

Alton Estate Regeneration
Hybrid Application

FIRE SAFETY STRATEGY

SWECO
May 2019



ALTON GREEN

ROEHAMPTON SW15



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Fire safety strategy

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Sweco

1 Bath Road
Maidenhead
Berkshire
SL6 4AQ

+44 (0)1628 623 423

building.services@sweco.co.uk

www.sweco.co.uk

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Registered Office: Sweco UK Limited, Grove House, Mansion Gate Drive, Leeds, LS7 4DN. Company Registration No 02888385

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1. Scope

Introduction

This report outlines the planning stage fire safety strategy (FSS) for the Alton Estate in Roehampton, London. The mixed use complex consists primarily of residential accommodation, with ancillary amenity spaces, forming part of a major redevelopment of the area. This FSS has been developed in conjunction with the project stakeholders (client, advisors and professional design team) to satisfy the aims of the brief, which is to address the functional requirements of the Building Regulations, as detailed below.

The figures/drawings included within this strategy are for illustrative purposes only, intended to convey the key features and objectives of the fire strategy. Reference is to be made to the detailed architectural layouts.

Consultation

At the time of writing no consultation with the Building Control authority has been undertaken, nor has a Building Control authority been formally appointed. Equally, no consultation with the local Fire Service has been carried out. Consultation with the relevant authorities typically occurs following any planning permission.

As such, it is intended that discussions and formal consultation with the relevant authorities will be made following any planning permission and continue throughout the detailed design and construction phases of the project. This document will therefore continue to evolve as the design develops.

Nevertheless, it is Sweco's view that the fire strategy outlined herein offers a suitable framework for the detailed design to be developed upon and aims to ensure that the development meets all functional requirements of Parts B1 – B5 of the Building Regulations 2010.

The Building Regulations

The information contained in this document is intended to address the functional requirements of Parts B1 – B5 of the Building Regulations 2010 only, as outlined below:

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

Formal approval will be sought under the Building Regulations application to the relevant Building Control authority, at which point London Fire Brigade will also be formally consulted.

Exclusions

The FSS does not:

- Set out to specifically address insurance requirements, risks to business continuity or property protection. Recommendations or guidance provided for life safety purposes may or may not be beneficial with regard to these issues.
- Address fire precautions during the construction works for which the risk and hazard from fire are often greater. It is recommended that the guidance issued by the Health and Safety Executive (HSE) be consulted accordingly.
- Represent a design or specification; it is a series of principle recommendations that others may consider and relate to the design of the building as appropriate.
- Constitute a fire safety management strategy.
- Satisfy the duties of the 'responsible person' to carry out a fire risk assessment under the Regulatory Reform (Fire Safety) Order. Note that the responsible person has yet to be identified for this building.
- Satisfy duties under Regulation 38 of the Building Regulations to provide the building management team / owner / responsible person with a package of as built information. This duty is handled by the principal contractor, albeit this document shall be updated throughout construction to reflect design development.

Basis of design

With respect to addressing the functional requirements of Parts B1-B5, the FSS draws on the framework from BS 7974 to establish a disciplined approach to the fire safety design. BS 7974 provides the framework for a flexible but formalised methodology that can be readily assessed by the statutory authorities. In doing so, it provides a means of establishing acceptable levels of fire safety without imposing unnecessary constraints on other aspects of building design, and recognises that a range of alternative and complimentary fire protection strategies can achieve the design brief.

This FSS takes into account the total fire safety package within the scheme to provide a functional and practical solution to fire safety. The FSS draws on prescriptive standards as a basis for design; however, it is only through utilising a combination of established guidance, fire engineering and technical experience that a satisfactory standard of fire safety can be achieved given the scale and complexity of the scheme from a Building Regulations standpoint.

To this end, the FSS is based primarily upon the recommendations of BS 9991 for the residential aspects of the scheme. The FSS will address the areas that have a significant influence on the design of the building; however, where the FSS is silent on a particular issue, it is expected that the design guidance of BS 9991 be implemented. Where the FSS or associated British Standard references other documentation, design guidance or

British Standards, it is expected that these particular documents are incorporated appropriately.

Fire engineering

Where a particular feature, arrangement or area of the project lies outside the recommendations of the guidance, a fire-engineered solution will be produced. This solution will be based upon current guidance, good engineering practice and information available at the time of writing.

It should be noted that any fire engineered solution may not be valid if the design criteria etc. on which it is based are altered. The scope and objectives of the fire safety design will be defined, performance criteria established and the design solutions made clear. Engineering methods used to evaluate the intended solutions will be supported with sensitivity analyses where relevant. This is intended to highlight which systems and processes are critical to the design and the level of redundancy that should be in place to safeguard them.

The following summarises key aspects of design that are expected to be subject to fire engineering:

- Open plan apartments;
- Ventilation to fire fighting shafts;
- Travel distances within residential corridors;

Future fire safety management

This FSS is not a fire safety management document. The eventual management strategy for the building will need to be developed and should incorporate the key recommendations of this document. In developing the FSS, it has been assumed that a robust level of fire safety management will be adopted once the building is occupied. This is the only reasonable approach for a scheme of this scale and complexity. It is important that management are aware of their roles and responsibilities in the day to day running of the site as required by law. Further guidance for the development of a robust, sensible management procedure may be sought in the appendix to BS 9999.

The Regulatory Reform (Fire Safety) Order 2005

On occupation of the building, the 'responsible person' as defined in the Regulatory Reform (Fire Safety) Order 2005 (FSO) is required by law to undertake a fire risk assessment. This FSS will not satisfy this obligation; instead it may be used as a basis for the risk assessment.

Limitations

This FSS has been produced for the Alton Estate. The information contained within this report is for use solely in relation to that project and should not be used in relation to any other project. Sweco does not accept responsibility for the use of the FSS for any other purpose or by other parties without their express written agreement.

Key stakeholders

Role	Organisation
Developer	Redrow / Wandsworth
Insurer	TBC
Architects	Barton Willmore (planning, Block M & Q) Hawkins Brown (master planning, Block A, N, O & PPCC) Gillespies (landscape) Tate Hindle (Block K)
Building Services / Fire Engineers	Sweco
Building Control Authority	TBC
Fire Authority	London Fire Brigade (Wandsworth)

1.1

Summary of key design risks and enhancements

The following table sets down what Sweco believe to be the major design risks for the scheme as this stage of design (pre-planning). There may be other design risks that emerge as the scheme develops, but the intention is to align key fire safety aspects against prescriptive standards, given the new build status of much of the scheme.

Risk	Comment	Notes
Open plan apartments	BS 9991 sets down limits which apply to apartments where bedrooms are accessed directly from the living area.	Deviations from the prescriptive guidance will need to be fully identified and where apartment layouts do not fully align with these recommendations, a detailed analysis may need to be carried out to demonstrate equivalence with a prescriptive design.

1.1.1 Additional enhancements

Proprietary mechanical smoke extract to residential fire fighting lobbies

BS 9991 enables the use of natural ventilation to fire fighting lobbies serving residential accommodation for low rise blocks of apartments. Nevertheless, the intention is to adopt a proprietary mechanical smoke extract system wherever practical to do so.

Detailed CFD modelling may be necessary to justify the arrangement in accordance with 'Guidance on smoke control to common escape routes in apartment buildings' issued by the Smoke Control Association, rev 2 as a basis for design.

Fire alarm system

The fire alarm system will be reviewed in detail in the next stage of design with a view to increasing system intelligibility and addressability. This may include the facility to remotely activate the alarm system in certain apartments, whole floors, or the whole building, should a catastrophic event occur.

Sprinkler protection

Given the new build aspects of the scheme, the design intent is to adopt sprinkler protection to all residential buildings, regardless of height. The design standard for residential sprinkler systems is BS 9251, but Sweco will be exploring opportunities to expand on the performance and resilience of this system.

Insulation

As a large, new build scheme, every opportunity will be explored to ensure insulation of limited combustibility will be provided, irrespective of height. Such insulation products should be Class A2 or better, as tested and certified under BS EN 13501.

1.1.2 Specialist design elements

The fire strategy includes aspects that will require detailed analysis by others. Such aspects may require CFD modelling to validate the proposals to be carried out by the respective party in due course. These include:

- Car park smoke control
- Residential corridor smoke control

1.2 The London Plan

Under the legislation establishing the Greater London Authority (GLA), a Spatial Development Strategy (SDS) has been published. The SDS is known as The London Plan. As the overall strategic plan for London, it sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years.

Amongst various other aspects, the latest draft London Plan sets out specific policy requirements with regards to Fire Safety (Policy D11) design of buildings in London. These policy requirements are summarised below:

Section A) In the interests of fire safety and to ensure the safety of all building users, development proposals must achieve the highest standards of fire safety and ensure that they:

- 1A) Identify suitably positioned unobstructed outside space for fire appliances and assembly points
 - 1) Are designed to incorporate appropriate features which reduce the risk to life and of serious injury in the event of fire
 - 2) Are constructed in an appropriate way to minimise the risk of fire spread
 - 3) Provide suitable and convenient means of escape, and associated evacuation strategy for all building users.
 - 4) Develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in.
 - 5) Provide suitable access and equipment for firefighting which is appropriate for the size and use of the development

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

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

This fire strategy fully appreciates the requirements set down in Policy D11 of The London Plan and incorporates these provisions in the wider fire strategy of the scheme. Appendix A provides specific details on how the proposed fire strategy fulfils each policy requirement of The London Plan Policy D11.

2. Outline project illustration

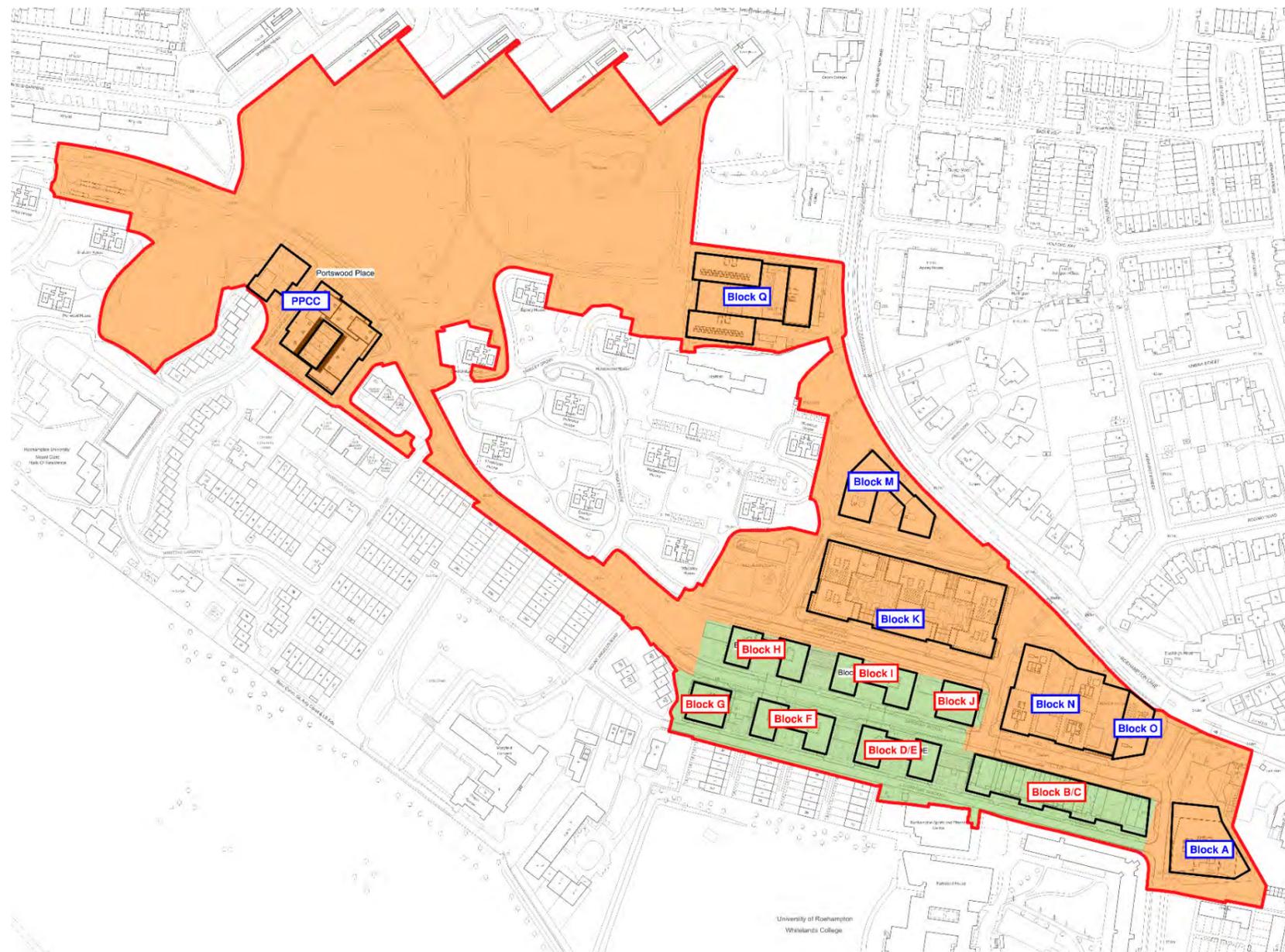


Figure 1 – Site masterplan identifying each of the proposed blocks.

The mixed-use phased development comprising up to 1,103 residential units (including 256 affordable homes comprising social rent & intermediate tenures) ranging from 1 - 9 storeys above ground level and up to 9,572 sqm (GIA) of non-residential uses comprising new and replacement community facilities (including library and healthcare facilities, youth facilities, community hall, children's nursery & children's centre) (Class D1); flexible commercial floorspace (comprising retail (Class A1), financial and professional services (Class A2), café / restaurants (Class A3), hot-food takeaways (Class A5), business (Class B1), non-residential institutions (Class D1)); landscaping; removal and replacement of trees; public realm improvements; access improvements; relocation of bus turnaround; improvements to children's play facilities; provision of energy centre; on and off street car & cycle parking; and other highway works incidental to the development.

The proposed masterplan comprises of 15 primarily residential building (Blocks A-Q) and new community/health facilities building named as Portswood Place (PPCC).

The initial phase of the master plan consists of Portswood Place and Blocks A, K, M, N, O and Q and is the primary focus of this document. Nevertheless, the subsequent phases (green area) will be designed on the same strategy principles.

3. Package of fire protection measures
- 3.1 Fire detection and alarm system (AFD)
- 3.1.1 Apartments
- The apartments will operate under a 'defend in place' strategy. A BS 5839-6: 2013 Category LD1 system will be installed in all apartments. The fire alarm system will be Grade D. Neither sounders nor manual call points will be located in the common residential lobbies, given the 'defend in place' strategy. Detection will however be provided in the common residential corridors that will activate the smoke control measures.
- The fire alarm system will be reviewed in detail in the next stage of design with a view to increasing system intelligibility and addressability. This may include the facility to remotely activate the alarm system in all apartments to facilitate whole residential building escape, should a catastrophic event occur.
- A fire alarm panel will be provided within the entrance to each block of flats, intended to provide information to the attending fire service on the level and location of a fire.
- The presence of centralised security or concierge as part of the site management is yet to be determined. If there is to be such a provision, the intent will be to offer a relay from each block back to a centralised monitoring point, where management personnel can be notified of an alarm in a block, and initiate management actions, which may include calling the Fire Service.
- 3.1.2 Non-residential areas
- A BS 5839-1 Category L2 system will be installed throughout all non-residential areas.
- A proprietary personal alarm system for the hearing impaired will be provided to assist with pre-defined escape procedures established under the respective personal emergency evacuation plan for the individual or group.
- Plant areas open to outside will not be provided with automatic fire detection. Packaged plant rooms will be provided with AFD that will initiate escape and send an alert signal to management. The provision and location of adequate sounders / beacons in the plant areas should be carefully considered by the Building Services Engineers and specialist contractor(s), to ensure adequate distribution and audibility.
- All lifts shall return to ground floor level on fire alarm (or alternative designated landing in the event of fire at ground floor).
- 3.2 Suppression system
- 3.2.1 Automatic sprinkler installation
- Irrespective of building height, sprinkler protection will be provided to all residential accommodation, in accordance with BS 9251.
- Sprinkler protection within apartments will cover the habitable rooms, including living areas, bedrooms and kitchens. Bathrooms less than 5m² in area do not require sprinkler protection.
- The extent and resilience of the residential sprinkler systems will be reviewed during the forthcoming stages of design, as to whether the system will be standalone to each block of flats or part of a wider common infrastructure. This will be dictated by:
- The extent of onsite water storage as opposed to relying on towns mains
 - The availability of back-up power supplies to sprinkler or boosted cold water pumps
- As part of this sprinkler review process, the residential sprinkler system may be alternatively enhanced, by connecting the system onto a commercial standard sprinkler system in accordance with BS EN 12845. This would draw on the benefit of having dedicated duty-standby sprinkler pumps, with resilient power supplies and significant on-site water storage benefits.
- 3.2.1.1 Non-residential areas
- An Ordinary Hazard 3 (OH3) Life Safety sprinkler system will be installed generally in accordance with the LPC Rules incorporating BS EN 12845 to non-residential areas.
- The extent and third party certification of the installation is subject to consultation with the relevant stakeholders.
- Areas where the omission of sprinkler protection may be technically justified will be reviewed in due course, together with the relevant stakeholders.
- 3.3 Fire fighting and disabled refuge communications
- Disabled refuges will be provided within each stair/lobby of non-residential accommodation (i.e. basement / car parking etc). Disabled refuges are not required on residential levels.
- Fire fighting and disabled refuge communications will be installed in accordance with BS 5839-9: 2011. A fire telephone system is to be provided in every fire fighting lobby, with means of two way communication.
- 3.4 Smoke control
- 3.4.1 Basement
- Areas below ground will be provided with smoke clearance provisions, either by way of:

- Natural smoke vents with an area equivalent to 2.5% of the floor area of the basement, sited at high level, and evenly distributed around the building (on at least two sides) to facilitate clearance, or:
 - A mechanical smoke extract system designed to extract 10 air changes an hour. The system should be capable of handling smoke temperatures of 300°C for a period of one hour. The smoke extract system will be automatic, designed to initiate on fire detection / sprinkler activation in the relevant zone(s) of incidence. The supply and extract ductwork will be fire rated for integrity throughout in accordance with BS EN 1366. Ductwork passing through escape routes / corridors will be provided with an additional insulation rating in accordance with BS EN 1366. The system will need to be safeguarded by an automatic fire suppression system.
- 3.4.2 Loading bay / car parks
- A separate dedicated smoke clearance system will serve loading bays / car parks. This may be by way of a mechanical smoke extract system, capable of 10 air changes per hour, or via natural vents offering 5% ventilation area as a percentage of the floor area, with 2.5% provided on at least two sides of the loading bay.
- Lobbies accessed off an area of special fire risk, such as a loading bay or car park should be provided with 0.4m² of permanent natural ventilation to outside (subject to specialist contractor design).
- 3.4.3 Common residential corridors
- A proprietary mechanical smoke extract system will be provided in common residential corridors. This will typically result in a 0.6m² shaft placed as far as possible from the stair door, such that unventilated dead-end distances are limited wherever possible, and to optimise system performance. The smoke extract rate will typically be 5m³/s, but will be subject to specialist trade contractor design.
- Stair doors should not be full height so as to assist in maintaining the fire fighting stair clear from smoke in the event of a fire. Supply air to each system will be provided by a 1m² automatic opening head of stair vent. Override controls for the corridor vent system will be provided in the fire fighting stair at every level.
- The system will be designed in accordance with BS 9991 and will use the 'Guidance on smoke control to common escape routes in apartment buildings' issued by the Smoke Control Association, Rev 2 as a basis for design. Additionally, ensuring a smoke-free stair should be taken as the key performance objective of the system. The design, validation, specification and installation of these systems will be by specialist contractor, in liaison with Building Control in due course.
- On the basis of a mechanical smoke extract system being provided, single direction travel distances of up to 25m may be justified through CFD modelling. Where the inclusion of a mechanical smoke extract system is not warranted, or practical, then a 1.5m² automatic opening vent (AOV) will be provided within the corridors. For a sprinkler protected building, the maximum travel distance from apartment to stair door using a natural AOV is 15m.
- 3.4.4 Fire fighting stairs
- A 1.0m² automatic opening vent will be provided at the top of each common stair.
- Override controls for the head of stair AOV will be provided at ground/access level, and at the top storey within the stair.
- 3.5 Signage
- Fire escape signage and fire protection indication and warning signage shall be provided in accordance with BS 5499 & BS ISO 3864.
- 3.6 First aid fire fighting
- Fire extinguishers will be provided in accordance with BS 5306-8. Hose reels will not be installed.
- 3.7 Emergency power supplies
- Primary power supplies will be protected in accordance with BS 9999, BS 8519 and LPC requirements. The services connected to the life safety system will include any smoke extract fans, sprinkler pumps, emergency lighting, fire fighting lifts and BMU cradles (if applicable).
- Normal lighting levels (100 lux) should be maintained within fire fighting shafts.
- Alternative supplies to critical life safety plant will be provided from a separate life safety supply, with the ability to maintain operation for a minimum of three hours, and within 15 seconds of primary power failure. The changeover shall be automatic. Options will be explored to establish the most effective form of secondary power supplies, and whether a centralised or decentralised system will be most appropriate.
- Automatic transfer switches (ATS) should be protected within IP rated protected enclosures that are resistant to tampering. The ATS should not be exposed within fire fighting lobbies, instead being located within risers or separate compartments.

4. Means of escape

4.1 Residential areas

4.1.1 Residential evacuation strategy

The high degree of compartmentation in the residential accommodation means that the spread of fire from one apartment to another is unlikely. In the event of fire, it is only necessary to evacuate the apartment where fire has broken out. Occupants in all other apartments will remain in place.

Individual apartment evacuation remains independent from the evacuation of fires elsewhere on the site, unless deemed necessary by the management team / attending Fire Service. The ability of the fire alarm system to remotely activate (under management or Fire Service control) in apartments to facilitate widespread evacuation, and hence ease the burden on the Fire Service, is to be addressed in the next stage of design.

4.1.2 Conventional apartments

Conventional apartment arrangements consist of a protected entrance hall serving all habitable rooms. BS 9991: 2015 states that a protected internal hallway, enclosed in 30 minute fire rated construction, should be provided that leads off to all habitable rooms having a travel distance not exceeding 9 m from the flat entrance door to the door of any habitable room.

4.1.3 Open plan apartments

An open plan apartment is one where escape from the bedrooms is via the main living space, and not via a protected internal corridor. As there is no protected corridor by which to make escape, certain measures and limitations must be put in place to safeguard occupants, such as:

- A Grade D LD1 fire alarm and fire detection system in accordance with BS 5839-6.
- An automatic water fire suppression system (sprinklers or water mist).
- The overall size of the open-plan flat should not exceed 16 m × 12 m (192m²) with a maximum single direction travel distance of 20m.
- Be limited to a single level only, and with ceiling heights of at least 2.25m.
- Where the open plan apartment has an area greater than 8m x 4m (32m²), the kitchen should be enclosed. This is one of the most challenging aspects of open plan design.
- Cooking facilities should not be located adjacent to the entrance of the apartment. Sweco would however recommend that they are kept as remote from escape routes from bedrooms and the front door as possible.

Deviations

Open plan designs for apartments have been in use in the UK for a number of years, and have become common place in the industry. However, guidance has changed from the first iteration of BS 9991 in 2011 to the second iteration in BS 9991 2015, most notably with respect to the size of open plan apartments, and the limit on when the kitchen should be enclosed (i.e. when the apartment exceeds 32m² in area). The primary reason behind this was to align the guidance within the British Standard to the research on open plan apartments originally undertaken by the NHBC.

As such, there are historic examples of large open plan apartments that:

- Are greater than 192m² in area
- Have large travel distances
- Are located over two or more levels (i.e. open plan duplex units)
- Have kitchens open to the apartment when in excess of 32m².

While such deviations from prescriptive guidance have historically been developed and built, they are more critically scrutinised today, and deviations present an increased design and approvals risk, often carrying the need for extensive CFD to be carried out to justify such arrangements.

4.1.4 Travel distances

Aspect	Distance (m)
Open plan apartments	20
Protected internal corridor of apartment	9
Residential lobby	15 ^[1]

[1] Option to increase distance up to 25m based on enhanced smoke control measures (e.g. mechanical). The 15m limit is based on the provision of sprinkler protection to the scheme.

4.1.5 Storey exit widths

The storey exits will be a minimum 800mm clear on residential levels.

4.1.6 Means of escape for the disabled

Disabled refuges are not necessary on residential levels.

Disabled refuges will be provided within each stair/lobby of non-residential accommodation. Management procedures will be developed, incorporating Personal

Emergency Evacuation Plans (PEEPs), to ensure the safe evacuation of disabled occupants from the building in the event of fire. Guidance on PEEPs and general fire safety management outlined in BS 9999 will be adopted.

Each refuge point will be provided with means to alert the concierge desk to the presence of persons requiring assistance. This will be in the form of outstations as recommended under BS 5839-9: 2011. Refuges will be 1400mm x 900mm and located clear of the minimum escape width.

4.1.7 Doors and escape corridors

In general, doors on escape routes (whether the door is a fire door or not) should either not be fitted with a lock, latch or bolt fastening, or be fitted with simple fastenings that can be readily operated from the side approached by people making an escape. The inclusion of panic hardware is recommended where more than 60 people are expected to use a door.

Exits should open in the direction of escape if the number of people that might be expected to use the door at the time of a fire is more than 60. In this case, the final exit door should be fitted with panic hardware in accordance with BS EN 1125. Electrically powered locks should return to the unlocked position on operation of the AFD system, loss of power and/or activation of a manual door release unit (Type A – BS EN 54-11).

The opening of a door should not encroach on the minimum escape width. Door width is measured between the door stop and projecting ironmongery, or from door stop to door leaf, whichever is the lesser.

The width of a door in a corridor should be not less than either the calculated corridor width minus 150mm, or 1050mm, whichever is the greater.

The width of a corridor or escape route should not be less than 1200mm.

Reference should be made to Approved Document M, which outlines further recommendations on doors related to general access.

Corridors leading from stairs to the final exit should be lobby approached from all other accommodation, and should contain no access to services. The route should be kept sterile and not pass through any other accommodation.

4.1.8 Stair widths

Stair width is measured between the walls or balustrades. Handrails may encroach up to 100mm on either side of the stair.

All residential stairs serving above ground shall be a minimum of 1100mm. All other stairs serving above ground shall be 1200mm.

All stairs serving below ground shall be a minimum of 1200mm for upwards means of escape.

Stairs serving above and below ground level should be separated at ground floor level by way of a fire door. These should not reduce the clear width of the stair.

4.2 Non-residential areas

All non-residential units (i.e. commercial, healthcare, educational and retail) will implement an independent evacuation from all other areas with dedicated means of escape, where possible. The following outline the key points to be implemented with regards to the means of escape from non-residential units:

- Where the occupancy is limited to 60 people, a single exit would be sufficient from each retail unit
- Where a larger occupancy than 60 people is anticipated, two alternative exits should be provided from each unit and should be sufficiently remote from each other (absolute minimum of 5m separation).
- Each exit should achieve a minimum of 1050mm clear width where the occupancy is greater than 120 people
- Exits to be outward opening where possible. Where the occupancy is more than 60 people, exits must be outward opening.
- Dedicated protected stairs (min 1000mm clear width) will be provided to serve any non-residential areas above ground. If serving more than one level above ground, the protected stairs will be lobby protected.
- Single direction travel distance should be limited to 20m. Where alternative escape is possible, the travel distance to the where the choice is available should be limited to 20m and the total distance to the nearest exit should be limited to 50m.

4.2.1 Non-residential travel distances

Occupancy	Risk profile	One Direction (m)	Two Directions (m)
School/Nursery	BB 100	18	45
Retail	B2	20	50
Healthcare	B2	20	50
Office	A1	26	65
Plant	A2	22	55
Car park	A2	22	55

Note: The above risk profiles are based on BS 9999 (except School/Nursery). It is typical to adopt a 2/3 limit on the above travel distances when the internal layouts are not known.

5. Internal fire spread – structure

5.1 Structural fire protection standard

The term ‘elements of structure’ is applied to the main load bearing elements of structure. Structure includes, but is not limited to:

1. Structural frame
2. Beams
3. Columns
4. Load bearing walls (internal and external)
5. Floor structures (e.g. galleries and link bridges)
6. Party Wall

The following table sets down the structural fire protection standard for the respective buildings depending on their height.

Building height	Rating (mins)
<30m	60
30m – 50m	90
More than 50m	105

The ratings in the table above rely on the provision of fire suppression. Building height is measured from the Fire Service access level to the finished floor level of the topmost occupied floor. Floors used solely for as plant space may not be regarded as occupied.

5.2 Compartmentation

The following outlines additional compartmentation recommendations. Compartmentation in the following locations should be provided in terms of insulation and integrity on both sides. Where the standards of compartmentation overlap, the higher value should be adopted. Compartmentation drawings will be developed by the respective architects in due course, drawing on the table below, and input from Sweco in their role of developing the fire strategy.

Area	Rating (mins)
Life safety plant rooms	120
Fire fighting shafts / access points	120
Car park / loading bay	120
Life safety risers	120
Compartmentation between different risk profiles & occupancies	120

Area	Rating (mins)
Stairs serving basement accommodation (including lobbies)	120
Service risers / escape stairs	See section 5.1
Floors below ground	120
Floors above ground	See section 5.1
Compartmentation separating apartments	60
Residential corridors	60
Internal protected apartment corridors/stairs	30

The junction between compartment walls / floors with external cladding should maintain the relevant standard of compartmentation. Cladding should be fixed securely to the compartment wall/floors to resist movement in the event of fire. Adequate fire stopping should be provided that is securely fixed in place.

5.3 Door ratings

Door location	Door rating (mins)
Compartment wall separating buildings	Same rating as compartment wall
Onto protected shaft	Half the period of shaft
Basement plant rooms	FD60S ^[1]
Fire fighting lobby	FD60S
Escape stair	FD60S
Fire fighting stair	FD30S
Escape stair lobby	FD30S
Sub-dividing a corridor	FD20S
Door within a cavity barrier	FD20
In a compartment floor	Same as floor
Apartment doors	FD60S ^[2]

[1] Except life safety plant rooms, which shall have FD120S doors.

[2] Represents an enhanced rating to take account of open plan apartment design

5.4 Protected lobbies / corridors

Protected lobbies will be provided in the following locations:

- Fire fighting stairs (at every storey)
- Basement stairs
- Communication with refuse areas
- Rooms accessed of escape routes / fire fighting access routes

5.5 Ductwork

Ductwork that passes through escape routes or breaches compartmentation will be fire rated in line with the methods outlined in BS 9999 as follows:

Method 1 – protection using dampers (not appropriate for protecting escape routes unless activated at smoke detection i.e. MFSD)

Method 2 – protection using fire-resisting enclosures

Method 3 – protection using fire-resisting ductwork

Access to services from a fire fighting stair or shaft shall not occur.

Access to services within escape lobbies and residential corridors is permissible, subject to well-enforced management procedures.

5.6 Concealed cavities

Where concealed cavities are incorporated, the following provisions will be made:

- Fire stops to be provided within cavities by the junction of a compartment walls or floors, maintaining the relevant standard of compartmentation;
- Cavity barriers (30 min integrity, 15 min insulation) to be provided around any openings and edges within the voids of external cavities
- Any extensive cavity should be provided with cavity barriers (30 min integrity, 15 min insulation) such that the maximum dimension does not exceed 20m in any direction. If the cavity surfaces are lined with any product other than Class 0 or Class 1, cavity barriers should be provided such that the maximum dimension does not exceed 10m in any direction.

6. Internal fire spread - linings

6.1 Linings

The classification of the surfaces of walls and ceilings will comply with the following:

Location	National Class	European Class
Small rooms not more than 4m ² in residential accommodation and 30m ² in non-residential accommodation	3	D-s3, d2
Other rooms, not used as circulation space	1	C-s3, d2
Circulation spaces	0	B-s3, d2

6.2 Examples of Materials

Rating ^[1] ^[2] ^[3]	Typical performance ratings of some generic materials and products
Class 0	Any non-combustible material or material of limited combustibility
	Brickwork, blockwork, concrete and ceramic tiles
	Plasterboard (painted or not with a PVC facing not more than 0.5 mm thick) with or without an air gap or fibrous or cellular insulating behind
	Wood wool cement slabs
	Mineral fibre tiles or sheets with cement or resin binding
Class 3	Timber or plywood with a density more than 400 kg/m ³ , painted or unpainted
	Wood particle board or hardboard, either untreated or painted
	Standard glass reinforced polyesters

Notes:

[1] For details of European class ratings consult table A8 of ADB.

[2] Materials and products listed under the above class 0 and meet class 1.

[3] Timber products listed under class 3

7. External fire spread

External elements within 1m of the title boundary should be provided with fire resisting construction achieving the relevant building rating as identified in Section 5.1 from both sides (integrity & insulation).

Where facades face onto roadways, the relevant boundary may be extended to the centerline of the road, as future development is considered unlikely.

Site boundaries have not been addressed at this stage given the significant design development in terms of massing and master planning. They will however be reviewed in detail as the scheme develops, albeit the large separation distances and highly compartmentalized nature of the scheme mean that external fire spread challenges are not envisaged.

7.1 External cladding

External cladding should be designed in accordance with BS 9999 Clause 35.5. Additionally, the external wall construction will incorporate the November 2018 Approved Document B (ADB) amendments relating to building facades.

Therefore, given that the proposed development consists of residential buildings over 18m in height, the external wall of all blocks should be constructed throughout only of materials classified as Class A2 or Class A1, as tested and certified under BS EN 13501.

It should be highlighted that the external wall construction may not be justified via meeting the performance criteria outlined in BR 135, based on data from BS 8414, as previously permitted.

Additionally, it should be highlighted that the above regulations are applicable to attachments onto the external wall, such as balconies, heat deflectors or solar panels.

Where a cavity exists in the external wall construction, cavity barriers should be provided to sub-divide the rainscreen cladding at each compartment floor and around openings. Where ducts penetrate cavity walls, fire dampers may be required, subject to key stakeholder discussion.

External cladding should be restrained at the junction of compartment walls and floors to resist movement in the event of fire.

External cladding at the junction of a fire fighting shaft shall be 60 minute fire rated for 500mm.

7.2 External wall surfaces

All external surfaces of walls should be Class 0.

7.3 External wall insulation

Any insulation products used in the external wall construction shall be of limited combustibility (i.e. Class A2 or better).

8. Fire service access and facilities

8.1 Vehicle access

Vehicle access shall be provided to within 18m of the entrance to all buildings. The dry riser inlets to the buildings shall be visible and within 18m of the appliance parking position. The following table sets down the vehicle access recommendations to the site.

Criteria	Pump	High reach	Special appliance
Width of road between kerbs	3.7m	3.7m	4.0m
Width of gateway	3.1m	3.1m	3.1m
Turning circle between kerbs	16.8m	26.0m	26.0m
Turning circle between walls	19.2m	29.0m	29.0m
Clearance height	3.7m	4.0m	4.27m
Carrying capacity	14 tonnes	23 tonnes	32 tonnes

The vehicle access requirements will be discussed in detail with London Fire Brigade during the consultation process to establish any need for special appliance access. At this stage of design, vehicle access is expected to be provided for high reach appliances.

The figure opposite illustrates the Fire Service access road and primary access points for each building of the initial phase of the masterplan.

All blocks have conventional Fire Service access arrangements, with the exception of Block Q where the distance from the primary appliance parking position to the furthest core is up to c.60m when measured along the podium (see Figure 3 and Figure 4).

Nevertheless, the proposed arrangement may be justified on the basis of offering two diverse routes into each of the two cores sited the furthest away from the primary access point (i.e. Cores Q1 and Q3). The primary route for all cores would be along the podium and the secondary routes will be through the pedestrian path for Core Q1 and via the car park on the level below for Q3, as indicated in Figure 3 and Figure 4. Further, two dry riser inlet breeching points will be provided for Cores Q1 and Q3. The primary dry riser inlet point for all three blocks will be consolidated at the podium entrance and the secondary inlet points for Q1 and Q3 will be at lower level within the vicinity (i.e. 18m) of the alternative vehicle parking positions (see Figure 3 and Figure 4). The additional dry riser inlet points are being provided to limit horizontal pipe runs to 18m in line with BS 9990.

The North vehicle access road providing access to Core Q1, offers no turning facilities for the fire tender vehicle, however the dead-end vehicle distance will be limited to 20m,

from where access to the dry riser inlet will be provided within 18m from the vehicle. See Figure 4 for an illustration of the proposed arrangement.

The building is limited in height at c.23m from the lowest level to the finished floor level of the top storey. A building of this height would typically not be sprinkler protected, and as such, the provision provides a benefit to the fire service, and crucially helps offer them additional time to set up equipment prior to starting fire fighting operations. Given this and the alternative access points and dry riser inlets being provided, the fire service access arrangement is considered reasonable.

Nevertheless, the proposed unconventional aspects with regards to the Fire Service access will be reviewed with Building Control and the Fire Service in due course.



Figure 2 – Fire Service vehicle access road and entry points for each of the blocks in the initial phase.

8.2 Fire fighting shafts

For buildings greater than 18m in height, measured from fire service access level to the finished floor level of the top storey served, fire fighting shafts will be provided.

Residential fire fighting shafts will consist of:

- A fire fighting stair enclosed in 120 minute construction. The width of the stair will be 1100mm clear.
- A fire fighting lift in accordance with BS EN 81-72. The lift will be housed within a 120 minute fire rated shaft. The lift is to be within 7.5m of the fire fighting stair door.
- A dry rising fire main in accordance with BS 9990. The outlet will be located within the stair enclosure at each level.
- Ventilated lobbies, which are formed by the common residential corridors. The corridors can be ventilated by way of a mechanical smoke extract shaft, or opening windows (see section 3.4.3).



Figure 3 – Block Q podium level (i.e. Level 2) fire service access. Fire tender vehicle parking zones indicated in orange boxes, dry riser inlet locations in red boxes and clear vehicle turning facilities indicated in purple box.

Primary Fire Service access shown in solid arrows and alternative in dotted arrows.



Figure 4 - Block Q car park level (i.e. Level 1) fire service access and alternative dry riser inlet locations (red boxes). Alternative fire tender vehicle parking zones indicated in orange boxes and alternative dry riser inlet locations in red boxes.



Figure 5 - Fire Service vehicle access road and entry points for Portswood Place

9. Appendix A – Response to The London Plan

This appendix establishes the design intent for the Alton Estate scheme, with respect to the relevant aspects of the Draft London Plan. For reference, the relevant part of the London Plan is Policy D11 – Fire Safety. The following table sets down how each aspect of the policy is considered at a high level, but more detailed information may be found in the main body of this report.

Notwithstanding the above, it must be noted that the project still remains in its incipient stages, and detailed design development needs to be carried out moving forward, which will in turn be reflected in this document.

Policy aspect	Design response
Section A) In the interests of fire safety and to ensure the safety of all building users, development proposals must achieve the highest standards of fire safety and ensure that they:	
1A) Identify suitably positioned unobstructed outside space for fire appliances and assembly points	Fire appliance parking achieving a suitable load bearing capacity will be provided to within 18 m from each core/dry riser inlet. Assembly points should be allocated for each individual block in a safe area sufficiently far from the premises to avoid interference with the fire and rescue service or danger from falling debris.
1) Are designed to incorporate appropriate features which reduce the risk to life and of serious injury in the event of fire	A blanket approach has been taken to sprinkler protect all aspects of the development, irrespective of height. Further, the decision has been made to offer the most comprehensive fire alarm coverage possible (LD1) within apartments, designed to offer early warning of fire. Additionally, high degree of compartmentation is proposed across all buildings. These features are incorporated to improve general fire safety to building occupants.
2) Are constructed in an appropriate way to minimise the risk of fire spread	As above, sprinkler protection is installed throughout, and is intended to help limit fire growth, albeit in many instances they will serve to extinguish a fire altogether. Further, all residential apartments will be constructed as ‘fire compartments’, with one hour fire rated walls separating them from other apartments, and common corridors. Sweco’s intention is to also enhance all apartment front doors to FD60S instead of FD30S to account for the potential open plan design of some apartments, over and above prescriptive recommendations.

Policy aspect	Design response
	All external wall construction is to be non-combustible.
3) Provide suitable and convenient means of escape, and associated evacuation strategy for all building users.	Protected means of escape stairs will be provided to all buildings. Escape distances will be in line with prescriptive guidance. Where any deviations exist (i.e. increased travel distances in common residential corridors), enhanced smoke control systems are to be provided to offset such arrangements. Common residential corridors will be provided with means of smoke control, to prevent smoke ingress into the escape stairs, and to prevent smoke build up in common corridors that could impact on other building occupants. Such systems will be triggered automatically, and not rely on the fire service. In tall buildings (over 18m) fire fighting lifts will be provided to assist fire fighting and search and rescue operations. Such lifts may be used by less actively mobile occupants to escape the building, and will be provided with back-up power supplies. Where fire fighting lifts are not provided, strong consideration is to be given to enhancing normal passenger lifts with secondary power supplies and controls, such that they too can be used by less actively mobile occupants. It is a combination of all of the fire protection measures within the building that come together to safeguard the single stair design: sprinklers to limit fire growth and size; fire detection to alert occupants, trigger automatic fire systems and call the fire service; compartmentation to limit fire spread and growth; using materials of limited combustibility to prevent undue fire growth and providing smoke control to lobbies to prevent smoke impacting means of escape and fire fighting operations.
4) Develop a robust strategy for evacuation which can be periodically updated and published, and which all building users can have confidence in.	Comments generally as above. The residential scheme will adopt a ‘stay-put’ policy where only the fire affected apartment will evacuate – all others will remain in place. However, the fire alarm system may be provided with the functionality to sound in all areas of the building in the event of a catastrophic emergency.

Policy aspect	Design response
	<p>This aspect is advocated within the project fire strategy, but is to be interrogated further with London Fire Brigade during consultation.</p> <p>The client/estate management team will ensure fire risk assessments are carried out at least annually and that the evacuation strategy plan is clearly communicated to all occupants and periodically reviewed, updated and published as appropriate.</p>
5) Provide suitable access and equipment for firefighting which is appropriate for the size and use of the development	<p>Fire fighting shafts are to be provided to all buildings in excess of 18m to assist firefighting operations.</p> <p>A firefighting shaft will contain a fire fighting lift, a ventilated 'lobby' and access to either a dry or wet rising fire main. Sweco also look to enhance lighting levels in residential firefighting stairs to assist in any potential smoke logged operations.</p> <p>The roadways around the site are provided to assist vehicle access close to the building, without dead-ends. Hydrants will be provided throughout the site in line with prescriptive standards to again assist operations.</p> <p>Whilst subject to detailed design, Sweco will look to have dedicated sprinkler tanks to the sprinkler systems, to avoid drawing water from town's main supplies, which in turn could affect hydrant supplies, inhibiting firefighting operations.</p> <p>Finally, as all buildings shall be sprinkler protected, the chances of a significant fire are substantially reduced.</p>
<p>Section B) All major development proposals should be submitted with a Fire Statement, which is an independent fire strategy, produced by a third party suitably qualified assessor. The statement should detail how the development proposal will function in terms of:</p>	
1) The buildings construction: methods, products and materials used, including manufacturers details	<p>The fire strategy document is clear that elements of structure supporting the buildings stability are to be fire rated to the appropriate level, taking cognisance of the height and use of the building.</p> <p>Only tested, certified products that are fit for purpose should be used, and it is important that a system of inspection and validation is carried out by the specialist contractor, and witnessed by a third party.</p>

Policy aspect	Design response
	<p>The fire strategy sets down the surface fire classification for all wall and ceiling linings in the buildings.</p> <p>The fire strategy also clearly sets down the need to use non-combustible products in external façade construction.</p>
2) The means of escape for all building users: suitably designed stair cores, escape for building users who are disabled or require level access, and the associated evacuation strategy approach.	<p>Refer to responses to Section A, points 3 & 4.</p>
2A) Features which reduce the risk to life: fire alarms systems, passive and active fire safety measures and associated management and maintenance plans.	<p>Refer to responses to Section A, point 1.</p> <p>The client/estate management team will fire risk assessments are carried out at least annually and the life safety systems are inspected, tested and maintained in line with recommendations in BS 9999.</p>
3) Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and positioning of equipment, fire fighting lifts, stairs and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these.	<p>Refer to responses to Section A, points 3, 4 & 5.</p> <p>Additional commentary is set down in the main body of this report, but consultation is to be carried out with London Fire Brigade to ensure they are satisfied the provisions offered are suitable for their current, and importantly, future requirements.</p>
4) How provision will be made within the cartilage of this site to enable fire appliances	<p>Refer to response to Section A, point 5.</p> <p>Road access is provided throughout the site, designed to offer appropriate access to all buildings. The requirements for access are outlined in the project fire strategy.</p>

Policy aspect	Design response
to gain access to the building.	
4A) Ensuring that any potential future modifications to the building will take into account and not compromise the base build fire strategy/protection measures	Client/estate management team to seek fire consultation and fire strategy review/update in the case of a significant future modifications in the building.