

Avondale Drive Estate

OUTLINE FIRE STRATEGY

November 2021



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1 Introduction

1.1 Scope

This Fire Statement has been prepared by Elementa in support of a Hybrid Planning Application submitted to the Hillingdon Council by the Applicant, London Borough of Hillingdon (hereafter referred to as 'the Applicant') for the redevelopment of Avondale Drive Estate in Hayes (hereafter referred to as 'the Site').

This Outline Fire Strategy should be read in conjunction with other supporting documents submitted with the planning application, including the Planning Statement and Development Specification Statements prepared by Savills and the Design and Access Statement prepared by PTE which explain the Proposed Development in more detail and relate it to the surrounding context and planning policy framework for the Site.

This Outline Fire Strategy covers the outline area of the proposed development, which covers Phase 1B and Phase 2. Phase 1 is considered in the Detailed Fire Strategy report. This strategy therefore considers the illustrative masterplan as one way in which the outline area could be delivered in accordance with the maximum parameters. This strategy does not provide a detailed assessment but makes assumptions and provides guiding principles on the basis of the illustrative masterplan to inform the fire safety considerations of the detailed design of these future phases, which will need to be documented as part of Reserved Matters Applications.

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.

The Greater London Act is to implement The London Plan. 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. Items highlighted with blue text are requirements for compliance with the London Plan.

1.2 Building Description

The outline area discussed in this strategy covers Phase 1B and Phase 2 of the proposed development.

Note – these storeys are indicative and to be confirmed but represent the maximum building heights and storeys based on the maximum parameters.

Phase	Block	Number of Storeys
1B	E	Ground + 9
	F	Ground + 4
	G	Ground + 7
	H	Ground + 7
2	B	Ground + 6
	C	Ground + 4
	D	Ground + 6

Table 1 – Number of floors

There are the potential for single storey elements to Phase 2 on the basis of the illustrative masterplan, which are also considered in this report.





Figure 1 – General Blocks Layout

1.3 Competency and Qualifications of Assessors

Camille Waharte – Fire Engineer

Camille Waharte is a Fire Engineer with 1 year' experience.

She has detailed knowledge of Approved Document B (ADB) and BS9991 with a good understanding and experience of multi-storey residential developments including early stage and construction design stages.

Andrew Kennedy – Fire Engineer

Andrew Kennedy is a Fire Engineer with 4 years' experience, is an Associate Member of the Institution of Fire Engineers (AIFireE) and registered with the Engineering Council.

He has detailed knowledge of Approved Document B (ADB) and BS9991 with a good understanding and experience of multi-storey residential developments including early stage and construction design stages. Andrew has worked on many similar schemes in the past, incorporating elements such as natural smoke control and firefighting facilities into designs, as well as extensive experience working on buildings over 18m in height.

Simon Burch – Senior Fire Engineer

Simon is a Senior Fire Engineer at Elementa registered with the Engineering Council and a Member of the Institution of Fire Engineers (MiFireE) with a wealth of experience on a variety of high-rise residential developments for major housing clients across London and the South East. He is the lead author of fire strategies and responsible for all stages of the fire engineering design from the initial client contact through the tendering phase, across construction and the ongoing management and maintenance of fire safety systems and passive fire protection.

1.4 Policy D12 Fire Safety Statement

In the interests of fire safety, the proposed design aims to satisfy the recommendations of Policy D12 of the London Plan dated March 2021 as summarised below:

1.4.1 The Building's Construction Method and Products and Materials Used

Structural fire protection will be provided in accordance with Table B4 of ADB. Each floor will be designed as a compartment floor. Further information is provided in Sections 5.1 and 5.2.

All materials within the external wall construction for all blocks will be non-combustible as discussed in Section 6.2.

For the specific materials that shall be used, this will be outlined in the architect's specification at the detailed design stage.

1.4.2 Means of Escape for All Building Users and Evacuation Strategy

The residential apartments and ancillary accommodations will evacuate independently of one another. The residential apartments will implement a stay-put policy, whilst the ancillary accommodations on site will adopt independent simultaneous evacuation approaches.

To assist with the evacuation of disabled occupants as recommended in the London Plan dated March 2021, one evacuation lift will be provided alongside the firefighting lift to provide a dignified escape for disabled occupants within the buildings. This is discussed further in Section 3.4.

1.4.3 Passive and Active Fire Safety Measures

The apartments will be provided with an automatic fire alarm and detection system in accordance with BS5839 Part 6.

The residential common corridors at the upper levels will be provided with a smoke ventilation system, natural or mechanical dependent on the travel distances, as discussed in Section 3.3.2.

The ancillary spaces, car park, stores, plant and bin stores will be provided with an automatic fire alarm and detection system in accordance with BS5839 Part 1.

Sprinkler coverage is provided to all the residential apartments and shall be extended to cover the ancillary accommodations. Sprinklers will also be provided to the car parks.

The apartments shall all be enclosed in fire rated construction with fire doors, as will the staircases, lifts and risers. This is discussed in detail in Section 5.2.1. The ancillary accommodation shall also be enclosed in fire rated construction and when accessed via the residential accommodation, this shall be via a protected ventilated lobby as discussed in Section 7.4.

Any penetrations through the compartment walls shall be fire stopped.

1.4.4 Access and Facilities for the Fire and Rescue Service

Where blocks exceed 18m in height they will be provided with a firefighting shaft.

A dry riser inlet will be located on the facade of all blocks and adjacent to the entrances. It will also be within 18m of the fire appliance parking location.

All parts of the floor plates will be covered within 60m when measured along a suitable route for laying a hose from a dry riser outlet or within 60m of the fire appliance parking location at the fire tender access level as discussed in Section 7.

Block C which is under 18m will be provided with a dry riser in the escape stair.

Hydrants will be provided within 90m of the dry riser inlet in accordance with ADB.

1.4.5 Site Access for the Fire and Rescue Service

Fire tender access will be provided in accordance with the ADB and LFB guidance as discussed in Section 7.



1.4.6 Future Development of the Asset and the 'Golden Thread' of Information

A Regulation 38 pack shall be submitted to the end users upon handover. This will contain all of the details of the building fire safety / protection measures. Any changes to the buildings following their construction will need to maintain the original design intent of this fire strategy and be assessed by a suitable competent person.

1.5 Tall Buildings Assessment

The height of the blocks varies, with blocks under 18m not requiring a firefighting core. Blocks over 18m in height will have a firefighting core comprising of a firefighting stair and lift, as detailed in Section 7. A dry riser will be provided in all blocks as they are under 50m in height.

One lift in each block will be designed as an evacuation lift to comply with the London Plan as detailed in Section 1.4 and Section 3.4.

Restrictions on materials used in the construction of the building façades are as noted in Section 6.2.

Due to the provisions as detailed in this strategy, the design will ensure the safety of all occupants in accordance with London Plan Policy D9 and the Local Plan Part 2 Policy DMHB10.

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 Ministry of Housing, Communities and Local Government's (MHCLG) 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 2010 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.

2.3 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.



2.4 Construction, Design and Management Regulations

Projects undertaken in the UK are subject to the requirements of the Construction (Design and Management) Regulations 2015 (CDM) or within the European Union, that particular country's interpretation of the European Union Directive.

This report defines the strategy for meeting the functional and performance requirements for fire safety in the finished building. It is intended to form part of the submission for approval under the Building Regulations, Part B (Fire safety). Where any conclusions or recommendations contained within this report specify particular materials, products or forms of construction these will have been assessed, in accordance with CDM Regulations 11 and 18 (duties for designers).

In the event that these involve significant residual risks or health and safety critical assumptions, this information will be made available to the CDM Coordinator. Where the architect or other consultants use all or part of this report to specify works, they are understood to be competent in alerting the Client, CDM Coordinator, Designers, Contractors and Building Occupier of issues arising under the CDM Regulations.

2.5 Statutory Consultation

During the Building Regulations application process, the building control body is required to formally consult with the local fire authority. The purpose of this consultation is to give to fire authority the opportunity to make observations with respect to the Building Regulations and to provide an opportunity to make the applicant aware of action that may have to be taken to meet the requirements of the Fire Safety Order.

The consultation should allow both parties to reach mutually compatible views on whether the building meets the requirements of both pieces of legislation. In the exceptional event that the fire authority propose to require physical changes to the building to meet the requirements of the Fire Safety Order, the building control body should make the applicant aware.

2.6 The London Plan

The London Plan is the statutory Spatial Development Strategy for Greater London prepared by the Mayor of London ("the Mayor") in accordance with the Greater London Authority Act 1999 (as amended) ("the GLA Act") and associated regulations.

The London Plan was published by the Mayor in March 2021. It forms the statutory spatial development strategy for Central London. This report addresses the recommendations in Policy D5 (Inclusive Design) and Policy D12 (Fire Safety) and includes a policy D12 statement in Section 1. 4. Policy D9 has also been assessed in Section 1.5.

2.7 London Borough of Hillingdon Local Plan

The Local Plan Part 2 (LPP2) details requirements for high buildings and structures in Policy DMHB10. This strategy sets out the requirements for the building and it will therefore comply with this policy, which requires the design to 'demonstrate consideration of public safety requirements as part of the overall design, including the provision of evacuation routes.'

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 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 to 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.

Ancillary accommodation such as bike storage, car park, refuse stores and plant facilities will be considered completely independent of the residential elements. It is proposed that these areas adopt an independent simultaneous evacuation approach. Evacuation of these units will not cause evacuation of other areas.

3.2 Travel Distances

The travel distances for the buildings should follow the recommendations of ADB, which is detailed in the table below.

Purpose Group	Area	Travel within	Maximum travel distance (m)	
			In one direction	More than one direction
1(a)	Apartment	Within apartment / hallway	9m	N/A
	Common Area	Within common corridor	7.5m	30m
7(a)	Plant	Escape within room	9m	35m
	Bike store, refuse and storage	Escape within room	25m	45m
7(b)	Car park	Escape within Car Park	25m	45m

Table 2 – Travel distance requirements



3.3 Escape within Residential Accommodations

3.3.1 Escape within Apartments

Whilst the apartment layouts are not part of the outline proposals, as the design develops at the next stage the following should be taken into consideration.

Apartments which are provided with protected entrance hallways should have a maximum travel distance of 9m within the hallway. The protected entrance hallway will be provided as a 30-minute enclosure with FD20 fire doors.

Where an apartment has an open living area and a bedroom provided as an inner room, these are classed as open plan apartments. If these are to be included as the design progresses the following guidance should be followed. Since ADB does not provide specific guidance on the design of open plan apartments, supplementary guidance can be taken from BS9991, which states that they 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.
- The kitchen should be enclosed in open-plan flats having an area exceeding 8m x 4m. Cooking appliances in open-plan flats having an area smaller than 8m x 4m should not be adjacent to the entrance of the flat.
- In addition to the above, the open plan apartments should be provided with an LD1 fire alarm and detection system in accordance with BS5839 Part 6 as well as a sprinkler system in accordance with BS9251.

It should be noted that in the studio and open plan apartments, occupants should not have to make their escape past a kitchen, therefore the kitchen shall be placed in a location remote from the means of escape route from the apartment. Where this is not possible an assessment will be made on the escape route and the proximity to the kitchen. This is to be developed at the next stage of design, however the minimum distance between the hob and the escape route should be 1.8m, with a minimum width of 750mm for the escape route.

3.3.2 Escape within houses

Within both the indicative Phase 1B and Phase 2 there are some houses which are accessed directly from outside. These will be a maximum of 2 storeys and will be provided with an internal protected stair which leads directly to outside.

3.3.3 Escape within Common Corridors

When the travel distances within the common corridor are up to 7.5m in a single direction of escape, the common corridor will be provided with automatic smoke venting to assist means of escape.

Where the travel distance exceeds 7.5m in length, a 0.6m² mechanical smoke ventilation system (MSVS) must be provided. 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 located within 7.5m of the dead end of the corridor.

Replacement air will be provided to the shaft via the 1.0m² AOV at the head of the stair. Where inlet air is required from the staircase AOV, the staircase doors need to open into the common area on these floors to provide the replacement air, which shall also protect the staircase from smoke ingress. At the later stages of design, a Computational Fluid Dynamics (CFD) assessment will be required to validate the smoke venting strategy for all the blocks.

3.3.3.1 Phase 1B

This commentary is on the basis of the illustrative masterplan to show the how the Outline Area can comply with policy and standards, but the specific layouts will be subject to the detailed design that



comes forward as part of future Reserved Matters Applications and will be informed by these guiding principles.

Within Phase 1B, the common corridor travel distances in each block are under 7.5m from the apartment door to the stair door.

Therefore, the smoke venting can be provided by one of the following:

- Natural smoke shaft (1.5m² in size). The smoke shaft will need to rise at least 2.5m above the ceiling of the top storey it serves and at roof level the natural smoke shaft will need to rise at least 0.5m above any surrounding structures within 2m.
- Natural AOV windows (1.5m²) in size. Some cores do not have external windows in the corridor so this method would not be applicable in these instances.
- Mechanical smoke shaft (0.6m²) in size, as previously discussed.

As the design develops, if the travel distances are increased to greater than 7.5m, mechanical venting will be required.

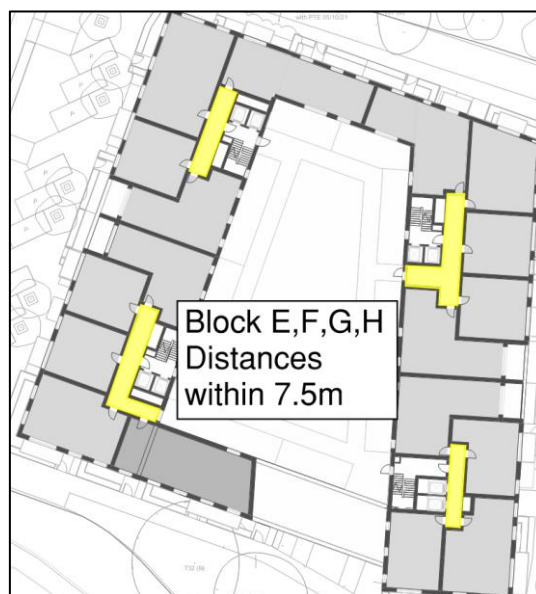


Figure 2 - Phase 1B indicative travel distances

3.3.3.2 Phase 2

This commentary is on the basis of the illustrative masterplan to show the how the Outline Area can comply with policy and standards, but the specific layouts will be subject to the detailed design that comes forward as part of future Reserved Matters Applications and will be informed by these guiding principles.

On the upper levels of Phase 2 there are three blocks, B, C and D.

Block B and D have travel distances within 7.5m from the apartment door to the stair door.

Therefore, the smoke venting can be provided by one of the following:

- Natural smoke shaft (1.5m² in size). The smoke shaft will need to rise at least 2.5m above the ceiling of the top storey it serves and at roof level the natural smoke shaft will need to rise at least 0.5m above any surrounding structures within 2m.
- Natural AOV windows (1.5m²) in size. Some cores do not have external windows in the corridor so this method would not be applicable in these instances.
- Mechanical smoke shaft (0.6m²) in size, as previously discussed.

Block C is identical to the building in Phase 1. The travel distances within this core exceed 7.5m and therefore mechanical smoke venting will be required.

A shaft 0.6m² in size will be required at the end of the corridor which exceeds 7.5m. If both dead ends are greater than 7.5m in length, a smoke shaft will be required at both ends.

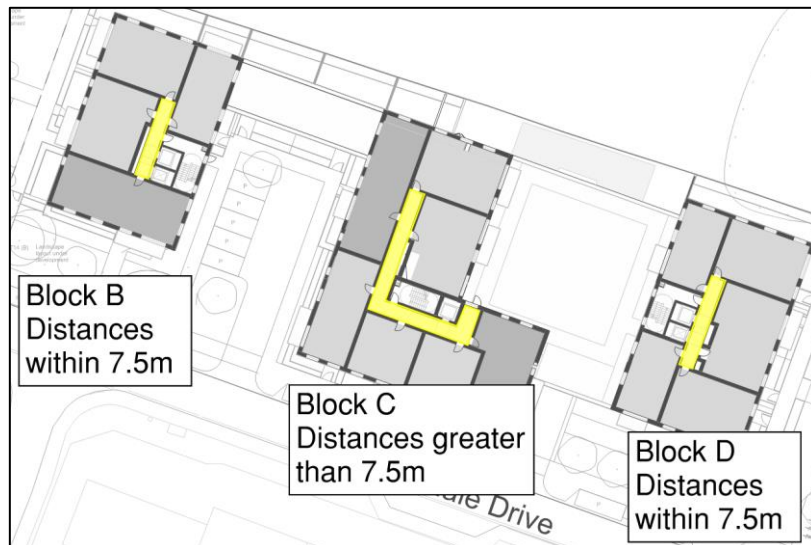


Figure 3 – Phase 2 indicative travel distances

3.3.4 Vertical Escape

Where cores serving apartments exceed 18m in height they will be provided as firefighting shafts. This is applicable to Block B, D, E, F, G and H on the basis of the illustrative masterplan. The firefighting staircase should be at least 1100mm wide. (assuming the handrails do not protrude more than 100mm into the stair). The storey exits leading into the staircase at each level are required to have a minimum clear width of 850mm. The final exits doors at ground level should technically have a minimum clear width at least as wide as the associated staircase, i.e. 1100mm, however as the only occupants using the exit should be those in the apartment of fire origin it should be possible to reduce the residential final exit widths down to a clear opening of 850mm.

Due to the fact that these staircases shall be designed for firefighting, no service risers should be accessed from the staircase, or the exit from the staircase at ground floor level.

Block C is under 18m in height and shall not be designed for firefighting, and therefore the minimum width (measured between the walls and / or balustrade) should be not less than 750mm.

3.3.5 Final Exit Route

Approved Document B requires that any discharge paths from the staircase must be along a protected route with any access into adjacent accommodation being by way of a protected lobby. Cupboards and stores should not be directly accessed from the entrance lobby.

Within all blocks, the staircase will be provided with a protected route directly to outside with the access to the ancillary accommodation (e.g. the car park, bike store) via a lobby that shall be provided with 0.4m² permanent ventilation.

3.3.6 Ancillary Accommodation

Travel distances in the plant rooms should be limited to 9m where escape is in a single direction and 35m where escape is possible in more than one direction unless they are places of special fire hazard, in which case the travel distances where there are more than one direction of escape should be limited to 18m.

Travel distances within the cycle stores, refuse stores and car parks should be limited to 25m where escape is in a single direction or 45m where there are two directions of escape.

Ancillary rooms do not tend to have many occupants at any one time due to their use therefore ADB recommends 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.

Occupants on the podiums will have multiple exits available, and escape will be in open air, therefore there is no limit on the travel distances.

If any roof terraces are provided which have only one exit, these will be limited to 60 occupants. As occupants on these terraces will be in open air, there is no limit to the travel distances.

3.4 Disabled Evacuation

The residential accommodations on the upper levels do not require disabled refuges to be provided. In the event of an occupant escaping their apartment, the staircase will be the place of relative safety within which someone can wait for assistance to escape should they require it.

Policy D5 Inclusive design of the London Plan outlines that emergency carry down or carry up mechanical devices or similar interventions that rely on manual handling are not considered to be appropriate, for reasons of user dignity and independence. It suggests that the installation of lifts which can be used for evacuation purposes (accompanied by a management plan) provide a dignified and more independent solution.

Furthermore, Policy D12 Fire Safety recommends that in all developments where lifts are installed, Policy D5 Inclusive design requires as a minimum at least one lift per core (or more, subject to capacity assessments) to be a suitably sized fire evacuation lift suitable to be used to evacuate people who require level access from the building

However, a fully compliant evacuation lift will require a full team of staff to operate, which is impractical for a residential scheme where there may not be sufficient permanent staff at all times. Therefore, it is considered reasonable to provide an evacuation lift in each core, in addition to the firefighting lift where this is provided, that has dual power supply and allows a disabled occupant to descend to ground floor under fire service control should they see fit to utilise the lift for evacuation. This lift will be a minimum 1100mm x 1400mm in size.

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.

3.5 Fire Alarm & Detection System

3.5.1 Residential Accommodation

Apartments with protected entrance halls should be provided with a minimum LD2 automatic fire detection and alarm system with a minimum grade D power supply, designed, installed and maintained in accordance with BS5839 Part 6.

Open plan and studio 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.

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.

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



A smoke detection system should be provided in the common corridors on each floor to BS5839 Part 1 and to an L5 standard. The sole purpose of the detection system is to activate the smoke ventilation system. No sounders will be provided in the common corridor areas. A sounder will be provided on the podium amenity and rooftop amenity spaces to alert occupants of smoke detection within the common corridor at that level.

3.5.2 Ancillary Accommodation

The fire alarm and smoke detection within the ancillary spaces, stores, plant and bin stores should be designed in accordance with BS5839 Part 1 and be of type M/L3.

This will also apply to the podium car parks.

3.6 Emergency lighting

Emergency lighting as backup lighting should meet the recommendations of BS5266 Parts 1 and 7.

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

3.7 Signage

Escape signage should follow the recommendations of BS5499. Further detail will be provided during the design development.

Wayfinding signage will also be required for the fire service and will be detailed as the design develops.

3.8 Manual Fire Fighting Equipment / Fire Extinguishers

Manual firefighting equipment will not be installed within the common parts of the residential accommodation.

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 less than: • 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 and commercial units	B-s3,d2
Note: * The European classifications are described in BS EN 13501-1.	

Table 3 – 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 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;

- a) 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;
- b) If the building is sub-divided by elements of fire-resisting construction into compartments;
- c) If any openings in fire-separating elements are suitably protected in order to maintain the integrity of the element; and
- d) 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 ADB 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 minimum level of structural fire resistance required for each block is defined in the following table. Where cores share elements of structure depending on the structural design, the fire resistance should be the more onerous of the two.



Block	Number of Storeys	Max Height (m)	Structural Fire Resistance
E	Ground + 9	27m	90 minutes
F	Ground + 4	16m	60 minutes
G	Ground + 7	21m	90 minutes
H	Ground + 7	21m	90 minutes
B	Ground + 6	18m	90 minutes
C	Ground + 4	16m	60 minutes
D	Ground + 6	18m	90 minutes

Table 4 – Structural fire resistance

Note – heights are approximate at this stage of design and based on the illustrative masterplan and will need to be confirmed as the design develops. Should the height of any block exceed 30m, the structural fire resistance should be 120-minutes.

Where elements of structure support a building above 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 apartments should have 60-minute fire resistant compartment walls with FD30S self-closing front doors. Where an internal corridor is provided it should be 30-minutes fire resisting with FD20 doors.

All floors should be compartment floors with a fire resistance equal to the structure.

Firefighting cores should be enclosed in 120 minutes fire resistance with FD60S self-closing doors. The firefighting lift shaft should have a fire resistance of 120 minutes with FD60 landing doors. Non-firefighting lift shafts and risers should have fire ratings equal to the structure with FD60 doors.

The final exit route from the stair to outside should be the same fire rating as the stair. Any risers accessed from this route will need to be provided with the same fire resistance as the stair, with FD60S doors with the services fire stopped in line with the slab.

The houses on site which are accessed directly from outside should be provided with an internal stair which is 30-minutes fire resistant construction.

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 Ancillary Accommodation

Plant and refuse stores should achieve 30 minutes fire resistance with FD30 doors. If the plant rooms and refuse stores are accessed from the staircase lobby, this should be via a protected lobby that is ventilated via a 0.4m² passive vent connected directly to outside. If the refuse stores are accessed from



any accommodation, it should be provided with a 0.2m² permanent ventilation regardless. This ventilation requirement also applies to the lobbies separating the car parks from final exit routes.

Cleaner cupboards, stores and utility rooms should be enclosed in 30 minutes fire resistance with FD30 doors as a minimum, or 60-minutes where they are accessed from the common corridors.. If these rooms are accessed from the staircase lobby, this should be via a protected lobby that is ventilated via a 0.4m² passive vent connected directly to outside.

Any rooms that contain life safety equipment should be enclosed in 120 minutes fire resisting construction in accordance with BS8519. Any electrical sub-stations 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 ADB.

5.4 Cavity barriers

Cavity barriers should be provided as per the guidance in ADB.

5.5 Sprinklers

5.5.1 Residential Accommodation

Sprinklers will be provided to all residential accommodation as per the May 2020 amendment to ADB, which requires sprinklers for all residential apartments over 11m in height. This system will be in line with BS9251 (2021), category 4 system as it will serve apartments over 18m in height.

5.5.2 Ancillary Accommodation

Where ancillary accommodation is within the area limits of Table 4 of BS9251 it will be served by the residential sprinkler system. If there are spaces greater than this, it will need to be taken from the commercial BS EN 12845 system.

5.5.3 Car Park

The car parks, where they sit under the residential accommodation will be provided with sprinkler protection in accordance with BS EN 12845, Category OH2.

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:

- a) *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.*
- b) *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.

Looking at the worst-case scenario for the residential accommodation, the largest apartment elevation is 18m long x 3m high, therefore considering that the apartments shall be provided with an automatic sprinkler system (as discussed in Section 5.5) which allows for the boundary distances can be halved, the required boundary distance is 2.0m. Since all of the residential apartments are more than this distance from the boundary, there are no limits to the amount 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.

Where blocks are over 18m in height all of the materials which become part of an external wall, should achieve European Classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009. 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 classification of B-s3,d0.

Blocks which are under 18m in height and are further than 1m from the relevant boundary have no restrictions on the external wall materials when referring to ADB.



However, it is advised that these blocks are considered the same way as blocks over 18m for consistency, and that the external wall is of A2-s1,d0 classification. This will also ensure the block under 18m complies with the relevant part of the Fire Safety Act 2021.

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 all blocks should be designed in accordance with Table 12.1 of ADB as shown in Figure 4 below.

Table 12.1 Limitations on roof coverings				
Designation ⁽¹⁾ of covering of roof or part of roof	Distance from any point on relevant boundary			
	Less than 6m	At least 6m	At least 12m	At least 20m
B _{ROOF} (t4)	●	●	●	●
C _{ROOF} (t4)	○	●	●	●
D _{ROOF} (t4)	○	● ⁽²⁾⁽³⁾	● ⁽²⁾	●
E _{ROOF} (t4)	○	● ⁽²⁾⁽³⁾	● ⁽²⁾	● ⁽²⁾
F _{ROOF} (t4)	○	○	○	● ⁽²⁾⁽³⁾

● Acceptable.
 ○ Not acceptable.

NOTES:

Separation distances do not apply to the boundary between roofs of a pair of semi-detached dwellinghouses and to enclosed/covered walkways. However, see Diagram 5.2 if the roof passes over the top of a compartment wall.

Polycarbonate and uPVC rooflights that achieve a class C-s3, d2 rating by test may be regarded as having a B_{ROOF}(t4) designation.

1. The designation of external roof surfaces is explained in Appendix B.

2. Not acceptable on any of the following buildings.

- Dwellinghouses in terraces of three or more dwellinghouses.
- Any other buildings with a cubic capacity of more than 1500m³.

3. Acceptable on buildings not listed in (1) if both of the following apply.

- Part of the roof has a maximum area of 3m² and is a minimum of 1500mm from any similar part.
- The roof between the parts is covered with a material rated class A2-s3, d2 or better.

Figure 4 - Limitations on Roof Coverings

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. 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 5 – Vehicle Access Requirements

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.

The general block layout shows adequate fire service access to within 18m of all cores, predominately along Avondale Drive and Abbottswood Way. A road will go round the blocks in Phase 1B providing access, which will conform to the requirements in Table 6.

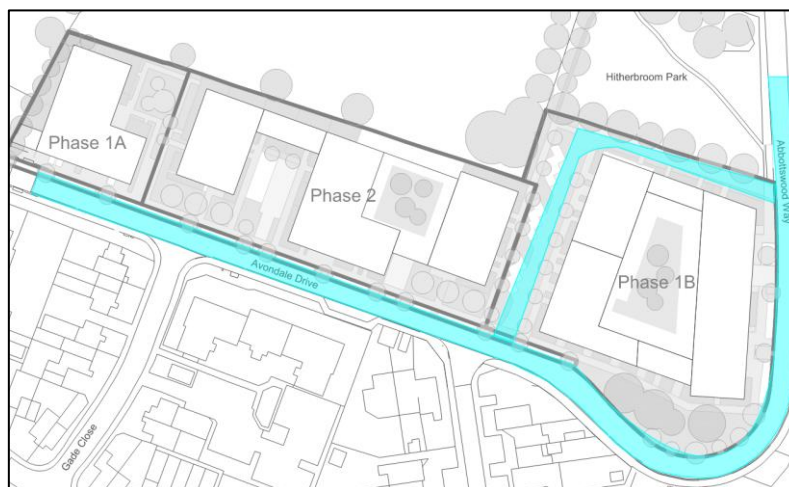


Figure 5 – Vehicular access routes

Road access should be ensured when the landscaping designs are developed at the detailed design stage.



7.2 Internal Fire Service Access

All blocks which contain a top floor in excess of 18m from the access level shall be provided with a firefighting shaft. In this case, the firefighting shaft should serve every upper floor level and be designed in accordance with ADB 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 Fire Fighting 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.

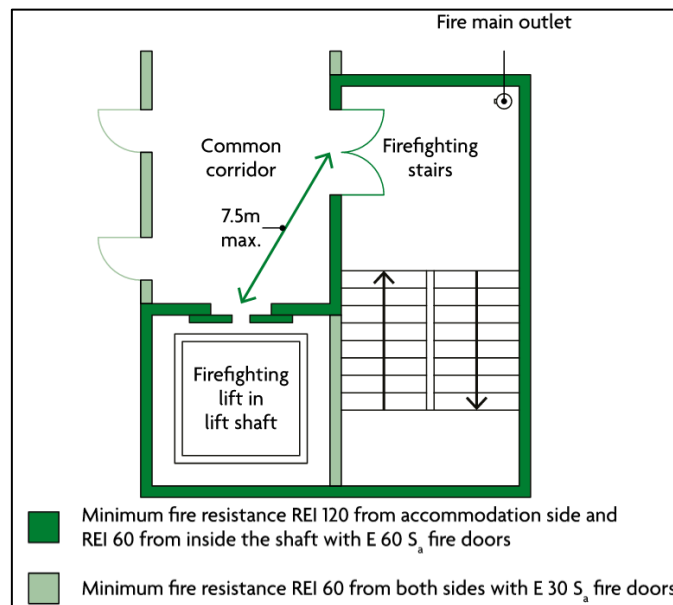


Figure 6 – Internal firefighting shaft

At the access level, the firefighting lift should be accessible from the firefighting shaft – i.e., firefighters should not have to enter a residential common corridor to use the lift.

The firefighting stair will be provided with a level of lighting recommended in BS5266 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.

7.3 Dry Riser

A dry riser will be provided in all blocks. All dry riser inlets should ideally be adjacent to the building entrances and be visible from the fire appliance (plus accessible 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 the dry riser outlets provided within firefighting staircases, and within 45m of the dry riser outlet in Block C and F which is not a firefighting shaft.

7.4 Smoke Venting

7.4.1 Residential Accommodation

The smoke venting requirements for the residential areas are discussed in detail as part of the common areas means of escape section (Section 3). No further provisions beyond this are needed for firefighting.

7.4.2 Ancillary Accommodation

All ancillary accommodation accessed from the stair lobbies should be accessed via a protected lobby that is ventilated via a 0.4m² natural ventilation duct connected directly to outside.

7.4.3 Car Park

There is a car park within both Phase 1B and Phase 2, which sits under the podium in each phase. Both car parks require venting which can be provided by natural or mechanical means.

Where natural venting is proposed, the openings will need to be sized to achieve at least 2.5% of the total area. The free area needs to be split so at least half is provided on two opposing facades, therefore opposing faces need to achieve a minimum of 0.625% of the area of the car park.

Where mechanical smoke venting is proposed, it will achieve an air change rate of 10 air changes per hour.

7.5 Hydrants

ADB recommends that hydrants should be provided as necessary to ensure that the dry riser inlet is within 90m of a fire hydrant. Where the existing hydrants cannot achieve this, then a private hydrant should be provided.

It is proposed that a site survey confirms whether the above criteria is achieved based on any existing hydrant provisions. If this survey establishes that the existing hydrants are inadequate it is recommended that an additional private hydrant is included on the site.

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.

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.



8 Conclusions and Recommendations

This report outlines the fire safety strategy for the Avondale Drive Outline Proposals and seeks to demonstrate compliance with the Building Regulations (generally in the form of the recommendations of Approved Document B).

The designs of the residential cores, such as travel distances etc., based on the illustrative masterplan are generally compliant within the common areas in accordance with ADB. Where travel distances are greater than 7.5m a mechanical smoke system will be installed and developed and 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.

Elements of structure will achieve varying levels of fire resistance dependent on the height of each block.

All blocks over 18m in height will be provided with a firefighting shaft. The shaft will incorporate a firefighting stair, smoke clearance and a dry main. Block C and F which are under 18m will incorporate a dry riser in the escape stair.

Based upon the above proposals it is considered that adequate measures are provided to meet the functional requirements of the Building Regulations, as well as the London Plan Policies D5, D9, D12 and the LPP2 Policy DMHB10.

