

Fire Strategy Report (RIBA Stage 03)

St Ann's New Neighbourhood Phase 1b & 2

Block E-J

01/12/23

AFF_20708_02_St Ann's Block E-J_FSR_02

Scope and Report Structure

This report has been prepared to set out the method by which Fire Safety objectives are to be met for St Ann's New Neighbourhood Block E-J, London. To this end this report intends to clearly set out the following:

- The fire safety objectives.
- The performance criteria against which the detailed design shall be progressed.

Demonstration that these performance criteria, where adopted into the design, shall achieve the fire safety objectives.

So as to robustly demonstrate that the building has been considered holistically, and based upon sound fire engineering principles, this report is structured to adopt the design process as recommended by **BS 7974** and will inherently address the Qualitative Design Review (QDR) process. Adoption of standard design guidance such as Approved Document B shall be presented as an assessment method within this process, and clear assessment will be made as to whether adoption of this guidance is suitable.

To this end this report is structured as indicated in the following figure:

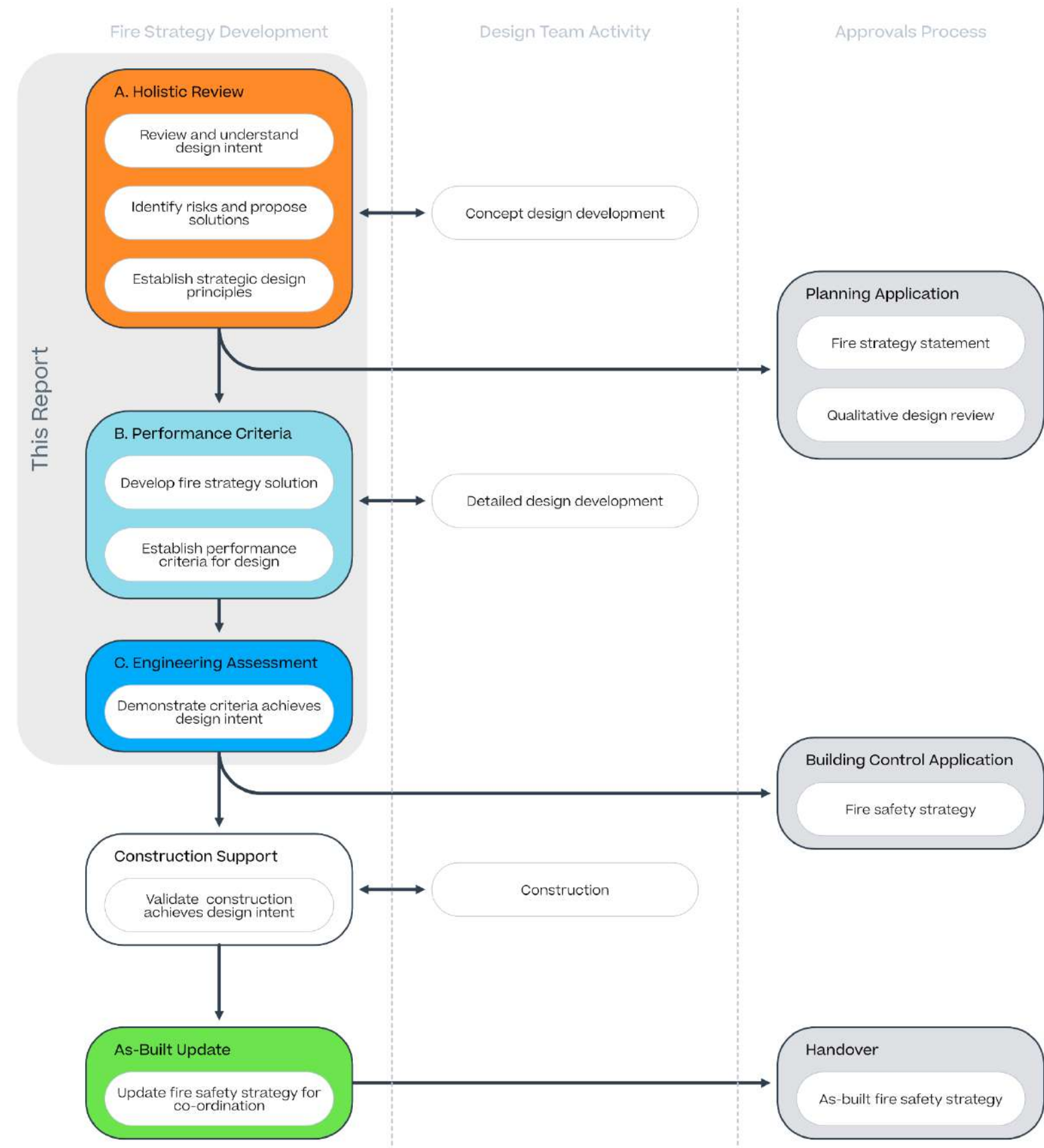


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Section A.

Holistic Review

A.1 Introduction

This report has been developed to address Condition 68 of the Hybrid consent whereby each reserved matter(s) application for layout, scale and appearance shall be accompanied by a detailed fire statement in order to meet Gateway One or equivalent. The development shall thereafter proceed in accordance with recommendations and mitigation measures recommended in the statement. This is to ensure that the development incorporates the necessary fire safety measures in accordance with the Mayor’s London Plan Policy D12.

St Ann’s New Neighbourhood comprises residential development split into several phases.

- Phase 1b consists of 194 units across the Blocks E, F and G.
- Phase 2 consists of 270 units across the Blocks H and J.

Block E will be townhouses.

Figure 1 outlines Phase 1b and Phase 2 as well as highlights Block E-J.

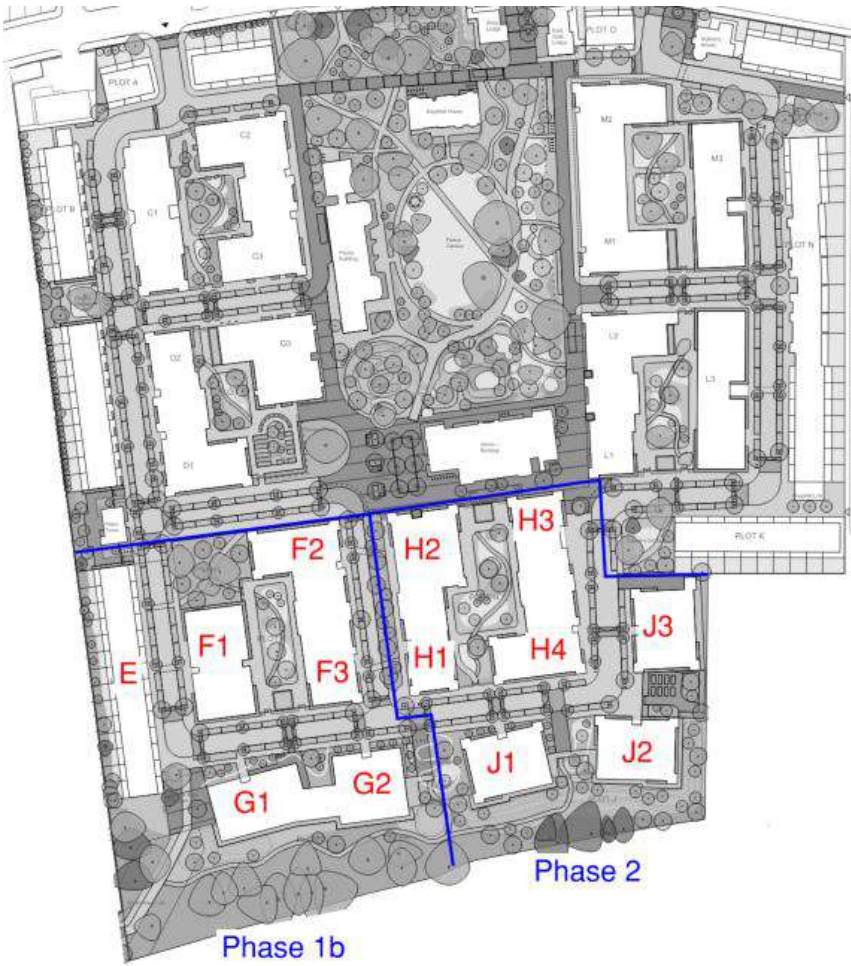


Figure 1: Site Plan (proposed landscape)

A.2 Objectives

A.2.1 Relevant Stakeholders

This Fire Strategy Statement has been developed collaboratively with the relevant stakeholders as identified below:

Name	Role	Organisation
David Wakeford	Project Manager	Peabody
Ross Williams	Regional Head of Development	Hill Residential Limited
Frazer Collet	Development Manager	Hill Residential Limited



Name	Role	Organisation
Jag Bains	Technical Manager	Hill Partnership Limited
James Cook	Structural Engineer	Price & Myers
James Watson	M&E Engineer	AWA Consultants
Suzanne Prest	Architect	Karakusevic Carson Architects
Maurizio Biadene.	Architect	Karakusevic Carson Architects
Maximilian Dangelmaier	Fire Engineer	Affinity Fire Engineering (UK)

A.2.2 Stakeholder Requirements

The stakeholder requirements have been identified for this project:

Class	Requirement
Statutory Requirements	Fire Safety (England) Regulations 2022
	The Building Regulations 2010 – Schedule B1-B5 & Regulation 7
	Regulatory Reform (Fire Safety) Order 2005
	The Town and Country (Local Planning) (England) Regulations 2012
	The London Plan (2021)
Client Requirements	Peabody have set out their own requirements in this document to further enhance the fire safety standards in line with their own policies.

A.3 Architectural Review

A.3.1 Overview

St Ann’s New Neighbourhood consists of several new builds. Blocks E-J are part of this report.

Block	Storeys
E	3 storey townhouses
F1	6 storeys
F2	6 storeys
F3	6 storeys
G1	6 storeys
G2	9 storeys
H1	6 storeys
H2	9 storeys
H3	7 storeys
H4	7 storeys
J1	9 storeys
J2	8 storeys
J3	7 storeys

A.3.2 Acknowledgement of Recent DLUHC Long-term Plan for Housing

Following the recent setting by DLUHC of their long-term plan for housing, we wish to draw attention to the statement made regarding the number of stairs which confirms the intention to mandate second staircases in new residential buildings above 18m. We acknowledge that Blocks G2, H2-4, J1-3 are provided with a single stair core despite being above 18m in height. We wish however, to highlight that this is a new regulation (published 24 July 2023) and that the major building elements for Blocks G2, H2-4 and J1-3 were prepared before this regulation was introduced.

The statement appears to clearly indicate that these changes are going to take the form of regulatory change rather than change to the guidance of Approved Documents B1 and



B2. We wish to highlight that should these changes be made as regulatory changes that (as for Regulation 7), no variation or fire engineered assessment could be made to demonstrate that the functional requirements of the Building Regulations B1-B5 are being met another way, nor would there be any opportunity to apply any reasonable interpretations. Should this be the case, the progress of this project may depend upon the transitional arrangements mentioned in the statement as there is currently no clarity on what this might mean.

We would welcome any further discussion on this item and would welcome a workshop to discuss the status of this project.

A.3.3 Building Location and Access

The buildings are located in Haringey, northern London. The site can be accessed via the public road 'St. Ann's Road'.

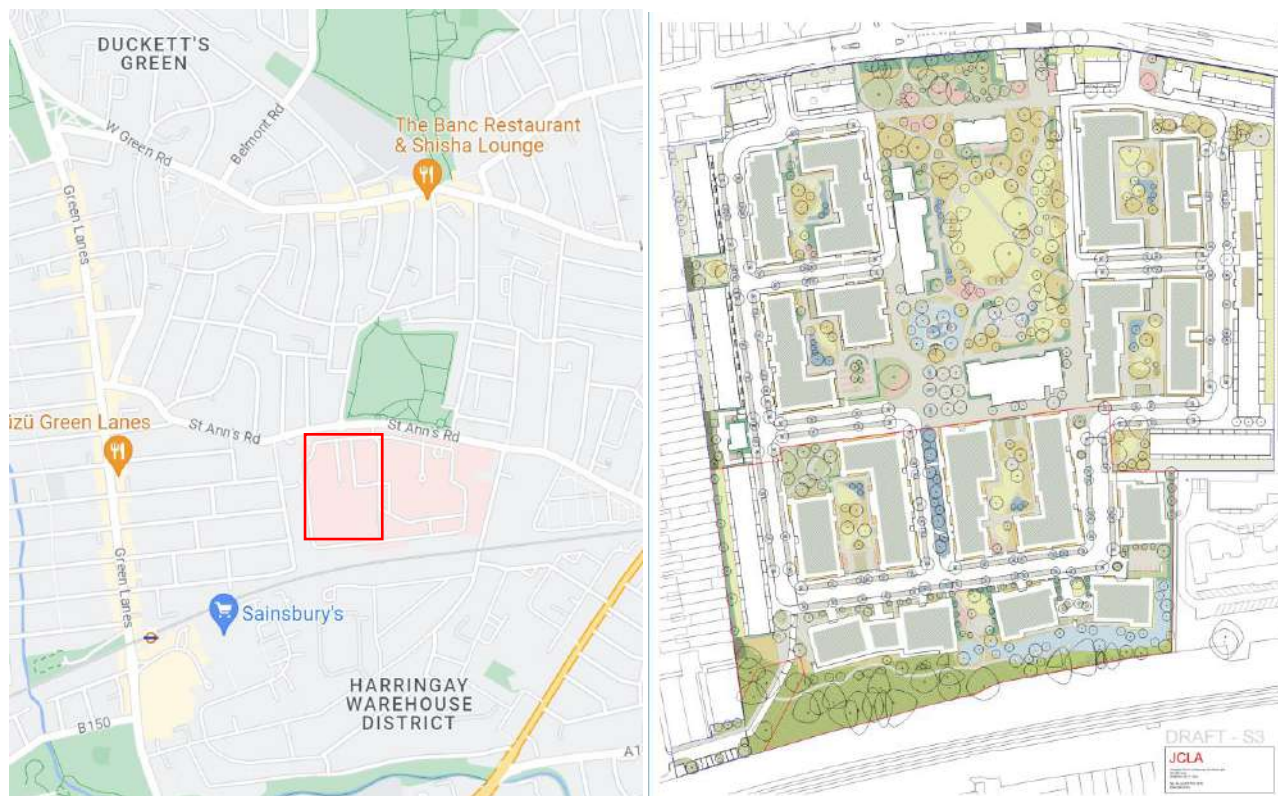


Figure 2: Excerpt from Google Maps and Site Plan

All buildings are accessible via public roads.

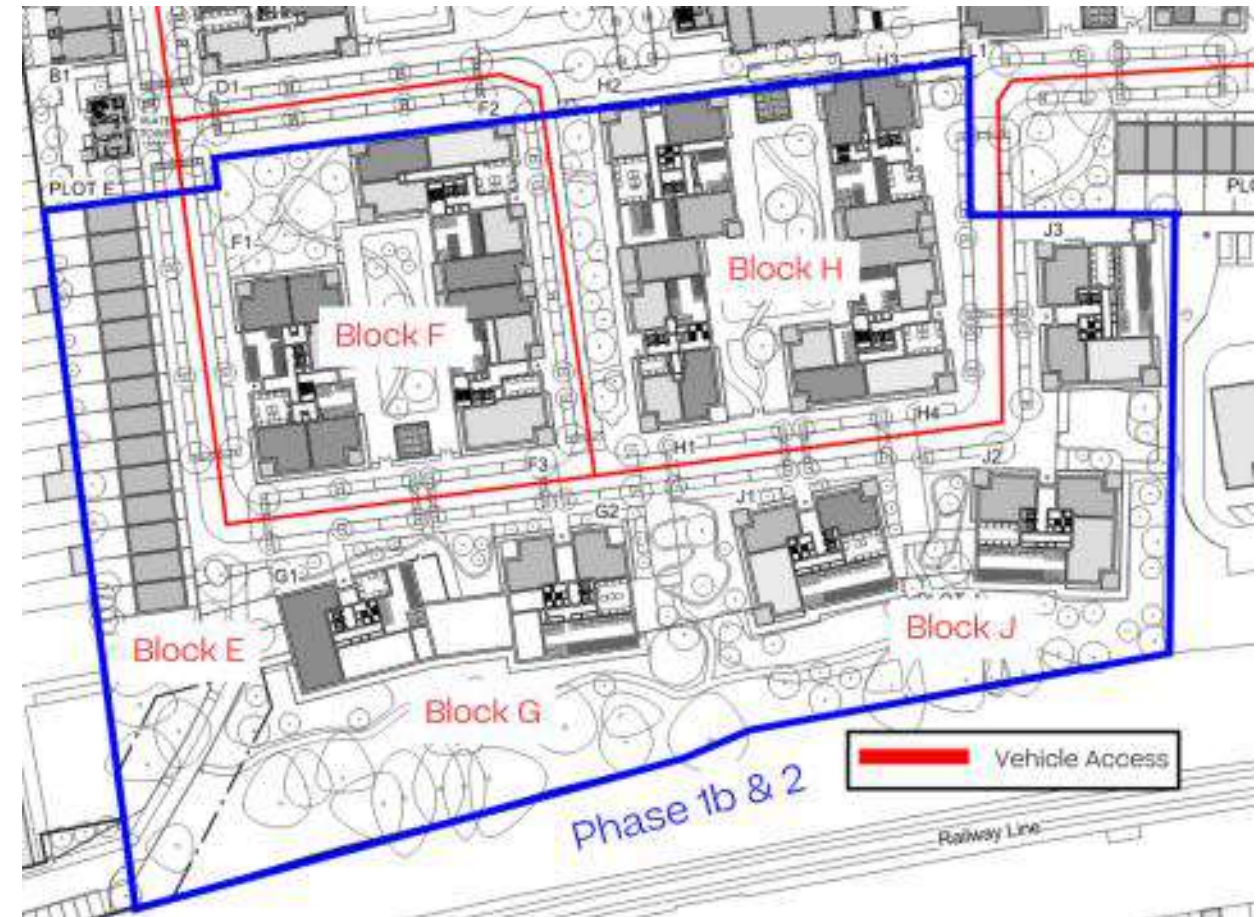


Figure 3: Site Accessibility

A.3.4 Site Boundary and Notional Boundaries

It is assumed that all buildings are located on the same site. Therefore, the boundaries between each block constitutes a notional boundary.

The site boundaries are relevant boundaries and are highlighted in red in Figure 4 below.

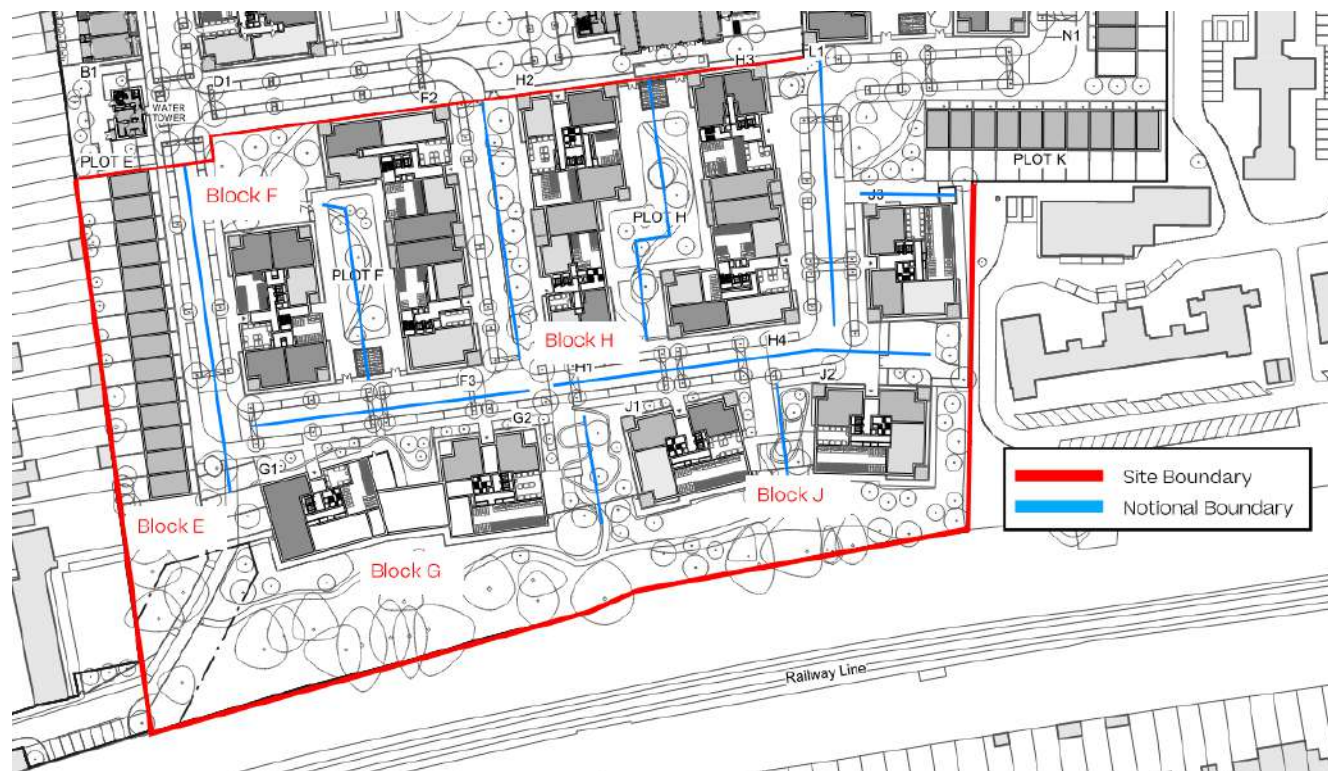


Figure 4: Site Boundaries

A.3.5 Major Building Elements and Usage

The usage of the buildings is mainly residential. The following block comprises a commercial unit (retail/café) on ground floor level:

- G1

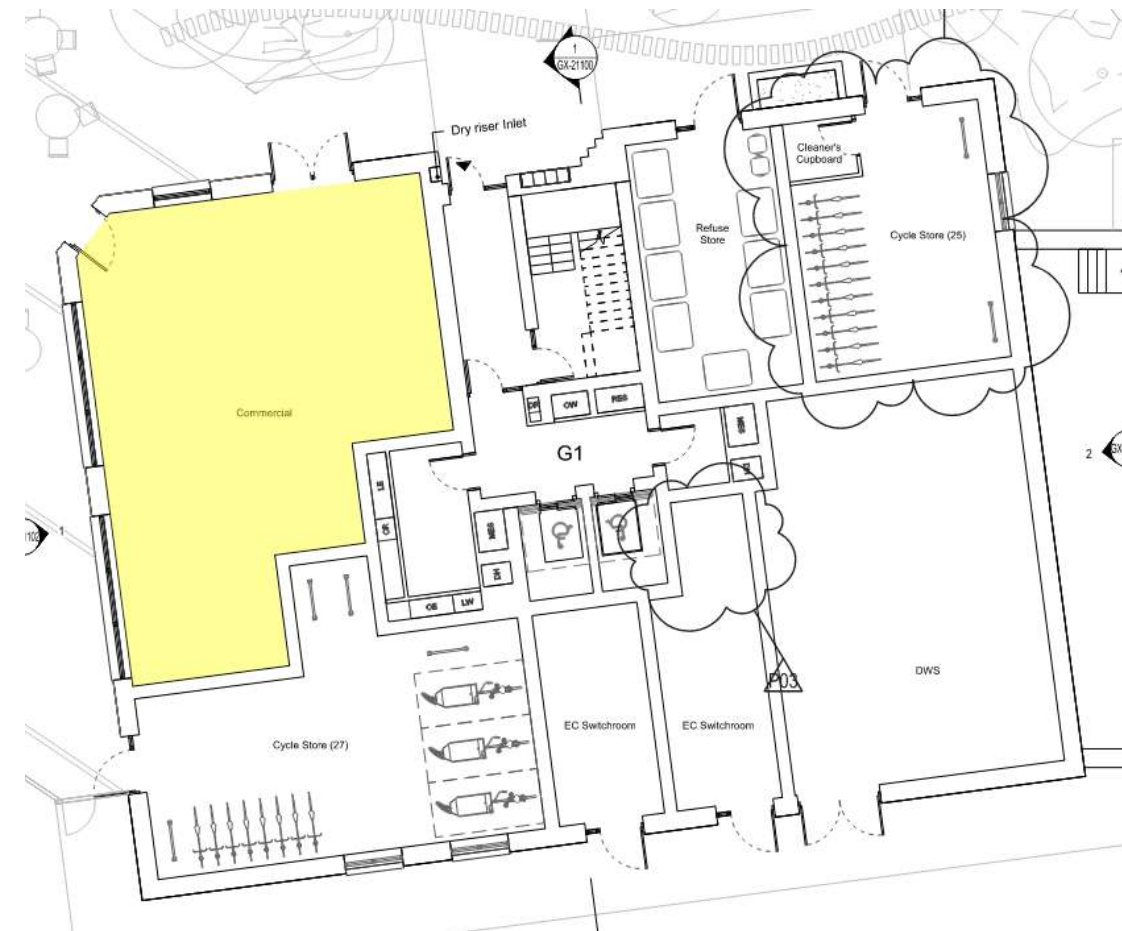


Figure 5: Commercial Unit | 99.3m²

All other blocks with the exception of Block E are provided with the following ancillaries:

- Cycle Rooms.
- Refuse Stores.

Block G1 is provided with additional ancillary:

- 2 Switchrooms
- DWS

Block G2 is provided with additional ancillary:

- Life Safety Generator (LSG)
- LSG Switchroom

The following one storey rooms are flanked by G1 and G2:

- Double Substation
- Energy Centre

A.3.6 Building Heights

The building height is assessed against the following definitions:

- 1. **Height of the building** which is measured from mean ground level to mean roof level.
- 2. **Firefighting access height**, which is measured from firefighting access level to the height of the topmost storey.
- 3. **The height of the topmost storey** which is the height measured from the lowest ground level adjacent to the building to the finished floor level of the topmost habitable storey.

The following blocks will have a height of the topmost storey of <11m:

- Block E

The following blocks will have a height of the topmost storey of >11m and <18m:

- Block F1-F3
- Block G1
- Block H1

The following blocks will have a height of the topmost storey of >18m and <30m:

- Block G2
- Block H2-H4
- Block J1-J3

Note: The building heights have to be specified by the architect.

A.4 Construction Type and Materiality

The buildings comprise a concrete frame system structure with an external facing brick façade.

A.5 Population Assessment

This fire strategy is based upon the following worst-case population usage and is designed to reflect the worst possible case population within the building and may not reflect the normal or design population found within the building.

Building Element	Usage	Floor Area (m ²)	Floor Space Factor (m ² /person)	Population (persons)
Commercial Unit (G1)	Unknown	99.3	1.0	99

Note: The population is to be re-assessed during the fit-out of the unit.

The commercial unit is highlighted in yellow in **Figure 5**.



A.6 Specific Fire Hazards and Risk Factors

The following table identified specific considerations which would be non-standard for a building of this type.

Hazard / Risk Factor	Location / Building Element	Assessment
Fire Hazards		
Contents and Fuel Density	Commercial Unit (G1)	As noted previously this report is provided on the basis of the commercial unit being provided as shell and core only. However, it is reasonably expected that once fitted out the fuel density will be typical of a small retail or commercial unit, and hence could have significant fuel loading.
	Energy Centre (G1 & G2)	It is expected that the energy centre is provided with a higher than usual fuel load.
	Apartments	Fuel loading is generally expected to be typical of residential accommodation.
Ignition Source	Double Substation (G1 & G2)	The double substation constitutes a high risk for ignition as there are high voltage facilities and cables to be expected.
	Energy Centre (G1 & G2)	A high risk for ignition is expected within the energy centre.
	Switchrooms (G1 & G2)	A high risk for ignition is expected within the switchrooms.
	Apartments	Electrical and lighting are expected to be provided as typical for residential accommodation. Cooking facilities are expected to be present but are to be sited a reasonable distance away from escape routes. Smoking cannot be controlled with private accommodation, and this is reasonably expected.
Occupant Factors		
Occupant Characteristics	Commercial Unit (G1)	As noted previously this report is provided on the basis of the commercial unit being provided as shell and core only. However fitted out once, occupants are expected to be awake but may be unfamiliar.
	Apartments	Occupants are expected to be both awake and asleep as well as familiar with their own unit as well as the common parts of the residential building.
Mobility and Other Impairments	Commercial Unit (G1)	Occupants with impairments are to be expected, as it will be open to the public.
	Apartments	Private residencies can demonstrate extremely wide range activities and occupants which can impair the ability of occupants to respond quickly to alarm.
Management Factors		
Level of Management	All units	Onsite management is provided for the common parts of this building. This building is expected to be managed in line with the Regulatory Reform Order 2005 and Fire Safety Act.

A.7 Design Principles

A.7.1 Basis of Design

Except where otherwise noted in **Section A.7** below, the hazards presented by the configuration of this building are considered to be in line with the intended limits of application of the guidance of BS 9991 and BS 9999 under the following reasoning:

- The building is assessed as presenting a design size and configuration which is consistent with understood limits of this standard guidance.
- This building is assessed as presenting a usage type consistent with the understood limits of this standard guidance.
- The overall materiality of this building is considered consistent with the understood limits of this standard guidance, and where specific elements of construction may fall outside this guidance these may be addressed without rendering application of the overall guidance unsound
- Where elements of design require variation from this guidance, such variance can be considered within the framework of this guidance without rendering application of other parts of the guidance unsound. It shall be discussed on a case-by-case basis why this is.

On this basis the following specific trail designs are made in the context of a holistic consideration on the basis that except where otherwise noted the performance criteria shall align with the minimal guidance of BS 9991 and BS 9999.

The guidance has been applied as follows:

Guidance	Location
BS 9991	Apartments Refuse Stores Cycle Stores Common Residential Areas Ancillary Accommodation
BS 9999	Commercial Unit (G1)



A.7.2 Evacuation Strategy

Functional Objective(s)	Rationale / Commentary	Statutory Objective(s)
Block F-J are to be configured to facilitate adoption of a ‘stay put’ evacuation strategy. Means of egress and alarm and detection are to be afforded sufficient to facilitate ‘stay put’ strategy for all residencies. Commercial unit (G1) and Block E are to facilitate a ‘simultaneous’ evacuation strategy.	Residencies adopt a ‘Stay Put’ evacuation strategy has been implemented with this building so as to limit the risk that occupants will ignore alarm signals if there are repeated false, or nuisance, alarm activations within the building. Whereby: - Occupants of the unit of fire origin are reasonably expected to evacuate as soon as they are aware of a fire within their premises. - Occupants of all other units are not automatically made aware of fire within another unit, and as such are afforded suitable protection against the spread of fire such that they should be able to remain within their own unit in relative safety. This is not to imply that residents should ‘stay put’ should they wish to evacuate, and suitable provisions are made to allow for occupants to safely egress from the building at any time.	Building Regulation B1 London Plan Policies B(2), B(4) and B(6), D12
Escape routes are to be sufficiently protected from the effects of fire and smoke.		Building Regulations B1, B5 London Plan Policies B(2), B(4) and B(6), D12
All occupants are to escape to a place of safety without external assistance.	When activating the evacuation lift switch or at activation of the fire detection and alarm system, the evacuation lift should ignore all calls and return to the final exit level. There it should be parked with the doors open. After this stage, it should only be operated using the lift car controls.	Building Regulations B1, B5 London Plan Policy D5
Escape routes are to be suitably located, sufficient in number and of adequate capacity. Additionally, escape routes are to be sufficiently protected from the effects of fire and smoke.	Blocks G2, H2-4, J1-3 are assessed as being between 18m and 30m in uppermost storey height and afforded a single stair core for means of egress and fire service access. Whilst this does align with the guidance of Approved Document B1, it is noted that the NFCC position statement would advise for buildings of >18m in height to be afforded a second stair for robustness. In due consideration of the following factors, it is considered that a secondary stair is not necessary to achieve an appropriate level of robustness in design: - The building is to be afforded with mechanically assisted ventilation to be demonstrated as limiting the potential ingress of smoke into the stair and lift core under firefighting activities. - The building is to be afforded with an evacuation lift to assist in the egress of occupants. This lift is to be provided with a protected lobby as noted above. - The building is to be provided with an evacuation alert system.	Building Regulations B1, B5 London Plan Policies B(2), B(4) and B(6), D12

A.7.3 Suppression

Functional Objective(s)	Rationale / Commentary	Statutory Objective(s)
Block E is not provided with a sprinkler system. Automatic suppression to be provided throughout all other blocks to the appropriate standard relative to the use.	The spread of fire and smoke is limited by the provision sprinklers. Therefore, an extended one-way travel distance may be permitted as occupants are being given more time to escape. Sprinklers may be used to reduce the structural fire resistance.	Building Regulation B1 London Plan Policies B(2), B(4) and B(6)

A.7.4 Smoke Control and Active Systems

Functional Objective(s)	Rationale / Commentary	Statutory Objective(s)
Appropriate provisions are to be made to limit the ingress of smoke to the escape routes or to restrict the spread of fire and smoke. Ventilation of heat and smoke during or after firefighting operations.	This is achieved by: - Mechanical smoke extract system with the communal corridors. - AOV at the head of each stair.	Building Regulation B1

A.7.5 Materials and Contents

Functional Objective(s)	Rationale / Commentary	Statutory Objective(s)
Prevent fire and smoke spread over internal linings; in particular in circulation spaces as they function as escape routes for occupants.		Building Regulation B2
Building materials should not contribute to fire within the building, relative to the size and configuration of the building.	The building structure will be protected against exposure to fire so that it does not contribute to the fire loading within the building.	Building Regulations B2 and B4
Common stairs are to be placed within stairwells, which themselves are fire sterile. Stair construction should be non-combustible. Stairs in Block E (within dwellings) may be combustibile with limited reaction to fire classification.		Building Regulation B2
The external envelope of a building should not contribute to undue fire spread from one part of a building to another part.	See also Section A.7.7 .	

A.7.6 Structural Resistance and Passive Systems

Functional Objective(s)	Rationale / Commentary	Statutory Objective(s)
Provide fire resistance to allow for firefighters to tackle a fire and enable occupants to leave the building if necessary.	The provision of sprinklers may reduce the level of fire resistance recommended in guidance.	Building Regulation B3
Contain the spread of fire and smoke to a single compartment.	The blocks F-J contain several compartments. The compartment of fire origin might be compromised but other compartments should stay free of smoke and fire.	Building Regulation B3
Prevent the spread of fire and smoke beyond the boundaries of the building of fire origin. See also Section A.7.7.		Building Regulation B3
Provide a safe horizontal egress route to a stair enclosure (vertical egress route) or directly into the open.		Building Regulation B3
Provide a barrier between the common corridors and the stairs as well as a place of relative safety for occupants.		Building Regulation B3
Prevent the spread of fire and smoke beyond fire rated elements.		Building Regulation B3
Provide a safe vertical egress route to a place of absolute safety and for firefighters to have a safe means in or out of the building.		Building Regulation B3

A.7.7 External Walls and Fire Spread

Functional Objective(s)	Rationale / Commentary	Statutory Objective(s)
Measures such as fire resisting walls should be provided to restrict the spread of fire between buildings.	Fire resisting external walls may not have to be provided, depending on the external fire spread assessment.	Building Regulation B4
Roof coverings need to provide adequate protection against a fire from the outside. The central part of Block G1&G2 is not elevated beyond Ground Floor, hence the ceiling above the Ground Floor forms a roof between the 2 blocks on 1 st Floor. This roof needs to achieve equal provisions as the roof on top of both blocks.	Roof coverings only describe 1 or more layers on the roof, but not the roof structure as a whole. The centre roof above Ground Floor between G1&G2 may require additional fire resistance so as to prevent fire spread to the adjacent higher elevated parts of the building.	Building Regulation B4
The spread of fire over the façade should be limited, so as to prevent fire to reach other compartments as well as providing enough time for both firefighters to tackle a fire and occupants to safely escape the building.		Building Regulation B4

A.7.8 Fire Service Access and Facilities

Functional Objective(s)	Rational / Commentary	Statutory Objective(s)
Firefighters should be able to reach a fire quickly and hence advantageous access to the building of fire origin should be provided. Access routes to the buildings should be suitable for fire tenders.	Based on the current site layout, no turning facilities are needed.	Building Regulation B5
Water supply should be provided by the public water network and is utilised by firefighters on site via hydrants. Hydrants should be sited in a way to allow for firefighters to cover the distance to the building of fire origin or to every point within the building (Block E) with hoses.	The location of existing hydrants is to be determined.	Building Regulation B5
To allow for firefighters to tackle a fire quickly within the building, dry fire main outlets are to be provided in the stairwell on the landing of each floor of Blocks F-J. An inlet is to be provided on the outside at the entrance of each stair.	The travel distance to the dry riser inlet needs to be taken into account when assessing vehicle access. See also Section A.7.8.1 .	Building Regulation B5

A.7.8.1 Dry riser Location Block J1-J3

The dry riser outlet is sited within the protected entrance lobby on ground floor level. This is acceptable because of the following:

- The entrance lobby forms an extension of the stairwell and is fully enclosed with fire rated construction.
- The entrance lobby will be kept fire sterile.
- The stairwell is of limited space. The entrance lobby provides more space for firefighters to deploy their equipment and to connect the hose to the outlet.

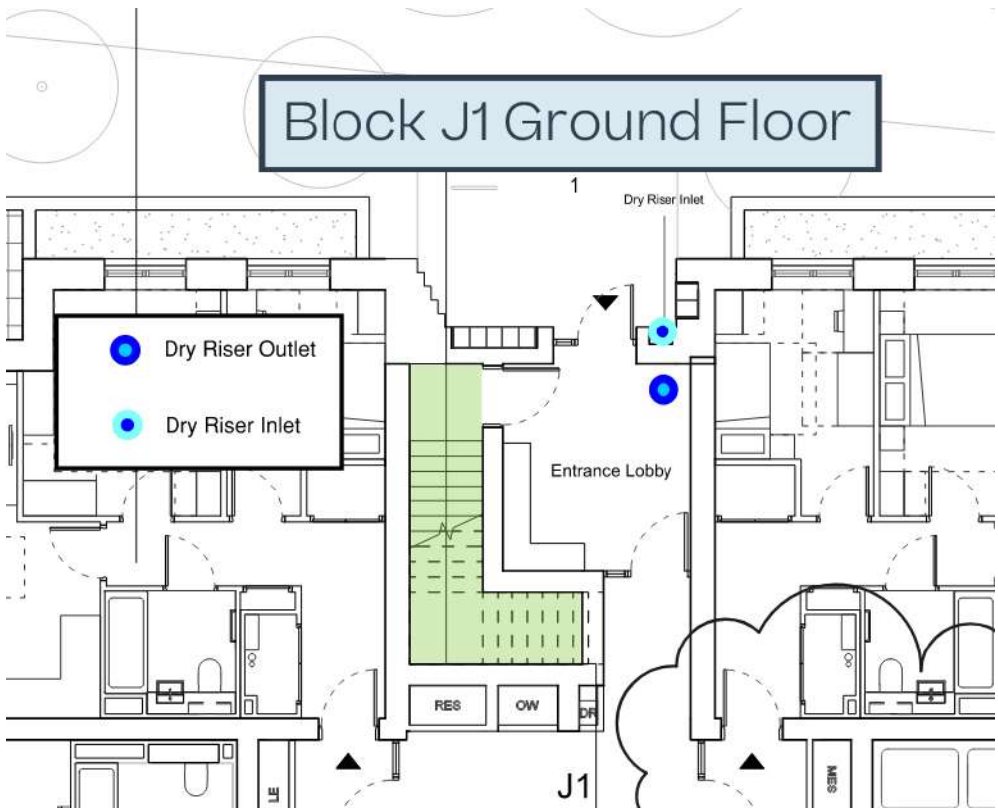


Figure 6: Dry Riser Outlet Ground Floor | Block J1



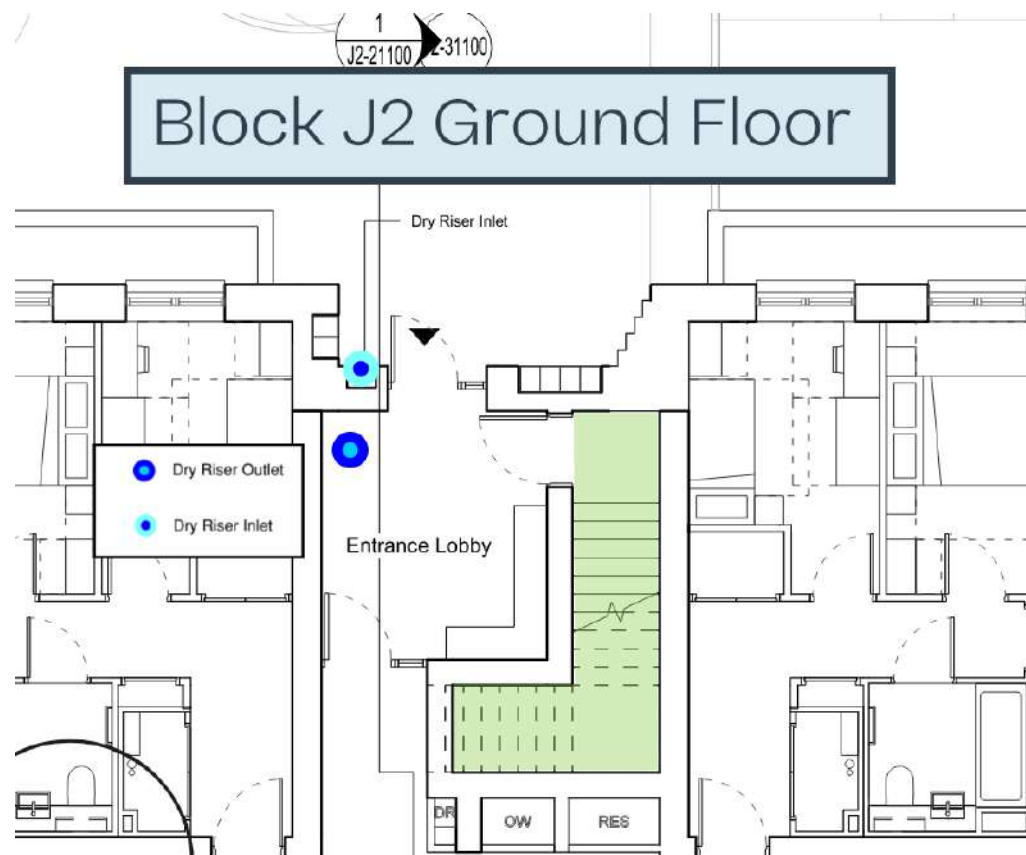


Figure 7: Dry Riser Location Ground Floor | Block J2

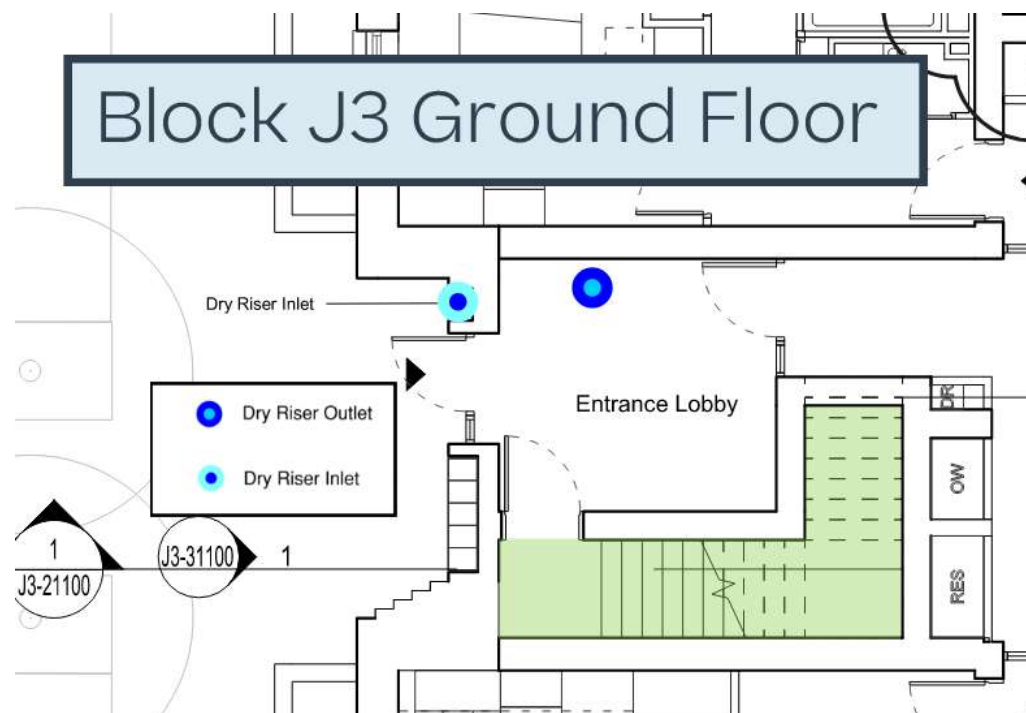


Figure 8: Dry Riser Location Ground Floor | Block J3

A.7.9 Management

Functional Objective(s)	Rational / Commentary	Statutory Objective(s)
Maintain the buildings in a condition consistent with the developed fire strategy.	Level of management is to be determined as part of the fire risk assessment.	Building Regulations B1, B2, B3, B4 and B5 Regulatory Reform Order
As evacuation lifts are provided, occupants who require the use of said lifts are to be trained in the operation of the lift. This may be supplemented by using Personal Emergency Evacuation Plans (PEEP).		London Plan Policy D5
It is reasonably expected that the building operator shall ensure that the commercial unit is fitted out, managed and maintained in a manner which does not undermine the fire strategy for the building as a whole.		Building Regulations B1, B2, B3, B4 and B5 Regulatory Reform Order

A.8 Further Considerations

A.8.1 Double-Substation

Between the Blocks G1 and G2 a double substation is proposed. This substation is to achieve a fire resistance rating of 240/240/240min in line with UK Power Networks requirements. This is beyond the recommendations according to BS 9991 / BS 9999.

A.8.2 Power Supply E-Bike Charging Stations

On ground floor level of all blocks, except Block E, cycle rooms are provided. To make sure firefighters can adequately tackle a potential fire caused by a malfunctioning charging dock of e-bikes, a switch should be sited close to the entrance of the room. By operating the switch, all power supply to the charging docks should be shut down.

This switch should be marked clearly and conspicuously. In the Personnel Information Box, information about this switch should be provided as well.

A.9 Risk Profile

Based on the holistic consideration of the building Block G1 above, the following risk profile is to be applied where considering the guidance of BS 9999:

Building Element	Occupancy Characteristic	Fire Growth Risk ^A
Commercial Unit	B – Awake and unfamiliar	2 – Medium
Note A – The growth profile is reduced by 1 due to the provision of automatic suppression.		

According to Table above, the risk profile for the commercial unit is B2.

Note: The risk profile is based upon the core & shell layout and has to be re-assessed during the development of the fit-out.



Section B.

Performance Criteria

B.1 Introduction

This section has been developed to provide the relevant performance criteria against which the design is to be progressed only.

Each major section is prefaced by a ‘Status’ table which is intended to identify:

- Whether the building design and layout can be assessed as meeting the following criteria (Sections B.3 and B.6).
- Whether systems have been confirmed as being designed to meet the following performance criteria by the relevant specialist designer (Section B.2).
- Whether the material and structure of the building has been confirmed as being designed to meet the following performance criteria by the principle designer (Sections B.4 and B.5)

Note: These status tables are provided based on the best understanding at the time of reporting and are provided for the purposes of providing continuity of fire strategy advice throughout the design process **only**. These must not be utilised as the formal design status or approvals status for this project.

These statuses use the following colour notation:

Colour	Meaning
	Design criteria understood as being met.
	Design criteria understood as being still to be designed.
	Design criteria understood as not being met by design.

B.2 Fire Safety Systems

Performance Criteria	Status ^A
Automatic Alarm and Detection	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.

Performance Criteria	Status ^A
Fire Suppression	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Fire Alarm Panels	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Smoke Control Systems	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Actuated Systems	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Redundant Power Supplies	It has been confirmed by the relevant specialist that their design achieves the performance criteria below.
Note A: Based upon review of the information as noted in Section C.2.4.3APPENDICES1.6.	

B.2.1 Automatic Detection and Alarm

Location	Detection	Alarm / Effect
Each Residency Block F-J	Grade D1 Category LD1	Alarm to be raised in unit of detection only.
Each Residency Block E	Grade D Category LD2	Alarm to be raised in unit of detection only.
Common Corridors	Local detection (notionally Category L5)	No alarm raised. Actuation of smoke ventilation.
Ancillary	Category M	No automatic alarm and detection is to be provided.
Commercial Unit (G1)	Category L2 ^A	Alarm to be raised in unit of detection only.



Note A: The final layout of the commercial unit is not yet known; any fit-out requires re-assessment of the above.

Domestic alarm and detection systems are to be designed in installed in accordance with BS 5839-6.

Common areas and ancillaries are to be designed and installed in accordance with BS 5839-1.

Fire alarm panels are to be provided within or in close proximity to the entrance to each core.

These measures comply with **Clause 3.3** as well as **4.2 Catalyst ER**.

B.2.2 Fire Suppression

B.2.2.1 Block F1-3, G1, H1

The following blocks have a topmost storey height <18m:

- F1-3
- G1
- H1

and are to be provided with a sprinkler system. Exemptions from sprinkler protection are listed in Clause 5.4 BS 9251.

Location	Suppression	Alarm
Each Residency	BS 9251 - Category 2	No alarm to be raised but should be indicated on fire alarm panel.
Ancillary <100m ² A	BS 9251 - Category 3	No alarm to be raised but should be indicated on fire alarm panel.

Note A: No ancillaries >100m² have been identified.

The system should achieve the following minimum requirements:

- Design discharge density of 2.8mm/min.
- The sprinklers are to remain functional for at least 30min.

Block G1 has a commercial unit with approx. 99.3m² on ground floor level. As it is <100m² the Category 4 system in accordance with BS 9261 utilised throughout the building can be extended down the commercial unit. The system is to be zoned so as to provide a zone alert on fire control panel.

B.2.2.2 Block G2, H2-4, J1-3

The following blocks have a topmost storey height >18m but <30m:

- G2
- H2-4
- J1-3

and are to be provided with a sprinkler system. Exemptions from sprinkler protection are listed in Clause 5.4 BS 9251.

Location	Suppression	Alarm
Each Residency	BS 9251 - Category 4	No alarm to be raised but should be indicated on fire alarm panel.
Ancillary <100m ² A	BS 9251 - Category 4	No alarm to be raised but should be indicated on fire alarm panel.

Note A: No ancillaries >100m² have been identified.

The system should achieve the following minimum requirements:

- Design discharge density of 2.8mm/min.
- The sprinklers are to remain functional for at least 60min.

For this Category 4 system an enhanced water supply should be used, which conforms with the additional requirements for water supply as well as pumps. Refer to Clause 5.12.5 of BS 9251.

B.2.3 Fire Alarm Panels

The fire alarm panels for all residential blocks are to be located adjacent to the entrance to each building, or within the entrance lobby, and are to be designed in accordance with BS 5839-6.

The fire alarm panel for the commercial unit in Block G1 is to be located adjacent to the entrance at ground floor level in accordance with BS 5839-1.



B.2.4 Smoke Control

B.2.4.1 Common Corridors

The common corridors in all blocks (except Block E) are to be fitted with a mechanical smoke ventilation system in accordance with Clause 14.2.4 BS 9991.

- Two fans should be provided as a minimum requirement. The standby fan should be activated automatically in case the duty fan fails to operate. Both fans as well as the actuators are to be provided with a secondary power supply.
- The vents in the common corridors discharge into a smoke shaft. The system should be designed in a such way, that only the vent of the fire floor as well as on top of the stairs (see **Section B.2.4.2**) open simultaneously and all other vents should remain closed.
- Smoke shaft should have a cross-sectional free area of not less than 0.6m.
- The mechanical ventilation system should limit pressure differentials so that the door opening forces do not exceed 100N at the door handle when the system is in operation.
- No services other than those relating to the smoke shaft should be contained within the smoke shaft.
- The volumetric extract rate as well as the criteria listed above are to be tested to ensure performance criteria for the system are met via computational fluid dynamic simulation (CFD). This will be part of a separate report.

Performance criteria are:

- Allow occupants and fire service personnel to use the stair & lift lobby without being affected by smoke.
- Allow occupants to evacuate via the residential common corridors while the fire is ongoing.
- Allow fire service personnel to undertake fire service intervention to the fire affected area.

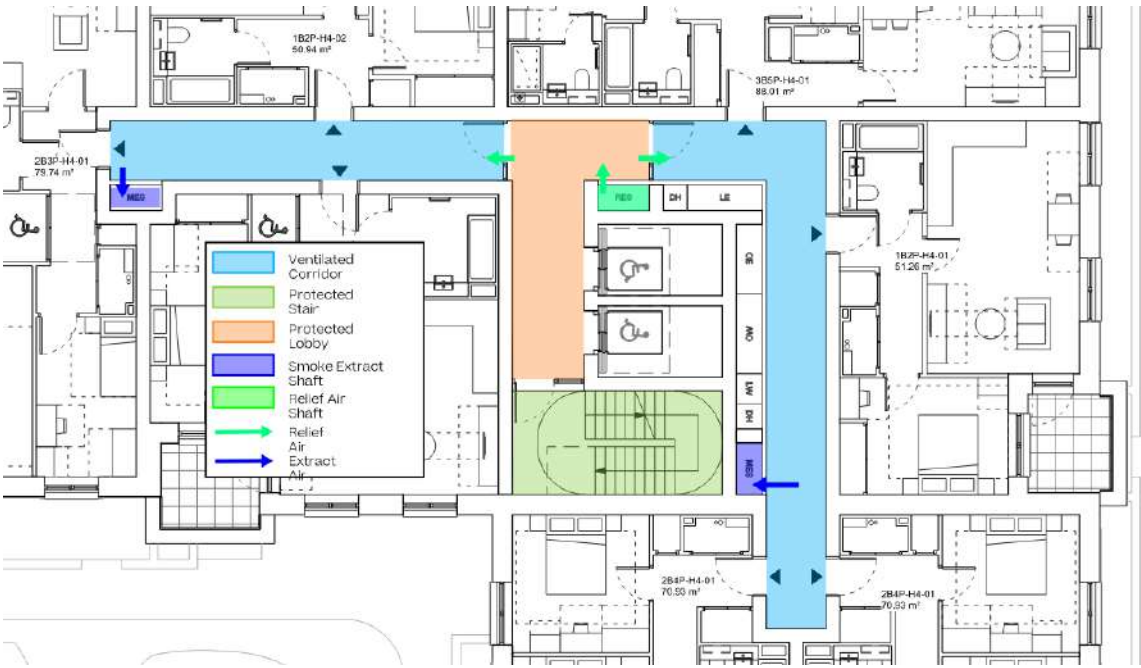


Figure 9: Block H4 | Smoke Control Common Corridor

B.2.4.2 Stairs

In addition to the smoke control measures listed in **Section B.2.4.1** an AOV with a minimum free area of 1.0m² is to be located at the head of each stair.

B.2.5 Cause and Effect

B.2.5.1 Residential

Cause	Effects
Smoke Detection in Common Corridor.	Open AOV at head of the stair with no designed delay.
	Open vent of the smoke extract shaft on the floor of fire origin.
	Firefighting lift to be moved to firefighting entrance level.
	Evacuation lift movement in accordance with risk assessment / management.
	Indication at fire alarm panel of location of detection.
Detection in Flats	Alarm activation in that unit only with no designed delay.



Cause	Effects
Detection in Townhouses (Block E)	Alarm activation in that unit only with no designed delay.
Activation of Flow Switch (sprinkler)	Indication at fire alarm panel of location of detection.

B.2.5.2 Commercial

Cause	Effects
Detection anywhere in unit	Shutdown of HVAC systems within the unit only.
	Shutdown of gas within the unit only.
	Indication at fire alarm panel of location of detection.

B.2.6 Redundant Power Supplies

System	Duration	Standard/Comments
Residential sprinklers	3h	BS 9251
Fire alarm and detection system	-	BS 5839-6 / -1 (commercial unit)
Emergency lighting	3h	BS 5266 - 1
AOVs	-	BS EN 12101 – 2 (only where not able to mechanically fail open upon alarm).
Mechanical smoke extract system	4h	BS 7346-8
Evacuation lift	3h	BS EN 81-20, BS EN 8519
Firefighting lift	3h	BS 9999, BS EN 81-72, BS EN 8519



B.3 Means of Egress

Performance Criteria	Status ^A
Number of Egress Routes	It has been assessed that the design does meet the performance criteria below.
Final Exits	It has been assessed that the design does meet the performance criteria below.
Egress Capacity	It has been assessed that the design does meet the performance criteria below.
Travel Distances	It has been assessed that travel distances do not meet the performance criteria below in the following aspects: Exceeded in certain units.
Inner Rooms	Detailed design of alarm and detection systems to be provided by relevant specialist.
Persons of Restricted Mobility	The location of refuges meets the performance criteria below. Detailed design of the associated systems are to be provided by relevant specialist.
Means of Egress Elements	Detailed design of systems and hardware to be provided by principal designer.
Note A: Based upon review of the information as noted in Section C.2.4.3APPENDICES1.6.	

B.3.1 Common Means of Egress

The common stair is to be provided at no less than 1,000mm in free width. Note that handrails may project up to 100mm into this free width from either side.

In line with Clause 7.4 BS 9991, the maximum travel distance should be 15m from the flat entrance to the stair door (lift lobby door in this case) where there common corridor is ventilated, and sprinkler provision is provided throughout the building. It has been assessed that the travel distance is within the limits of guidance in all blocks.

B.3.2 Means of Egress from Flats

Cooking facilities are to be sited away from the flat entrance doors and internal escape routes.

The minimum egress width is to be 0.9m and further a distance of 0.3m is required between the flat entrance and the 1.8m radius, as well as the 2m radius mentioned above, in order to ensure a person to access the door hardware.

This is also in line with **Clause 3.3 Catalyst ER**.

B.3.3 Number of Egress Routes

Location(s)	Population	Minimum No. of Egress Routes	Available Egress Routes	OK?
Commercial unit (G1)	99	2	2	Y

Note: The population assessment is based upon the core & shell layout and has to be re-assessed during the development of the fit-out. For a population >60, at least 2 exits with 850mm minimum clear width are needed.

B.3.4 Final Exits

All stairs discharge on ground floor level either

- Directly into the open.
- Into a protected corridor with a direct exit to outside. These corridors don't have any connection to ancillaries or other rooms.

The lift lobbies in some blocks are connected to apartments and ancillary accommodation such as cleaner's cupboards through a lobby. This is acceptable as these lobbies are afforded a mechanical smoke control system (see **Section B.2.4**). This arrangement is in line with the recommendations of guidance BS 9991, Section 34.



The final exits are to be protected for no less than 1.8m against fire and smoke. This is achieved by fire rated construction. See also

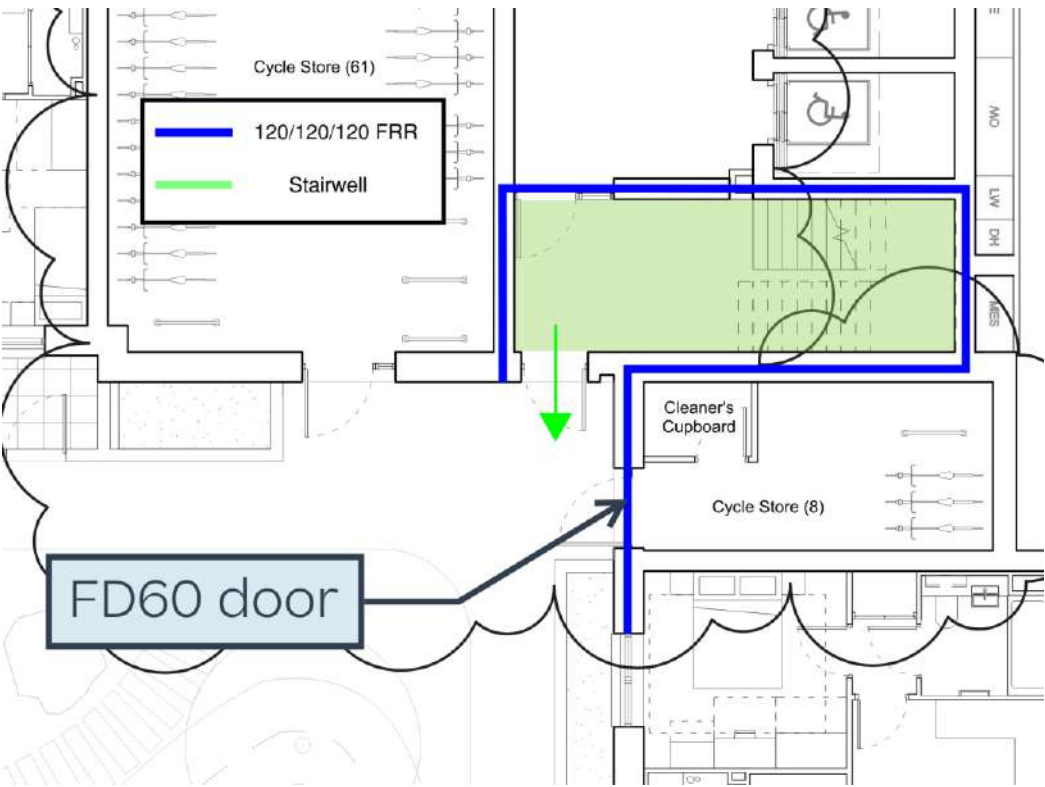


Figure 29.

B.3.5 Egress Capacity

In line with the ‘Stay Put’ evacuation strategy it is not anticipated that the entire buildings will evacuate simultaneously unless at the direction of the attending Fire and Rescue Service. Egress routes are therefore not sized for the simultaneous evacuation of all occupants within the building.

For the commercial unit, based on the discounting of the largest exit the remaining exit width is 850mm. The population of this unit is 99, see **Section A.5**. In line with Table 12 BS 9999, a minimum exit width of 4.1 mm/person is applied.

The total exit capacity is $\frac{850mm}{4.1mm/person} = 207\text{ persons}$

The exit width therefore is in line with guidance.

B.3.6 Travel Distances

B.3.6.1 Commercial Unit

Location(s)	Risk Profile	Maximum Distance in a Single Direction	Maximum Distance where Multiple Directions Available
Commercial Unit Block G1	B2	24	N/A

It has been assessed that the travel distance in the commercial unit is in line with guidance.

B.3.6.2 Flats

The travel distance from any point of the flats to the flat entrance should not exceed 20m in accordance with BS 9991.



Figure 10: Travel Distance within Flats | Block F1 Exemplar



Some units on ground floor level in Block F2 and Block F3 as well as Block H3 and H4 are afforded a 2nd exit from their terraces to the common area on the outside premises which is to be maintained.

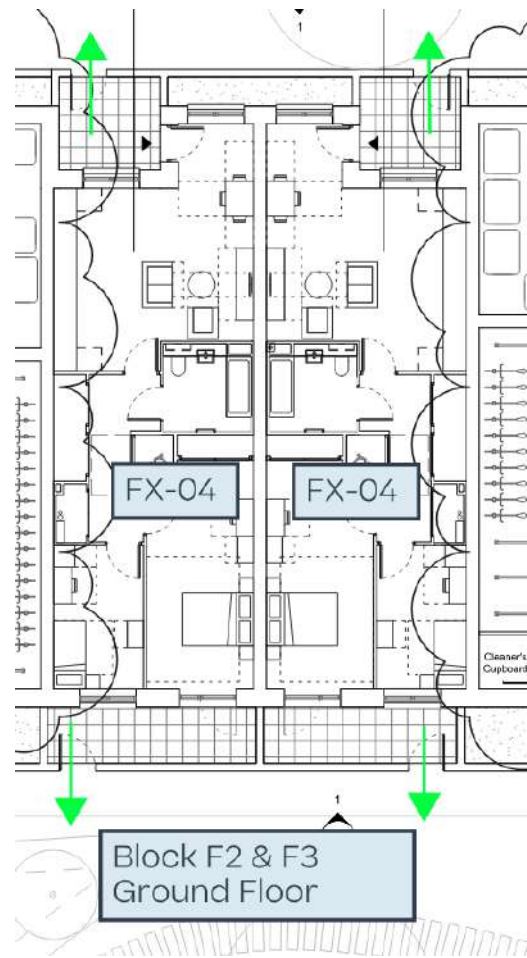


Figure 11: Extend Travel Distance | Block F2 & F3

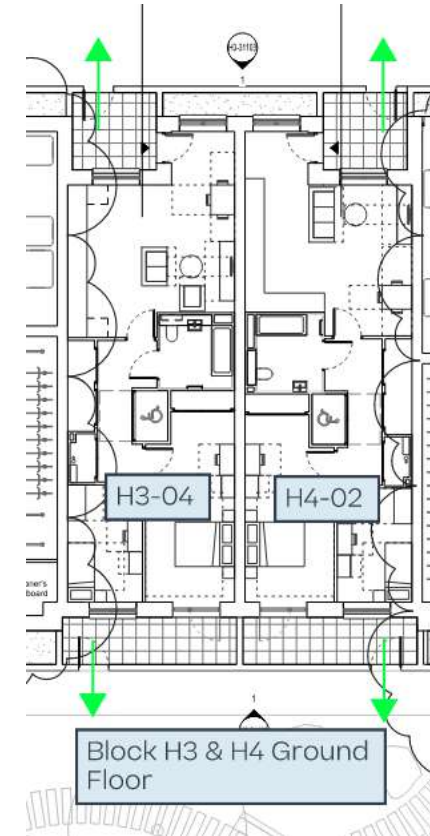


Figure 12: Flats H3-04 and H4-02 | Block H3 & H4

B.3.6.3 Ancillary Accommodation

It has been assessed that the travel distance within the ancillary spaces is in line with the guidance of BS 9991, except for Block G1 ground floor level. The travel distance within the DWS room is exceeded by 3m. This is acceptable because of the following:

- The unit is not accessible for occupants of the residential areas. Only personnel who is familiar with the room layout will have access to the room.
- As these non-residents are familiar with the room layout, and a suppression system is afforded to this room, a risk profile of A2 in line with the guidance of BS 9999 Table 4 can be applied.
- The actual one-way travel distance for A2 risk profile is 22m in accordance with Table 11 BS 9999.

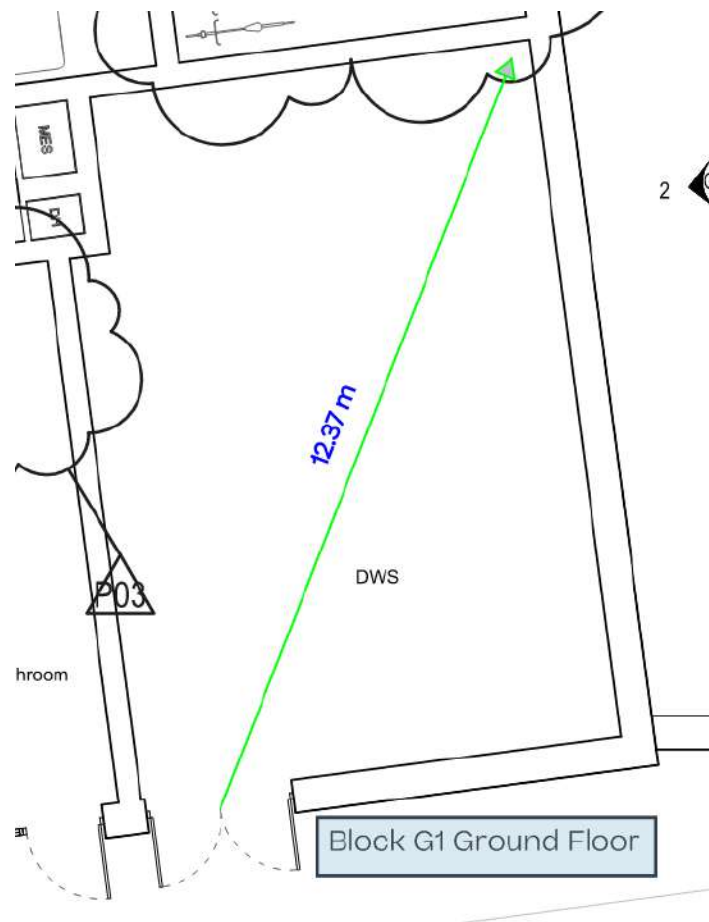


Figure 13: Travel Distance DWS Room | Block G1

B.3.7 Persons of Reduced Mobility

B.3.7.1 Refuge Locations

A refuge is to be provided in each lift lobby in each building. The lift lobbies provide direct access to the evacuation lifts.

Each refuge is to achieve the following:

- Provide a clear location of no less than 900mm x 1,400mm.
- The refuge location does not narrow the egress route.

B.3.7.2 Evacuation Lifts

Under current guidance, the provision of evacuation lifts is not considered required. However, in accordance with **Clause 6.2 Catalyst ER** and the upcoming changes to BS 9991 and overall emphasis by the industry on dignified egress for occupants with reduced mobility, at least 1 evacuation lift is to be provided for each Block.

The omission of evacuation lifts in Block E is acceptable, as these are townhouses and are not afforded a lift.

The lifts should be designed in accordance with BS EN 81-20 (1). This is also in accordance with **Clause 6.2 Catalyst ER**.

Each evacuation lift is to be designed and installed in accordance with BS 81-76 and afforded secondary power in line with **Section B.2.6**.

Adequate signage should be provided to indicate the location and intended use of the evacuation lifts.

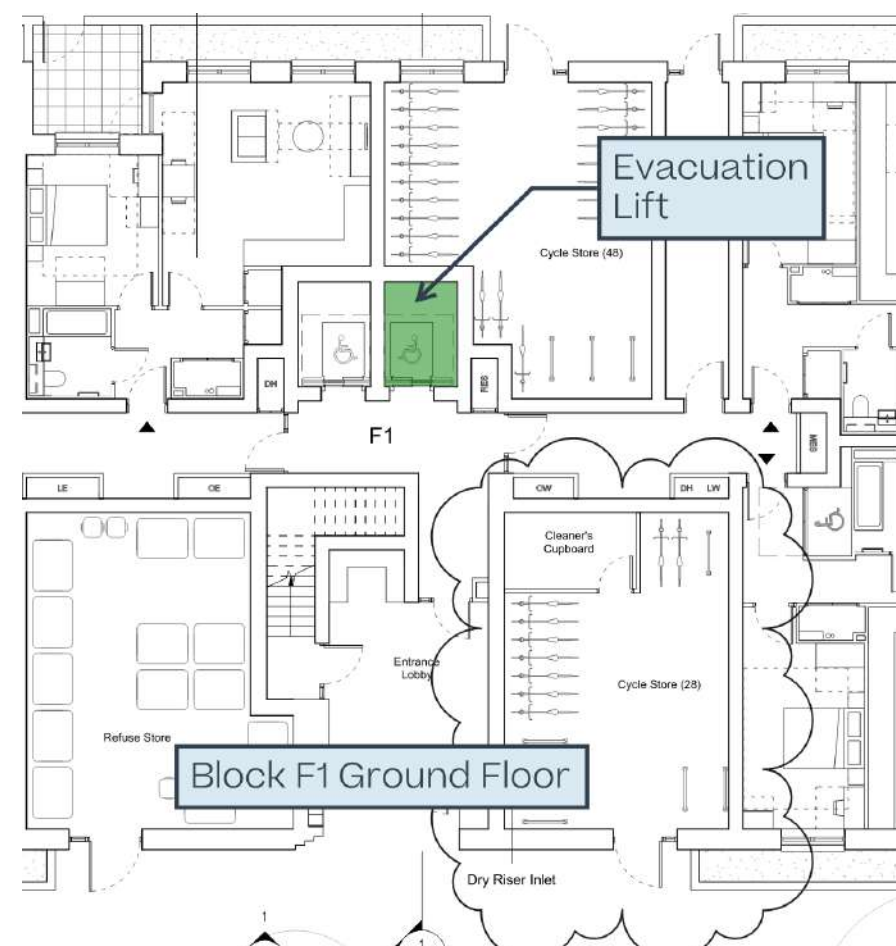


Figure 14: Evacuation Lift | Block F1

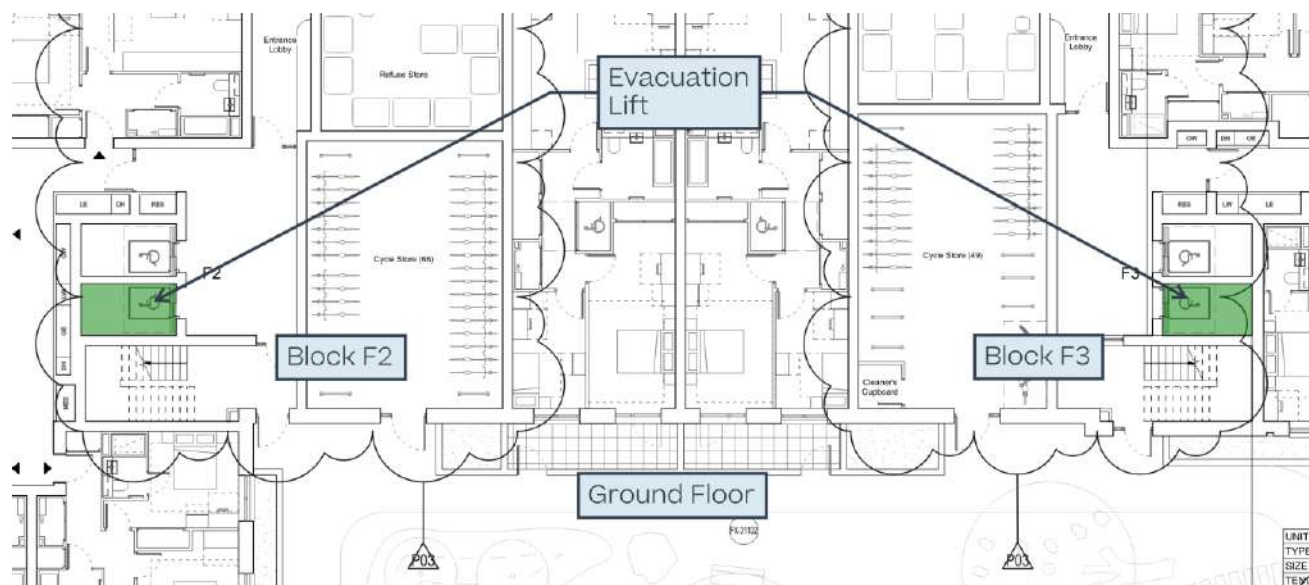


Figure 15: Evacuation Lift | Block F2 & F3

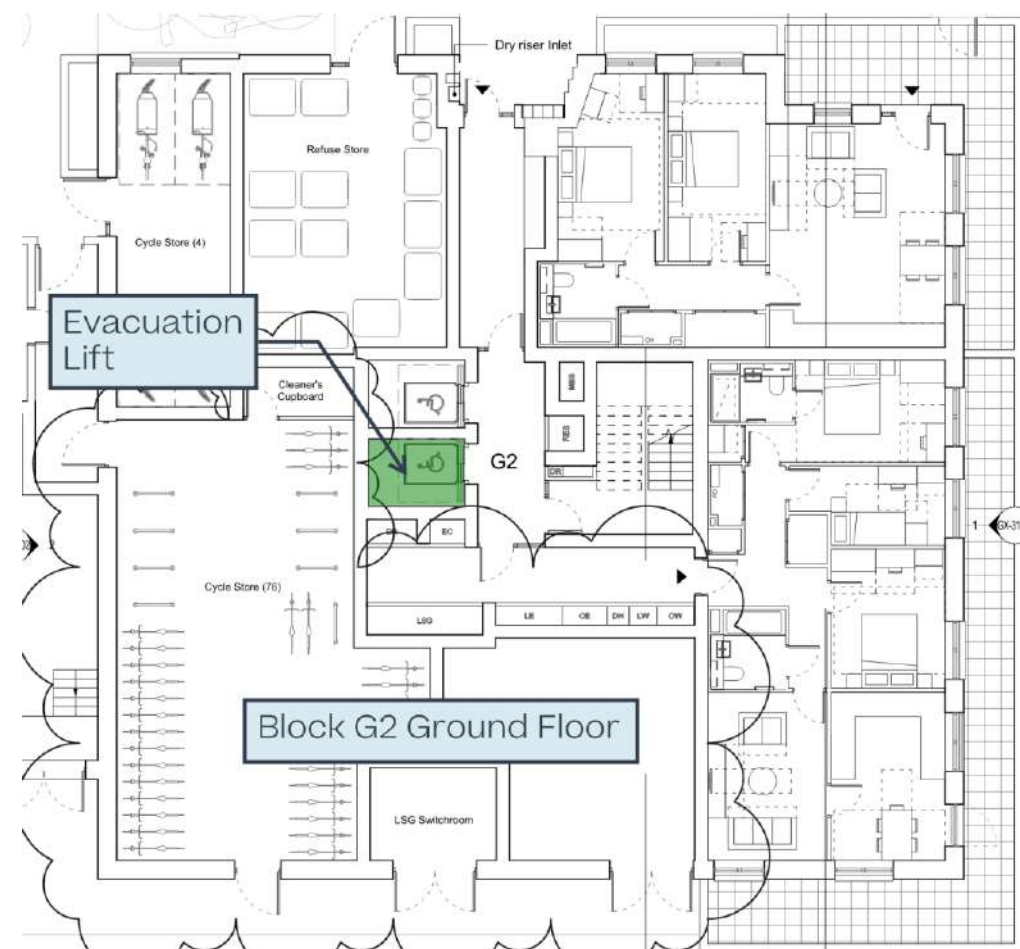


Figure 17: Evacuation Lift | Block G2

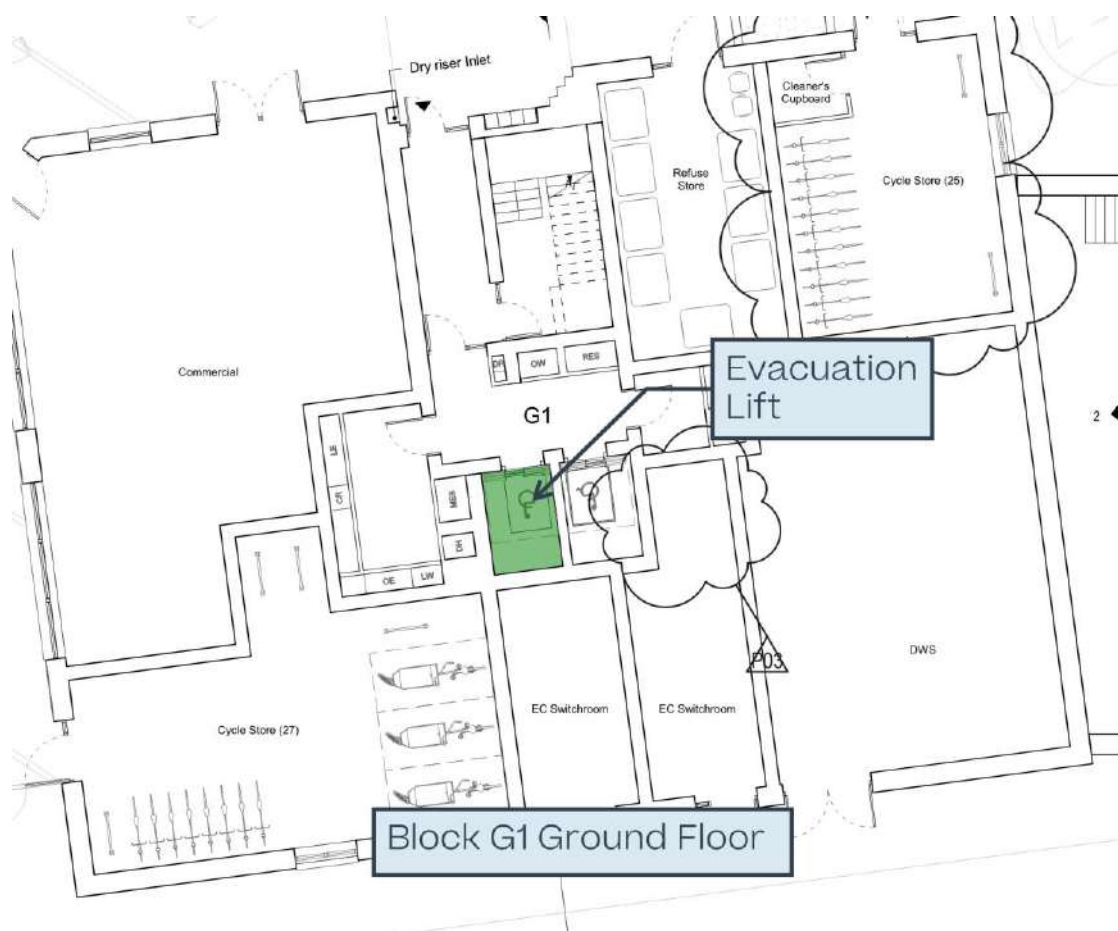


Figure 16: Evacuation Lift | Block G1

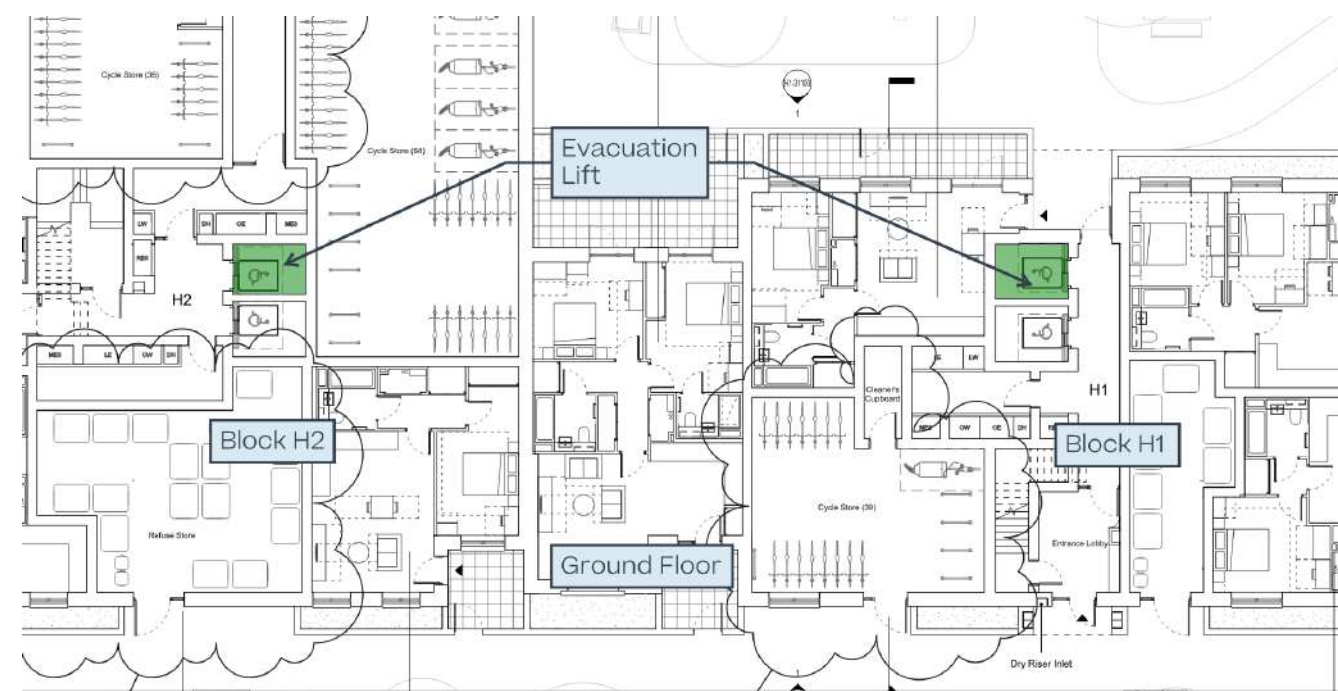


Figure 18: Evacuation Lift | Block H1 & H2

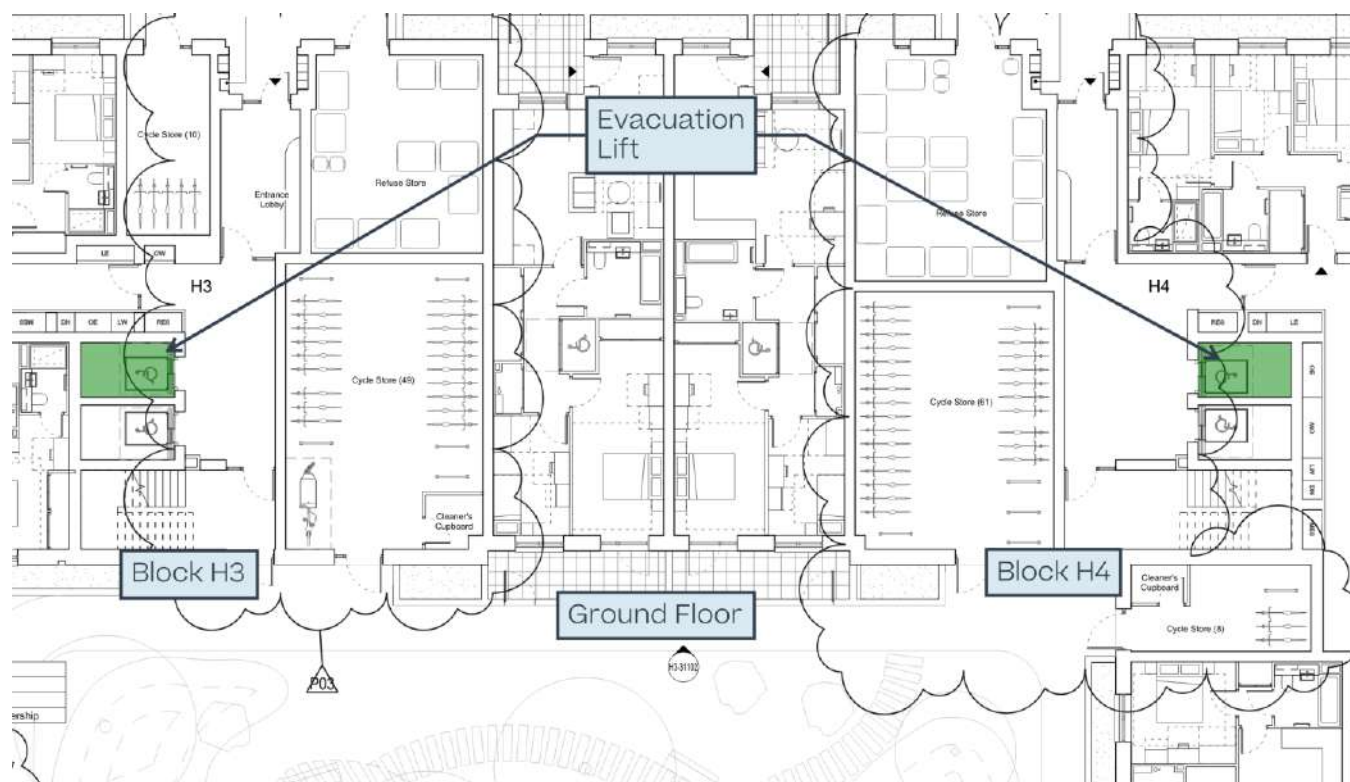


Figure 19: Evacuation Lift | Block H3 & H4

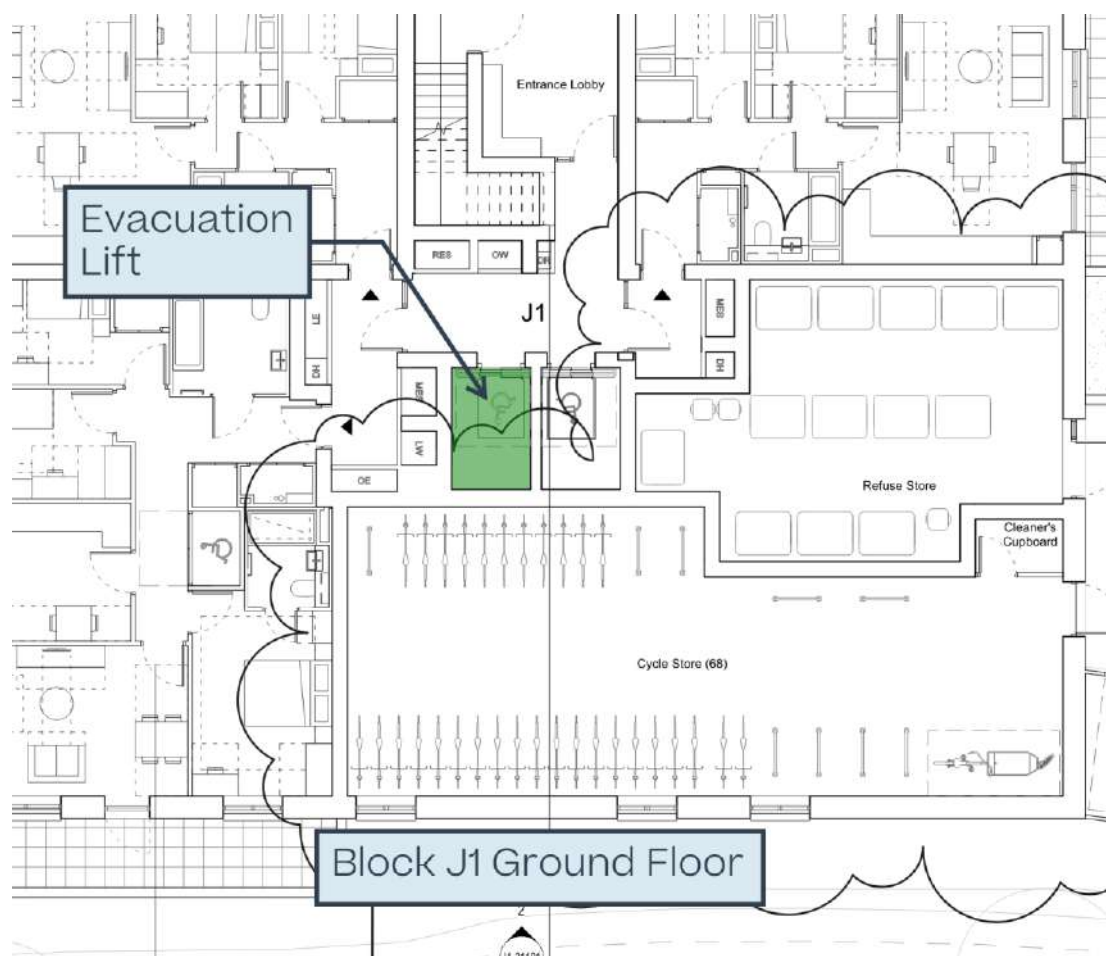


Figure 20: Evacuation Lift | Block J1

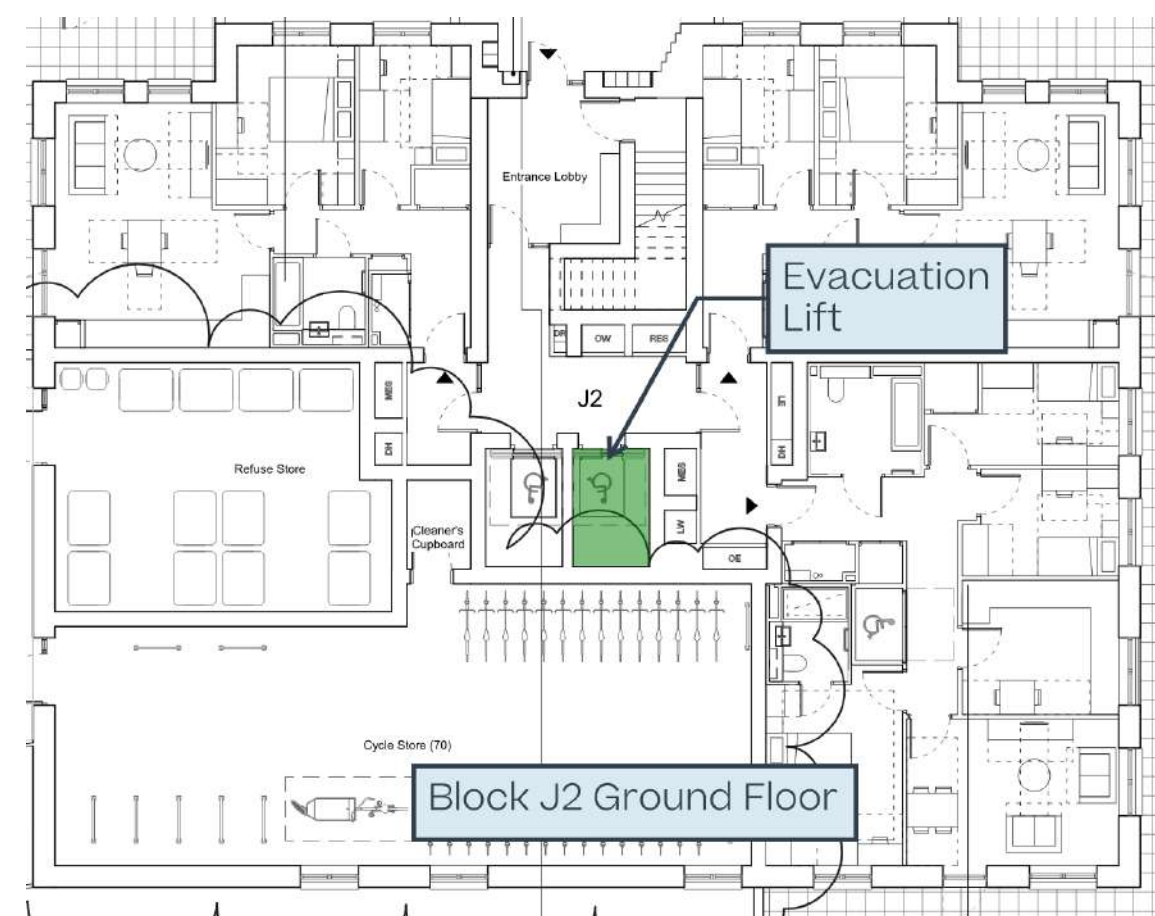


Figure 21: Evacuation Lift | Block J2

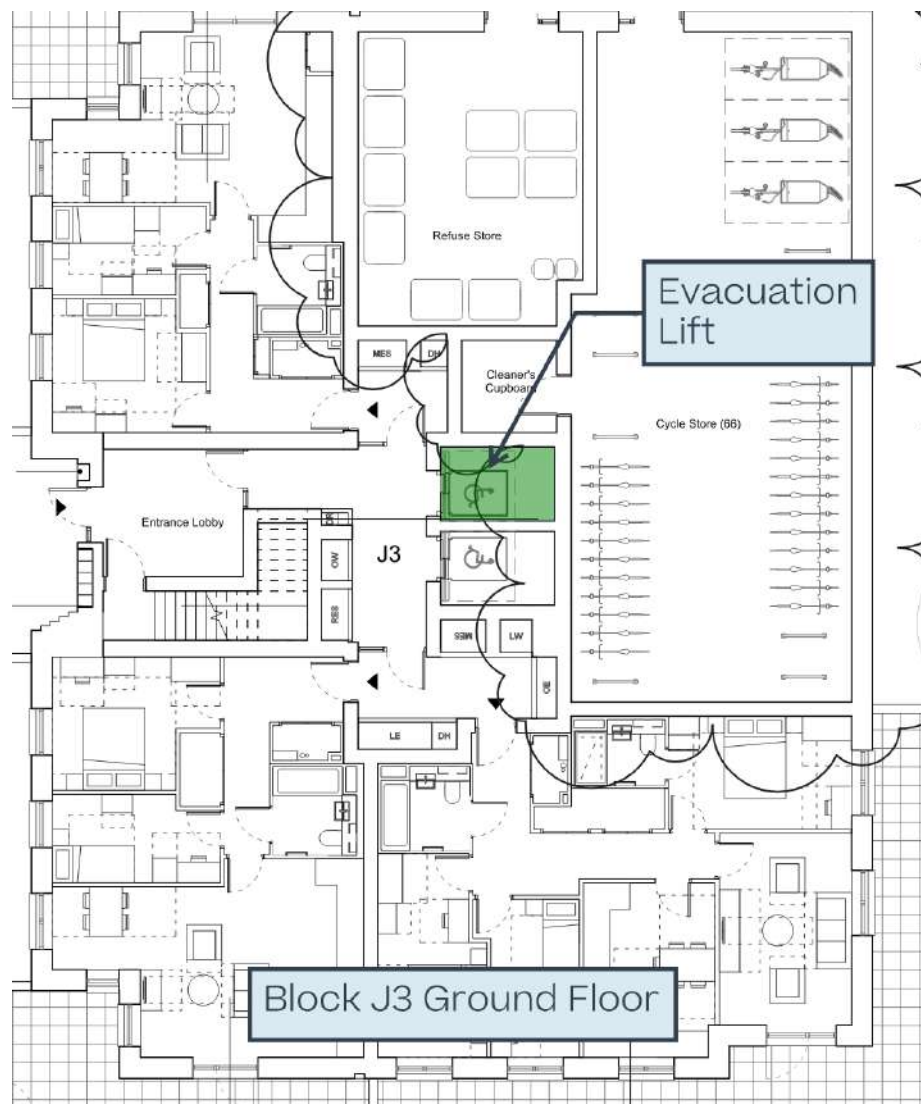


Figure 22: Evacuation Lift | Block J3

B.3.7.3 Communication Systems

An Emergency Voice Communications (EVC) systems is to be provided in accordance with BS 5839-9, to achieve the following performance criteria:

- Each refuge location is to be provided with a Type B outstation.
- A Type B outstation is to be provided within the stair enclosure for each storey exit.
- The masterstation is to be co-located with the Fire Alarm Panel (FAP) see **Section B.6.5**).
- A repeater masterstation is to be provided at the concierge.

B.3.8 Inner Rooms

There are no relevant inner rooms provided.

B.3.9 Means of Egress Elements

B.3.9.1 Door Opening Direction

All doors upon an egress route shall be designed to open in the direction of egress from any location which contain 60 or more persons:

- Commercial Unit, Block G1.

As all blocks (except Block E) are to facilitate a 'stay put' evacuation strategy (see **Section A.7.2**), it is not necessary for doors to open in direction of escape.

B.3.9.2 Security and Panic Hardware

So as to permit safe egress under all circumstances all doors upon the egress route must be openable in the direction of egress without the evacuees requiring:

- A key, pass, fob or similar device.
- Specialist knowledge, such as a pass code.

Electronically powered locks must be returned to the unlocked position under any of the following circumstances:

- Activation of the building fire alarm.
- Power failure.
- Activation of a manual door release unit (Type A) designed and installed in accordance with BS EN 54-11 located on the side of the door approached during egress from the building.

According to BS 9991 and **Section 3.5 Catalyst ER**, it is deemed reasonable to provide escape doors with push to exit or emergency door release systems.

As the commercial unit Block G1 is designed for public occupation doors providing egress from this unit with an occupancy of more than 60 persons shall be required to be provided with panic hardware designed and installed in accordance with BS EN 1125.

B.3.9.3 Emergency Lighting

Emergency lighting is to be provided within

- The ancillary accommodations.
- The stairways.

The emergency lighting should be in accordance with BS 5266.

Since in all Blocks, except Block E, the communal spaces on ground floor level and the commercial unit, a ‘stay put’ strategy should be implemented, emergency lighting with self-contained luminaire according to **Clause 5.1 Catalyst ER** should be provided to the following additional areas:

- Common escape routes,
- Identified slips, trip or fall hazards,
- Call points (where installed),
- Firefighting equipment for windowless plant areas and maintenance areas and
- Guarantee safe movement in parts of the premises when the occupants need not evacuate the premises immediately.

B.3.9.4 EXIT Signage

Fire EXIT signage should be provided in accordance with BS ISO 3864-1 and BS 5499-4 in at minimum the following locations:

- Above or adjacent to every storey exit (other than those in normal usage).
- To clearly indicate the direction to the nearest storey exit from any location where it is not possible to identify the location or direction to the nearest storey exit.

EXIT signage should be provided in accordance with the guidance of the HSE publication Safety Signs and Signals: Guidance on Regulations.

B.4 Combustibility and Content Control

Performance Criteria	Status ^A
Internal Structure	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
External Wall Construction	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Roof	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Internal Linings	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Control of Combustible Contents	To be included in Fire Safety Management plans.
Note A: Based upon review of the information as noted in Section C.1C.2.4.3APPENDICES1.6.	

B.4.1.1 General

Except where otherwise noted, all products are to be specified to achieve the reaction to fire classifications given below, when tested in accordance with BS EN 13501-1.

B.4.2 External Wall Construction

The external wall is the external surface of the building which as at ≥70° from horizontal. Those elements at <70° are considered a roof (see Section B.4.3).

Materials which form part of the external wall (i.e. anything from the innermost to outmost surface of the wall) should be specified to achieve the following:

Location	Height (m)	External Wall Construction ^A
Block E Block F1-3 Block G1 Block H1	<18m	A2-s3-d2 or better in line with Section 10 Catalyst ER and Hill Policy 004
Block G2 Block H2-4 Block J1-3	>18m	A2-S1,D0 or better
Note A: The following materials are exempted: - Membranes (in line with Section 10 Catalyst ER and Hill Policy 004), to be provided at B-S3,D2. - Windows and frames (in line with Hill Policy 004). - Doors and frames. - Seals gaskets (in line with Section 10 Catalyst ER and Hill Policy 004) and backer rods. - Electrical installations. - Fire stopping materials (where used for this purpose). - Thermal break materials (where used for this purpose).		

B.4.2.1 Cladding

Location	Height (m)	Distance to Boundary (m)	Cladding Construction
Block E Block F1-3 Block G1 Block H1	<18m	<1m	A2-s3-d2 or better in line with Section 10 Catalyst ER and Hill Policy 004
		≥1m	A2-s3-d2 or better in line with Section 10 Catalyst ER and Hill Policy 004
Block G2 Block H2-4 Block J1-3	>18m	<1m ≥1m	A2-S1,D0 or better

B.4.2.2 Balconies and Specified Attachments

Location	Element	Height (m)	Cladding/External Surface
Block E	Balconies	<11	A2-s3-d2 or better in line with Section 10 Catalyst ER and Hill Policy 003 V3
Block F Block G Block H Block J	Balconies	>11m	A2-S1,D0 or better

B.4.3 Roof

The uppermost surface of the roof shall be specified to achieve the following classification below, when tested in accordance with BS EN 13501-5:

Location	Distance from the Boundary (m)			
	<6	<12	<20	>20
B _{ROOF} (t4)				
C _{ROOF} (t4)				
D _{ROOF} (t4)				

B.4.4 Internal Linings

All residential buildings should achieve the minimum recommendations listed below.



Location	Minimum Reaction to Fire Classification of Walls and Ceilings ^B
All other rooms <4m ² within the dwelling	D-S3,D2
Stairs and hallways within the dwelling All other rooms within the dwelling ^A	C-S3,D2
All common means of egress (including stairs)	B-S3,D2
Note A: Up to ½ (but no greater than 20m² total) of an individual rooms internal surface may be reduced to a D-s3,d2 classification. Note B: The following elements are excluded from application of these performance requirements: • Doors and door frames. • Window and window frames. • Architraves, picture rails, mouldings, skirting boards and other similar narrow elements. • Fitted furnishings. • Fireplace surrounds and mantle shelves.	

The commercial unit on Ground Floor Block G1 should achieve no less than the following:

Location	Minimum Reaction to Fire Classification of Walls and Ceilings ^C
All rooms <30m ²	D-S3,D2
All rooms ≥30m ² ^A	C-S3,D2
All circulation spaces including stairs ^B	B-S3,D2
Note A: Up to ½ (but no greater than 60m² total) of an individual rooms internal surface may be reduced to a D-s3,d2 classification. Note B: Circulation routes within a large open space, i.e. an open plan office, or retail unit, do not count as circulation spaces for this performance criterion. Note C: The following elements are excluded from application of these performance requirements: • Doors and door frames.	

Location	Minimum Reaction to Fire Classification of Walls and Ceilings ^C
• Window and window frames. • Architraves, picture rails, mouldings, skirting boards and other similar narrow elements. • Fitted furnishings. • Fireplace surrounds and mantle shelves.	

B.4.4.1 Stairs

The flights and landing of the escape or firefighting stairs are to achieve no less than an A2-S3,D2 reaction to fire classification.

Additionally, any textile coverings in the firefighting stairs of blocks

- Block G2
- Block H2-4
- Block J1-3

are to achieve all of the following:

- When tested in accordance with BS 4790 (together with any underlay) achieve either:
 - No ignition. Or,
 - Have a radius of ignition of no greater than 35mm.
- Securely affixed to the stairs via a non-water-soluble mechanism.
- Be interrupted at the door threshold via a non-combustible strip of no less than 50mm in width.

B.4.4.2 Thermoplastic Materials

Thermoplastics used in rooflights and diffusers within the ceiling are to achieve the following:



Classification of the Lower Surface	Location	Maximum Area of Each Element (m²)	Maximum Aggregate Area (m²)	Minimum Separation between Elements (m)
TP(a)	Any Rooms	1	50	^A
		5	50	3
TP(b) or D-S3,D2	Circulation Routes ^B	5	15	3
Note A: Equal to the largest plan dimension of the largest element.				
Note B: Thermoplastic rooflights and diffusers are not permitted within protected stairs.				

B.4.5 Control of Combustible Contents

Location	Controls
Common stair to apartments ^A	To be maintained clear of all combustibles at all times.
Common corridors	To be maintained clear of all combustibles at all times.
Note A: This includes the entrance lobbies.	

B.4.5.1 Services and Wiring

Wiring is to be protected to the standard of the IET Wiring Regulations within the following locations:

- Common stair to apartments.

B.5 Fire Rated Construction

Performance Criteria	Status ^A
Separated Elements of Structure	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Structural Fire Resistance	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
External Walls	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Compartmentation	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Fire Stopping	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Service Penetrations	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Cavity Barriers	No confirmation has yet been received from the relevant specialist that their design meets the performance criteria below.
Note A: Based upon review of the information as noted in Section C.1 .	

B.5.1.1 General

Except where otherwise noted, all products are to be specified to achieve the fire resistance classifications given below, when tested in accordance with:

- BS EN 1364, for non-loadbearing elements.
- BS EN 1365, for loadbearing elements.
- BS EN 1366, for service installations.



- BS EN 1634 Parts 1 and 3 for doors and closures.

The fire resistance levels in the following sections are specified in terms of R/E/I, where R, E and I correspond to the following and are measured in minutes:

R - Loadbearing Capacity.

E – Integrity.

I – Insulation.

B.5.2 Structural Fire Resistance

Part of Building	Height (m)	Minimum Fire Resistance for Loadbearing Structure ^{A B}	Minimum Fire Resistance for Floor Slabs ^A
Block E	<11	60/-/-	60/60/60
Block F1-3	>11 and <18	60/-/-	60/60/60
Block G1			
Block H1			
Block G2	>18 and <30	90/-/- ^C	90/90/90 ^C
Block H2-4			
Block J1-3			

Note A: Elements of structure which support only the roof and roof mounted plant, and do not otherwise provide overall lateral stability to the building, may be provided without any fire resistance.

Note B: Elements of structure must be demonstrated to achieve fire resistance for the number of exposed sides for that element.

Note C: The fire resistance rating may be reduced with the provisions of sprinklers.

B.5.3 External Walls

The following performance criteria are developed based upon the fire spread assessments in Section C.1.



Figure 23: External Fire Spread Assessment

A small substation is placed on north side of Block J3.

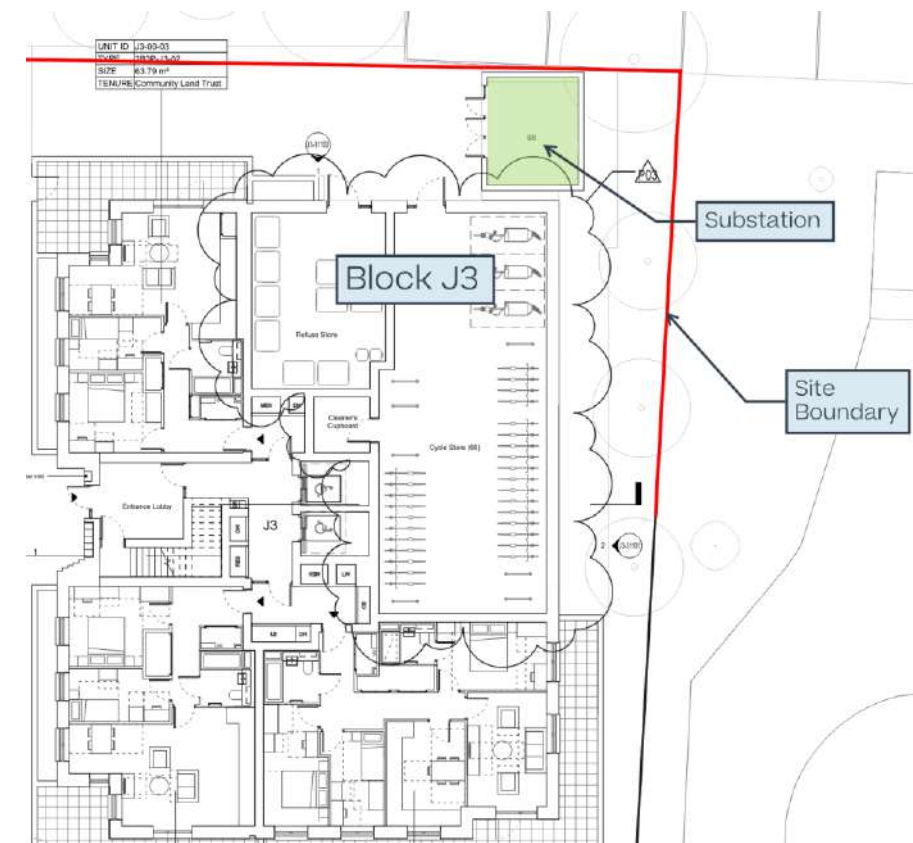


Figure 24: Block J3 Substation

Location	Elevation	Minimum Fire Resistance	Type of Exposure
Block E	North	60/60/60	From Both Sides
Block F2-3	North	60/60/15	From Inside
Block H1-2	North	60/60/15	From Inside
Block H3-4	North	60/60/15	From Inside
Block J3	East	60/60/15	From Inside
Block J3 Amenity	North	60/60/15	From Inside
Block J3 Amenity	South	60/60/15	From Inside
Block J3 Amenity	East	60/60/15	From Inside

B.5.3.1 Fire Spread between Building Elements

B.5.3.2 Inner Angles

Block F2 is forming an inner angle at the stairwell. To prevent fire spread between the 2 neighbouring flats and so as to maintain compartmentation, the external wall needs to be fire rated for a distance of no less than 1.8m.

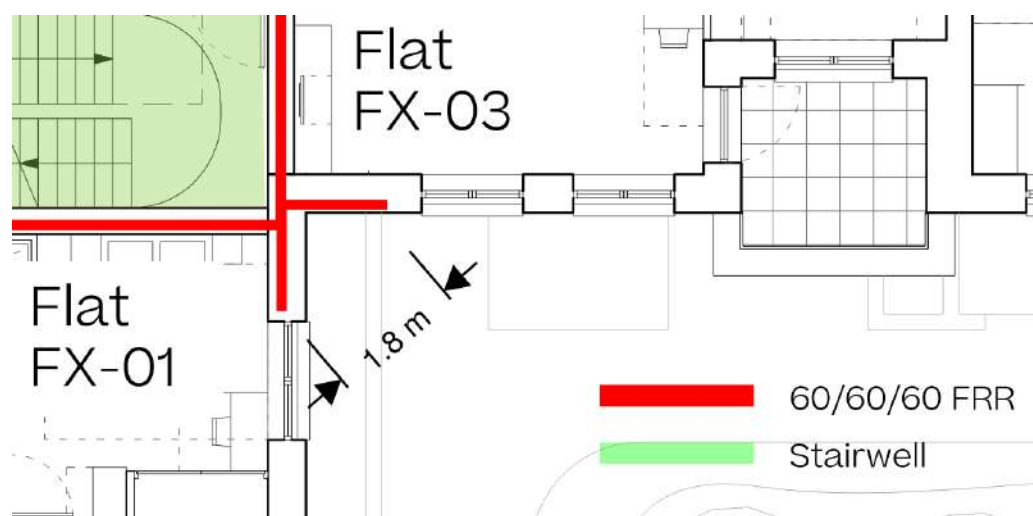


Figure 25: Block F2 Inner Angle

H1, H4 are forming an inner angle between 2 adjacent flats.

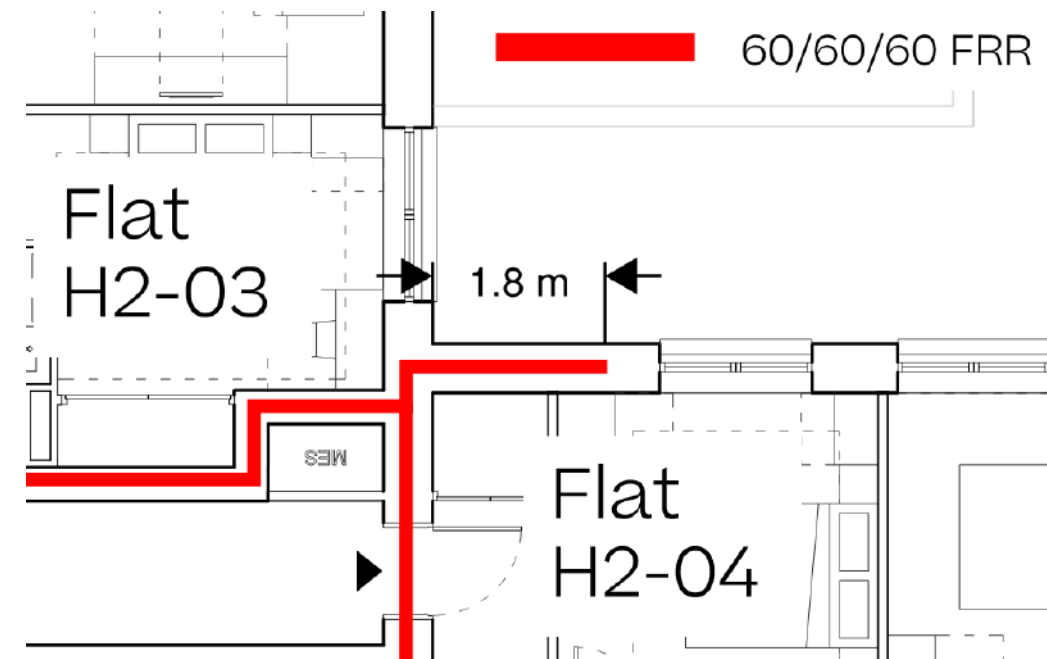


Figure 26: Block H2 Inner Angle

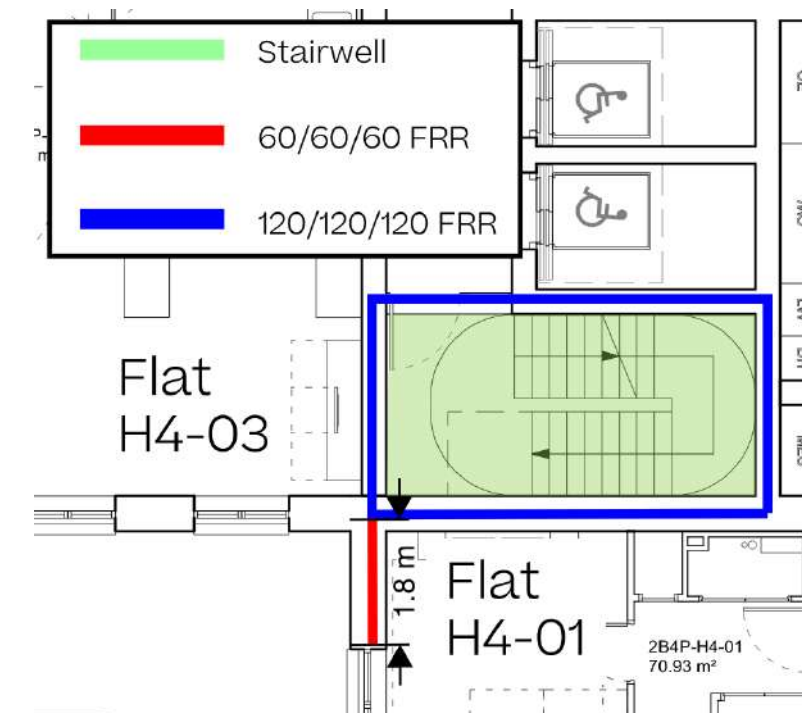


Figure 27: Block H4 Inner Angle

B.5.3.3 Final Exits

The stairs of Block F2 discharge on ground floor level directly to the outside. The escape stair needs to be sufficiently protected against heat and smoke.

As 1 side of the external wall faces the final exit in a 90 degree angle, the external wall needs to be protected for a length of minimum 1.8m with fire rated construction. This is shown as being met in the figure below.

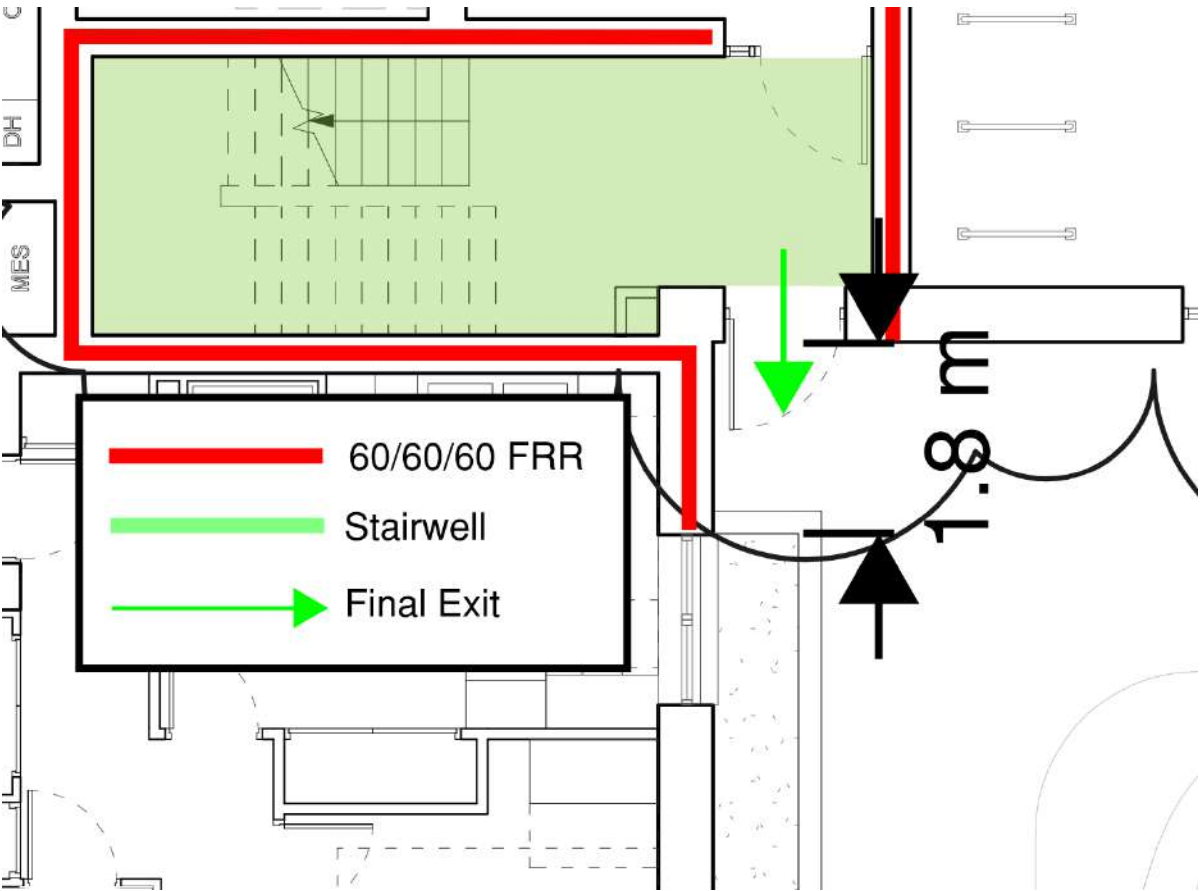


Figure 28: Final Exit Block F2

Note: The window of the bedroom has to be either rearranged or fire rated.

Block H4 discharges on ground floor level directly to the outside. It is acceptable to omit the smoke seal from the door to the cycle store, on the basis that the door is leading to the outside and smoke can disperse freely in the open air.

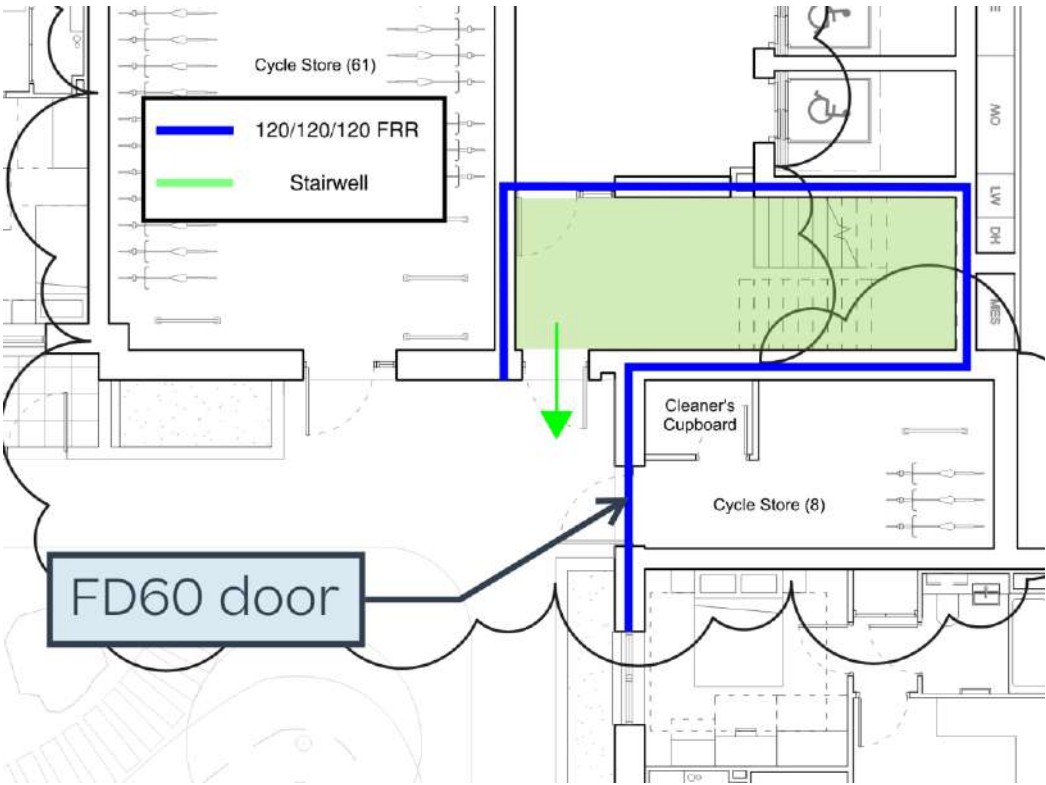


Figure 29: Final Exit Block H4

B.5.4 Compartmentation

Location	Minimum Fire Resistance for Construction	Type of Exposure	Minimum Fire Resistance for Doors and Closures
Party Walls	60/60/60	Each side separately	N/A
Common Stairs	30/30/30	Each side separately	E30Sa
Lift Lobby	60/60/60	Each side separately	E30Sa
Lifts	60/60/60	Each side separately	E30

Location	Minimum Fire Resistance for Construction	Type of Exposure	Minimum Fire Resistance for Doors and Closures
Firefighting Shaft	120/120/120	Each side separately	E60Sa
Lift Lobby to Firefighting Stair	60/60/60	Each side separately	E30Sa
Firefighting Lifts	120/120/120	Each side separately	E60
Service Shafts	60/60/60	Each side separately	E30Sa
Residencies	60/60/60	Each side separately	E30Sa
Life Safety Rooms	120/120/120	Each side separately	E60Sa
Commercial Unit	60/60/60	Each side separately	N/A
Bin Store, Cycle Store	60/60/60	Each side separately	N/A
EC Switchroom, DWS Room	30/30/30	Each side separately	N/A

B.5.4.1 Floors

The floor slab above all floors except the last one (=roof) in each building forms the upper part of compartmentation.

Floors within Block E which are not identified as compartment floors above, whilst requiring fire resistance (see **Section B.5.2**) are not otherwise required to maintain continuity of construction. However, the walking surface of the floor should not be penetrated in a manner which would result in smoke movement limiting safe means of egress.

B.5.4.2 Fire Rated Separations and Closures

All compartment walls and compartment floors should achieve both of the following:

- Form a complete barrier to fire between the compartments they separate.

- All gaps and joints should be provided with fire stopping to maintain the fire resistance (see **Section B.5.2**).
- All services penetrations should be protected to maintain the fire resistance (see **Section B.5.2**).

Compartment walls common to 2 buildings (party walls) should comply with both of the following:

- Run the full height of the building in a continuous vertical plane (compartment walls between buildings or separated parts of the building).
- Be continued through any roof space to the underside of the roof.

Timber beams, joists, purlins and rafters may be built into or carried through a masonry or concrete compartment wall if the openings for them are both of the following.

- As small as practicable.
- Fire-stopped.

If trussed rafters bridge the wall, failure of the truss due to a fire in one compartment should not cause failure of the truss in another compartment.

B.5.5 Protected Stairway Enclosures (Block E)

Fire rated ceilings are to be provided within the protected stairway to achieve vertical compartmentation (see **Section B.5.4.2**). This is due to the fact, that walls within protected stairways do not necessarily align on a vertical level. As floor slabs within townhouses may be constructed as a joisted floor, the provision of a fire rated ceiling within the protected stairway ensures compartmentation within the egress route. The fire rated ceiling needs to connect the fire rated walls of the stairway enclosure.

This is in accordance with BQ035 Group Technical Policy (Hill). See **Figure 30** below:

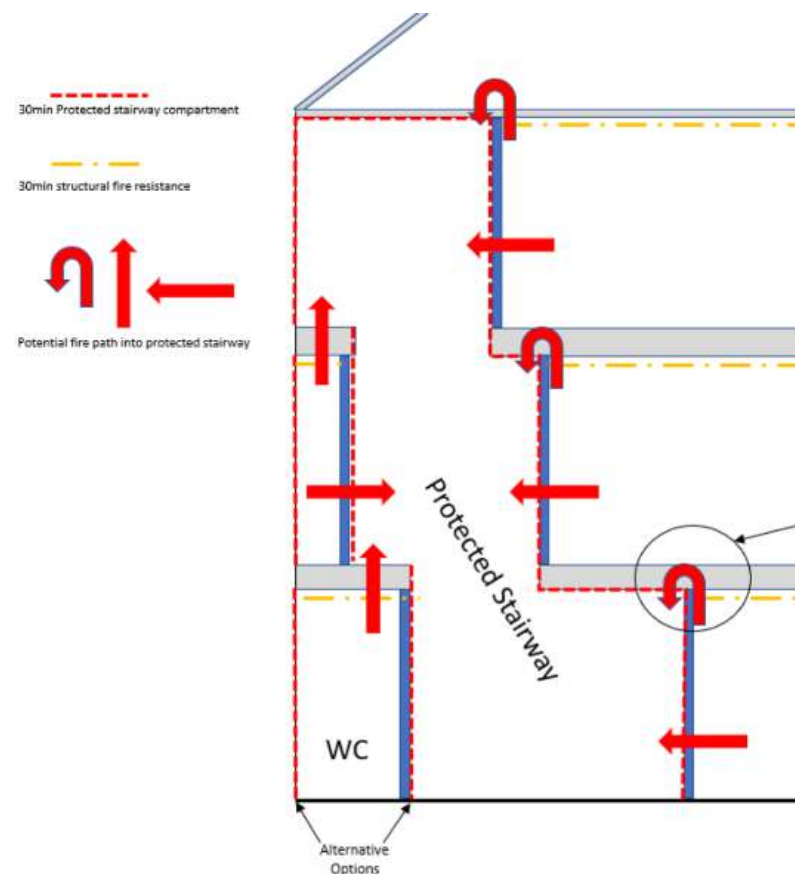


Figure 30: BQ035 Hill Policy - Protected Stairway

B.5.6 Fire Stopping

Fire stopping materials are to be specified to afford the same fire resistance rating as the compartmentation penetrated (see Section B.5.4).

It is recommended that fire stopping materials are designed, specified and installed in line with the guidance of Ensuring Best Practice for Passive Fire Protection in Buildings from the ASFP.

B.5.7 Service Penetrations

B.5.7.1 Flues

Flues should be specified to achieve no less than ½ the fire resistance of the compartmentation they penetrate.

B.5.7.2 Pipes

Except where otherwise noted below; pipes passing through compartment walls should be specified to be fire stopped with proprietary seals (collars or similar) to maintain the fire resistance of the compartmentation they penetrate.

For pipes which fall under the dimensional constraints set out in the table below, these seals are not required, however fire stopping must be provided around the pipe and all gaps sealed.

Situation	Pipe Material and Maximum Nominal Internal Diameter (mm)		
	High Melting Point Metal ^A	Lead, Aluminium, Aluminium Alloy, uPVC ^B and Fibre Cement	Any Other Material
Structure (but not a wall separating buildings) enclosing a protected shaft that is not a stair or a lift shaft	160	110	40
Compartment wall or compartment floor between flats	160	160 (stack pipe) ^C 110 (branch pipe) ^C	40
Wall separating dwelling houses (Block E)	160	160 (stack pipe) ^C 110 (branch pipe) ^C	40
Any other situation	160	40	40
Note A: Any metal (such as cast iron, copper or steel) which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe. Note B: uPVC pipes that comply with either BS 4514 or BS 5255. Note C: These diameters are only in relation to pipes that form part of an above-ground drainage system and are enclosed as shown in Figure 6.			

B.5.7.3 Ducts

General Provisions

If air handling ducts pass through fire-separating elements, the load-bearing capacity, integrity and insulation of the elements should be maintained using one or more of the following four methods.

1. Thermally activated fire dampers.
2. Fire resisting enclosures.
3. Protection using fire resisting ductwork.
4. Automatically activated fire and smoke dampers triggered by smoke detectors.

Kitchen Extract

Methods 1 and 4 should not be used for extract ductwork serving kitchens. The likely build-up of grease within the duct can adversely affect dampers.

Ducts passing through Protected Escape Routes

Method 1 should not be used for extract ductwork passing through the enclosures of protected escape routes.

Installation and Specification of Fire Dampers

Both fire dampers and fire and smoke dampers should be all of the following.

- Sited within the thickness of the fire-separating elements.
- Securely fixed.
- Sited such that, in a fire, expansion of the ductwork would not push the fire damper through the structure.

Access to the fire damper and its actuating mechanism should be provided for inspection, testing and maintenance.

Fire dampers should meet both of the following conditions.

- Conform to BS EN 15650 (2).
- Have a minimum E classification of 60 minutes or to match the integrity rating of the fire resisting elements, whichever is higher.

Fire and smoke dampers should meet both of the following conditions.

- Conform to BS EN 15650 (2).

- Have a minimum ES classification of 60 minutes or to match the integrity rating of the fire resisting elements, whichever is higher.

Smoke detectors should be sited so as to prevent the spread of smoke as early as practicable by activating the fire and smoke dampers. Smoke detectors and automatic release mechanisms used to activate fire dampers and/or fire and smoke dampers should conform to BS EN 54-7 (3) and BS 5839-3 (4) respectively.

B.5.8 Cavity Barriers

Except where otherwise noted below; all cavity barriers are to be specified to achieve no less than -/30/15 fire resistance.

B.5.8.1 Locations

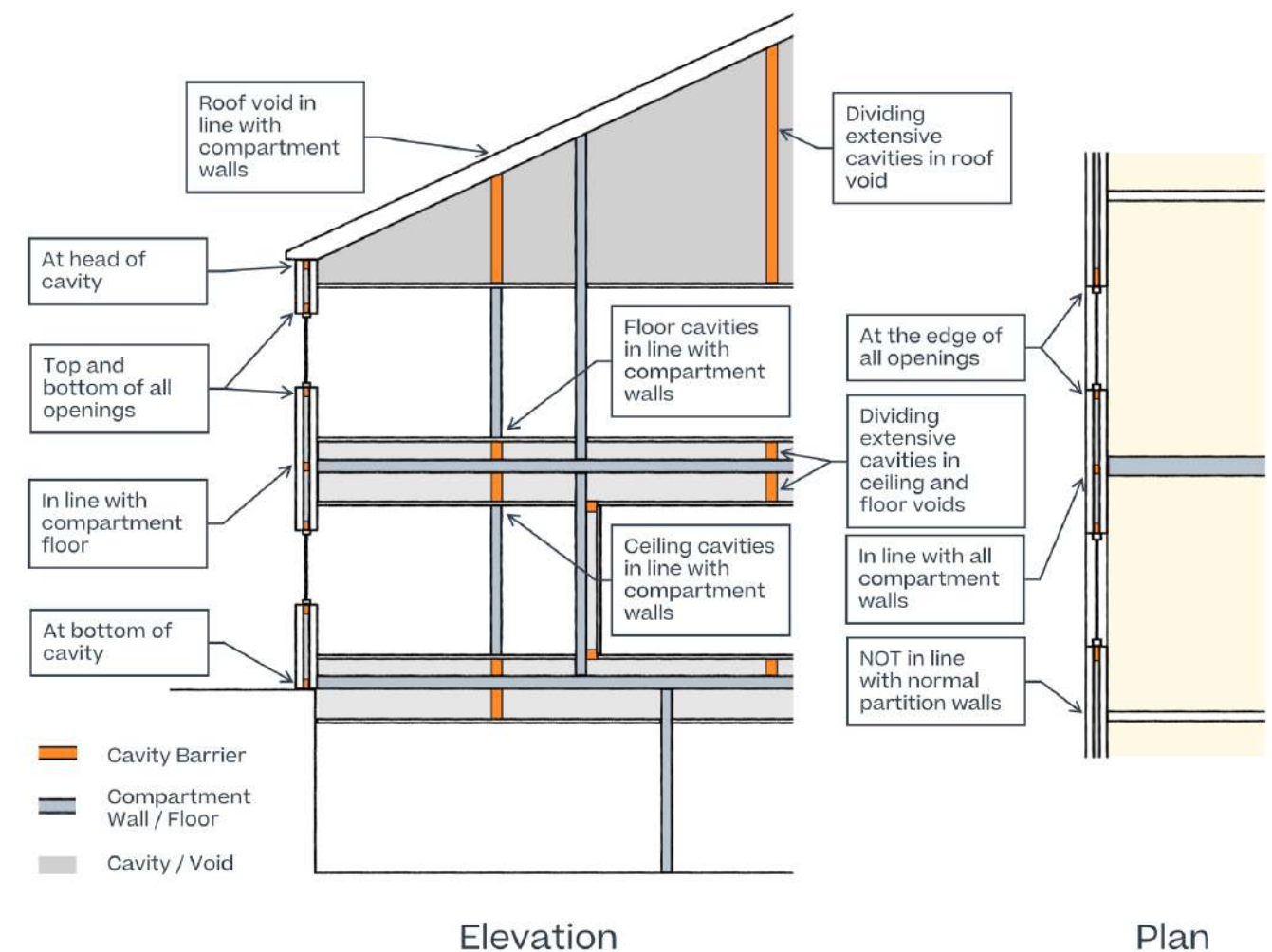


Figure 31: Cavity barrier locations

Extensive cavities are to be subdivided by cavity barriers on the following basis:

Location	Reaction to Fire Classification of Exposed Surfaces ^A	Maximum Dimension in any direction (m)
Between Roof and Ceiling	Any	20
Elsewhere	C-S3,D2 or better	20
	Any	10
Note A: This does not apply to services or pipe insulation passing through the cavity.		

B.5.8.2 Masonry Cavity External Walls

For where the inner and outer leaf of external walls are formed of masonry (brickwork, blockwork or concrete) for with a minimum thickness of 75mm, cavity barriers may be omitted; providing that:

- Cavity closers are provided around all openings.
- Cavity closers are provided at the head of the wall, unless the wall is fully filled with insulation.
- Cavity barriers should be located to separate this wall type, from any other wall types.

Note: Cavity closers need not achieve a fire resistance.

B.6 Fire Service Access and Facilities

Performance Criteria	Status ^A
Tender Access	Contents to be confirmed as part of Fire Safety Management plans.
	Contents to be confirmed as part of Fire Safety Management plans.
Rising Mains	Contents to be confirmed as part of Fire Safety Management plans.
	Contents to be confirmed as part of Fire Safety Management plans.
External Walls	Contents to be confirmed as part of Fire Safety Management plans.
	Contents to be confirmed as part of Fire Safety Management plans.
Fire Service Access and Information	Contents to be confirmed as part of Fire Safety Management plans.
	Contents to be confirmed as part of Fire Safety Management plans.
Wayfinding Signage	Contents to be confirmed as part of Fire Safety Management plans.

B.6.1 Tender Access

B.6.1.1 Block E

Block E is provided with fire service access on the basis that:

- All parts of the building can be reached from the roadway by a 45m hose.
- The aggregate floor area of all floors is less than 2,000m².



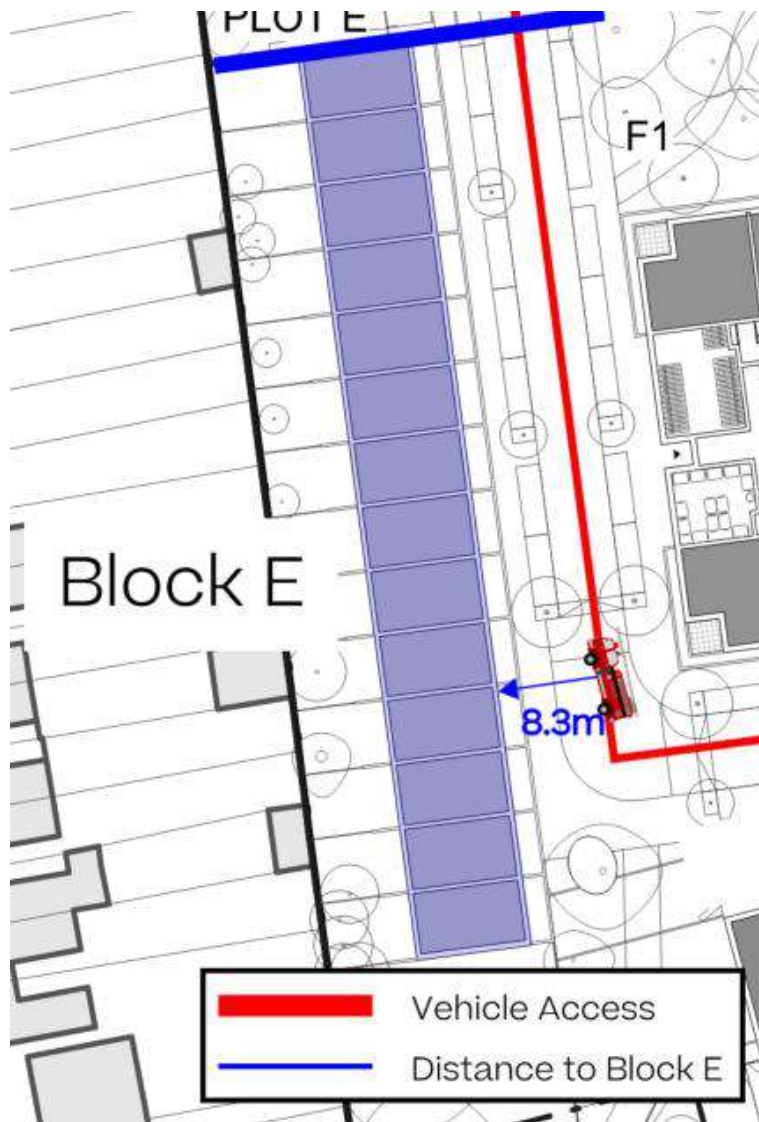


Figure 32: Tender Access | Block E

B.6.1.2 Block F-J

The buildings are provided with rising mains, as such roadway access to within 18m of all mains inlet is to be provided as schematically demonstrated below:

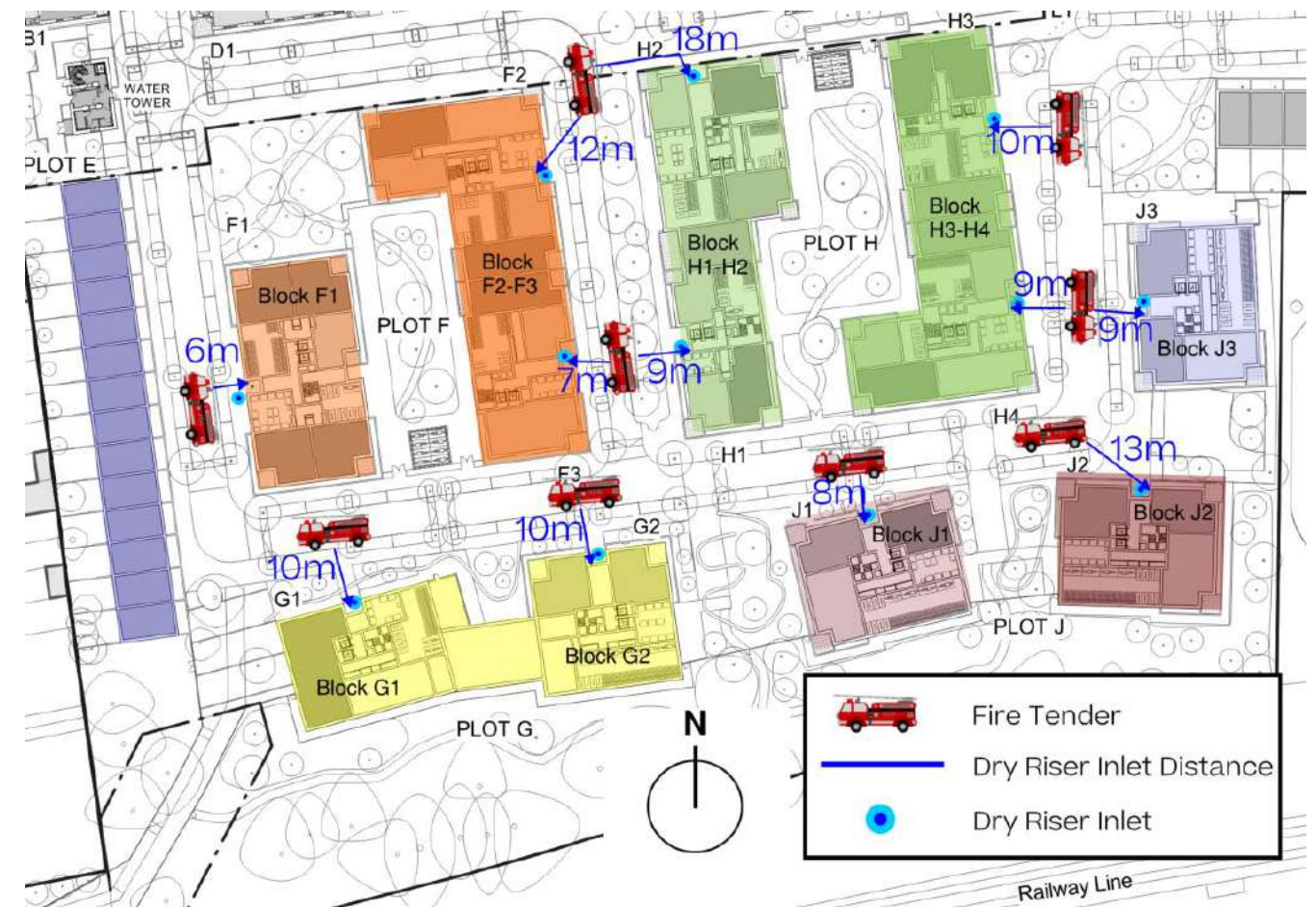


Figure 33: Tender Access | Block F-J

B.6.1.3 Commercial Unit Block G1

In line with guidance, every point of the commercial unit on Ground Floor of Block G1 can be accessed within 45m.

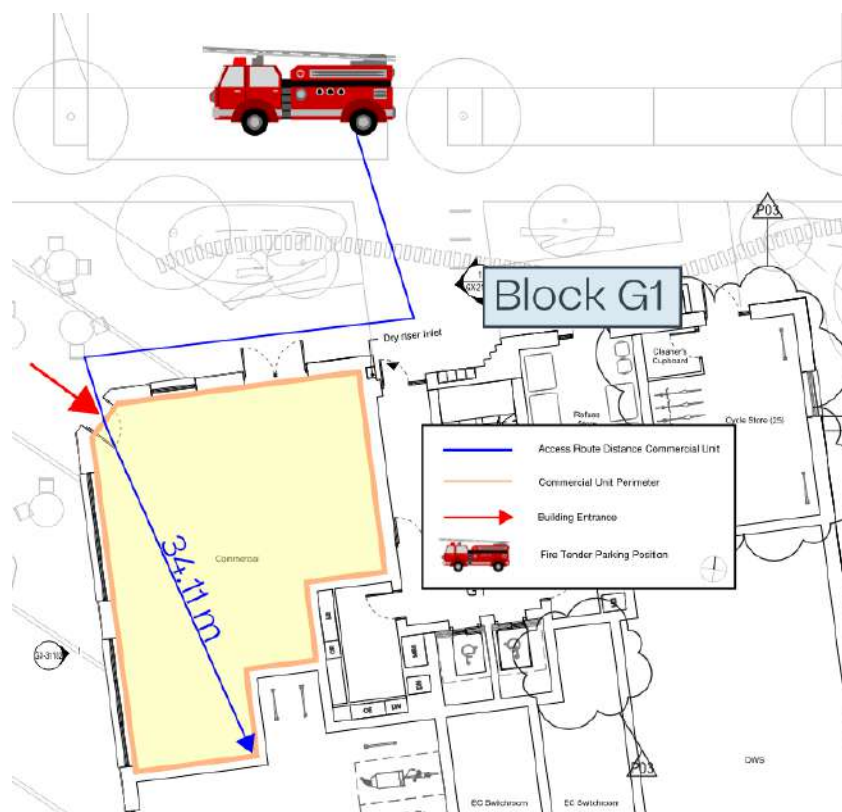


Figure 34: Tender Access | Commercial Unit Block G1

B.6.1.4 Access Routes

All roadways required to achieve the access requirements are to be designed to achieve the following performance criteria:

Criteria	Minimum Performance
Width of Road between Kerbs	3.7m
Width of Gateways	3.1m
Turning Circle Between Kerbs	16.8m
Turning Circle Between Walls	19.2m
Clearance Height	3.7m
Minimum Carrying Capacity	14 tonnes ^A

Criteria	Minimum Performance
Maximum Dead-End Travel Distance	20m
Note A: In accordance with London Fire Brigade GN 29 (5).	

B.6.1.5 Water Supplies

Fire hydrants are to be located within 90m of the fire tender access locations noted above.

Note: The location of the hydrants is to be confirmed by the design team.

B.6.2 Rising Mains

A dry rising mains system is to be specified in accordance with the guidance of BS 9990 where:

- An inlet is to be located in an easily identifiable location adjacent to fire service access point to the building(s), as schematically indicated below.
- An outlet is to be located within the stair/firefighting lobby as schematically indicated below.

It has been assessed that all distances between the dry riser inlet and outlet on ground floor level are within the limits recommended by guidance.

B.6.3 Fire Fighting Shaft

Following guidance BS 9991, at least 1 fire fighting shaft is to be provided for:

- Block G2.
- Block H2-4.
- Block J1-3.

The fire fighting shaft is to be formed of the following major elements:

- Fire fighting stair.
- Fire fighting lift.

The location of the fire fighting shafts is shown below.

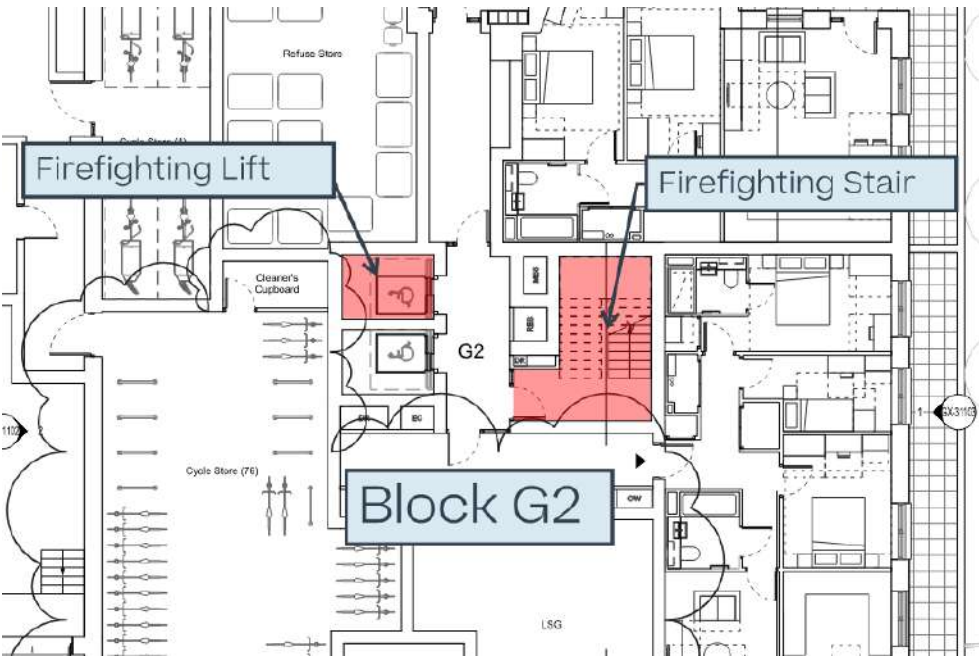


Figure 35: Fire Fighting Shaft | Block G2

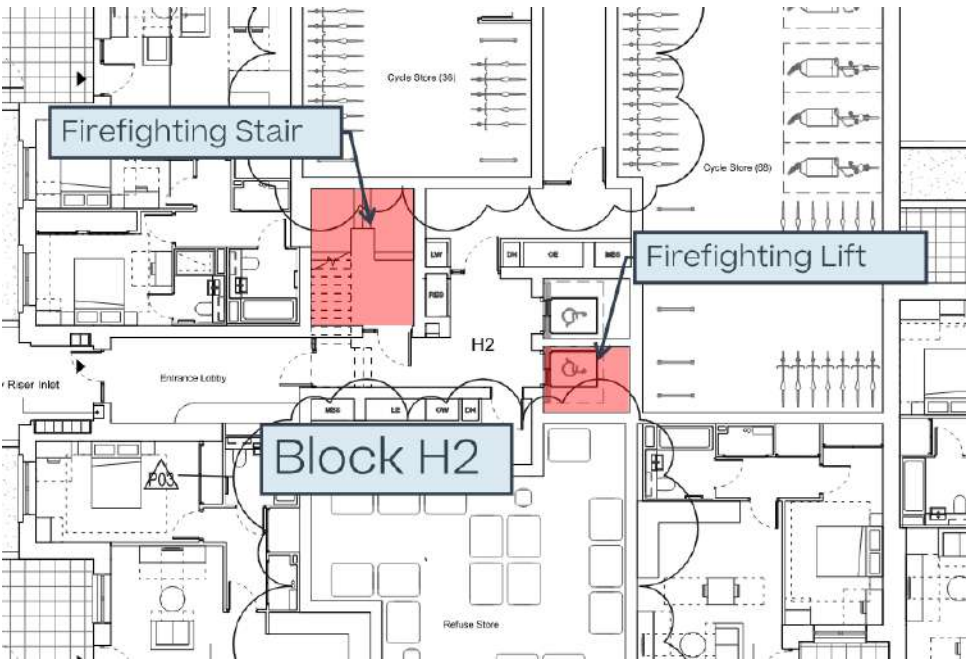


Figure 36: Fire Fighting Shaft | Block H2

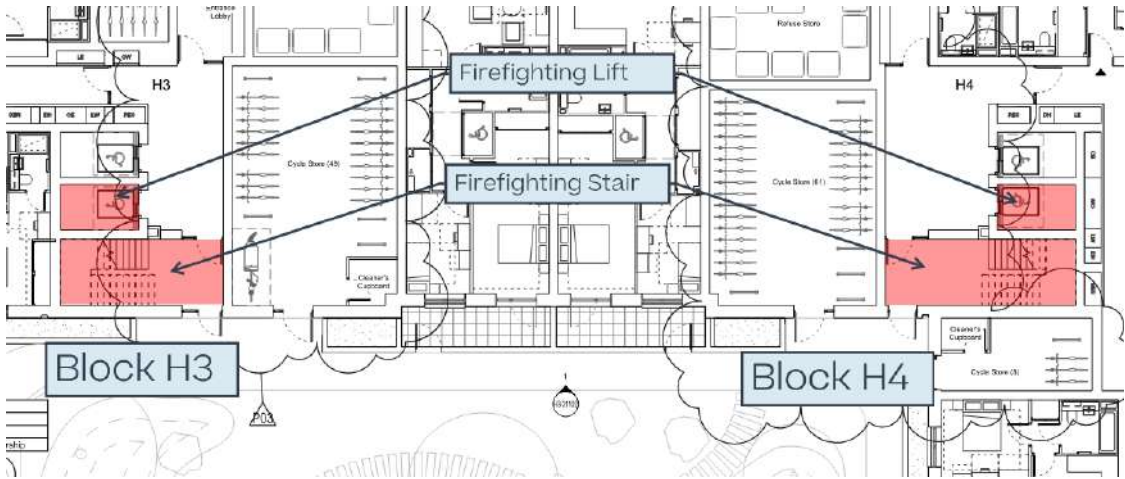


Figure 37: Fire Fighting Shaft | Block H3-4

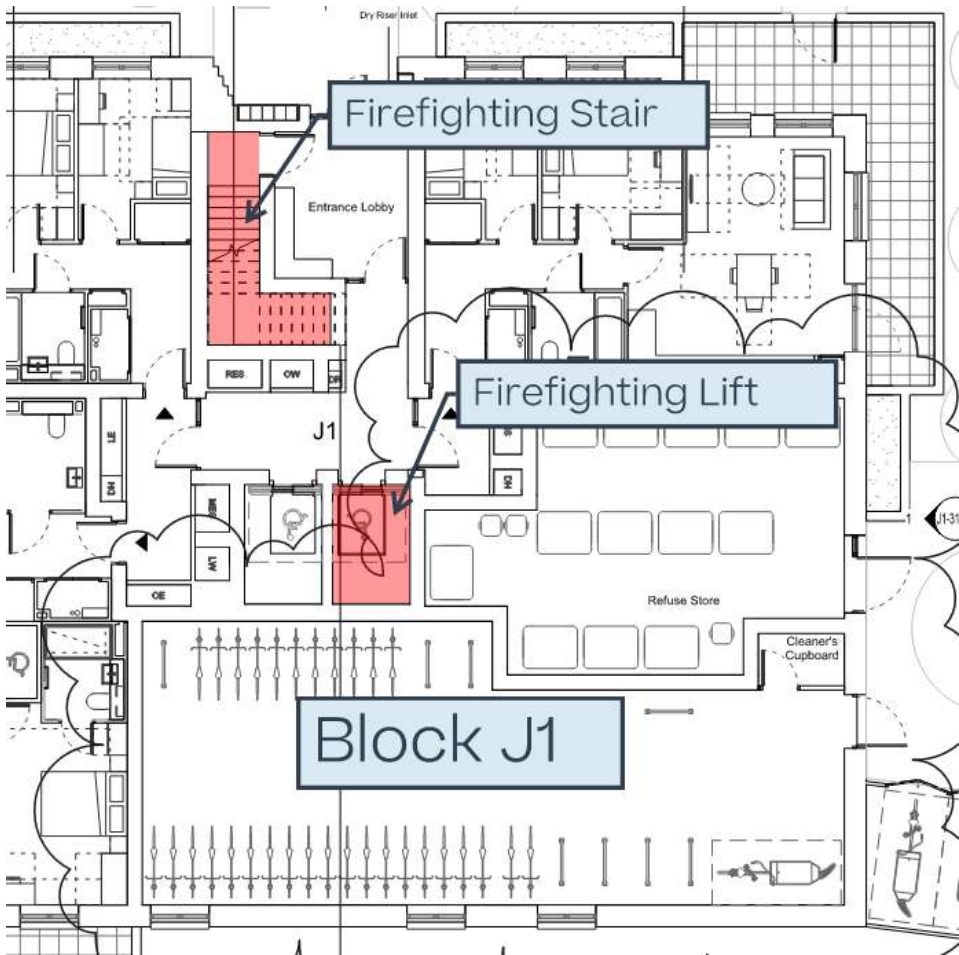


Figure 38: Fire Fighting Shaft | Block J1

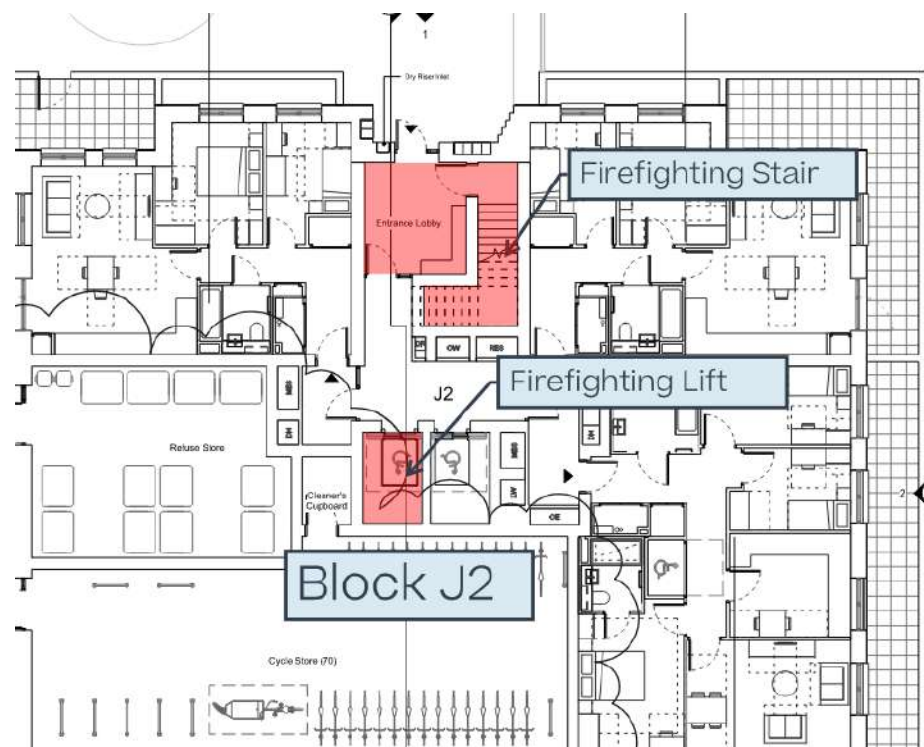


Figure 39: Fire Fighting Shaft | Block J2

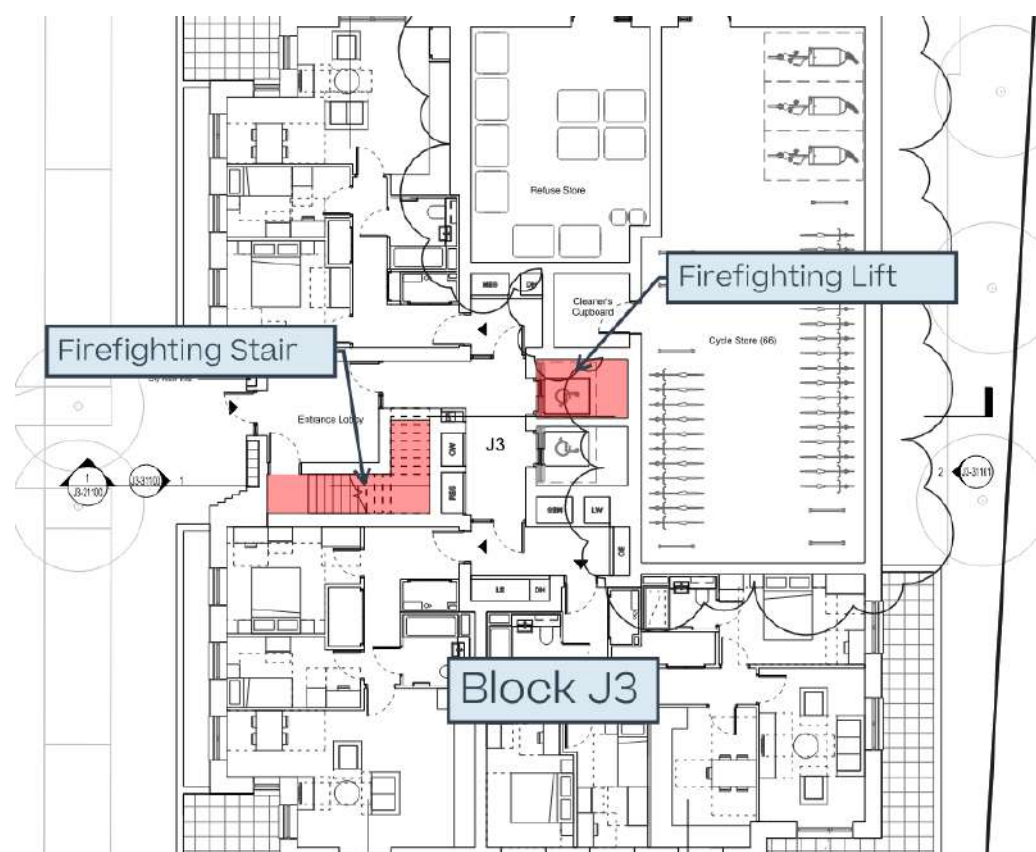


Figure 40: Fire Fighting Shaft | Block J3

The firefighting stair is to be provided with a tread width of no less than 1100 mm tread width; however, handrails may project into the width by 100 mm at each side. Firefighting stairs are to be designed in accordance with BS 5395-1 (6).

Only services that serve a firefighting stair may be accessed from within a firefighting stair.

The elements are to be enclosed and separated from each other by construction which achieves the following:

- Fire resistance is to achieve the periods indicated in **Section B.5.4**.
- Unless constructed of brick or concrete, all partitions are to achieve the following standard of impact resistance when tested in accordance with BS 5234-2:

Test	Severity	Criteria
Stiffness	500N	No significant damage, maximum deflection B) 10 mm and residual deflection 1 mm
Small Hard Body Impact	10 N.m	No significant damage
	30 N.m	No perforation
Large Soft Body Impact	100 N.m	2mm maximum deformation
	120 N.m	No collapse or dislocation
Crowd Pressure	1.5 kN/m	No collapse or dangerous damage

B.6.3.1 Fire Fighting Lift

Lift provisions including firefighting lifts are addressed in **Section B.1**.

B.6.4 Hose Laying Distance

It has been assessed that hose laying distances are within the 60m recommended limit for sprinklered buildings. See the hose laying distance indicated in **Figure 41**.

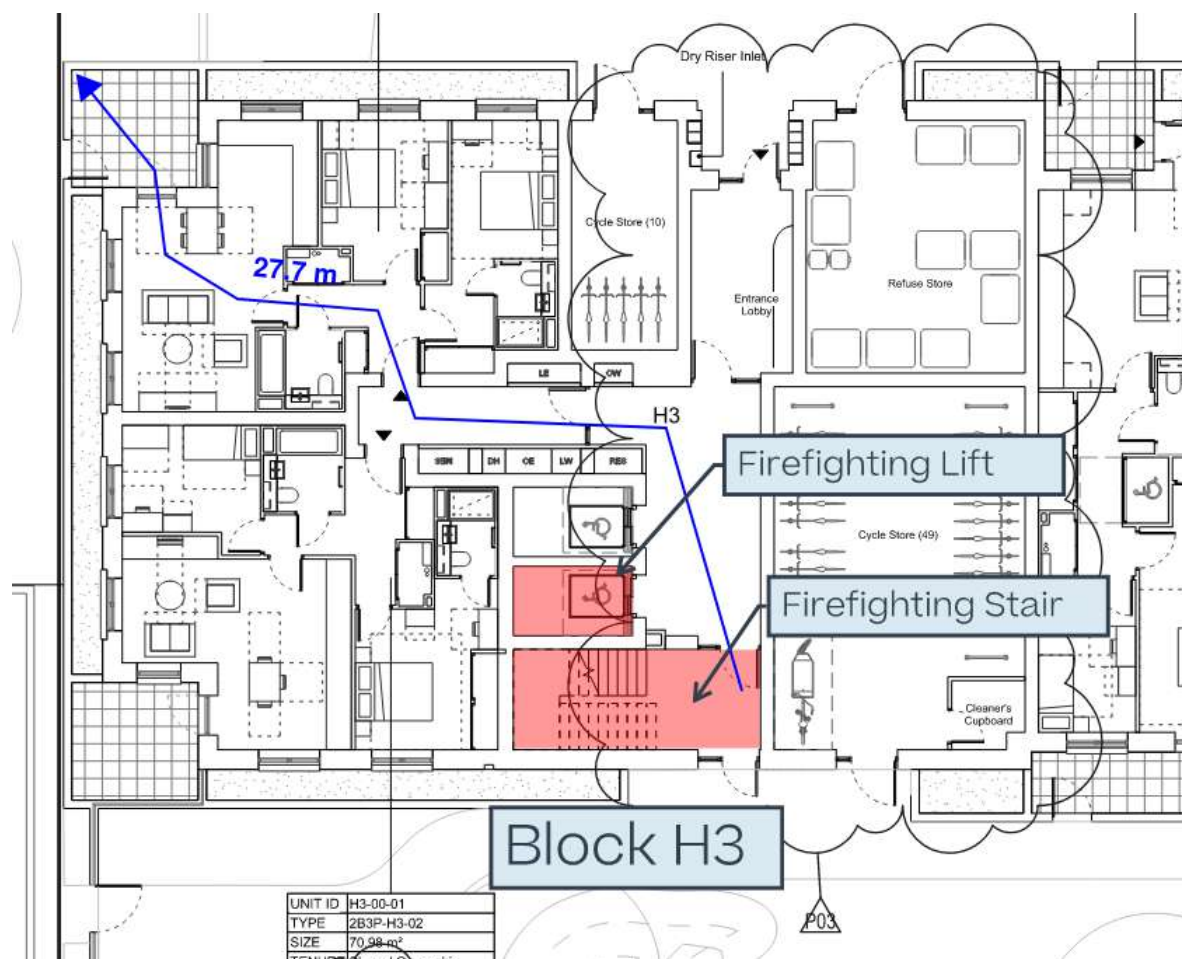


Figure 41: Hose Laying Distance Block H3

B.6.5 Fire Service Access and Information

A Premises Information Box (PIB) should be located in a prominent location adjacent to the main entrance. This information box should contain the information as recommended by the LFEPA Fire Safety Guidance Note No.70.

It is strongly recommended that these PIB's are provided with any necessary security overrides to provide the fire service free access into the building.

B.6.6 Wayfinding Signage

B.6.6.1 Floor Identification Signage

The floor identification signs are to be specified to meet all the following points:

- The signs are to be located of every landing of a protected stairway and every protected corridor into which a firefighting lift opens.

- The text should be in sans serif typeface with a letter height of at least 50mm. The height of the numeral that designates the floor number should be at least 75mm.
- The signs should be visible from the top steep of the firefighting stair and, where possible from inside a firefighting lift when the lift car door opens.
- The signs should be mounted between 1.7m and 2m above floor level and, as far as practicable, all signs should be mounted at the same height.
- The text should be on contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch.

B.6.6.2 Wording for Floor Identification Signage

The wording used on the floor identification sign should take the form of Floor X, with X designating the number of the storey, as intended for reference by the residents. The floor numbering designations should meet all of the following points:

- The floor closest to the mean ground level should be designated as either Floor 0 or Ground Floor.
- Each number above ground floor should be number sequentially beginning with Floor 1.
- A lower ground floor should be numbered sequentially beginning with Floor -1.
- Each floor below the ground floor should be numbered sequentially beginning with Floor -1 or Basement 1.

B.6.6.3 Flat Indicator Signage

All floor identification signs are to be supplemented by flat indicator signs which provide information relating to flats accessed on each storey. The flat indicator signs should meet all of the following points:

- The signs should be immediately below the floor identification signs, such that the top edge of the sign is no more than 50mm below the bottom edge of the floor identification sign.
- The wording should take the form Flats X-Y, with the lowest flat number first.
- The text should be in sans serif typeface with a letter height of at least half that of the floor indicator sign.
- The wording should be supplemented by arrows when flats are in more than 1 direction.

- The text and arrows should be on contrasting backgrounds, easily legible and readable in low level lighting conditions or when illuminated with a torch.

Note: in the case of multi storey blocks of flats with two or more entrances, the flat number should be indicated on the normal access storey.

B.6.7 Evacuation Alert System

An Evacuation alert system designed and installed in line with BS 8629 is to be provided for

- Block G2
- Block H2-H4
- Block J1-J3

as they are >18m in height. This is in accordance with **Clause 4 Catalyst ER**.

Note: It is recommended to provide

- Block F1-F3
- Block G1
- Block H1

with an evacuation alert system as well, to achieve a standardized design throughout the development.

B.7 Management

B.7.1 Fire Safety Management Level

This fire strategy has been developed on that basis that the Fire Safety Management of this building will achieve at least the standard required to comply with the Regulatory Reform (Fire Safety) Order 2005.

B.7.2 Management of Evacuation for Persons with Reduced Mobility

Due to the fact that evacuation lifts are provided in every level of each core, the provision of Personal Emergency Evacuation Plans (PEEP) is not required, however recommended. Occupants who require the use of the evacuation lift need to be trained in the operation of said lift so to make use of it without assistance.

Section C.

Engineered Assessments

C.1 Fire Spread to the Boundary

C.1.1 Method

The following assessments have been undertaken to determine the maximum allowable unprotected area on the external wall in line with guidance of BR 187, using the enclosing rectangle method calculations as set out in **Section B.4** of this document.

Where identified in **Section C.1.2**, the elevation should be provided with fire resistance rating where less than 100% unprotected area is achieved. The protected area needs to achieve fire resistance in line with **Section B.5.3.1**.

C.1.2 Assessment Block E

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block E	N	North	Residential	<1	9.8	3	0
Block E	N	East	Residential	7.5	5.7	3	100
Block E	N	West	Residential	7.0	5.7	3	100

C.1.3 Assessment Block F1

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block F1	Y	North	Residential	22.8	9.3	3	100



Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block F1	Y	East	Refuse Store	9.4	5.5	3	100
Block F1	Y	South	Residential	8.1	9.3	3	100
Block F1	Y	West	Cycle Store	7.5	7.0	3	100

C.1.4 Assessment Block F2-3

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block F2-3	Y	North	Residential	1.0	16.8	3	42.5
Block F2-3	Y	East	Refuse Store	8.6	6.3	3	100
Block F2-3	Y	South	Residential	8.1	7.5	3	100
Block F2-3	Y	West	Cycle Store	9.4	6	3	100

C.1.5 Assessment Block G1-2

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block G1-2	Y	North	Commercial	8.1	9.9	4.4	100
Block G1-2	Y	East	Residential	10.5	14.4	3	100
Block G1-2	Y	West	Commercial	7.3	12.4	4.4	100

C.1.6 Assessment Block H1-2

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block H1-2	Y	North	Residential	1.1	11.2	3	50.9
Block H1-2	Y	East	Refuse Store	6.0	6.3	3	100
Block H1-2	Y	South	Residential	8.1	7.5	3	100
Block H1-2	Y	West	Cycle Store	8.6	6	3	100

C.1.7 Assessment Block H3-4

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block H3-4	Y	North	Residential	1.1	8.0	3	58.2
Block H3-4	Y	East	Refuse Store	9.0	6.0	3	100
Block H3-4	Y	South	Residential	8.1	12.2	3	100
Block H3-4	Y	West	Cycle Store	6.0	8.2	3	100

C.1.8 Assessment Block J1

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block J1	Y	North	Residential	8.1	10.5	3	100
Block J1	Y	East	Refuse Store	6.6	6.0	3	100

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block J1	Y	West	Residential	10.5	12.7	3	100

C.1.9 Assessment Block J2

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block J1	Y	North	Residential	8.0	10.5	3	100
Block J1	Y	East	Residential	8.4	12.7	3	100
Block J1	Y	West	Refuse Store	10	6.2	3	100

C.1.10 Assessment Block J3

Building / Block	Sprinklers	Elevation / Location	Usage / Fire Load	Distance to Boundary (m)	Width (m)	Height (m)	Maximum Unprotected Area (%)
Block J3	Y	North	Refuse Store	5.3	6.0	3	100
Block J3	Y	East	Cycle Store	3.0	17.0	3	87.1
Block J3	Y	South	Residential	8.0	12.2	3	100
Block J3	Y	West	Residential	9.0	10.4	3	100

C.2 Cooking Facilities Assessment

C.2.1 Introduction

The purpose of this section is to demonstrate how the recommendation of Clause 9.4.2 (a) of BS 9991 for the location of cooking facilities is being met. The location of cooking facilities is subject to the following guidance in 9.4.2:

Cooking facilities should be sited away from the flat entrance door and the internal escape route (see Figure 10a below);

Figure 10 Flat with restricted travel distance

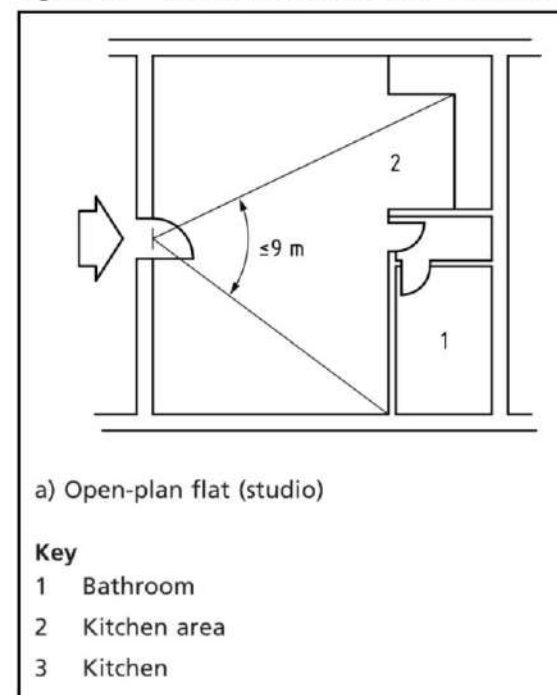


Figure 42: Figure 10 a) Extract from BS 9991 – Example of Open Plan Flat with Open Kitchen Subject to Clause 9.4.2

It is noted this guidance for location of cooking facilities is not entirely clear as to what an acceptable distance is between cooking facilities and the internal egress route. This section therefore provides an interpretation of this guidance as to what a suitable location of cooking facilities is based on a radiation analysis which is considered as meeting the intent of the Building Regulations B1.

This report will consider a number of available sources, including:

- The requirements of the Building Regulations 2010.
- The guidance of Approved Document B (ADB).
- The guidance of BS 9991:2011 and BS 9991:2015 (Fire safety in the design, management and use of residential buildings - Code of practice).

Additional calculations using standard models and the guidance of BS 7974.

C.2.2 Regulatory Requirements

The design of apartments is required by the Buildings Act 1984 to comply with the requirements of the Building Regulations 2010 Part B (Fire) B1 – B5. Whilst an open plan apartment will be required to demonstrate compliance with all parts, this report shall relate only to the level of compliance with the requirements of Part B1 – Means of Warning and Escape, which states that:

B1. 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 times.

The following additional performance criteria are provided:

In the Secretary of State's view, the Requirement of B1 will be met if:

- a) There are routes of sufficient number and capacity which are suitably located to enable persons to escape to a place of safety in the event of a fire.
- b) The routes are sufficiently protected from the effects of fire where necessary.
- c) The routes are adequately lit.
- d) The exits are suitably signed.
- e) There are appropriate facilities to either limit the ingress of smoke to the escape route(s) or the restrict the fire and remove smoke.
- f) All to an extend necessary that is dependent on the use of the building, its size and height.
- g) There is sufficient means for giving early warning for persons to the building.

In the context of an apartment layout these requirements are reasonably interpreted as being:

That means of egress within the apartment is configured such that occupants may reasonably gain access to the relative safety of the common corridors (or other places of safety) before the egress route(s) is rendered impassable by the action of smoke or fire within the apartment.

C.2.3 Radiation Modelling

The purpose of this section is to determine the location of cooking appliances which is considered as meeting the guidance of BS 9991 Clause 9.4.2 (a). Therefore, this report must establish two things:

- Is the radiation hazard from the cooking facilities to the internal egress route sufficiently low to allow occupants to evacuate from the flat?
- What is an acceptable distance from the cooking facilities to the internal egress route which allows for this evacuation and demonstrates compliance with the recommendations of BS 9991 Clause 9.4.2 (a).

To this end, radiation modelling was conducted on confined cooking fires. These are fires that are contained to the cooking appliance. The criterion for the distance of separation is that at the peak Heat Release Rate (HRR) of a confined cooking fire, occupants must be able to withstand the radiation from the fire whilst evacuating from their apartment.

C.2.3.1 Model

The radiation model used is the point source model. The radiant heat flux (q'') is given by:

$$\dot{q}'' = \frac{\dot{Q}_r \cos\theta}{4\pi R^2}$$

where:

R is the distance from the source (m)

θ is the angle between the normal to the target, and the line of sight from the target to the point source.

The location of the theoretical point source of energy is at the centre of the fire at the mid-height of the flame. The mean flame height, H , is measured by the Heskestad correlation.

$$H = 0.23\dot{Q}^{(2/5)} - 1.05D$$

$$\dot{Q}_r = \chi_r \dot{Q}$$

where:

D is the effective diameter (m)

χ_r is the radiative fraction. This is the fraction of energy released from the fire that as radiation. - The point source is at $H/2$.

$$R = \sqrt{L^2 + H_{tx}^2}$$

There are two important assumptions made for this use of the model. The first is that the height of the target is the same as the height of the point source, which maximises the level of radiation received at the target. This is not in the interest of conservatism, but it is assumed that the height of the point source is less than the height of a person, and as we care about radiation levels on any point on a person's body, we will study the point on a person that is the same height as the radiation source, where the person will receive the most radiation. Therefore H_{tx} is taken as zero for all tests.

The second is the angle. It is assumed that there is some point on a person's body with its normal facing toward the flame, therefore the maximum radiation received on a person will be with a value ($\cos\theta = 1$). Therefore, the angle θ is assumed to be zero for all tests.

Therefore, the model is simplified to:

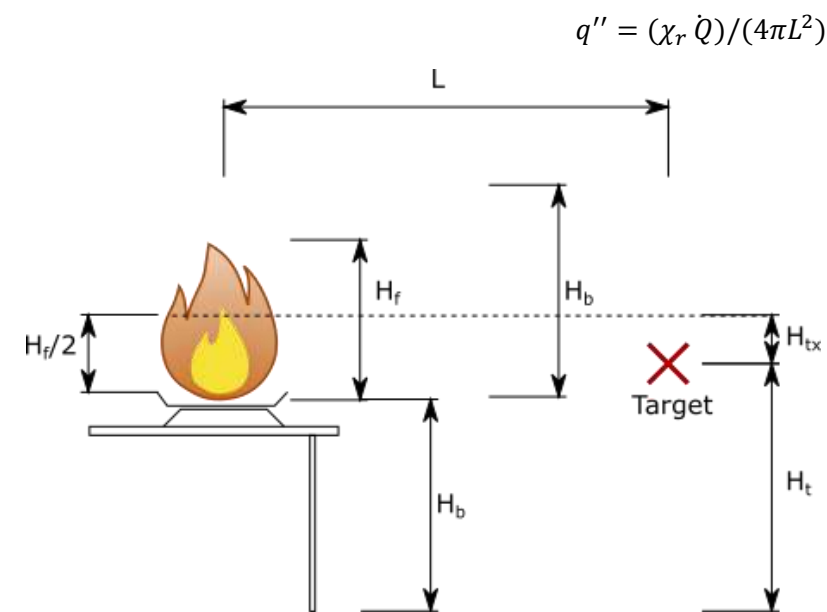


Figure 43: Layout of the Radiation Model.

C.2.3.2 Model Validation

The modelling methodology used for this point-source model in which a number of radiation models were validated against experiments. It was found that the point-source model correlated best. The experiments used to validate these experiments were as small as 300 mm×300 mm in size, which correlates approximately to a large pan fire. Also concluded the point source model showed the best correlation of those tested.

C.2.3.3 Input Variables

Radiative Heat Fraction - χ_r

Radiative heat fraction is largely independent of HRR and is governed more by the type of fuel and the efficiency of the fire, which are big factors in determining soot composition which is a critical factor in determining radiative fraction (Markstein 1976).

Radiative fraction is typically taken a 0.3 for typical fuel mixes (Drysdale, 2011) and this value has been used as the basis of the following analysis.

Beyler reports in the SFPE Handbook values of up to 0.40 for higher order hydrocarbons. Whilst cooking oils are typically light fraction hydrocarbons, with lower radiative fractions, it was considered reasonable to undertake a sensitivity study using this value.

Heat Release Rate (HRR) - $\dot{Q}$

Heat release is the most significant intrinsic property of the fire when it comes to radiation levels, as the radiation emitted is directly proportional to the heat release rate. A key source was from which the results in are quoted. The HRR used in this radiation modelling is based on the assumption that the fire is an oil-based fire in a pan or similar, with the fire not having escaped that confines of the pan. If the fire were to escape the confines of the vessel of origin, then other objects may become involved, such as cupboards and furniture. This assumption is supported by the fact that 94% of cooking fires remain confined to their vessel of origin, however, this assumption should only be used in flats with smoke detection systems are installed, in order to minimise the risk of occupants remaining in the flat after the fire escapes from the vessel of origin.

As the highest HRR found in these tests was 400 kW, a value of 400 kW was used in the model.

C.2.3.4 Results

Using the established constants, we can formulate a relationship between the radiation threshold (2.5 kW/m²) distance and the HRR of the cooking fire.

$$L = \sqrt{(0.3 \dot{Q}) / (4\pi 2.5)}$$

$$L = \sqrt{0.3 / (4\pi 2.5)} \times \sqrt{\dot{Q}}$$

$$L = 0.0977 \times \sqrt{\dot{Q}}$$

$$L = 0.0977 \times \sqrt{400}$$

$$L = 1.954$$

As noted above a sensitivity study has been undertaken using a radiative fraction of 0.4, which provides the following:

$$L = \sqrt{(0.4 \dot{Q}) / (4\pi 2.5)}$$

$$L = \sqrt{0.4 / (4\pi 2.5)} \times \sqrt{\dot{Q}}$$

$$L = 0.1128 \times \sqrt{\dot{Q}}$$

$$L = 0.1128 \times \sqrt{400}$$

$$L = 2.257$$

C.2.4 Conclusion

C.2.4.1 Input Variables

The purpose of this section was to demonstrate how the recommendation of Clause 9.4.2 (a) of BS 9991 for the location of cooking facilities is being met through a radiation analysis.

C.2.4.2 Intent of Guidance

The location of cooking facilities is subject to the following guidance of BS 9991 Clause 9.4.2 (a):

Cooking facilities should be sited away from the flat entrance door and the internal escape route.

It is noted this guidance for location of cooking facilities is not entirely clear as to what an acceptable distance is between cooking facilities and the internal egress route. This advice note therefore provides an interpretation of this guidance as to what a suitable location of cooking facilities is based on a radiation analysis which is considered as meeting the intent of the Building Regulations B1.

The radiation analysis conducted in this advice note demonstrates how this guidance of Clause 9.4.2 is being met and is considered as meeting the requirements of the Building Regulations B1.

The reason that cooking appliances are located away from the entrance is that the entrance is a single point of failure, and a cooking fire will block egress from the rest of the apartment.

C.2.4.3 Recommendations

The radiation modelling has demonstrated that a separation distance of 1.95 m from cooking appliances is necessary to reduce radiation risks to occupants, to less than 2.5 kW/m². A sensitivity study undertaken indicates that if the fire consists of fuels with a high radiative fraction were present then this radial distance would be increased to 2.26 m.

It is therefore recommended that:

- A radial distance of 2 m is maintained between the centre of the cooker and the closest part of the internal egress route.
- An additional 800 mm is maintained for the internal egress route to allow occupants to pass at normal walking rates.

This is considered acceptable under the basis that:

- For normal fuel scenarios this will maintain the incident heat flux at less than 2.5 kW/m² for the entire egress route.
- Under the sensitivity analysis with high radiative value fuel types, either:
 - The egress route would be narrowed to 540 mm which is still wider than the average male human shoulder width of 470 mm. Or,
 - Should occupants require the full 800 mm width they may need to pass through a region of elevated incident radiation for a distance of 2.1m with a peak incident radiation of 3.18 kW/m². This is still far below the 4s exposure tenability stated in PD-7974 Part 6 of 10kW/m², and even at a reduced walking speed of 0.6m/s occupants would be exposed to this elevated radiation for a period of only 3.5 s.

Both of which are considered acceptable for the purposes of a sensitivity study.

Appendices

1 Method and Limitations

1.1 The Building Act 1984 (as amended by Building Safety Act 2022)

The Building Act 1984 is the primary legislation under which the Building Regulations are made and enforced through Building Control Approval.

For building defined as higher-risk buildings they shall fall under the enhanced approvals process as defined under the Building Safety Act 2022. For the purposes of this Act higher-risk buildings are those which are both:

- Greater than 18m in building height or 7 storeys in height.
- Contain at least 2 residential units, or are hospitals or care homes.

In accordance with this Act all building control approvals for higher-risk buildings shall be regulated by the Building Safety Regulator (HSE).

1.1.1 The Building Regulations 2010

The Building Regulations 2010 is the Statutory Instrument which seeks to ensure that the policies set out in the Act are implemented.

Compliance with the requirements of the Building Regulations B1 – B5 may be demonstrated via the following:

Meeting Standard Guidance

Demonstrating that design meets the recommendations of the Approved Documents B1 or B2, or other suitable design guidance documents. It must be noted that these guidance documents are specifically created to provide solutions for generic/common buildings, and guidance documents may only relate to specific building or occupancy types.

Development of an Alternative Approach

Any other approach may be adopted to demonstrate that the functional requirements of the Building Regulations have been met. These alternative approaches are commonly referred to as Fire Engineered Solutions.

As a matter of good practice Fire Engineered Solutions should be developed in accordance with the guidance BS 7974 which set out a consistent framework for

robustly determining whether the Fire Engineered Solutions will achieve the functional requirements.

In this instance the following approach is adopted; wherever practicable the design of the building will be demonstrated as meeting the relevant guidance of BS 9991, and where the design of the building falls outside the application of this guidance an alternative approach will be developed.

Determination of compliance with the requirements of the Building Regulations is at the jurisdiction of the Approvals Authority, and all design guidance or performance criteria set out within this report are at approvals risk until agreed with the authority.

1.2 The Building Regulations 2010 – Regulation 7

The Building Regulations, Regulation 7 requires that materials which are used are; appropriate for the circumstances in which they are used, adequately mixed or prepared, and are applied, used or fixed so as to adequately perform the functions for which they are designed. It is noted that report provides performance specifications against which the selection and application of materials must be determined by the design team or principal contractor.

The Building Regulations 2010 (incorporating the 2018 Amendments) place additional specific regulatory requirements upon materials incorporated into external wall construction for any construction which:

- Has an uppermost storey of >18m, when measured from lowest possible adjoining ground level to the top of the uppermost floor surface of the uppermost storey.

AND

- Has any of the following:
 - One or more dwellings.
 - Contains an institution ^A.
 - Contains a room for any residential purpose (excluding any hostel, hotel or boarding house).

Note A: Means an institution (whether described as a hospital, home, school or other similar establishment) which is used as living accommodation for, or for the treatment, care or maintenance of persons:

- Suffering from disabilities due to illness or old age or other physical or mental incapacity. Or,
- Under the age of five years.

1.3 The Regulatory Reform (Fire Safety) Order 2005

The Regulatory Reform (Fire Safety) Order (RRO) requires that all buildings are managed and maintained so as to afford an adequate standard of life safety for all legal occupants (including visitors) of a building and to provide adequate access and facilities for the Fire Service to undertake their activities within the building.

This Fire Strategy must be provided to the Responsible Person under the requirement of the Building Regulations Regulation 38. Additionally:

- This strategy should form part of the Fire Safety Arrangements under the RRO for the building once occupied.
- This strategy should be provided, and referred to, as part of the Fire Risk Assessment process for the building.

Whilst the RRO does not come into force until after a building has been constructed, reasonable provision should be made in the design and construction of the building to allow for the building to be safely managed and operated in accordance with the RRO. To this end the Approvals Authority has a statutory duty to consult with the relevant Enforcing Authority (London Fire Brigade) whom are required to advise on:

- Matter which have to be complied with under the RRO once the building is occupied.
- Matters which have to be complied with to meet any other fire legislation, other than the Building Regulations.
- Advisory but non-enforceable matters, including commentary on the application of the Building Regulation should they choose to do so.

Where it is the view of the Enforcing Authority that the design of the building is such that the requirements of the RRO cannot be met they should set down its concerns and recommendations in a formal written case, which may include details of any enforcement action it may take upon occupation.

Determination of compliance with the requirements of the Regulatory Reform (Fire Safety) Order solely is at the jurisdiction of the Enforcing Authority, and all design guidance

or performance criteria set out within this report are at approvals risk until agreed with the authority.

1.3.1 The Fire Safety (England) Regulations 2022

For high-rise residential buildings the enhanced requirements of the Fire Safety Regulations apply to provide specific requirements upon the responsible person, above and beyond the general application of the Regulatory Reform Order. For the purposes of this regulation high-rise residential buildings are those in which both:

- Greater than 18m in building height or 7 storeys in height.
- Contain at least 2 residential units.

The enhancements of the Fire Safety Regulations make specific requirements relating to:

- Retention and keeping of information in an electronic format.
- Provision of information to the fire service via a Premises Information Box.
- Record of the design and construction of external walls.
- Keeping of floor and building plans.
- Inspections and maintenance of critical life safety systems.
- Inspections and maintenance of fire doors (including front entrance doors).
- Provision and keeping of wayfinding signage.
- Provision of fire safety information to residents.
- Provision of fire safety information the Fire and Rescue Service in an electronic format relating to external wall construction and building plans.

1.4 The Construction (Design and Management) Regulations 2015

The Construction (Design and Management) Regulations (CDM) require that all parties involved in the design of a building, or whose advice may effect a change upon the design of the building shall be required to:

- Take account of any pre-construction information provided by the client (and principal designer, if one is involved).

- Eliminate foreseeable health and safety risks to anyone affected by the project (if possible).
- Take steps to reduce or control any risks that cannot be eliminated.

This is generally communicated via a Designers Risk Assessment (DRA) which identifies elements of the design which may present construction hazard and identifying what measures may be taken to eliminate the risk or otherwise reduce the hazard presented.

It is noted that this Fire Strategy sets out the minimal performance requirements for the building design and design decision made to meet these performance requirements may not be safely eliminated from the final design. Advice is however provided to the design team in consideration of these risks, and where possible to do so recommendations are made which limit the level of risk during construction, management, maintenance and upkeep of any specific fire safety systems which may be recommended to the design. It is however noted that ultimately Affinity does not provide the design of these systems and a full Risk Assessment process must be undertaken by the designer of that system.

1.5 Limitations

In this instance this report is developed based on applicable limitations and assumptions for the development which are listed as follows. Affinity Fire Engineering (UK) Ltd. accept no liability for where this report is applied outside the limitations stated:

- The information contained in this document is provided for the sole use for Hill/Catalyst and applies only to the St. Ann’s New Neighbourhood Phase 1b & 2. No reliance should be placed on the information by any other person or for any other project.
- This Fire Strategy provides strategic design advice and performance criteria **only**. This Fire Strategy does not constitute a design document, and the detailed design shall be provided by other parties. Where this document does not provide clear performance criterions all elements of design shall be required to be designed to meet the relevant guidance as set out in **Section A.7.1** above and any applicable standards made reference to within that guidance.
- This Fire Strategy has been developed based upon the understanding of the building design and usage as set out in **Section A** above. Any changes in the design or usage of the building may alter the basis upon which the Fire Strategy was developed.

- This Fire Strategy has been developed based upon the information stated in **Appendix 1.6** below. Any changes to the design of the building subsequent to this information will not be reflected within this Fire Strategy document.
- This Fire Strategy has been developed to meet the fire safety needs of the building as an entire system, and elements of this strategy must not be partially implemented from, or cherry picked.
- This Fire Strategy has been developed on the basis that active and passive fire safety systems within the building are managed and maintained in such a manner that they shall (so far as is reasonable) operate as intended in the instance of fire.
- Unless explicitly otherwise stated this Fire Strategy does not address any fire safety requirements (or recommendations) in regards to compliance with COSHH (Control of Substances Hazardous to Health Regulations 2002) or DSEAR (Dangerous Substances and Explosive Atmosphere Regulations 2002).

1.6 Sources of Information

Name	Author	Date / Revision
633-KCA-XX-XX-IE-A-0101-DIR (87 drawings)	Karakusevic Carson Architects	27/04/2023
N15302-KCA-EX-ZZ-DR-A-15000	Karakusevic Carson Architects	27/04/2023 Rev: P01
N15302-KCA-ZZ-00-DR-A-10000	Karakusevic Carson Architects	23/06/2023 Rev: P02
N15301-KCA-XX-XX-IE-A-00100 (10 drawings)	Karakusevic Carson Architects	04/07/2023 Rev: P03



2 References

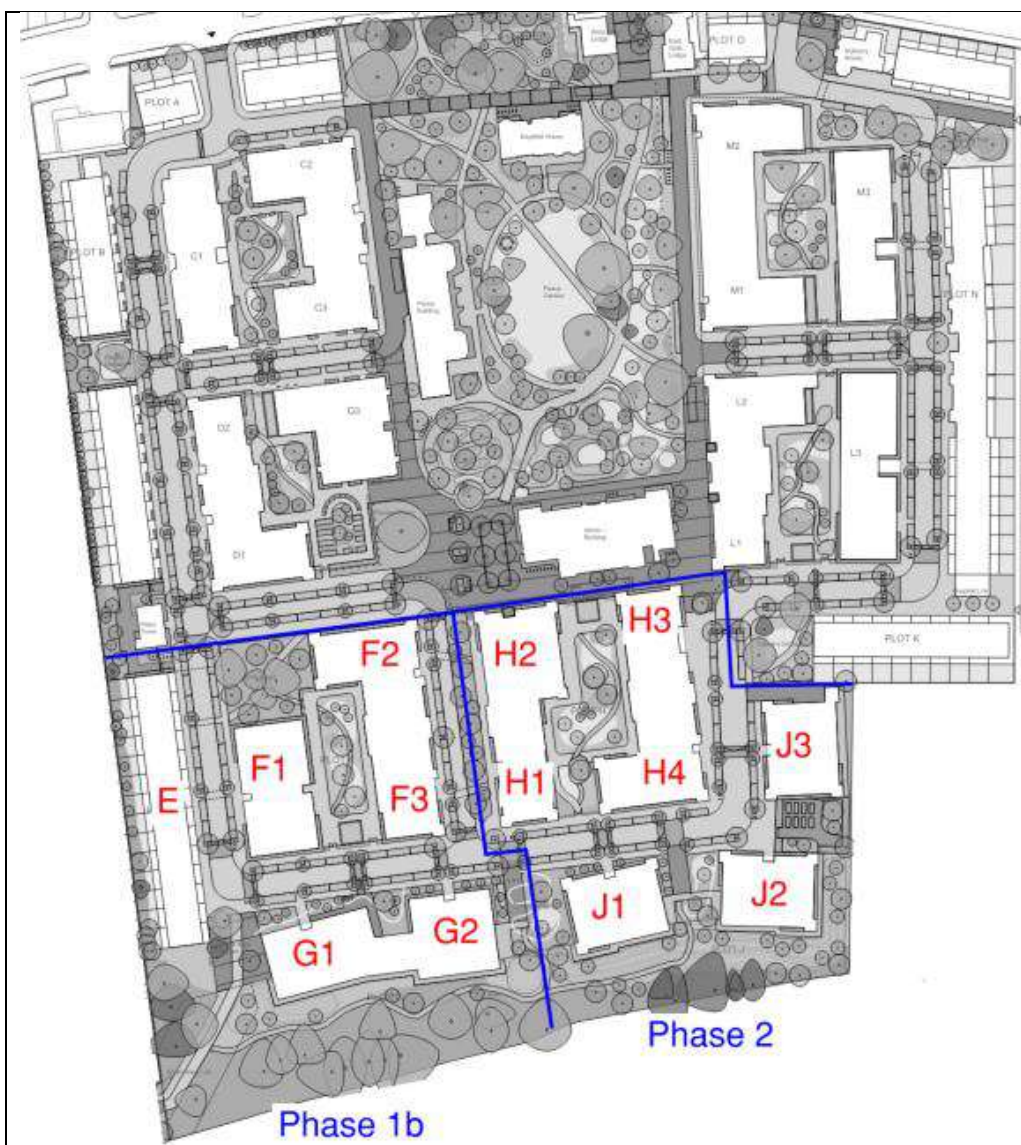
1. **British Standards Institution.** *BS EN 81-20: Safety rules for construction and installation of lifts. Lifts for the transport of persons and goods. Passenger and goods passenger lifts.* s.l. : Bsi, 2014. ISBN: 978 0 580 99253 7.
2. —. *BS EN 15650: Ventilation for buildings. Fire dampers.* s.l. : British Standards Institution, 2010. 978 0 580 58367 4.
3. —. *BS EN 54-7: 2018 : Fire detection and fire alarm systems. Smoke detectors. Point smoke detectors that operate using scattered light, transmitted light or ionization.* s.l. : BSI, 2018. 978 0 580 85649 5.
4. —. *BS 5839-3: Fire detection and alarm systems for buildings. Specification for automatic release mechanisms for certain fire protection equipment.* s.l. : BSi, 1988. ISBN: 978 0 580 59885 2.
5. **London Fire Brigade.** *Guidance Note : Access for Fire Appliances, GN29, Revision 13.* s.l. : London Fire Brigade, 2020. Guidance Note 29.
6. **British Standards Institution.** *BS 5395-1: Stairs. Code of practice for the design of stairs with straight flights and winders.* s.l. : BSi, 2010. ISBN: 978 0 580 55896 2.
7. —. *BS 9991: Fire safety in the design, management and use of residential buildings. Code of practice.* s.l. : BSi, 2015. ISBN: 978 0 580 96356 8.
8. —. *BS 5839-6: Fire detection and fire alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises.* s.l. : BSi, 2019. ISBN: 978 0 580 52359 5.
9. **Ministry of Housing, Communities and Local Government.** *Approved Document M - Access to and use of buildings.* s.l. : NBS, 2016. ISBN 978 1 85946 487 8.

3 Fire Statement Form

The following fire statement form has been provided in support of the planning application of this scheme and is based upon, and should be read in conjunction, with the holistic assessment of the building as set out in **Section A** of this report.

Application information	
1. Site address line 1 Site address line 2 Site address line 3 Town County Site postcode (optional)	St Ann's New Neighbourhood
	Haringey
	London
2. Description of proposed development including any change of use (as stated on the application form):	St Ann's New Neighbourhood comprises residential development split into several phases. - Phase 1b consists of 192 units across the Blocks E, F and G. - Phase 2 consists of 267 units across the Blocks H and J. Block E will be townhouses.
3. Name of person completing the fire statement (as section 15.), relevant qualifications and experience. Guide: no more than 200 words	Maximilian Dangelmaier, M.Sc. Rescue and Fire Engineer
	Ids Van der Wal, BEng (Hons), MSc. AIFireE Jeremy Ockenden, BEng (Hons), MSc. AIFireE
4. State what, if any, consultation has been undertaken on issues relating to the fire safety of the development; and what account has been taken of this.	N/A
5. Site layout plan with block numbering as per building schedule referred to in 6. (consistent with other plans drawings and information submitted in connection with the application)	
Site layout plan is: inserted in the form	





The principles, concepts and approach relating to fire safety that have been applied to the development									
6. Building schedule									
Site information			Building information		Resident safety information				
a) block no. as per site layout plan above	b) • block height (m) • number of storeys excluding those below ground level • number of storeys including those below ground level	c) proposed use (one per line)	d) location of use within block by storey	e) standards relating to fire safety/ approach applied	f) balconies	g) external wall systems	h) approach to evacuation	i) automatic suppression	j) accessible housing provided
E	3 storey townhouses <11m	residential houses	throughout	BS9991	worse than class A2-s1, d0	worse than class A2-s1, d0	simultaneous in each townhouse	none	none
F1	6 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)
G1	6 storeys above ground >11m <30m	residential flats restaurant, cafe, hot food take- away, drinking establishment	throughout Ground Floor	BS9991 BS 9999	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put simultaneous for Ground Floor commercial unit	yes- residential sprinklers, full	M4(3) N/A non-residential
G2	6 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)
H1	6 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)
H2	9 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)
H3	7 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)
J1	9 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)

J2	8 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)
J3	7 storeys above ground >11m <30m	residential flats	throughout	BS9991	class A2-s1, d0 or better	class A2-s1, d0 or better	stay put	yes- residential sprinklers, full	M4(3)

7. Specific technical complexities
Explain any specific technical complexities in terms of fire safety (for example green walls) and/or departures from information in building schedule above

- Double substation (UK PN) and energy centre in between Block G1 and G2.

8. Issues which might affect the fire safety of the development
Explain how any issues which might affect the fire safety of the development have been addressed.

- Regulation 7 is being met by buildings >18m.

9. Local development document policies relating to fire safety
Explain how any policies relating to fire safety in relevant local development documents have been taken into account.

- Client requirements: The Hill Group Policy and Catalyst Employers Requirements.
- The London Plan 2021

Emergency road vehicle access and water supplies for firefighting purposes

10. Fire service site plan
Explanation of fire service site plan(s) provided in 14. including what guidance documents have informed the proposed arrangements for fire service access and facilities?

- Site access is made via public roads in accordance with BS 9991 and London Fire Brigade GN 29

11. Emergency road vehicle access
Specify emergency road vehicle access to the site entrances indicated on the site plan.

- Emergency access is made via the public road 'St Ann's Road'. 2 site entrances are proposed.

Is the emergency vehicle tracking route within the site to the siting points for appliances clear and unobstructed?
yes

12. Siting of fire appliances
Fire appliances are able to access all blocks on site and can be sited <18m to each block.

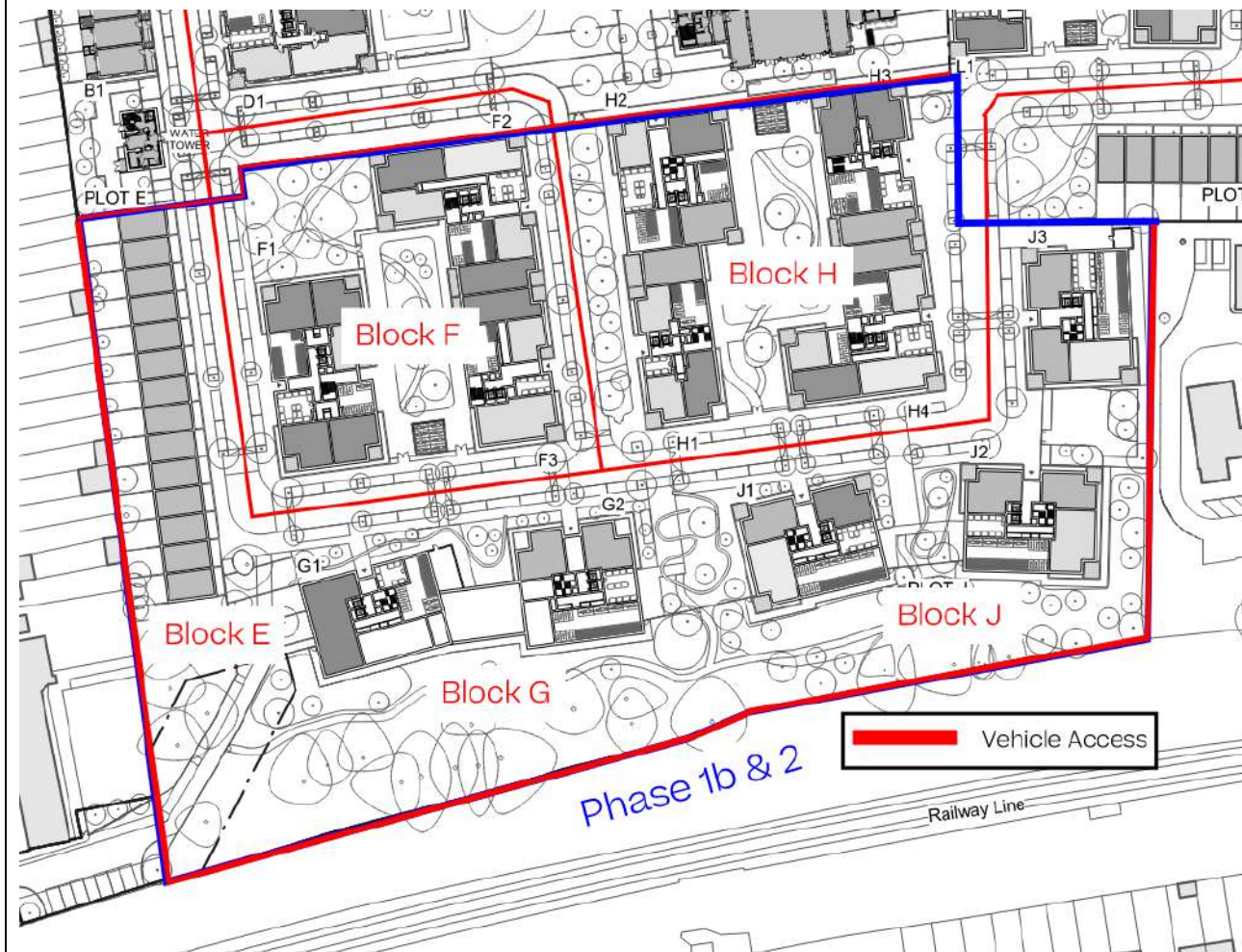
13. Suitability of water supply for the scale of development proposed
The public hydrants are to provide a readily available source of water for firefighting purposes and should be easy to locate for firefighters arriving on site. Public hydrants should be located within 90m of the entrance to Blocks F-J and in such way that all floor area of Block E is covered within 45m hose-laying distance.

Nature of water supply:
hydrant- public

Does the proposed development rely on existing hydrants and if so are they currently usable / operable?
don't know

14. Fire service site plan

Fire service site plan is:
inserted in the form



Fire statement completed by	
15. Signature	 Maximilian Dangelmaier Senior Fire Engineer
16. Date	09/05/2023

4 Change Control

Revision	Comments / Changes	Date	Prepared By	Reviewed By	Verified By
AFF_20708_02_St Ann's Block E-J_FSR_01	First draft for comments	21/07/2023	Maximilian Dangelmaier M.Sc. Rescue and Fire Engineer	Ids van der Wal BEng (Hons) MSc. AIFireE	Jeremy Ockenden BEng (Hons) MSc. AIFireE
AFF_20708_02_St Ann's Block E-J_FSR_02	Revision to include updated plans	01/12/2023	Christian Bradbury BSc. (Hons)	Jeremy Ockenden BEng (Hons) MSc. AIFireE	Jeremy Ockenden BEng (Hons) MSc. AIFireE



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Engineering fire solutions. Together.