

FIRE STRATEGY



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Copy No:- 1 of

PROPOSED DEVELOPMENT
AT
WAT TYLER, BOYTON ROAD, LONDON
N8 7AW

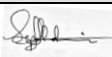
REGULATION 38 DOCUMENT

FIRE SAFETY ASSESMENT
USING
APPROVED DOCUMENT B v1
(2019 edition)

Report Produced For: Walker Management

Report Produced By: Vemco Consulting

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DRAFT

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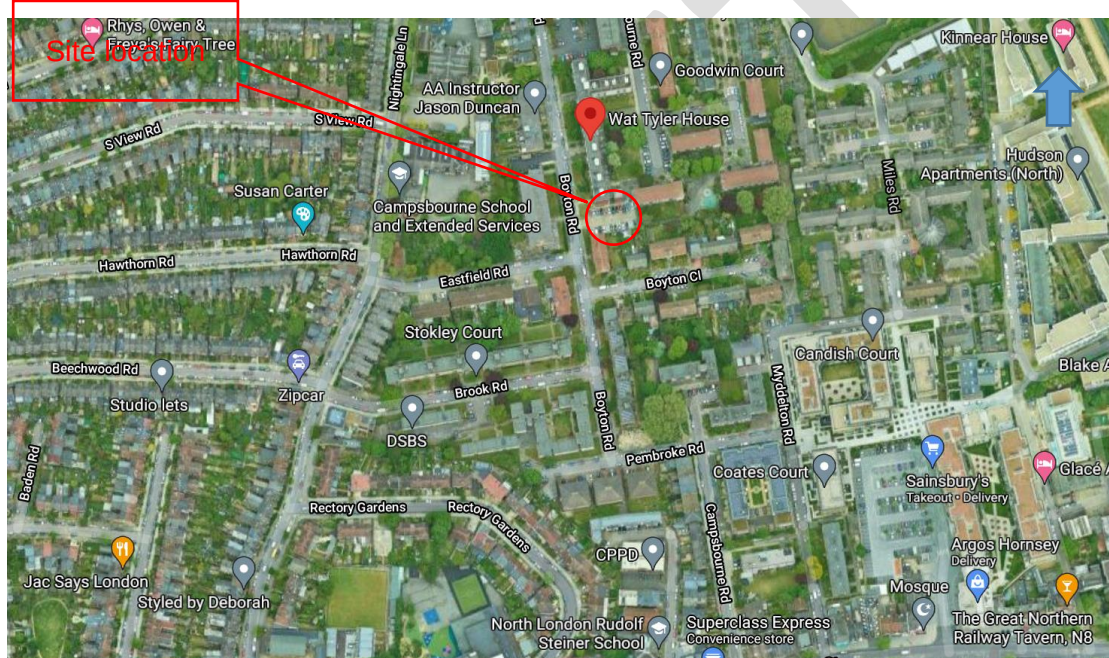
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1.0 INTRODUCTION

1.1 Overview

1.1.1 Vemco Consulting has been instructed by Walker Management Ltd to undertake a fire strategy report. The fire strategy will be in accordance with Building Regulations 2010 - Fire Safety Approved Document B Volume 1 (dwellings) on a proposed residential development; Wat Tyler, Boyton Road, London, N8 7AW. The proposed site location and its aerial view are shown in Figures 1.1 and 1.2 respectively.

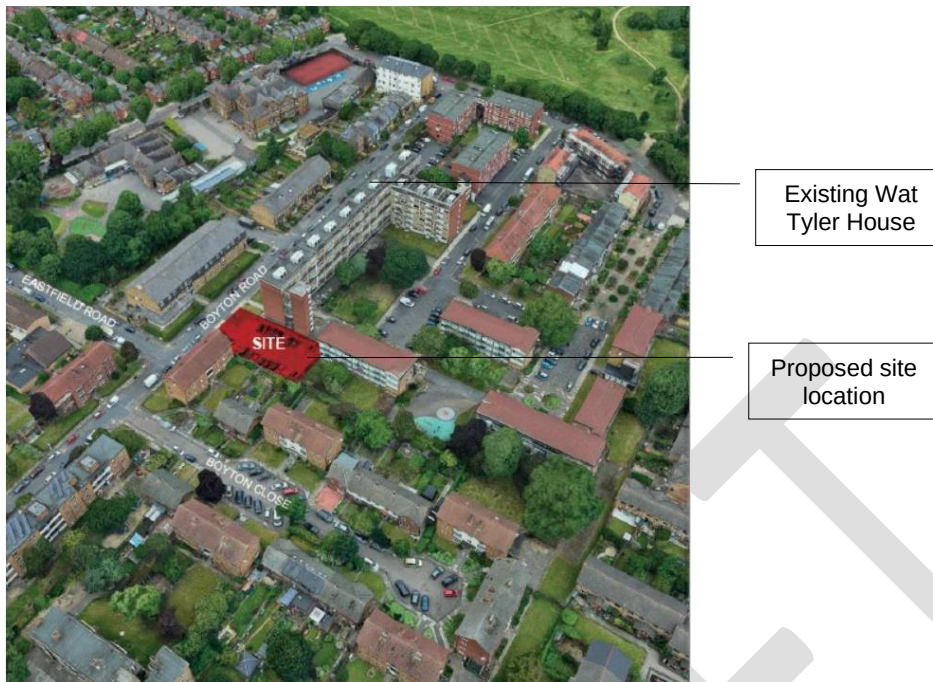
Figure 1.1: Site location



1.1.2 The property is situated approximately 800m north-west of Hornsey train station. This building falls under the planning jurisdiction of London Borough of Haringey Council.

1.1.3 The proposed drawings demonstrate that the building will be a 7-storey residential development comprising flats on all floors.

1.1.4 The drawings used for this report are listed in Appendix A.

Figure 1.2: Aerial View of Proposed Site location**Table 1.1: Summary of building characteristics**

Building Name & Address:	Wat Tyler, Boyton Road, London, N8 7AW.
Number of Floors:	7 (ground, 1 st , 2 nd , 3 rd , 4 th , 5 th , and 6 th)
Building Height:	19m (to uppermost finished floor level)
Purpose Group(s):	1(a) – Residential (dwellings)
Sleeping Risk:	Yes
Evacuation method:	Stay Put
Property Tenants:	Owner/Occupier

1.2 Fire Strategy Overview

- 1.2.1 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 v1 2019. This level of safety therefore satisfies the functional requirements of the Building Regulations relating to fire safety.

1.2.2 The highlights of this fire strategy report can be summarised as follows:

- **Fire detection:** A minimum of Grade D2 Category LD2 (owner-occupied flat) or Grade D1 Category LD2 (rented flat) fire detection and fire alarm system should be installed within all flats. An L5 system should be introduced within the communal areas of the residential demise
- **Space separation:** The BR 187 method for calculating boundary distance reveals that the risk of fire spreading from the proposed development to a relevant boundary is low on all elevations.
- **Means of escape within flats:** The travel distance within all flats on all floors are compliant.
- **Means of escape within communal areas:** The travel distance within all common corridors on all floors are compliant.
- There is a cleaner's cupboard on the 5th floor which opens onto a lobby. This is non-compliant since the cleaner's cupboard is entered from a protected lobby which gives access to another lobby that forms the only common escape route on the storey. Therefore, strictly speaking, the cleaner's cupboard should be omitted. However, the additional lobby protection between the cleaner's cupboard and the stair lobby reduces the risk of the escape route becoming smoke-logged in the event of a fire within the cleaner's store. On this basis, the location of the cleaner's cupboard is deemed to be acceptable provided that the lobbies have a fire resistance of at least 30 minutes each side separately with FD30S doors.
- **Vertical means of escape**
 - A firefighting shaft is required as building is above 18m in height.
 - The stair should be provided with a fire resistance of 120 minutes from the accommodation side, and 60 minutes from the inside of the shaft with FD60S doors.
 - The stairwell serves as a firefighting stair and should therefore have a minimum width of 1100mm. This provision has been complied with.
 - The protected stairwell should either discharge to a final exit/means of escape from the building or connect into a protected corridor / lobby which then provides the final means of escape/exit from the buildings ^[1]. The stairwell is compliant with this requirement.
- **Smoke control:** A smoke shaft has been provided within the common lobby on all floors. The smoke shaft should have a cross sectional area of 1.5m².

- **Sprinkler system:** Approved Document B requires an Automatic Fire Suppression System (AFSS) to be fitted to properties with floors more than 11m above ground level. At approximately 19m in height, the proposed building requires a sprinkler system.
- **Fire service access, hydrants**
 - There is a fire hydrant located within 100m of the building. This is compliant, no additional fire hydrant required.
 - A firefighting shaft will be incorporated in the building as the building is above 18m in height. This is compliant.

1.3 Building Regulations

- 1.3.1 The construction or modification of any building in England must comply with the statutory requirements of today's Building Regulations. These regulations deal with minimum standards of design and building work for the construction of, not only domestic premises but, commercial and industrial buildings also. Building Regulations contain a list of requirements, referred to as Schedules, which are designed to ensure the health and safety of people in and around buildings. There are 16 Parts, which cover subjects such as structure, fire safety, ventilation etc.
- 1.3.2 In the case of fire, specific regulations are dealt with under the functional requirements B1 to B5 of Schedule 1 of the Building Regulations produced under the Building Act 1984. There are a number of prescriptive documents that are frequently adopted to show compliance with the Schedules. These include Approved Document B and relevant British Standards (i.e., BS9991:2011 and BS9999:2008).

1.4 Fire Safety Act 2021

- 1.4.1 The most recent legislation is Fire Safety Act 2021 which Amends the Fire Safety Order 2005 to require all responsible persons to assess, manage and reduce the fire risks posed by the structure, external walls (including cladding, balconies and windows), and any common parts of buildings.
- 1.4.2 The duty of ensuring that the requirements of the Act are met rests with the Responsible Person, who must undertake a risk assessment for the purpose of identifying the fire precautions he needs to take.

1.5 Construction, Design and Management Regulations

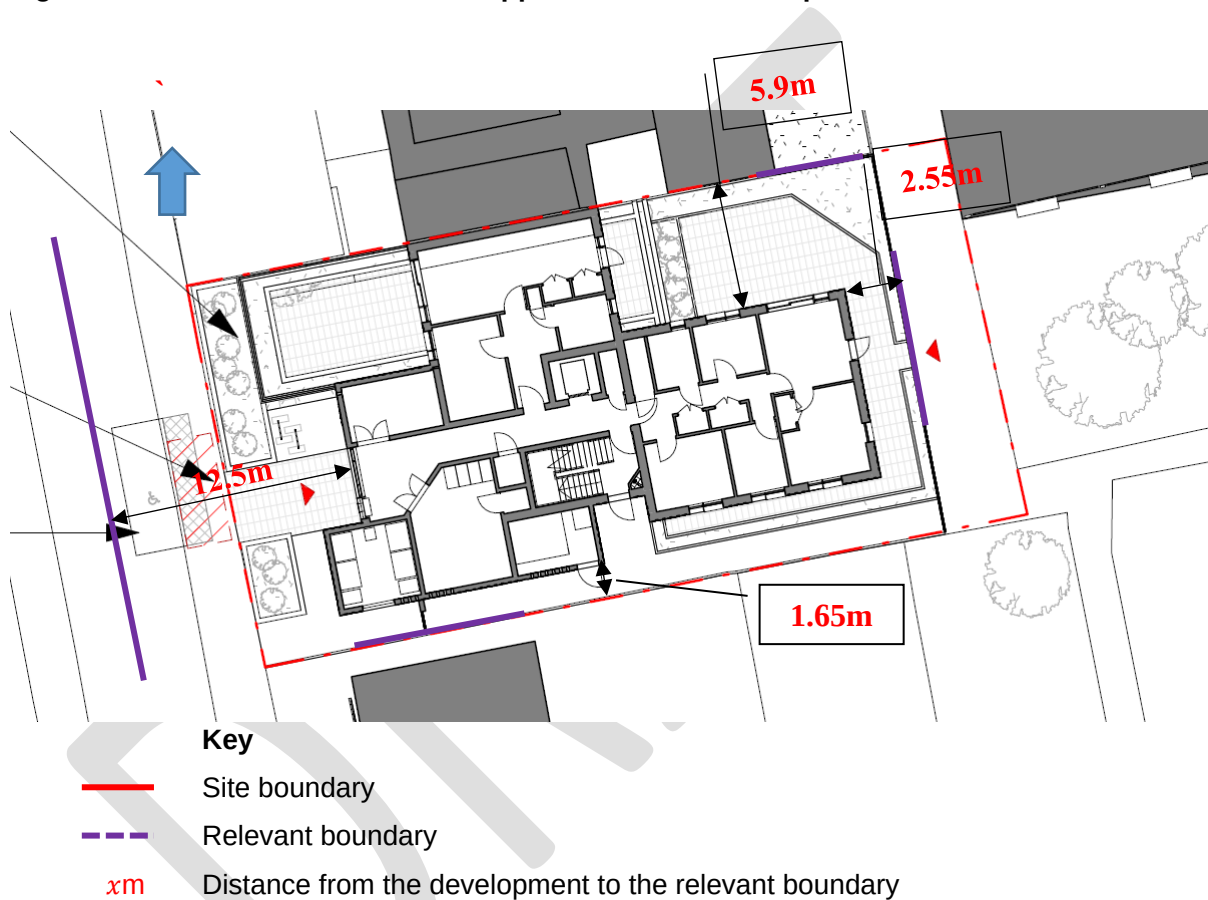
- 1.5.1 Projects undertaken in the UK are subject to the requirements of the Construction (Design and Management) Regulations 2015 (CDM) or within the European Union, that particular country's interpretation of the European Union Directive.
- 1.5.2 This report defines the strategy for meeting the functional 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 CDM Regulations 11 and 18 (duties for designers).
- 1.5.3 In the event that these involve significant residual risks or health and safety critical assumptions, this information will be made available to the CDM Coordinator. 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, CDM Coordinator, Designers, Contractors and Building Occupier of issues arising under the CDM Regulations.

2.0 EXTERNAL FIRE SPREAD – EXTERNAL WALLS

2.1 Construction of External Walls

2.1.1 The requirement is that external walls and roof of a building shall adequately resist the spread of fire.

Figure 1.2: Relevant boundaries applicable to the development



2.1.2 The provisions relate to the spread of fire across relevant boundaries. Limits therefore depend on the distance of the wall/roof from a relevant boundary.

2.1.3 Where a wall is 1000mm or more away from a relevant boundary a reduced standard of fire resistance can be accepted in most cases and the wall only needs fire resistance from the inside ^[2]. In the case of this development, three of the elevations are greater than 1000mm from the relevant boundary. The north elevation wall is coincident with the adjacent building (existing Wat Tyler House). It is therefore deemed as within (less than)

1000mm from the relevant boundary. Relevant boundaries for the site are illustrated using purple lines in Figure 1.2 above.

- 2.1.4 Where a wall is within 1000mm from a relevant boundary, the external walls should have a fire resistance as stated in Table B3 of ADB.
- 2.1.5 The proposed building stands approximately 19m to the uppermost finished floor level. A fire resistance of 90 minutes is therefore required to all floors as the building height is more than 18m but less than 30m above ground level ^[3] This applies to all structural members, beams and columns (exposed faces), load bearing walls (each side separately) and floors (from the underside). Any floor that does not contribute to the support of the building within a flat of more than one storey, the fire resistance is reduced to 30 minutes.

3.0 EXTERNAL FIRE SPREAD – SPACE SEPARATION

3.1 Unprotected Areas

- 3.1.1 The provisions in ADB v1 limit the extent of unprotected areas in the sides of a building such as openings and areas with combustible surfaces which will not give adequate protection against the external spread of fire from one building to another ^[4].
- 3.1.2 As for the construction of external walls, the use of distance to a relevant boundary rather than another building, in measuring separation distance, makes it possible to calculate the allowable proportion of unprotected areas.
- 3.1.3 Any part of an external wall which has less fire resistance than the appropriate amount given in ADB v1 is considered to be an unprotected area ^[5]. The windows and any external door openings would be categorized as unprotected areas.
- 3.1.4 Small unprotected areas in an otherwise protected area of a wall are considered to pose a negligible risk of fire spread and therefore may be disregarded. ADB v1 gives the constraints that apply to the placing of such areas in relation to each other ^[6].
- 3.1.5 A wall situated within 1000mm from any point on the relevant boundary, including a wall coincident with the boundary will meet the provisions for space separation if:
- a) The only unprotected areas are those shown in ADB v1 ^[7]; and
 - b) The rest of the wall is fire resisting from both sides.
- 3.1.6 A wall situated at least 1000mm from any point on the relevant boundary will meet the provisions for space separation if:
- a) the extent of unprotected areas does not exceed that given by one of the methods referred to in AD B v1; and
 - b) the rest of the wall (if any) is fire resisting.
- 3.1.7 ADB v1 Method 1 is only applicable to small residential buildings ^[8], and AD B v1 Method 2 is only applicable to determine the acceptable amount of unprotected area in an external wall of building not more than 10m in height ^[9]. Accordingly, the method set out in the BR

187 BRE 1991 report External Fire Spread, Building Separation and Boundary Distances will be used.

3.1.8 The assumptions used to calculate boundary and separation distances in this assessment are that:

- the extent of a fire in a building should be limited by compartmentation;
- unprotected areas on a burning building are taken to fail immediately;
- unprotected areas on an exposed building fail when the fire in the adjacent building reaches its peak intensity; and
- thermal radiation from a burning building is based on:
 - total unprotected area on the elevation of a compartment
 - compartment temperature which is dependent on fire load, ventilation, insulation and presence of a suppression system.

3.1.9 As stated in paragraph 2.1.5 of this report, Table B3 and B4 of ADB demonstrate that external walls of buildings up to 18m above ground level should be provided with 90 minutes fire resistance from the inside where the façade is greater than 1000mm from a relevant boundary. Notwithstanding this, based on their proximity to relevant boundaries, some external walls are permitted to have a certain percentage of unprotected area. This means that in some cases, the internal lining of the external wall may not require 90 minutes fire resistance.

3.2 Enclosing Rectangles

3.2.1 For most elevations with a number of unprotected areas, the calculation can be approximated to a single area that will provide an equivalent intensity of radiation. This equivalent radiator is the rectangle which totally encloses all the openings in the elevation (termed the overall enclosing rectangle) that radiates at a reduced intensity, the reduction factor being the ratio of the total area of all the openings to the area of the enclosing rectangle. Figures 3.1 to 3.4 below show the elevations of the building.

Figure 3.1: Proposed West Elevation



Figure 3.2: Proposed South Elevation



Figure 3.3: Proposed North Elevation



Figure 3.4: Proposed East Elevation



3.3 Space Separation - General

3.3.1 Consideration has been given to external fire spread via adjacent unprotected openings where façades abut or are close to another building or centre line of a road. Figure 1.2 illustrates locations of relevant boundaries in relation to the proposed development.

3.3.2 The enclosing rectangles used in this assessment are shown as red boxes in diagrams 3.1 to 3.4 and represent a single compartment within the building. Enclosing rectangles have not been evaluated for all openings in each of the floors since the size and locations of lower floors are often repeated on the upper floors (i.e., an assessment of one floor on a façade is deemed to provide the worse-case scenario for that façade). The rectangles identified in Figures 3.1 to 3.4 are therefore a representative assessment for the entire façade for the purposes of external fire spread.

3.4 Space Separation Calculations

3.4.1 As shown in Table 3.1 below, all four (4) elevations of the building are compliant in respect of space separation.

3.4.2 In summary, the BR 187 method for calculating boundary distance reveals that the risk of fire spreading from the proposed development to a relevant boundary is low on all elevations.

Table 3.1 Space separation assessment
Using BR 187 method

Compartment	Width of compartment (m)	Height of compartment (m)	Actual separation distance (m)	Calculation	Result
West Elevation					
A	15	3	12.5	Unprotected percentage = (Total unprotected area ÷ Area of enclosing rectangle) x 100	22.9% of enclosing rectangle A is unprotected area. This is rounded up to 30%. The façade width is rounded up to 15m. The façade height of 3.0m. Table A (for 3m high enclosing rectangles)

				$= (4.6 + 1.9 + 1.9 + 1.9) \div (45) \times 100$ $= (10.3 \div 45) \times 100$ $= 22.9\%$	gives a minimum boundary distance of 1.5m . The actual separation distance is 12.5m. Enclosing rectangle A is therefore compliant.
South Elevation					
B	12	3	1.65	Unprotected percentage = (Total unprotected area ÷ Area of enclosing rectangle) x 100 $= (0.59 + 0.59 + 1.17 + 1.17) \div (36) \times 100$ $= (3.52 \div 36) \times 100$ $= 9.7\%$	9.7% of enclosing rectangle B is unprotected area. This is rounded up to 20%. The façade width is rounded up to 12m. The façade height of 3.0m. Table A (for 3m high enclosing rectangles) gives a minimum boundary distance of 1.0m . The actual separation distance is 1.65m. Enclosing rectangle B is therefore compliant.
North Elevation					
C	12	3	5.9	Unprotected percentage = (Total unprotected area ÷ Area of enclosing rectangle) x 100 $= (1.89 + 1.89 + 4.4) \div (36) \times 100$	22.7% of enclosing rectangle C is unprotected area. This is rounded up to 30%. The façade width is rounded up to 12m. The façade height of 3.0m. Table A (for 3m high enclosing rectangles) gives a minimum boundary distance of 1.0m . The actual separation distance is 5.9m. Enclosing

				$= (8.18 \div 36) \times 100$ $= 22.7\%$	rectangle C is therefore compliant.
West Elevation					
D	12	3	2.25	Unprotected percentage = (Total unprotected area ÷ Area of enclosing rectangle) x 100 $= (1.8 + 1.8 + 1.9 + 4.4) \div (36) \times 100$ $= (9.9 \div 36) \times 100$ $= 27.5\%$	27.5% of enclosing rectangle D is unprotected area. This is rounded up to 30%. The façade width is rounded up to 12m. The façade height of 3.0m. Table A (for 3m high enclosing rectangles) gives a minimum boundary distance of 1.0m. The actual separation distance is 2.25m. Enclosing rectangle D is therefore compliant.

4.0 MEANS OF WARNING AND ESCAPE

4.1 Fire Detection

- 4.1.1 Residential means of escape is somewhat different to many other types of buildings in that only the particular apartment that has a fire in it is immediately evacuated. 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. The Fire Service carries out evacuation of the other apartments if necessary. This philosophy is reflected by the stand-alone detectors / sounders, which are required in each apartment but not in the common corridors or escape routes. A smoke detection system can be located within the common areas, but this is only to operate the life safety systems within that area if required i.e., automatic opening vents (AOVs).
- 4.1.2 The requirement is given in Part B of Schedule 1 to the Building Regulations 2010 in that '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 the case of a fire from the building to a place of safety outside of the building capable of being safely and effectively used at all material times.
- 4.1.3 In terms of early warning, a minimum of Grade D2 Category LD2 (owner-occupied flat) or Grade D1 Category LD2 (rented flat) fire detection and fire alarm system should be installed within the flats. This in accordance with BS 5839-6:2019. An L5 system should be introduced within the communal areas of the residential demise. This is in accordance with 5839-1:2017.
- 4.1.4 The smoke and heat alarms will be mains operated and conform to BS EN 14604 and BS 5446-2 respectively. The detectors will have a standby power supply in the form of a rechargeable battery and are therefore compliant with the requirements of Approved Document B v1. The positioning of the smoke and heat detectors is to accord with the guidance given in BS 5839 part 6. Heat detectors will be provided in kitchens of the flats.
- 4.1.5 The fire alarm cause and effect principles for the building can be summarised in the table below.

Table 4.1: Cause and effect

Accommodation	Cause	Effect
Residential Accommodation – Apartments	Single smoke or heat detector activated within the apartment	- Alarm signal sounds throughout the affected apartment only, invoking immediate evacuation. - No interlinks are proposed to any other accommodation.
Residential Accommodation – Common Areas	Single smoke detector activated within the common corridor	AOV at the top of the staircase and from the common corridor will open.

4.2 Means of Escape from Common Areas

4.2.1 Travel distances for the different parts of the building will be in accordance with the travel distances recommended in ADB (see table below).

Table 4.2: Travel distance by purpose group

Purpose Group	Travel within	Maximum travel distance (m)	
		In one direction	More than one direction
1(a) – Flats	Flat Protected Hallway	9m	n/a
	Entire flat (if there is no protected entrance hallway) – from the furthest room to front door of flat		
	Common areas / Common Corridor	7.5m	30m

4.3 Means of Escape – Ground floor

4.3.1 The plan view in Figure 4.1 shows the intended layout of the ground floor level.

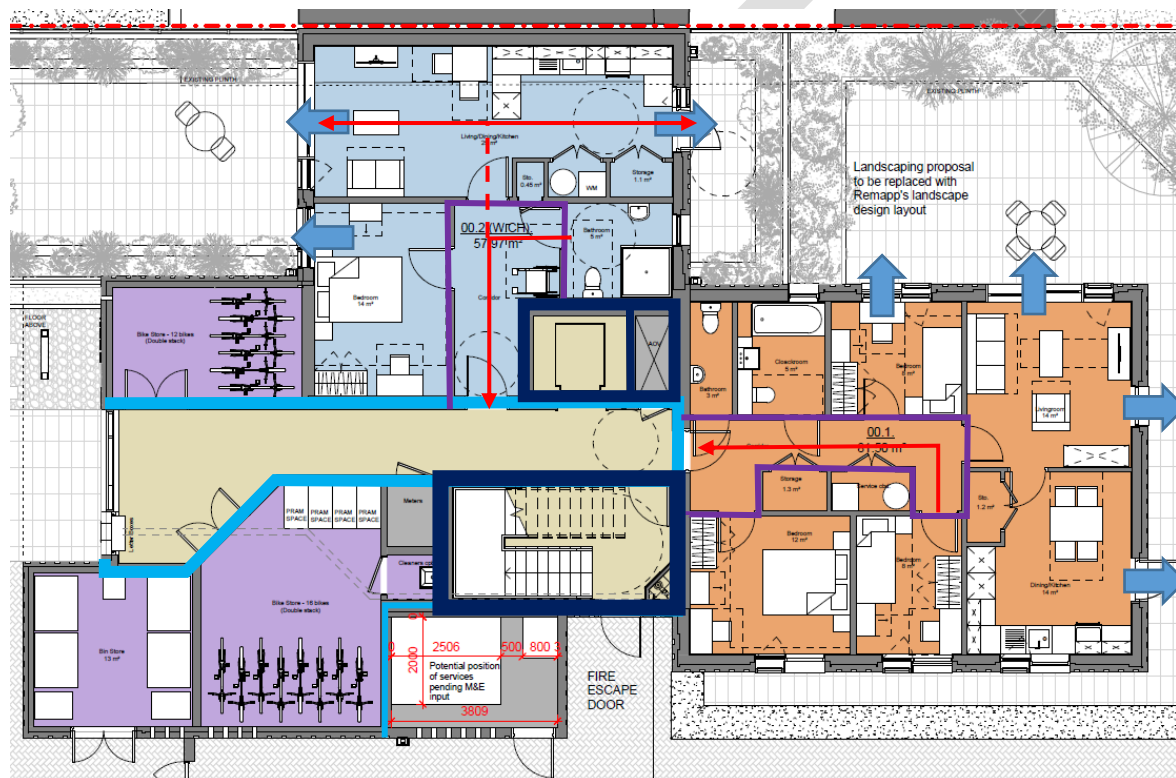
4.3.2 The ground floor is mainly of residential occupancy comprising two flats but also houses a meter room, cleaners' store and bicycle storage as ancillary accommodation. Paragraph 3.37 of ADB states:

- *“Ancillary accommodation should not be located in, or entered from, a protected lobby or protected corridor forming the only common escape route on that storey.”*
- 4.3.3 However, the current layout may be acceptable as each flat on the ground floor comprises an independent alternative exit, and occupants of the upper floors are not required to enter the protected corridor (which gives access to the bike store) to escape (see Figure 4.1). The ground floor of is therefore deemed to be acceptable in this regard.
- 4.3.4 Emergency escape windows have been provided for all habitable rooms. In order for the ground floor flat to meet compliance in terms of escape windows and external doors, it should meet all the provisions highlighted in Diagram 2.5 and Paragraph 2.10 of ADB v1 as follows.
- a. *Windows should have an unobstructed openable area that complies with all of the following.*
 - I. *A minimum area of 0.33m².*
 - II. *A minimum height of 450mm and a minimum width of 450mm (the route through the window may be at an angle rather than straight through).*
 - III. *The bottom of the openable area is a maximum of 1100mm above the floor.*
 - b. *People escaping should be able to reach a place free from danger from fire.*
 - c. *Locks (with or without removable keys) and opening stays (with child-resistant release catches) may be fitted to escape windows.*
 - d. *Windows should be capable of remaining open without being held.*
- 4.3.5 According to Table 3.1, of ADB v1, on ground floor flats, the maximum travel distance from a flat entrance door along a common area (corridor) to the final exit should be 7.5m if escape is in one direction and 30m if escape is in more than one direction. The ground floor is compliant in this regard.
- 4.3.6 All habitable rooms in both flats open directly into protected entrance halls. The travel distance within this protected entrance hall is less than 9m. The above-mentioned is in accordance with Diagram 3.2 of ADB v1. Hence, the ground floor is compliant in this regard. However, in order to fully comply with Diagram 3.2 of ADB, the protected entrance hall should have a fire resistance of 30 minutes each side separately.

4.3.7 The common corridor should meet the requirements of Paragraph 3.34 of ADB v1, which stipulates that, “common corridors should be protected corridors. The wall between each flat and the corridor should be a compartment wall (minimum REI 30 where the top storey is up to 5m above ground level, otherwise REI 60)”.

4.3.8 The building is greater than 18m in height, therefore a firefighting shaft is required. Refer to section 7.3 of this report for requirements for firefighting shafts.

Figure 4.1: Means of escape on ground floor.



Key

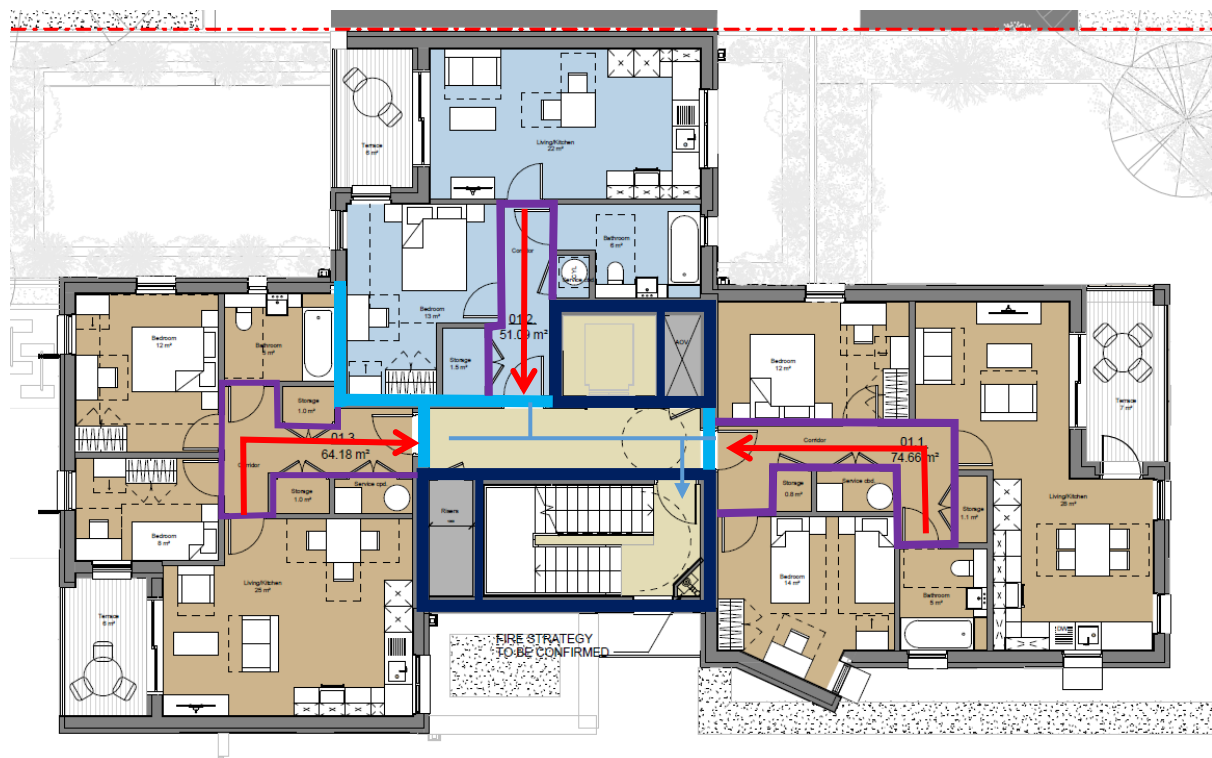
-  Travel within apartment (9m rule)
-  Travel within protected corridor/common area for means of escape (7.5m one direction / 30m more than one direction 5m rule)
-  Escape door/ window
-  Compartment walls: 60 minutes each side separately
-  Firefighting shaft: Fire resistant to 120 minutes from accommodation side, and 60 minutes from inside the shaft with FD60S doors.
-  Fire resistant to 30 minutes each side separately
 - All doors within compartment walls to be FD30S.
 - All doors within protected entrance halls of flats should be FD20 doors.

Fire resistance required to external walls:

- Less than 1m from relevant boundary: 60 minutes each side separately
- Greater than or equal to 1m from relevant boundary: 60 minutes from the inside
- This does not include the permitted unprotected area

4.4 Means of Escape – First floor

- 4.4.1 The plan view in Figure 4.3 shows the intended layout of the first-floor level.
- 4.4.2 The first floor comprises three apartments with a single escape route (a single common stair). According to paragraph 3.27 of ADB v1, a single escape route and common stair is acceptable under two conditions. Firstly, a protected lobby or common protected corridor should separate each flat from the common stair and secondly, the maximum travel distance for escape in one direction should not be surpassed (in this case 7.5m). The first floor is compliant in this regard.
- 4.4.3 Additionally, as all flats are served by a single stair, each floor should be designed in accordance with Diagram 3.7 of ADB v1 which states that smoke control should be introduced within the stair lobby. A smoke shaft has been introduced within the stair lobby as shown in Figure 4.2. The smoke shaft should have a cross sectional area of 1.5m².
- 4.4.4 All habitable rooms in all flats open directly into protected entrance halls. The travel distance within these protected entrance halls is less than 9m. All flat protected entrance halls on the first floor are therefore compliant in this regard.
- 4.4.5 All protected entrance halls should have a fire resistance of no less than 30 minutes each side separately. The doors within the flats that give access to the protected entrance hall should be FD20 doors.
- 4.4.6 The common corridor should meet the requirements of Paragraph 3.34 of ADB v1, which stipulates that, *“common corridors should be protected corridors. The wall between each flat and the corridor should be a compartment wall (minimum REI 30 where the top storey is up to 5m above ground level, otherwise REI 60)”*.
- 4.4.7 The building is greater than 18m in height, therefore a firefighting shaft is required. Refer to section 7.3 of this report for requirements for firefighting shafts.

Figure 4.2: Means of escape on first floor**Key**

- Travel within apartment (9m rule)
- Travel within protected corridor/common area for means of escape (7.5m one direction / 30m more than one direction 5m rule)
- Compartment walls: 60 minutes each side separately
- Firefighting shaft: Fire resistant to 120 minutes from accommodation side, and 60 minutes from inside the shaft with FD60S doors.
- Fire resistant to 30 minutes each side separately
 - All doors within compartment walls to be FD30S.
 - All doors within protected entrance halls of flats should be FD20 doors.

Fire resistance required to external walls:

- Less than 1m from relevant boundary: 60 minutes each side separately
- Greater than or equal to 1m from relevant boundary: 60 minutes from the inside
- This does not include the permitted unprotected area

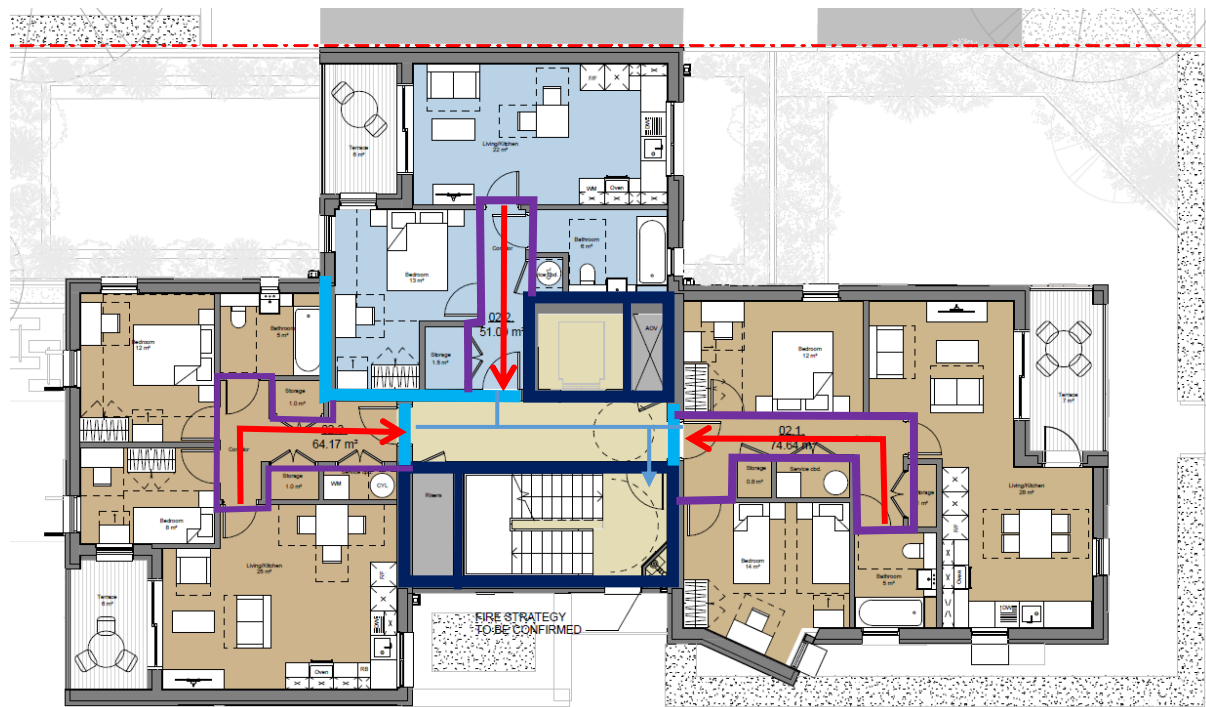
4.5 Means of Escape – Second Floor

4.5.1 The plan view in Figure 4.4 shows the intended layout of the second-floor level.

4.5.2 The second floor comprises three apartments with a single escape route (a single common stair). According to paragraph 3.27 of ADB v1, a single escape route and common stair is acceptable under two conditions. Firstly, a protected lobby or common protected corridor should separate each flat from the common stair and secondly, the maximum travel

distance for escape in one direction should not be surpassed (in this case 7.5m). The second floor is compliant in this regard.

- 4.5.3 Additionally, as all flats are served by a single stair, each floor should be designed in accordance with Diagram 3.7 of ADB v1 which states that smoke control should be introduced within the stair lobby. A smoke shaft has been introduced within the stair lobby as shown in Figure 4.3. The smoke shaft should have a cross sectional area of 1.5m².
- 4.5.4 All habitable rooms in all flats open directly into protected entrance halls. The travel distance within these protected entrance halls is less than 9m. All flat protected entrance halls on the second floor are therefore compliant in this regard.
- 4.5.5 All protected entrance halls should have a fire resistance of no less than 30 minutes each side separately ^[10]. The doors within the flats that give access to the protected entrance hall should be FD20 doors ^[11].
- 4.5.6 The common corridor should meet the requirements of Paragraph 3.34 of ADB v1, which stipulates that, *"common corridors should be protected corridors. The wall between each flat and the corridor should be a compartment wall (minimum REI 30 where the top storey is up to 5m above ground level, otherwise REI 60)"*.
- 4.5.7 The building is greater than 18m in height, therefore a firefighting shaft is required. Refer to section 7.3 of this report for requirements for firefighting shafts.

Figure 4.3: Means of escape on second floor.**Key**

- Travel within apartment (9m rule)
- Travel within protected corridor/common area for means of escape (7.5m one direction / 30m more than one direction 5m rule)
- Compartment walls: 60 minutes each side separately
- Firefighting shaft: Fire resistant to 120 minutes from accommodation side, and 60 minutes from inside the shaft with FD60S doors.
- Fire resistant to 30 minutes each side separately
 - All doors within compartment walls to be FD30S.
 - All doors within protected entrance halls of flats should be FD20 doors.

Fire resistance required to external walls:

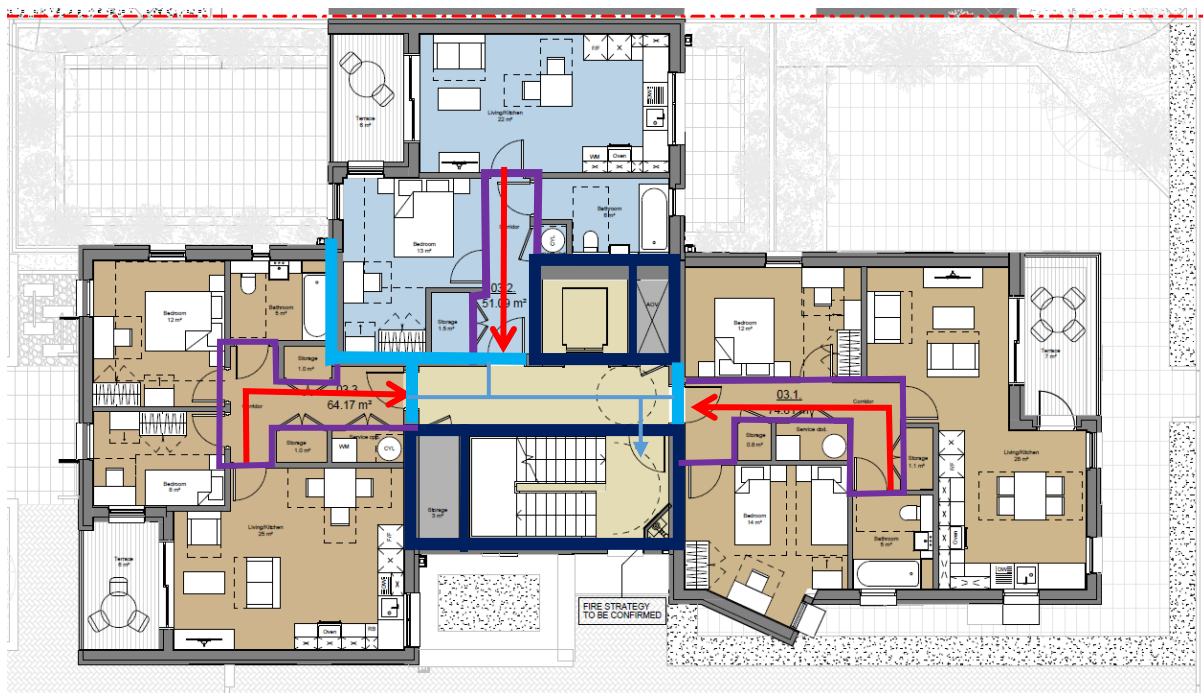
- Less than 1m from relevant boundary: 60 minutes each side separately
- Greater than or equal to 1m from relevant boundary: 60 minutes from the inside
- This does not include the permitted unprotected area

4.6 Means of Escape – Third Floor

4.6.1 The plan view in Figure 4.3 shows the intended layout of the third-floor level

4.6.2 The third floor comprises three apartments with a single escape route (a single common stair). According to paragraph 3.27 of ADB v1, a single escape route and common stair is acceptable under two conditions. Firstly, a protected lobby or common protected corridor should separate each flat from the common stair and secondly, the maximum travel distance for escape in one direction should not be surpassed (in this case 7.5m). The third floor is compliant in this regard.

- 4.6.3 Additionally, as all flats are served by a single stair, each floor should be designed in accordance with Diagram 3.7 of ADB v1 which states that smoke control should be introduced within the stair lobby. A smoke shaft has been introduced within the stair lobby as shown in Figure 4.4. The smoke shaft should have a cross sectional area of 1.5m².
- 4.6.4 All habitable rooms in all flats open directly into protected entrance halls. The travel distance within these protected entrance halls is less than 9m. All flat protected entrance halls on the third floor are therefore compliant in this regard.
- 4.6.5 All protected entrance halls should have a fire resistance of no less than 30 minutes each side separately. The doors within the flats that give access to the protected entrance hall should be FD20 doors.
- 4.6.6 The common corridor should meet the requirements of Paragraph 3.34 of ADB v1, which stipulates that, *“common corridors should be protected corridors. The wall between each flat and the corridor should be a compartment wall (minimum REI 30 where the top storey is up to 5m above ground level, otherwise REI 60)”*.
- 4.6.7 The building is greater than 18m in height, therefore a firefighting shaft is required. The stair should therefore be provided with a fire resistance of 120 minutes from the accommodation side, and 60 minutes from the inside of the shaft with FD60S doors. The doors within the protected corridor serving as the front door of flats should be FD30S.

Figure 4.4: Means of escape on third floor.**Key**

-  Travel within apartment (9m rule)
-  Travel within protected corridor/common area for means of escape (7.5m one direction / 30m more than one direction 5m rule)
-  Compartment walls: 60 minutes each side separately
-  Firefighting shaft: Fire resistant to 120 minutes from accommodation side, and 60 minutes from inside the shaft with FD60S doors.
-  Fire resistant to 30 minutes each side separately
 - All doors within compartment walls to be FD30S.
 - All doors within protected entrance halls of flats should be FD20 doors.

Fire resistance required to external walls:

- Less than 1m from relevant boundary: 60 minutes each side separately
- Greater than or equal to 1m from relevant boundary: 60 minutes from the inside
- This does not include the permitted unprotected area

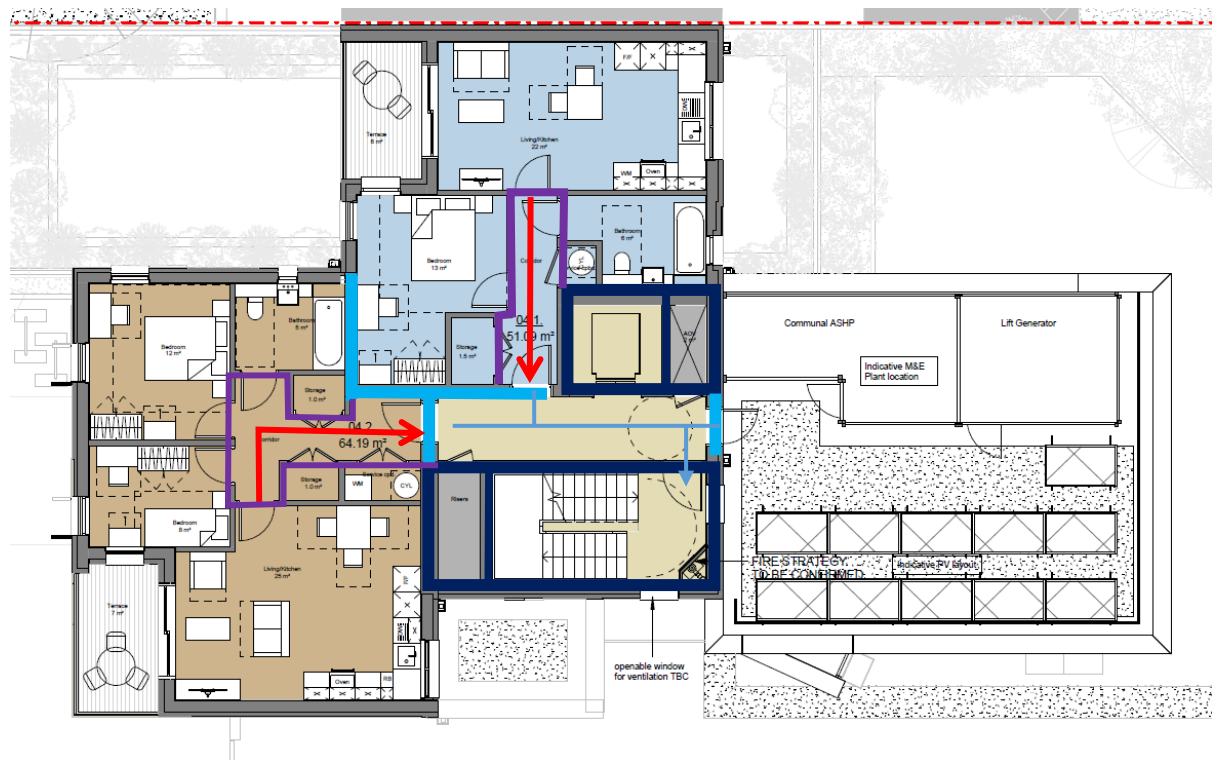
4.7 Means of Escape –Fourth Floor

4.7.1 The plan view in Figure 4.4 shows the intended layout of the Fourth-floor level.

4.7.2 The fourth floor comprises two apartments with a single escape route (a single common stair). According to paragraph 3.27 of ADB v1, a single escape route and common stair is acceptable under two conditions. Firstly, a protected lobby or common protected corridor should separate each flat from the common stair and secondly, the maximum travel

distance for escape in one direction should not be surpassed (in this case 7.5m). The fourth floor is compliant in this regard.

- 4.7.3 Additionally, as all flats are served by a single stair, each floor should be designed in accordance with Diagram 3.7 of ADB v1 which states that smoke control should be introduced within the stair lobby. A smoke shaft has been introduced within the stair lobby as shown in Figure 4.4. The smoke shaft should have a cross sectional area of 1.5m².
- 4.7.4 All habitable rooms in both flats open directly into protected entrance halls. The travel distance within these protected entrance halls is less than 9m. All flat protected entrance halls on the fourth floor are therefore compliant in this regard.
- 4.7.5 All protected entrance halls should have a fire resistance of no less than 30 minutes each side separately ^[12] The doors within the flats that give access to the protected entrance hall should be FD20 doors. ^[13]
- 4.7.6 The common corridor should meet the requirements of Paragraph 3.34 of ADB v1, which stipulates that, *“common corridors should be protected corridors. The wall between each flat and the corridor should be a compartment wall (minimum REI 30 where the top storey is up to 5m above ground level, otherwise REI 60)”*.
- 4.7.7 The building is greater than 18m in height, therefore a firefighting shaft is required. Refer to section 7.3 of this report for requirements for firefighting shafts.

Figure 4.5: Means of escape on fourth floor.**Key**

- Travel within apartment (9m rule)
- Travel within protected corridor/common area for means of escape (7.5m one direction / 30m more than one direction 5m rule)
- Compartment walls: 60 minutes each side separately
- Firefighting shaft: Fire resistant to 120 minutes from accommodation side, and 60 minutes from inside the shaft with FD60S doors.
- Fire resistant to 30 minutes each side separately
 - All doors within compartment walls to be FD30S.
 - All doors within protected entrance halls of flats should be FD20 doors.

Fire resistance required to external walls:

- Less than 1m from relevant boundary: 60 minutes each side separately
- Greater than or equal to 1m from relevant boundary: 60 minutes from the inside
- This does not include the permitted unprotected area

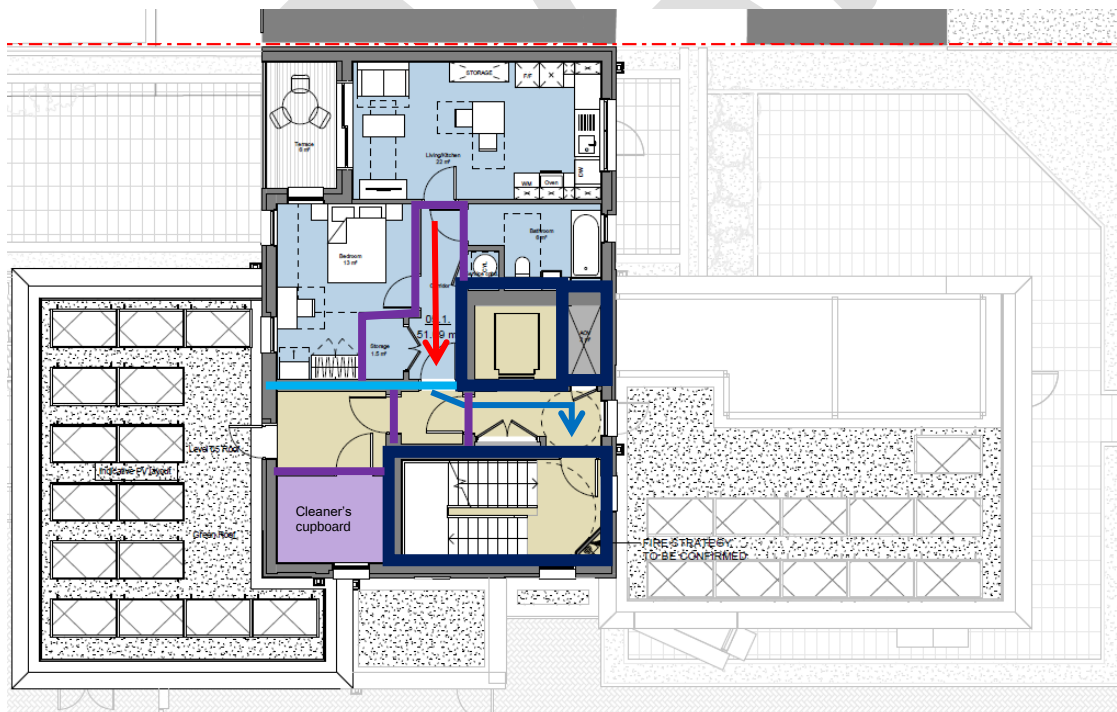
4.8 Means of Escape – Fifth Floor

4.8.1 The plan view in Figure 4.5 shows the intended layout of the fifth-floor level.

4.8.2 All habitable rooms in the single flat on the fifth floor opens directly into protected entrance halls. The travel distance within these protected entrance halls is less than 9m. The fifth floor is compliant in this regard.

- 4.8.3 The protected entrance hall should have a fire resistance of no less than 30 minutes each side separately. The doors within the flats that give access to the protected entrance hall should be FD20 doors.
- 4.8.4 Additionally, as all flats are served by a single stair, each floor should be designed in accordance with Diagram 3.7 of ADB v1 which states that smoke control should be introduced within the stair lobby. A smoke shaft has been introduced within the stair lobby as shown in Figure 4.6. The smoke shaft should have a cross sectional area of 1.5m².
- 4.8.5 The common corridor should meet the requirements of Paragraph 3.34 of ADB v1, which stipulates that, *“common corridors should be protected corridors. The wall between each flat and the corridor should be a compartment wall (minimum REI 30 where the top storey is up to 5m above ground level, otherwise REI 60)”*.
- 4.8.6 The building is greater than 18m in height, therefore a firefighting shaft is required. Refer to section 7.3 of this report for requirements for firefighting shafts.

Figure 4.6: Means of escape on the fifth floor



Key  Travel within apartment (9m rule)  Travel within protected corridor/common area for means of escape (7.5m one direction / 30m more than one direction 5m rule)  Compartment walls: 60 minutes each side separately  Firefighting shaft: Fire resistant to 120 minutes from accommodation side, and 60 minutes from inside the shaft with FD60S doors.  Fire resistant to 30 minutes each side separately • All doors within compartment walls to be FD30S. • All doors within protected entrance halls of flats should be FD20 doors.	Fire resistance required to external walls: • Less than 1m from relevant boundary: 60 minutes each side separately • Greater than or equal to 1m from relevant boundary: 60 minutes from the inside • This does not include the permitted unprotected area
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4.8.1 There is a cleaner's cupboard on the 5th floor which opens onto a lobby. Clause 3.37 of ADB states: *'ancillary accommodation should not be located in, or entered from, a protected lobby or protected corridor forming the only common escape route on that storey'*. The cleaner's cupboard is entered from a protected lobby which then leads to another lobby which separates the flat from the ventilated stair lobby. Strictly speaking the cleaner's cupboard should be omitted. However, the additional lobby protection between the cleaner's cupboard and the stair lobby reduces the risk of the escape route becoming smoke-logged in the event of a fire within the cleaner's store. On this basis, the location of the cleaner's cupboard is deemed to be acceptable provided that the lobbies have a fire resistance of at least 30 minutes each side separately with FD30S doors.

4.9 Means of Escape –Sixth floor

4.9.1 The plan view in Figure 4.7 shows the intended layout of the sixth-floor level.

4.9.2 All habitable rooms in the single flat on the sixth floor opens directly into protected entrance halls. The travel distance within these protected entrance halls is less than 9m. The sixth floor is compliant in this regard

4.9.3 The protected entrance hall should have a fire resistance of no less than 30 minutes each side separately. The doors within the flats that give access to the protected entrance hall should be FD20 doors.

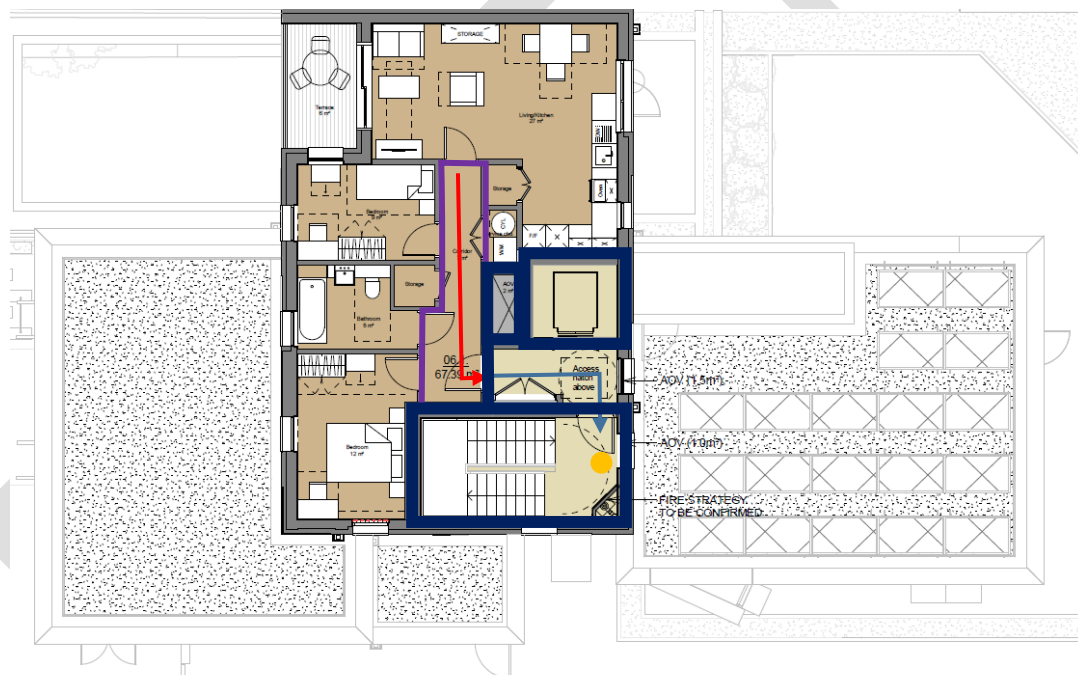
4.9.4 Additionally, as all flats are served by a single stair, each floor should be designed in accordance with Diagram 3.7 of ADB v1 which states that smoke control should be

introduced within the stair lobby. A smoke shaft has been introduced within the stair lobby as shown in Figure 4.7. The smoke shaft should have a cross sectional area of 1.5m².

4.9.5 The common corridor should meet the requirements of Paragraph 3.34 of ADB v1, which stipulates that, “*common corridors should be protected corridors. The wall between each flat and the corridor should be a compartment wall (minimum REI 30 where the top storey is up to 5m above ground level, otherwise REI 60)*”.

4.9.6 The building is greater than 18m in height, therefore a firefighting shaft is required. Refer to section 7.3 of this report for requirements for firefighting shafts.

Figure 4.7: Means of escape on the sixth floor.



Key

- Travel within apartment (9m rule)
- Travel within protected corridor/common area for means of escape (7.5m one direction / 30m more than one direction 5m rule)
- Compartment walls: 60 minutes each side separately
- Firefighting shaft: Fire resistant to 120 minutes from accommodation side, and 60 minutes from inside the shaft with FD60S doors.
- Fire resistant to 30 minutes each side separately
- 1.0m² AOV
 - All doors within compartment walls to be FD30S.
 - All doors within protected entrance halls of flats should be FD20 doors.

Fire resistance required to external walls:

- Less than 1m from relevant boundary: 60 minutes each side separately
- Greater than or equal to 1m from relevant boundary: 60 minutes from the inside
- This does not include the permitted unprotected area

4.10 Vertical Means of Escape

- 4.10.1 The vertical means of escape for this building is via a protected stair from the ground floor to the 6th floor. The protected stair penetrates compartment floors; therefore, it is a protected shaft. The stair should be provided with a fire resistance of 120 minutes from the accommodation side, and 60 minutes from the inside of the shaft with FD60S doors.
- 4.10.2 The stairwell serves as a firefighting stair and should therefore have a minimum width of 1100mm. Note that ADB states that when measuring stair widths “handrails and strings intruding into the width by a maximum of 100mm on each side may be ignored” ^[14]. The stairwell has a width more than 1100mm and is therefore compliant.
- 4.10.3 The requirement of ADB v1 is that the protected stairwell should either discharge to a final exit/means of escape from the building or connect into a protected corridor / lobby which then provides the final means of escape/exit from the buildings ^[15]. The stairwell is compliant with this requirement.
- 4.10.4 The protected stairway should be provided with an Automatic Opening Vent at the top of the shaft with a minimum 1m² opening area. The stairway is compliant with this requirement.
- 4.10.5 Riser shafts should be provided with 90 minutes fire resisting construction (clause 7.21 and 7.23 ADB v1).

4.11 Emergency Lighting

- 4.11.1 Emergency lighting as backup lighting meeting the recommendations of BS5266 Parts 1 and 7 will be provided in the following areas:

Table 4.3: Areas requiring escape lighting

Purpose group or use	Areas requiring escape lighting
Residential	All common escape routes

- 4.11.2 Luminaries will be provided appropriately spaced to provide the light levels suggested within British Standard BS5266 as follows:

Table 4.4: Light levels recommended for escape routes

Defined escape routes	0.5lux
Undefined routes	1lux

4.11.3 Emergency lighting shall be provided on all escape routes. The installation shall also comply with the Codes of Practice for Emergency Lighting BS5266 Part 1: 1999.

4.11.4 Final locations and routes shall be agreed during the design development.

4.12 Escape Signage

4.12.1 Escape signage will be provided above storey exits and final exit doors from the common areas within the residential accommodation. Emergency escape signage will be required to meet the requirements of the Regulatory Reform (Fire Safety) Order. Such signage will meet the recommendations of BS5499 Part 4 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, especially 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 signs.
- 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.
- 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.

4.12.2 It is suggested that the final signage provision is agreed with the Regulatory Authorities prior to occupation of the complete building.

4.13 Other Signage

4.13.1 Except for front doors to apartments, or fire doors within apartments, fire resisting doors and fire exit doors and escape routes in and around the building will be provided with signage meeting the recommendations of BS5499 Part 5.

Table 4.5: Signage for fire doors

Method of Closure	Signage	Sign Diameter	Letter Height	Location
Self-closing device 		60mm	5mm	Fire doors in corridors, off staircases and refuse lobbies
Keep locked shut 				Within the inside door of the riser cupboards and maintenance access cupboards

5.0 INTERNAL FIRE SPREAD

5.1 Linings

5.1.1 The requirement is given in Part B of Schedule 1 to the Building Regulations 2010 in that *'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 or rate of fire growth, which is reasonable in the circumstances.*

Internal linings means the materials or products used in lining any partition, wall, ceiling or other internal structure.'

5.1.2 The surface linings of walls and ceilings should meet the classifications shown in Table 5.1 below.

Table 5.1: Classification of linings¹⁶

Location	European Class
Small rooms of maximum internal floor area of 4m ²	D-s3, d2
Garages (as part of a dwellinghouse) of maximum internal floor area of 40m	
Other rooms (including garages) Circulation spaces within a dwelling	C-s3, d2
Other circulation spaces (including the common areas of blocks of flats)	B-s3, d2

5.2 Fire Stopping

5.2.1 Any openings for services breaching compartment walls will be fire stopped (unless protected throughout their entire length with fire resisting material) in accordance with Section 9 of ADB. This is to prevent the passage of fire and assist in retarding the movement of smoke. Joints between elements of structures that serve as barriers to fire

will be fire-stopped to prevent the passage of fire and smoke. See Table 5.2 below showing the maximum nominal internal diameter of pipes passing through a compartment wall/floor:

Table 5.2: Extract from ADB showing maximum nominal internal diameter of pipes passing through a compartment wall/floor¹⁷

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

5.3 Cavity Barriers

5.3.1 During construction of a building, cavities offer a route for fire and smoke to spread, which may present danger to occupants of the building. Cavities are found in concealed spaces, i.e. voids in the floors, walls, ceilings etc. cavity barriers are designed to prevent the spread of fire and smoke throughout the building. Please note that provisions for cavity barriers are not the same as those for fire-stopping.

5.3.2 Cavity barriers will be included in any large cavity with the potential for extensive unseen fire spread. 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 and at the top of such an external cavity wall
- At the junction between an external cavity wall and every compartment floor and compartment wall
- At the junction between a 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
- Where the corridor will be sub-divided to prevent fire or smoke affecting two alternative escape routes simultaneously
- Within the void behind the external face of rain screen cladding at every floor level and on the line of compartment walls abutting the external wall
- At the edges of cavities (including around openings, i.e. windows)

5.3.3 In addition to the above locations cavity barriers are also normally required in cavities (including ceiling voids and under floor service voids) where the cavity exceeds 20m.

5.3.4 The cavity barriers will provide a minimum of 30-minute fire rating (i.e., 30 minutes integrity and 15 minutes insulation). Any penetrations through the cavity barriers will be either:

- Fitted with a proprietary sealing system; or
- Pipes of limited diameters that are sealed with fire-stopping, or sealed with sleeving of non-combustible pipe material.

5.4 Ventilation ducts and flues passing through fire-separating elements, fire dampers

5.4.1 Where ductwork for ventilation passes through fire-separating elements (i.e., compartment walls / enclosures to protected escape routes), then the integrity of those walls should be maintained, using one or multiple of the following four methods:

- Method 1: thermally actuated fire dampers;
- Method 2: fire-resisting enclosures;
- Method 3: protection using fire-resisting ductwork;
- Method 4: automatically actuated fire and smoke dampers triggered by smoke detectors

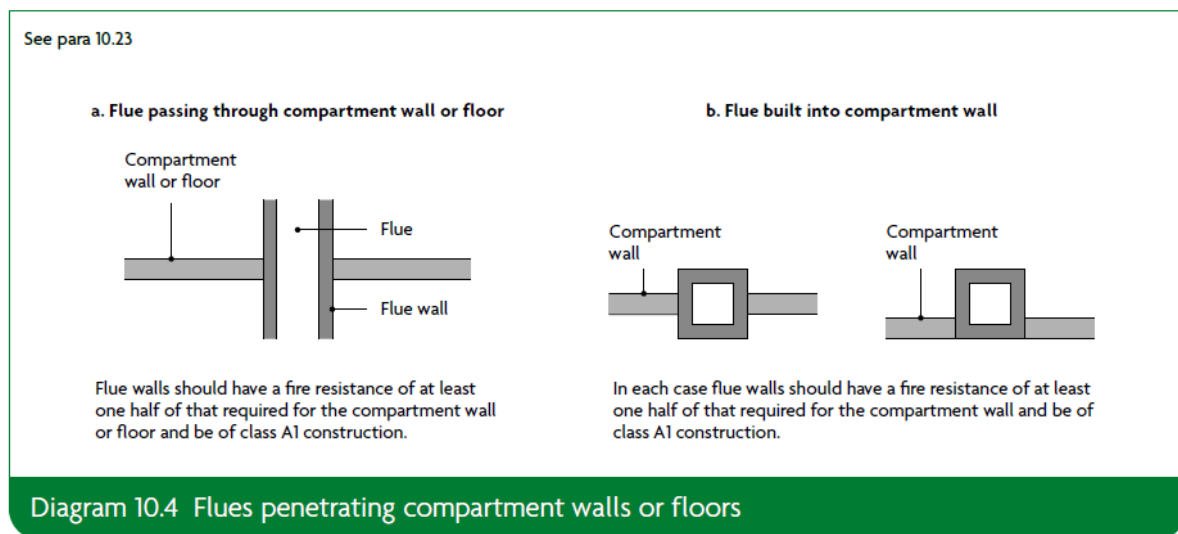
5.4.2 Paragraph 10.17 of ADB v1, requires that fire dampers and smoke dampers should comply with the following:

- Sited within the thickness of the fire-separating elements.
- Securely fixed.

- Sited such that, in a fire, expansion of the ductwork would not push the fire damper through the structure.

5.4.3 The fire resistance of the wall of a flue, a duct containing flues or appliance ventilation duct(s) should be no less than half of the fire resistance of any compartment wall or compartment floor it is housed within, in accordance with Paragraph 10.23 and Diagram 10.4 of ADB v1.

Figure 5.1 Flues penetrating compartment walls and floors (Diagram 10.4 of ADB v1).



6.0 BUILDING SMOKE CONTROL

6.1 Smoke

6.1.1 Smoke control may be mechanical or natural. Natural vents should comply either of the following:

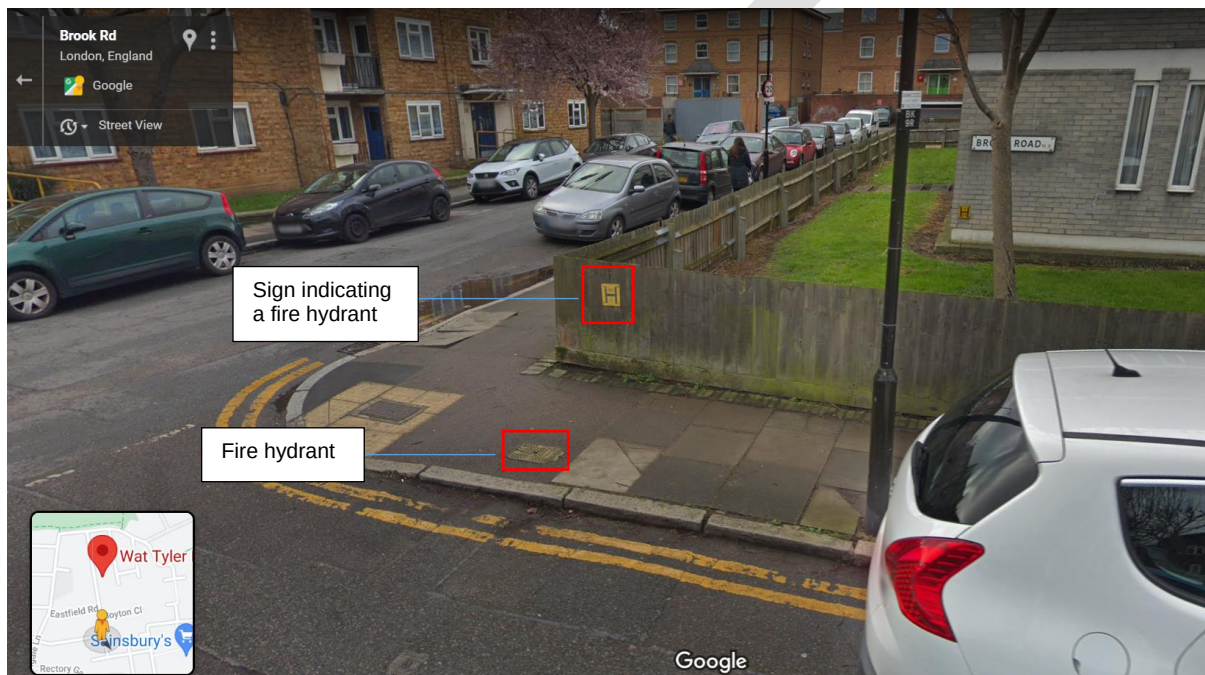
- a. Located on an external wall with minimum free area of 1.5m^2 .
- b. discharge into a vertical smoke shaft, closed at the base, that meets all of the following:
 - i. The shaft should conform to the following:
 - Have a minimum cross-sectional area of 1.5m^2 (minimum dimension 0.85m in any direction);
 - Open at roof level, minimum 0.5m above any surrounding structures within 2m of it horizontally; and,
 - Extend a minimum of 2.5m above the ceiling of the highest storey served by the shaft.
 - ii. The area of vents should be a minimum of 1m^2 in the following areas.
 - From the corridor or lobby into the shaft;
 - At the opening at the head of the shaft;
 - at all internal locations within the shaft (e.g., safety grilles).
 - iii. The smoke shaft should be of a class A1 material. The shaft should be vertical from base to head, with a maximum of 4m at a maximum inclined angle of 30 degrees.
 - iv. If smoke gets into the common corridor or lobby and is detected, two actions should take place:
 - Vents should simultaneously open on the storey where the fire is sited, at the top of the smoke shaft and the stair.
 - Vents within the corridors on all other storeys should remain closed, even if smoke is subsequently detected on storeys where the fire is not located¹⁸.

7.0 FIRE ACCESS

7.1 Fire Mains and Hydrants

7.1.1 There is a fire hydrant located on the T-junction where Brook Road meets Boyton Road approximately 95m from the proposed location of the building. This is within 100m of the proposed building; therefore, an additional fire hydrant is not required.

Figure 7.1 Location of fire hydrant



7.2 Fire Tender Vehicular Access

7.2.1 For flats, either of the following provisions should be made:

- a. Provide access for a pumping appliance to within 45m of all points inside each flat of a block, measured along the route of the hose, or;
- b. Provide fire mains in accordance with the following:
 - Access should be provided for a pumping appliance to within 18m of each fire main inlet connection point. Inlets should be on the face of the building.
 - The fire main inlet connection point should be visible from the parking position of the appliance.

7.2.2 A firefighting shaft is required within the building. A dry riser will therefore be installed within the firefighting stair. See section 7.3 below.

7.2.3 Access routes, hardstandings and turning facilities should comply with the guidance in below given Table 7.2 ^[19].

Table 7.2: Typical fire and rescue service vehicle access route specification

Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High Reach	3.7	3.1	26.0	29.0	4.0	17.0
Notes: - Fire appliances are not standardised. The building control body may, in consultation with the local fire and rescue service, use other dimensions. - The road base can be designed to 12.5 tonne capacity. Structures such as bridges should have the full 17-tonne capacity. The weight of high reach appliances is distributed over a number of axles, so infrequent use of a route designed to accommodate 12.5 tonnes should not cause damage.						

7.2.4 The access road to the building is Boyton Road. This road complies with the minimum road width as shown in Table 7.2.

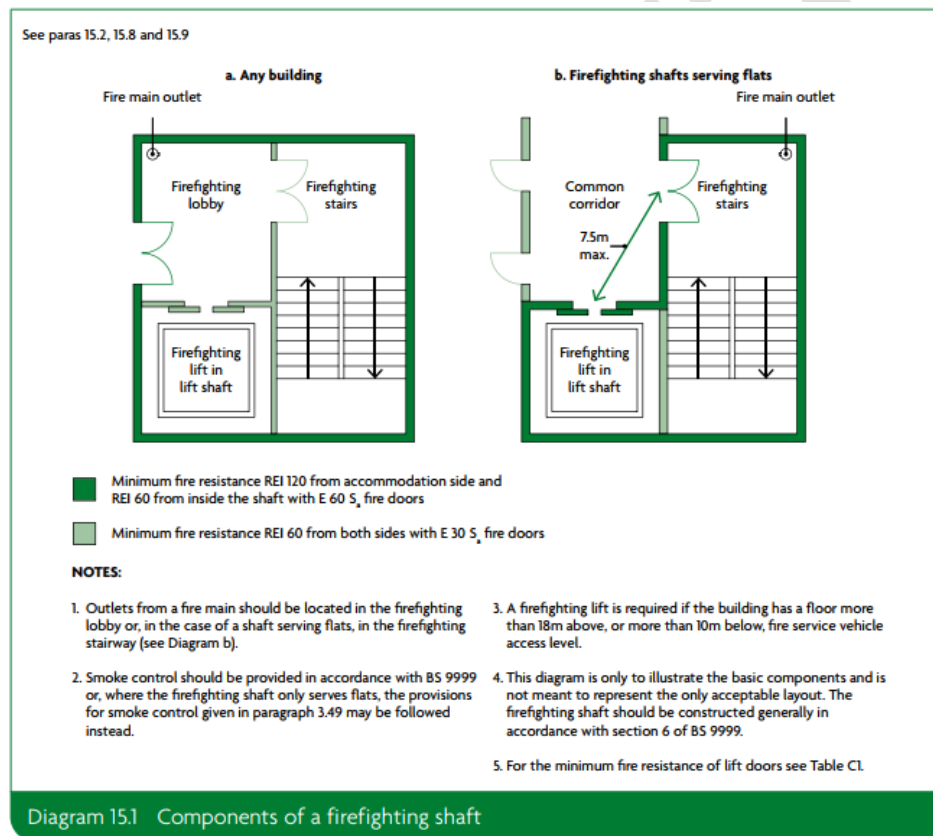
7.3 Requirements for fire-fighting shafts

7.3.1 Firefighting shafts are required in buildings with a storey greater than 18m above fire and rescue service vehicle access (paragraph 15.2 ADB v1). In accordance with Diagram 15.1 of ADB, the firefighting shaft should comprise: a fire-fighting stair, a fire-fighting lobby provided with a fire main, and firefighters lift installation. See Figure 7.2 below. The firefighting shafts should be provided with no less than 120 minutes fire resisting construction from the outside and 60 minutes from the inside. The construction separating each of the fire-fighting stair, firefighters lift well and fire-fighting lobby from each other should achieve no less than 60 minutes fire resistance each side separately.

7.3.2 At approximately 19m height, this building requires a firefighting shaft. The stairwell will require at least one firefighting shaft incorporating a firefighting lift, dry riser and dual power supplies. The firefighting shaft within this building should therefore comply with the provisions of ADB v1 as follows ^[20]:

- Firefighting shafts should serve all storeys through which they pass.
- Firefighting shafts and protected stairways should be positioned such that every part of each storey more than 18m above the fire and rescue service vehicle access level complies with the maximum distance of 60m from the fire main outlet in a firefighting shaft [21]. The building is compliant in this regard as the travel distance from the dry riser outlet to the furthest part of the furthest flat on any of the residential floors greater than 18m above fire service vehicle access level is less than 60m.
- Distances should be measured from the fire main outlet on a route suitable for laying a hose.

Figure 7.2 Provisions for firefighting shafts



7.3.2 The lift and stairwell within the building will comply with Diagram 15.1. A dry riser will be introduced within the stair enclosure. Note 2 of Diagram 15.1 states that the provisions for smoke control in paragraph 3.49 of ADB may be followed to provide the necessary smoke control. The provisions of paragraph 3.49 of ADB will be incorporated in this building as a smoke shaft will be introduced within the protected corridor (see section 6 of this report).

7.4 Manual Fire Fighting / Extinguishers

- 7.4.1 Manual firefighting equipment is not necessary within the residential areas of this building under Building Regulations. Whilst the Regulatory Reform (Fire Safety) Order 2005 requests that first aid firefighting facilities should be provided, this is only relevant to in places of work. The shop is a place of work and are therefore required to have manual firefighting equipment.

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8.0 AUTOMATIC FIRE SUPPRESSION

8.1 Sprinkler System

8.1.1 At approximately 19.0m in height, the proposed building requires a sprinkler system. All residential compartments should be fitted with sprinklers. BS 9251 defines blocks of flats above 18m in height as requiring a Category 4 sprinkler system. This building is approximately 19.0m to the uppermost finished floor level, therefore a Category 4 sprinkler system is appropriate (see Table 8.1). The minimum design discharge densities, number of design sprinklers that should be capable of operating simultaneously in a compartment, and duration of supply should be in accordance with Table 2 of BS 9251 (see Table 8.2).

Table 8.1 Extract from BS 9251:2021, Table 1 – Category of Sprinkler System

Table 1 — Category of system

Category of system	Description of building/occupancy
1	Single family dwellings such as: • dwelling house; • individual flat^{A)}; • individual maisonette; and • transportable home Houses of multiple occupation (HMOs) ^{B)} Bed and breakfast accommodation ^{B)} Boarding houses ^{B)}
2	Blocks of flats ^{C), D)} Small residential care premises with 10 residents or fewer ^{D)} Sheltered and extra care housing ^{C), D)}
3	Residential care premises with more than 10 residents ^{D), E), F)} Student accommodation ^{E), F)} Dormitories (e.g. attached to educational establishments) ^{D), E)} Hostels ^{D), E)}
4 ^{F)}	All residential buildings 18 m or higher

Table 8.2 Extract from BS 9251:2021, Table 2 – Minimum Sprinkler Design Parameters**Table 2** — *Minimum design parameters*

Category of system (see Table 1)	Minimum design discharge density	Number of design sprinklers (see 5.3.2)	Minimum duration of supply
	mm/min		min
1	2.10 ^{A)}	1 or 2	10
2	2.80 ^{B)}	1 or 2	30
3	2.80 ^{C)}	2 to 4 ^{D)}	30
4	2.80 ^{C)}	2 to 4 ^{D)}	60 ^{E)}

8.1.2 To comply with the number of design sprinklers, see paragraph 8.1.4 below. Note that, where a sprinkler system is installed as a compensatory feature, the minimum design discharge density should be increased to either:

- 2.80 mm/min for a single head operation, or 2.10 mm/min through each sprinkler operating simultaneously up to a maximum of two sprinklers in a single area of operation; or
- 4 mm/min for single head operation, or 2.80 mm/min through each sprinkler operating simultaneously up to a maximum of two sprinklers in a single area of operation.

8.1.3 The increased level of discharge density needed [a) or b) above] should be agreed with the approving authorities prior to installation, based on the risk identified. The system flow rate should be not less than the greater of:

- flow determined by multiplying the discharge density (Table 2 above) by the maximum area of operation; or
- flow from the sprinkler operation at 0.5 bar (i.e., 10^5 N/m^2 or 100kPa); or
- approved flow rate specified by the manufacturer for that area of operation.

8.1.4 Residential sprinkler spacing, and positioning should meet the following recommendations as set out in section 5. of BS 9251:2021:

- the maximum area protected by each sprinkler should be in accordance with its approved listing performance or 25 m^2 , whichever is the lesser;
- sprinklers should be not more than 5.5 m apart;

- c) sprinklers adjacent to a wall or partition should not be more than half spacing and not more than 2.75 m from that wall or partition;
- d) the distance between sprinklers within a compartment (sprinkler) should be not less than 2.4 m, except where there is an intervening constructional feature preventing adjacent sprinklers wetting each other;
- e) pendent and upright sprinklers should have heat-sensitive elements, not more than 100 mm below the ceiling and under no circumstances exceeding the manufacturer's approval listing, whichever is the lesser;
- f) sidewall pattern sprinklers should have the top of the detector within 100 mm to 300 mm below the ceiling and under no circumstances exceeding the manufacturer's approval listing, whichever is the lesser;
- g) for sloping ceilings, sprinklers should be positioned in accordance with the manufacturer's instructions;
- h) sprinklers should be positioned such that the sensitivity and discharge pattern are not adversely affected by obstructions, such as constructional beams, smoke alarms, light fittings or other sprinkler heads (refer to manufacturer's instructions for guidance);
- i) sprinklers should be positioned at a distance from any heat sources (e.g. fireplaces, stoves, ovens, kitchen ranges, hot air flues, hot water pipes, hot air diffusers, water heaters, heat generating, light fixtures) in accordance with the sprinkler head manufacturer's instructions;
- j) the potential for a shielded fire to develop should be taken into account; and
- k) the minimum distance from any wall or partition to the centre of the pendant or upright sprinklers should not be less than 100 mm or the manufacturer's recommended distance, whichever is greater. The minimum distance from any wall to the centre of the sidewall sprinkler, except the wall upon which it is mounted, should not be less than 100 mm.

8.1.5 Sprinkler heads should have a thermal sensitivity rating conforming to BS EN 12259-14. Fusible link sprinklers should be colour coded on the frame or sprinkler body. Glass bulb

sprinklers should be colour coded by the bulb liquid and conform to BS EN 12259-14 or BS EN 12259-1. The temperature rating of the sprinklers should be:

- the closest to but at least 20 °C greater than the highest anticipated ambient temperature of the location.
- within the range of 79 °C to 107 °C when installed under glazed roofs.

8.1.6 For normal climatic conditions in each compartment, the sprinkler temperature ratings should be set to 68 °C

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9.0 CONCLUSIONS, RECOMMENDATIONS AND SUMMARY OF FINDINGS

9.1 Conclusions

9.2.1 The following recommendations should be considered for implementation. Where advice is given, and the requirement is not mandatory for the building, the client is free to accept or reject our advice. Where a requirement is mandatory, this will be specified.

9.2 Recommendations and Summary of Findings

Space separation:

- The BR 187 method for calculating boundary distance reveals the risk of fire spreading from the development to a relevant boundary is low on all elevations.

Fire detection:

- A minimum of Grade D2 Category LD2 (owner-occupied flat) or Grade D1 Category LD2 (rented flat) fire detection and fire alarm system should be installed within all flats.
- An L5 alarm system should be introduced within the communal areas of the residential accommodation. to operate the life safety systems.

Means of escape within flats

- The travel distance within all flats on all floors are compliant.

Means of escape within common areas

- The travel distance on all common corridors on all floors are compliant.
- There is a cleaner's cupboard on the 5th floor which opens onto a lobby. This is non-compliant since the cleaner's cupboard is entered from a protected lobby which gives access to another lobby that forms the only common escape route on the storey. Therefore, strictly speaking, the cleaner's cupboard should be omitted. However, the additional lobby protection between the cleaner's cupboard and the stair lobby reduces the risk of the escape route becoming smoke-logged in the event of a fire within the cleaner's store. On this basis, the location of the cleaner's cupboard is deemed to be acceptable provided that the lobbies have a fire resistance of at least 30 minutes each side separately with FD30S doors.

Vertical means of escape

- A firefighting shaft is required as building is above 18m in height.
- The stair should be provided with a fire resistance of 120 minutes from the accommodation side, and 60 minutes from the inside of the shaft with FD60S doors.
- The stairwell serves as a firefighting stair and should therefore have a minimum width of 1100mm. This provision has been complied with.
- The protected stairwell should either discharge to a final exit/means of escape from the building or connect into a protected corridor / lobby which then provides the final means of escape/exit from the buildings ^[22]. The stairwell is compliant with this requirement.

Emergency lighting

- Emergency lighting will meet the recommendations of BS5266 Parts 1 and 7.

Escape signage

- Signage will meet the recommendations of BS5499 Part 4.

Linings

- Linings of walls and ceilings should meet the classifications of Table 4.1 of ADB.

Fire stopping

- Any openings for services breaching compartment walls will be fire stopped in accordance with Table 9.1 of ADB.

Cavity barriers

- Cavity barriers will be included in any large cavity with the potential for extensive unseen fire spread. It will also be provided at all compartment lines and around openings and at the junction between an internal cavity wall and every compartment floor, compartment wall or other wall or door assembly forming a fire resisting barrier in accordance with Clause 8.3, ADB v1.

Smoke control

- A smoke shaft has been provided within the common lobby on all floors. The smoke shaft should have a cross sectional area of 1.5m².
- The protected stairway should be provided with an Automatic Opening Vent at the top of the shaft with a minimum 1m² opening area. The stairway is compliant with this requirement.

Sprinkler system

- Approved Document B requires an Automatic Fire Suppression System (AFSS) to be fitted to properties with floors more than 11m above ground level. At approximately 19m in height, the proposed building requires a sprinkler system.

Fire service access, hydrants

- There is a fire hydrant located within 100m of the building. This is compliant, no additional fire hydrant required.
- A firefighting shaft will be incorporated in the building as the building is above 18m in height. This is compliant.

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A.0 Appendix A – List of drawings

SITE PLAN

- 0535_KCA_PL_1000 - Proposed Site Plan

PLANS

- KCA-0535-1100_ Ground Floor Plan
- KCA-0535-1101_ First Floor Plan
- KCA-0535-1102_ Second Floor Plan
- KCA-0535-1104_ Fourth Floor Plan
- KCA-0535-1105_ Sixth Floor Plan
- 0535_KCA_PL_1100 - Proposed Ground Floor Plan
- 0535_KCA_PL_1101 - Proposed First Floor Plan
- 0535_KCA_PL_1102 - Proposed Second Floor Plan
- 0535_KCA_PL_1103 - Proposed Third Floor Plan
- 0535_KCA_PL_1104 - Proposed Fourth Floor Plan
- 0535_KCA_PL_1105 - Proposed Fifth Floor Plan
- 0535_KCA_PL_1106 - Proposed Sixth Floor Plan
- 0535_KCA_PL_1107 - Proposed Roof Plan

ELEVATIONS

- KCA-0535-3000_ Proposed West Elevation
- KCA-0535-3001_ Proposed South Elevation
- KCA-0535-3002_ Proposed North Elevation
- KCA-0535-3003_ Proposed East Elevation

SECTIONS`

- KCA-0535-2000_ Proposed Section A-A

References

- ¹ HMGovernment. Approved Document B. Fire safety. HM Government; 2019 Para 3.81
- ² HMGovernment. approved document B. Fire safety. HM Government; 2019 Table B3
- ³ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table B4
- ⁴ HMGovernment. approved document B. Fire safety. HM Government; 2019 Section 11
- ⁵ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table B4
- ⁶ HMGovernment. approved document B. Fire safety. HM Government; 2019 Diagram 11.5
- ⁷ HMGovernment. approved document B. Fire safety. HM Government; 2019 Section 11
- ⁸ HMGovernment. approved document B. Fire safety. HM Government; 2019 Para 11.17 and 11.18
- ⁹ HMGovernment. approved document B. Fire safety. HM Government; 2019 Para 11.19 and 11.20
- ¹⁰ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table B3 point 16
- ¹¹ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table C1 point 9
- ¹² HMGovernment. approved document B. Fire safety. HM Government; 2019 Table B3 point 16
- ¹³ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table C1 point 9
- ¹⁴ HMGovernment. Approved Document B. Fire safety. HM Government; 2019 Appendix D, para D4 ADB v1
- ¹⁵ HMGovernment. Approved Document B. Fire safety. HM Government; 2019 Para 3.81
- ¹⁶ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table 4.1
- ¹⁷ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table 9.1
- ¹⁸ Para 3.51
- ¹⁹ HMGovernment. approved document B. Fire safety. HM Government; 2019 Table 13.1
- ²⁰ HMGovernment. Approved Document B. Fire safety. HM Government; 2019 section 15
- ²¹ HMGovernment. Approved Document B. Fire safety. HM Government; 2019 Para 15.7 point a
- ²² HMGovernment. Approved Document B. Fire safety. HM Government; 2019 Para 3.81