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Barratt West London

Outline Fire Safety Strategy

Bollo Lane Plot 3A
London

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Outline Fire Safety Strategy

Bollo Lane Plot 3A London

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The checker has provided an internal review of the technical content of the report.

The approver confirms the report has received quality assurance in accordance with the principles of ISO 9001 and authorises external release of the document on behalf of Ashton Fire.

CONTENTS

1. INTRODUCTION	4	5. EXTERNAL FIRE SPREAD	21
1.1 General	4	5.1 External wall construction - Buildings over 18 m	21
1.2 Fire safety guidance	4	5.2 Roof coverings	21
1.3 Alternative fire engineering solutions	4	5.3 Space separation and unprotected areas of the façade	21
1.4 The London Plan - Policy D12	4	6. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE	24
1.5 Reference information	5	6.1 Vehicle access to and around the site	24
1.6 Project description	5	6.2 Access into and through the building	24
1.7 The non-residential areas (ancillary areas and commercial) - Risk Profile	6	6.3 Firefighting facilities	25
1.8 Design Occupancy (non-residential areas)	6	6.4 Water supplies	25
2. ACTIVE FIRE SAFETY SYSTEMS	10	6.5 First-aid firefighting	25
2.1 Means of detection and alarm	10	APPENDIX A - LONDON PLAN POLICY D5 - INFORMATION ON EVACUATION LIFT	26
2.2 Evacuation Alert System (EAS)	10	A.1 General	26
2.3 Automatic suppression system	10	A.2 Design consideration	26
2.4 Smoke ventilation system	10	A.3 Capacity assessment	26
2.5 Evacuation for people with reduced mobility and evacuation lifts	11	A.4 Evacuation Strategy	26
2.6 Electromagnetic locking / hold-open devices	11	A.5 Evacuation lift management	26
2.7 Emergency lighting	11	A.6 Conclusion	26
2.8 Fire safety signage	11	APPENDIX B - LONDON PLAN POLICY D12 - INFORMATION ON THE FIRE SAFETY PROVISIONS	27
2.9 Wayfinding signage	12	B.1 General	27
2.10 Firefighting lift	12	B.2 Policy D12 (1) - <i>The building's construction: methods, products and materials used, including manufacturers' details</i>	27
2.11 Fire mains	12	B.3 Policy D12 (2) - <i>The means of escape for all building users: suitably designed stair cores, escape for building users who are disabled or require level access, and associated evacuation strategy approach</i>	27
2.12 Emergency (life-safety) power supplies	12	B.4 Policy D12 (3) - <i>Features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans</i>	27
3. MEANS OF WARNING AND ESCAPE	13	B.5 Policy D12 (4) - <i>Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and position of equipment, firefighting lifts, stair and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these</i>	28
3.1 Evacuation philosophy	13	B.6 Policy D12 (5) - <i>How provision will be made with the curtilage of the site to enable fire appliances to gain access to the building</i>	28
3.2 Horizontal means of escape - Residential areas	13	B.7 Policy D12 (6) - <i>Ensuring that any potential future modification to the building will take into account and not compromise the base build fire safety/ protection measures</i>	28
3.3 Horizontal means of escape - Ancillary areas and the commercial unit	16	B.8 Conclusion	28
3.4 Vertical means of escape	17	7. BIBLIOGRAPHY	29
3.5 Private balconies	18		
3.6 Escape beyond final exits	18		
4. PASSIVE FIRE PROTECTION	19		
4.1 Internal wall and ceiling linings	19		
4.2 Structural fire resistance	19		
4.3 Compartmentation and fire-resisting construction	19		
4.4 Fire doors	20		
4.5 Fire-stopping and penetrations through fire-resisting construction	20		
4.6 Cavity barriers and concealed spaces	20		

1. INTRODUCTION

1.1 General

- 1.1.1 Ashton Fire has been commissioned by Barratt West London to provide fire safety consultancy services for the proposed Bollo Lane Plot 3A development located in London.
- 1.1.2 This report outlines the minimum fire safety provisions required for the proposed development to be compliant with the functional requirements of the Building Regulations 2010 (as amended).
- 1.1.3 This document is intended for RIBA Stage 3. This document is an outline document only and is not to be submitted as part of the Building Regulations application; a Detailed Fire Safety Strategy is required to be developed during the proceeding design stages to support.
- 1.1.4 This document has been prepared to support the pre-planning design and the planning application for the development.
- 1.1.5 In accordance with the requirements of the 'Town and Country Planning (Development Management Procedure and Section 62A Applications)(England)(Amendment) Order 2021' a fire statement should be prepared in support of the planning application.
- 1.1.6 As the building has a topmost occupied storey height above 50 m, a Qualitative Design Review (QDR) has been undertaken as a separate report.

1.2 Fire safety guidance

- 1.2.1 The principal guidance document being used to demonstrate compliance with the requirements of the Building Regulations is BS 9991:2015 [1] which is applicable at the time of writing this report. For areas that fall outside the scope of BS 9991, the recommendations contained within BS 9999:2017 [2] should be followed. It is noted that this guidance document does not set out statutory requirements; they are intended to provide guidance only for generic building designs. An alternative solution can be applied to achieve an acceptable level of safety commensurate with the function requirements of the Building Regulations 2010 (as amended).
- 1.2.2 On the basis that recommendations made within the guidance documents are followed, it is considered that the Requirements of the Building Regulations 2010 (as amended) will be fulfilled; and that an adequate level of fire safety will be provided throughout the premises.
- 1.2.3 Unless specifically covered in this report please refer to the adopted design guidance for further details.

1.3 Alternative fire engineering solutions

- 1.3.1 Fire engineering principles are employed to support alternative solutions where strict adherence to the codes would conflict with the wider aspirations for the scheme. The use of a fire safety engineering approach is recognised within BS 9991 as an acceptable means of complying with the Functional Requirements.
- 1.3.2 Apart from where noted in this report, the design will be in accordance with the recommendations of BS 9991. Departures from the code guidance are identified and alternative solutions proposed following the methodology outlined in BS 7974 [3].
- 1.3.3 In accordance with the fire safety engineering principles detailed in the BS 7974 codes of practice, all fire precautions are determined based on there being one seat of fire, as considered suitable for accidental fires.

1.4 The London Plan – Policy D12

- 1.4.1 The Policy D12 states:

In the interest of fire safety and to ensure the safety of all building users, all developments proposals must achieve the highest standards of fire safety and ensure that they:

- *Identify suitably positioned unobstructed outside space:*
 - *For fire appliances to be positioned on;*
 - *Appropriate for use as an evacuation assembly point;*
- *Are designed to incorporate appropriate features which reduce the risk to life and the risk of serious injury in the event of a fire; including appropriate fire alarm systems and passive and active fire safety measures;*
- *Are constructed in an appropriate way to minimise the risk of fire spread;*
- *Provide suitable and convenient means of escape, and associated evacuation strategy for all building users;*
- *Develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in;*
- *Provide suitable access and equipment for firefighting which is appropriate for the size and use of the development.*

All major development proposals should be submitted with a Fire Statement, which is an independent fire strategy, produced by a third party, suitably qualified assessor. The statement should detail how the development proposal will function in terms of:

- *The building's construction: methods, products and materials used, including manufacturers' details;*
- *The means of escape for all building users: suitably designed stair cores, escape for building users who are disabled or require level access, and associated evacuation strategy approach;*
- *Features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans;*
- *Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and position of equipment, firefighting lifts, stair and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these;*
- *How provision will be made with the curtilage of the site to enable fire appliances to gain access to the building;*
- *Ensuring that any potential future modification to the building will take into account and not compromise the base build fire safety/ protection measures.*

- 1.4.2 This fire safety report has been developed in line with the above items. This document is intended to provide strategic guidance, therefore detailed design information such as the methods of construction or the selection of specific products will not be included within this document. However, the minimum performance requirements to be achieved by certain products or materials in the building are stated within this report, which will be used to inform the selection of products during the subsequent stage of project design.

1.4.3 In accordance with Policy D5 (Inclusive Design) of the London Plan, safe and dignified emergency evacuation is required to be incorporated into the building for all building users. As this building has a passenger lift installed, the aforementioned policy stipulates that a suitably sized lift should be provided for evacuation. Fire evacuation lifts and associated provisions should be appropriately designed and constructed and should include the necessary controls suitable for the purposes intended. Furthermore, the operation of the lifts should be supported by appropriate management procedures. In accordance with Annex G of BS 9999, the evacuation lifts may be operated using either driver assisted evacuation, automatic evacuation or remote assistance evacuation. The end client will need to understand and provide a suitable management plan for the evacuation lifts within the building.

1.4.4 In accordance with Clause 3.12.9 of Policy D12 of the London Fire Plan, Fire Statements are to be produced by qualified engineers with relevant experience in fire safety such as a chartered engineer or suitably qualified and competent professionals with demonstrable experience to address the complexity of the design being proposed. The relevant experience of the authors and authorisers of this document are displayed in Table 1.

Table 1 - Qualifications and relevant experience

Name	Role	Academic qualifications	Membership of professional bodies	Relevant experience
Michael Houghton	Graduate Fire Engineer	BEng in Aerospace Engineering	N/A	1 year in the design of fire strategies for residential buildings including high-rise buildings.
Daniel Mois	Associate Fire Engineer	BSc in Civil Engineering MSc in Civil Engineer, Building Structures	Associate Member with the Institute of Fire Engineers (AIFireE)	5 years in the design of fire strategies for residential buildings including high-rise buildings.
Jun Heng Low	Senior CFD Fire Engineer	BEng (Hons) in Mechanical Engineering MSc in Fire Safety Engineering	Associate Member of the Institution of Fire Engineers (AIFireE) Member of the Society of Fire Protection Engineers (MSFPE)	5 years in the development of fire strategies for residential buildings, including high-rise.

1.4.5 As this document is a performance-based strategic document which is used to inform other members of the design team. As such, when reviewing the Policy D12 requirements, this document should be read in line with other supporting documentation produced by other members of the design team.

1.5 Reference information

1.5.1 This document is based on information provided by the design team to Ashton Fire as listed in Table 2. Additional contradictory information or subsequent design variations to the information supplied may render the findings and recommendations of this report invalid.

1.5.2 The figures used within this report are indicative and used to express the principles of the fire safety strategy. They may not be representative of final arrangement. The principles contained within this report are required to be maintained through any design amendments during the life of the building.

Table 2 - Project documentation referenced

Description	Drawing Number	Revision	Author
Ground Floor	BOLAN-AAM-BA-00-DP-AR-06100	P1	Allies and Morrison LLP
Residential Mezzanine	BOLAN-AAM-BA-0M-DP-AR-06150		
Level 01	BOLAN-AAM-BA-01-DP-AR-06101		
Level 02	BOLAN-AAM-BA-02-DP-AR-06102		
Level 03	BOLAN-AAM-BA-03-DP-AR-06103		
Level 04	BOLAN-AAM-BA-04-DP-AR-06104		
Level 05-11	BOLAN-AAM-BA-05-DP-AR-06105		
Level 12	BOLAN-AAM-BA-12-DP-AR-06112		
Level 13-21	BOLAN-AAM-BA-13-DP-AR-06114		
Level 22	BOLAN-AAM-BA-22-DP-AR-06122		
Level 23-24	BOLAN-AAM-BA-24-DP-AR-06123		
Level 25	BOLAN-AAM-BA-25-DP-AR-06125		

1.6 Project description

1.6.1 This report is specific to the Bollo Lane Plot 3A development located in London.

1.6.2 The proposal is a high-rise mixed-use development, comprising of residential units and a commercial space which are completely independent of each other. The building is primarily for residential use. The development is arranged over 26-storeys (including Ground + Mezzanine). The building measures approximately 81.3 m from Ground Floor/fire service access level to the finished floor level (FFL) of the topmost occupied storey (25th Floor).

1.6.3 Ancillary accommodation is located throughout the building on Ground to 4th Floor and on the 25th Floor. Ancillary areas consist of a gym, residential back-of-house (BOH), cycle store, generator, residential water tank, wet riser tank, commercial sprinkler tank, bin store, substations, internal heating substation, plant, and amenity spaces. The commercial space is located on the Ground + 1st Floor.

1.6.4 All upper storeys within the building are served by two residential staircases, forming a multi-stair arrangement on all levels. Both staircases serving the residential units should be designed as firefighting stairs (Stairs 1 & 2). The commercial space is served by a protected staircase. The building has been designed to incorporate evacuation lifts for the evacuation of disabled occupants.

1.6.5 The fire safety strategy for the commercial spaces is concerned with the shell and core of these spaces only. Demonstrating compliance with Part B of the Building Regulations for the fit-out of these units should be the tenant's responsibility.

1.6.6 Indicative layouts for the building are illustrated in Figure 1 to Figure 12.

1.6.7 The accommodation provided within the building is summarised in Table 3.

Table 3 - Summary of accommodation

Storey	Accommodation type
Ground	Ancillary & commercial
Mezzanine	Ancillary, commercial & residential
1 st to 4 th Floor	Ancillary & residential
5 th to 11 th Floor	Residential
12 th Floor	Ancillary & residential
13 th to 24 th Floor	Residential
25 th Floor	Ancillary

1.7 The non-residential areas (ancillary areas and commercial) – Risk Profile

- 1.7.1 The non-residential areas (ancillary areas and commercial) should be designed in accordance with the guidance contained in BS 9999:2017.
- 1.7.2 As per the guidance contained in BS 9999, a risk profile is established to determine appropriate means of escape and other relevant fire safety provisions for life safety. The risk profile is a function of the occupancy characteristic and the fire growth rate.
- 1.7.3 The risk profiles of the different non-residential areas are summarised in Table 4.

Table 4 - Risk profile summary

Areas	Occupancy characteristics	Fire growth rate ⁽¹⁾	Risk profile
Commercial space	B - Awake and Unfamiliar	2 - Medium	B2
Ancillary areas (plant room, storage etc.)	A - Awake and Familiar	2 - Medium	A2
Ancillary areas (amenity & reception)	A - Awake and Familiar	1- Slow	A1
Notes: 1) Based on provision of sprinkler system.			

1.8 Design Occupancy (non-residential areas)

- 1.8.1 The number of occupants expected in the non-residential areas must be calculated to ensure that the number and width of exits have sufficient capacity for means of escape purposes.
- 1.8.2 The maximum design occupancy noted in the table below has been calculated based on the floor space factors provided in Table 9 of BS 9999. Where a space is considered as transient (e.g. for maintenance), it is expected that the number of occupants within the space does not exceed 60 people.

Table 5 - Maximum estimated design occupancy

Space	Area (m ²)	Floor space factor	Maximum design occupancy
Ground Floor			
Gym	83	2 m ² /person	41 people
Residential BOH	61		30 people
Residential amenity/lobby	48		24 people
B1 (c)	131		60 people ⁽¹⁾
Mezzanine Floor			
Amenity	26	2 m ² /person	13 people
1 st Floor			
B1 (c)	276	2 m ² /person	60 people ⁽¹⁾
Amenity	78		39 people
2 nd to 3 rd Floor			
Amenity	40	2 m ² /person	20 people
4 th Floor			
Amenity	51	2 m ² /person	25 people
25 th Floor			
Amenity	82	2 m ² /person	41 people
Notes: 1) Maximum design occupancy is limited to 60 people based on a single means of escape.			



Figure 1 - Indicative Ground Floor plan



Figure 2 - Indicative Mezzanine Floor plan



Figure 3 - Indicative 1st Floor plan



Figure 4 - Indicative 2nd Floor plan



Figure 5 - Indicative 3rd Floor plan



Figure 7 - Indicative 5th to 11th Floor plan



Figure 6 - Indicative 4th Floor plan



Figure 8 - Indicative 12th Floor plan



Figure 9 - Indicative 13th to 21st Floor plan



Figure 11 - Indicative 23rd to 24th Floor plan



Figure 10 - Indicative 22nd Floor plan



Figure 12 - Indicative 25th Floor plan

2. ACTIVE FIRE SAFETY SYSTEMS

2.1 Means of detection and alarm

2.1.1 The fire detection and alarm system requirements across the development are summarised in Table 6.

Table 6 - Minimum fire detection and alarm system

Accommodation	Minimum requirements
Residential flats	All residential flats should be provided with a Grade D, Category LD1 detection and alarm system, designed and installed in accordance with BS 5839-6 [4]. In line with Annex D.3 of BS 99991, an alarm system should be provided on the balcony.
Residential communal areas	Residential communal areas should be provided with an L5 system conforming to BS 5839-1 [5]. The purpose of this system is to activate the smoke ventilation systems within the communal corridors only. However, within other communal areas which may be occupied (e.g. amenity spaces), the system will provide an audible alarm signalling for occupants to evacuate. Visual alarms should be provided where required in accordance with BS 5839-1. It is recommended that the detector head spacing for the L5 system within the corridors is in accordance with the recommendations for a category L4 system. The roof should be provided with an alarm system (visual alarms/sounders where deemed necessary), conforming to BS 5839-1.
Ancillary Accommodation	An L2 system conforming to BS 5839-1 should be provided to all ancillary accommodation, in accordance with BS 9999.
Commercial unit	An L2 system conforming to BS 5839-1 should be provided to the commercial units, in accordance with BS 9999.

2.2 Evacuation Alert System (EAS)

2.2.1 Following recent amendments to ADB Volume 1 [6], residential buildings with a top storey over 18 m above Ground Level should be provided with an Evacuation Alert System in accordance with BS 8629 [7].

2.3 Automatic suppression system

2.3.1 The building is more than 11 m in height; therefore, a sprinkler system should be provided as follows:

- A Category 4 sprinkler system conforming to BS 9251:2021 [8] should be provided throughout the residential blocks of flats as the top floor is located above 18 m.
- The commercial units and ancillary areas (refuse areas, plant areas etc) should be provided with a sprinkler system designed and installed in accordance with BS EN 12845 [9].

2.3.2 The commercial unit should be protected by at least a Category OH2 sprinkler system conforming to BS EN 12845. The future fit-outs/tenancies should be commensurate with an OH2 classification in accordance with Table A.2 in BS EN 12845 or the hazard classification should be upgraded to OH3.

2.3.3 In accordance with BS EN 12845, ancillary areas should be provided with a Category OH3 sprinkler system.

2.3.4 Notwithstanding the above, where the ancillary areas are further sub-divided in fire compartments of reduced dimensions, the residential sprinkler system could be extended to cover those areas. BS 9251:2021 recommends a maximum compartment size of 100 m².

2.3.5 The design of the sprinkler system including specification of the system category is subject to specialist designer input & design.

2.4 Smoke ventilation system

Residential Staircase

2.4.1 The escape stairs (Stair 1 & 2) serving the residential accommodation on the upper floors within the development are required to be provided with a 1.0 m² AOV at the head of the stairway. The AOV should conform to BS EN 12101-2 [9].

Residential communal corridors & evacuation lift lobby

2.4.2 In line with the principles within BS 9991, the communal corridors in front of the staircase should be provided with a smoke ventilation system. However, at the time of writing this report no guidance is provided in regard to the design of evacuation lifts in residential buildings i.e., there is no clear information within the public domain on what is considered to be appropriate protection for the lift shafts, refuge areas or controls needed for the lift cars in residential buildings.

2.4.3 In accordance with London Plan, one evacuation lift per core is included in the proposal. Therefore, the proposals are to follow the guidance within BS 9991 but include additional measures for protection of the evacuation lift and associated refuge space. As the lobby in front of the stair and lift provides refuge whilst occupants await the lift, this should be appropriately protected for the period it is needed.

2.4.4 To achieve the above, it is recommended that the lobby will be protected to the same standard as the stair (i.e., adopting the principles in BS 9991 for protecting the stair and applying this to the lobbies). As such, the lobby should be protected from the ingress of smoke, and this should be facilitated by the provision of a smoke ventilation system through smoke shafts or AOVs in the communal corridors adjoining the lobby. A smoke shaft should also be located within the lobby, the size of which should be determined via CFD modelling (typically the same size as the communal corridor smoke shafts – see Section 2.4.7).

2.4.5 The protected lobby serving the evacuation lifts should be treated as part of the staircase with regard to the protection against the egress of smoke. Therefore, the recommendations within BS 9991 with regards to the smoke ventilation system for the communal areas in front of the staircase are recommended to be applicable also for the communal corridors in front of the evacuation lift lobby, therefore the smoke ventilation system should extend the same level of protection to the evacuation lift lobby.

2.4.6 In line with BS 9991 recommendations, in a multi-stair building, travel distance within the communal corridor supported by a smoke ventilation system should be limited to 7.5 m in a single direction, measured from the flat entrance door to the lobby door. Where travel is possible in multiple directions, travel distances are supported up to 30 m, the travel distance should be measured from the furthest flat entrance door to the door of the lift lobby (this should be discussed and agreed with the planning authorities).

- 2.4.7 Where the topmost occupied storey height of the block is above 18 m, it is recommended that a mechanical smoke ventilation system is provided. The size and performance of the smoke shaft should be determined via CFD modelling. Typically, in a 25-storey building, with a topmost occupied storey height of 81.3 m, mechanical smoke shafts should have cross sectional areas of circa 1.0 m², with a minimum dimension of 700 mm.
- 2.4.8 The MSVS should comply with the recommendations detailed below:
 - No services other than those relating to the smoke shaft should be contained within the smoke shaft.
 - The smoke shaft should be located at the remote end of the corridor away from the staircase.
- 2.4.9 The functionality of the MSVS should be demonstrated through the use of CFD modelling and should be carried out by a CFD specialist and captured in a separate report.
- 2.4.10 Smoke ventilation system requirements are further detailed within Section 3 of this report.
- 2.4.11 The smoke ventilation system in the communal lobby/corridor should be provided as per recommendations in Section 2.4 and is summarised in Table 7.

Ancillary accommodation

- 2.4.12 Throughout the building, a number of ancillary areas are accessible from the communal corridor serving flats (e.g. amenity areas). The stair should be afforded the same level of protection at all levels and thus should be separated from all ancillary accommodation via a mechanically ventilated lobby/corridor, as per the flats.
- 2.4.13 Where escape from the ancillary accommodation is via the communal corridor with a single direction of escape, the ancillary accommodation should be accessed from a protected lobby (no ventilation required).

Refuse Storage

- 2.4.14 Refuse stores, where accessed internally should only be via a lobby provided with 0.4 m² free area permanent ventilation.

Table 7 - Summary of smoke ventilation for communal areas

Corridor travel distance	Residential corridor	Lift Lobby
< 7.5 m	A mechanical smoke shaft	Natural inlet shaft ⁽¹⁾ ;
< 30 m	Two mechanical smoke shafts (push-pull system)	
Notes:		
1) The reduced dimensions of the inlet shaft or AOV should be established during the CFD modelling process (typically similar in size to the corridor smoke shaft). Typical smoke shafts should have a free area of circa 1.0 m ² in a 25-storey building, with a top storey height of 81.3 m.		

2.5 Evacuation for people with reduced mobility and evacuation lifts

- 2.5.1 In accordance with BS 9991, the applicable guidance at the time of writing this report, evacuation lifts are not required to be provided in residential buildings.
- 2.5.2 However, following recent updates of London Plan, in accordance with D12 & D5 Policy recommendations, consideration should be given on how all building occupants, including those with reduced mobility / wheelchair users can evacuate in an emergency. As it can be difficult for people with

reduced mobility (PRM) to navigate the escape stairs, it is typically recommended that occupants are provided with use of suitable lifts in an emergency.

- 1.1.1 The lift should be designed and installed in accordance with relevant provisions of BS EN 81-20 [10] and BS EN 81-70 [11]. A Type 2 evacuation lift in accordance with Table 3 of BS EN 81-70:2021 should be provided. One evacuation lift will be provided per core.
- 2.5.3 The residential areas within the building are served by 3 lifts. All lifts should be designed as evacuation lift, but they will also serve as firefighting lifts. Therefore, the lifts in the building should have a dual functionality, both for evacuation and firefighting purposes.
- 2.5.4 A dedicated lift is located within the commercial unit. In accordance with London Plan, the lift within the commercial unit should be designed as an evacuation lift.
- 2.5.5 As per BS EN 81-70, minimum car dimensions for a Type 2 lift are 1100 mm width and 1400 mm. This car accommodates one wheelchair user and an accompanying person.
- 2.5.6 Based on the evacuation philosophy, i.e., defend in place or "stay-put", only the flat of fire origin is required to evacuate. Therefore, the evacuation lift could accommodate one wheelchair user evacuating from the flat of fire origin at a time.
- 2.5.7 The evacuation lift would be required to be provided with a secondary power supply.
- 2.5.8 The cause and effect of any evacuation lift is to be discussed and agreed. Confirmation from the client/end user on the preferred operating sequence is required. The operation requirements and cause and effect arrangements may require consultation with a specialist vertical transport consultant.

2.6 Electromagnetic locking / hold-open devices

- 2.6.1 Where doors are provided with electromagnetic locking or hold-open devices, these devices are to operate (either release the door to close normally, or release the door to be opened) upon:
 - Activation of the detection and alarm system;
 - Failure of the power supply;
 - Operation of a hand operated witch located to the side of the door;
 - Malfunction.

2.7 Emergency lighting

- 2.7.1 Emergency lighting should be installed to provide temporary illumination in the event of failure of the primary power supplies to the normal lighting system. As part of the emergency lighting system, escape lighting will be provided to ensure the escape routes are illuminated at all material times. Adequate artificial lighting will be provided in all common escape routes and will be of a sufficient standard to enable persons to see to escape.
- 2.7.2 Emergency lighting will be installed in accordance with the recommendations of BS 5266 [12], BS EN 1838 [13] and BS EN 60598-2-22 [14].

2.8 Fire safety signage

- 2.8.1 Fire safety signs should be installed where necessary to provide clear identification of fire precautions, fire equipment and means of escape in the event of fire. All parts of the development should be fitted with appropriate fire safety signage to comply with The Health and Safety (Signs and Signals) Regulations 1996 [15], i.e. signage to be specified in according to BS ISO 3864-1 [16], BS 5499-4 [17] and BS 5499-10 [18].

2.9 Wayfinding signage

2.9.1 In line with BS 9991 requirements, each core should be provided with floor identification signs and flat indicator signs within the stairway and protected corridors/ lobbies.

2.10 Firefighting lift

2.10.1 A firefighting lift should be accessible from each staircase. Firefighting lift installations should conform to BS EN 81-20 and BS EN 81-72 [11]. Due to the height of the building, it is recommended that a third, additional firefighting lift is provided in order to ensure that the FRS are provided with one lift per core at all times (in the event of one being out-of-order for maintenance etc.).

2.11 Fire mains

2.11.1 Due to the height of the building, a wet riser main should be provided in each residential staircase. The wet riser main should be in accordance with BS 9990 [19]. Wet riser outlets should be located on the full landing of the stair at each level.

2.11.2 Wet riser inlet should be located near the entrance point and on the face of the building, should be within 18 m and in clear sight of the fire and rescue service vehicle parking position.

2.12 Emergency (life-safety) power supplies

2.12.1 All life-safety systems should be provided with robust power supplies in accordance with BS 8519 [20]. Secondary power supplies should be provided via a generator, UPS, internal batteries (where feasible) or a secondary substation on a different HV main.

2.12.2 The following fire safety systems should comply with their respective British Standards regarding secondary power supplies:

- Emergency lighting and signage;
- Automatic fire detection and alarm system;
- Automatic fire suppression system;
- Automatic smoke ventilation systems;
- Firefighting and evacuation lifts;
- Wet fire main pumps;
- Emergency Voice Communication system.

2.12.3 There must be a minimal delay in change over if the main power fails and it must occur automatically.

3. MEANS OF WARNING AND ESCAPE

3.1 Evacuation philosophy

- 3.1.1 A 'stay-put' (also known as 'defend-in-place') strategy will be implemented in all residential units, whereby, in the event of fire, only the unit of fire origin will receive a signal to evacuate. Further evacuation of other units may be enacted by the fire and rescue service, as needed depending on the development of the fire.
- 3.1.2 The areas of ancillary accommodation should operate a local simultaneous evacuation, whereby upon activation of the detection and alarm system, only the relevant areas should receive a signal to evacuate. All other areas should not receive a signal to evacuate.
- 3.1.3 In the commercial space, a simultaneous evacuation regime should be implemented within the relevant demise, whereby, in the event of fire anywhere in the commercial space, all occupants will receive the signal to evacuate.
- 3.1.4 The automatic fire detection and alarm system in the residential and non-residential parts of the building should be provided in support these evacuation philosophies, as set out in Section 2.1.

3.2 Horizontal means of escape – Residential areas

Flay layouts

- 3.2.1 The flats within the development are designed as single storey open-plan flats. In line with BS 9991 recommendations, where open-plan flats are provided, the following provisions should be included in the design:
- A Grade D1, LD1 detection and alarm system should be provided in accordance with BS 5839-6;
 - A sprinkler system should be provided throughout the flat;
 - The size of the flat should not exceed 16 m x 12 m;
 - Open-plan flats should be situated on a single level only;
 - The ceiling within the open-plan flat should have a minimum height of 2.25 m;
 - The kitchen should be enclosed in open-plan flats having an area exceeding 8 m x 4 m. Cooking appliances in open-plan flats smaller than 8 m x 4 m should not be adjacent to the entrance of the flat. It is recommended that the cooking facilities should be located at least 1.8 m away from internal escape routes and flat entrance doors as to not impede escape.
- 3.2.2 Regarding the final point above, the restriction on the flat size of 8 m x 4 m before enclosing the kitchen is quite restrictive in the design of open-plan flats. As such, further research (beyond the research carried out by the BRE and commissioned by the NHBC Foundation on open-plan flat design - NF19) has been carried out (Open plan apartments – revisiting risks in light of contemporary demands. IFE Journal Issue No 18, November 2016) [18]. The results of the additional research were published within the IFE journal and demonstrated that flats with a size greater than 8 m x 4 m with the kitchen open to the living area had a similar or better results than when compared to the scenarios with the kitchen enclosed. However, cooking facilities should not be sited adjacent to the entrance to the flat. Therefore, on the basis of the above, flats greater than 8 m x 4 m but less than 16 m x 12 m, with open kitchens are considered acceptable.
- 3.2.3 Where flats are provided with a sprinkler system and an LD1 fire detection alarm system, the overall travel distance from the furthest point in the flat should not exceed 20 m.

- 3.2.4 In line with Annex D.3 of BS 9991, an alarm system should be provided on the balconies.

Communal areas

- 3.2.5 Escape from any part of the roof should be directly into a protected stairway. Travel distance on the roof open to air should not exceed 60 m in the single direction.
- 3.2.6 The final escape route from each staircase at the final exit level should be considered as part of the staircase; it should be protected to the same standard as the stair itself and thus kept fire sterile.
- 3.2.7 On the upper floors, the staircases and lift lobbies should be separated from accommodation by mechanically ventilated corridors/lobbies.
- 3.2.8 Ancillary accommodation is situated on a variety of floors throughout the building, as outlined in Section 1.6.3. Ancillary accommodation should be separated from the communal corridors via a protected lobby where escape is in a single direction, as per BS 9991 recommendations.
- 3.2.9 BS 9991 does not provide guidance in regard to protection of the evacuation lift. However, additional fire safety provisions should be provided in support of this arrangement. In support of the evacuation lift arrangement, the following should be included in the design:
- The evacuation lift should be accessible from a protected lobby. The protected lobby providing access to the evacuation lift should not access anything other than:
 - The staircase;
 - The lifts;
 - The adjoining communal corridor;
 - The travel distance across the protected lobby should be in accordance with Table 3.1 of ADB, summarised in Table 8 below.
 - The protected lobby should be provided with a smoke ventilation system in accordance with Section 2.4 of this report.
 - The protected lobby should include an emergency voice communication system.
 - The communal corridor serving the flats should be provided with a smoke ventilation system in accordance with Section 2.4 of this report.
- 3.2.10 The travel distance limits applicable within the different parts of the building are summarised in Table 8.
- 3.2.11 A review of the floors in terms of means of escape is shown in Figure 13 to Figure 22. Key fire safety challenges to be further addressed are highlighted are summarised in Table 9.

Table 8 - Travel distance limits

Part of the building	Single direction limit	Multi-direction
Open-plan flat	20 m ⁽¹⁾	N/A
Communal corridor ⁽²⁾	7.5 m	30 m
Evacuation lift lobby ⁽³⁾	7.5 m	N/A

Notes:
 1) Cooking facilities should be located at least 1.8 m away from the flat entrance door and the internal escape route.
 2) Measured from flat entrance door to the evacuation lift lobby door
 3) Measured from the evacuation lift lobby door to the staircase door

Table 9 - Key fire safety challenges

Floor	Description	Reference
All Floors	BS 9991 does not provide guidance in regard to protection of the evacuation lift. However, additional fire safety provisions should be provided in support of this arrangement. In support of the evacuation lift arrangement, the lift should be accessed from a protected lobby. This should be discussed and agreed with the planning authorities.	Figure 13 to Figure 24
All Floors	Open-plan flats in excess of 8 m x 4 m are provided with kitchens open to the living area within the building. BS 9991 guidance does not support this arrangement, however further research (beyond the research carried out by the BRE and commissioned by the NHBC Foundation on open-plan flat design - NF19) has been carried out (Open plan apartments - revisiting risks in light of contemporary demands. IFE Journal Issue No 18, November 2016) [18]. The results of the additional research were published within the IFE journal and demonstrated that flats with a size greater than 8 m x 4 m with the kitchen open to the living area had a similar or better results than when compared to the scenarios with the kitchen enclosed, which is recommended within prescriptive guidance.	All Figures
25 th Floor	A lobby is provided in front of Stair 1 core. The lobby should be maintained fire sterile.	Figure 13

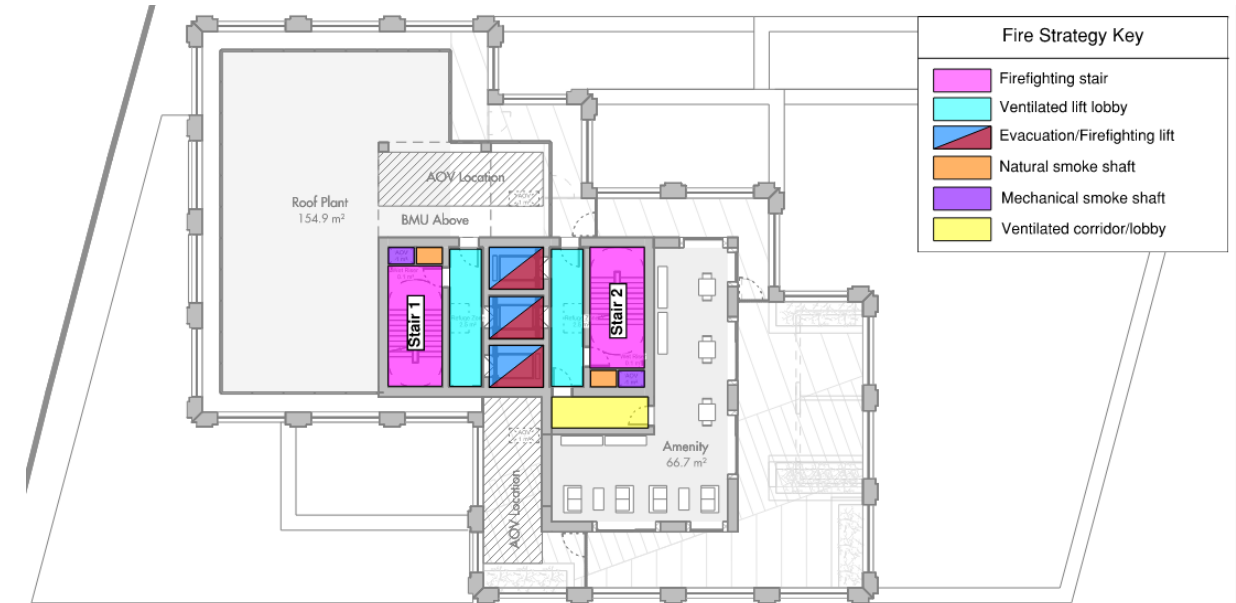


Figure 13 - Horizontal means of escape - 25th Floor

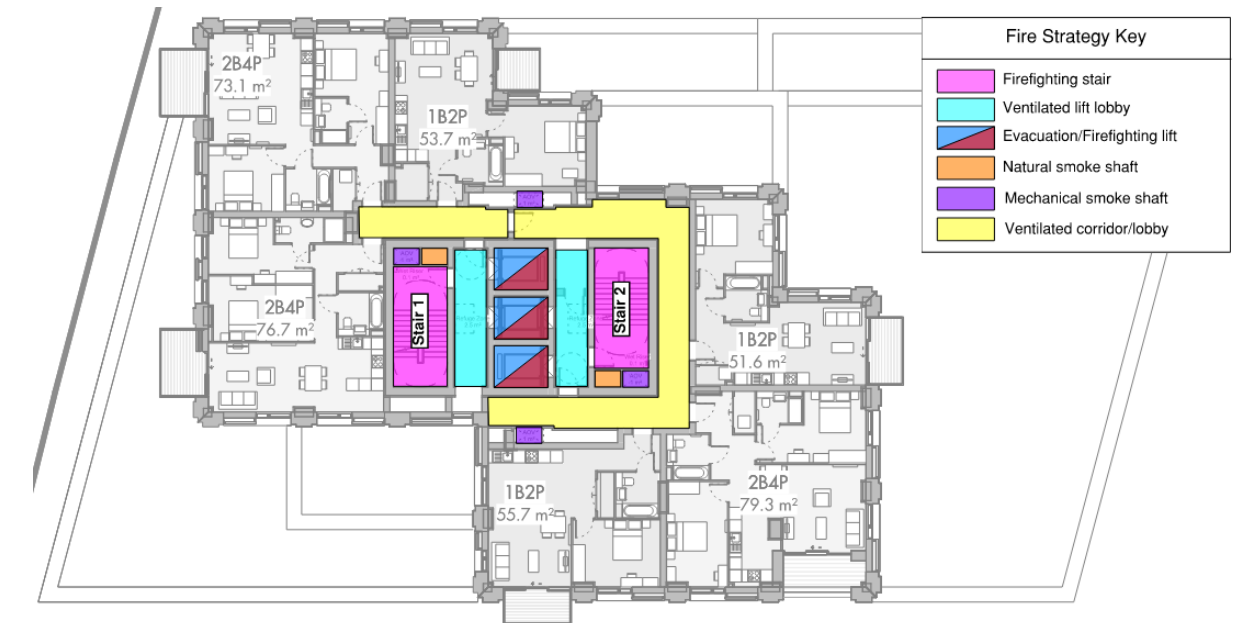


Figure 14 - Horizontal means of escape - 24th to 23rd Floor

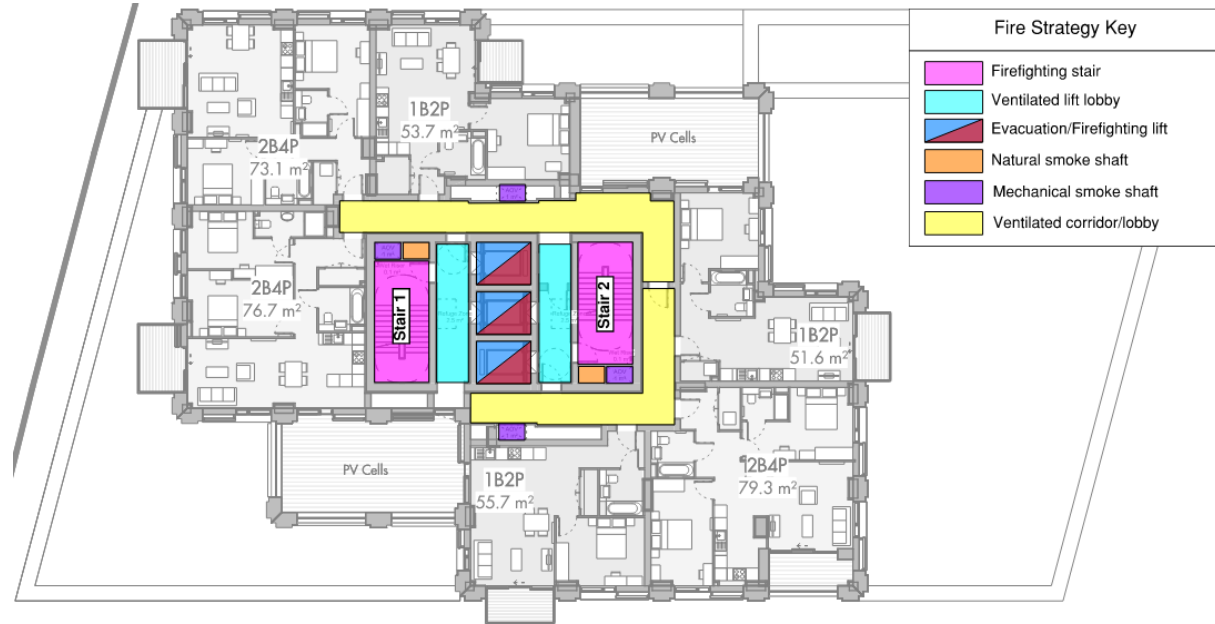


Figure 15 - Horizontal means of escape - 22nd Floor



Figure 17 - Horizontal means of escape - 12th Floor



Figure 16 - Horizontal means of escape - 21st to 13th Floor



Figure 18 - Horizontal means of escape - 11th to 5th Floor



Figure 19 - Horizontal means of escape - 4th Floor



Figure 22 - Horizontal means of escape - 1st Floor



Figure 20 - Horizontal means of escape - 3rd Floor



Figure 23 - Horizontal means of escape - Mezzanine Floor



Figure 21 - Horizontal means of escape - 2nd Floor

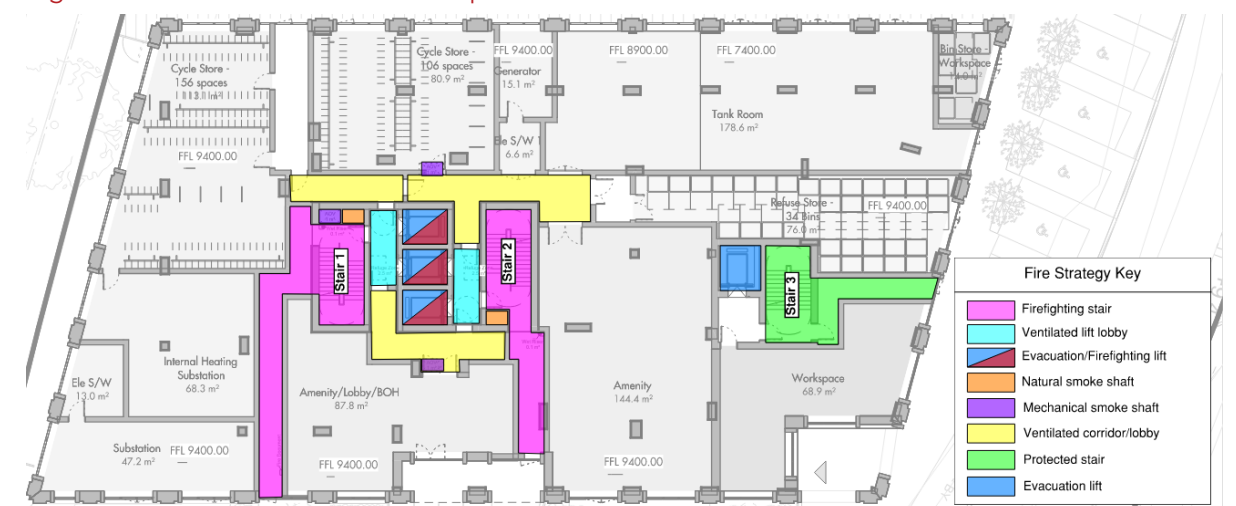


Figure 24 - Horizontal means of escape - Ground Floor

3.3 Horizontal means of escape - Ancillary areas and the commercial unit

3.3.1 The design of the ancillary areas and the commercial unit should be in accordance with BS 9999 guidance. In accordance with the recommendations, an A2 or A1 risk profile should be assigned to the

ancillary accommodation, and a B2 risk profile assigned to the commercial unit as detailed in Section 1.7.

- 3.3.2 In accordance with BS 9999 recommendations, doors which open against the direction of escape should be limited to 60 people. Spaces with a single exit, or where the door swings against the direction of escape are limited to 60 people.
- 3.3.3 A number of rooms at Ground Floor are accessed from another room. As such this should be classified as an inner room arrangement. BS 9999 provides recommendations to mitigate the risks presented to occupants in inner room arrangements, which include the following:
- automatic detection will be provided in both the inner room and the access room, with a fire alarm provided in the inner room, in the process alerting occupants to a fire within the access room;
 - the occupancy of the space will be less than the stipulated limit of 60 for inner rooms;
 - the travel distance from the remotest point of each inner-room to the nearest exit from the access room is within limits outline in Table 10; and
 - the access rooms are not considered a place of special fire hazard.
- 3.3.4 The fire safety strategy for the commercial spaces is concerned with the shell and core of these spaces only. Demonstrating compliance with Part B of the Building Regulations for the fit-out of these units should be the tenant's responsibility.
- 3.3.5 The maximum permitted travel distance within the commercial unit is limited to 23 m in the single direction and 57.5 m in the multi-direction. Travel distance limits have been increased by 15% based on an enhanced automatic fire detection and alarm system.
- 3.3.6 Based on a single means of escape from the commercial unit, the capacity should be limited to 60 people. Accounting for a maximum occupancy of 60 people, all storey exits (First and Ground Floor) should be provided with a minimum clear width of 850 mm.
- 3.3.7 Means of escape requirements for the ancillary areas and the commercial unit are summarised in Table 10.

Table 10 - Means of escape requirements (Ancillary areas)

Room/ Space	Number of exits	Maximum travel distance		Minimum exit clear width
		Single direction	Multi direction	
Gym	1	29.9 m	74.8 m	850 mm
Residential BOH	1			

Room/ Space	Number of exits	Maximum travel distance		Minimum exit clear width
		Single direction	Multi direction	
Residential amenity/lobby	2			
Amenity (1 st Floor)	1			
Amenity (2 nd to 3 rd Floor)	2			
Amenity (4 th Floor)	1			
Amenity (25 th Floor)	1			
B1 (c)	1	25.3 m	63.3 m	
Cycle store	2			
Generator	2			
Residential water tank	1			
Commercial sprinkler tank	2			
Refuse store	2			
Bin store	1			
Substation	2			
Water riser tank room	1			
Ele S/W 1	1			
Ele S/W 2	1			
Internal Heating Substation	1			
Commercial space (1 st Floor)	1	23 m	57.5 m	

3.4 Vertical means of escape

Residential staircases

- 3.4.1 All cores serving the residential units have a topmost occupied storey height above 18 m. Therefore, in accordance with BS 9991 guidance, a firefighting shaft should be provided.
- 3.4.2 In accordance with BS 9991, where the floor area of one or more storeys above 18m exceeds 900 m², at least two firefighting shafts should be provided. Stair 1 and Stair 2 should be designed as firefighting stairs achieving a minimum clear width of 1100 mm.

Commercial stair

- 3.4.3 Stair 3 which serves the commercial space should be designed as a protected stair, achieving a minimum clear width of 1000 mm, in accordance with BS 9999.
- 3.4.4 A refuge space of dimensions 900 mm x 1400 mm should be provided within the staircase or the evacuation lift lobby. The refuge area should not impede escape for other occupants, thus a minimum clear width of 1000 mm should be available.

3.4.5 Where the handrails intrude 100 mm or less, these can be ignored when assessing the clear width of the stair. The stair width should be kept clear for a vertical distance of 2 m.

3.4.6 The flights and landing of all escape stairs in the building should be constructed of materials achieving class A2-s3, d2 or better.

3.5 Private balconies

3.5.1 Private balconies should meet the following recommendations:

- The escape routes from the balcony should not pass through more than one access room;
- A detection and alarm system in accordance with BS 5839-6 should be provided to the access room with an alarm system on the balcony;
- The maximum permitted travel distance from the balcony access door to the furthest point on the balcony is 7.5 m.

3.5.2 Balconies should be designed in accordance with BS 8579:2020. In accordance with BS 8579, balconies within buildings with a top floor located above 11 m are to be constructed of materials class A2-s1, d0 or better.

3.5.3 Note that blocks of flats with a topmost occupied floor located above 18 m are subject to Regulation 7(2) and balconies are considered as part of the external wall, therefore all balconies should be constructed of materials class A2-s1, d0 or better, regardless of the floor height.

3.6 Escape beyond final exits

3.6.1 Travel beyond the building final exit must be away from the building, towards a place of safety, and not be jeopardised by unprotected openings of the building. In general, the building should be provided with escape routes, upon exiting the building that are either directly away from the building or alternate paths along the building façade.

3.6.2 Any external wall within 1.8 m of the external final escape route should be fire rated.

4. PASSIVE FIRE PROTECTION

4.1 Internal wall and ceiling linings

4.1.1 All wall and ceiling linings within the building should meet the recommendations of BS 9991 when tested under the European Classifications (in accordance with BS EN 13501-1 [21]) as summarised in Table 11.

Table 11 - Surface spread of flame requirements

Location	Euro Class
Small rooms ≤ 4m ²	D-s3, d2
Other rooms	C-s3, d2
Circulation spaces (within dwellings)	C-s3, d2
Circulation spaces (communal)	B-s3, d2

4.2 Structural fire resistance

4.2.1 The required period of fire resistance of the structural elements has been based upon the recommendations in BS 9991.

4.2.2 The building has a top floor height above 30 m, therefore the structural elements should achieve at least 120 minutes fire resistance. It should be noted that based on the height of the building, the QDR may indicate that higher periods of fire-resistance may be necessary.

4.2.3 Structural elements providing stability or supporting the firefighting shafts should achieve 120 minutes fire resistance.

4.2.4 Where a construction element with lower fire resistance supports or provides stability to another element of structure, then the protection to the supporting structure should be at least the same as the structure it is supporting.

4.2.5 Elements of structure that only supports a roof do not require fire resistance. The structure is considered to support more than only a roof if it supports a load other than the roof itself (e.g., rooftop plant) or is essential to the stability of a fire-resisting wall (internal or external).

4.3 Compartmentation and fire-resisting construction

4.3.1 All floors within the residential section of the building are required to be built as compartment floors and should achieve the same fire resistance as the structure of the building.

4.3.2 Residential and non-residential parts of the building should not connect and should be separated by compartment walls and floors achieving at least the same fire resistance as the structure of the building.

4.3.3 Flats should be individually separated from the rest of the building by fire rated construction achieving a minimum of 60 minutes fire resistance.

4.3.4 All shafts (e.g., service risers, lifts, shafts) are to be constructed as protected shafts achieving the same fire resistance as the structure of the building.

4.3.5 Re-entrant corners of the external walls between different fire compartments (e.g. two flats) or between the protected stairway and the rest of the building should be fire rated for a distance of 1.8 m on one side of the re-entrant corner.

4.3.6 Where a firefighting shaft forms a re-entrant corner, the façade should be 60 minutes fire rated for a distance of 5.0 m.

4.3.7 Glazing should not be located within 500 mm of the junction of external walls with the firefighting shaft walls, otherwise it would be required to be fire rated and fixed shut.

4.3.8 The non-residential areas should be separated from the rest of the building by compartment walls and floors achieving at least the same fire resistance as the structure of the building.

4.3.9 The following fire resistance requirements apply to the development:

Table 12 - Periods of fire resistance for fire-separating elements (in minutes)

Part of Building	Minimum Fire Resistance rating when tested to the relevant part of BS EN 13501			Methods of Exposure
	Loadbearing	Integrity	Insulation	
Structural elements	120	n/a	n/a	Exposed faces
Loadbearing wall	120	n/a	n/a	Each side separately
Compartment floor	120	120	120	From underside
Other floors	120	120	120	From underside
Compartment walls separating flats	60	60	60	Each side separately
Compartment walls separating residential from non-residential areas	120	120	120	Each side separately
External walls:				
Any part less than 1,000 mm from a point in the relevant boundary	120	120	120	Each side separately
Any part more than 1,000 mm from the relevant boundary	120	120	15	From the inside
Any part adjacent to an external escape route or stair	30	30	n/a	From the inside
Protected Shafts (stair, risers, lifts, etc.)	120	120	120	Each side separately
Firefighting shaft (stairways lifts)	120	120	120	From side remote of the shaft
	60	60	60	From shaft side
Smoke shaft	120	120	120	Each side separately
Cavity barriers	n/a	30	15	Each side separately

4.3.10 Ancillary accommodation within the building is to be enclosed within fire-resisting construction in accordance with Table 29 of BS 9999. The degree of separation required depends on the contents of the room/enclosure and is summarised in Table 13 below.

Table 13 - Ancillary accommodation fire protection requirements

Ancillary accommodation	Minimum fire resistance
Storage areas not greater than 450 m ²	30 minutes
Transformer, switchgear and battery rooms for LV equipment	
Service installation rooms	60 minutes
Places classified as high fire risk areas	
Repair and maintenance workshops where flammable liquids are used / stored	
Transformer and switchgear rooms for equipment above low voltage	120 minutes
Refuse storage areas	
Boiler rooms	
Fuel storage spaces	
Rooms housing fixed internal combustion engine(s)	
Any area that contains plant associated with life safety systems and fire protection systems	120 minutes

4.4 Fire doors

4.4.1 Fire doors should be in accordance with the recommendations of Table 12 in BS 9991.

4.4.2 Fire door assemblies should comply with:

- BS 476-22 [22] or BS EN 1634-2 [23] for fire resistance; and where applicable,
- BS 476-31 [24] or BS EN 1634-3 [25] for smoke leakage.

Table 14 - Fire doors

Position of Door	Tested to BS 476-22	Tested to BS EN 1634-2
Enclosing ancillary accommodation	As per the wall it is fitted in	As per the wall it is fitted in
Enclosing smoke shaft	FD120S	E 120 S _a
Enclosing a protected shaft/riser	Half of the wall it is fitted in and with suffix 'S'	Half of the wall it is fitted in and with suffix 'S _a '
Enclosing a firefighting stair	FD 60 S	E 60 S _a
Enclosing an evacuation lift	Half of the wall it is fitted in	Half of the wall it is fitted in
Enclosing an evacuation lift lobby	FD 60S	E 60 S _a
Enclosing a firefighting lift	Half of the wall it is fitted in	Half of the wall it is fitted in
Flat entrance doors	FD 30 S	E 30 S _a

Position of Door	Tested to BS 476-22	Tested to BS EN 1634-2
Notes: Smoke seals are indicated by the suffix 'S' (to BS 476-31) or 'S _a ' (to BS EN 1634-3) and are required in all doors which form the enclosure to protected escape routes. The ratings shown above are for integrity only.		

4.5 Fire-stopping and penetrations through fire-resisting construction

4.5.1 Fire-stopping should be provided at the junction of fire-separating walls/ floors and external walls in order to maintain the fire resistance period of fire-separating walls, and thereby prevent a fire from travelling around the junction and into the neighbouring space. Penetrations through lines of fire-resisting separation should be fire-stopped using a system which will achieve the same fire resistance rating as the penetrated wall or floor.

4.6 Cavity barriers and concealed spaces

4.6.1 Cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). In general, cavity barriers should be at 20 m centres, around any openings, at the head of cavity wall and in line with compartment wall and floors within cavities.

4.6.2 Cavity barriers provided around openings within the external wall may be formed of:

- steel at least 0.5 mm thick; or
- polythene-sleeved mineral wool, or mineral wool slab under compression when installed cavity; or
- calcium silicate, cement-based or gypsum-based boards at least 12 mm thick.

5. EXTERNAL FIRE SPREAD

5.1 External wall construction – Buildings over 18 m

- 5.1.1 Under current regulations, buildings with a height greater than 18 m are classed as a ‘relevant building’ in accordance with Regulation 7(2).
- 5.1.2 The building is required to satisfy Regulation 7(2), where it states: “building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled “Fire classification of construction products and building elements. Classification using test data from reaction to fire test” (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009.”
- 5.1.3 The information in paragraph 5.1.2 does not apply to:
- Cavity trays when used between two leaves of masonry;
 - Any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;
 - Door frames and doors;
 - Electrical installations;
 - Insulation and water proofing materials used below ground level;
 - Intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
 - Membranes;
 - Seals, gaskets, fixings, sealants and backer rods;
 - Thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or
 - Window frames and glass.
- 5.1.4 The provisions of Regulation 7 apply in addition to requirement B4. Therefore, in addition to paragraph 5.1.2 above, the potential impact of any products incorporated into or onto the external walls and specified attachments should be carefully considered with regard to their number, size, orientation and position.
- 5.1.5 Particular attention is drawn to the following points:
- Membranes used as part of the external wall construction above ground level should achieve a minimum of class B-s3, d0;
 - Internal linings should comply with the guidance provided in Section 4.1;
 - Any part of a roof should achieve the minimum performance as detailed in Section 5.2;
 - As per Regulation 7 (3), window frames and glass (including laminated glass) are exempted from Regulation 7 (2). Window spandrel panels and infill panels must comply with Regulation 7 (2);
 - Thermal breaks are small elements used as part of the external wall construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two compartments and should be limited in size to the minimum required to restrict the thermal bridging (the principal insulation layer is not to be regarded as a thermal break).

- Regulation 7 (2) only applies to specified attachments. Shop front signs and similar attachments are not covered by the requirements of Regulation 7 (2), although attention is drawn to the point below;
- While Regulation 7 (2) applies to materials which become part of an external wall or specified attachment, consideration should be given to other attachments to the wall which could impact on the risk of fire spread over the wall.

5.2 Roof coverings

- 5.2.1 The relevant test and classification standards for the external fire performance of roof systems are BS EN 13501-5 [26] (European Class).
- 5.2.2 Best practice guidance for green roofs can be found in Fire Performance of Green Roofs and Walls [27], published by the Department for Communities and Local Government.
- 5.2.3 Table 15 below summarises the separation distances from the boundary according to the type of roof covering as described in section 35.4 of BS 9999.

Table 15 – Limitations on roof coverings

Distance from relevant boundary	B _{ROOF} (t4)	C _{ROOF} (t4)	D _{ROOF} (t4)
Less than 6m	✓	✗	✗
At least 6m	✓	✓	✗
At least 20m	✓	✓	✓

5.3 Space separation and unprotected areas of the façade

- 5.3.1 Should a fire occur in a building, heat will radiate through non-fire resisting openings in the external walls. This heat can be enough to set fire to nearby buildings. In order to reduce the chance of this occurring, fire safety guidance places limits on the area of the external elevation with no fire resistance, known as the unprotected area.
- 5.3.2 The relevant boundaries are the reference point at which the potential for fire spread, being:
- the site boundary;
 - a notional boundary created on the centreline of an adjacent carriage way; or
 - a notional boundary created midway between this building and the nearest adjacent building.
- 5.3.3 It should be noted that where an external wall is within 1.0m from the relevant boundary, that external wall should be fully protected and is required to have the same fire resistance as the structure of the building.
- 5.3.4 In accordance with BS 9991 guidance, only small, unprotected areas in an otherwise protected façade do not contribute to the extent of unprotected area. These are shown in Figure 25.
- 5.3.5 In accordance with BS 9991 guidance, the external fire spread assessment should be carried out using the enclosing rectangle method as detailed in BR 187.
- 5.3.6 The amount of unprotected area depends on height and width of the fire compartment and the distance between the façade and relevant boundary.

5.3.7 The amount of unprotected area depends on height and width of the fire compartment and the distance between the façade and relevant boundary. To inform the design, the relevant distances to the relevant boundaries and the distances from the associated elevations are shown below in Figure 26.

5.3.8 The results of the external fire spread assessment are shown below in Table 16. It is indicated that all elevations can be fully unprotected i.e., they do not have to be fire resisting for the purpose of external fire spread.

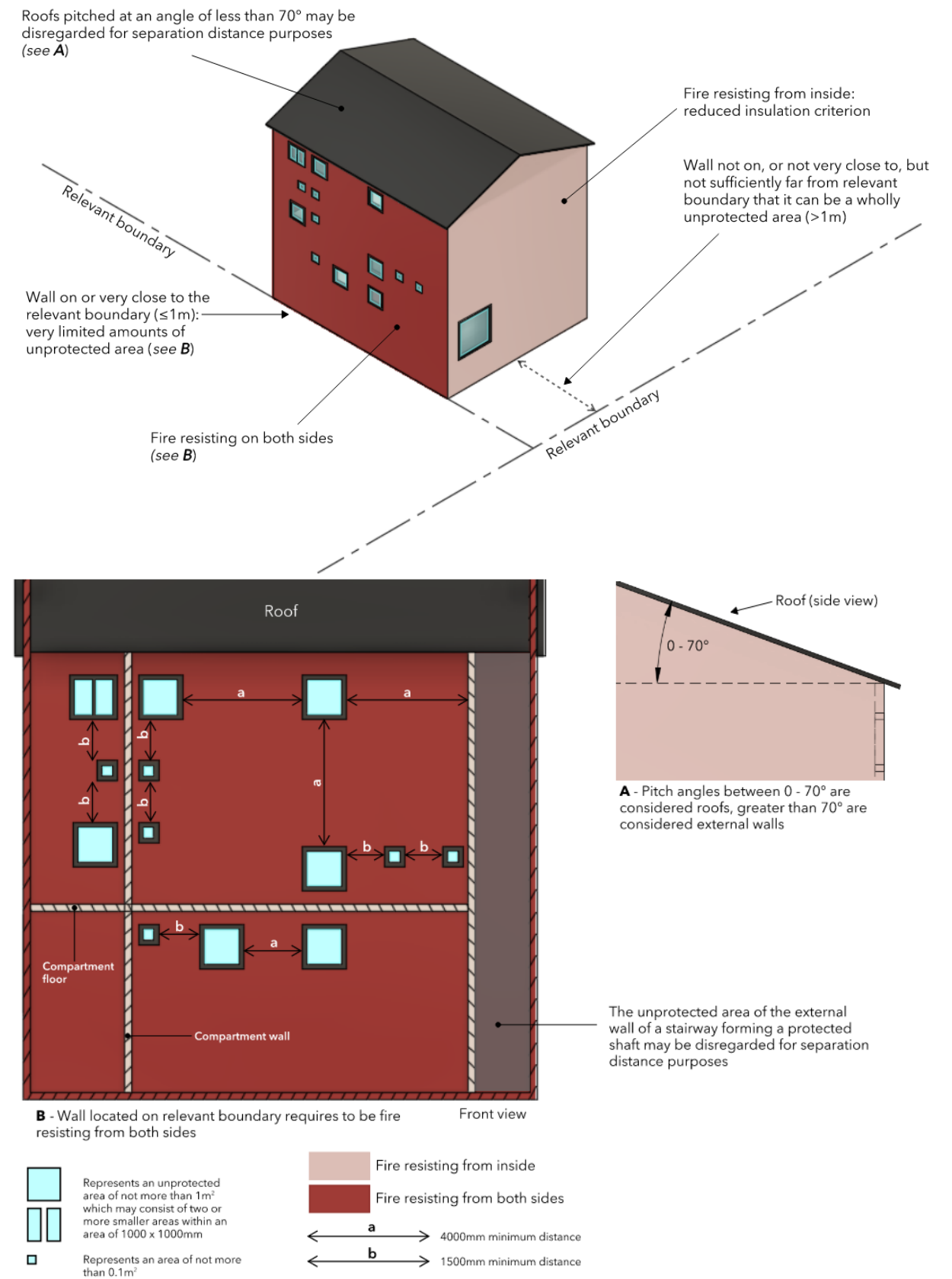


Figure 25 -Exclusion from unprotected area calculations (reproduced from Figure 44 of BS 9999)

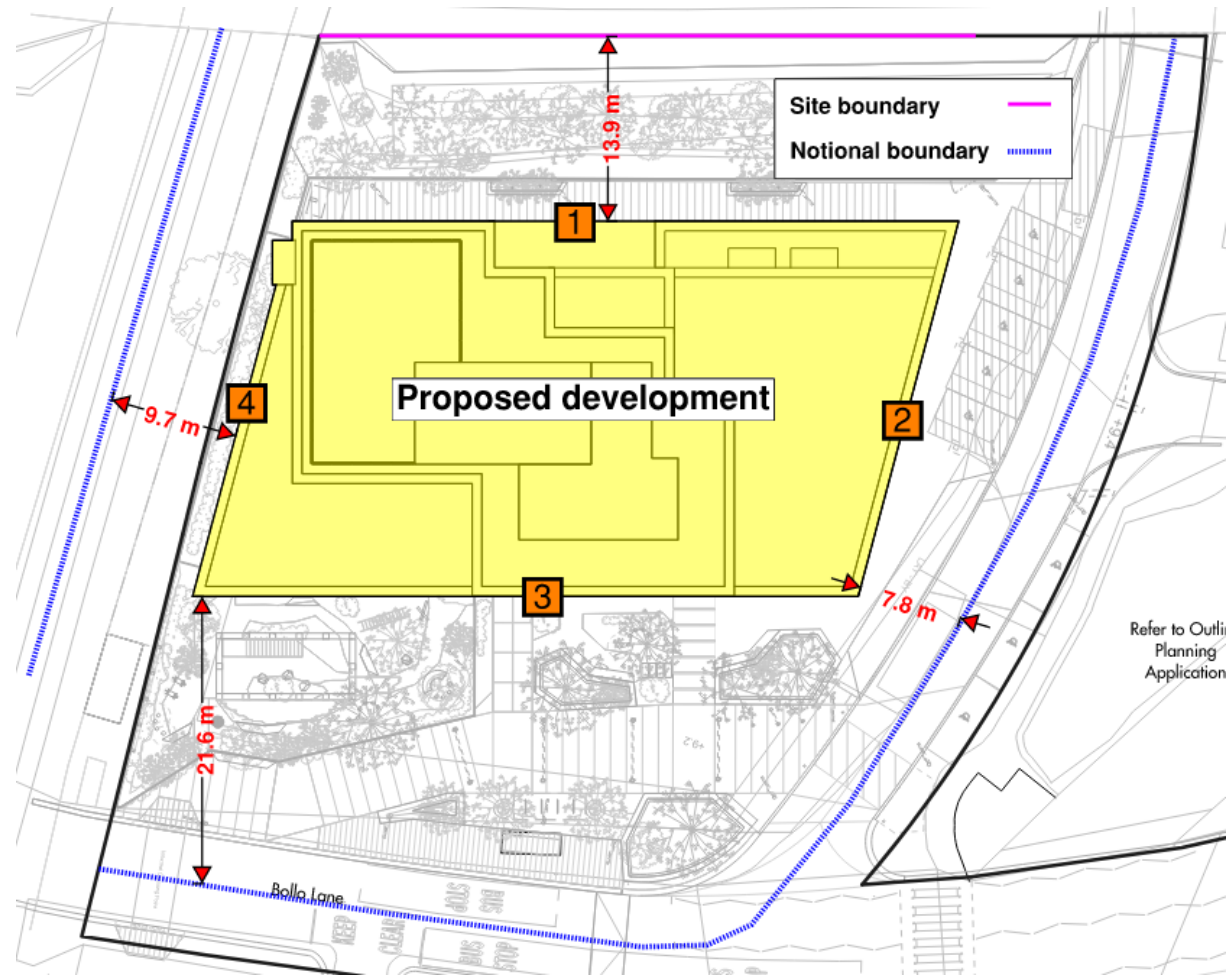


Figure 26 - Relevant boundaries and distances to boundaries

Table 16 - Summary of external fire spread assessment

Elevation	Enclosing rectangle [m]		Radiation intensity [kW/m ²]	Sprinkler considered	Distance to boundary [m]	Allowable unprotected area (%)
	W	H				
Ground Floor						
1	31.8	3.5	168	Yes	13.9	100
2	24.7	6.5	168	Yes	7.8	100
3	41.8	3.5	168	Yes	21.6	100
4	15.3	3.5	168	Yes	9.7	100

6. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE

6.1 Vehicle access to and around the site

- 6.1.1 All cores serving the residential accommodation will be provided with a wet rising main. Fire and rescue service (FRS) vehicle access should be provided to within 18 m and within clear sight of the wet riser inlet to facilitate personnel access and connectivity with firefighting equipment.
- 6.1.2 FRS access to the ancillary areas accessible only from outside should be within 45 m of every point on the projected plan area from the FRS vehicle parking position.
- 6.1.3 FRS access to the commercial unit should be within 45 m of every point on the projected plan area from the FRS parking position or within 15% of the perimeter of the unit, whichever is the less onerous, in line with BS 9999 guidance. Where perimeter access is provided, FRS access should be to within 18 m of the 15% perimeter. Any elevation to which access is provided should have a door, not less than 750 mm wide, giving access to the interior of the building. Doors should be provided such that there is no more than 60 m between each door and/or the end of that elevation.
- 6.1.4 The access route requirements are provided in Table 17 are generic recommendations for a pump-type appliance taken from Table 20 of BS 9999. FRS appliances are not standardised, therefore vehicle access provision should be discussed and agreed with the local FRS to ensure their vehicle complies with the parameters listed in Table 17.
- 6.1.5 FRS appliances should not reverse more than 20 m, otherwise, suitable turning facilities will be provided.
- 6.1.6 The detailed vehicle access provisions for firefighting appliances will need to be developed as part of the wider masterplan design and discussed and agreed with the local fire and rescue service.

Table 17 - Typical pump-type firefighting appliance access requirements

Minimum access route specification	Dimension
Width between kerbs	3.7 m
Width between gateways	3.1 m
Turning circle between kerbs	16.8 m
Turning circle between walls	19.2 m
Clearance height	3.7 m
Carrying capacity	12.5 tonnes

- 6.1.7 Figure 27 indicatively illustrate fire service access routes and fire service access to the buildings.



Figure 27 - Indicative FRS access

6.2 Access into and through the building

- 6.2.1 Access to the residential accommodation is provided at Ground Floor level. In accordance with prescriptive guidance, the fire service should have access directly from the outside into the stair, via a dedicated passageway which should not exceed 18 m to the stair. Access to the upper floors should be facilitated via firefighting shafts.
- 6.2.2 All doors giving access to the interior of the building will have a minimum width of 750 mm.
- 6.2.3 The building should be provided with a wet riser for each firefighting shaft. Wet riser outlets should be located within the stairway on the full landing at all levels including the Ground Floor. The wet rising main should be designed and installed in accordance with BS 9990.
- 6.2.4 The remotest point of each storey within the block of flats should be within 60 m reach of the fire main outlet in the firefighting stair, measured on a route suitable for laying hose.
- 6.2.5 To facilitate firefighting operations, premises information box should be provided in the main entrance lobbies. Best practice guidance with regards to the premises secure information boxes can be found in the Code of Practice for the Provision of Premises Information Boxes in Residential Buildings published by the Fire Industry Association (FIA).
- 6.2.6 Liaison should be conducted with the FRS in order to ascertain security arrangements to facilitate access into the protected/ firefighting stairs in the event of an emergency as part of management duties under the FSO.

6.3 Firefighting facilities

- 6.3.1 Stairs 1 & 2 should be designed as firefighting stairs, provided with wet rising mains, designed and installed in accordance with BS 9990. Wet riser main outlets should be provided on the full landing of the stair at all levels.
- 6.3.2 The firefighting stairs should achieve a minimum clear width of 1100 mm.
- 6.3.3 Each of the residential cores should be provided with a firefighting lift. Firefighting lift installations should conform to BS EN 81-20 and BS EN 81-72. Due to the height of the building, it is recommended that a third, additional firefighting lift be provided in order to ensure that the FRS are provided with one lift per core at all times (in the event of one being out-of-order for maintenance etc.).

6.4 Water supplies

- 6.4.1 Hydrants will be required in the vicinity of the building to support firefighting operations.
- 6.4.2 If the building is more than 90 m from an existing hydrant, new hydrants should be provided within 90m of the entry point to the building and not more than 90 m apart.
- 6.4.3 If fire hydrants are to be installed, they should be included as part of a ring fire main system. They should preferably be sited immediately adjacent to roadways or hard-standing facilities suitable for FRS appliances. To ensure that they remain usable during a fire, they should be sited with consideration of the effect that falling debris and other possible occurrences during a fire might have on the continuing viability of the location and as such should be not less than 6 m from the building.
- 6.4.4 A water supply capable of providing a minimum of 1,500 litres per minute at all times is recommended. Water supplies will be designed and installed in accordance with BS 9990.

6.5 First-aid firefighting

- 6.5.1 First-aid firefighting provisions should be assessed and provided as part of the fire risk assessment for the development, including consideration for the day-to-day management of these provisions.
- 6.5.2 In general, fire points should be located within the ancillary areas presenting a significant fire risk and to ensure coverage of at least one fire point for every 200 m² of floor area. The type and size of extinguisher(s) at each fire point should be chosen in accordance with the guidance given in BS 5306-8.

APPENDIX A - LONDON PLAN POLICY D5 – INFORMATION ON EVACUATION LIFT

A.1 General

- A.1.1 The fire strategy report has been developed including the recommendations of London Plan Policy D5.
- A.1.2 London Plan Policy D5(B5) states that where a lift is installed in a development, at least one lift per core (or more) should be a suitably sized evacuation lift. This planning requirement for evacuation lifts is in addition to the requirements for firefighters' lifts, where required by Building Regulations.
- A.1.3 Following the *London Plan Guidance Fire Safety* document published in February 2022 by the Mayor of London, further information is provided regarding the evacuation lifts regarding the design, number, size and operation of the evacuation lifts.

A.2 Design consideration

- A.2.1 The evacuation lift should be designed and installed in accordance with relevant provisions of BS EN 81-20 [10] and BS EN 81-70 [11]. It is recommended that the minimum lift car size should be Type 2 in accordance with Table 3 of BS EN 81-70:2021 in residential cores.
- A.2.2 The evacuation lift should be provided with a protected lobby which gives access to both the evacuation lift and the stair. The lobby affording access to the evacuation lift should not provide direct access to accommodation.
- A.2.3 The lobby should be provided with an Emergency Voice Communication (EVC) system conforming to BS 5839-9 [28].
- A.2.4 The commercial unit arranged over two storeys has the capacity to include a lift. However, the current proposal is for shell and core only.

A.3 Capacity assessment

- A.3.1 An evacuation lift should be provided in each core of the development. The evacuation lift should be provided in addition to the firefighting lift.
- A.3.2 Based on the evacuation philosophy, i.e. defend in place or "stay-put", only the flat of fire origin is required to evacuate. Therefore, the evacuation lift could accommodate one wheelchair user evacuating from the flat of fire origin at a time.
- A.3.3 As per BS EN 81-70, minimum car dimensions for a Type 2 lift are 1100 mm width and 1400 mm. This car accommodates one wheelchair user and an accompanying person.

A.4 Evacuation Strategy

- A.4.1 The proposed evacuation strategy for the building is defend in place or "stay-put", where only the flat of fire origin is required to evacuate. This is in line with BS 9991 recommendations.
- A.4.2 In order to meet the requirements of London Plan Policy D5, an evacuation lift should be provided in each core of the development. The evacuation lift should be provided in addition to the firefighting lift.
- A.4.3 In support of the evacuation lift arrangement, the following should be included in the design:

- The communal corridor serving the flats should be provided with a smoke ventilation system in accordance with Section 2.4 of this report.
- The evacuation lift should be accessed from a protected lobby. The protected lobby providing access to the evacuation lift should not access anything other than:
 - The staircase;
 - The lifts;
 - The adjoining unventilated corridor;
 - Service risers (unless the risers contain electrical equipment, motors, etc. which pose a higher ignition risk than cables alone).
- The protected lobby should be provided with a smoke ventilation system in accordance with Section 2.4 of this report.
- The protected lobby should include an emergency voice communication system.

A.4.4 As occupants using the evacuation lift will be required to wait for a short period of time for the lift to be called and land at the floor, consideration on adequate protection to the lift and refuge / waiting area is required. This report is primarily concerned with ensuring suitable protection to the evacuation lift and associated refuge area(s). The evacuation lift should be provided with a protected lobby which gives access to both the evacuation lift and the stair. A method of preventing smoke ingress into the lobby is provided. The lobby providing refuge space should also include an Emergency Voice Communication system.

A.4.5 Escape to outside from the evacuation lift should be provided via a fire sterile lobby who will be provided level access to outside.

A.5 Evacuation lift management

- A.5.1 Generally, evacuation lifts should be manually operated by a suitably trained, competent person, however it is recognised that a competent person may be absent in residential premises. In this instance, one of the following operation methods may be adopted:
- Automatic evacuation operation (where a suitable Building Management System (BMS) is in place).
 - Remote assisted evacuation.
 - Remote building management evacuation (remote assisted evacuation operation).
- A.5.2 When the evacuation lift lobby, lift well or machinery space of the evacuation lift becomes unsafe, e.g. due to smoke or fire, the evacuation operation should be suspended.
- A.5.3 The cause and effect of any evacuation lift is to be discussed and agreed. Confirmation from the client / end user on the preferred operating sequence is required. The operation requirements and cause and effect arrangements may require consultation with a specialist vertical transport consultant.

A.6 Conclusion

- A.6.1 The fire strategy report has been developed including the recommendations of London Plan Policy D12 and London Policy D5.
- A.6.2 Evacuation lifts in accordance with BS EN 81-20 and BS EN 81-70 should be provided in each core of the building.

APPENDIX B - LONDON PLAN POLICY D12 – INFORMATION ON THE FIRE SAFETY PROVISIONS

B.1 General

B.1.1 The Policy D12 states:

In the interest of fire safety and to ensure the safety of all building users, all developments proposals must achieve the highest standards of fire safety and ensure that they:

- 1) *Identify suitably positioned unobstructed outside space:*
 - a) *For fire appliances to be positioned on;*
 - b) *Appropriate for use as an evacuation assembly point;*
- 2) *Are designed to incorporate appropriate features which reduce the risk to life and the risk of serious injury in the event of a fire; including appropriate fire alarm systems and passive and active fire safety measures;*
- 3) *Are constructed in an appropriate way to minimise the risk of fire spread;*
- 4) *Provide suitable and convenient means of escape, and associated evacuation strategy for all building users;*
- 5) *Develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in;*
- 6) *Provide suitable access and equipment for firefighting which is appropriate for the size and use of the development.*

All major development proposals should be submitted with a Fire Statement, which is an independent fire strategy, produced by a third party, suitably qualified assessor. The statement should detail how the development proposal will function in terms of:

- 1) *The building's construction: methods, products and materials used, including manufacturers' details;*
- 2) *The means of escape for all building users: suitably designed stair cores, escape for building users who are disabled or require level access, and associated evacuation strategy approach;*
- 3) *Features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans;*
- 4) *Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and position of equipment, firefighting lifts, stair and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these;*
- 5) *How provision will be made with the curtilage of the site to enable fire appliances to gain access to the building;*
- 6) *Ensuring that any potential future modification to the building will take into account and not compromise the base build fire safety/ protection measures.*

B.1.2 The following provides information with regards how the above points have been addressed.

B.2 Policy D12 (1) - *The building's construction: methods, products and materials used, including manufacturers' details*

B.2.1 The buildings should be constructed following the recommendations of contemporary guidance provided in BS 9991 to achieve the life safety requirements of the Building Regulation 2010 (as amended).

B.2.2 The fire resistance requirements for the construction are provided in line with BS 9991 requirements (see Table 12 for reference).

B.2.3 The block of flats should be constructed in line with Regulation 7(2) which allows only materials achieving class A2-s1, d0 or better within the external wall, except for the exempt elements as set out under Regulation 7(3).

B.3 Policy D12 (2) - *The means of escape for all building users: suitably designed stair cores, escape for building users who are disabled or require level access, and associated evacuation strategy approach*

B.3.1 The means of escape for occupants in the blocks of flats have been developed in line with BS 9991. The evacuation philosophy is detailed in Section 3.1 of this report.

B.3.2 The vertical evacuation is supported by two staircases. In addition to the staircases, evacuation lifts are provided in each core. The evacuation lifts are in addition to the firefighting lifts.

B.3.3 Adequate emergency lighting and fire safety signage should be provided in line with the contemporary guidance.

B.4 Policy D12 (3) - *Features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans*

B.4.1 The proposed design includes active and passive fire safety provisions in line with recommendations in BS 9991. The active and fire safety provisions are summarised in Table 18 below.

Table 18 - Fire Safety Provisions

Active Fire Safety Systems	Passive Fire Safety Systems
Automatic fire detection and alarm systems	Fire safety signage
Automatic suppression systems (sprinklers)	Structural fire resistance
Automatic opening vents at the head of the staircases	Fire rated compartmentation
Automatic smoke ventilation system in the communal corridors	Fire stopping of penetrations
Automatic smoke control system in the car park	Non-combustible external walls to limit the fire spread
Emergency lighting	Cavity barriers to limit the fire spread
Firefighting & evacuation lifts	
Dry riser main for firefighting operations	

Active Fire Safety Systems	Passive Fire Safety Systems
Secondary power supplies	

B.8.4

B.5 *Policy D12 (4) - Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and position of equipment, firefighting lifts, stair and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these*

- B.5.1 Fire service access across the site to the blocks of flats is provided in line with BS 9991 recommendations.
- B.5.2 The block of flats has a top floor above 18 m and will include two firefighting shafts in support of the firefighting operations. The firefighting shafts should include a firefighting stair with a wet riser main and a firefighting lift. The firefighting facilities are protected in line with BS 9991 with regards to fire resisting construction and smoke protection.
- B.5.3 FRS vehicle access should be provided within 45 m of all points on the floor plans or within 18 m of 15% of the perimeter of the commercial units accessed directly from outside at Ground Floor, whichever is the less onerous.
- B.5.4 Water supplies for the firefighting operations will be provided provided via hydrants.

B.6 *Policy D12 (5) - How provision will be made with the curtilage of the site to enable fire appliances to gain access to the building*

- B.6.1 Fire service appliance access to the blocks of flats is provided in line with BS 9991 and supplement by recommendations within BS 9999:2017 where required. The fire service access to the building is illustrated in the report, see Section 6 of this report for reference.

B.7 *Policy D12 (6) - Ensuring that any potential future modification to the building will take into account and not compromise the base build fire safety/ protection measures*

- B.7.1 This report has been prepared in support of the planning application. The principles set out in this report should be retained in the following stage of the design and further developed into a Detailed Fire Strategy for Building Regulation submission.
- B.7.2 This strategy report may be used to support the end user of the building in the development of any fire safety management procedures and plans considered necessary to fulfil their responsibilities under the Regulatory Reform (Fire Safety) Order 2005 (FSO) and any other applicable fire safety legislation. Furthermore, fire safety information should be given to the responsible person under Regulation 38.

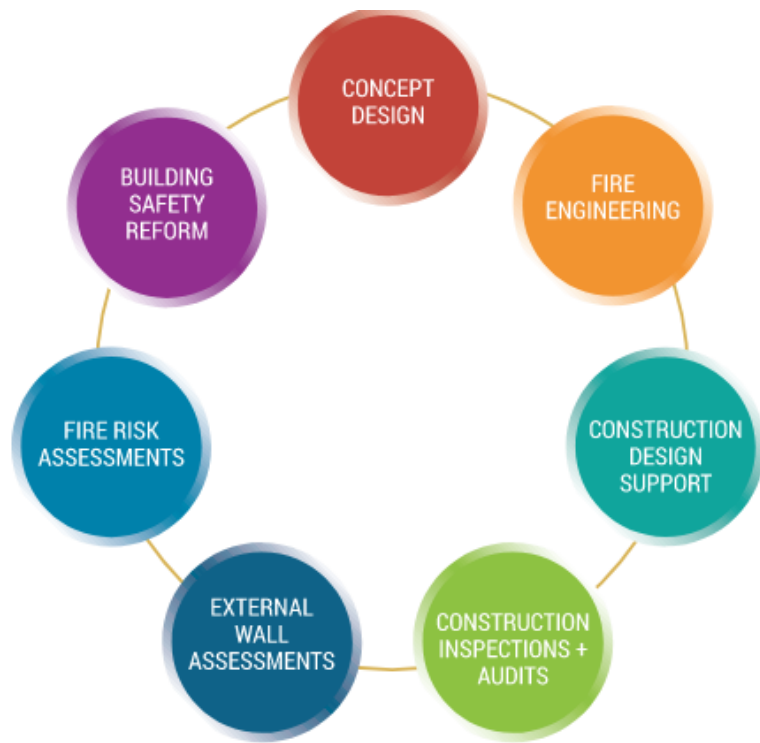
B.8 Conclusion

- B.8.1 This fire report summarises the RIBA Stage 3 fire strategy design information and demonstrates how the building should satisfy the functional requirements of the Building Regulations through further design development.
- B.8.2 The RIBA Stage 3 fire strategy design is considered to be in accordance with the London Plan requirements.
- B.8.3 In Ashton Fire opinion, the fire strategy report prepared for planning submission complies with relevant requirements of London Plan Policy D12 and D5.

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