Fire Statement

OX19028 01/03/2023 R06

Royal National Throat, Nose and Ear Hospital, 330 Gray's Inn Road, London

1 APPOINTMENT AND BACKGROUND

OFR Consultants (OFR) have been appointed by Groveworld to provide fire safety design advice in support of the redevelopment of the Royal National Throat, Nose & Ear Hospital site, London, known as 330 Gray's Inn Road. OFR will aid the design team in the development of the building, including assisting in specifying the requisite fire safety systems and provisions necessary for the building.

The proposed development is located in London and therefore is subject to the London Plan 2021 (New London Plan), which is the statutory Spatial Development Strategy for Greater London prepared by the Mayor of London ("the Mayor") in accordance with the Greater London Authority Act 1999 (as amended) ("the GLA Act") and associated regulations.

The New London Plan was published in March 2021. The London Plan is part of the statutory spatial development strategy for London, meaning that the policies in the Plan should inform decisions on planning applications across London. In support of the New London Plan, the Greater London Authority (GLA) have published draft guidance documents outlining the details required to adhere to Policies D12 (Fire Safety) and D5 (Inclusive Design) of the London Plan 2021. A fire safety guidance document and two draft guidance documents to supplement this have been released and are available on the Greater London Authority website, these can be referred to for specific guidance on these points as listed below:

- London Plan Guidance – Fire Safety
- Greater London Authority, London Plan Guidance Sheet, Policy D12(B)
- Greater London Authority, London Plan Guidance Sheet, Policy D5(B5)

The guidance document listed above as "London Plan Guidance – Fire Safety" forms the most recent guidance document on the London Plan 2021 and forms the basis upon which this London Plan Fire Statement has been prepared.

This London Plan Fire Statement aims to demonstrate that the relevant fire safety aspects of the design to date, and the approach that OFR will adopt with regards to the Building Regulations are appropriate. However, the London Plan Fire Statement does not constitute the Detailed Fire Strategy that is being developed to demonstrate compliance with the Building Regulations. The exhaustiveness and definitiveness of the statement are commensurate with the nature of the planning application submitted and the RIBA Stage 2 level of design.

A Planning Gateway One Fire Statement is required for the scheme as Block A and B residential buildings are considered as 'relevant building'(s) under Planning Gateway One (i.e., Block B contains two or more dwellings and top storey is above 18 m and so is Block A when it is measured from the lowest external level (Lower Ground Floor)).

This issue of the fire statement incorporates design changes from the revised scheme.

2 COMPETENCY, COMPLIANCE AND QUALITY ASSURANCE RECORD

Consistent with the guidance contained within Policy D12, the statement has been prepared by someone who is third-party independent and suitably qualified. The approver of this document is a registered engineer with the Engineering Council with the post-nominals CEng (Chartered Engineer) and is registered with the Institute of Fire Engineers with the post nominals MIFireE.

The technical content that will be produced within the development application will seek to comply with all relevant legislation, as well as the London Plan Policy D5(B5) and Policy D12 requirements.

Rev	Date	Comments	Author	Checked by	Approved by
R00	14/09/20	Initial Issue	MA	BMcC	JW
R01	30/10/20	Update following client comments	As above		
R02	16/11/20	Update following client comments	As above		
R03	01/03/21	Update following GLA comments	As above		
R04	17/03/21	Update to include lift designation	As above		
R05	23/02/23	Updated following Stage 2 revisit	AS	BMcC	JW
R06	01/03/2301/03/23	Updated to reflect planning consultant comment and client instruction.	As above		

3 FIRE STATEMENT LAYOUT

The fire statement of the London Plan should set out the following in line with the London Plan policy requirements:

- How the proposed fire safety measures meet the requirements of London Plan Policy D12A (parts 1-6) and D12B (parts 1-6).
- How evacuation lifts have been incorporated into the development (where required in line with London Plan Policy D5(B5).
- How the development meets the minimum fire safety regulations and standards.
- What additional fire safety measures are to be included beyond the minimum requirements of the Building Regulations.
- Whether a Planning Gateway One Fire Statement has also been submitted. This is the case, with document reference '230301-R01-OX19028-GTW01_Fire_Statement-DN-CIC'.

The fire statement is laid out in sections that directly pertain to the requirements of the London Plan Policy D12A and D12B. These sections also address the items above.

4 THE DEVELOPMENT

The development is described as follows:

Variation of Condition 2, 18, 31, 41 and 54 of planning permission ref 202/553/P for the 'Redevelopment of the former Royal National Throat, Nose and Ear Hospital site, comprising: Retention of 330 Gray's Inn Road and a two storey extension above for use as hotel (5 above ground storeys in total), demolition of all other buildings, the erection of a part 13 part 9 storey building plus upper and lower ground floors (maximum height of 15 storeys) for use as a hotel (including a cafe and

restaurant); covered courtyard; external terraces; erection of a 7 storey building plus upper and lower ground floors (maximum height of 9 storeys) for use as office together with terraces; erection of a 10 storey building plus upper and lower ground floors (maximum height of 12 storeys) for use as residential on Wicklow Street and office space at lower ground and basement floors; erection of a 5 storey building plus upper and lower ground floors (maximum height of 7 storeys) for use as residential on Swinton Street and associated residential amenity space; together with a gymnasium; new basement; rooftop and basement plant; servicing; cycle storage and facilities; refuse storage; landscaping and other ancillary and associated works.' Namely to enable amendments to the approved drawings list to enable an uplift in office/labs floorspace, a reduction in affordable workspace, amendments to the landscape design of the residential garden, a revised entrances on Wicklow Street, a revised arrangement to the loading bay on Wicklow Street, reconfiguration at basement level of the office/labs building, and increased cycle parking provision, and additional basement level, reconfiguration of the roof level plant and enclosures, the addition of flues in addition to other associated works.

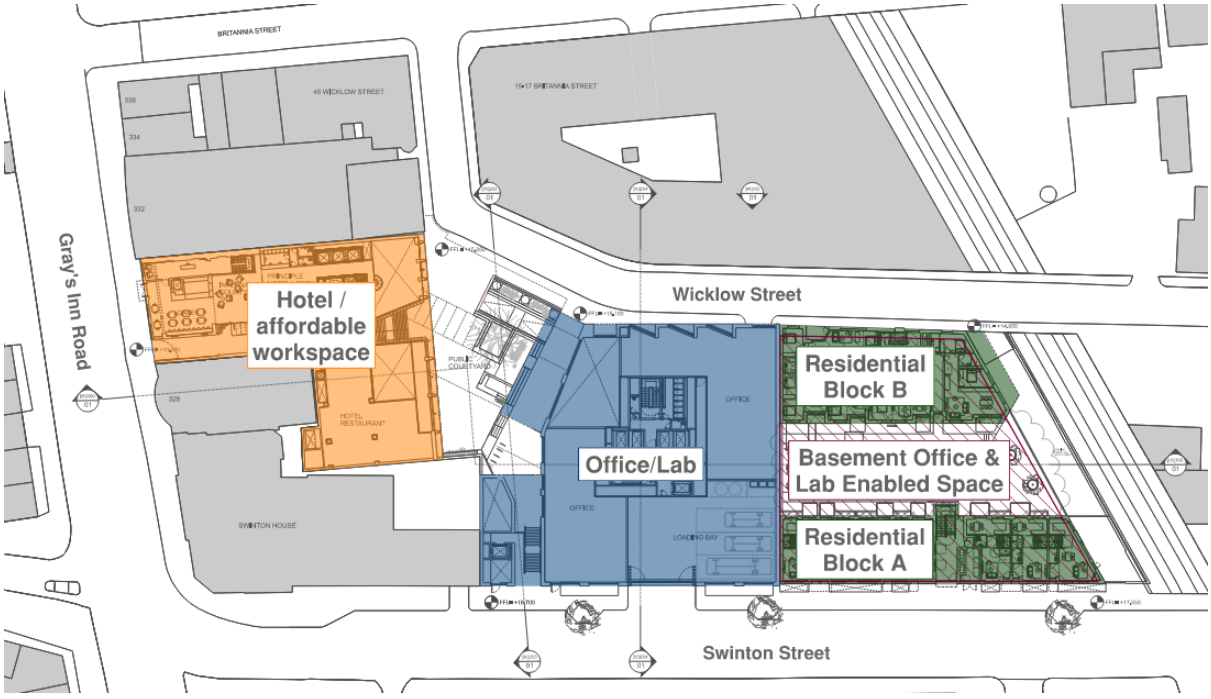


Figure 1 – 330 Gray's Inn Road site masterplan

Table 1 summarises the buildings with the height and number of floors above access level.

Table 1 – Buildings heights relative to access levels

Building	Height [m]	Floors relative to access level	Depth [m]	Floors below access Level
Hotel				
Lower Block (affordable workspace)	13.5	5 (UGF + 4)	3.2	-
Main Block	46.6	15 (LGF + UGF + 13)	11.3	2 (B1 + B2)
Office				
Office/Lab	31.3	9 (LGF + UGF + 7)	15.2	3 (B1 + B2 + B3)
Residential				
Block A	16.6*	6 (UGF + 5)	8.9	2 (LGF + B1)
Block B	40.4	13 (LGF + UGF + 10 +L11 [Terrace])	5.8	1 (B1)
Basement Office & Lab Enabled Space	3.5	1 (LGF)	14.8	3 (B1 + B2 + B3)
* Per Gateway 01 definition, the Lower Ground Floor could be considered as the lowest external lower level which would put the building height at 19.6 m. Per ADB and BS 9999:2017, the height of the building is measured as 16.6 m.				

5 DESIGN APPROACH AND METHODOLOGY

The minimum fire safety goal for each building is to provide a reasonable standard of health and safety in accordance with the current social, economic and sustainable context. For each element of the scheme this will be achieved by satisfying the functional requirements of Part B of the Building Regulations 2010, the Construction Design and Management Regulations 2015 (CDM) and the management requirements of the Regulatory Reform (Fire Safety) Order 2005 (RRO).

In meeting the above, the base-build fire strategies for the hotel and office blocks will adopt the guidance in BS 9999:2017 [1], with the residential blocks adopting the guidance specific to residential buildings, as per that provided in BS 9991:2015 [2]. These strategies will be supplemented by fire engineering judgements and analyses, where necessary.

It is noted that BS 9991:2015 is currently under review and that a draft issue was published in 2021 for public consultation. Therefore, consideration has been given to the recommendations of BS 9991:2021 (Draft) where practicable, and once the new revision of BS 9991 is published (expected in 2023), the Detailed Fire Strategy will be developed in accordance with the revised BS 9991. Additionally, guidance within Approved Document B (Volume 1) [3], will be considered where applicable and relevant over the guidance of BS 9991 for best practice.

Residential Blocks A and B are both single stair residential buildings. Residential Block A is below 18 m (c. 16.6 m) in height from the external access level to the topmost storey, with Block B having a topmost storey height of c. 40.4 m from external access level.

On 23/12/22, the UK Government issued a public consultation on their proposal to implement further changes to Approved Document B. Most notably for the scheme at this stage of design, is the proposal to implement a height threshold, above which, a minimum of two stairs would be recommended in fire safety guidance for residential buildings. The Government indicated their preferred option would be a threshold of 30 m, with that proposal currently (at the time of writing) out for public consultation.

OFR have been instructed by the client to follow the current published guidance, in the form of BS 9991: 2015 and Approved Document B Volume 1: 2022 with respect to the building design, which does not impose any height thresholds on single stair buildings.

Whilst the Hotel is not explicitly a residential building, it is also single stair with a topmost storey height of c. 46.6 m. It is recognised that the Hotel shares occupant typology and fire strategy similarities with a residential typology. OFR have also been requested by the client to continue with the single stair design for this building.

OFR will monitor further changes / updates to any relevant legislation and guidance as the design progresses, instructing the design team and stakeholders, and implementing these as necessary. At Building Regulation submission, OFR advise that the design should seek to meet legislation that is current at the time of the submission (whilst being aware of impending changes). Should legislation / guidance changes occur beyond this time, OFR would advise that these are adopted as a matter of best practice, as opposed to regulatory obligation.

OFR are applying a long-established methodology based on BS 7974 [4] and the International Fire Safety Engineering Guidelines [5], which includes actively involving stakeholders to weigh in on the strategy development. The aim of the process is to identify the aspirations of the project and its constituent parts, the associated fire safety objectives and the key issues that impact the development of a suitable fire strategy for these unique buildings of varied form and function.

Stakeholders include:

- Client – Groveworld.
- The appointed Building Control Body (although noting no consultation has taken place to date).
- London Fire Brigade (LFB) (although noting no consultation has taken place to date).
- Design team members and consultant team.

As part of the Building Regulations process the strategies will each be the subject of milestone reviews and regular meetings which will be held with representatives from the appointed Building Control Body. As the regulatory approver, they will in turn lead the engagement process with London Fire Brigade (both the Fire Engineering Group and the Inspections team) and advice / feedback from these authorities will in turn inform the building design and the fire strategies that are being developed.

6 CONSTRUCTION MATERIALS

A mix of modern and traditional methods of construction are proposed for each block, with details of each presented in the following sections.

6.1 Office / Lab

The office block will comprise a concrete superstructure on the lower floors, with a steel frame and composite slab on the upper levels.

The outer linings will be constructed of brick or stone, hence being Euroclass A1. The external façade construction will achieve the following:

- Euroclass B-s3, d2 surface spread of flame for the portion of the façade more than 18 m above the adjacent ground level, and where external walls are required to be fire rated for space separation.
- Euroclass C-s3, d2 below this.
- All insulation and filler materials used in the construction of the wall will be of limited combustibility (Euroclass A2-s3, d2), or better.

6.2 Hotel

The lower and main blocks will have a concrete frame and slab superstructure, with internal plasterboard and stud partitions. The hotel external wall build-up will consist of terracotta spandrels / fins on stainless steel or aluminium supports, with rockwool insulation behind a plasterboard finish.

As of the 21st December 2018, the updated version of Approved Document B [6] and Regulation 7 came into effect, which specified more onerous requirements for the construction of external facades of relevant buildings.

The hotel is a relevant building under Regulation 7; thus, the scheme will adopt the provisions appropriate to relevant buildings due to the potential for delayed evacuation regime incurred from the building providing sleeping accommodation. Therefore, all materials used in the construction of the external walls and specified attachments (such as balconies) of the buildings are recommended to be Euroclass A1 or Euroclass A2-s1, d0.

6.3 Residential

The residential blocks will have a concrete frame and slab superstructure. The external wall build-up will consist of a masonry / stone outer lining, with mineral wool insulation.

As the residential blocks are relevant buildings under Regulation 7, external walls and specified attachments will be primarily constructed of materials which achieve a Euroclass A1 or Euroclass A2-s1, d0 in accordance with BS EN 13501-1[7]. This is in line with Regulation 7 of the Building Regulations. The only exceptions will be those listed in Regulation 7(3), such as window frames & windows, membranes etc.

7 Risk Profiles

BS 9999:2017 sets out fire safety measures as a function of risk profile. The risk profile is formed of two components: (a) the nature of the occupants, and (b) the nature of the fire hazard. The proposed risk profiles for the development are noted in Table 2. Generally, a base risk profile is applied for each block (e.g. office, hotel). Specific localised areas are given differing risk profiles according to the potential nature of occupants and hazards therein. BS 9991:2015 does not set out fire safety measures as a function of risk profile, therefore one is not given for the residential block. The risk profiles have been reduced by one for both the office and hotel demises in consideration of the provision of sprinklers.

Table 2 – 330 Gray's Inn Road Risk Profiles

Area (s)	Nature of the occupants	Fire growth rate *	Risk Profile (inclusive of sprinkler provision)
Office block - general	Awake & familiar	Medium, reduced to slow	A1
Office block – lab spaces	Awake & familiar	Fast, reduced to medium	A2**
Hotel block (main)	Likely to be asleep, short-term occupancy	Medium, reduced to slow	Ciii1
Hotel (small)	Awake & familiar	Medium, reduced to slow	A1
Residential block	As per BS 9991:2015		
Reception / lobby Restaurant / café Gym	Unfamiliar and awake	Fast, reduced to medium to allow design flexibility	B2
Plant spaces	Awake & familiar	Fast, reduced to medium	A2
* After reduction in growth parameter by one increment as sprinklers are provided. ** This is a conservative assumption as the use and equipment is unknown at this stage. This will be assessed with further detail at the next stage.			

8 MEANS OF ESCAPE

8.1 Office / Lab

8.1.1 Evacuation regime

The office/ lab block will adopt a simultaneous evacuation regime whereby in the event of a fire, all occupants will evacuate the building.

8.1.2 Means of escape provisions

The office / lab block is planned around a central core, providing access to two escape stairs. Each of the two stairs will have a clear width of 1,300 mm and serve all floors above ground (LGF + UGF + 7), resulting in an above ground capacity of c. 1,300 persons, based upon simultaneous evacuation. This equates to a per floor capacity of c. 185 persons. Protected lobbies are provided to both stairs, hence, ensuring their availability in a fire scenario.

Each floor will be provided with three storey exits into the central core at diverse locations. To accommodate the proposed per floor occupancy, storey exits will achieve a minimum clear opening width of 1,050 mm.

Upon exiting the building, occupants will assemble at a designated assembly point outside, away from the building, with the evacuation strategy away from the building to be developed during Stage 3.

8.1.3 Means of escape for Mobility-Impaired Persons (MIPs)

To facilitate egress of MIPs, and in line with Policy D5(B5) of the London Plan, at least one evacuation lift will be included in the building. The office is formed with a single, central core, comprising two firefighting shafts (see Section 10.2). Therefore, at least one evacuation lift is recommended per Policy D5(B5) (or more subject to a capacity assessment), as well as the two firefighting lifts (i.e. one per shaft, see Section 11).

The evacuation lift will be under the operational control of the building management in a fire scenario. Landlord staff and occupants will be trained to coordinate the response of the evacuation lift and both a management and evacuation response plan will be developed by the operator. Tenants will be provided information within their information pack regarding the evacuation lift and how it operates. Any disabled member of staff will have a Personal Emergency Evacuation Plan (PEEP) and the procedures are to be practiced. A Generic Emergency Evacuation Plan (GEEP) will need to be written for visitors who would need assistance to escape.

Where egress direct to the outside of the building is possible, exits have been cited to permit unaided escape. Where a change in level is required, ramps or lifts will be provided to permit unaided escape.

8.2 Hotel

8.2.1 Evacuation regime

The main block will adopt either a simultaneous or phased evacuation regime, subject to further design development. At the current stage, provisions have been considered to evacuate as a minimum the floor of fire origin and floor above after receiving an alert following first detection. Whichever evacuation regime is adopted, appropriate / relevant building-wide provisions will be ensured to facilitate its implementation.

The lower block is used as affordable workspace and will adopt a simultaneous evacuation regime.

Given the connection to the main block at GF level, the small block will evacuate upon detection within the main block. The response of the main block following detection within the small block will be developed at the next stage.

8.2.2 Means of escape provisions

The lower block (retained on Gray's Inn Road) is used as affordable workspace at above ground levels and is served by a single stair. The main hotel block will be provided with a single stair (part of the firefighting shaft) due to its limited floor plate area. This single stair will serve a floor up to 46.6 m above ground floor level. The tall single stair arrangement will be demonstrated through computational fire and smoke modelling that the stair remains clear of smoke during the evacuation and firefighting phases. The active fire protection measures will include a smoke extract system comprising inlet and exhaust shafts with mechanical fan sets.

Each of the two stairs will have a clear width of 1,100 mm, resulting in a maximum permitted building occupant load of c. 400 persons in the smaller block, and c. 700 persons in the main hotel block. However, the design occupant load will be less than the maximum permitted through the stair size calculation due to the single escape route from each floorplate. Both stairs will be approached via protected lobbies at each level.

In the lower block, which does not contain bedrooms and will be used as affordable workspace, single direction travel distances to the stair lobby are within the allowable limits given in BS 9999:2017 for a A1 risk profile. In the main hotel block single direction travel distances exceed those permitted in BS 9999:2017 for sleeping hotel accommodation, risk profile Ciii1. That is, 27 m and 13 m for multiple

and single direction travel, respectively. This extension is supported by the provision of a mechanical smoke extract system protecting the circulation corridor, as discussed further in Section 9.5.1.

At ground floor, each stair will discharge to a final place of safety (outside), or into a protected corridor leading to a final place of safety. Final exits at the base of stairs will be no narrower than the preceding stair width.

Upon exiting the building, occupants will assemble at a designated assembly point in the courtyard.

8.2.3 Means of escape for Mobility-Impaired Persons (MIPs)

To facilitate egress of MIPs, and in line with Policy D5(B5) of the London Plan, evacuation lifts will be included in the hotel. The small hotel block is served by one lifts, which will be an evacuation lift. The main hotel block is constructed with a single, central core, formed as a firefighting shaft (see Section 10.2). Therefore, at least one evacuation lift is recommended per Policy D5(B5) (or more subject to a capacity assessment), as well as the firefighting lift (see Section 11).

The evacuation lifts will be under the operational control of building management in a fire scenario, aided by the fire and rescue service (FRS) where necessary. Landlord staff and occupants will be trained to coordinate the response of the evacuation lift and a management and response plan will be developed by the operator. Guests will be provided information within their information pack regarding the evacuation lift and how it operates. Any MIP member of staff will have a PEEP and the procedures are to be practiced. A GEEP will need to be written for guests / visitors who would need assistance to escape.

Where egress direct to the outside of the building is possible, exits have been cited to permit unaided escape. Where a change in level is required, ramps or lifts will be provided to permit unaided escape.

8.3 Residential

8.3.1 Evacuation regime

The residential blocks will be designed with a 'stay put' evacuation policy where only the flat of fire origin receives an alert to evacuate whilst other occupants remain within their flats. Special provisions are made to ensure that a fire is contained within the flat of origin and that common escape routes and stairways remain relatively free from smoke and heat in the event of a fire within a dwelling. This is premised upon the high levels of fire compartmentation and smoke control systems in place, as is typical for residential buildings.

This strategy does not restrict occupants within other flats choosing to evacuate, either of their own volition or at the request of the FRS, with active and passive fire safety measures ensuring their escape routes maintain suitably tenable for escape.

Per ADB Volume 1: 2022, an evacuation alert system will be provided throughout both residential Blocks (A and B), in accordance with BS 8629. This will have the functionality to trigger a building-wide alert to evacuate.

8.3.2 Internal planning of flats

The flats will align with one of the below design arrangements:

- Be provided with a protected entrance hall (rated to 30 minutes fire resistance) and be provided a sprinkler system, where the travel distance between the access to all rooms and the flat front door is less than 9 m.

- Limit the travel distance from any point within the flat to the entrance door to 20 m in an open-plan arrangement, supported through a BS 5839-6 [8] LD1 detection system, and the sprinkler system provided to all flats in accordance with BS 9251 [9].

At upper and lower ground floor in Block A, the flats will be formed as open-plan duplexes, accessed externally from upper ground floor. This is supported by the provision of sprinklers in the flats as well as a comparative smoke toxicity modelling analysis to be carried out during Stage 3.

At the top floor of Block B, each flat will contain an internal stair providing access to a roof terrace. These layouts will be provided with escape routes commensurate with BS 9991:2015.

8.3.3 Means of escape provisions

The flats in residential Block A will be approached externally via a wide approach common (external) walkway that has guarding only at the edges and otherwise is completely open to the atmosphere.

The flats in residential Block B will open onto the shared common corridor, from which the lifts and the protected stair will be accessed.

The external balcony forming the flats in Block A is designed to permit the exhaust of smoke and hot gases away from the building. The common corridors in Block B are the primary escape routes from the flats and will be mechanically ventilated with a smoke extract system to provide protection to the escape stair and common corridor. This system will ensure tenable conditions for both means of escape and firefighting and will be designed to prevent smoke from entering the single escape stair. A mechanical push-pull system is proposed.

The travel distance within the communal corridor in Block B is measured to be c. 10 m.

Each of the residential buildings will be served by a single escape stair. The stair discharge arrangement will be developed so that all lobbies which open onto the escape stair are afforded mechanical extract.

8.3.4 Means of escape for Mobility-Impaired Persons (MIPs)

To facilitate egress of MIPs, and in line with Policy D5(B5) of the London Plan, at least one dedicated evacuation lift (i.e. not shared with the firefighting lift) will be provided in each building. The mechanical smoke ventilation system (or equivalent) in the common corridor will provide a suitable level of protection to the refuge, subject to a detailed computational fluid dynamics analysis. Both residential buildings are constructed with a single, central core, with Block A core formed as a protected shaft as it is below 18m high and Block B core formed as a firefighting shaft (see Section 10.2). Therefore, in Block A, any of the lifts may be the evacuation lift and in Block B, one evacuation lift independent to the firefighting lift will be provided (see Section 11).

Subject to the presence of concierge or similar personnel in Block B, the evacuation lifts will either operate by self / voluntary evacuation or be under the operational control of building management in a fire scenario. Block A will not be provided with concierge. The former relies on adequate training for the occupants that will need to use the lift for evacuation. This will form part of the purchase information provided to owners / tenants. With the latter, both staff and occupants will be trained to coordinate the response of the evacuation lift and a management and response plan will be developed by the operator.

8.4 Basement levels

The development contains three basement levels that are independent except for one connection (corridor) at B1 level between the Office/Lab and Hotel. The basement Office and Lab enabled space is completely independent. The residential blocks have a single basement level that is separate from

the non-residential use basements. Figure 2 shows the different spaces at B1 level, indicating the connection.

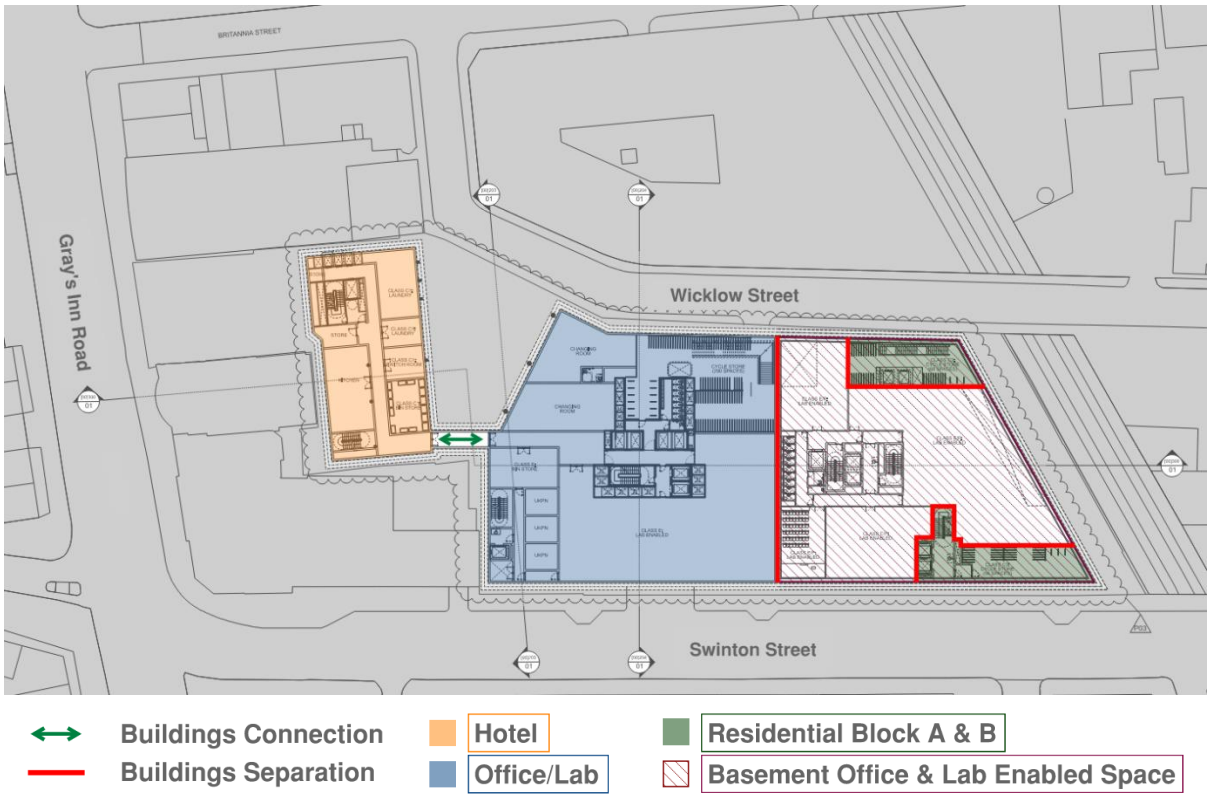


Figure 2 – Basement 01

The Office / Lab basement comprises 3 below ground storeys and is served by two firefighting shafts (two escape stairs total). Plant is located at B3, with B1 and B2 containing lab and office spaces, plus changing and cycle facilities at B1.

The Hotel basement comprises 2 storeys and contains one firefighting shaft and one protected escape stair (two escape stairs total). Plant is located at B2, with kitchen and back of house services at B1.

The Basement Office and Lab enabled space comprises 3 storeys and is served by two firefighting shafts (escape stairs) to levels B1 and B2, with one firefighting shaft also continuing to serve B3 (one escape stair). Plant is located at B3, with B1 and B2 containing lab and office spaces.

The residential blocks basements are single level (B1 only), served by one firefighting shaft (Block A) and one protected stair (Block B). The single level basement at B1 contains cycle storage. Block A has two levels below access level (Lower GF and B1) when measured from Swinton Street.

The design of all the basements will provide a level of safety commensurate with BS 9999:2017 with regards to means of escape, compartmentation and FRS provisions.

9 PASSIVE AND ACTIVE FIRE SAFETY SYSTEMS

A balance of passive and active fire safety systems will be employed within each of the buildings to support and enable the life safety objectives agreed with the project stakeholders.

9.1 Structural fire resistance

The fire resistance period for elements of structure will adhere to the recommendations made in the relevant guidance documents, as presented in Table 3, with construction achieving the designated rating through specification in accordance with BS EN 13501-2 [10]. The specifications consider the sprinkler provisions.

Elements which form the structural frame (e.g. columns, beams, floors, etc.) will achieve the ratings detailed in Table 3. This rating also applies to:

- Compartment floors.
- Compartment walls.
- High hazard spaces (e.g. electrical rooms operating above low voltage, refuse stores).
- External walls which require fire resistance.

Table 3 – Structural fire resistance periods for buildings

Building	Maximum storey height *	Fire resistance period (presuming sprinklers installed throughout all buildings **)
Office block	31.3m	120 minutes ***
Small hotel block	13.5m	60 minutes
Main hotel block	46.6m	120 minutes ***
Residential Block A	16.6m	60 minutes
Residential Block B	40.4m	120 minutes ***

*Height measured from the fire service access to level to topmost accessible storey level

** Only sprinkler systems installed in accordance with BS 9251 / BS EN 12845 (as appropriate) are suitable to reduce the fire resistance periods

*** Rationalisation may be possible through structural fire engineering assessment to be conducted at a later design stage. This would appraise the fire resistance requirements as per the methods outlined within BS 9999:2017 / BS 9991:2015 for the building-specific layouts and fire hazards.

9.2 Compartmentation

The potential for fire spread will be reduced by subdividing the building into compartments, separated from one another by walls and / or floors of fire-resisting construction. The same approach can be applied to prevent fire spread between buildings that are close together. Compartmentation, horizontal or vertical, can also be used as part of an escape strategy to create areas of relative safety. Further, compartmentation contributes to business continuity by limiting the extent of fire damage, which can have direct and consequential benefits for post-fire recovery.

Compartment sizes are dictated by the use of the space.

For the office block:

- Compartment floors are provided throughout.
- BS 9999:2017 places no limit on compartment sizes for an A1 risk profile. However, compartmentation should be provided to separate tenancies within buildings.

For the small hotel block (which does not contain bedrooms):

- Compartment floors not provided (as not a minimum requirement for life safety).

- BS 9999:2017 places a compartment size limit of 8000 m^2 for a B2 risk profile in buildings under 18 m. This limit will not be exceeded in the design.

For the main hotel block:

- All floors are to be compartment floors.
- All penetrations through floors, e.g. stairs, risers, lifts etc. are formed as individual fire compartments.
- Circulation corridors are to be separated from the bedroom accommodation by a minimum of 30-minute fire rated construction.

For the residential blocks:

- All floors are formed as compartment floors.
- All penetrations through floors, e.g. stairs, risers, lifts etc. are formed as individual fire compartments.
- On floor levels, all apartments and common corridors are to be separated from each other by 60-minute fire rated construction.

Across all buildings, fire stopping will be suitable for the locations at which it is provided, including being accompanied by appropriate test evidence, with all installers to be third-party accredited.

The maintenance of all the associated fire safety features within the building will be in line with the relevant sections of BS 9999:2017 and BS 9991:2015, the manufacturer's recommendations, and other requirements of the Building Regulations.

9.3 Detection and alarm systems

9.3.1 Typical specification

Detection and alarm systems will be specified in accordance with:

- BS 5839-1 [11] for the office and hotel blocks, and the common access portions of residential blocks.
- BS 5839-6 [8] for residential demises.

9.3.2 Extent of coverage – non-residential

The following extent of coverage will be provided as a minimum:

- Office block – L1 system, alongside a voice alarm / public address system to optimise the means of escape design.
- Basement Office & Lab Enabled Space – L1 system.
- Hotel block – L1 system.

The above constitutes automatic detection throughout the demises, with detectors installed as per the relevant British Standard.

9.3.3 Extent of coverage – residential

An LD2 system will be installed throughout, uprated to an LD1 system for open plan flats / duplexes with an open stair.

The above constitutes automatic detection throughout the demise, with detectors installed as per the relevant British Standard.

Common portions of the residential blocks will be provided with a BS 5839-1 L5 system, comprising detection within specific locations, including all common corridors, reception spaces and hazard rooms.

9.3.4 Building-wide alarm

Per ADB Volume 1: 2022, An evacuation alert system will be provided throughout both residential Blocks (A and B), in accordance with BS 8629. This will have the functionality to trigger a building-wide alert to evacuate.

9.3.5 Links to other fire safety systems / interconnectivity

The Control and Indicating Equipment for the BS 5839-1 detection and alarm system within each block will be located at fire service access level, in proximity to building entrance points.

CIE will have the ability to interact with other fire safety systems, including smoke control systems, automatic door closing systems, shutdown of air handling or other plant systems, and lifts.

9.4 Automatic fire suppression systems

Fire suppression systems provide an automatic means of fire detection and suppression. They are designed to detect a fire and either extinguish it in its early stages of development or control it / limit its growth such that extinguishment can be completed by other means (e.g. firefighter intervention).

Each block will be provided with sprinkler protection. For the office and hotel blocks, this will be a commercial grade system designed in accordance with BS EN 12845 [12] with the enhancements to improve system reliability detailed in Annex F. For the residential blocks, the system will be in accordance with BS 9251 [9], with additional features to enhance the resilience of the system. The additional features will include dual pumps and back-up power supplies.

9.5 Smoke Control

9.5.1 Hotel

To support the single-direction travel distances in the main hotel block and support protection to a single escape stair, a mechanical smoke extract system will be provided. The system will incorporate two extract points at the remote ends of the circulation corridor, with a centrally located inlet shaft to mitigate smoke ingress into the escape stair. The detailed design of the system will be undertaken at a later design stage and confirmed through computational fluid dynamic (CFD) modelling.

9.5.2 Residential

A mechanical ventilation system will be provided to protect the communal corridors and the stair. The extract rates and suitability of the system will be confirmed through CFD modelling.

9.5.3 Basements

Basements will be provided with either a natural or mechanical smoke and heat ventilation system. The choice of system is subject to coordination at the next stage of design, however, the provision of a BS EN 12845 sprinkler system for the site permits the provision of a mechanical or natural smoke and heat ventilation system.

9.6 Power supplies

All life safety systems will be provided with robust power supplies in accordance with Figure 1 or 2 of BS 8519:2010 [13]. This may be either an automatic standby generator, or an alternative utility supply provided via two separate in-takes into the building from the same external substation.

Emergency power supplies are necessary for the following life safety systems within the demise:

- The automatic sprinkler system (control equipment and pump sets).
- The smoke control systems (fans, control equipment and AOVs).
- Fire detection and voice alarm system.
- EVC system.
- Emergency lighting and lighting within the firefighting shaft.
- The firefighting lift.
- Firefighting communication installations.
- Any other life safety systems.

9.7 Space separation

An external fire spread assessment to BR 187 [14] will be carried out to ensure that fire spread from the new buildings to neighbouring premises is adequately restricted through the provision of fire protection to the external elevations as necessary. The provision of compartment floors and sprinklers in all buildings will be accounted for within the analysis.

10 Access and Facilities for the FRS

10.1 Site access for the FRS

The main vehicle access route to the site will be via Gray's Inn Road, Wicklow Street and Swinton Street, with an access points identified in Figure 3. Appliance access will be provided within 18 m of the dry riser main inlet points for each building. Typically, multiple access points are available for the responding FRS, affording flexibility in incident response.

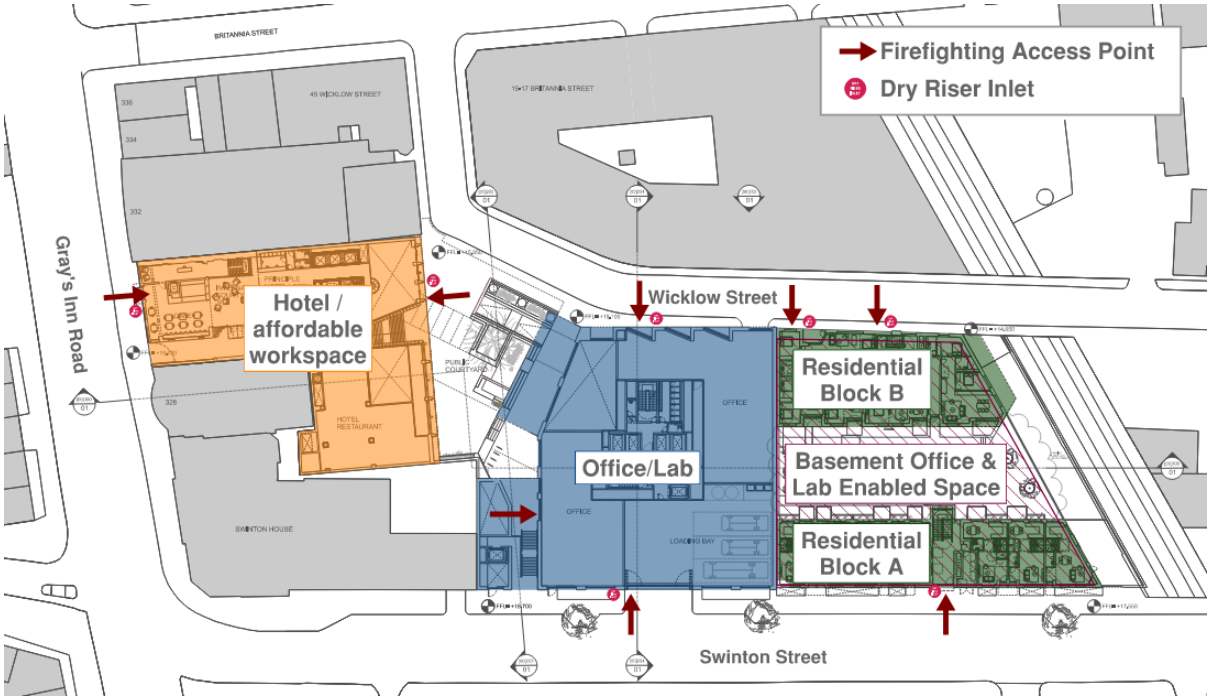


Figure 3 - Firefighting access

10.2 Firefighting provisions

As well as supporting the building occupant life safety objectives, the provision of both passive and active fire safety systems also provides substantial benefits to firefighter operations. These includes the provision of a means to quickly identify the location of a fire and facilities from which to coordinate a response (i.e. firefighting shafts).

A fire-fighting shaft consists of a 120-minute fire rated protected enclosure containing a fire-fighting stair, ventilated fire-fighting lobbies, a fire main and, if provided, a firefighters lift together with any machinery space.

Internally firefighting is facilitated through the firefighting shafts, equipped with dry riser mains intended to simplify and add speed to incident response.

The fire strategy approach is that firefighting and evacuation lifts are separate and not shared. Therefore, the FRS should be able to commandeer the firefighting lifts upon arrival at site. Furthermore, excluding the residential blocks, with a defend-in-place evacuation strategy, the other blocks all operate a simultaneous evacuation regime which should assist in clearing buildings prior to the FRS entry. The residential blocks contain an evacuation alert system to trigger building-wide evacuation should this be considered necessary.

10.2.1 Residential Block A

Residential Block A is below 18 m and will be provided with a protected stair and dry riser main. In Block A, the distance to the most remote point in any flat will not exceed 30 m from the fire main outlet.

10.2.2 Residential Block B

Residential Block B will be provided with one firefighting shaft.

10.2.3 Office/Lab

As the floor plate of the Office/Lab building is over 900 m^2, two firefighting shafts will be provided.

10.2.4 Hotel

The main hotel block will be provided with one firefighting shaft.

10.2.5 Basement Office & Lab Enabled Space

The basement Office and Lab enabled space building has a floorplate over 900 m^2, two firefighting shafts will be provided.

Each firefighting shaft will contain a firefighting stair, ventilated firefighting lobby (formed as the common corridor within the residential demises) with a dry riser main outlet and a firefighter lift installation. The firefighting lifts will also serve as passenger lifts during normal day-to-day operations.

10.3 Water supplies

There are existing hydrants in the vicinity of the area. The condition of these hydrants is to be confirmed as the design develops.

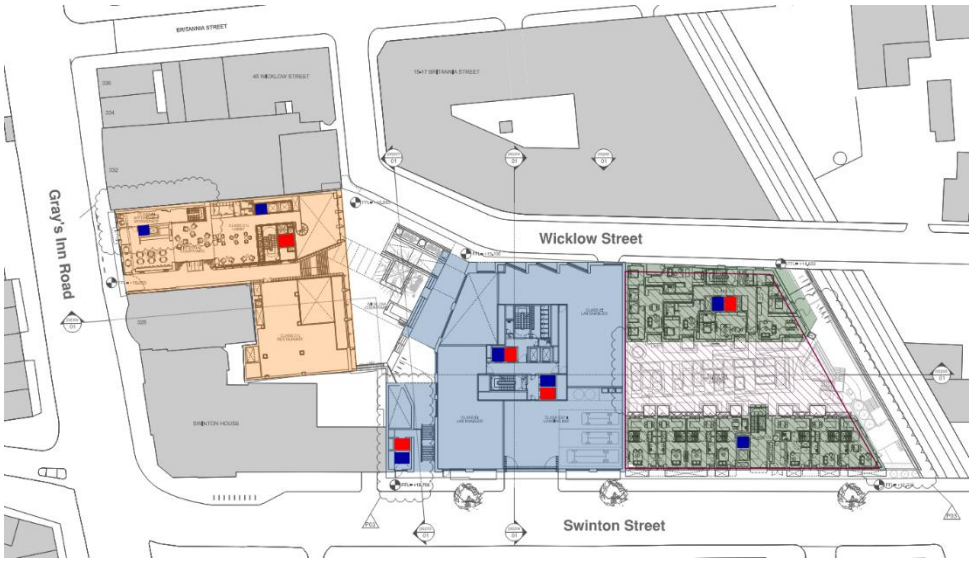
If hydrants are more than 90 m away from the fire main inlet, the Fire and Rescue Services Act 2004 states that it is the duty of the fire authority to source firefighting water supplies. In order to do this, they can either enter into an agreement with a water supplier under Section 39 of that Act or with another individual to put in another source of water (tank, private main etc) under Section 41.

The sprinkler systems for the development are to be provided with water storage tanks, sized to provide the requisite duration of supply stated in the relevant guidance. The BS 9251 and BS EN 12845 systems will be separate; however, sprinkler systems will share infrastructure between buildings, i.e. one sprinkler tank will serve multiple buildings.

11 LIFTS

As discussed in Sections 8.1.3, 8.2.3 and 8.3.4, evacuation lifts will be provided in each of the buildings in the development in addition to the fire-fighting lifts required by Building Regulations. Further, where firefighting shafts are provided, these will contain a firefighters' lift provision, per Section 10.2.

At this stage, a preliminary lift designation drawing has been produced, with a view to develop this as the design progresses. Figure *4* identifies the firefighting and evacuation lifts present throughout the scheme, noting that the evacuation lifts are provided as well as firefighting lifts, as recommended in Policy D5(B5) in the London Plan.



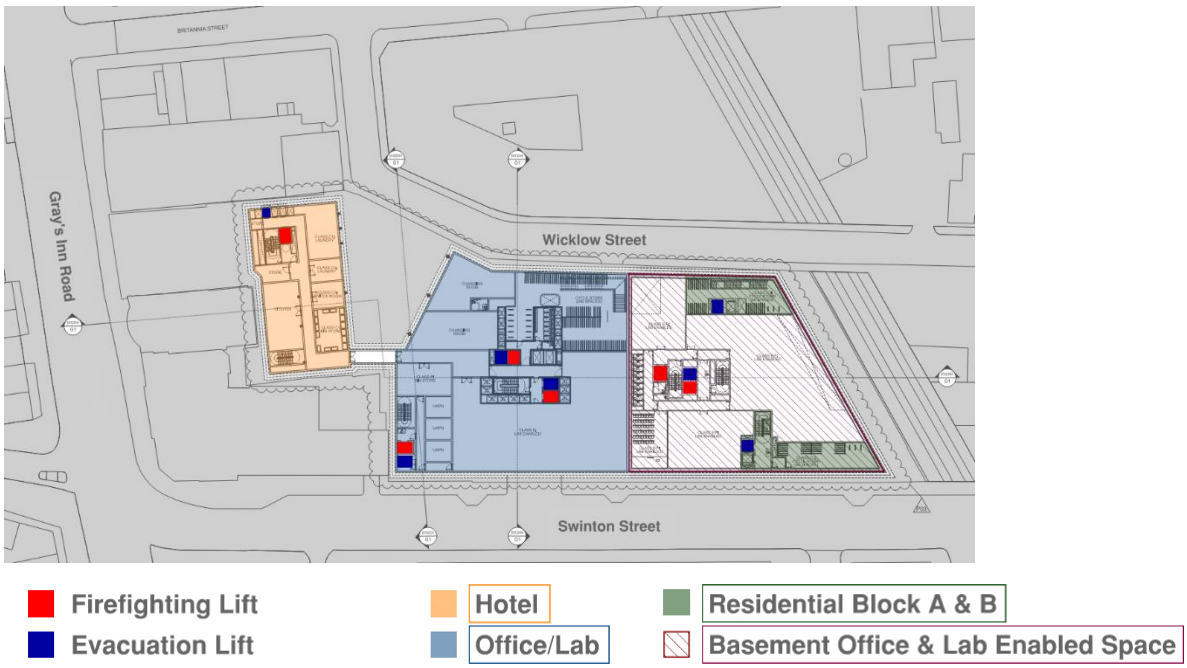


Figure 4 – Designation of firefighting and evacuation lifts across the development – Upper levels (top) and underground levels (bottom)

12 Future Modifications

This fire statement documents the fire strategy principles for the scheme with the design at a RIBA Stage 2 [15] level of detail. These proposals herein may be subject to further specification / change as the design progresses. In due course, a detailed fire strategy will be produced with a level of information suitable for Building Regulations approval. The detailed fire strategy will also form part of the information pack handed over to the building operator(s) under Regulation 38 to assist the responsible person to carry out the necessary fire safety risk assessments and implement and maintain a fire management plan in accordance with the Regulatory Reform (Fire Safety) Order 2005 "FSO".

Any future alterations to the scheme shall not compromise the fire strategy of the building, with approval from the relevant authorities required to be attained where and as necessary.

13 Next Steps

The fire strategies will continue to progress regulatory approvals to demonstrate full compliance with Part B of the Building Regulations and Policies D5(B5) and D12 of the London Plan. The strategy reports will set out the physical fire precautions within the building and the equipment that is necessary to enable safe management of the premises whilst also highlighting key fire management requirements to help ensure safe ongoing operation of the building.

14 References

[1] BSI, 'BS 9999:2017 Fire safety in the design, management and use of buildings. Code of practice', BSI, London, 2017.

[2] BSI, 'BS 9991:2015 Fire safety in the design, management and use of residential buildings. Code of practice', BSI, London, 2015.

[3] HM Government, 'The Building Regulations 2010, Approved Document B (Fire Safety) Volume 1 (2019 edition, as amended May 2020 and June 2022)', 2020.

[4] BSI, 'BS 7974:2019 Application of fire safety engineering principles to the design of buildings. Code of practice', BSI, London, 2019.

[5] ABCB, 'International Fire Engineering Guidelines', Australian Building Codes Board, Canberra, ACT, Edition 2005, 2005.

[6] HM Government, 'The Building Regulations 2010, Approved Document B (Fire Safety) Volume 2 (2019 edition)', 2019.

[7] BSI, 'BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests', BSI Standards Publication, London, 2018.

[8] BSI, 'British Standard BS 5839-6:2013, 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', BSI Standards Publication, 2013.

[9] 'BS 9251:2014 Fire sprinkler systems for domestic and residential occupancies. Code of practice', BSI, London, 2014.

[10] BSI, 'BS EN 13501-2:2016 Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services', BSI, London, 2016.

[11] BSI, 'BS 5839-1:2017 Fire detection and fire alarm systems for buildings - Part 1: Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises', BSI Standards Publication, 2017.

[12] BSI, 'BS EN 12845:2015+A1:2019 Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance', BSI, London, 2019.

[13] BSI, 'BS 8519:2010, Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications - Code of practice', BSI Standards Publication, 2010.

[14] R. Chitty, *BR 187 External fire spread. Building separation and boundary distances.*, 2nd ed. Watford: BRE Bookshop, 2014.

[15] RIBA, *RIBA Plan of Work Overview 2020*. RIBA.