided by the designated specialists.

3.15 EMERGENCY LIGHTING SYSTEMS

3.15.1 To facilitate normal working where applicable, the lighting levels throughout the building will be more than adequate. In the event of a fire within the building, it is considered unlikely that the mains power to the primary lighting circuit would be affected in the early stages while the occupants are escaping. This is based upon the fact that the electrical supply to the light fittings would initially be away from the general fire origin and therefore continue to operate during the immediate means of escape phase.

Nonetheless, assuming a power failure or worst-case fire scenario, emergency lighting as backup lighting meeting the recommendations of BS 5266 Part 1 and BS EN 1838 will be provided in the following areas:

Purpose Group	Areas requiring escape lighting
Residential	<i>All common escape routes (including necessary external routes)</i>
Car park	<i>Underground or windowless accommodation Internal corridors more than 30m long Open-plan areas of more than 60m² All escape routes to which the public are admitted (including external escape routes but excluding retail accommodation <280m² per sales floor) Any disabled toilets Toilets with a floor area over 8m²</i>
Ancillary accommodation	<i>Underground or windowless accommodation Stairways serving a central core Internal corridors more than 30m long Open-plan areas of more than 60m² Electricity and generator rooms Emergency control rooms</i>

3.15.2 Luminaries will be provided appropriately mounted (generally at least 2m in height) and spaced to provide the light levels suggested within British Standard BS 5266 Part 1 and BS EN 1838:

Location	Illuminance	Duration
<i>Open areas (>60m² in area)</i>	<i>0.5lux</i>	<i>3 hours</i>
<i>Defined escape routes (<2m in width)</i>	<i>1.0lux</i>	
<i>Locations of disabled refuge</i>	<i>5.0lux</i>	
<i>Reception areas</i>	<i>15.0lux</i>	<i>30 minutes</i>
<i>Non-residential kitchen areas</i>		
<i>First aid areas</i>		

3.15.3 Emergency lighting luminaires can either be self-contained emergency luminaires or centrally supplied emergency luminaires.

3.15.4 External routes forming part of the occupant escape (including those located outside the building entrance) to a place of ultimate safety away from the building will also need emergency illumination. IP enclosure classification should adhere to BS EN 60529. Existing installation of external street lighting can be used providing continued operation is confirmed.

3.15.5 Final locations and routes shall be agreed during the design development and identified within the final fire strategy drawings produced by the architect.

3.15.6 Further details on the emergency lighting throughout the building will be provided by the designated emergency lighting specialist when appointed.

3.16 ESCAPE SIGNAGE









3.16.1 Escape signage will be provided above storey exits and final exit doors from the common areas within the residential, shared residential facilities and car parking accommodations. Emergency escape signage will be required to meet the requirements of the Regulatory Reform (Fire Safety) Order.

3.16.2 Such signage will meet the recommendations of BS 5499 Part 4 and BS ISO 3864 Part 1 and will be located as follows, except for escape routes which are in ordinary use:

- All designated escape routes or escape routes across open areas will be provided with signage in stairs and other changes in level and direction,
- The position of all doors and other exits sited on escape routes, including storey exits and final exits will be identified by signage,
- Where an escape route from a room is not conspicuous or confusion could occur, the route will be indicated by a sign, including intermediate signs where necessary, and
- All changes of direction in corridors, stairways and open spaces forming part of an escape route will be marked with intermediate signs. Each intermediate door or junction will be similarly signed.




3.16.3 Signage above doors or open spaces should be mounted between 2.0m and 2.5m from floor level and as centrally as practicable. Mounting on walls should be between 1.7m and 2.0m. Measurements are taken from finished floor level to the base of the sign.

3.16.4 Signage should be accompanied by appropriate directional arrows and supplementary text. Examples are given below.




Escape route sign	Meaning	Location examples
	<i>Progress down to the right (change of level)</i>	<i>On wall / suspended at head of stairs</i> <i>On half landing wall or stairs</i> <i>Suspended at change of level</i>
	<i>Progress up to the right (change of level) / Progress forward and across to the right from here when suspended in open area</i>	<i>On wall / suspended at foot of stairs</i> <i>On half landing wall / stairs</i> <i>Suspended at change of level</i> <i>Suspended in open areas</i>
	<i>Progress down to the left (change of level)</i>	<i>On wall / suspended at head of stairs</i> <i>On half landing wall / stairs</i> <i>Suspended at change of level</i>
	<i>Progress up to the left (change of level) / Progress forward and across to the left from here when suspended in open area</i>	<i>On wall / suspended at foot of stairs</i> <i>On half landing wall / stairs</i> <i>Suspended at change of level</i> <i>Suspended in open areas</i>
	<i>Progress forward from here / Progress forward and through (when sited above door) / Progress forward and up from here (change of level)</i>	<i>Suspended in corridor leading to door</i> <i>Suspended in open areas</i> <i>Suspended in front of door</i> <i>Positioned above door</i> <i>Suspended at foot of stairs or ramp</i>
	<i>Progress to the right from here</i>	<i>On corridor walls</i> <i>Suspended adjacent and left of the exit</i> <i>Suspended at change of direction</i>
	<i>Progress to the left from here</i>	<i>On corridor walls</i> <i>Suspended adjacent and right of the exit</i> <i>Suspended at change of direction</i>
	<i>Progress down from here (change of level)</i>	<i>Suspended at head of stairs / ramp</i> <i>Suspended at change of level</i>

Other signage

3.16.5 Except for front doors to the apartments, or internal fire doors within apartments, fire resisting doors and fire exit doors (escape routes in and around the development) will be provided with appropriate blue fire safety signage.

Method of closure	Signage	Sign diameter / letter height	Location
Self-closing device		60mm sign diameter and 5mm letter height	Fire doors in corridors, staircases and protected lobbies
Keep locked shut			On the outside door of the riser cupboards and maintenance access cupboards
Automatic door			Doors nominated as Automatic Opening Vents / doors

- 3.16.6 Dedicated fire equipment associated with firefighting activities will be identified by red fire equipment safety signage.
- 3.16.7 It is also strongly recommended that the following prohibition / general signage for day-to-day use is also provided under the recommendations of BS 5499 Part 5.

Safety sign	Signage	Location
No smoking		Stair entrance lobby
No naked flames		External communal amenity areas
Fire extinguisher		Adjacent to fire extinguishers

- 3.16.8 Final locations and signage details shall be agreed during the design development and identified within the final fire strategy drawings produced by the architect.
- 3.16.9 Further details on the escape signage throughout the building will be provided by the designated signage specialist with client confirmation on general signage when appointed.
- 3.17 MANUAL FIREFIGHTING EQUIPMENT**
- 3.17.1 Manual firefighting kit is not a requirement to be provided within the individual residential dwellings. In addition, firefighting equipment is not proposed to be included within the residential communal areas as to discourage potentially untrained use and occupants attempting to combat a severe fire.
- 3.17.2 Although manual firefighting equipment is not necessary under Building Regulations, the Regulatory Reform (Fire Safety) Order provides guidance that requests first aid firefighting facilities should be provided in places of work. In this case it is proposed that manual firefighting equipment will be provided within the shared residential facility areas that incorporate a staff presence i.e. manned concierge / entrance lobbies.
- 3.17.3 BS 5306 Part 8 provides guidance on the selection and position of fire extinguishing equipment within general areas. At this stage, a general guide for the extent of fire extinguishers would typically involve one extinguisher per 200m² of floor area with the appropriate medium agent relevant to the primary risk contained within the area i.e. carbonaceous material – water, liquid fires – powder or CO₂. A general guide is included below.

Extinguisher type	Colour	Fire classification					
		Class A General combustible materials (wood, paper etc.,)	Class B Flammable liquid material (paint, petrol etc.,)	Class C Flammable gases (methane, butane etc.,)	Class D Flammable metals (sodium, lithium, potassium etc.,)	Class E Electrical equipment (computers etc.,)	Class F Deep fat fryers (chip pans or cooking fats / oils etc.,)
Water	Red	Acceptable	Unacceptable				
Foam	Orange	Acceptable		Unacceptable			
Dry powder	Blue	Acceptable				Unacceptable	
CO ₂	Black	Unacceptable	Acceptable	Unacceptable		Acceptable	Unacceptable
Wet chemical	Yellow	Acceptable	Unacceptable				Acceptable

- 3.17.4 Extinguishers should be positioned as such to be readily seen by persons following an escape route on either brackets (handles between 1.0m and 1.5m from finished floor level), on floor stands or within cabinets.
- 3.17.5 Dedicated fire blankets / fixed firefighting hose reels are not recommended.
- 3.17.6 Further details on the fire extinguishing equipment throughout the development will be provided by the designated fire extinguisher specialist upon project completion.

4.0 INTERNAL FIRE SPREAD AND CONTROL (LININGS)

4.0.1 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B2, Internal Fire Spread (Linings):

- (1) To inhibit the spread of fire within the building the internal linings shall-
- (a) adequately resist the spread of flame over their surfaces; and
 - (b) have, if ignited, a rate of heat release which is reasonable in the circumstances.
- (2) In this paragraph 'internal linings' means the materials lining any partition, wall, ceiling or other internal structure.

4.0.2 The following sections discuss the implications of the proposed building design and seek to demonstrate that a satisfactory standard of fire safety is achieved with respect to both requirements stated above.

4.1 GENERAL PRINCIPLES

- 4.1.1 The purpose of limiting internal fire spread is to restrict the growth and spread of fire by restricting certain locations with low rates of surface spread of flame, and in some cases, low rates of heat release.
- 4.1.2 The choice of materials used for wall and ceiling construction can significantly impact the spread of fire growth and is particularly important in primary circulation spaces where linings may offer the principal medium for fire spread to adversely impact the occupant escaping.
- 4.1.3 In addition, restrictions made to the internal fire spread and control can play a crucial part in the protection to firefighters in critical areas to maintain limited materials for ignitability and flammability.

4.2 INTERNAL FIRE SPREAD (LININGS)

4.2.1 For the purposes of this document the internal surface and linings do not apply to the upper surface of floors and stairs as these should not contribute to the adverse spread of flame during occupant evacuation. However, general internal fire spread requirements (subsequent section) refers to control of areas for firefighting activities. Doors, door frames, window frames and frames in which the glazing is fitted, architraves and skirting are also exempt from these limitations.

4.2.2 The walls and ceilings should meet the recommendations below in

Location	Class of lining	
	National Class ¹	European Class ²
Small rooms of area; <ul style="list-style-type: none"> • 4m² in residential accommodation • 30m² in non-residential accommodation 	3	D-s3, d2
Other rooms (residential or non-residential)	1	C-s3, d2
Circulations spaces within dwellings		
Other circulation spaces including the common areas in residential block of apartments	0	B-s3, d2
Open-deck surface material (single direction of escape)(facing wall / balcony soffit / balustrade)		

¹National Classifications are based on tests in BS 476 Part 4, 6, 7 and 11.

²The European Classifications are described in BS EN 13501 Part 1.

4.2.3 The Classification of linings recommended in the table above can be downgraded (but not less than Class 3 or D-S3, d2) in walls of rooms providing the total area of those parts in any one room does not exceed one half of the floor area of the room and subject to a maximum of 20m² in residential accommodation and 60m² in non-residential accommodation.

4.3 GENERAL INTERNAL FIRE SPREAD REQUIREMENTS

4.3.1 Non-combustible and limited combustible construction materials should be used in the following situations.

Non-combustible material¹	Limited combustible material¹
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<i>Escape ladders (within ancillary accommodation)</i>	<i>Escape staircases</i>
<i>Refuse chutes</i>	<i>Insulation in external walls (>18m in height)</i>
<i>Fire stopping sleeving</i>	<i>Support of fire stopping materials</i>
<i>Flue walls penetrating compartmentation</i>	

¹Defined under BS 476 (various) and BS EN 13501 Part 1 where applicable

- 4.3.2 Flooring and floor coverings within firefighting shafts should be of a low flammability to limit spread of flame. Textile coverings should be tested, with underlay, to BS 4790 to ensure non- or limited ignitability classification. Floor coverings will be secured with non-water based adhesive and be interrupted at all door thresholds with non-combustible strips of a minimum of 50mm.
- 4.3.3 Furniture and fittings can have a major impact on fire spread but is not covered within the Building Regulations through Approved Document B. It is however recommended to keep display materials and decorations (permanent and seasonal) to a minimum with ongoing fire risk assessment, by the Building Management, to maintain a permanent pathway of means of escape and limited impact to the defined areas of sterility when the building is in use.
- 4.3.4 Further guidance should be sought from BS 7176:2007 + A1:2011 - Specification for resistance to ignition of upholstered furniture for non-domestic seating by testing composites, and the Furniture and Furnishings (Fire Safety) Regulations, with further input from an interior designer.

5.0 INTERNAL FIRE SPREAD AND CONTROL (STRUCTURE)

5.0.1 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B3, Internal Fire Spread (Structure):

(1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.

(2) A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those two buildings.

(3) To inhibit the spread of fire within the building, it shall be sub-divided with fire resisting construction to an extent appropriate to the size and intended use of the building.

(4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.

5.0.2 The following sections discuss the implications of these requirements on the proposed design of the building.

5.1 GENERAL PRINCIPLES

5.1.1 The building will be constructed with consideration to resistance to collapse, fire penetration and the transfer of heat to ensure that elements of loadbearing structure are capable to withstand the effects of fire for an appropriate period without loss of stability.

5.1.2 Consideration will also be given to the restriction of fire spread throughout the construction by way of sub-dividing the building into fire separated compartments. The primary objectives of compartmentation are to both prevent rapid spread of fire to impact on occupant evacuation and reduce the likelihood of potentially severe fires (to other occupants and firefighters).

5.1.3 Further thought should also be provided against unseen fire spread in cavities to limit concealed danger to both occupants evacuating and firefighters tackling a fire; unaware of the further potential risk in immediate hidden areas.

5.2 LOADBEARING ELEMENTS OF STRUCTURE

5.2.1 Elements of structure are loadbearing members to the primary structure of the building i.e. structural framing systems, beams, columns etc. Where one element of structure supports or gives stability to another, the supporting element should have no less fire resistance and protection than the element it supports. The measures also provide for elements of structure that are common to more than one building or compartment to be constructed to the relevant provisions.

5.2.2 Any elements of structure which only support themselves or a roof do not require any specific fire resistance.

5.2.3 Elements of structure for each area of the development will be based on the height of the associated top floor level (measured from the respective lowest floor in accordance with Diagram C6 of Approved Document B). All elements of structure and all those supporting these elements will require a fire resistance shown in the table below, under standard fire conditions in accordance with the relevant parts of BS 476 or the relevant European test methods (exposure to a fire from either side / face, or in the case of floors, underside only).

Height of top floor	Fire resistance to element of structure	Fire resistance to compartment floors
>5m but <18m	60 minutes	

Any accommodations located below a building must adopt the higher level of fire resistance associated with the above accommodation.

5.2.4 External walls should be considered as elements of structure if designed as loadbearing to the primary structure. Further requirements for external wall fire resistance (if any) is given in Section 6.0 of this report for external fire spread control.

5.3 SUMMARY OF COMPARTMENTATION

5.3.1 The summary of the fire resistant partition provisions required for the block(s) are shown in a table below in accordance with Table A1 of Approved Document B:

Minutes	Building area		Exposure
60	Protected stair shafts	Staircase enclosure	Each side separately
		Access onto staircase	
		Protected lobbies ¹	
	Compartment floors		From underside
	Lift shaft		Each side separately
	Service risers		
	Cleaner cupboards (from protected lobbies)		
	Apartment enclosures		
30	Common corridor enclosures		Each side separately
	Residential apartment entrance halls		
	Sterile lobby division partitions / cross-corridor door partition		
	Cleaner cupboards (from common corridor)		
	Ancillary accommodation	Refuse storage	
		Buggy / Cycle storage	
		General plant rooms	

¹Protected stair lobbies at basement level serving car parking accommodation (excluding common corridors)

5.3.2 The summary of the fire resistant door provisions required for the building is shown in a table below in accordance with Table B1 of Approved Document B:

Fire door	Location		Device
FD30S	Protected stairs	Stair enclosures	Self-closers required
		Access onto protected stair shaft	
		Stair lobbies ¹	
	Service risers accessed from sterile areas		No self-closers required
	Apartment entrance doors		Self-closers required
Common corridor sterile lobbies			
FD30	Common corridor (sub-division)		Self-closers required
	Cleaner cupboards		
	Residential apartment entrance halls		
	Ancillary accommodation	Refuse storage	
		Buggy / Cycle storage	
General plant rooms			
Residential apartment stair and landings			
FD60S	Lift shafts		N/A

¹Protected stair lobbies at basement level serving car parking accommodation (excluding common corridors)

5.3.3 Final fire door and compartmentation drawings / schedules shall be agreed during the design development and identified within the submitted fire strategy information produced by the architect.

5.4 RESIDENTIAL APARTMENT COMPARTMENTATION

5.4.1 Each apartment will be constructed as an individual compartment having a minimum fire resistance of 60 minutes with FD30S self-closing fire doors for access / egress. Enclosures in a flat that are protected entrance halls / landings should afford 30 minutes fire protection and be fitted with the minimum of FD30 doors (no self-closers required).

5.4.2 Compartmentation enclosure to apartments should extend throughout all internal divisions of the apartment and any other accommodation. In areas where apartments are separated from another dwelling balcony, 60 minutes fire resistance should be extended to separate the balcony of one apartment from the party wall of another apartment. Division between balconies do not require fire resistance.

5.5 RESIDENTIAL COMMUNAL AREAS COMPARTMENTATION

- 5.5.1 All residential floors will be constructed as compartment floors. Each compartment floor will follow the same fire rating of the element of structure of the building (i.e. 60 minutes). Roofs inclusive of general plant requiring access will be designed to achieve a minimum of 30 minutes fire resistance.
- 5.5.2 Common corridors will be enclosed in a minimum of 60 minutes fire resistance throughout. Internal separating partitions will achieve 30 minutes with FD30S self-closing doors for general sub-division or sterile and nominated protected lobbies.
- 5.5.3 The stairs will be designed as protected stairs and shall be enclosed in 60 minutes fire rated construction with FD30S self-closing doors. Access onto the protected shaft will achieve 60 minutes separation from any other part of the building at occupant discharge level.
- 5.5.4 To assist with mitigation of smoke spread from the shared residential facility to the residential floor above, smoke seals will be provided to the lift doors at all levels served by the lift.
- 5.5.5 All service risers, lift shafts and smoke shafts will achieve a minimum fire rating equivalent to the fire rating of the building. Riser doors and lift doors will achieve half the fire resistance of the shaft it is located in. The smoke ventilation dampers will achieve 60 minutes fire resistance.
- 5.5.6 The majority of the service risers are located and accessed along the common corridor and therefore will be provided with fire doors achieving the above principles. However, due to space constraints, service risers are also proposed in sterile lobby areas causing a potential for fire spread route via the service risers.
- 5.5.7 On this basis, it is considered to upgrade these fire doors and provide additional smoke seals to these riser doors to ensure smoke protection to the protected communal space in the event of a fire within the riser. These service risers are to be locked at all times with access only given, on an infrequent basis, to engineering personnel for maintenance purposes only under Building Management authority.

5.6 NON-RESIDENTIAL COMPARTMENTATION

Shared Residential Facilities

- 5.6.1 The shared residential facilities will include 60 minutes separation from all above and adjacent accommodations.
- 5.6.2 No further internal compartmentation is considered necessary for Part B requirements.

Places of special fire risk

- 5.6.3 Plant rooms, cycle stores and other ancillary units (including general stores and utility rooms) will be separated from the adjacent accommodations by at least 30 minutes fire resisting construction with FD30 doors.
- 5.6.4 Utility providers and specialists should be consulted for further increased fire resistance to the enclosures i.e. life-safety plant rooms / generators.

Car park

5.6.5 The car park will be designed with an element of structure of 60 minutes. Arrangements will also include 60 minute separation from all above accommodations.

5.6.6 The car park should be separated from the residential area or route of means of escape by at least three fire rated doors (i.e. 3 x FD30S). In addition to this, the primary car park access lobbies will be depressurised by the car park smoke extract system..

5.7 GENERAL COMPARTMENTATION REQUIREMENTS

5.7.1 Each occupancy type (residential, shared facilities and car park,) will be separated from any other Purpose Group by way of fire rated division, equivalent to that of the associated building element of structure.

5.7.2 Fire doors throughout the development should be certified as applicable under BS 8214. All fire doors will be provided with intumescent seals along both side jambs and head jambs (smoke seals provided where required). Door and doorframe proximity must be in accordance with the manufacturers guidance (typically 3mm jamb detail and 8mm sill (decreased to 3mm for smoke sealed doors)).

5.7.3 Cleaner cupboards where provided, should be enclosed in a minimum of 30 minutes with FD30S self-closing doors. 60 minutes is proposed for locations from protected lobbies. Locations should not prejudice final means of escape (i.e. entrance lobbies or final discharge pathways from stairs).

5.8 CAVITY BARRIER PROTECTION

5.8.1 Cavity barrier protection outlines the requirements for the restriction of smoke and flames by subdividing cavities for the purpose of either cavities representing a potential pathway for spread of fire to impact on means of escape and firefighters or extensive cavities signifying possibly severe unseen fire spread.

5.8.2 The key areas that require cavity barriers are as follows:

- At the junction between an external cavity wall and a compartment wall that separates buildings,
- At the top of such an external cavity wall,
- At the junction between an external cavity wall and every compartment floor / other compartment wall,
- At the junction between an internal cavity wall and every compartment floor, compartment wall, or other wall or door assembly that forms a fire resisting barrier,
- In a protected escape route, above and below any fire resisting construction that is not carried full storey height,
- Within the void at every floor level and on the line of compartment walls abutting the external wall, and
- At the edges of cavities (including around openings i.e. windows).

5.8.3 Cavity barrier provision should be designed under Figure 24 of BS 9991, as represented in the figure below.

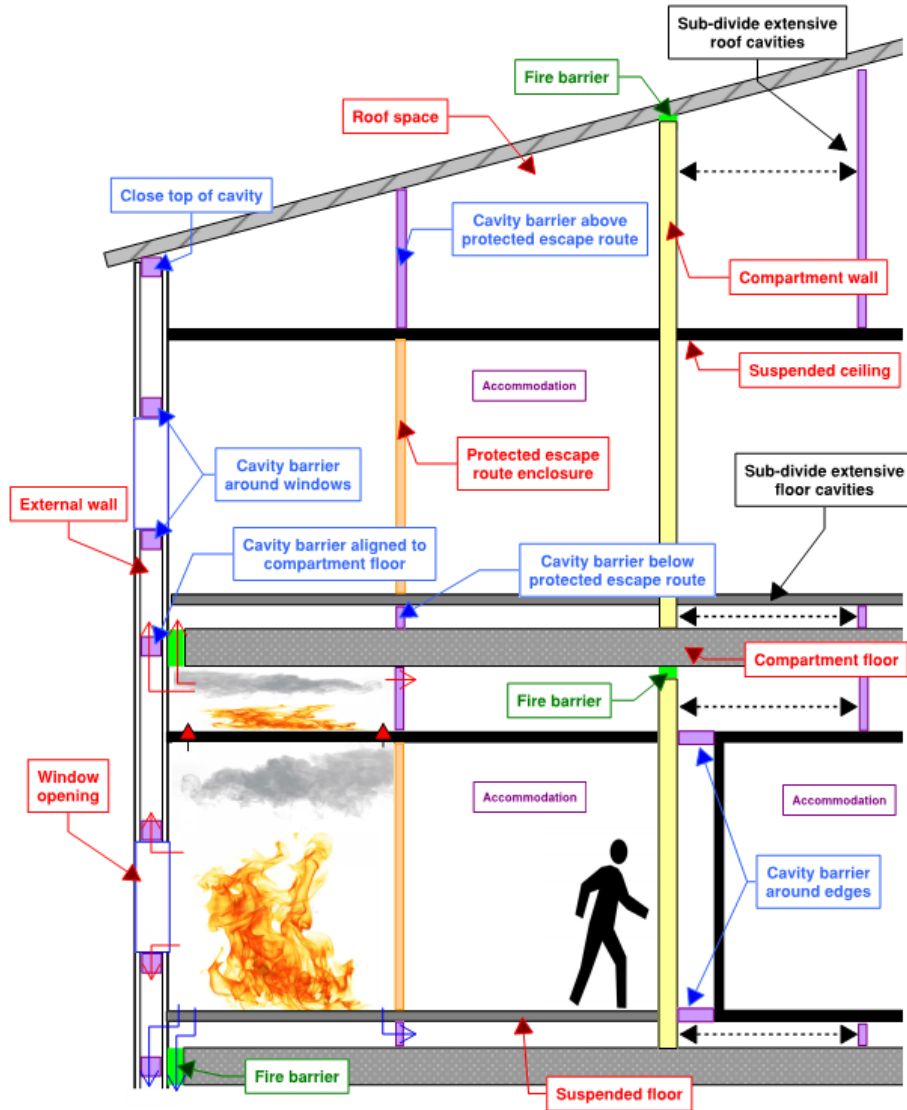


Figure 12 - Typical representation of cavity barrier protection

5.8.4 In addition to the above locations cavity barriers are also required in cavities (including ceiling voids and under floor service voids) where the cavity exceeds 10m - 20m in any direction.

Location of cavity	Class of surface / product exposed in cavity (excluding the surface of any pipe, cable or conduit, or any insulation to any pipe)		Maximum dimension in any direction
	National Class	European Class	
Between roof and a ceiling	Any	Any	20m
Any other cavity	Class 0 or Class 1	Class A1	
		Class A2-s3, d2	
		Class B-s3, d2	
	Class C-s3, d2		
	Not Class 0 or Class 1	Not any other above classes	10m

5.8.5 The cavity barriers should provide a minimum 30 minute fire rating (i.e. 30 minutes integrity and 15 minutes insulation).

5.8.6 Cavity barriers in a stud wall / partition or provided around openings may also be formed using construction materials (rather than specified products) of the following:

- Steel at least 0.5mm thick,

- Timber at least 38mm thick,
- Mineral wool (compressed), or
- Calcium silicate / cement-based / gypsum-based boards at least 12mm thick.

5.8.7 Cavity barriers should be either be fitted under compression or mechanically fixed in position.

5.8.8 Further information on fire barriers (excluding cavity barrier application) is covered in the subsequent Section.

5.9 FIRE BARRIERS AND STOPPING

5.9.1 Dissimilar to cavity barrier protection, fire stopping requirements maintain the fire compartmentation of the wall or floor in which it resides. Therefore, the fire resistance of the material / product specified must achieve the fire resistance required for the associated compartment line it protects. Every joint to another element, imperfection of fit or opening to allow services must be adequately protected by sealing or fire stopping so that the resistance of the element is not impaired.

5.9.2 Any openings for services (exceeding a dimension set out in Table 10 of BS 9991 shown below) breaching compartment walls should be fire stopped (unless protected throughout their entire length with fire resistant material) in accordance with Section 21.4 of BS 9991 as outlined in the following:

- **Option 1 – Sleeving:** A pipe of lead, aluminium (or alloy), uPVC or fibre-cement with a maximum nominal diameter of 160mm with fire resistant sleeving on both sides of the associated wall of not less than 1000mm. Sleeving (or non-combustible pipe) to be in contact with the service pipe.
- **Option 2 – Fire collars (proprietary sealing):** A service pipe (of any material and nominal diameter) with a specified product, certified for the application used to maintain the resistance of the compartment line.
- **Option 3 – fire dampers:** Securely fixed, automatic fire rated damper within the service opening to close in the event of a fire (thermally actuated devices). Smoke detection-actuation to be used where a sleeping risk is evident.
- **Option 4 – Restricted internal diameter:** Maintain the opening as small as practicable given the pipe material used as per Table 14 with appropriate fire stopping material around the service opening.

5.9.3 Typical representation of fire stopping to service penetrations is shown in the figure below.

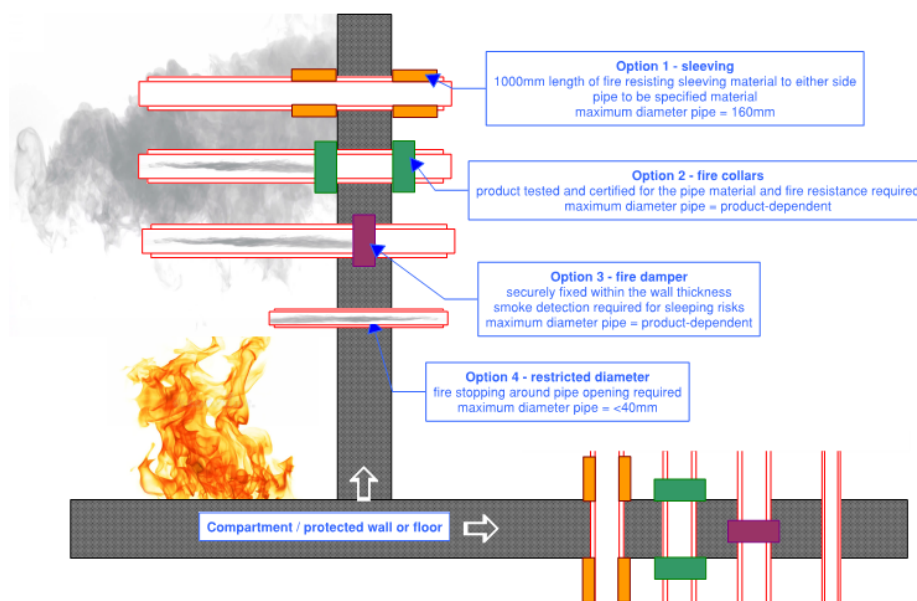


Figure 13 - Typical representation of fire stopping protection

5.9.4 This is primarily to prevent the passage of fire and assist in retarding the movement of smoke across the lines of compartmentation.

Situation	Pipe material and maximum nominal internal diameter		
	Non-combustible material	Lead, aluminium (or alloy), uPVC, fibre cement	Any other material
Structure (but not a wall separating buildings) enclosing a protected shaft which is not a staircase or a lift shaft	160mm	110mm	40mm
Compartment wall or compartment floor between flats		160mm (stack pipe) ¹ 110mm (branch pipe) ¹	
Any other situation		40mm	

¹Relevant to above drainage systems only – in all other cases, 40mm to be applied

5.9.5 Products used for fire stopping and sealing systems should be certified as tested in the application intended. However general fire stopping materials can also be used:

- Cement mortar,
- Gypsum-based plaster,
- Cement-based or gypsum-based vermiculite or perlite mixes,
- Glass fibre, crushed rock, blast furnace slag or ceramic-based products, or
- Intumescent mastics.

5.10 AUTOMATIC SPRINKLER SYSTEM REQUIREMENTS

5.10.1 The internal arrangement of the apartments does not include for inner-room scenarios nor open-plan arrangement and therefore residential sprinkler systems are not considered to be required for means of escape purposes. Additionally, as the building does not exceed 30m in height, sprinklers are not required to meet the requirements of the Building Regulations. Where the development include for occupants who are unable to evacuate independently, the provision of sprinklers should be further considered to meet the recommendations for specialised housing, as discussed in BS 9991.

5.10.2 The Penthouse apartments - Apt 27 and Apt 28 will be provided with a watermist system to BS 8458: 2015 as compensation for the extended travel from the Garden rooms to the apartment entrance.

5.10.3 Coverage will be provided throughout the whole of the apartments. The system will be from I-Mist and an Exova Warringtonfire test report is included in Appendix B to this report.

6.0 EXTERNAL FIRE SPREAD

6.0.1 Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B4, External Fire Spread:

(1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of building.

(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

6.0.2 The following sections discuss the implications of these requirements on the proposed design of the building.

6.1 GENERAL PRINCIPLES

6.1.1 The design for external walls, extent of unprotected facades (per associated compartment) and roof classification can play a key part in restricting the severity of fire spread either across the external fascia of the building or onto a neighbouring boundary line / building.

6.2 EXTERNAL WALL CONSTRUCTION

6.2.1 The external envelope of the building should not be a medium for fire spread under Approved Document B.

6.2.2 External walls considered as loadbearing to the primary structure of the building should achieve a fire rating equivalent to the element of structure fire resistance value for the associated block (unless forming an unprotected area defined under Section 6.3 of this report).

6.2.3 External walls featured on the building should adhere to the guidance in ADB 2019 for building less than 18m.

6.3 SPACE SEPARATION

6.3.1 Any extent of the cross-sectional area of a compartment along the external wall line is considered to be an unprotected area for external fire spread unless provided with fire resistance. For the purpose of this assessment, external walls of protected shafts (considered as sterile areas) are excluded.

6.3.2 The extent of the requirements of fire resistance to the unprotected areas (if any) are governed by the height and width of the compartment and the distance from the compartment to the relevant boundary line. This forms an assessment of the likelihood of fire spread to occur to buildings on an adjacent site or to separate fire compartments on the same development.

6.3.3 Elevation drawings and site plans showing the building boundary have not been provided therefore calculations will be carried out for the required boundary distances and achieved boundary distances on receipt of the drawings.

6.3.4 Unprotected openings of 0.1m^2 in area are permitted in otherwise fire rated walls, providing even spacing of no less than 1.5m apart from one another. Larger openings of 1.0m^2 are also permitted providing no further opening of such size (per compartment) is located within 4.0m.

6.4 EXTERNAL FIRE SPREAD CLASSIFICATION

6.4.1 The final external surface of the external walls should be of a spread of flame classification to adhere to Diagram 40 of Approved Document B represented in the following table.

Building height ¹	Boundary distance	Minimum external wall classification	
		<18m	>1.0m
	<1.0m	Class B-s3, d2 (European Class)	
≥18m	>1.0m	<18m	Class C-s3, d2 (European Class)
		>18m	Class B-s3, d2 (European Class)
	<1.0m	Class B-s3, d2 (European Class)	

¹Measured from ground to mean roof level

6.5 ROOF COVERINGS

6.5.1 The final external surface of the proposed roof coverings should be of a spread of flame classification to impede the spread of fire along the roof between compartments (where a compartment line meets the roof junction) and to reduce the spread of fire to roofs from exposure to fire from the outside.

Roof classification at junction of compartment wall to roof

6.5.2 Roof structures do not require fire resistance but can represent a risk of fire spread from one compartment to another at the junction of a compartment wall to a roof membrane.

6.5.3 Where a compartment wall meets the roof junction, a zone of 1500mm on either side of the junction should have a covering of designation AA, AB or AC (to BS 476 Part 12 or equivalent BS EN 13501 Part 5) on a substrate or deck material of limited combustibility. Alternatively, the compartment wall can penetrate the roof membrane and extend 375mm above the top surface of the roof.

Roof classification requirement due to boundary distance

6.5.4 The fire spread classification of the roof material will be limited to a specified designation dependent on the minimum distance from any point of the roof to the proximate relevant boundary as per the table below.

Designation of roof covering		Minimum distance to relevant boundary			
National Class	European Class	<6m	6m-12m	12m-20m	>20m
AA, AB or AC ¹	B _{ROOF} (t4)	Acceptable			
BA, BB or BC	C _{ROOF} (t4)	Unacceptable	Acceptable		
CA, CB or CC	D _{ROOF} (t4)	Unacceptable	Acceptable		
AD, BD or CD	E _{ROOF} (t4)	Unacceptable	Acceptable		
DA, DB, DC or DD	F _{ROOF} (t4)	Unacceptable			Acceptable

¹Unwired glazing at least 4mm thick can be regarded as AA / B_{Roof}(t4) designation

7.0 FIRE SERVICE ACCESS

7.0.1 Schedule 1 of the Building Regulations requires the following functional requirement to be met in respect of B5, Access and Facilities for the Fire Service:

- (1) The building shall be designed and constructed so as to provide reasonable facilities to assist fire fighters in the protection of life.
- (2) Reasonable provisions shall be made within the site of the building to enable fire appliances to gain access to the building.

7.0.2 The following discusses the implications of these requirements on the proposed design with regard to access and facilities for the Fire Service within and around the building(s).

7.1 GENERAL PRINCIPLES

7.1.1 To assist with the purpose of protecting life via Fire and Rescue Services operations, the building should be provided with a specific strategy for access and supporting facilities to assist with the attending Fire Service actions.

7.1.2 Dependent on the building use and size, this involves providing the following:

- Adequate means of additional water supply,
- Adequate means for vehicular access to the development (externally),
- Adequate means for firefighting personnel access to the development (internally),
- Supporting provisions for internal firefighting such as fire mains and firefighting shafts (if any), and
- Ventilation to sub-ground floor areas (if required).

7.2 HYDRANT AND WATER SUPPLY ACCESS

7.2.1 BS 9991 recommends that public hydrants should be present to ensure that rising main inlets or the building(s) entrances are accessible within 90m of an available hydrant with further hydrants no more than 90m apart from one another.

7.2.2 A search has indicated a hydrant is located at the junction of Station Road and Seymore which is approximately 50m to the location of Mulberry Court and an additional hydrant located outside of Nos 19/21 Lower Teddington Road, which is approximately 80m from the location of Mulberry court, and therefore the hydrant provision is acceptable.

7.2.3 The final hydrant access strategy shall be agreed during the design development and identified within the submitted fire strategy drawings produced by the architect indicating the above achieved criteria.

7.3 EXTERNAL FIRE SERVICE VEHICLE ACCESS

7.3.1 Fire Service vehicle access will be available to the site via Lower Teddington Road leading onto Station Road. However, due care should be given to ensure that the vehicle access route (including all areas required for vehicular manoeuvres) meets the requirements as shown in the table below (taken from London Fire Brigade – Guidance Note 29).

Appliance type ¹	Minimum width of road between kerbs	Minimum width of gateways	Minimum turning circle between kerbs	Minimum turning circle between walls	Minimum clearance height	Minimum carrying capacity
Pump	3.7m	3.1m	16.8m	19.2m	3.7m	14.0t

¹Non-standardised appliance types may be applicable, dependent on Local Fire Authority.

7.3.2 Any access / security measures in and around the site (especially any bollards preventing vehicle access) will need to be by-passable by the Fire Service. The details of the bypass arrangements will need to be developed and agreed with the local Fire Service as applicable.

- 7.3.3 Where dead-end routes are evident within the site, these should either be limited to approximately 20m or a turnaround (turning circle or hammerhead) facility provided.

7.4 INTERNAL FIRE SERVICE FIREFIGHTING ACCESS

Fire mains

The protected Stair 1 is to be provided with a rising fire main to assist with internal firefighting operations. Where all parts of all of the apartments cannot be reached within 45m from Stair 1 along a route suitable for laying hose, a second main should be provided to Stair 2.

- 7.4.1 All fire mains are to be of a dry type.
- 7.4.2 Design and installation of the rising fire mains should be in accordance with BS 9990 and follow location of the riser landing valves at each floor (inclusive of ground), within the staircase, on the full landing. It is also proposed to extend the fire mains in Stair 1 to basement level with an outlet located and accessed within the stair lobby.
- 7.4.3 Air release valves should be provided at the top of all fire mains. Dry outlets should be provided at roof level for testing purposes.
- 7.4.4 All parts of the floor plates should be covered within 45m (when measured along a route suitable for laying hose) from an outlet provided within the protected staircase.
- 7.4.5 All fire mains should be provided with inlet connection points adjacent to the associated core entrances and visible from the Fire Service appliance parking location. The run of horizontal connecting pipework from the base of the riser to the inlet should be laid to a fall and be kept below 18m. Access from the Fire Service parking location to the dedicated inlet connection points should be within a maximum of 18m.
- 7.4.6 Further information on the fire main system requirements should be provided by the specialist supplier when appointed.

7.5 VENTILATION FOR FIREFIGHTING

- 7.5.1 A fire originating within a sub-ground floor level can seriously inhibit the ability for Fire Service to carry out fire and rescue operations when compared to that of an above ground floor level due to the potentially build-up of smoke and heat.
- 7.5.2 It is therefore proposed to assess the necessary ventilation for firefighting activities throughout the development.

Above ground floor level

- 7.5.3 The applicable smoke venting requirements for the above ground floor levels (residential areas, commercial accommodation and ancillary spaces) are discussed in detail as part of the means of escape section (Section 3.0) outlined earlier. No further provisions beyond this are needed for firefighting under B(5) of Approved Document B.

Below ground floor level

- 7.5.4 The basement level consists of a dedicated car parking facility with associated ancillary units accessed from the primary use.
- 7.5.5 The car park is sized at approximately 718m² and requires ventilation for smoke clearance (Section B(5) requirement) and also CO management (under the requirements of Approved Document F). Approved Document B recommends that a car park be provided with evenly distributed natural ventilation to two opposing sides with an aggregate free area ventilation of 2.5% relevant to the Net Internal Area of the car park (i.e.0.625% to each opposing side). However, Approved Document F overrides this requirement which recommends for an additional 2.5% (total of 5% free area ventilation

to the Net Internal Area of the car park) that should be located around the periphery of the car park. Alternatively, it should be demonstrated that the CO toxicity levels should not exceed 30ppm over an 8 hour period or 90ppm over a 15 minute peak period.

Mode	Cause	Effect
<i>General mode</i>		-
<i>Environmental mode</i>	<i>CO detection</i>	<i>Fans operate to achieve equivalence of 6 air changes per hour</i>
<i>Fire mode</i>	<i>Smoke detection</i>	<i>Fans operate to achieve equivalence of 10 air changes per hour</i>

7.5.6 The basement level also includes for ancillary areas that are located below 3m in depth from ground floor level but are not more than 200m² therefore the areas do not require independent smoke clearance. It is considered that direct ventilation from the ancillary spaces into the car park to be reasonable for B(5) purposes.

7.5.7 Full details will be provided by the designated smoke venting contractor upon appointment.

7.6 GENERAL FIREFIGHTING PROVISIONS

7.6.1 To further support the proposals outlined within this report, it is advised to provide a premises information box (drawing guidance from London Fire Brigade – Guidance Note 70) detailing these recommendations such that the attending fire crew are provided with suitable information for operational procedures.

7.6.2 The location of these boxes should be confirmed with the local Fire Authority, however at this stage, it is proposed to initially locate these at the main entrance. Additional copies should ideally be supplied to the local Fire Authority to enable any pre-planning for an emergency.

7.7 EMERGENCY POWER SUPPLY

7.7.1 Each life safety system provided within the building will have an independent power supply which would operate in the event of a failure of the main supply within the individual specification limits. Design of the emergency power supply strategy should be in accordance with BS 8519 and include for secondary supply of the following components / systems:

- Automatic Opening Vents,
- Mechanical Smoke Venting Systems,
- Car park ventilation system,
- Fire alarm systems,
- Emergency lights and signs, and

7.7.2 Cabling resistance survival time and secondary power supply duration for equipment associated with means of escape is typically either 30 or 60 minutes.

7.7.3 Secondary power supplies will be provided from a generator.

7.7.4 Further details of the emergency power supply strategy should be provided by the Mechanical and Electrical Consultant and Contractor.

8.0 FIRE SAFETY AND MANAGEMENT

8.1 GENERAL

- 8.1.1 On completion of a fire safety system, the complete installation should be checked for conformity to the approved drawings and system design.
- 8.1.2 A full Fire Risk Assessment should be carried out by the employers within the building (coordinated by the landlord where multiple tenants are present) nearer to the development completion and be in place on occupation to meet the Regulatory Reform Order. The assessment should be maintained and act as a record of the provision and measures, passive and active, used to minimise fire risk within and around the building.
- 8.1.3 Maintenance procedures will be developed to ensure that all equipment and services within the building are able to operate effectively. Guidance used as part of the system specification (Appendix A can be used for further information).
- 8.1.4 Given the use and likely occupancy of the building, management procedures will assist in the prevention and control of fires and the evacuation of occupants.
- 8.1.5 Good housekeeping standards will be enforced to ensure that the effectiveness of the fire safety provisions is not affected.

8.2 KEY MANAGEMENT ISSUES

- 8.2.1 This section describes each of the key management areas that will need to be implemented and maintained during the lifetime of the building:
- All necessary fire safety systems must be regularly maintained and tested.
 - The Building Management will regularly monitor and control the specification and use of combustibles within the escape routes and circulation areas. These areas will generally be maintained free of all combustibles and the escape routes will be unobstructed at all times.
 - A full Fire Risk Assessment will be developed for the building.
 - All applicable building staff and tenants will receive regular training including roles and responsibilities for key members of staff.

Control of evacuation and fire safety planning / implementation

- 8.2.2 A detailed fire safety plan will be drawn up by the Building Management, which will provide clear simple advice for the occupants in the event of an emergency.
- 8.2.3 The fire safety plan will be prepared, maintained and implemented by the fire personnel responsible for the various accommodations of the development and will include:
- The procedures to be adopted in the event of a fire signal being given,
 - Procedures for evacuation of occupants (including disabled occupants),
 - Procedures for equipment maintenance,
 - Frequency and nature of fire drills,
 - Staff training, and
 - Procedures for recording and monitoring equipment maintenance and any fire incidents.
- 8.2.4 Expanding on the information given above the fire strategy includes a number of risk critical areas resulting in the need to formalise the fire safety management in the building. In order to develop and maintain the safety of the building, the building management should formulate a policy statement appropriate to the building configuration, location, occupation, and if relevant, to the building users. The policy statement should include.
- a. General safety issues related to the use of the building,
 - b. Possible fire scenarios, and

c. Aims and objectives of the proposed management system and its methodology.

8.2.5 This policy should be endorsed by the highest level of management (by the client / management company).

8.3 REGULATION 38

8.3.1 To satisfy Regulation 38 of the Building Regulations it is proposed that a full package of building design information is passed to the end user for the various accommodations on-site. As a fire engineered building it is proposed that the following information is provided to the end users:

- This fire strategy report,
- Any management information proposed in addition to that contained in this strategy,
- Details of all passive fire safety measures (including compartmentation, cavity barriers, fire doors, self-closers and duct dampers),
- Details of the fire alarm and detection systems, emergency lighting, emergency signage, access controls, door hold open devices,
- Details of all active fire safety measures including smoke control systems design, mode of operation and control systems,
- Details of the fire mains and fire hydrants,
- Any high risk rooms and equipment present,
- As built plans for the building,
- O&M Manuals for the building systems, including commissioning information and certification, and
- Any provision incorporated into the building to facilitate the evacuation of disabled people.

8.3.2 This information will be transferred as a package of information by the main contractor at handover of the building.

8.3.3 It is recommended that information held within Annex F of BS 9991 (information on residential evacuation) is provided to building management and occupiers.

9.0 CONCLUSIONS AND RECOMMENDATIONS

- 9.1 This report documents the FDS Consult RIBA Stage 4 technical design aspects of the project known as Mulberry Court, Hampton Wick.
- 9.2 Full relevant guidance used as part of this fire safety design review is listed in Appendix A of this report.
- 9.3 The fire strategy outlines the fire safety strategy proposals for the building of the development in London and seeks to demonstrate compliance with the Building Regulations (commonly in the form of the recommendations within BS 9991)
- 9.4 Where deviations are evident, fire engineering principles have been applied to assess non-compliance and propose engineered solutions where applicable to either maintain the minimum functional requirements of BS 9991 or provide a greater level of safety to both occupants and firefighters and increase design / construction efficiency.
- 9.5 Section 10 of this report documents the deviations away from prescriptive guidance as part of the design risk register. These deviations are at risk until agreed in principle by the relevant Approval Authority to discharge the design condition.
- 9.6 Based upon the above proposals it is considered that adequate measures are provided throughout to meet the base functional requirements of the Building Regulations for fire safety.
- 9.7 It is recommended that this report is subject to a Design Team internal review with submission made to the relevant Approving Building Control Authority. Further information to the fire strategy i.e. fire strategy drawings, detailed design works and supporting information (by others) should be provided as part of a complete fire strategy design submission.
- 9.8 Appendix 1 of this report documents the correspondence between FDS Consult and the Approval Building Control Authority.
- 9.9 Appendix 2 of this report documents the correspondence between FDS Consult and the Consultee Local Fire Authority.

10.0 DESIGN RISK REGISTER

10.1 The following acts as a subjective register of design aspects to the project perceived as risk items until agreement in principle is gained from the relevant Approval Authority.

10.2 The status matrix adopts a traffic-light identity to track the potential approval severity of the design risk.

<i>Design risk</i>	<i>Discipline / Approval body</i>	<i>Status</i>	<i>Comment</i>
Means of Escape			
<i>Extended travel in penthouse apartments</i>	<i>Building Control</i>	<i>Med</i>	<i>Watermist system to BS 8458 provided to apartments</i>
Ventilation			
<i>Mechanical ventilation in residential common corridors</i>	<i>Building Control and Local Fire Authority</i>	<i>Med</i>	<i>CFD provided to BC / LFB</i>
<i>Mechanical ventilation in car park</i>			<i>CFD to demonstrate depressurisation of lobbies provided to BC / LFB</i>
<i>Omission of 1.0m² vent to basement stair lobbies</i>			
Compartmentation			
<i>Service risers accessed from protected sterile stair lobbies</i>	<i>Building Control</i>	<i>Low</i>	<i>Justification provided</i>
<i>Lift accessed from Ground floor reception area</i>			<i>Smoke seals provided to lift doors at all levels</i>
Firefighting			
<i>Emergency power supply strategy</i>	<i>Building Control and Local Fire Authority</i>	<i>Low</i>	<i>Generator provided</i>

11.0 FIRE MANAGEMENT / FIRE RISK ASSESSMENT

- 11.1 This following log identifies the key fire strategy elements that must be highlighted to the end user / occupier of the various accommodation to assist them with managing and maintaining the fire safety strategy for the development. These items should be incorporated into an applicable fire risk assessments and management procedures that consider fire safety within the building.
- Ongoing management control will be needed to ensure that all common areas and escape routes remain sterile. Where a single apartment accesses a lobby area, the management must ensure that the common area remains sterile and does not become part of the tenants' domain.
 - A key part of the escape strategy for the building revolves around the presence of: an L5 automatic smoke detection system within the common parts of the residential building (with extended coverage, with sounders, to the relevant ancillary areas); an L3 fire alarm and detection system within the basement level car park and relevant ancillary areas and an L3 independent fire alarm and detection system within the shared residential facilities. Once installed and commissioned, these systems should be regularly tested and maintained in accordance with their individual fire alarm and detection contractors' requirements.
 - The residential natural ventilation, mechanical ventilation and car park ventilation system should be regularly tested and maintained in accordance with the smoke venting contractor's requirements.
 - All associated equipment necessary for firefighting i.e. dry risers should be tested and maintained by the building management.
- 11.2 It is a requirement under the Regulatory Reform Order for the building owners / occupiers to carry out a Fire Risk Assessment (FRA) for the building / accommodation and additionally develop / implement management procedures to assist with the safe operation and evacuation of the building / area.
- 11.3 The Fire Risk Assessment should be comprehensive overview of the risk to life within the premises and where appropriate, will make recommendations to ensure compliance with the ongoing use of the building.
- 11.4 Further guidance is found within Publicly Available Specification 79 (PAS79) – Fire Risk Assessment Guidance and Methodology together with the generally available guides to the Regulatory Reform Order applicable to the various sections of the building.

APPENDIX A – FULL REFERENCE GUIDANCE DOCUMENTS

The full list of fire-related reference guidance documents used (as available at the time of appointment and commencement of works) and applied to the fire strategy report is given here.

Reference document	Date	Full title
Approved Document B	2019	Fire Safety: Volume 1 – Dwelling houses
Approved Document B	2019	Fire Safety: Volume 2 – Buildings other than dwelling houses
Approved Document F	2010	Ventilation
Approved Document M	2014	Access to and use of buildings: Volume 1 – Dwellings
BR 187	2014	BRE External fire spread: building separation and boundary distances
BS 476 Part 11	1982	Fire tests on building materials and structures. Method of assessing the heat emission from building materials
BS 476 Part 12	1991	Fire tests on building materials and structures. Method of test for ignitability of products by direct flame impingement
BS 476 Part 4	1970	Fire tests on building materials and structures. Non-combustibility test for materials
BS 476 Part 6	1989	Fire tests on building materials and structures. Method of fire test for fire propagation for products
BS 476 Part 7	1997	Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products
BS 4790	1987	Method for determination of the effects of a small source of ignition on textile floor coverings (hot metal nut method)
BS 5266 Part 1	2016	Emergency lighting. Code of practice for the emergency lighting of premises
BS 5499 Part 4	2013	Safety signs – Code of practice for escape route signing
BS 5839 Part 1	2017	Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises
BS 5839 Part 6	2019	Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in fire detection and fire alarm systems in domestic premises
BS 7346 Part 7	2013	Components for smoke and heat control systems. Code of practice on functional recommendations and calculation methods for smoke and heat control systems for covered car parks
BS 7346 Part 8	2013	Components for smoke control systems. Code of practice for planning, design, installation, commissioning and maintenance
BS 8458	2015	Fixed fire protection systems - Residential and domestic watermist systems p Code of practice for design and installation
BS 8519	2010	Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting. Code of practice
BS 9990	2015	Non-automatic firefighting systems in buildings. Code of practice
BS 9991	2015	Fire Safety in the design, management and use of residential buildings. Code of practice
BS EN 12101 Part 2	2017	Smoke and heat control systems. Natural smoke and heat exhaust ventilators
BS EN 12101 Part 6	2005	Smoke and heat control systems – Specification for pressure differential systems – kits
BS EN 12101 Part 7	2011	Smoke and heat control systems. Smoke duct sections
BS EN 13501 Part 1	2007	Fire classification of construction products and building elements. Classification using test data from reaction to fire tests
BS EN 13501 Part 5	2016	Fire classification of construction products and building elements. Classification using data from external fire exposure to roof tests
BS EN 1366 Part 1	2014	Fire resistance tests for service installations. Ventilation ducts
BS EN 1838	2013	Lighting applications. Emergency lighting
BS EN 60529	1992	Degrees of protection provided by enclosures (IP code)
BS EN 81 Part 20	2014	Safety rules for the construction and installation of lifts. Lifts for the transport of persons and goods. Passenger and goods passenger lifts
BS ISO 3864 Part 1	2011	Graphical symbols. Safety colours and safety signs. Design principles for safety signs and safety markings
BS ISO 4190 Part 1	2010	Lift (elevator) installation. Class I, II, III and VI lifts
CIBSE	2010	CIBSE Guide E: Fire Safety
Construction Regulations	2015	Construction (Design and Management) Regulations
Equality Act	2010	Equality Act
BS 7176: +A1	2007 2011	Specification for resistance to ignition of upholstered furniture for non-domestic seating by testing composites
GN 29	2007	LFEPFA Fire safety Guidance Note – Access for fire appliances
GN 70	2004	LFEPFA Fire safety Guidance Note – LFB premises information boxes
PAS 79	2012	Fire Risk Assessment. Guidance and a recommended methodology



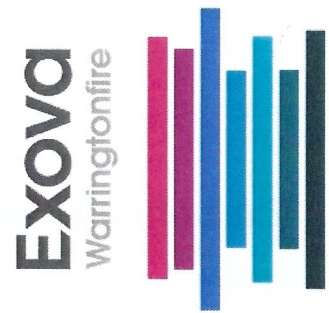
<i>Regulation 38</i>	<i>2010</i>	<i>Building Regulations: Regulation 38 – Fire safety information</i>
<i>Regulatory Reform Order</i>	<i>2005</i>	<i>The Regulatory Reform (fire safety) Order</i>
<i>Smoke Control Association Guidance</i>	<i>2020</i>	<i>Guidance on smoke control to common escape routes in apartment buildings (flats and maisonettes)</i>



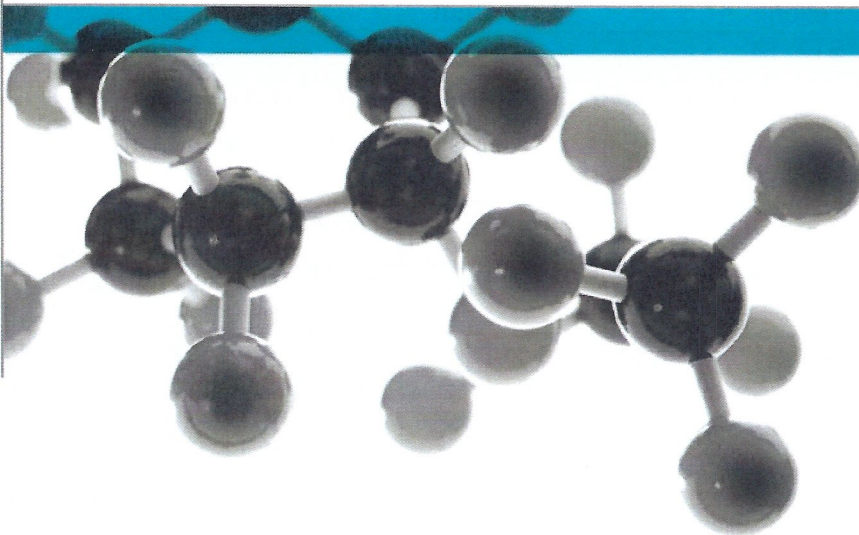
APPENDIX B - EXOVA WARRINGTON FIRE REPORT FOR I-MIST LTD, DATED 18TH AUGUST 2016

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BS 8458:2015: Annex C



Method for Measuring the Capability of a Watermist System to Control a Fire – “Room Fire Test for Watermist Systems with Automatic Nozzles”

A Report To: I-Mist Ltd

Document Reference: 367730

Date: 18th August 2016

Issue No.: 1

Page 1

Testing
Advising
Assuring



APPENDIX 1 – APPROVAL AUTHORITY (BUILDING CONTROL) COMMENTS AND RESPONSE

1. Building Control Approval Authority submission of report to be completed.
2. Comments yet to be received.



**Building Regulation Hub
London Fire Brigade Head Quarters
169 Union Street
London
SE1 0LL**

14 April 2020

Dear Sir/Madam,

APPROVED INSPECTORS SERVICES | BUILDING REGULATIONS 2010 (AS AMENDED)

**LOCATION: Site of Orione House (demolished, now to be known as
Mulberry Court), 12-14 Station Road, Hampton Wick, KT1 4HG**

PROPOSAL: New build residential development

In accordance with regulation 12 of the Building (Approved Inspector etc.) Regulations 2010 (as amended) and in connection with the above project, we enclose for your assessment and comment the plans as detailed in:

- ▶ Appendix A - Schedule of Plans & Supporting Documents Enclosed.

We have considered the proposals using the information we have received and find that if the additional items listed in: Appendix B - Design Compliance Observations are incorporated into the scheme, it will be able to satisfy the Fire Safety requirements of the Building Regulations.

We look forward to receiving your report within the next 15 days, but if you require any further information please do not hesitate to contact us.

Yours faithfully,

Grahame J Baird BSc (hons) ACABE MIFireE

Enclosures

CC: John O'Neil & Paul Taylor - CIRC; Peter Lohse -PRC (by email only - no enclosures)



APPENDIX A - Schedule of Plans & Supporting Documents Enclosed

Reference	Title	Revision
10901 PL_100	Proposed Site Plan	P8
CI02 PRC GR DR AR 10001	Outline Site Plan	P1
CI02 PRC BO DR AR 13001	Basement Plan - Overall	P9
CI02 PRC GF DR AR 13002	Ground Floor Plan - Overall	P10
CI02 PRC 01 DR AR 13003	First Floor Plan - Overall	P10
CI02 PRC 02 DR AR 13004	Second Floor Plan - Overall	P9
CI02 PRC 03 DR AR 13005	Third Floor Plan - Overall	P10
CI02 PRC RF DR AR 13006	Roof Plan - Overall	P13



APPENDIX B - Design Compliance Observations

General Fire Safety Analysis

Number of storeys?

- ▶ Five including basement

Purpose Group

- ▶ Residential (dwellings) Group 1(a) Flats

Relevant travel distances?

- ▶ As Approved Document B1

Fire engineered solution involved?

- ▶ No

Height of top floor & structural fire resistance?

- ▶ Between 5 and 18 metres, therefore 60 minutes

Use of Building(s)

- ▶ Residential - flats

Automatic smoke detection & alarm system?

- ▶ Yes

Does the project involve the use of sprinklers?

- ▶ Not required by building regulations.

Part B | Fire Safety

Requirement B1 | Means of escape in case of fire

- 1** It is understood FDS have been appointed to produce a Fire Strategy for the development. Much of what is contained in the forgoing section would be expected to be addressed and or justified in that document. We have requested a copy of the document once it is available, for our information and review, and subsequently to forward to yourselves.
- 2** The building regulations do not require a sprinkler system for this type and size of building. However, if a sprinkler installation is proposed, some deviation from the design requirements of fire safety recommendations could be considered. The FDS document will confirm if sprinklers are to be installed.
- 3** In respect to the flats, there is 3 stages of escape:
 - i) Stage 1, escape within the flat;
 - ii) Stage 2, escape along the horizontal section of the common spaces; and
 - iii) Stage 3, vertical escape to a final exit.
- 4** Stage 1.

The flats are for private residential use, therefore are not covered by the consultation requirements. However, I confirm the layouts comply with the relevant sections of Part B, whilst information has been requested in regard to the smoke detection and internal fire doors etc.

**Part B | Fire Safety**

- 5** Stage 2.
At third floor level, the stage 2 escape from flat 03-01 and 03-02 is in a single direction to stair 01.
The maximum recommended travel distance in a single direction is 7.5 meters. The proposals indicates a longer distance, justification has been requested.
An automatic opening vent with a clear area of 1.5m² is shown in the common corridor.
Confirmation of the proposed method of activation has been requested.
- 6** At ground to second floor level, automatic smoke ventilation is indicated to the common residential corridors. Confirmation of the proposed method of activation has been requested.
- 7** The corridors would be protected to a minimum fire resistance of 60 minutes, as the flats will be enclosed as Fire Compartments.
- 8** At ground to second floor levels, there are two directions of escape from the entrance/exit door of each flat, to either a storey exit or a final exit. The routes are separated by cross corridor doors and screens. These cross corridor doors and screens should be specified with a minimum fire resistance of thirty minutes, with the doors specified as FD20S and self closing (if they are held open on detentes, they should release on activation of the fire alarm, failure of the power system, and should be closed at night.
Confirmation has been requested.
- 9** Stage 3.
There are two stairs which serve the residents from floors second to ground, and one stair (Stair 01) which serves the third floor.
The stair widths are not critical in residential premises, as only the residents of the flat of fire origin would be expected to escape.
- 10** A smoke vent is indicated to the head of stair 01, with a clear area of 1m².
A smoke shaft is indicated adjacent stair 02.
Confirmation of the proposed method of activation of these smoke vents has been requested.
- 11** Normally at grade level, a protected escape stair would discharge to a final exit. Stair 01 does so, but Stair 02 doesn't.
However, this arrangement can be considered acceptable as any products of a fire that is leaking into the corridor from flat 00-02, persons can continue their escape to a final exit via the corridor to the Main entrance/exit. Conversely, if a fire is obstructing the corridor to flats 00-01 and 00-05; or the communal area at ground floor, the escape route to the Side Entrance/exit would be available.
- 12** Wheelchair refuge areas are shown in the upper floor stair enclosures, and at basement level.
From a building control point of view, these would not be required at the upper levels. This is because if a resident's flat is on fire, once they leave their flat, they are in an adjacent Fire Compartment and therefore in a reasonably safe place.
- 13** Communal areas:
The corridors comply as they will be protected routes leading to either a storey exit or a final exit.

**Part B | Fire Safety**

- 14** The travel distance in the ground floor community areas are less than 45 metres to either final exit available.
- 15** The landlord area fire alarm system will need to be designed and installed in accordance with the relevant recommendations for an LI system, in accordance with BS 5839: Part 1; 2017.
Relevant design details have been requested for our consideration.
- 16** The inner rooms will be compliant, on the basis of the LI fire alarm system.
- 17** The door widths, and the number of exits indicated in the Ground floor lobby cafe area would be sufficient for the maximum number of persons likely to occupy this space.
- 18** The relevant design details for the emergency lighting system has been requested. The system will need to illuminate the common escape routes, basement car park and community areas at ground floor.
The design should be in accordance with the relevant section of BS 5266: Part 1: 2016.
- 19** Roof access is shown. The maximum travel distance in a single direction on a roof top plant room is 60 metres. Although the roof is not Plant, the PVs may require greater maintenance than a regular roof - i.e. cleaning. However, the travel distance from each roof to the access/egress point is less than 60 metres.
Access to the roof would be limited access for authorised maintenance only, and should form part of the Fire Risk Assessment in regard to lighting - i.e. no access at night unless suitable task lighting available; and provision for warning of a fire in the building - which could be fixed beacons on the roofs, or a hand held radio communication system.
- 20** In the car park there are two storey exits into protected stair enclosures. These provide travel distances less than 45 metres. Where initially escape would be in a single direction, the distance to a point from where two directions are available is less than 18 metres. This includes the cycle store and refuse store. Therefore compliance is shown. In addition, if the vehicular ramp is to be designated as an escape route, this route would also be available.
- 21** The car park will require a smoke ventilation facility. This could either be a natural system, or mechanical. Detailed proposals have been requested for our consideration, commentary as necessary, and to forward to yourselves for your information, and any further comments as may be deemed appropriate. See also paragraph 39 below.
- 22** The Plant rooms and generator enclosure have a single direction of travel. The maximum travel distance in a single direction should be 9 metres. The travel distance in Plant room 3 exceeds 9 metres. Compliance may be available as the PRC section 7 indicates a door beneath the vehicular ramp - if there is a route beneath the ramp between plant 1 and 3, this may provide an alternative. Alternately, an actual risk assessment of the Plant room 3 contents could be undertaken to determine if 9 metres is an appropriate maximum travel distance.
- 23** Proposals in regard to Fire Escape signage have been requested.
- 24** Doors on escape routes should be free from fastenings, with final exit doors secured with a single simple fastening. Confirmation of these proposals have been requested.

**Part B | Fire Safety**

25 Any electromagnetic or manual mechanical key code style locking devices on a fire escape door will be acceptable on the proviso that it will be released on actuation of the fire warning and/or detection system at the premises and is backed up by the provision of a manually operated break glass point (typically coloured green) guaranteed to interrupt the electrical current and sited adjacent to the fire escape door.

26 Commissioning of installation certificates will be required at the completion of the project or project stages.

- i) In respect to the fire alarm proposals, please confirm the design, and subsequent installation and commissioning will comply with the relevant sections of BS 5839: Part 1: 2017;
- ii) In respect of emergency lighting proposals, please confirm the design, and subsequent installation and commissioning will comply with the relevant sections of BS 5266: Part 1: 2016; and, if applicable;
- iii) In respect of any proposed sprinkler system.

27 Testing and Integration of Fire Safety Systems

We have strongly recommend that upon commissioning, all fire safety systems are fully justified, fully tested and shown to be working as designed. Thereafter, their effectiveness should be reconfirmed periodically throughout their working lifecycle.

Furthermore, where the operation of one fire safety system depends upon, or is otherwise affected by, the operation of another, the interactions should be fully described in the Fire Safety Management documentation and those interactions should be confirmed to be properly working before the building is occupied and periodically thereafter. Testing of the interactions should form part of the audit process under the Fire Safety Order in future.

Requirement B2 | Internal fire spread (linings)

28 Confirmation that the proposed surface spread of flame characteristic of the new internal walls and ceilings will be as follows has been requested:

- ▶ B-s3, d2 (Class 0 as was) in escape routes;
- ▶ C-s3, d2 (Class 1 as was) elsewhere; and
- ▶ D-s3, d2 (Class 3 as was) in enclosures of 4m² in the facts and
- ▶ D-s3, d2 (Class 3 as was) in enclosures of 30m² or less in the communal spaces.

Requirement B3 | Internal fire spread (structure)

29 The building fire time will need to be 60 minutes. The external walls, compartment walls (enclosures to each flat), compartment floors, riser shafts, lift shafts, protected stair enclosures and the enclosures to Places of Special Fire Risk (Plant Rooms) will all need to achieve this fire resistance.

Except doors to flats, the doors should maintain the fire time of the wall in which they are located. Doors to flats can be specified as FD30S and be self closing.

30 The lift shaft is shown to connect through to all floor levels. At basement level, there is no protected lobby shown between the lift and the car park.

Confirmation as to proposals in this regard to prevent a car park fire rising through the lift shaft, and thus potentially comprising escape from the upper floors has been requested.

**Part B | Fire Safety**

- 31** Confirmation of the proposals in respect to cavity fire barriers has been requested. These should be located at eaves, compartment floors and in line with each compartment wall.
In this regard the PRC section plans indicate stone sills and headers around the window openings.
- 32** Any concealed voids, such as suspended ceilings in the corridors, should be separated by fire resisting construction in line with the cross corridor doors.
Confirmation of these proposals have been requested.
Any suspended ceiling above the lobby entrance cafe area would not require cavity barriers, as the maximum distance is around 20 metres.
- 33** Any penetrations for the passage of M&E services through construction required to be fire resisting will need to be appropriately fire stopped. Confirmation of proposals have been requested.

Requirement B4 | External fire spread

- 34** The proposals appear to indicate the external walls are none combustible - either render or brickwork. Therefore, compliance with the relevant sections of Approved Document B4 will be achieved to minimise fire spread across the external wall surfaces.
- 35** The proposals appear to indicate the roof materials are none combustible, and thus the proposals would comply with the relevant requirement of Approved Document B4 to minimise fire spread across the external surfaces of the roofs.
- 36** The un-protected areas of the external walls indicate compliance with the requirement of Approved Document B4 to minimise spread of flame across the relevant boundaries.

Requirement B5 | Access and facilities for the fire service

- 37** All internal areas of each flat needs to be accessible within 45 metres of either a fire tender, or from a dry riser outlet. The measurement being as a fire hose is laid.
In this regard, it appears the third floor is further than 45 metres from where a fire tender can park, therefore dry risers would be required.
Specific design details have been requested for the dry riser- including the inlet location, which will need to be within 18 metres of, and in sight of where the fire tender parks. It appears this could be on the roadway to the car park entrance, as the reversing distance back to Station Road would be less than 20 metres.
- 38** Being that the site is in a predominantly residential area, there is likely to be an an existing Fire Hydrant within 90 metres of the entrance to the development. However, if not, a new Fire Hydrant will be required, specifically as the basement car park area exceeds 280m².
If your records indicate the location of the nearest Fire Hydrant, please advise us.
- 39** The basement level car park will require smoke ventilation.
Design details have been requested.
This system can either be natural or mechanical. If natural, a clear area equivalent to 1/40th of the car park area would be required, the outlets being positioned to provide a cross flow of smoke ventilation.
If mechanical, the system would need to provide the equivalent of 10 air changes per hour.



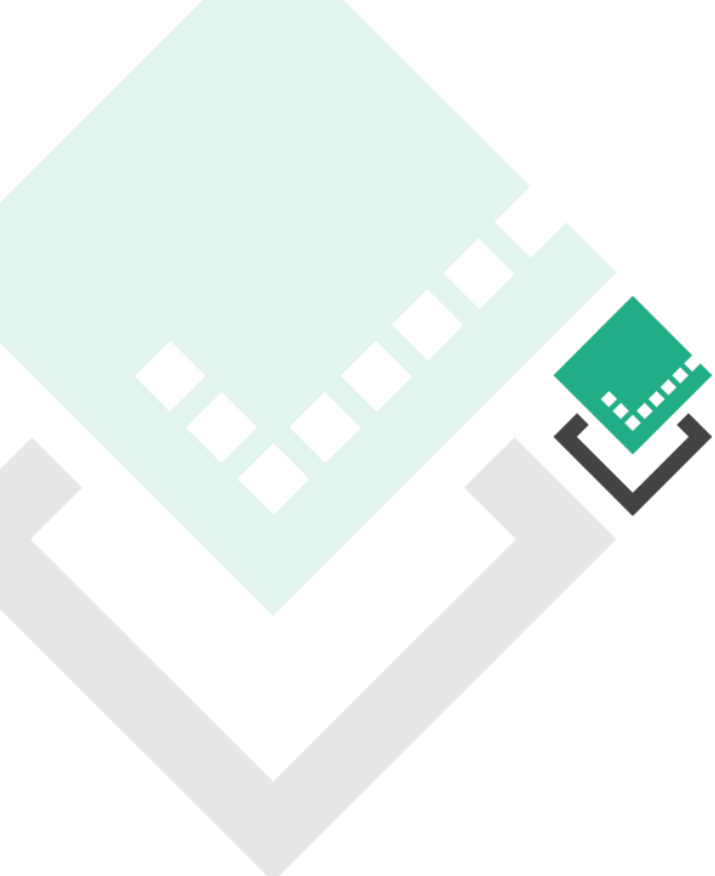
Part B | Fire Safety

Regulation 38 | Provision of Fire Safety Information

- 40** Regulation 38 'Fire Safety Information' is applicable to the common areas of the building. In this regard, the design team has been reminded that they should correlate all fire safety information relating to the operation, maintenance and identification of the fire safety services and systems installed at the premises.
- At the completion of the project or upon first occupation, this package should be handed to the 'Responsible Person' ('Responsible Person' has the meaning given in the RRO), in order that they can assess the building prior to developing an appropriate Fire Risk Assessment document.

Other Legislation

- 41** **The Regulatory Reform (Fire Safety) Order 2005**
- There will be a need to carry out a Fire Risk Assessment of the common areas of the premises prior to occupation as required by the Regulatory Reform (Fire Safety) Order 2005.
- The client design team has been reminded of this requirement.



PRO

Building Control



CONTACT US

ADDRESS

PRO Building Control Limited
26 Arnold Avenue,
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Grantham,
Lincolnshire
NG31 8HN

PHONE

T 07799 896524

ONLINE

E office@probuildingcontrol.co.uk





APPENDIX 2 – APPROVAL AUTHORITY (LOCAL FIRE AUTHORITY) COMMENTS AND RESPONSE

1. Statutory consultation with Location Fire Authority to be completed.
2. Comments yet to be received.

Pro Building Control Ltd
26 Arnold Avenue
Gonerby Hill Foot
Grantham
Lincolnshire
NG31 8HN

The London Fire Commissioner is the
fire and rescue authority for London

Date 1 May 2020
Our Ref 24/010718
Your Ref Ai-RC019-02

Dear Sir/Madam

RECORD OF CONSULTATION/ADVICE GIVEN

REGULATORY REFORM (FIRE SAFETY) ORDER 2005 ARTICLE 46 THE BUILDING (APPROVED INSPECTORS ETC.) REGULATIONS 2010

SCOPE OF WORKS: New build residential development

PREMISES: OROINE HOUSE, 12 STATION ROAD, HAMPTON WICK, KT1 4HG

PLAN NUMBERS: 10901 PL 100, C102 PRC GR DR AR 10001, C102 PRC BO DR AR 13001, C102 PRC GF DR AR 13002, C102 PRC 01 DR AR 13003, C102 PRC 02 DR AR 13004, C102 PRC 03 DR AR 13005, C102 PRC RF DR AR 13006.

The London Fire Commissioner (the Commissioner) is the fire and rescue authority for London. The Commissioner is responsible for enforcing the Regulatory Reform (Fire Safety) Order 2005 (The Order) in London.

The Commissioner has been consulted with regard to the above-mentioned premises and makes the following observations:

The Commissioner is not satisfied with the proposals, for the following reasons:

Please provide:

- justification for extended escape travel distance at third floor level and activation method of AOV in common corridors in all levels.
- Details of ventilating underground car park.
- Confirmation of data requested by Building Control.

The Commissioner strongly recommends that sprinklers are considered for new developments and major alterations to existing premises, particularly where the proposals relate to schools and care homes. Sprinkler systems installed in buildings can significantly reduce the damage caused by fire and the consequential cost to businesses and housing providers, and can reduce the risk to life. The Commissioner's opinion is that there are opportunities for developers and building owners to install sprinkler systems in order to save money, save property and protect the lives of occupier. Please note that it is our policy to regularly advise our elected Members about how many cases there have been where we have recommended sprinklers and what the outcomes of those recommendations were. These quarterly reports to our Members are public documents which are available on our website.

Any queries regarding this letter should be addressed to FSR-AdminSupport@london-fire.gov.uk. If you are dissatisfied in any way with the response given, please ask to speak to the Team Leader quoting our reference.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Dan DeG', written in a cursive style.

Assistant Commissioner (Fire Safety Regulation)

Reply to John Simmons
Direct T 07825996428

The London Fire Brigade promotes the installation of sprinkler suppression systems, as there is clear evidence that they are effective in suppressing and extinguishing fires; they can help reduce the numbers of deaths and injuries from fire, and the risk to firefighters.

Graeme Baird
Pro Building Control Ltd
26 Arnold Avenue
Gonerby Hill Foot
Grantham
Lincolnshire
NG31 8HN

The London Fire Commissioner is the
fire and rescue authority for London

Date 9 August 2021
Our Ref 24/010718
Your Ref Ai-RC019-02

Dear Sir

RECORD OF CONSULTATION/ADVICE GIVEN

**REGULATORY REFORM (FIRE SAFETY) ORDER 2005 ARTICLE 45
THE BUILDING (APPROVED INSPECTORS ETC.) REGULATIONS 2010
SCOPE OF WORKS: NEW BUILD RESIDENTIAL DEVELOPMENT
PREMISES: MULBERRY COURT, 12-14 STATION ROAD, HAMPTON WICK, KT1 4HG.**

PLAN NUMBERS:

- C102-CBC-B0-DR-EL-63201
- C102-CBC-GF-DR-EL-63202-2
- C102-CBC-01-DR-EL-63203
- C102-CBC-02-DR-EL-63204
- C102-CBC-03-DR-EL-63205
- 11177_TE-SK-200520-01-Fire Hose Strategy GF
- 11177_TE-SK-200520-03-Fire Hose Strategy 2ndF
- 11177_TE-SK-200520-02-Fire Hose Strategy 3rdF
- LFB Consultation pro-forma, PRO Building Control Limited, Reference AI-RC19-02,4/12/2021
- Mulberry Court, Hampton Wick RIBA Stage 4 Fire strategy, FDS Consult, Reference C102-FDS-XX-RP-XX-00001, Issue 02, 12/5/2020

The London Fire Commissioner (the Commissioner) is the fire and rescue authority for London. The Commissioner is responsible for enforcing the Regulatory Reform (Fire Safety) Order 2005 (The Order) in London.

The Commissioner has been consulted with regard to the above-mentioned premises and makes the following observations:

The Commissioner is **not** satisfied with the proposals, for the following reasons:

(1) Comments on proposed scheme primarily relating to the Regulatory Reform (Fire Safety) Order 2005

MULBERRY COURT, HAMPTON WICK RIBA STAGE 4 FIRE STRATEGY, FDS CONSULT, REFERENCE C102-FDS-XX-RP-XX-00001, ISSUE 02, 12/5/2020

3.4 ESCAPE WITHIN RESIDENTIAL COMMUNAL AREAS

1. We note the proposals of mechanical smoke ventilation systems for the communal residential corridors. We have not been provided with any CFD modelling input and output data or a report to demonstrate the solutions suitability thus Fire Engineering Group will be unable carry out a full evaluation of the proposals until such time as we are in receipt of a copy of the CFD modelling on a CD/DVD or other portable storage device. The disc/device should contain all aspects of the CFD modelling, including the input and output files. The CFD modelling analysis should be supported with a strategy detailing the input parameters, outcomes and acceptance criteria for the specified project. We therefore request that the CFD modelling and supporting documents are submitted to us via the building control body along with their (or their third party reviewer's) assessment, comments, and approvals decision in respect to this additional information.
2. We note the omission of 1m² permanently ventilated lobbies to the basement car park. We note that the fire engineers have proposed an alternative solution provided that the car park mechanical smoke ventilation system is able to demonstrate it prevents the ingress of smoke to the stairs. It is requested that a QDR is held to agree the input parameters and acceptance criteria. We would expect the system to meet to be designed to satisfy the requirements in BS 7346-7 and as the proposed system is specified to protect the staircases from smoke, it should be considered a life safety system and designed as a smoke control system and not just smoke clearance. It is our opinion that the design should either; have suitable redundancy and backup power supplies (Clause 15, BS 9991:2015) or; the systems performance is analysed at its lowest worst case specification e.g. 50%.
3. We do not feel the layout and the justifications provided in relation to base of stair 2 is suitable and sufficient to satisfy Article 14 of the RR(FS)O 2005. This design element should be reconsidered with the stair provided protection from the ingress of smoke.
4. The reference within section 3.4.9 to the anticipated mobility of occupants is noted however this should be reviewed in conjunction with the fire risk assessment over time. If the occupant demographics change then the current arrangements will need review.
5. The curtain described in section 3.4.21 need careful consideration as to whether the proposals are sufficiently robust and can be managed and maintained. Failure of this curtain could allow smoke to spread onto other levels into unventilated areas of escape corridor. As the curtain is supporting the compartmentation within the building we question whether a smoke curtain alone is sufficient in this instance.

3.5 GENERAL RESIDENTIAL ESCAPE REQUIREMENTS

6. Paragraph 3.5.6 proposes that the lift in core 1 is upgraded to provided evacuation capabilities. However from the plans provided the only lift for the building appear to be located within the unventilated portion of the central corridor. Due to being in an unprotected area, this lift will not be appropriate for evacuation purposes.

3.11 MEANS OF ESCAPE SMOKE VENTILATION

7. Paragraph 3.11.3 notes that guidance from the Smoke Control Association guidance should be applied. It should be highlighted that the current layout does meet the principals of the SCA guidance due to the MSVS extracting towards the stair.
8. Paragraph 3.11.7 notes that replacement air will be provided via the staircase AOV. Careful consideration in relation to the door opening forces especially with the proposed occupancy need to be had with the proposed solution as all plans provided indicate that the staircase doors open inward in to the staircore, creating the potential for the doors to be pulled/pushed shut caused by the air velocity.

9. Paragraph 3.11.8 notes that manual control for the MSVS will be provided for firefighters. We would like to highlight that MSVS should operate automatically and be a single-speed system such that no intervention or action is required by incoming firefighters.

3.14 NON-RESIDENTIAL FIRE ALARM AND DETECTION SYSTEM

10. Due to the incorporation of two differing evacuation strategies, it needs to be ensured that all occupants are clear on the emergency procedures depending on their location. It should be ensured that areas where the 'stay put unless affected by smoke' is in place are not affected by noise bleed-over from the sounders of the simultaneous alarm system, as this may cause confusion for occupants potentially contriving Article 15 of the RR(FS)O 2005.

8.0 FIRE SAFETY AND MANAGEMENT

11. We have been provided information that there will be no onsite management of this building. It is unclear as to how several of the active fire safety measures and evacuation procedures including PEEP's will be suitably managed and maintained without onsite management.

11177_TE-SK-200520-03-Fire Hose Strategy 2ndF

12. We note that continuous balconies are proposed. It should be ensured that fire resistant separation between the apartments should extend to the extremities of the demise, i.e. should be provided between the terraces/balconies of neighbouring dwellings where these elements are continuous. We leave for the BCB to confirm that this is provided as necessary.

11177_TE-SK-200520-02-Fire Hose Strategy 3rdF

13. The plans indicate that two AOV's are located within terrace 2 area. Please confirm the height of these openings, as it will be inappropriate to have products of combustion released within the demise of the resident. Additionally by having them located within an occupants demises it could place the activation of them at risk; as inspection history have found occupants placing items on top and near these, which may cause management complications and enforcement action for the responsible person.

(2) Comments on proposed scheme primarily relating to the Building Regulations

See section 1.

(3) Additional observations and recommendations relating to proposed scheme

Regulation 38 (Building Regulations)

14. Where applicable, we presume that the building control body will check to ensure that adequate fire safety information (as detailed in Section 17 of Approved Document B, Volume 1/Section 19 of Approved Document B, Volume 2) will be issued to the responsible person for the premises at the completion of the project, or when the building or extension is first occupied.

Common escape route

15. Maintenance and integrity of the flat front doors – when a fire occurs in the premises, the safety of occupants and their means of escape relies heavily on the flat front doors retaining their self-closing devices and their fire resistance. Ongoing control over the repair, maintenance and replacement of doors and self-closing devices is an important issue that will need to be effectively planned, monitored and reviewed by the responsible person in order to ensure ongoing compliance with the Regulatory Reform (Fire Safety) Order 2005. This may include the need to ensure the issue is specifically covered in leases and tenancy agreements to make certain that appropriate remedial works can be carried out as the need arises.

(4) Expected outcome of consultation

Based on the nature of the items raised above in sections (1) to (3):

- We would expect to be consulted further to this letter due to the significant issues raised in relation to matters under the Regulatory Reform (Fire Safety) Order 2005 and/ or B5 fire service access arrangements. In our view further information should be provided in regards to the following:

Section 1

Notwithstanding the above, we presume that all comments raised in this consultation letter will be forwarded to the client/ project design team for consideration.

The above observations are in relation to the current proposal and may not be relevant to any future proposal.

Any queries regarding this letter should be addressed to FSR-Adminsupport@London-fire.gov.uk. If you are dissatisfied in any way with the response given, please ask to speak to the Team Leader quoting our reference.

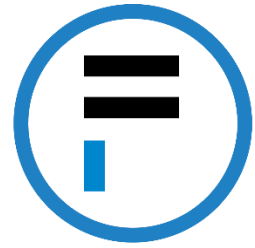
Yours faithfully,



Assistant Commissioner (Fire Safety Regulation)

Reply to Paul Rajkumar
Direct T 0208555 1200 ext 89171

The London Fire Brigade promotes the installation of sprinkler suppression systems, as there is clear evidence that they are effective in suppressing and extinguishing fires; they can help reduce the numbers of deaths and injuries from fire, and the risk to firefighters.



fds consult uk

DATE 24th August 2021

FAO Grahame Baird

152-154 London Road
Greenhithe
Kent
DA9 9JW

Tel : 01322 387411
Fax : 01322 386361

Dear Grahame,

**Ref: Mulberry Court, Hampton Wick
LFB Response letter dated 9th August 2021 - Ref 24/010718**

Further to the response from the London Fire Brigade in the letter detailed above, please see my comments below: -

3.4 Escape within the residential communal areas

1. FDS - I note the request from the LFB for the provision of a CFD model to justify the use of a Mechanical Smoke Ventilation System on this development. This is a standard response from the LFB and the CFD is usually provided by the fire consultant, when appointed to do so, or the smoke control contractor. In this case, FDS Consult was not appointed to carry out this work, therefore it would be expected that the smoke control contractor would provide this.
2. FDS - The fire strategy report noted in section 3.4.16 that the lobbies should be served by a 1.0m² permanent vent or the smoke control system should be shown to demonstrate that the lobbies are protected. The Fire Strategy report also recommended a QDR should be carried out prior to any CFD being commissioned to agree the parameters and acceptance criteria. This was a further piece of work that FDS Consult was not appointed to carry out.
3. FDS - Given that the building is served with 2 x stairs, both of which are accessible to all the residents at this area of the building, it is considered that the measures provided protect the means of escape. The basement section is served by a lobby (either vented or depressurized by the car park system, as above) and a door to the head of the basement stair. The base of the stair is separated from the adjacent accommodation by lobbies at the Ground floor. The residents of the upper floor do not have to pass through the stair to make their escape and the stair is vented with a head of stair vent. It is difficult to see what other advantage would be achieved by a door at the base of the stair. There is insufficient space to form a door swing which would not obstruct other users of the floor or the stair and as the stair is generally used as a main circulation route, it is likely the door would be held open to avoid residents having to maneuver it on a regular basis.
4. FDS - The comment is noted and will be for the management of the development to consider. It should be noted that the change in demographic can be applied to any residential building with more or less fire safety provisions but with less management in place.
5. FDS - It is understood that the curtain reference in the FDS Consult Fire Strategy Section 3.4.21 has been omitted in lieu of 1hr fire Doors & Smoke seals (As Built Drawing C102-PRC-GF-DR-AR-30002-C04-PDF.pdf - dated 23/08/2021 refers).

3.5 General Residential Escape Requirements

6. FDS - It is understood that the evacuation aspect of the lift have been omitted in favor of self / assisted evacuation. This forms part of the management action plan and briefing to tenants / occupant of the building.

3.11 Means of escape smoke ventilation

7. FDS - I note your comments, however, it should be noted that the SCA Guide most deals with escape in a single direction or buildings with a single stair. The means of escape for the majority of this building is a two- stair approach. Noting that the layout details in ADB and BS 9991 for a two stair building do not specify a location for the smoke shaft, only that the corridor should be vented, we consider that the location of the shaft in this situation is not dissimilar to that approach.
8. FDS - It is understood that pressure switches will be provided to the stair door as an agreed deviation from the FDS Smoke Strategy (As Built Drawing C102-PRC-GF-DR-AR-300032-C03-PDF.pdf - dated 23/08/2021 refers).
9. FDS - With reference to the details for the controls for Firefighter controls of the MSVS, details of the system including the flow rate(s) and controls (if any) should be provided by the smoke control contractor. Note, the SCA also references the provision of Manual Control Points for FRS use, even where a system is designed for single speed.

3.14 Non-residential fire alarm and detection system

10. FDS - Comments noted. It is expected that this (will) form a part of the resident's information provided on occupation.

8.0 Fire safety and management

11. FDS - It is understood that the responsible person for this development has extensive experience in operating and managing properties and developments of this kind. A management plan can be made available on request.

11177_TE-SK-20020-03-Fire Hose Strategy 2nd Floor

12. FDS - The as-built fire strategy drawing for this level do not indicate shared balconies

11177_TE-SK-20020-02-Fire Hose Strategy 3rd Floor

13. FDS - Typically, where smoke control systems are located on or near residential areas, they are screened from the residents. Further details can be provided by the smoke control contractor and / or the landscape contractor.

Regulation 38 (Building Regulations)

14. FDS - Noted, no further comments.
15. FDS - Noted, no further comments.

Yours sincerely,



Granville Harris
CEng, MSc, BEng (Hons), MIFireE