Camden Goods Yard

STAGE 2 FIRE STRATEGY

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Issue	Description	Date	Prepared By	Signed Off
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1 Introduction

This Fire Strategy for Planning has been prepared on behalf of St George West London Limited (the "Applicant" by Introba Consulting as a specialist fire and life safety consultant in connection with the Proposed Development, forming part of the wider Camden Goods Yard Development.

The wider Camden Goods Yard Development includes Blocks A, B, C, D, E1, E2, F and PFS, with Blocks A and B at delivery stage and do not form part of this Proposed Development.

The Proposed Development comprises the proposed amendments in respect of Blocks C, D, E1, E2 and F of the Main Site Parcel, identified in the detail within the accompanying DAS Addendum and identified here for ease of reference:

- Insertion of secondary stairs to Blocks C, E1 and F in accordance with fire safety guidelines for residential buildings
- Reduction of affordable housing from 38% to 15% by habitable room (from 203 to 83 homes)
- Minor tenure and unit mix changes to approved plans
- Marginal increase to footprint of Block E1 (0.5m on the east, west and north elevations) to accommodate a secondary staircase
- Minor reduction in heights of Blocks C, D, E1, E2 and F.

The basement which consists of a Morrisons Superstore, car park, servicing and ancillary accommodations will be independent sections of Blocks F and E2 above. Fire separation will be achieved by structural fire resistance.

This Fire Strategy should be read in conjunction with the other planning application documents submitted in connection with the s73 planning application.

The following sections outline the key fire safety features that should be incorporated within the development. Some of the requirements may be negotiated down at a later date following discussion with the approving authorities.

1.1 Scope

The fire strategy is intended for discussion between the design team and to assist the design team in developing the layouts to ensure that once a Building Regulations application is made, all of the fire safety elements will be incorporated into the plans.

This report is based on the guidance in accordance with Approved Document B (Volume 1) for Block E2 buildings and BS 9991:2024 for the remaining residential buildings. Block E2 buildings are not provided with ancillary accommodations, and for non-residential elements, the guidance from BS 9999:2017 is followed for all other blocks.

This guidance has been developed to ensure the highest standard of fire safety is designed into the building development at an early stage of design.

Consideration has also been given to the Building Safety Update provided by DLUHC on the intention that residential buildings over 18m in height shall require to be provided with two stairs.

1.2 Building Description

The S73 application for the Camden Goods Yard Development consists of five independent residential blocks, i.e. Block C, D, E1, E2 and F, as highlighted in yellow in the following figure, where residential amenity facilities, residential ancillary accommodations and commercial accommodations are provided.

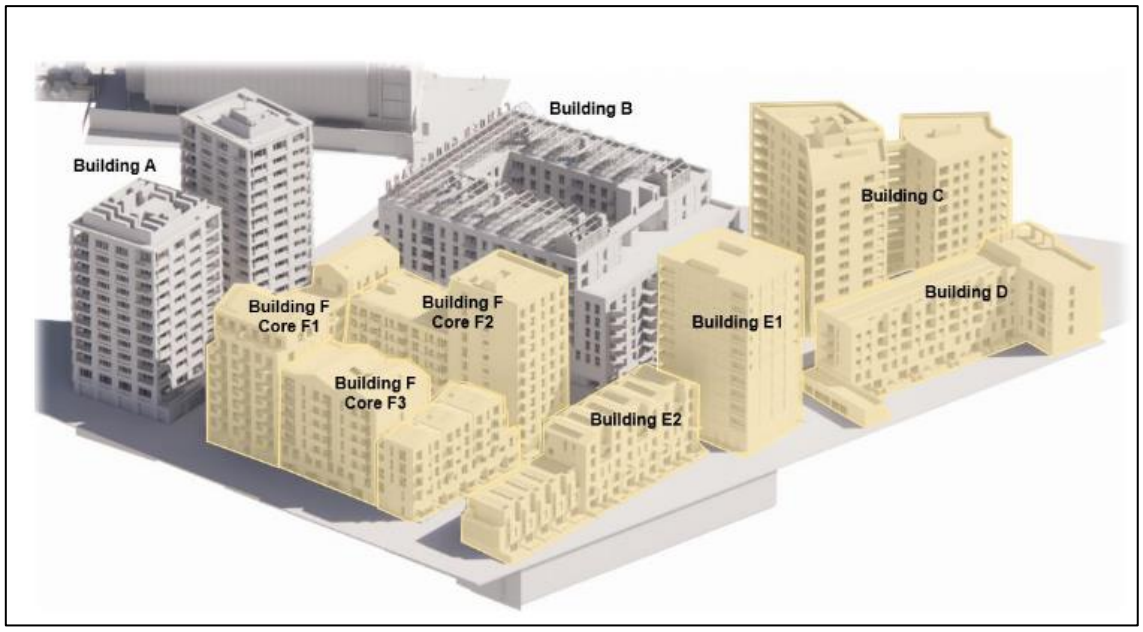

Figure 1 – Blocks of this S73 application

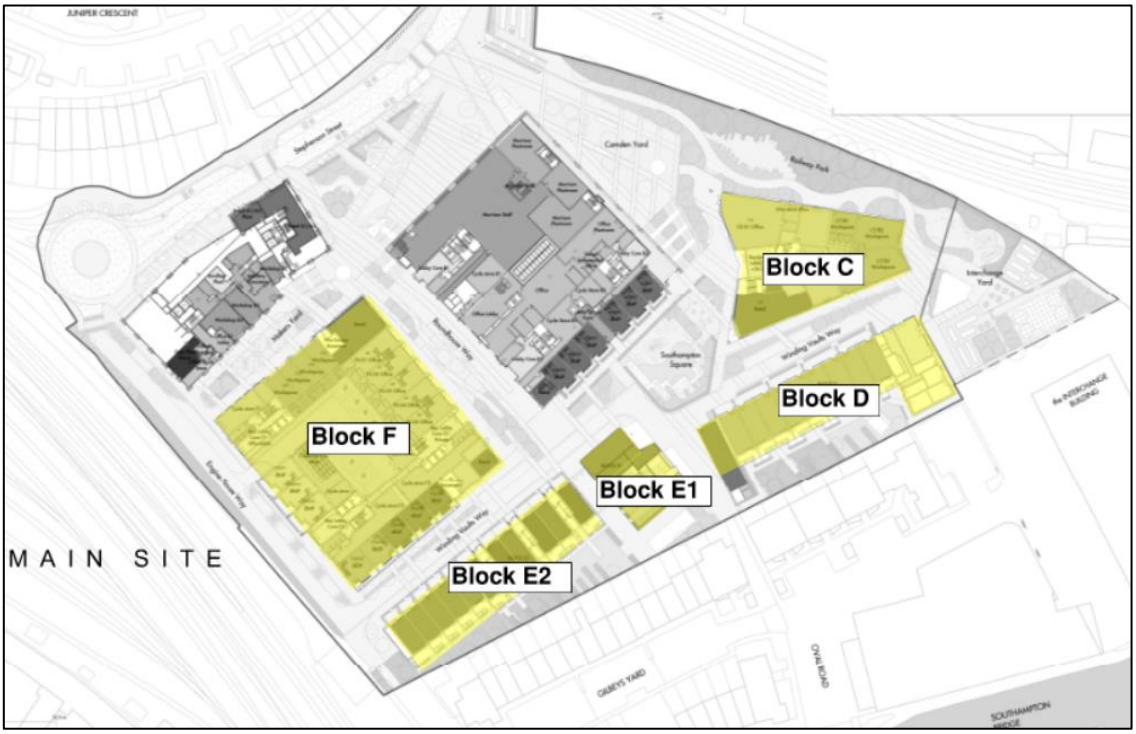

Figure 2 – Site plan showing blocks of S73 application

The following table provides information of each building:

Building		Number of Floors	Top Storey Height
Block C		Ground + 10 upper floors	32.325m
Block D		Ground + 4 upper floors	16.75m
Block E1		Ground + 10 upper floors	32.675m
Block E2	3 Blocks of flats	3 upper floors	See Note*
	5 Townhouses	Ground + 1 upper floor	3.35m
	5 Townhouses	Ground + 2 upper floors	6.45m
Block F	Core F1	Ground + 8 upper floors	27.125m
	Core F2	Ground + 10 upper floors	32.4m
	Core F3	Ground + 6 f upper floors	20.0m

Table 1 – Building descriptions

* Note: The three single-stair blocks of flats consist of apartments and duplexes that are provided at Levels 2 to 4. Level 4 is the upper level of the duplexes and is 13.025m from ground, which is not provided with any common access. The common stair serves up to Level 3 and is the access level of the multi-storey dwellings. Level 3 is 9.875m and 3.35m from Ground and Level 2 respectively, where the Ground and Level 1 do not serve any apartments.

1.3 Fire Strategy Overview

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 of Approved Document B for Block E2 buildings and the BS 9991:2024 and BS 9999:2017 for all other buildings. This level of safety therefore satisfies the functional requirements of the Building Regulations relating to fire safety.

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

- Means of escape will be based on each apartment evacuating independently. The residential amenity spaces, commercial accommodations, ancillary areas and car park will each have independent means of escape and shall implement a simultaneous evacuation strategy.
- Generally, travel distances and escape widths are acceptable apart from some common areas of the residential accommodation, which contain extended travel distances. A system of smoke clearance via a Mechanical Smoke Ventilation System is proposed for all blocks, which shall mitigate the extended travel distances.
- The fire alarm systems within the development will be.
  - Within apartments – LD2 for townhouses and duplexes
    – LD1 for all apartments
  - Common Corridor – L5
  - Residential Amenity Spaces – L3
  - Residential Ancillary Areas – L3
  - Residential Car park – L5
  - Retail – Manual
  - Workspaces – Manual
- Structural fire protection will be provided in accordance with ADB, BS 9991:2024 and BS 9999:2017 where applicable. Each floor will be designed as a compartment floor.
- Sprinkler coverage is provided to the residential apartments and could be extended to cover the ancillary areas and residential amenity space where these accommodations do not exceed the areas within Table 4 of BS9251:2021. All commercial accommodations will be provided with sprinklers in accordance with BS EN 12845.

- Blocks C, E1 and F exceed 18m in height but up to 50m, therefore each core will be provided with a firefighting shaft. Although Block D is under 18m in height, a firefighting shaft is provided to achieve the hose laying distance. The firefighting shaft will incorporate a dry riser, firefighting lift and a firefighting stair. Block E2 does not exceed 18m in height and will be provided with dry riser mains to achieve hose laying distances. Townhouses will be provided with hose laying coverage of 45m from the fire vehicle parking to the furthest point of the floor plate. For ancillary and other commercial accommodations that are accessed from the fire access level, they will be provided with access to either at least 15% of the perimeter of the unit, or 45m hose coverage to the furthest point of the floor plate from the parking of the fire appliance.

2 Legislation

2.1 Building Regulations 2010

The development will consist of new buildings, hence, will be undergoing building works as defined in Regulation 3 of The Building Regulations 2010. All buildings will therefore have to comply with the requirements of Schedule 1 of the Regulations.

The requirements of the Schedule relating to fire safety are:

- B1 – Means of warning and escape
- B2 – Internal fire spread (linings)
- B3 – Internal fire spread (structure)
- B4 – External fire spread
- B5 – Access and facilities for the fire service

The principle aim of the Building Regulations is to ensure the health and safety of people in and around a building.

The 'requirements' set out broad objectives or functions, which the individual aspects of the building design and construction must set out to achieve. They are therefore often referred to as 'functional requirements' and are expressed in terms of what is 'reasonable', 'adequate' or 'appropriate'.

2.2 Approved Document B (ADB)

The Department for Levelling Up, Housing and Communities (DLUHC) has produced a number of guidance documents to assist designers in meeting the relevant requirements of the Building Regulations. These 'Approved Documents' provide guidance on different aspects of the Regulations. Approved Document B – Fire safety (ADB) provides general design guidance on ways in which the functional fire safety requirements can be satisfied.

The Building Regulations 2022 require reasonable standards of health and safety for persons in or about the building to be provided.

However, as with many "deemed to satisfy" documents, the ADB is general in its approach and cannot contain sufficient detail for the multiplicity of building designs and varieties of building fire loads and occupancies encountered in practice.

The recommendations presented in the ADB provide guidance on how to satisfy the functional requirements of the Building Regulations. However, there is no obligation to adopt any particular solution contained in the document. The document recognises this and accepts that, if the requirement can be demonstrated to have been satisfied by alternative solutions, then this is equally acceptable.

This report considers the amendments to the Approved Document Volume I 2019 edition incorporating amendments in May 2020 and June 2022 and considers Regulation 7.

The guidance from ADB is followed for all Block E2, including the townhouses, apartments and duplexes.

2.3 British Standard 9991:2024 (BS 9991:2024)

In both new construction and upgrading existing buildings, the various aspects of fire precautions are interrelated and weaknesses in some areas can be compensated for by strengths in others. A higher standard under one of the areas might be of benefit in respect of one or more of the other areas. BS 9991:2024 provides a level of flexibility that allows the fire protection measures and the risks to be assessed to enable reasonable practical solutions to be designed.

BS 9991:2024 provides recommendations and guidance on the provision of measures to control or mitigate the effects of fire. The primary objective is to ensure that an adequate standard of life safety can be achieved in the event of fire in the building.

A secondary objective is to provide a level of protection for property and businesses against the impact of fire, e.g. in close proximity to residential buildings or as part of the same building or building complex. These can also have the effect of assisting the fire and rescue service and/or of providing environmental protection.

There are references throughout this British Standard to occupant safety, firefighter safety and property protection, to draw attention to the different issues these could raise. It is, however, important to be aware that provisions solely for life safety are unlikely to provide the full level of protection for buildings and property in a fully developed fire scenario.

This report considers Regulation 7 and follows the guidance of the 2024 version for all residential blocks and their ancillary accommodations other than Block E2.

2.4 British Standard 9999:2017 (BS 9999:2017)

In both new construction and upgrading existing buildings, the various aspects of fire precautions are interrelated and weaknesses in some areas can be compensated for by strengths in others. A higher standard under one of the areas might be of benefit in respect of one or more of the other areas.

The application of BS 9999:2017 permits a design approach to be adopted that corresponds to the complexity of the building and to the degree of flexibility required. This therefore allows for the development of a more transparent and flexible approach to fire safety design through use of a structured approach to risk-based design where designers can take account of varying physical and human factors.

BS 9999:2017 is designed as a coordinated package covering the four main areas that influence fire safety measures, namely:

- Fire safety management;
- The provisions of means of escape;
- The structural protection of escape facilities and the structural stability of the building in the event of a fire;
- The provision of access and facilities for firefighting.

This report follows the guidance of the 2017 version for commercial accommodations.

2.5 Regulatory Reform (Fire Safety) Order

Once the buildings are occupied, the Regulatory Reform (Fire Safety) Order (RRO) becomes the controlling fire safety legislation.

The Order came into force on 1st October 2006 and revoked the existing Fire Precautions Act and the Workplace Regulations. Under this order it will be necessary for the owner/ occupier of the building to carry out and maintain a fire safety risk assessment.

The building management team will also be responsible under this order to ensure that the buildings' fire safety provisions are appropriately managed, maintained and tested over the whole life of the building.

3 Means of Warning & Escape

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

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

The general principle to be followed when designing for means of escape is that any person confronted by a fire within a building can turn away from it and make a safe escape and therefore alternative means of escape should be available from most parts of the building.

3.1 Evacuation Strategy

Residential means of escape is somewhat different from many other types of buildings in that only the particular apartment that has a fire in it is immediately evacuated. The reasoning behind this is due to the level of compartmentation between each of the apartments and to reduce false alarms affecting all the people within the building. The Fire Service carries out evacuation of the other apartments if necessary. Additionally, an evacuation alert system will also be provided in buildings over 18m in height to allow the Fire Service to undertake the evacuation part or the whole building if necessary.

The residential amenity spaces, car park, ancillary accommodations and commercial units on the site will be considered completely independent of the residential elements. It is proposed that these areas adopt independent simultaneous evacuation approaches. This is particularly important for areas that may have members of the public who are unfamiliar with the building and any evacuation procedures. An alarm raised within the commercial areas will not cause the evacuation of the residential areas or other commercial areas.

3.2 Risk Profile and Travel Distances

As outlined in Section 1.1, all buildings of Block E2 shall follow the recommendations of ADB, and the travel distance requirements for each purpose group are outlined in the tables within this section.

All other residential and commercial accommodations are designed to BS 9991:2024 and BS 9999:2017, where the occupants within the building vary depending on the level and usage. A risk profile is not required for the residential elements on the upper floors.

Within the residential amenity, community, commercial workspaces/offices, occupants will be awake and familiar with the building. These areas will have a medium fire growth rate.

Within the commercial retail units, occupants will be awake but may be unfamiliar with the building. These retail units will have a fast fire growth rate.

Within the community space, occupants will be awake but may be unfamiliar with the building. These retail units will have a medium fire growth rate.

Within the residential car park, occupants will be awake and familiar with the building. The car park will have a medium fire growth rate.

As a sprinkler system will be provided to the full development, the risk profile can be adjusted accordingly.

Therefore, in accordance with BS 9999:2017, the risk profile for each space is as per the following table (For the avoidance of doubt, Block E2 that is designed to ADB has not been included in the table):

Block	Level	Usage	Risk profile (with sprinkler protection)
Block C	Ground	Retail	B2
		Office & workspaces	A1
Block D	Ground	Community use	A2
Block E1	Ground	Retail	B2
		Residential amenity lobby	A1
Block F	Ground	Residential car park	A1
	Ground	Retail	B2
	Ground, Level 1	Offices	A1

Table 2 – Risk profiles

The travel distance and exit width requirements based on the risk profile are as shown in the following table.

Risk profile	Travel Distances in single direction / multiple directions *(not applicable to residential ancillary accommodations)* Note 1	Exit width (mm/person)
A1	26m/65m	3.3
A2	22m/55m	3.6
B2	20m/50m	4.1

Table 3 – Risk profile-based requirements

Note 1: The travel distance requirements for residential ancillary accommodations will be in accordance with Table 16 of BS 9991:2024, whilst the occupancy-dependent exit width requirements will follow the risk profiles in accordance with BS 9999:2017.

Therefore, the applicable travel distances for all blocks of the development are as per the following table based on the recommendations of ADB, BS 9991:2024 and BS 9999:2017.

Use	Blocks	Accommodations	Travel within	Maximum travel distance (m)	
				In one direction	More than one direction
Residential and its ancillary Note 1	Block E2	Townhouses	Townhouse with protected hall/stairway	N/A	N/A
		Apartments	Apartment with protected hall/stairway	9m	N/A
		Duplexes	Duplex apartment with protected hall/stairway	9m	N/A
	All other blocks	Townhouses	Townhouse with protected hall/stairway	N/A	N/A
		Apartments	Open-plan apartment	N/A	N/A
			All other apartment	20m Note 3	N/A
		Common Areas	Enclosed Common Corridor	15m Note 3	30m
			Balcony access	N/A	N/A
		Residential Amenity	Amenity	18m	45m
			Management office	18m	45m
			Podium terrace	18m	45m
		Car park	Covered car park	18m	45m
		Plant rooms Note 4, cycle & refuse stores	Room	9m	45m
			Enclosed escape route to exit	18m	45m
		Roof top plant	In open air	60m	200m
Commercial Note 2	All blocks other than E2	Workspace / offices	Office	26m	65m
		Retail units	Retail unit	20m	50m
		Community unit	Community unit	22m	55m

Table 4 – Travel distance requirements

Note 1: The travel distance requirements for residential ancillary accommodations will be in accordance with Table 16 of BS 9991, whilst the occupancy-dependent exit width requirements will follow the risk profiles in accordance with BS 9999.

Note 2: Since fit-out is unknown, this fire strategy does not consider any additional fire protection benefits.

Note 3: This is on the basis that the blocks will be provided with sprinkler protection.

Note 4: Plant rooms include engineering services installation rooms, boiler rooms, fuel storage areas, as well as transformer, battery and switchgear rooms.

3.3 Escape within Residential Block E2 Buildings

3.3.1 Block E2 Townhouses

All Block E2 buildings will be designed in accordance with ADB, as discussed in earlier sections.

Block E2 townhouses are provided with level access to outside as shown in the following figure.

Figure 3 – E2 Townhouses

The three-storey townhouses will be provided with a protected stairway that achieves 30 minutes fire resistance with FD20 internal doors and extends to the final exit, i.e. the entrance door, in accordance with ADB.

The two-storey townhouses will be provided with an internal hallway/stairway that achieves 30 minutes fire resistance with FD20 internal doors and extends to the final exit, i.e. the entrance door, in accordance with ADB. Alternatively, an emergency window for each habitable room, where the windows should comply with all of the following.

- Have a minimum area of 0.33m^2.
- Have 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).
- The bottom of the openable area is a maximum of 1100mm above the floor.
- People escaping should be able to reach a place free from danger from fire. Courtyards or back gardens should comply with Diagram 2.5 of ADB.
- Windows should be capable of remaining open without being held.

3.3.2 Block E2 Apartments

There are three blocks of flats in E2, which are all small, single-stair buildings.

The stairs serve from Level 2 to Level 3.

At Level 2, two single-storey apartments are provided in each building. Since both apartments will be provided with an internal protected hallway that achieves 30 minutes fire resistance with FD20 internal doors, a stair lobby is not required in accordance with ADB.

The travel distance within the protected hallway is within 9m, which is acceptable.

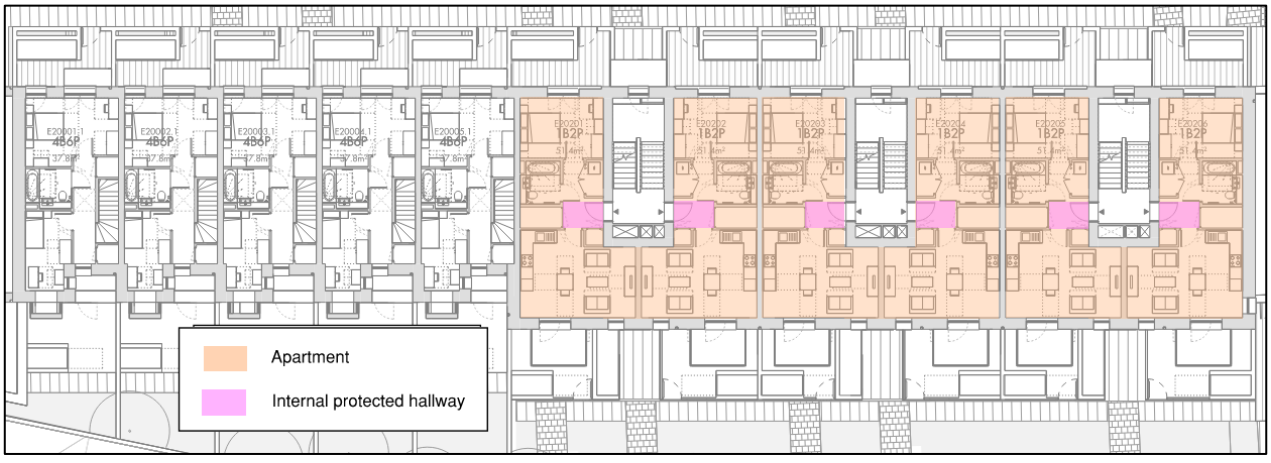

Figure 4 – Single-storey apartment in E2

At Level 3, two duplex apartments are provided in each building. Similarly to the level below, both apartments will be provided with an internal protected hallway that achieves 30 minutes fire resistance with FD20 internal doors, therefore a stair lobby is not required.

The travel distances within the protected hallway shall be limited to 9m.

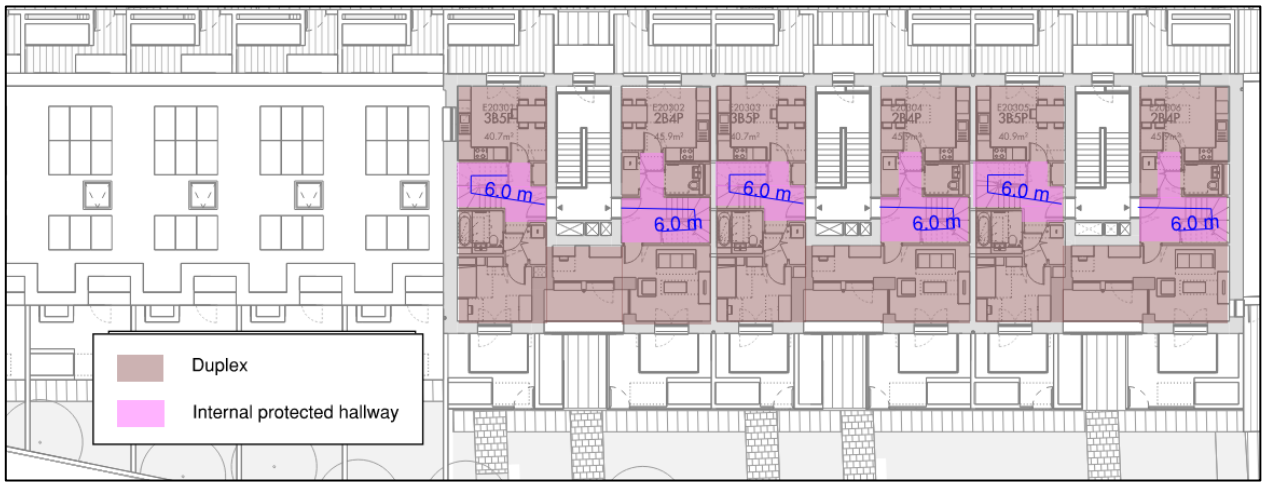

Figure 5 – Duplex apartments at Level 3

Figure 6 – Duplex apartments at Level 4

The common stairs in the three blocks will be provided with 1.0m^2 automatic venting opening (AOV) either via an external window or a vertical shaft to outside, in accordance with ADB.

3.4 Escape within Other Residential Buildings

Other than Block E2 buildings, all remaining buildings will be designed in accordance with BS 9991:2024.

3.4.1 Townhouses in Blocks D & F

Blocks D and F are provided with two-storey townhouses with level access to outside.

The two-storey townhouses will be provided with an internal hallway/stairway that achieves 30 minutes fire resistance with FD30 internal doors and extends to the final exit, i.e. the entrance door, in accordance with BS 9991. Alternatively, an emergency window will be provided for each habitable room, where the windows should comply with all of the following, in accordance with BS 9991.

- Have a minimum area of 0.33m^2.
- Have 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).
- The bottom of the openable area is a maximum of 1100mm above the floor.
- The window sill should not be higher than 4.2m from ground.

3.4.2 Open Plan Apartments in Blocks C, D, E1 & F

Throughout these buildings, there are open plan apartments, which are acceptable should they conform to the following.

- The size of the open plan flat should not exceed 16m x 12m.
- Open-plan flats should be situated on a single level only.
- The ceilings within the open plan flat should have a minimum height of 2.25m.
- All rooms in the apartment should be provided with a sprinkler system confirming BS 9251.
- The apartment should be provided with an LD1 fire alarm and detection system in accordance with BS 5839-6:2019+A1.

Additionally, the open plan apartment with an open plan kitchen should comply with the following.

- All cooking apparatus with a fixed connection to the dwelling's electricity or gas supply should be located at least 1.8m away from the escape route from any habitable room (including any enclosed balconies). The escape width should not be less than 0.9m and should be clear from any fixed obstructions (such as radiators or cupboards).
- A gap of 0.3m should be provided between the leading edge of the exit door from the space containing the cooking facility.

The following figure shows an example of an open plan apartment with an acceptable escape route. The open plan apartment and kitchen layouts will be reviewed at a later design stage.

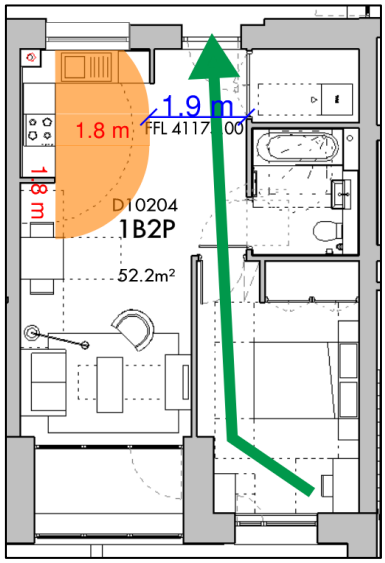

Figure 7 – Example of acceptable escape route in open plan

3.4.3 All Other Apartments in Blocks C, D, E1 & F

Any apartments that are single storey and are not open plan apartments will require to have a travel distance from the furthest point of the flat to the entrance door up to 20m in single direction.

Additionally, these apartments should be provided with a sprinkler system confirming BS 9251 and an LD1 fire alarm and detection system in accordance with BS 5839-6:2019+A1.

If an open plan kitchen is provided, requirements for these kitchens as outlined in Section 3.4.2 will be complied.

3.4.4 Private Balconies in All Blocks

The escape route from the balcony (regardless of open or enclosed) should not pass through more than one access rooms.

3.4.5 Escape within Common Escape Routes in Blocks C, D, E1 & F

External balconies or decks are provided as common escape routes in Blocks D and F, whilst enclosed protected common corridors are provided in Blocks C, E1 and F.

3.4.5.1 External Balcony Approach

Where an external balcony with alternative exits is provided, they will comply with requirements of Clause 7.3 of BS 9991:2024 as summarised below.

- The deck will have the same fire resistance as the floor and be constructed from materials classified as A2-s1, d0 or better;
- The walking surface should be imperforate.
- Where the deck is more than 2m deep, it will require down-stands at 90 degrees to the face of the building on the line of separation between individual flats.
- From 1.1m above the walking surface up to the soffit of the soffit of the deck, the outside wall of the deck will have a minimum of 50% evenly distributed free vent area.

For open decks providing a single direction of escape, the following additional provisions shall be provided:

- The face of the building (excluding window openings) should provide at least 30min fire resistance.
- Window openings should not extend below a height of 1.1m above the deck level. Alternatively, the glazing will need to be fire rated for 30 minutes fire resistance.
- Surface materials of the facing wall, balcony soffit and balustrade should be of A2-s1, d0 or better.
- Apartment entrance doors opening onto the balcony should be FD30 self-closing doors.
- The external balustrade should be continuous and using imperforate infill materials.

3.4.5.2 Enclosed Common Corridors

Since the residential apartments will be provided with sprinklers, the single direction travel distance within a ventilated common corridor can be up to 15m in accordance with BS 9991, via either 1.5m^2 permanent natural ventilation or via a Mechanical Smoke Ventilation System (MSVS). Where this travel distance limit is exceeded, BS 9991:2024 recommends *the Smoke Control Association (SCA) publication Guidance on smoke control to common escape routes in apartment buildings (flats and maisonettes)* to protect both the common corridor and the stair enclosure for means of escape. Therefore, these extended common corridors will be provided with a 0.6m^2 mechanical smoke extract shaft will be provided at the dead-end and will be limited to 30m in accordance with the SCA guidance to ensure tenable conditions are maintained during escape and firefighting operations.

Each escape stairway will be provided with a lift for evacuation purpose. All cores will also be provided with an evacuation lift lobby as a safe temporary waiting space for disabled occupants in the event of a fire. Doors shall be provided to separate the evacuation lift lobby from the corridor that serves the apartments.

All stairs will be provided with 1.0m^2 permanent ventilation via the AOV at the head of the stair.

Since the evacuation lobby shall be provided with the same level of protection of the stair, this lobby will be provided with 1.0m^2 permanent ventilation via an AOV window on external wall if the building is under 18m in height.

Alternatively, if the corridor is mechanically ventilated, the evacuation lift lobby could be provided with a 0.6m^2 air inlet shaft. The mechanical smoke shaft should achieve a minimum of 0.6m² internal free area with a 0.6m² Automatically Opening Vent (AOV) opening into each smoke shaft from each common corridor. The mechanical smoke shaft should be provided within the dead end of the corridor. The lift lobby doors shall open into the common corridors that are ventilated by the mechanical smoke ventilation system (MSVS) to provide the replacement air for this ventilation system, which shall also protect the lobby from smoke ingress.

For Block E1 and Block F Core 2 where mechanical smoke extraction is provided in common corridors, the makeup air will be from the AOV at the head of the firefighting stair. This will require installation of an automatic smoke and fire damper between the stair enclosure and the common corridor / evacuation lift lobby in association with a pressure relief damper. This solution follows the intent of the guidance given within BS EN 12101-13:2022. This is similar to Block F Cores 1 and 3 which will be discussed in detail in the following sections.

At the later stages of design, a Computational Fluid Dynamics (CFD) assessment will be required to validate the smoke venting strategy for all mechanically ventilated corridors/lobby and the stairs in the following scenarios in accordance with BS 9991:

- Stairway door closed;
- Stairway door open; and
- Stairway door open, dwelling door open and broken window.

Escape of common areas of each block is discussed in the following sections.

3.4.5.3 Block C

Block C is provided with residential apartments from Level 1 to 10 that are served by two stairs.

At Levels 1 to 9, the travel distance from the furthest apartment exceeds 15m in single direction in the right-hand corridor. Therefore, a mechanical smoke shaft will be provided at the dead-end corridor to mitigate the extended travel distance. The other corridors will also be provided with a 0.6m^2 mechanical smoke shaft to protect the stair and the lift lobby from smoke ingress.

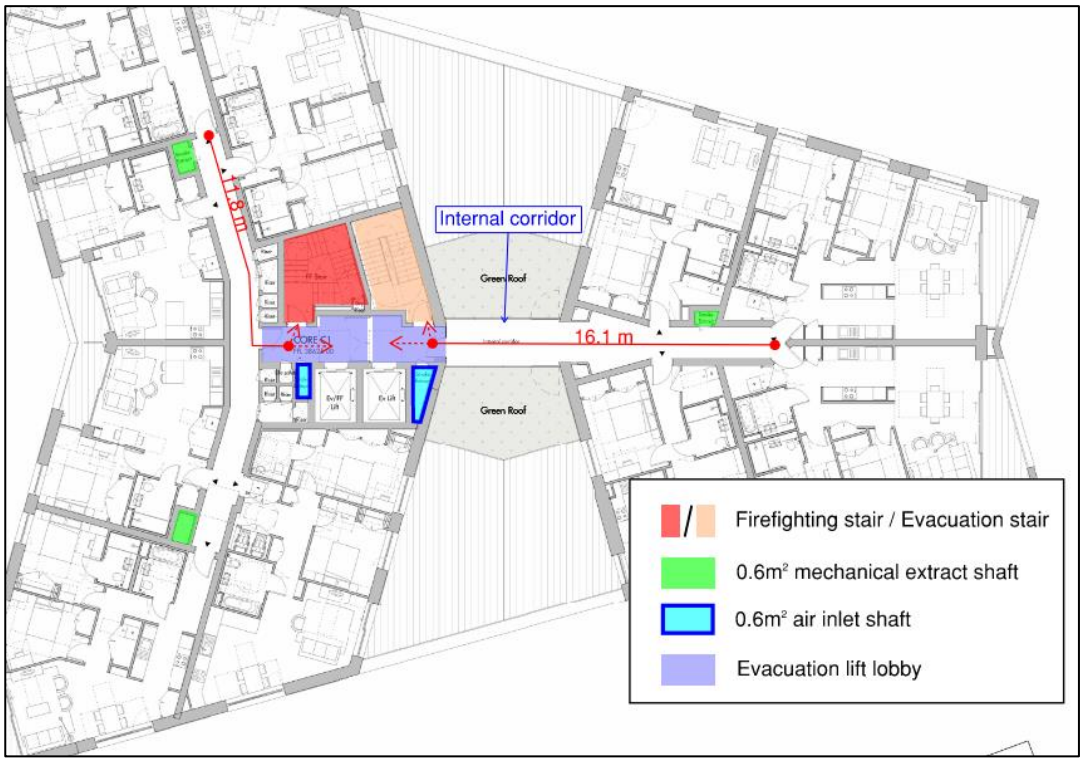

Figure 8 – Travel distances at Level 1-9

At Level 10, the building steps back and apartments are only provided on the left-hand wing of the building. The layout is similar to the floor below, with the two mechanical smoke extract shafts and inlet shafts being extended to serve this level.

3.4.5.4 Block D

Block D is provided with residential apartments with common areas from Level 1 to 4. Due to the building height of under 18m in height, Block D is provided by a single stair.

At Level 1, the travel distance from the furthest apartment is within 15m in single direction. Therefore, the corridor will be ventilated either via a 0.6m^2 mechanical smoke extract shaft or a 1.5m^2 natural shaft. The evacuation lobby will be provided with a 1.0m^2 AOV window on the façade.

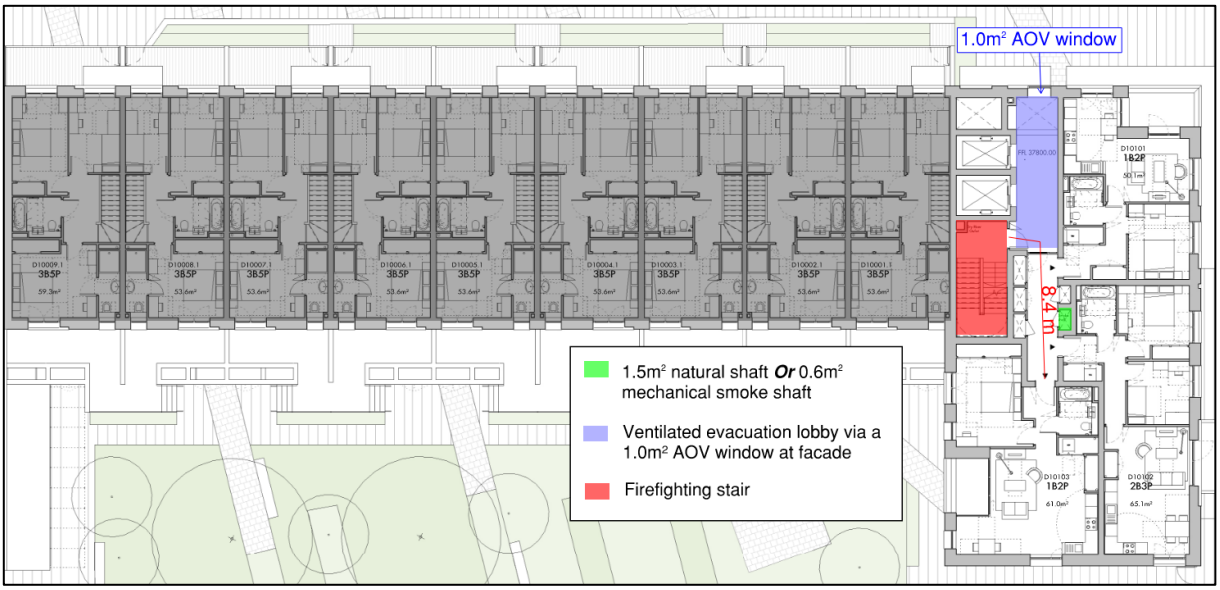

Figure 9 – Travel distances at Level 1

At Levels 2 to 4, apartments are also provided at the left-hand wing of the building, accessed via an external balcony where the dead end section is an enclosed corridor. This dead end section will be ventilated via a 1.5m2 AOV window whilst the external balcony providing one direction of escape will comply with the requirements as discussed in Section 3.4.5.1.

The right-hand section of the building is similar to the level below.

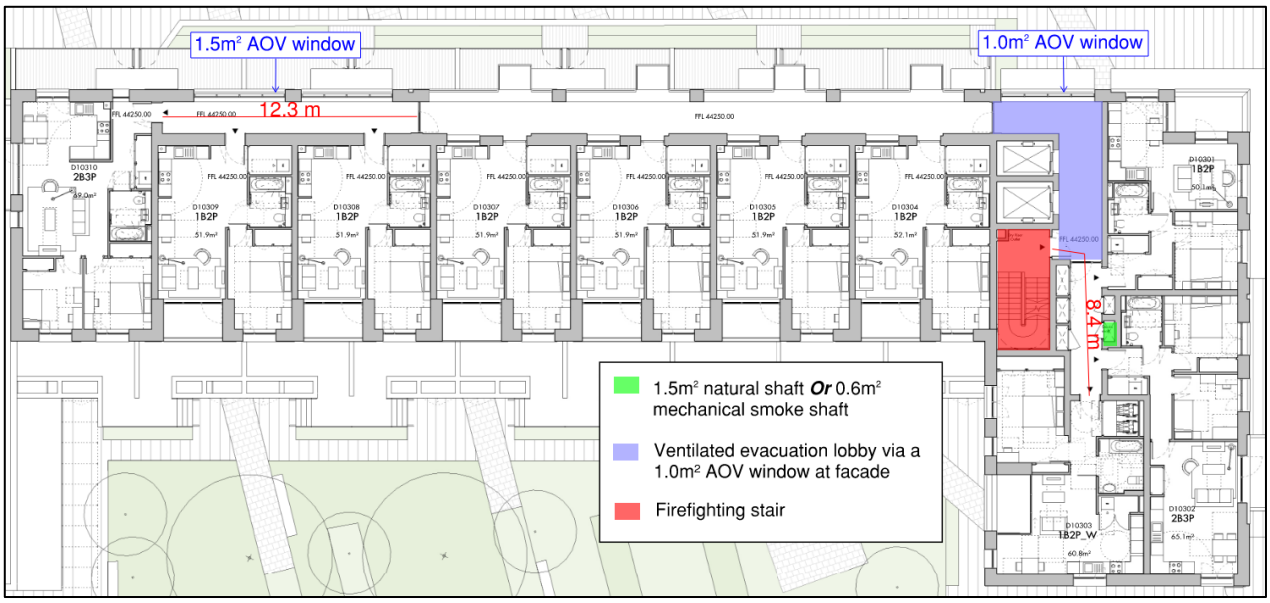

Figure 10 – Travel distances at Level 2-4

3.4.5.5 Block E1

Block E1 is provided with residential apartments from Level 1 to 10.

The travel distances from the furthest apartment are within 15m in single direction. The common corridors will be provided with mechanical smoke extraction, with the makeup air from the AOV at the head of the firefighting stair via an automatic smoke and fire damper relief damper. This solution follows the intent of the guidance given within BS EN 12101-13:2022.

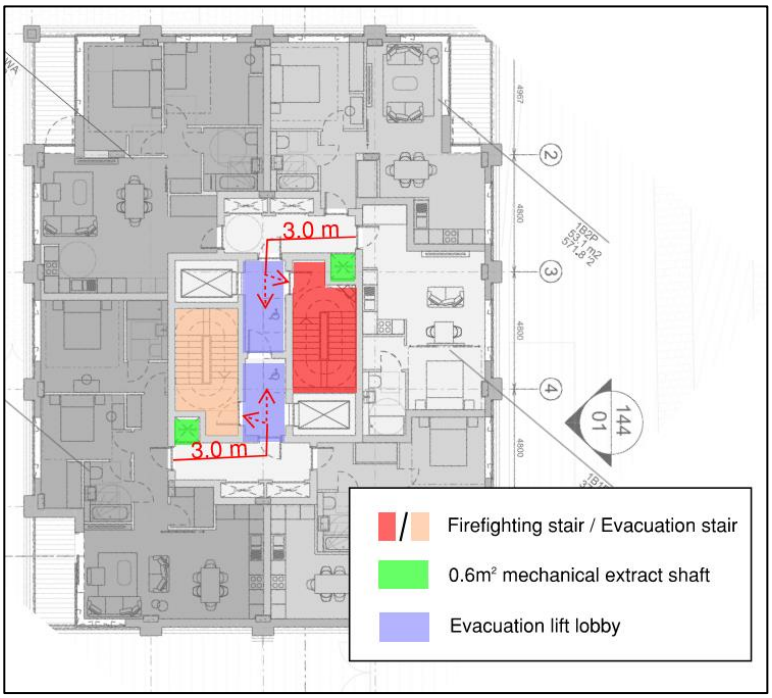

Figure 11 – Travel distances at typical floors

3.4.5.6 Block F Core 1

Block F1 is provided with residential apartments from Level 1 to 9.

The travel distances from the furthest apartment exceeds 15m in single direction. Therefore, a mechanical smoke shaft will be provided at the dead-end corridor to mitigate the extended travel distance.

An air inlet shaft is provided within the outer evacuation lobby nearest the common corridor, whilst the inner evacuation lobby will be provided with source of fresh air via the stair door that swings into the lobby (and/or an automatic smoke and fire damper between the stair enclosure and the common corridor / evacuation lift lobby in association with a pressure relief damper.

Where the lobby doors swing into the corridor, it shall be ensured that the clear width of the corridor will achieve 850mm when the lobby door is open.

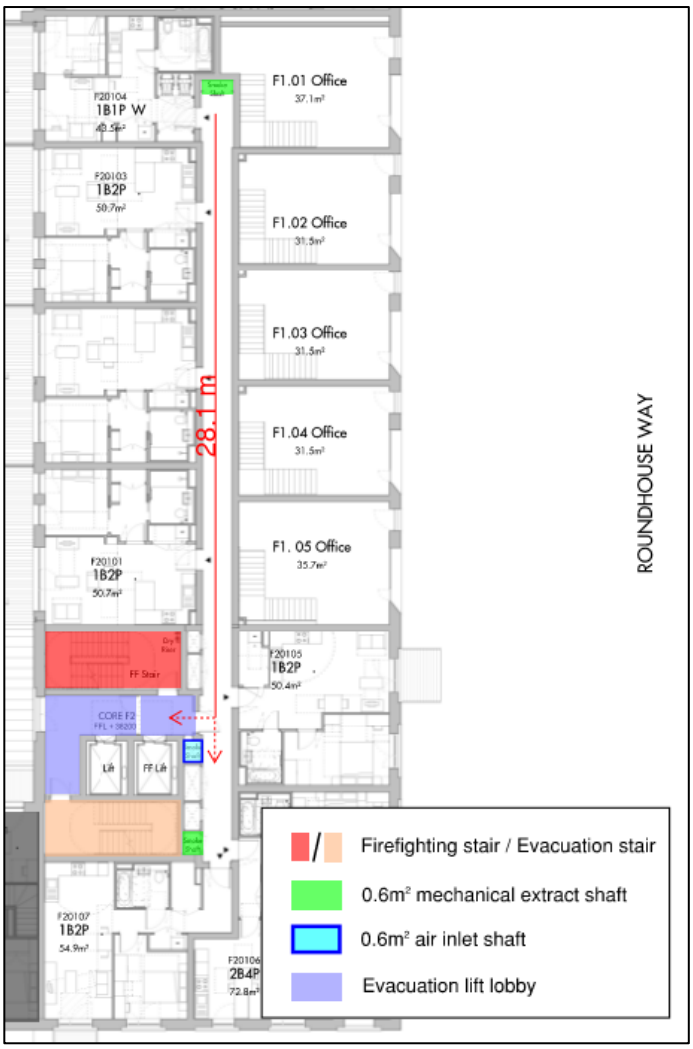

Figure 12 – Travel distances at Levels 1-6

At Level 7, the building steps back and the north smoke extract shaft will not be required.

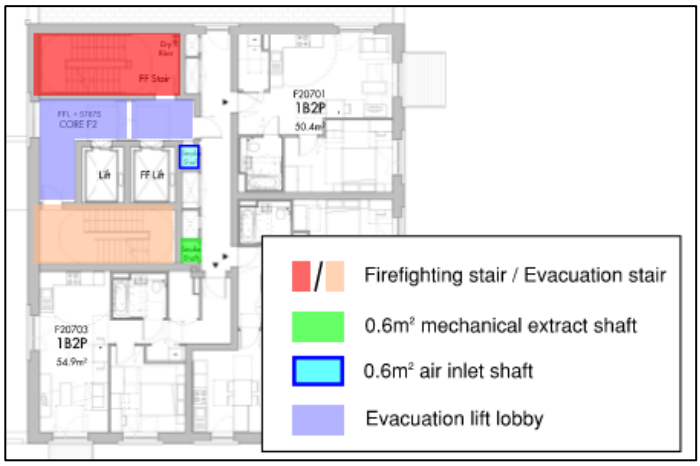

Figure 13 – Travel distances at Level 7-9

3.4.5.7 Block F Core 2

Block F Core 2 is provided with residential apartments from Level 1 to 8.

At Levels 1 to 6, the travel distance from the furthest apartment on the left-hand wing of the building is within 15m in single direction. The common corridors will be provided with mechanical smoke extraction, with the makeup air from the AOV at the head of the firefighting stair via an automatic smoke and fire pressure relief damper. This solution follows the intent of the guidance given within BS EN 12101-13:2022.

The right-hand corridor will be provided with a 0.6m^2 mechanical smoke extract shaft to ventilate the corridor, with an AOV door providing makeup air for the extraction system.

The external balcony will conform to the requirements as discussed in Section 3.4.5.1

Figure 14 – Travel distances at Level 1-6

At Level 7, the right-hand corridor will be ventilated by a 1.5m^2 AOV window only at this level. Occupants from this corridor will escape via the flat roof along a dedicated external balcony deck into the protected lobbies and stairs.

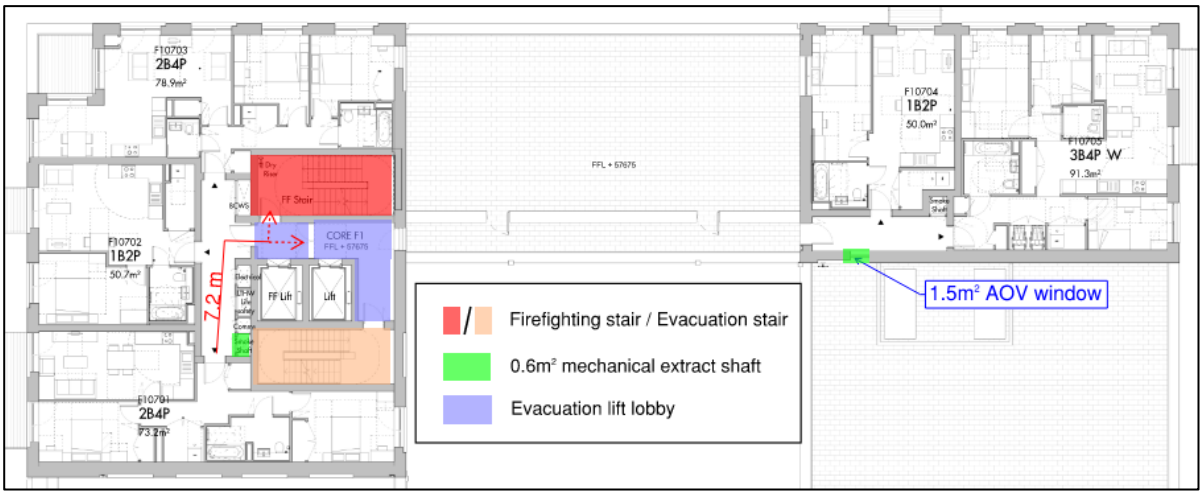

Figure 15 – Travel distances at Level 7

At Level 8, the building steps back and only the left-hand core is provided to serve apartments, with layouts similar to the levels below.

3.4.5.8 Block F Core 3

Block F3 is provided with residential apartments from Level 1 to 6.

At Level 1, the travel distances from the furthest apartment exceeds 15m in single direction. Therefore, a mechanical smoke shaft will be provided at the dead-end corridor to mitigate the extended travel distance. The other dead end corridor will also be provided with a mechanical smoke shaft.

Similar to Core 1, an air inlet shaft shall be provided within the outer evacuation lobby nearest the common corridor, whilst the inner evacuation lobby will be provided with source of fresh air via the stair door that swings into the lobby (and/or an automatic smoke and fire damper between the stair enclosure and the common corridor / evacuation lift lobby in association with a pressure relief damper.

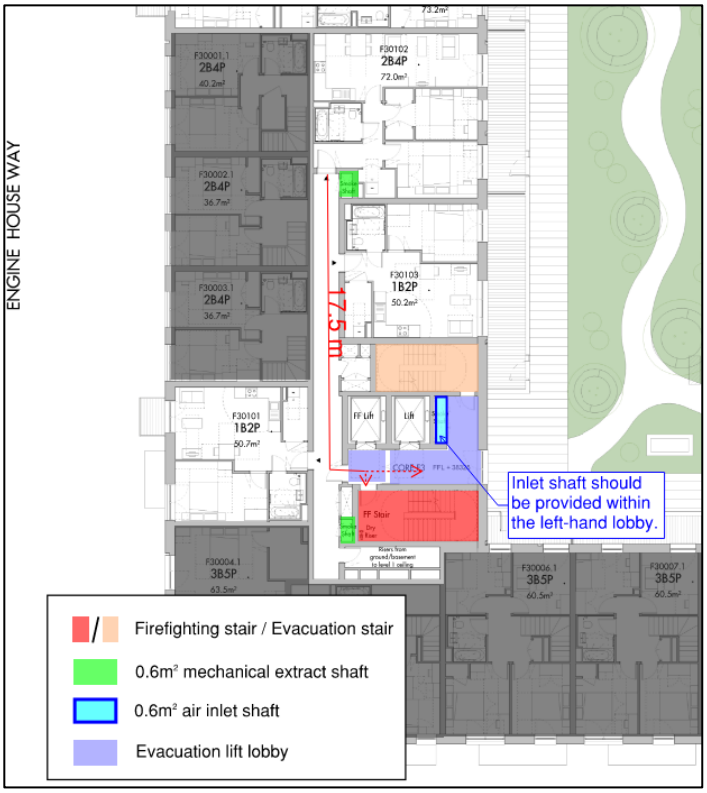

Figure 16 – Travel distances at Level 1

At Level 2, the building expands such that both corridors have extended travel distances in single direction. A mechanical smoke shaft is provided at each dead end of the corridor to mitigate the extended travel distances.

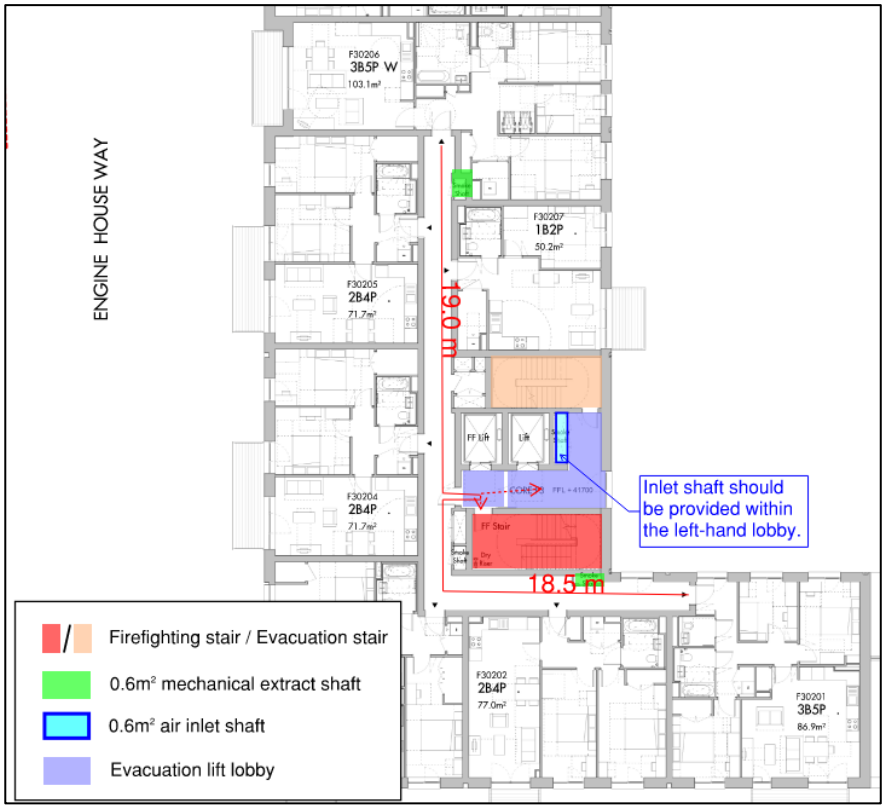

Figure 17 – Travel distances at Level 2-4

At Levels 5 and 6, the building steps back and the travel distances and hence smoke venting strategy is similar to Level 1.

Figure 18 – Travel distances at Level 5-6

3.4.6 Vertical Escape

For Block E2, the common escape stair will achieve a minimum width of 1000mm. handrails intruding into the width by a maximum of 100mm on each side may be omitted in accordance with ADB.

For other blocks, all stairs should be designed and constructed in accordance with BS 5395-1:2010. achieve a minimum width of 1000mm between handrails, or 1200mm including handrails, and the minimum goings for the stair should achieve 300mm.

For all blocks, the storey exits leading into the staircase at each level are required to have a minimum clear width of 850mm. The final exit doors at ground level should have a minimum clear width at least as wide as the associated staircase.

For firefighting stairs, no service risers shall be accessed from or pass through the staircase unless they are for the specific use of equipment within the firefighting shaft, such as emergency lighting or ventilation. Risers should not be provided or accessed within the fire access corridor at ground floor unless they are for the specific use of equipment within the firefighting shaft, such as emergency lighting or ventilation.

3.4.7 Final Exit Routes

BS 9991:2024 requires that any discharge paths from the staircase that are not direct to outside must be along a protected route with any access into adjacent accommodation being by way of a protected lobby.

Blocks D and E2 are each provided with single escape stair that leads directly to outside or via a protected escape route to outside. The final escape route will not be connected to any ancillary spaces. These blocks do not exceed 18m in height and are therefore not required to provide a firefighting shaft. Any risers accessed from the entrance lobby should be enclosed with 60 minutes fire resisting construction and FD30 doors.

For blocks that are provided with two escape stairs, escape from each stair will be via an independent protected escape route to outside. The two evacuation lifts and the associated stairs providing alternative means of escape should be separated by imperforate construction at the final discharge level. Therefore, the two lobbies at ground floor should be separated by a solid wall.

However, as a fire engineering solution, a fire door and a fire curtain/shutter could be provided in lieu of a solid wall in this case, since the final escape routes will be sprinklered and will be fire sterile. Therefore, this double protection is deemed to satisfy the functional requirements of the Building Regulations.

Where ancillary accommodations including plant rooms and stores are accessed from the residential final exit route in these buildings, a protected lobby with 0.4m^2 permanent ventilation or an equivalent mechanical means shall be provided.

Additionally, risers should not be provided or accessed from the fire service access route. Therefore, any risers provided will be completely blocked off, i.e. compartmented and not be accessed within the fire service access route. Should post boxes be provided in a firefighting entrance lobby, the post boxes should achieve a fire resistance period equal to that of the firefighting shafts, i.e. 120 minutes fire resistance. For other post boxes provided in a protected escape route, they should achieve a minimum of 30 minutes fire resistance.

Since all buildings will be sprinklered, where residential facilities are accessed from the residential final escape route, a protected lobby shall be provided with 0.4m^2 permanent ventilation.

The final escape routes and vented lobbies are shown in the following figures.

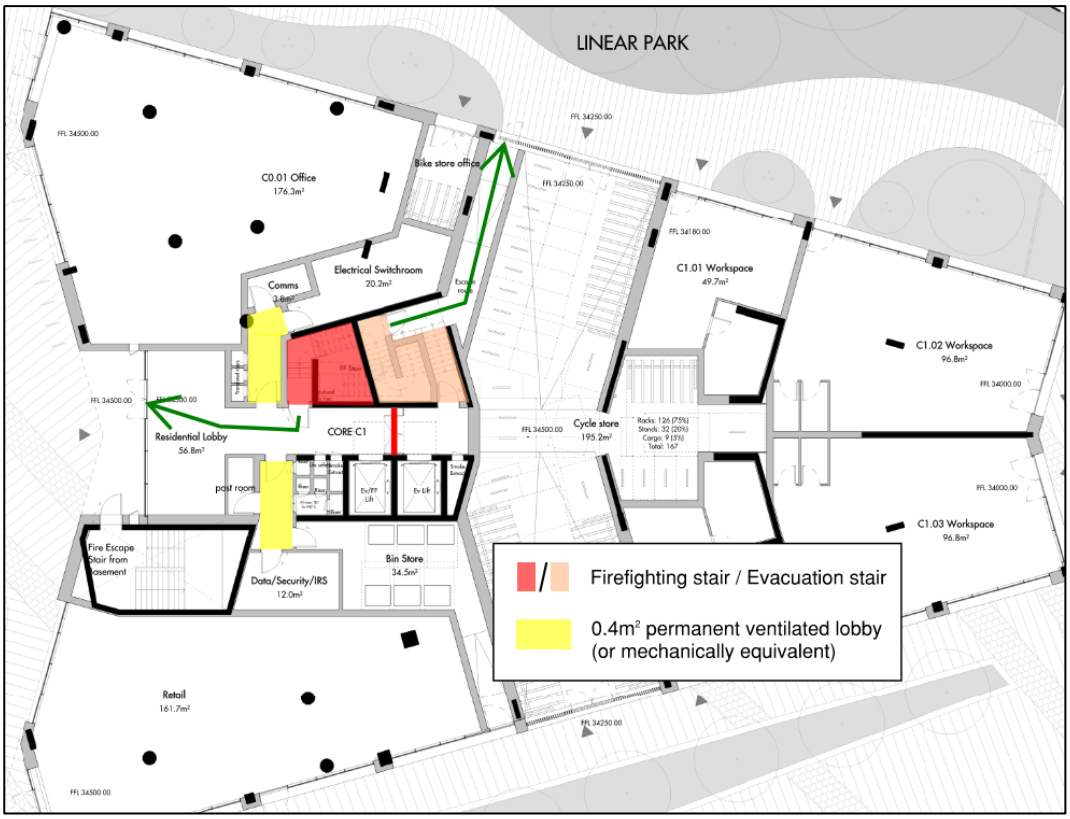

Figure 19 – Final escape routes from Block C

Figure 20 – Final escape routes from Block D

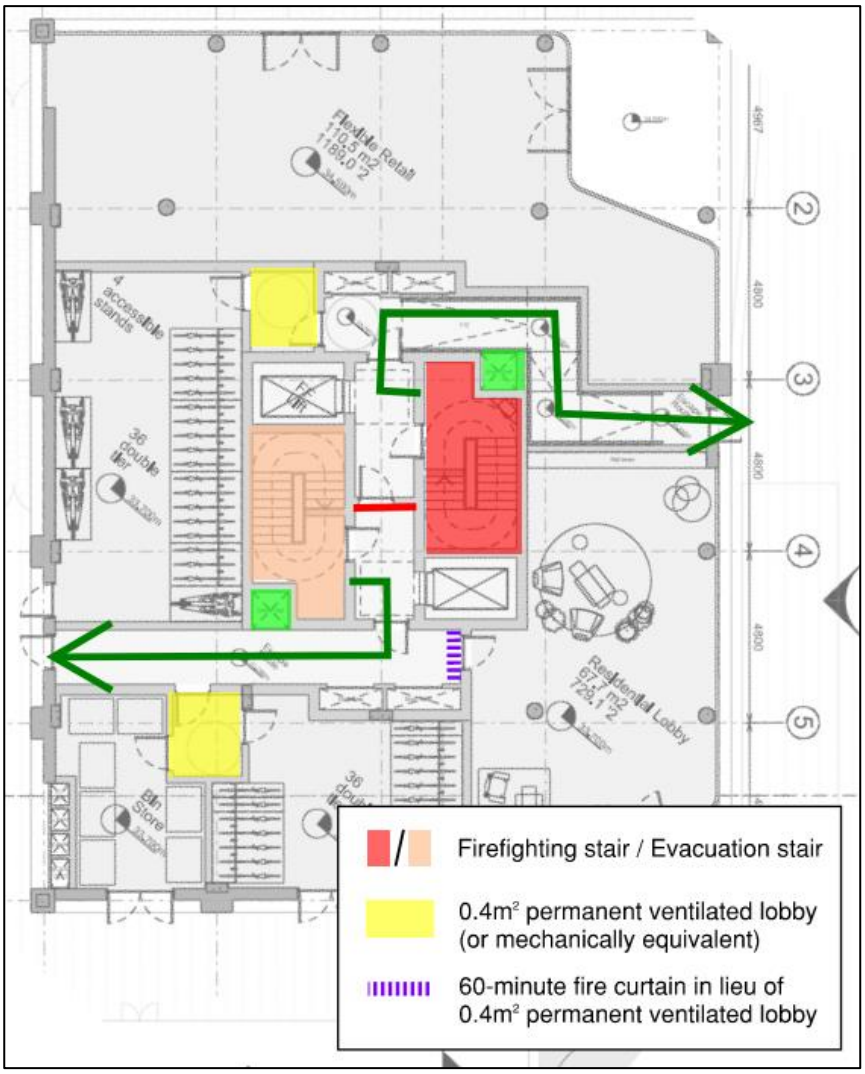

Figure 21 – Final escape routes from Block E1

Figure 22 – Final escape routes from Block E2

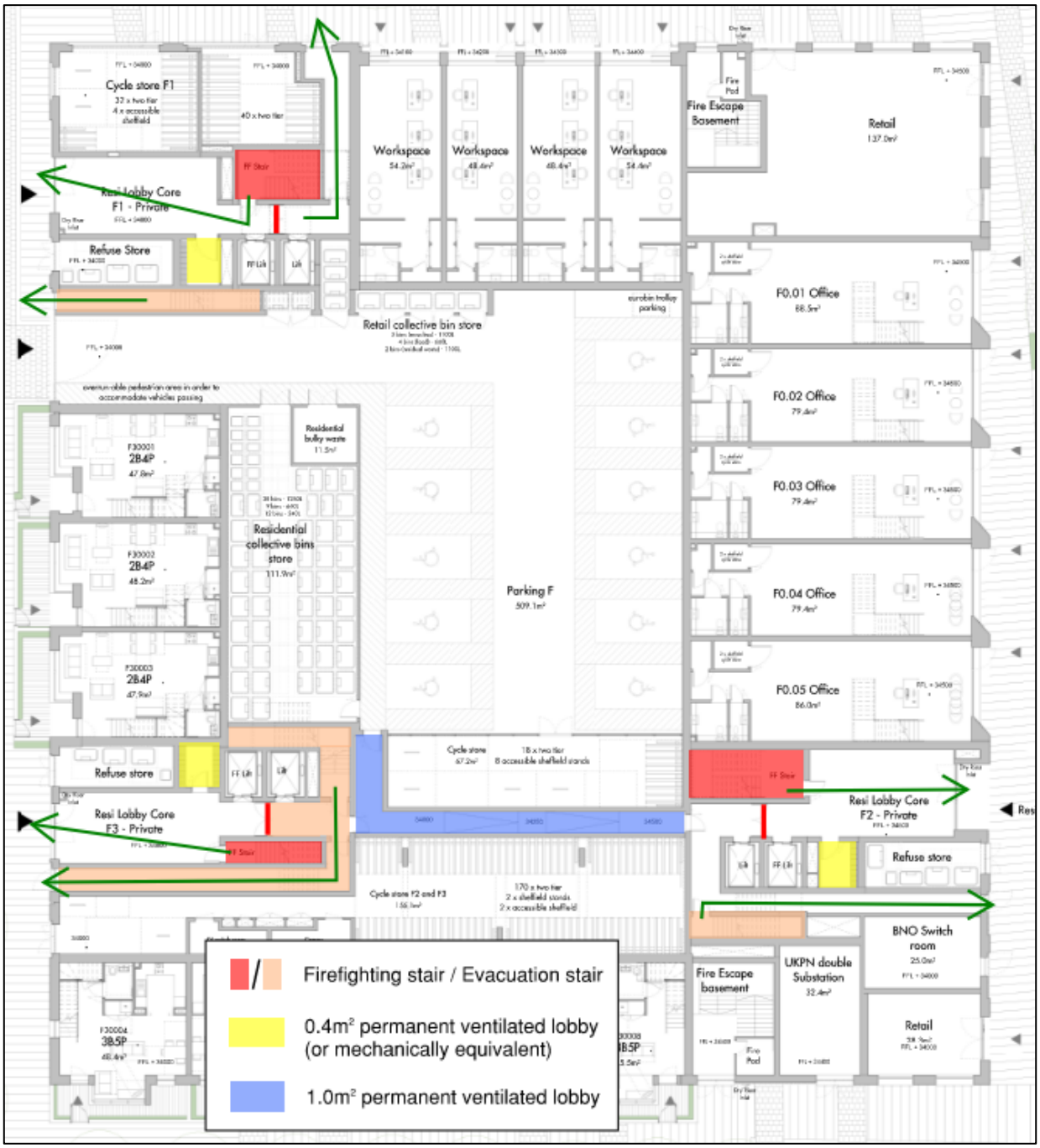

Figure 23 – Final escape route from Block F

3.5 Escape within Residential Amenity

An amenity entrance lobby is provided in Block E1 at ground and external terraces are provided in Blocks D and F.

Travel distances in residential amenity facilities (including external terraces and roof gardens) should be limited to 18m in single direction or 45m in multi-direction escapes.

For the entrance lobby in Block E1, currently the space is provided with alternative exits and the travel distances are acceptable. The entrance lobby should be separated from the final escape route by a 60-minute fire curtain in lieu of a 0.4m^2 permanently vented lobby. This is deemed to satisfy the functional requirements of the Building Regulations, subject to approval by the authorities

Exit requirements of the amenity space should comply with Table 3 in Section 3.2.

For the calculation of the required exit width, where the width of the door is less than 1050mm, the discharge capacity of the door is calculated by the equation *n = 500 / m*, where *n* is the number of persons safely accommodated by the door width and m is the minimum door width per person.

Based on the exit width requirements, on the assumption that the two exits are of a width of 850mm, the space could accommodate 151 occupants.

3.6 Escape within Residential Car Park

The residential covered car park is located at Ground level in Block F.

The travel distances should be limited to 18m in a single direction or 45m when there are two directions of escape.

The current travel distances are acceptable as shown in the figure below.

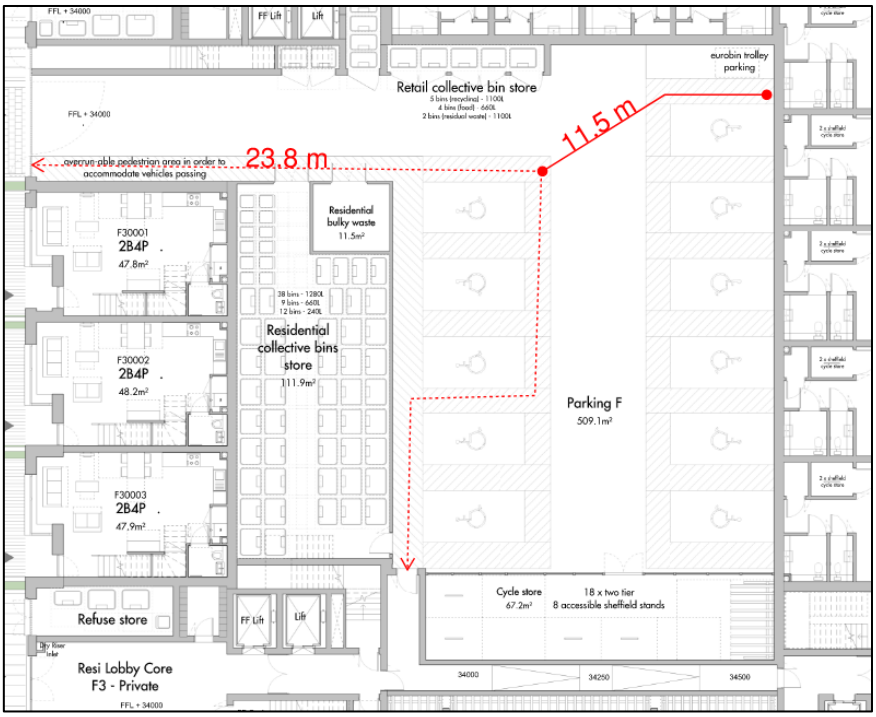

Figure 24 - Travel distance from residential car park in Block F

In case of fire, activated by alarm and detection system at Ground, any residential secured doors of Block F accessed from the car park should be released and failsafe unlocked.

The following table shows the calculation of the minimum required exit width for the residential car park. Two exits are required for travel distances.

Location	Type	Number of parking spaces	Occupancy Factor	Occupancy load	Exit Width (mm / person)	Minimum Required Exit Widths
Block F L00	Car park	11	2 persons / parking space	22	3.3	2 x 850mm

Table 5 – Residential Car Park Exit Capacity Requirements

For the ventilation in the car park, natural ventilation can be adopted with permanent openings at the car parking level. The openings can be at ceiling level. The aggregate free vent area should be a minimum of 1/40 of that level's floor area, at least half of which should be provided equally by two opposite walls (1/160 on each side). The remaining free area can be distributed wherever possible.

3.7 Escape within Other Ancillary Accommodations

Travel distances in enclosed ancillary rooms [Note 1] should be limited to 9m within the room and 18m within the enclosed escape route where escape is in a single direction. Where escape is possible in more than one direction, the travel distances should be up to 45m to the exit.

Where fit out has not been confirmed travel distances to be taken as two-thirds of the permitted distance.

Note 1: Ancillary rooms include engineering services installation rooms, boiler rooms, fuel storage areas, as well as transformer, battery and switchgear rooms, as well as cycle and refuse stores.

There are a number of ancillary accommodations are in inner rooms.

Inner rooms can be at risk if a fire starts in the access room. They are acceptable as long as the following is met:

- The occupant capacity of the inner room does not exceed 60.
- The inner room is entered directly from the access room.
- The escape route does not pass through more than one access room.
- The travel distance from any point in the inner room to the exit from the access room does not exceed the allowable one-way travel distance.
- The access room is not a place of special fire hazard and is in the control of the same occupier as the inner room.
- The access room is protected by an automatic smoke detector that either operates an alarm that is immediately audible in the inner room, to a sound pressure level in accordance with the minimum recommended in BS5839 Part 1 or gives an immediate visual alarm conforming to BS EN 54-23 in the inner room if the ambient noise levels are so great as to make an alarm inaudible.

Ancillary rooms do not tend to have many occupants at any one time due to their use therefore an occupancy load factor of 30m² per person in each room. Therefore, any ancillary room up to 1800m² in area can be served by a single exit door with a clear width of 750mm (subject to acceptable travel distances being achieved). Rooms larger than this require two exits with a clear width of 850mm.

3.8 Escape within Commercial Accommodations

Travel distances in workspaces and office should be limited to 26m in single direction or 65m in more than one direction.

Travel distances in retail unit should be limited to 20m in single direction or 50m in more than one direction.

Travel distances in the community unit should be limited to 22m in single direction or 55m in more than one direction.

Where fit out has not been confirmed travel distances to be taken as two-thirds of the permitted distance.

Exit requirements of these commercial units vary and shall comply with Table 3 in Section 3.2. The travel distances and exit provisions will be undertaken as the layouts of these spaces will be developed as the design progresses. The current exits and travel distances are provided indicatively as shown in the following figures.

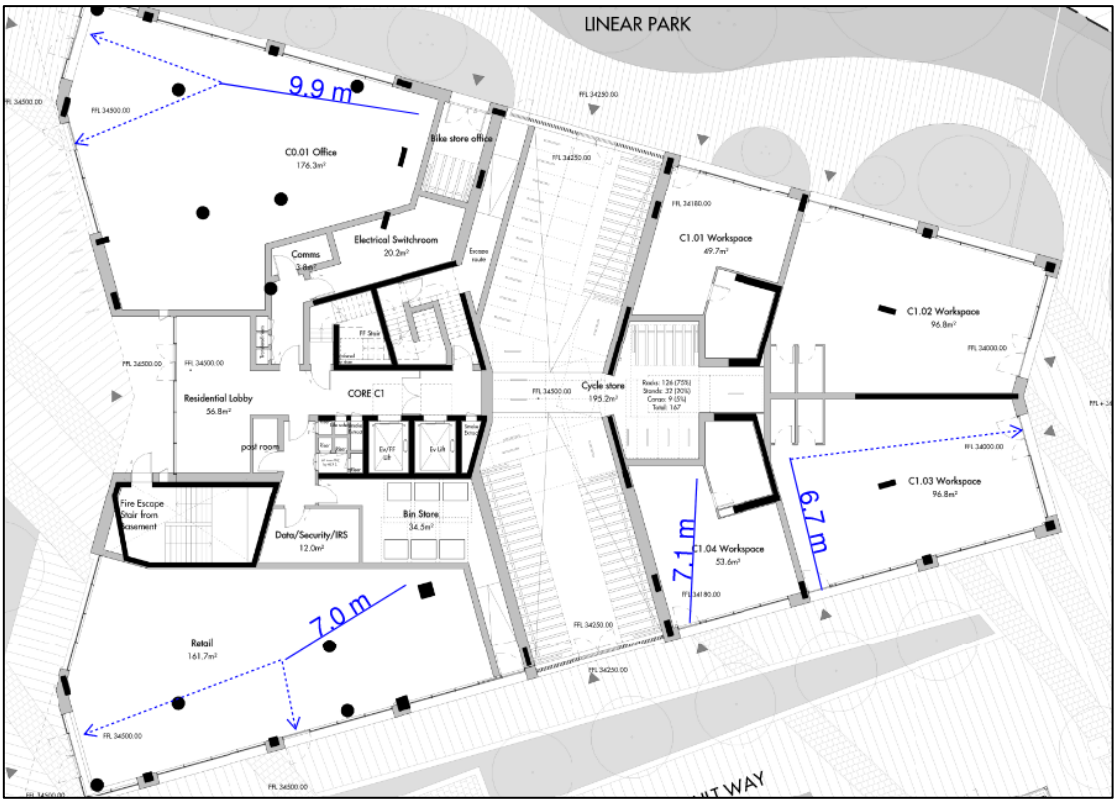

Figure 25 – Travel distances of commercial units of Block C

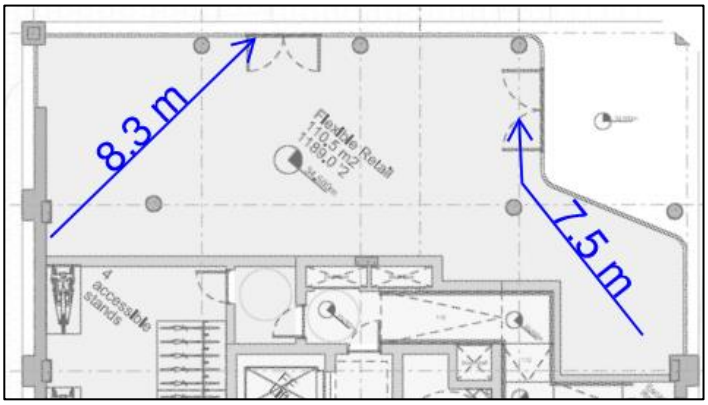

Figure 26 - Travel distances of commercial units of Block E1

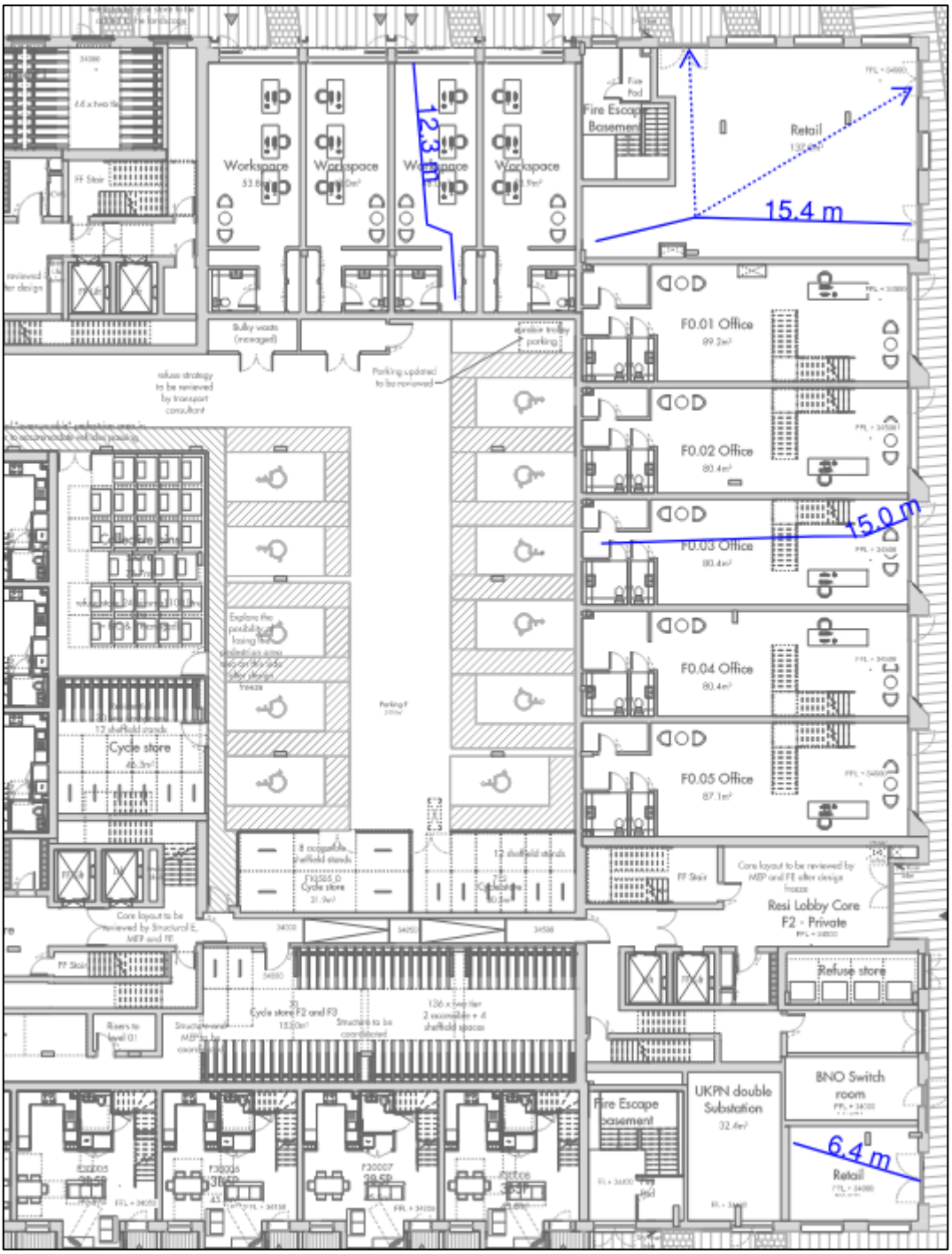

Figure 27 - Travel distances of commercial units of Block F

3.9 Disabled Evacuation

3.9.1 Residential Accommodations

The Building Regulations do not require residential accommodations on the upper levels to provide disabled refuges.

Block E2 will be designed as a small, single-stair building to ADB which does not require an evacuation lift per stairway. However, it is recommended that the building will be provided with facilities to assist disabled evacuation by, for instance, providing a refuge within the protected stair that will be provided with an emergency voice communication system in accordance with BS 5839-9.

For all other buildings, an evacuation lift will be provided for each stairway in most buildings (except Block E2) in accordance with BS 9991:2024. This would allow disabled occupants to descend / ascend to ground floor with level access, and the responsibility for lift control can be confirmed with the management strategy for the building.

The evacuation lift will be provided with a safe temporary waiting space in the event of a fire, which will be afforded the same level of protection as the stair.

The minimum dimension of the temporary waiting space should be 1.5m x 1.5m in front of the evacuation lift. This space should be provided with an emergency voice communication system in accordance with BS 5839-9. Communication points should be at least 500mm from any wall.

The walls of the lift landing and temporary waiting space and the lift door, and the landing floor and lift floor, should contrast visually.

One design fire is accounted for, so only the occupants of one apartment will be evacuating at any one time via the lift provided for evacuation purposes.

The building management forms an integral part of the design and on-going functionality of the building after occupation. The building will have a management team whose responsibilities will include ensuring the fire safety strategy is adopted and enforced. One of the responsibilities of this team will be to develop a management strategy for the building. This strategy will incorporate details of how the building satisfies the requirements of the Equality Act 2010. The management strategy should include information on staff training, how disabled occupants will be evacuated in the event of a fire and identify key roles in ensuring they are assisted in a fire situation.

3.9.2 Commercial Accommodations

The commercial units that have a single storey located on the access level is not required to provide a disabled refuge.

In the case of the five multi-storey offices in Block F, they have a small mezzanine floor on Level 1. Due to the small size of the space, it is not possible to include a protected stair with a disabled refuge. Therefore, prior to the S73 application, it has previously been designed that a strict management strategy will be implemented to aid the evacuation of disabled occupants.

The building management forms an integral part of the design and on-going functionality of the building after occupation. The building will have a management team whose responsibilities will include ensuring the fire safety strategy is adopted and enforced. One of the responsibilities of this team will be to develop a management strategy for the building. This strategy will incorporate details of how the building satisfies the requirements of the Equality Act 2010. The management strategy should include information on staff training, how disabled occupants will be evacuated in the event of a fire and identify key roles in ensuring they are assisted in a fire situation.

3.10 Fire Alarm & Detection System

3.10.1 Residential Accommodation

All apartments should be provided with an LD1 automatic fire detection and alarm system with a minimum Grade D power supply, designed, installed and maintained in accordance with BS 5839 Part 6.

Duplexes and townhouses should be provided with an LD2 automatic fire detection and alarm system with a minimum Grade D power supply, designed, installed and maintained in accordance with BS 5839 Part 6.

The system should be of Grade D1 if the dwellings are to be rented accommodation and Grade D2 if they are to be owner occupied.

It is not considered that the private balconies will be required to have an additional sounder as even though they are accessed from one access room the sounder in the apartment will be able to alert the

occupants in the balcony to a fire. This is on the basis that anybody in the balcony area will also be able to see if a fire occurs in the kitchen / living area. Additionally, if the travel distance from the balcony access door to the furthest point on the balcony exceeds 7.5m, then either there should be an alternative escape route from the balcony without going via the same access room, or a fire detection system will be provided in accordance with BS 5839 Part 6.

An L5 smoke detection system smoke detection system should be provided in the common corridors on each floor. The sole purpose of the detection system is to activate the smoke ventilation system. No sounders or manual call points will be provided in the common areas.

Residential blocks that are over 18m will be provided with an evacuation alert system for use by the fire and rescue service designed in accordance with BS 8629, which will require an alarm sounder in each flat as the control panel shall be capable of triggering evacuation alerts for specific areas within a building.

3.10.2 Residential Amenity Facilities

The fire detection and alarm system should be designed in accordance with BS 5839 Part 1 and be at least of type L3.

3.10.3 Residential Car Park

The residential car park should be provided with an automatic fire detection and alarm system. This system should be designed and installed in accordance with BS 5839 Part 1 and be a minimum of L5 standard.

Manual call points will be positioned by all exits and escape routes directly to the outside.

Fire alarm sounders and beacons will be provided to ensure an audibility level of 65dBA or 5dBa above background level (whichever is greater) is achieved in these areas. Operation of the fire alarm system will shut down all HVAC systems.

Should the car park be provided with charging points for electrical vehicles, it is recommended the charging points should be linked to fire alarm system within the car park and the power should be cut to the charging point upon detection within the car park.

3.10.4 Ancillary Accommodation

The fire alarm and smoke detection within the cycle stores, bin stores and plant rooms should be designed in accordance with BS 5839 Part 1 and be of type L3.

Manual call points will be positioned by all exits and escape routes directly to the outside.

Fire alarm sounders and beacons will be provided to ensure an audibility level of 65dBA or 5dBa above background level (whichever is greater) is achieved in these areas. Operation of the fire alarm system will shut down all HVAC systems.

Should the cycle stores be provided with charging points for electrical vehicles, it is recommended the charging points should be linked to fire alarm system within the car park and the power should be cut to the charging point upon detection within the cycle store.

3.10.5 Commercial Accommodation

The fire alarm and smoke detection within the commercial units should be designed in accordance with BS 5839 Part 1 and be a minimum of a manual type.

Manual call points will be positioned by all exits and escape routes directly to the outside.

Fire alarm sounders and beacons will be provided to ensure an audibility level of 65dBA or 5dBa above background level (whichever is greater) is achieved in these areas. Operation of the fire alarm system will shut down all HVAC systems.

3.10.6 Access Control Measures

Measures to restrict access the buildings should not adversely affect fire safety provisions. Measures should remain for occupants to safely evacuate the building in the event of a fire.

Electrically powered locks should return to the unlocked position in all of the following situations:

a) if the fire detection and alarm system operates,
b) if there is loss of power or system error, and
c) if the security mechanism override is activated.

On activation of the fire alarm and detection system the electromagnetic locks will need release allowing all occupants of the building.

3.11 Emergency lighting

Emergency lighting as backup lighting should meet the recommendations of BS 5266 Parts 1 and 7.

The dedicated escape routes at podium will be provided with emergency escape lighting.

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

3.12 Signage

Escape signage should follow the recommendations of BS 5499. Further details will be provided during the design development.

Wayfinding signage will also be required for the fire service for all blocks of flats as all blocks are over 11m in height and will be detailed as the design develops.

4 Internal Fire Spread (Linings)

Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B2, Internal fire spread (linings):

"To inhibit the spread of fire within the building the internal linings shall:
a) adequately resist the spread of flame over their surfaces; and
b) have, if ignited, a rate of heat release which is reasonable in the circumstances.

In this paragraph "internal linings" mean material lining any partition, wall, ceiling or other internal structure."

4.1 Surface Linings

The interior wall and ceiling surfaces in buildings can have a significant influence on how fast a fire may develop. It is particularly important that in circulation spaces including staircases, where the rapid spread of fire is most likely to prevent occupants from escaping, surface linings are restricted by making provision for them to have low rates of heat release and surface spread of flame.

The wall and ceilings linings within the building should meet the recommendations outlined in the table below.

Location	**Class of Lining**
	European Class*
Small Rooms of area up to: • 4m² in residential accommodation • 30m² in non-residential accommodation	D-s3,d2
Other Rooms	C-s3,d2
Circulations spaces within dwellings	C-s3,d2
Other circulation spaces including the common areas of block of flats, residential amenity facilities, car park & service yard and commercial units	B-s3,d2
Note: * The European classifications are described in BS EN 13501-1.	

Table 6 – Surface Lining Requirements

For the purpose of these requirements, a wall includes the internal surfaces of internal and external glazing as well as any part of a ceiling which slopes at an angle greater than 70 degrees to the horizontal. Doors, door frames, window frames and frames in which the glazing is fitted, architraves and skirting are also exempt from these limitations.

The class of linings can be downgraded (but not less than Class D-s3,d2) in walls of rooms providing the total area of those parts in any one room does not exceed one half of the floor area of the room and subject to a maximum of 20m² in residential accommodation and 60m² in non-residential accommodation.

5 Internal Fire Spread (Structure)

Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B3, Internal fire spread (structure):

1. *The building shall be designed and constructed so that, in event of fire, its stability will be maintained for a reasonable period.*
2. *A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings.*
3. *To inhibit the spread of fire within the building, it shall be sub-divided with fire resisting construction to an extent appropriate to the size and intended use of the building.*
4. *The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.*

The requirements will be met;

- If the loadbearing elements of structure of the building are capable of withstanding the effects of fire for an appropriate period without loss of stability;
- If the building is sub-divided by elements of fire-resisting construction into compartments;
- If any openings in fire-separating elements are suitably protected in order to maintain the integrity of the element; and
- If any hidden voids in the construction are sealed and sub-divided to inhibit the unseen spread of fire and products of combustion, in order to reduce the risk of structural failure and the spread of fire, in so far as they pose a threat to the safety of people in and around the building.

The extent to which these measures are necessary is dependent on the use of the building, its size and on the location of the element of construction.

5.1 Fire Resistance of Elements of Structure

Premature failure of the structure can be prevented by provisions for loadbearing elements of structure to have a minimum standard of fire resistance, in terms of resistance to collapse or failure of load bearing capacity.

The period of fire resistance required in accordance with BS 9991:2024 and BS 9999:2017 is linked to the risk profile of the building taking into account the height of the top floor and whether the building is sprinklered or not. Where any element supports another the supporting element should possess at least the resistance of the other. Approved Document B defines an element of structure as:

- a member forming part of the structural frame of a building or any other beam or column;
- a loadbearing wall or loadbearing part of a wall;
- a floor;
- a galley
- an external wall; and
- a compartment wall.

The following are excluded from definition of an element of structure:

- Structure that supports only the roof, unless:
  - the roof performs the function of a floor, such as for parking vehicles, or as a means of escape, or
  - the structure is essential for the stability of an external wall which needs to have fire resistance.

The following table shows the required fire resistance periods for each core.

Block	Top storey height	Fire resistance periods
Block C	32.3m	120 minutes
Block D buildings	16.8m	60 minutes
Block E1	32.8m	120 minutes
Block E2 three-storey buildings	6.5m	60 minutes
Block E2 all other buildings	13m	60 minutes
Block F Core 1	26.63m	60 minutes Note 1
Block F Core 2	32.4m	120 minutes
Block F Core 3	19.5m	60 minutes Note 1

Table 7 – Fire resistance periods

Note 1: In accordance with BS 9991, structural fire resistance of buildings between 18m and 30m in height could be reduced to 60 minutes if a sprinkler system is provided in accordance with BS 9251 (or BS EN 12845 where applicable).

Where elements of structure support an adjacent block or a building above (e.g. the car park) they should be provided with the structural fire resistance to at least that required for the building they support.

Any elements which only support themselves and or a roof can be non-fire rated.

5.2 Compartmentation

5.2.1 Residential Accommodation

All townhouses, duplexes and apartments should have 60-minute fire resistant compartment walls with FD30S self-closing front doors. Townhouses and duplexes that should be provided with an internal protected hallway/staircase with 30 minutes fire resistance and FD30 doors in accordance with BS 9991:2024 or FD20 doors in accordance with ADB.

For all blocks of flats, floors should be compartment floors with a fire resistance equal to the structure.

For all blocks of flats, the evacuation lift lobby shall be enclosed with 30 minutes fire resistance with FD30S self-closing doors. Where a cross-lobby door is provided, it should achieve 30 minutes fire resistance and can swing in either direction. Where risers are provided in the evacuation lift lobby at the upper levels, the riser doors shall be provided with smoke seals.

Blocks C, E1 and F exceed 18m in height but within 50m, therefore each core will be provided with a firefighting shaft. Although Block D is under 18m in height, a firefighting shaft is provided to achieve the hose laying distance. The firefighting shaft will incorporate a dry riser, firefighting lift and a firefighting stair.

The firefighting staircases should be enclosed in 120 minutes fire resistance with FD60S self-closing doors. The firefighting lift shafts should have a fire resistance of 120 minutes with FD60 landing doors. In this case, the secondary lift shafts within the cores will be designed for evacuation purposes to provide dignified escape for disabled occupants within the building, hence will also be enclosed in 120 minutes fire resistance with FD60 doors.

Block E2 is up to 18m in height will be provided with dry riser mains to achieve hose laying distances. The stair will achieve 60 minutes fire resistance with FD30S self-closing door.

The secondary stair will be enclosed in the same fire resistance as the elements of structure with smoke sealed self-closing fire doors achieving at least half of the resistance of the wall.

In these cores, risers should have fire ratings equal to the structure with FD60 doors. Additionally, risers should not be provided or accessed from the fire service access route. Should risers be accessible from the fire service access route in these blocks, it would be a fire engineering solution that the risers achieve 120 minutes fire resistance with upgraded FD120S doors at ground level. Should post boxes be provided in a firefighting entrance lobby, the post boxes should achieve a fire resistance period equal to that of the firefighting shafts, i.e. 120 minutes fire resistance. For other post boxes provided in a protected escape route, they should achieve a minimum of 30 minutes fire resistance.

It should be noted that BS 9991:2024 requires that any discharge paths from the staircase must be along a protected route with any accommodation being accessed via a protected lobby (that will also need to be ventilated for ancillary accommodations). These protected lobbies should achieve 120 minutes fire resistance with FD60S doors.

Where two evacuation lifts and the associated stairs are provided for alternative means of escape, they should be separated by imperforate construction at the final discharge level. Therefore, the two lobbies at ground floor should be separated by a solid wall. However, as a fire engineering solution, a fire door and a fire curtain/shutter could be provided in lieu of a solid wall in this case, since the final escape routes will be sprinklered and will not be any fire source. Therefore, this double protection is deemed to satisfy the functional requirements of the Building Regulations.

Openings in compartment walls should be limited to the passage of service ducts and access doors fitted with smoke seals. Where service ducts pass through compartment walls these will be provided with a fire barrier. All openings will be provided with a similar period of fire resistance to the wall they are provided within and the fire doors are to be locked closed.

In order to protect the final exit routes from the building all wall construction within 1.8m of the final exit points will be fire rated to 30 minutes. In general, most final exits are acceptable providing there are two directions of discharge from the exit, however where escape is only possible in a single direction and the exit route in the open air is within 1.8m of the building then any glazing present should be fire rated glazing to 30 minutes (integrity only).

5.2.2 Residential Amenity

Residential amenity facilities shall be separated from the other residential areas by a minimum of 60 minutes fire resisting construction with FD30S self-closing doors.

5.2.3 Residential Car Park

The car park should be separated from the rest of the accommodations by a minimum of 120 minutes fire resistance (including walls and floors).

The protected ventilated lobbies for the car park should also be separated from the residential common areas by 30 minutes fire resistance with FD30S self-closing doors.

5.2.4 Commercial Accommodations

For the commercial units, they should be separated from the rest of the building the fire resistance similar to the elements of structure (including walls and floors). There should be no connection to the residential areas.

5.2.5 Ancillary Accommodation

BS 9991:2024 gives recommendations of the level of fire resistance that should be provided to ancillary areas, as shown in the figure below.

Voltage of switchroom/ transformer room	Fire resistance[A] of enclosure, in minutes					
	Depth of basement below ground level		Height of floor of top occupied storey above ground level			
	>10 m	≤10 m	≤5 m	>5 m ≤18 m	>18 m ≤30 m	>30 m
LV or ELV switchroom	90	60	30	60	120	120
HV switchroom and transformer room	120	120	120	120	120	120

[A] For integrity and insulation, plus stability for load-bearing elements.

Figure 28 – Levels of fire resistance to ancillary areas

Should the ancillary accommodations be accessed from the final exit route from the stair, this should be via a 0.4m² ventilated lobby in the sprinklered building. The lobby can alternatively be ventilated by the mechanical smoke shafts from upper levels.

Any rooms housing life safety equipment should be enclosed in 120 minutes fire resistance in accordance with BS 8519.

Any electrical sub-stations should be fully separated from the adjacent accommodation spaces by at least 30 minutes fire resisting construction, although these requirements are likely to be superseded by the electricity supplier's requirements, which are typical based on 4 hours fire separation.

5.3 Fire Stopping

Fire stopping should be provided as per the guidance in BS 9991:2024 and BS 99999.

5.4 Cavity barriers

Cavity barriers should be provided as per the guidance in BS 9991:2024 and BS 99999.

5.5 Sprinklers

5.5.1 Residential Accommodation

Since all blocks are over 11m in height, sprinklers will be provided to all residential accommodation. Additionally, since the buildings contain a floor over 18m in height, the residential sprinkler system should be designed to a Category 4 in accordance with BS 9251.

5.5.2 Residential Amenity Facilities

The residential amenity facilities that are ancillary to the residential accommodation could be served by the residential sprinkler since the rooms are not larger than outlined in Table 4 of BS 9251:2021.

Any covered spaces will require to be sprinklered. However, the podiums and terraces are open spaces, i.e. not covered, which therefore do not require sprinkler protection.

5.5.3 Ancillary Accommodation

The stores and plant rooms that are ancillary to the residential accommodation could be served by the residential sprinkler as long as the rooms are not larger than outlined in Table 4 of BS 9251:2021 as shown below. Rooms larger than this should be served by a commercial sprinkler system in accordance with BS EN 12845.

Table 4 — *Examples of classification of areas and design criteria for areas to be protected with BS EN 12259-1 sprinkler heads*

Occupancy	Minimum density mm/min	Area of operation [A]
Car parking [B] within or beneath a block of flats	5.00	100 m²
Bin store [B], [C] within or beneath the flats		72 m²
Limited office areas (e.g. concierge or site management) [D]		72 m²
Residents' storage sheds/tenant stores [B]		4 heads
PTSN/CCTV/electrical rooms		72 m²
Plant rooms		100 m²
Laundry (with storage and processing of linen, e.g. institutional, care home)		100 m²
Laundry (communal facility)		72 m²
Hairdressing room		72 m²
Retail (e.g. shop)		100 m²
Bar/restaurant/cafe		72 m²
Kitchens in student hub accommodation (e.g. self-catering)		72 m²
Kitchens [E] in residential care or similar premises (e.g. care home) ≤50 m²		72 m²
Kitchens [E] in residential care or similar premises (e.g. care home) >50 m²		72 m²

[A] If the compartment (fire) area is less than 50 m², a maximum of four heads is required as the area of operation. Where greater than 50 m², refer to area of operation or compartment (fire) area, whichever is the lesser.

[B] Attention is drawn to the need to consider protection from frost damage.

[C] On the basis of the bin store building or compartment (fire) being of at least a minimum of 1 h fire resisting construction from the rest of the buildings.

[D] See also Table 3. Conduct a hazard evaluation to determine which option is most appropriate.

[E] Kitchens with deep oil cookers should be fitted with an appropriate local application system in addition to the sprinkler protection identified in this table (e.g. LPS1223, see BS 5306-0).

Figure 29 - Table 4 of BS9251:2021

5.5.4 Residential Car Park

The car park should be served by a sprinkler system designed in accordance with BS EN 12845.

5.5.5 Commercial Accommodation

All commercial accommodations will be provided with sprinklers in accordance with BS EN 12845.

6 External Fire Spread

Schedule 1 of the Building Regulations requires the following functional requirements to be met in respect of B4, External fire spread:

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

The objective of this requirement is to ensure that there is sufficient separation between buildings to prevent fire spread and to ensure that fire does not spread up the building façade.

6.1 Unprotected Areas

The unprotected areas are the areas of the façade that are not fire rated (i.e. glazing, etc.), which should be sized so that fire spread is unlikely to occur to buildings on the adjacent site or to separate fire compartments on the same site.

The following calculations have followed the guidance provided in BRE Guide BR187 – 'External fire spread: building separation and boundary distances'. The following calculations have been carried out for the required boundary distance based on the height of each floor with their biggest elevation available.

One of the worst-case scenarios would be the retail unit of Block C at Ground, with an elevation of 20.3m long x 3.4m high. Considering that the accommodation shall be provided with an automatic sprinkler system as mentioned in Section 5.5, which allows for the boundary distances to be halved, the required boundary distance is 5.25m. Since the distance from the boundary (i.e. the centre line of the public road) 7.3m, there are no limits to the area of unprotected openings.

More detailed calculations of each elevation will be undertaken at the detailed design stage.

6.2 External Wall Construction

The external envelope of the building should not be a medium for fire spread.

Since all residential buildings are over 11m in height and the development is in London that must comply with the London Plan, all materials within the external wall should achieve European Classification in A2-s1,d0 or Class A1 in accordance with Regulation 7(2).

Since the commercial units are within the apartment buildings, they will also achieve European Classification in A2-s1,d0 or Class A1.

This does however not apply to the following

- cavity trays when used between two leaves of masonry;
- any part of a roof 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.

Membranes above ground level, although exempt, should achieve a minimum of Class B-s3,d0.

In order to protect the staircases from a fire on the floor plate any wall construction perpendicular to the stair core within 1.8m of the staircase should be fire rated equal to that of the fire protection to the stairs.

6.3 Roofs

Roof coverings for the building should be designed in accordance with Table 8 of BS9991:2024 (or Table 12.1 of ADB) as shown in the figure below.

Table 8 **Separation distances for roof coverings**

Designation of covering of roof or part of roof [A]	Distance of roof from any point on relevant boundary			
	Less than 6 m	At least 6 m	At least 12 m	At least 20 m
AA, AB or AC	Acceptable	Acceptable	Acceptable	Acceptable
BA, BB or BC	Not acceptable	Acceptable	Acceptable	Acceptable
CA, CB or CC	Not acceptable	Acceptable [B], [C]	Acceptable [B]	Acceptable
AD, BD (or CD [B])	Not acceptable	Acceptable [C]	Acceptable	Acceptable
DA, DB, DC (or DD [B])	Not acceptable	Not acceptable	Not acceptable	Acceptable [C]

NOTE 1 Unwired glass at least 4 mm in thickness has an AA designation.

NOTE 2 See Table 9 for limitations on plastic roof lights.

[A] The performance of roof coverings is designated by reference to the test methods given in BS 476-3 (or DD ENV 1187).

[B] Not acceptable on buildings with a volume of more than 1 500 m^3.

[C] Acceptable on buildings not listed in Footnote B, if part of the roof is no more than 3 m^2 in area and is at least 1.5 m from any similar part, with the roof between the parts covered with a material of limited combustibility.

Figure 30 - Limitations on Roof Coverings

6.3.1 Green Roofs

Where green roofs are provided, 500mm wide fire breaks would be required in accordance with GRO Fire Risk Guidance and DCLG Fire Performance of Green Roofs and Walls.

7 Access & Facilities for the Fire Service

Schedule 1 of the Building Regulations requires the following functional requirement to be met in respect of B5, Access and facilities for the fire service:

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

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

7.1 Vehicle Access

Fire Service access is required to provide access for fire personnel and a water supply to within a reasonable distance of the building entrances. Where there are dead end routes within the site, these should either be limited to 20m or a turnaround (turning circle or hammerhead) facility will be provided.

Due care should be given to ensure that the vehicle access route meets the requirements for a pump appliance as shown in the table below (which is taken from London Fire Brigade – Guidance Note 29).

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

Table 8 – Vehicle Access Requirements

The fire service access route throughout the site is shown in the following figure.

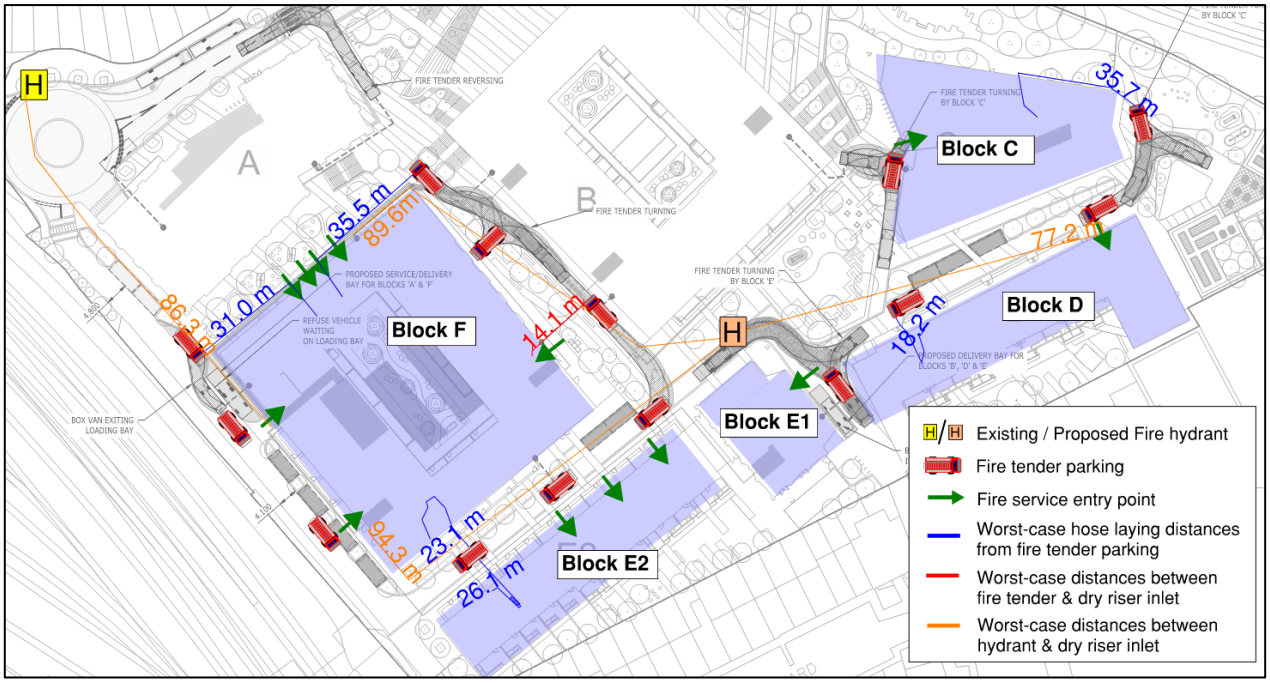

Figure 31 – Fire vehicle access site plan

Any access / security measures in and around the site (especially any bollards preventing vehicle access) should be bypass-able by the fire service. The details of the bypass arrangements should be developed and agreed with the fire service as applicable.

Townhouses will be provided with hose laying coverage of 45m from the fire vehicle parking to the furthest point of the floor plate.

Commercial accommodations are accessed from the fire access level, which will be provided with access to either at least 15% of the perimeter of the unit, or 45m hose coverage to the furthest point of the floor plate from the parking of the fire appliance.

7.2 Internal Fire Service Access

7.2.1 Residential Accommodation

Blocks C, E1 and F exceed 18m in height but within 50m, therefore each core will be provided with a firefighting shaft. Although Block D is under 18m in height, a firefighting shaft is provided to achieve the hose laying distance. The firefighting shaft will incorporate a dry riser, firefighting lift and a firefighting stair.

The firefighting shaft should serve every upper floor level and be designed in accordance with BS 9991:2024 as listed below.

- Be constructed within 120 minutes of fire resisting construction,
- Include firefighting staircase (at least 1100mm wide),
- Include firefighting lift (provided with dual power supply, water protection etc.),
- Ventilated firefighting lobby,
- Outlet from the fire main at each storey that the firefighting shaft serves (within the staircase),
- Protected access (at least 120 minutes) onto firefighting shaft at access level.
- A 1.0m² vent on the top of the staircase.

In the residential accommodation, where the common corridor is to be utilized as the firefighting lobby, the entrance to the stair and lift should not be separated by more than 7.5m. The separation between the common corridor and the apartments must provide a fire resistance of at least 60 minutes as shown in the following figure.

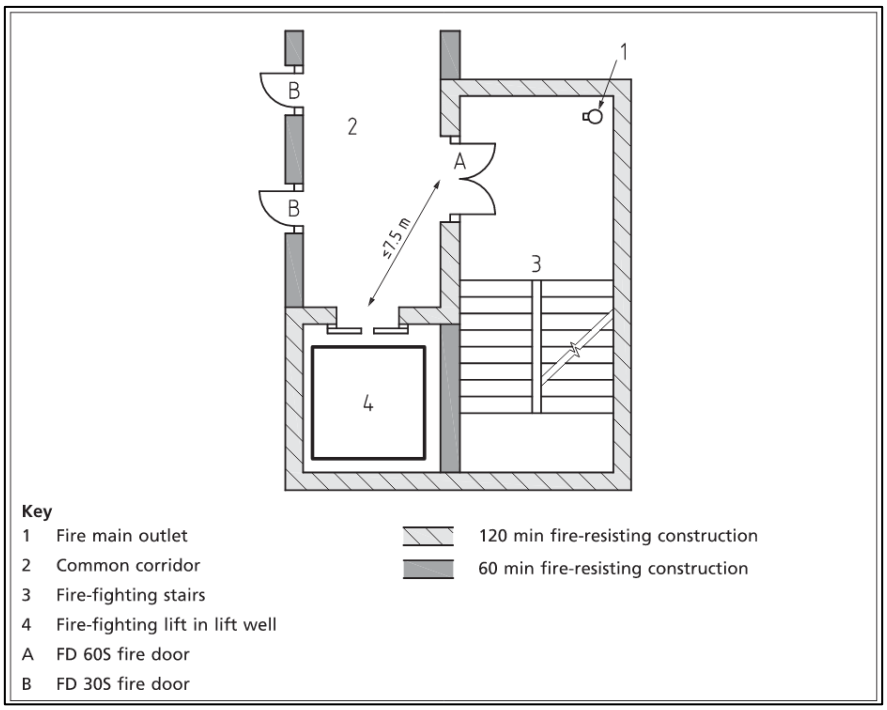

Figure 32 – Internal Firefighting Shaft

At the access level, a fire and rescue service mustering point with a minimum area or 5m^2 should be provided that is clear of any escape routes.

The firefighting stair will be provided with a level of lighting recommended in BS 5266 Part 1 and will have a backup power supply capable of maintaining the lighting and other operations in the firefighting shaft for at least 3 hours.

Block E2 is up to 18m in height will be provided with dry riser mains to achieve hose laying distances.

7.3 Dry Risers

All residential buildings will be provided with dry risers.

The dry riser inlets will be located adjacent to the entrance of each core and will also be within 18m of the fire appliance parking location.

All parts of the floor plates should be covered within 60m when measured along a route suitable for laying hose from a dry riser outlet provided within the firefighting staircase (i.e. Block C, D, E1 and F). Where the hose is from a dry riser within a non-firefighting staircase (i.e. in Block E2), the required hose laying distance will be within 45m.

7.4 Smoke Venting

7.4.1 Residential Accommodations

The smoke venting requirements for the residential areas and residential amenity are discussed in detail as part of the common areas means of escape section earlier. No further provisions beyond this are needed for firefighting.

At the later stages of design, a CFD study will be undertaken to validate the system.

7.4.2 Ancillary Accommodation

All ancillary accommodation accessed from the stair lobbies in buildings that are provided with two stairs should be accessed via a protected lobby that is ventilated as outlined in Section 3.4.7.

Should the mechanical smoke vent system be extended to the ground floor to vent these lobbies, this is deemed to be acceptable and exceed the lobby venting requirements.

7.4.3 Residential Car Park

For the ventilation in the car park, natural ventilation can be adopted with permanent openings at the car parking level. The openings can be at ceiling level. The aggregate free vent area should be a minimum of 2.5% of that level's floor area, at least half of which should be provided equally by two opposite walls. The remaining free area can be distributed wherever possible.

7.4.4 Commercial Accommodation

Since the commercial units will undertake individual simultaneous evacuation and do not have a floor over 18m in height, they will not require to be provided with any smoke venting.

7.5 Hydrants

ADB, BS 9991:2024 and BS 9999:2017 requires that buildings with dry fire mains should be within 90m from an existing or private fire hydrant.

The existing hydrant and a proposed hydrant are acceptable as shown in Section 7.1.

A third hydrant has been proposed which will be a washout to be reclassified as a hydrant within 90m from Block F Core 3. Alternatively, the proposed hydrant could be slightly relocated so that the distance to Block F Core 3 is within 90m.

7.6 Emergency Power Supplies

Each life safety system provided within the building will have an independent power supply which would operate in the event of a failure of the main supply.

The secondary source should come from one of the following:

- A life safety generator,
- An independent high voltage supply fed from an independent utility primary network substation to that feeding the primary supply, or
- An uninterruptible power supply (UPS) according to the electrical load requirements.

In the case of sprinkler systems, a diesel-driven fire pump set for fire protection service is also an acceptable form of secondary source.

In the event of the failure of the primary power source, the supply should automatically switch over to the secondary source.

Secondary power supply should be provided to the following life safety systems:

- Automatic opening vents,
- Mechanical Smoke Venting system,
- Fire Alarm System,
- Emergency lights and signs,
- Residential sprinkler system,
- Commercial sprinkler system,
- Firefighting lifts,
- Lifts for evacuation.

7.7 Firefighting Lifts

Each firefighting lift within the firefighting shaft will be designed and installed in accordance with BS 9999:2017 and BS EN 81-72. The summary of the some of these measures are listed below.

- Dual Power Supply (i.e. emergency, stand-by or alternative power supply),
- Size of the lift should be at least 1100mm wide x 1400mm deep with a rated load of 630kg as described in ISO 4190-1.
- Fire lift switch at access level,
- Fire Service Communication System,
  - Built-in microphone and speaker
- Provision to prevent water penetration into the firefighting lift via,
  - Drainage grid to the lift entrance, or
  - A floor sloped away from the lift entrance, or
  - A raised threshold to the lift entrance (at least 25mm high)
- Water protection to the electronic equipment / control within the firefighting lift well / car,
- Means to prevent water level in a lift pit from reaching equipment.
- Suitable means to prevent water rise above the level of fully compressed car buffer.

7.8 Evacuation Alert System

Residential blocks that exceed 18m in height will be provided with an evacuation alert system to allow the fire service to undertake the evacuation of part or the whole building if necessary.

It is recommended that the evacuation alert control and indicating equipment (EACIE) should be designed and installed in accordance with BS8629.

7.9 Secure Information Boxes

Since all residential blocks of flats are over 11m in height, they are required to be provided with a secure facility to store information about the building for use by the fire service during an incident.

The box should meet all the conditions listed below.

- Sized to accommodate all necessary information
- Easily located and identified by firefighters

- Secured to resist unauthorised access but readily accessible by firefighters,
- Protected from the weather.

Best practice guidance can be found in Sections 2 to 4 of the *Code of Practice for the Provision of Premises Information Boxes in Residential Buildings* published by the Fire Industry Association (FIA).

7.10Wayfinding Signage

Wayfinding signage will be required for the fire service for all blocks of flats as all blocks are over 11m in height as discussed in Section 3.12 and will be detailed as the design develops.

8 Fire Safety Management

8.1 General

Given the use and likely occupancy of the building, management procedures will assist in the prevention and control of fires and the evacuation of occupants.

Good housekeeping standards will be enforced to ensure that the effectiveness of the fire safety provisions is not affected.

Maintenance procedures will be developed to ensure that all equipment and services within the building are able to operate effectively.

A full Fire Risk Assessment should be carried out by the occupier of the building nearer to the development completion and be in place on occupation to meet the Regulatory Reform Order (RRO). The assessment should be maintained and act as a record of the provision and measures, passive and active, used to minimize fire risk within and around the building.

8.2 Key Management Issues

This section describes each of the key management areas that will need to be implemented and maintained during the lifetime of the building:

- All necessary fire safety systems must be regularly maintained and tested.
- The building management will regularly monitor and control the specification and use of combustibles within the escape routes and circulation areas. These areas will generally be maintained free of all combustibles and the escape routes will be unobstructed at all times.
- A full Fire Risk Assessment will be developed for the building.
- All building staff will receive regular training including roles and responsibilities for key members of staff.

8.2.1 Control of Evacuation and Fire Safety Planning / Implementation

A detailed fire safety plan will be drawn up by the building management, which will provide clear simple advice for the occupants in the event of an emergency.

The fire safety plan will be prepared, maintained and implemented by the fire personnel responsible for the building in question and will include:

- The procedures to be adopted in the event of a fire signal being given
- Procedures for evacuation of occupants (including disabled occupants)
- Procedures for equipment maintenance
- Frequency and nature of fire drills
- Staff training
- Procedures for recording and monitoring equipment maintenance and any fire incidents

Expanding on the information given above the fire strategy includes are number of risk critical areas resulting in the need to formalize the fire safety management in the building. In order to develop and maintain the safety of the building, the building management should formulate a policy statement appropriate to the building configuration, location, occupation, and if relevant, to the building users. The policy statement should include:

- General safety issues related to the use of the building
- Possible fire scenarios
- Aims and objectives of the proposed management system and its methodology

This policy should be endorsed by the highest level of management.

8.3 Regulation 38

To satisfy Regulation 38 to the Building Regulations it is proposed that a full package of building design information is passed to the end users. It is therefore proposed that the following information is provided to the end users:

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

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

9 Conclusions and Recommendations

This report outlines the fire safety strategy proposals for Camden Goods Yard Phases 2 and 3 Development and seeks to demonstrate compliance with the Building Regulations (generally in the form of the recommendations of Approved Document B, British Standard 9991:2024 and 9999).

For means of escape, blocks over 18m in height will be provided with two escape stairs. The design of the residential blocks, such as travel distances, are extended beyond the recommendations of BS 9991:2024 and fire engineered solutions are required as part of the justification. The enclosed corridors to either side of the staircase shall be vented via a 0.6m² mechanical smoke shaft as part of the justification, validated using CFD at a later design stage. An automatic opening vent will be provided at the head of each staircase to provide make-up air to the system.

Block E2 will be designed as a small, single-stair building to ADB which does not require an evacuation lift per stairway. However, it is recommended that the building will be provided with facilities to assist disabled evacuation by, for instance, providing a refuge within the protected stair that will be provided with an emergency voice communication system in accordance with BS 5839-9. For all other blocks, an evacuation lift is provided for each stairway in accordance with BS 9991:2024. Buildings over 18m in height will be provided with two stairs, each associated with an evacuation lift.

Fire resistance for elements of structure will be in accordance with ADB and BS 9991.

Since all residential buildings are over 11m in height and the development is in London that must comply with the London Plan, all materials within the external wall should achieve European Classification in A2-s1,d0 or Class A1 in accordance with Regulation 7(2). Since the commercial units are within the apartment buildings, they will also achieve European Classification in A2-s1,d0 or Class A1 in accordance with Regulation 7(2).

All the residential blocks are over 11m in height and therefore all apartments and duplexes will be sprinklered in accordance with BS 9251. The ancillary accommodation shall either be sprinklered with the residential or commercial sprinkler system depending on the size of the rooms.

Blocks C, E1 and F exceed 18m in height but within 50m, therefore each core will be provided with a firefighting shaft. Although Block D is under 18m in height, a firefighting shaft is provided to achieve the hose laying distance. The firefighting shaft will incorporate a dry riser, firefighting lift and a firefighting stair. Block E2 is up to 18m in height will be provided with dry riser mains to achieve hose laying distances. Ancillary accommodations that are accessed from the fire access level will be provided with access to either at least 15% of the perimeter of the unit, or 45m hose coverage to the furthest point of the floor plate from the parking of the fire appliance or from the dry riser outlet from a non-firefighting shaft. Townhouses will be provided with hose laying coverage of 45m from the fire vehicle parking to the furthest point of the floor plate.

Based upon the above proposals it is considered that adequate measures are provided to meet the functional requirements of the Building Regulations.

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