

Precis Advisory

# Belgrove House

## Fire Statement for Planning Application

Reference: 17002-ARUP-ZZ-XX-RP-YF-005

Issue P2 | 14 June 2023



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**Ove Arup & Partners Limited**  
 8 Fitzroy Street  
 London  
 W1T 4BJ  
 United Kingdom  
[arup.com](http://arup.com)

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		Prepared by	Checked by	Approved by	
		Name	Katherine Wong MSc, BEng	Eoin O'Loughlin CEng MIFireE	David Stow CEng MIFireE
		Signature			
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		Name	Katherine Wong MSc, BEng	Eoin O'Loughlin CEng MIFireE	David Stow CEng MIFireE
		Signature			
		Filename			
		Description			
		Prepared by	Checked by	Approved by	
		Name			
		Signature			

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Contents

Executive Summary		1
1.	Introduction	2
1.1	Fire Safety Objectives	2
1.2	Assumptions	2
1.3	Description of the Building	2
2.	Fire Safety Provisions	3
2.1	(D12) B.1 Building Construction	3
2.2	(D12) B.2 Means of Escape	4
2.3	(D12) B.3 Fire Safety Systems	6
2.4	(D12) B.4 Firefighting Facilities	6
2.5	(D12) B.5 Fire Vehicle Access	8
2.6	(D12) B.6 Future Building Changes	9
2.7	(D5) Inclusive Design	9
3.	Competency Statement	9

Tables

Table 1: Building usage and risk profile	2
Table 2: Linings classification	3
Table 3: Estimated Occupant Load	5

Figures

Figure 1: Proposed building section	2
Figure 2: Mark-up of a typical laboratory floor (L01) showing East and West cores	5
Figure 3: Final exits	5
Figure 4: Illustrative lift schematic showing the levels served (indicated by filled cells) by each lift.	7
Figure 5: Fire control centre at West core	7
Figure 6: Mark-ups of Ground floor (L00), a typical laboratory floor (L01) and office floor (L07) showing FF shafts and hose coverage.	8
Figure 7: Annotated Ground floor and site plan showing fire hydrants and their operational status (sent by LFB on 16 Dec 2021 via email), dry riser inlets and assembly point.	8



# Executive summary

This fire statement has been produced by Arup to support the planning application for the proposed development of Belgrove House in London, in order to comply with the requirements of the London Plan 2021.

This Fire Statement has been produced to describe how the fire strategy design of the building meets Policy D12 (Fire Safety) of the London Plan 2021, and other relevant aspects, specifically Policy D5 (Inclusive Design).

Belgrove House is a new laboratory and office building, to be located on Euston Road directly opposite King’s Cross Station (see Figure 1 and Figure 2).

The design is currently in RIBA Stage 4B. Arup has now been novated to work for the contractor Mace, who came on board after RIBA Stage 4A.

Although the building was granted planning permission before the London Plan requirements for a Fire Statement were introduced, a Fire Statement was requested by the planning authorities as a condition of the planning approval.

A separate Fire Strategy report has been developed as part of the design (latest RIBA Stage 4A report dated 25/11/2022) to explain the fire safety provisions in more detail, and to demonstrate compliance with the life safety requirements of Part B of the Building Regulations 2010 (as amended).

The guidance in BS 9999: 2017 *Fire safety in the design, management and use of buildings – Code of practice*, has been used as the primary fire safety guidance that the fire strategy is based on, along with the codes and standards referenced therein.

Alternative solutions, supported by fire engineering principles and assessment to demonstrate adequate safety, have been applied for some aspects of the fire strategy, where strict application of prescriptive guidance would conflict with the design aspirations.

The building will be provided with following:

- Phased evacuation, with at least two means of escape from each level;
- Use of lifts to aid evacuation of persons that cannot self-evacuate;
- Sprinkler protection throughout;
- Compartment floors throughout, with the connections forming double-height and-triple height spaces between some floors suitably addressed within the fire strategy to prevent fire spread between floors;
- Controls on combustible materials within external walls;
- External firefighting access to all elevations of the building via public roadways;
- Internal firefighting access, via two firefighting shafts comprising protected stairs, firefighting lifts, ventilated firefighting lobby and dry risers, as well as a fire command centre (FCC) at ground floor.

Bureau Veritas Building Control have been consulted on the fire strategy as it has been developed during RIBA Stage 3 and Stage 4A.

Statutory consultation with London Fire Brigade (LFB) has taken place based on the RIBA Stage 3 fire strategy report, to which The London Fire Commissioner has formally replied by letter (dated 04/12/2022) that they are “satisfied with the proposals subject to full compliance with building control comments”.

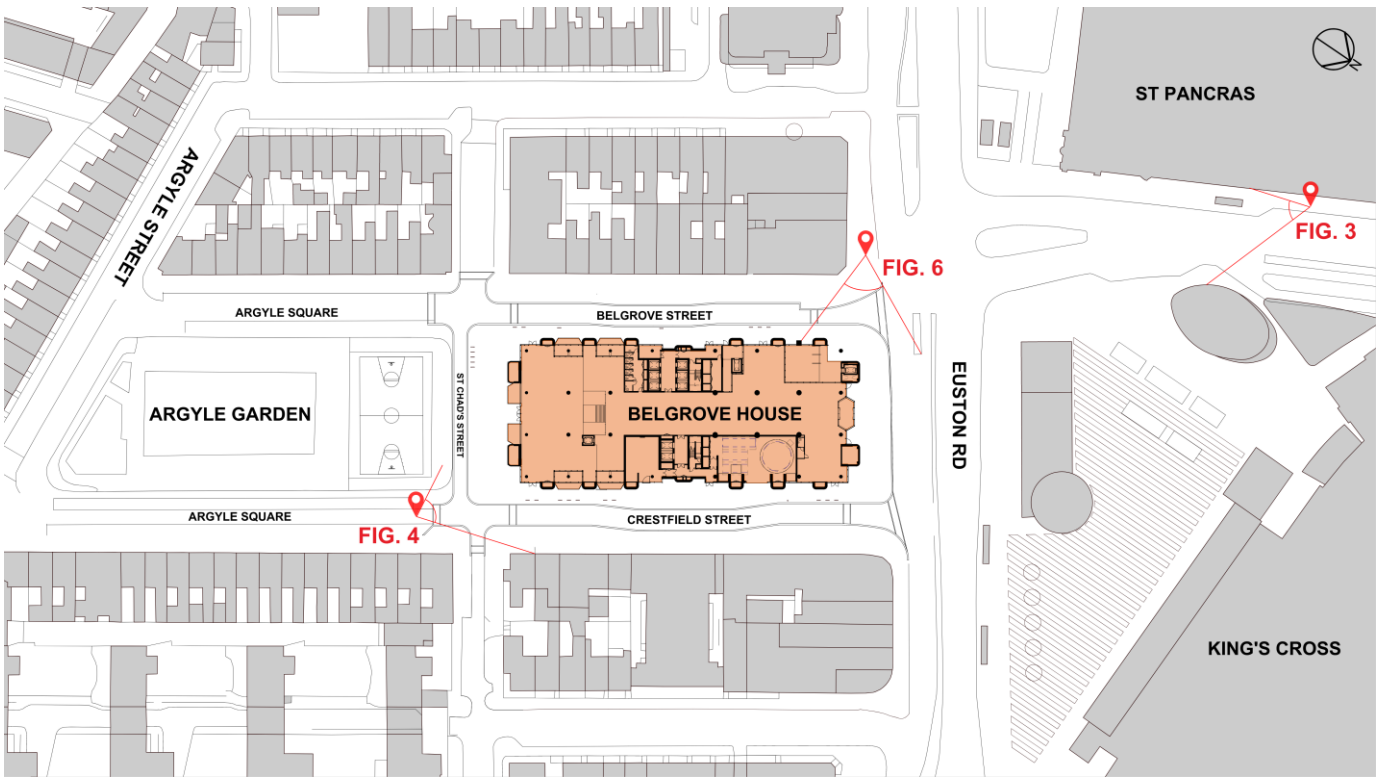


Figure 1: Site plan (adapted from an AHMM drawing).



Figure 2: Render of Belgrove House from the North-West (Pancras Road) (© AHMM).

1. Introduction

1.1 Fire safety objectives

The Belgrove House project involves the demolition of an existing storage building and reconstruction of a new laboratory and office building.

The primary fire safety goal is to demonstrate that the building has adequate life safety, in compliance with the functional requirements of Part B of the Building Regulations 2010 (as amended).

The key guidance document that has been used to demonstrate compliance with the Building Regulations 2010 is BS 9999:2017 – *Code of Practice for fire safety in the design, management and use of buildings*. The building generally follows the guidance in BS 9999, along with the codes and standards referenced therein.

In areas where the fire strategy departs from the prescriptive guidance of BS 9999, fire engineered justifications have been proposed throughout in order to demonstrate that the goals of the fire strategy can be satisfied. Deviations from BS 9999 have been agreed in principle with the approving authorities as the design has progressed.

The Responsible Person for the building will need to maintain the requirements of the fire strategy, as part of their duties under the Regulatory Reform (Fire Safety) Order 2005 (FSO).

Building Control have been consulted on the fire strategy as it has been developed during RIBA Stage 3 and Stage 4A. Statutory consultation with London Fire Brigade (LFB) has taken place based on the RIBA Stage 3 fire strategy report, to which The London Fire Commissioner has formally replied by letter (dated 04/12/2022) that they are “satisfied with the proposals subject to full compliance with building control comments”.

1.2 Assumptions

This Fire Statement has been produced based on the RIBA Stage 4A design information, including the Arup Fire Strategy Report (Issue P4, dated 25/11/2022).

The information reported here sets out the key principles upon which the fire strategy has been based, and which will be followed through as the contractor develops their proposals. The fire strategy also integrates approving authority and stakeholder feedback received to date, including the incoming sole tenant for the building, MSD.

1.3 Description of the building

Belgrove House is located in central London, on Euston Road directly opposite King’s Cross Station.

Belgrove House does not abut any other buildings, however it sits above the King’s Cross London Underground (LU) station. A new entrance / exit to King’s Cross LU station is provided as part of the Belgrove House project. The Ground floor of the proposed development therefore features a demise line between Belgrove House and LU King’s Cross station. OFR Consultants were appointed by CPC Project Services to develop the Fire Strategy for the new LU King’s Cross entrance / exit. OFR produced a Stage 2 Fire Strategy (Issued 04 Mar 2021), which details the fire safety requirements for this demise line.

Belgrove House is a new laboratory and office building, comprises three laboratory floors (L01 to L03), six office floors (L04 to L09) as well as plant on L10, Roof, and Level B1, and an auditorium and other facilities on Lower Ground (LG), as shown in Figure 1.

The building is served by two firefighting shafts consisting of firefighting stair, firefighting lobby and firefighting lifts located in separate cores at the East and West sides of the building.

The building height is 36.8 m (measured from lowest fire service access level (L00) to the finished floor level (FFL) of the topmost occupied storey (L09)). The basement is 12.0 m deep (measured from highest fire service access level (L00) to the finished floor level (FFL) of the deepest basement storey (B1)).

The footprint of the building is approximately 2,900 m².

The usage and risk profile of each floor is summarised in Table 1.

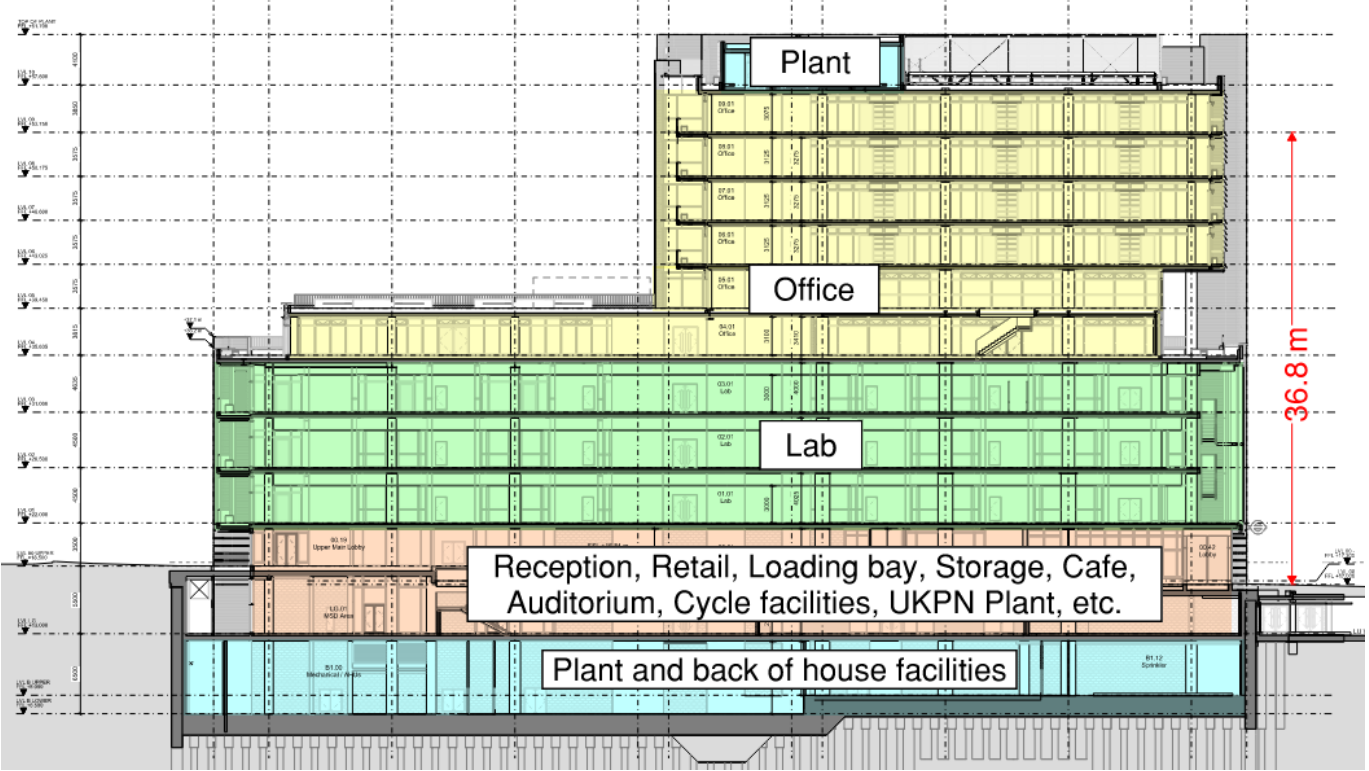


Figure 3: Proposed building section

Table 1: Building usage and risk profile

Level	Usage	Risk Profile
Roof	PV panels / green roof	A2
10	Plant (office AHUs, WSHPs, ASHPs, lab extract fans)	A2*
06-09	Office	A1*
05	Office / terrace	B1*
04	Office (with external perimeter terrace)	B1*
01-03	Lab	A3*
00	Reception / exhibition space, retail unit, loading bay, liquid nitrogen (LN2) storage, meeting rooms, café/amenity unit, education & outreach centre, cycle entrance, LU King's Cross entrance	B1*
LG	Auditorium, cycle storage and facilities, meeting rooms, waste storage, UKPN plant room	B1*
B1	Plant, waste processing and storage, switchroom	A2*

Note\*: As sprinkles are provided throughout, the fire growth rates can be reduced by one (1) in line with BS 9999



2. Fire safety provisions

The fire safety provisions for the project are described below, broken down in line with the Policy D12 (Fire Safety) segments B.1 to B.6 of the London Plan 2021 – see Sections 2.1 through to 2.6.

Other relevant aspects, specifically Policy D5 (Inclusive Design) are also covered within, specifically segments B.4 and B.5 of this part of the London Plan 2021 – refer Section 2.7.

These policy statements from the London Plan 2021 are included in this section in *red italics text*.

2.1 (D12) B.1 Building construction

*B.1. The building’s construction: methods, products and materials used, including manufacturers’ details.*

The primary structure is formed of reinforced concrete columns and beams, with concrete core walls and slabs. There are some steel elements that form primary structure locally also.

As the top occupied floor is more than 30 m above ground, all elements of structure shall be designed and/or protected to achieve at least 120 minutes fire resistance in terms of load bearing capacity (R 120), as per BS 9999.

2.1.1 Compartmentation

To reduce the risk of fire spread between floors and support the phased evacuation strategy, every floor shall be designed as a compartment floor. A fire resistance period of REI 120 minutes applies to all floors.

Connection of multiple office storeys (by circulation stairs) could be permitted so long as their design involved suitable fire safety features to reinstate the necessary floor-to-floor compartmentation in a fire scenario. This could involve, for example, fire and smoke rated glazing or curtains around the inter-connecting stairs. Any such options would need design development, suitable product specification, and integration with the cause & effect matrix.

Any vertical shafts passing through compartment floors shall be enclosed in REI 120 construction. This includes the escape stair shafts, lift shafts and service risers.

Any penetrations in compartment floors or walls shall be appropriately fire stopped to the same period of fire resistance as the floor or wall that the service is penetrating.

The floor sizes of the proposed development do not exceed the maximum areas of Table 28 in BS 9999. The compartmentation requirements for walls are as per the prescriptive guidance in Tables 22 and 29 in BS 9999.

The compartmentation requirements are summarised in the architect AHMM’s fire strategy drawings.

Fire doors will be provided in line with the prescriptive guidance in Table 30 in BS 9999. All fire doors in fire-separating walls will achieve the same fire resistance as the walls within which they are installed, apart from vertical protected shafts (e.g. stairs, service risers) for which the fire doors may be half the fire resistance of the shaft rating (in line with the prescriptive guidance). Any fire door that subdivides a corridor is to be provided with vision panels.

Independent compartmentation solutions are proposed for following connected floors.

- 1) **Interconnected level LG-L00** – Level LG and L00 are partially connected by an open stair located in the centre of the floorplate and four small lightwells located at the perimeter. Level LG and L00 are designed as a single evacuation zone. Therefore the fire strategy supports omission of fire compartmentation between these two floors at these locations. This complies with BS 9999.
- 2) **Connected voids at lab floors L01-L03** – Lab floors L01 to L03 are partially connected by an open circulation stair and lightwells. The central void with circulation stair is separated from all the lab floors (L01 to L03) by EI 60 glazing with E60 Sa doors and the corner voids with lightwells are separated from the lab floors L02 and L03 by EI 60 glazing and the lab floor L01 by E 60 Sa concertina fire curtains. No fire load will be provided within the voids, so the voids can be considered as sterile shafts. The proposed design is acceptable as it is equivalent to the principle adopted for fire doors into protected shafts. The proposed design is subject to discussion with Building Control and LFB.

- 3) **Interconnect office levels L04-L05** – A satellite stair is provided between office level L04 and L05. The stair is relied upon to achieve compliant one-way travel distances on L5. Thus, the EI 120 separation for the stair is recommended to be provided at L04.

2.1.2 Internal linings

The ceiling and wall linings used in the proposed development will be in accordance with the guidance given in the Table 33 of BS 9999 and shall achieve the classifications in Table 2 when tested in line with BS EN 13501-1.

Table 2: Linings classification

Location	European Class (BS EN 13501-1)
Small rooms of area not exceeding 30 m²	D-s3, d2
Other rooms	C-s3, d2
Circulation Spaces	B-s3, d2

Large rooms such as open plan offices need not be regarded as circulation spaces even though there are circulation routes in them.

2.1.3 External fire spread

Belgrove House will be separated by roadways from all opposing buildings, as shown in Figure 4.



Figure 4: Site plan showing distances used for external fire spread assessment

The risk of external fire spread to/from nearby buildings has been investigated following the ‘enclosing rectangle’ guidance in BR 187 as recommended by the guidance in BS 9999. The assessment considers the provision of fire compartmentation, suppression system and the amount of unprotected area provided in the façade construction.

Compartment floors are provided through the building. Therefore, the fire is assumed to be contained to one level.

Conservative calculations have been adopted, which use a single enclosing rectangle enveloping the entire façade of each level analysed (i.e. assuming the façade is entirely unprotected). In reality, there will be some inherent fire resistance from the solid portions of the elevations (i.e. the areas not formed as windows).

The radiation intensity adopted for the unprotected façade areas (i.e. windows, vents) in the analysis was for office and laboratory is 84kW/m² and 168kW/m² respectively, as recommended by BR 187.

The assessment shows that no fire resistance is required for the building façade on any elevation.

2.1.4 Construction of external walls

Belgrove House is not classified as a ‘Relevant Building’ under the definition provided in Regulation 7(4) of The Building Regulations 2010 (as amended), and therefore the requirements outlined in Regulation 7(1) do not apply.

The external walls will be designed and constructed in line with the recommendations in Approved Document B (ADB): Volume 2 (2019 edition). ADB has been updated regarding external wall construction more recently than BS 9999 and is therefore considered the most suitable reference document.

The building contains storeys which are 18m or more above ground level. Therefore, in accordance with ADB, any insulating products, filler materials (not including gaskets, sealants or similar) used as part of the external wall construction shall achieve European Classification A2-s3, d2 or better in accordance with BS EN 13501-1, as per Clause 12.6 of ADB.

Any membrane material must achieve a minimum reaction-to-fire performance of European Class B-s3, d0 or better as per the current guidance in ADB.

External wall systems that rely on BS 8414 large-scale external wall assembly testing and classification under BR 135 are not recommended by the fire strategy. No such external all systems are included in the design.

External surfaces must also meet the recommendations set out in Table 12 of ADB extracted in Table 3:

Table 3: Minimum reaction-to-fire performance of external surface of walls

Building height	Less than 1000 mm from the relevant boundary	1000 mm of more from the relevant boundary
More than 18 m	European Class B-s3, d2 or better	From Ground level to 18 m: European Class C-s3,d2 or better
		From 18 m in height and above: European Class B-s3, d2 or better

2.1.5 Vertical timber elements

The façade of Belgrove House features vertical timber mullions. To maintain floor-to-floor compartmentation, the vertical timber mullions are not continuous through the slab-edge / spandrel zone.

As per Section 2.1.1, 120 EI fire-stopping is to be provided at the junction of the compartment floors and the façade.

2.2 (D12) B.2 Means of escape

B.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 associated evacuation strategy approach.

2.2.1 Evacuation strategy

Belgrove House will adopt a phased evacuation strategy, whereby the building is evacuated in sequential phases. This approach allows maximum efficiency in stair widths and is a common approach in taller buildings.

A summary of the phased evacuation order is given below (based on BS 9999 Annex M):

1. Initial evacuation phase:

a. The floor of fire origin; plus

b. Anyone in the building requiring assistance / lifts to evacuate, as per their Personalised Emergency Evacuation Plan (PEEP), as well as those who do not identify as disabled but who might fall under this category in an emergency (e.g. pregnant people, people with small children);
2. The floors directly above and below the floor of fire origin;

3. The next two floors above;
4. The remaining floors in groups of two, working up the building;
5. Floors in groups of two below the floor of fire origin, working downwards to ground;
6. All floors below ground level.

As the evacuation involves more than three phases, a manual system of escalation will be used as per the recommendations of BS 9999. A fire control centre (FCC) / building management (BM) room is therefore provided with information panels and controls to allow manual escalation of the evacuation signal once the previous evacuation phase is completed.

Example evacuation phasing – sample scenarios

Samples scenarios are shown in Table 4 and Table 5.

Table 4: Example fire scenario one

Fire scenario one
<u>Location:</u> L02 laboratory floor
<u>Response:</u> <b>Alert phase:</b> upon first-knock detection, all levels are given an alert message but not told to evacuate. Only those requiring assistance to evacuate (i.e. disabled people who can use the evacuation lifts) evacuate upon first-knock alert. <b>Evacuation phase one:</b> once the fire is confirmed (“confirmed fire”), the floor of fire origin (L02) evacuates. All other levels continue to receive the alert message. <b>Evacuation phase two:</b> the floors directly above (L03) and below (L01) the floor of origin evacuate. <b>Evacuation phase three:</b> the next two floors above (L04 and L05) evacuate. <b>Evacuation phase four:</b> floors L06 and L07 evacuate. <b>Evacuation phase five:</b> floors L08 and L09 evacuate. <b>Evacuation phase six:</b> floors L10 and Roof evacuate. <b>Evacuation phase seven:</b> Ground floor (L00) and all floors below ground (LG and B1) evacuate (as L00 and LG form a single compartment as described in Section 2.1.1).

Table 5: Example fire scenario two

Fire scenario two
<u>Location:</u> LG auditorium
<u>Response:</u> <b>Alert phase:</b> upon first-knock detection, all levels are given an alert message but not told to evacuate. Only those requiring assistance to evacuate (i.e. disabled people who can use the evacuation lifts) evacuate upon first-knock alert. <b>Evacuation phase one:</b> once the fire is confirmed (“confirmed fire”), the floor of fire origin evacuates. All other levels continue to receive the alert message. Note that L00 and LG form a single compartment. BS 9999 Annex M Clause M.2 (f) states that all floors below ground level should be treated as one zone for evacuation purposes. Therefore, L00, LG and B1 evacuate together. <b>Evacuation phase two:</b> the two floors directly above (L01 and L02) the compartment of fire origin evacuate (as there is no floor directly below). <b>Evacuation phase three:</b> the next two floors above (L03 and L04) evacuate. <b>Evacuation phase four:</b> floors L05 and L06 evacuate. <b>Evacuation phase five:</b> floors L07 and L08 evacuate. <b>Evacuation phase six:</b> floors L09, L10 and Roof evacuate.

2.2.2 Building occupancy load

The population of the building is estimated based on floor space factors from BS 9999 and summarised in Table 6. The maximum occupancy is estimated as **3,320 people**, based on the latest proposed area schedule for the building.

Table 6: Estimated occupant load

Level	Usage	Area	Floor space factor (m <sup>2</sup> /person)	Estimated occupant load
Roof	Rooftop Plant	1000	50 <sup>[3]</sup>	20
10	Rooftop Plant	1000	50 <sup>[3]</sup>	20
06-09	Office	1088	6 <sup>[1]</sup>	182
05	Office	749	6 <sup>[1]</sup>	290 <sup>[4]</sup>
	Roof Terrace	455	N/A	
04	Office	1508	6 <sup>[1]</sup>	340
	Perimeter Terrace	531	6 <sup>[1]</sup>	
03	Lab	2178	7.5 <sup>[3]</sup>	291
02	Lab	2214	7.5 <sup>[3]</sup>	296
01	Lab	2278	7.5 <sup>[3]</sup>	304
00	Main Lobby	1497	6 <sup>[1]</sup>	257
	Loading Bay	220	30 <sup>[2]</sup>	
LG	Plant	387	30 <sup>[2]</sup>	674
	Auditorium and Foyer	1000	1.8 <sup>[3]</sup>	
	Cycle Store/Facilities	1000	10 <sup>[3]</sup>	
B1	Plant	3000	30 <sup>[2]</sup>	100
Total				3320

- Note[1] From BS 9999:2017
- Note[2] From BS 9999:2008 Table 10
- Note[3] Assumption
- Note[4] This is based on maximum capacity permitted by the 888mm horizontal escape door on the floor.

2.2.3 Horizontal means of escape

Every space that accommodates between 50 to 600 people shall be provided with two exits. Spaces accommodating less than 50 people can have one exit.

Doors shall open in the direction of escape when more than 50 people are expected to escape through them.

The above requirements are from the incoming tenant MSD’s Guidance Document SN34. They are slightly more onerous than BS 9999, which recommends a 60-person limit on spaces with one exit.

Doors (both into the lobby and storey exits into the stairs) have been sized based on calculations following BS 9999. The exits provided are sufficient to accommodate the occupancy calculated in Table 6.

2.2.4 Travel distances

The development shall be designed following the maximum permitted travel distances in BS 9999.

A 15% increase to the baseline allowable travel distances has been applied, on the basis that the L1 detection and alarm system, including voice alarm, provides additional benefit, in line with BS 9999 Clause 18.2 and associated commentary.

The design is within the travel distance limits in BS 9999.

2.2.5 Vertical means of escape

Belgrove House will be served by two cores, as shown in Figure 5. Each stair provides 1250 mm clear width, which provides sufficient evacuation capacity for the building based on the phased evacuation strategy.

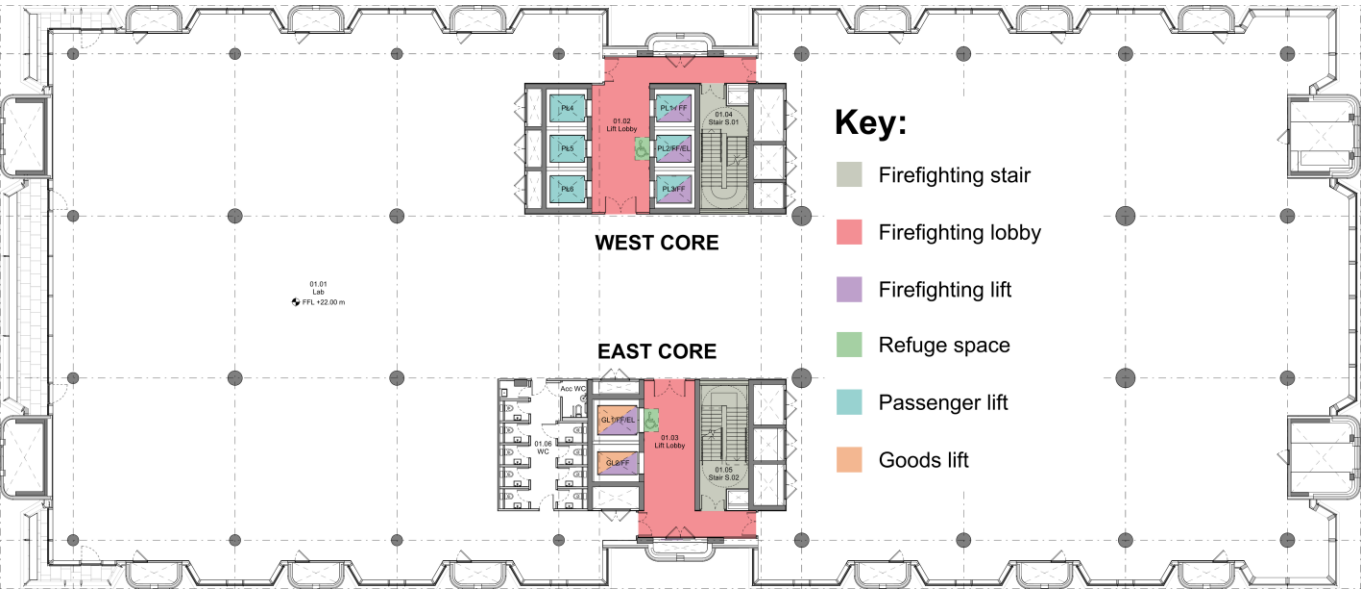


Figure 5: Mark-up of a typical laboratory floor (L01) showing East and West cores

BS 9999 states that every protected stairway should discharge directly to outside or by way of a protected exit route leading to a final exit to the outside.

As per the current design, the two firefighting stairs (East and West) discharge to outside via protected routes, as shown in Figure 6. The final corridors have a clear width of 1600 mm. The final exit doors shall be provided with panic bars complying with BS EN 1125:2008.

As the Lower Ground (LG) and Ground (L00) levels are interconnected, and because below-ground levels evacuate as a single phase in the phased evacuation strategy, escaping occupants from B1 and LG are likely to merge with those from L00 at the final exits. Therefore, a merging flow calculation has been completed following BS 9999. The result shows that the East and West core final exits can cater for around 40% of the estimated maximum occupancy of L00. This demonstrates that the final exit corridors provide ample merging flow capacity for the scenario of a full-occupied L00, LG and B1 evacuation.

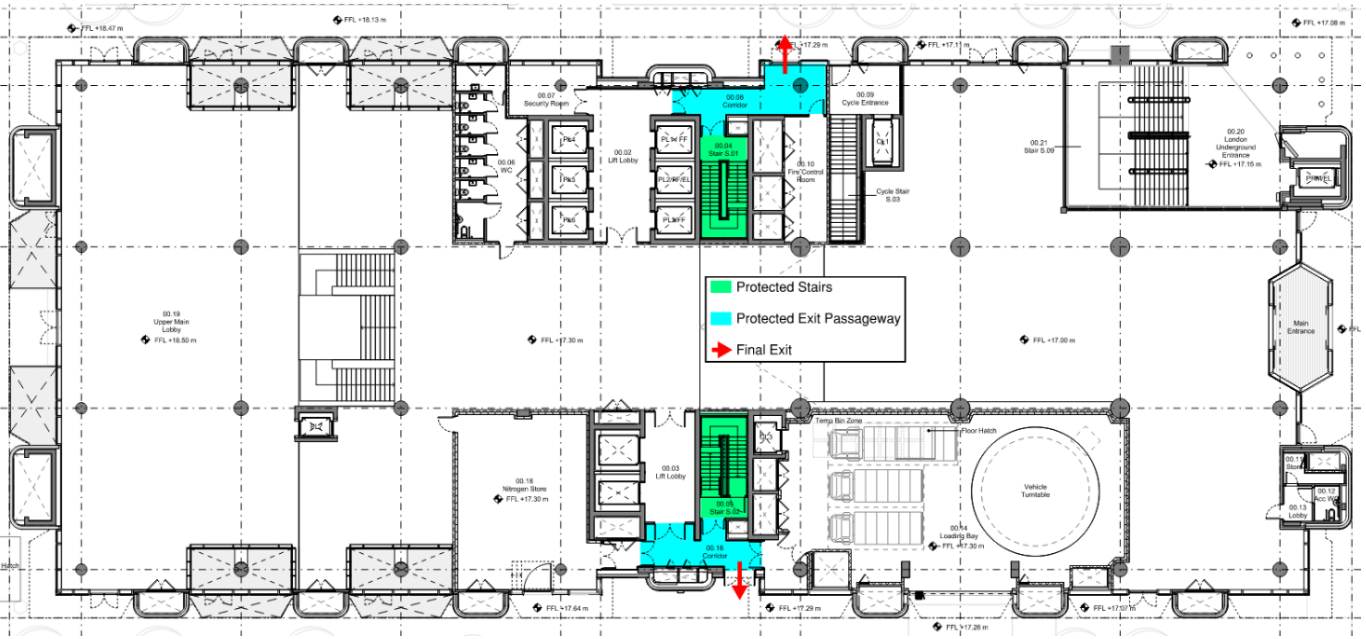


Figure 6: Final exits



2.2.6 Evacuation of people with reduced mobility (PRMs)

In both cores, protected refuges will be provided at each level, from where evacuation via lifts will be available as the primary means of escape for PRMs, as well as facilities for communicating with building management.

The following will be provided:

- A protected refuge with at least 900 x 1400 mm situated within protected firefighting lobbies at every level above and below ground. Although the B1 East core lobby is split due to the height difference across basement, refuge is provided for both lobbies;
- A two-way Emergency Voice Communication (“EVC”) system for refuges at each level in accordance with BS 5839-9;
- Each core will be provided with an evacuation lift in addition to firefighting lift, the lifts shall be specified to BS EN 81-72:2020 as firefighting lifts and shall comply with BS 9999 Annex G and be designed in accordance with relevant provisions in BS EN 81-20:2020 and BS EN 81-70:2018. The East core features two firefighting lifts and the West core features three firefighting lifts. All firefighting lifts can be used for evacuation of disabled people, either prior to or during firefighting operations. It is proposed to use a driver-assisted lift evacuation strategy, whereby a trained member of staff travels to the occupant and drives the evacuation lift car. This strategy is considered appropriate as the building is expected to be highly managed.
- A tailored Personal Emergency Evacuation Plan (PEEP) shall be prepared by building management for each person using the building who may not be able to escape in a timely manner unaided.

2.2.7 Assembly points

The assembly point for evacuees of Belgrove House is proposed to be Argyle Garden. The garden is open to the public and a short walk (50 to 150 m depending on which exit is used) from Belgrove House. The roads providing access to Argyle Garden (Crestfield St to the East and Belgrove St to the West) are both wide enough to allow safe access to the assembly point (away from falling debris or heat transfer via radiation, etc).

The use of Argyle Garden as the assembly point avoids the need to cross roads, in particular Euston Road. The assembly point is shown in Section 2.5, Figure 10.

Alternatively, the building occupiers may explore the potential for digital / virtual assembly points, whereby occupants of Belgrove House could mark themselves as safe and away from the building via an app or text message in an evacuation scenario.

2.3 (D12) B.3 Fire safety systems

*B.3. Features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans.*

2.3.1 Fire detection and alarm

A category L1 automatic fire detection system in line with BS 5839-1:2017 will be provided throughout the building.

The laboratory and office spaces will be fitted with smoke detector heads. In places subject to dust, such as plant rooms and the loading bay, heat detectors are likely to be more suitable as they will lead to fewer false alarm activations.

In addition to the automatic fire detection, the building will also be provided with a voice alarm system designed to BS 5839-8:2013 to support the phased evacuation strategy, as per BS 9999.

In addition to internal areas, alarm sounders shall be provided to the external terrace spaces and roof, situated where necessary to achieve adequate volume, audibility and intelligibility to all external areas. Visible flashing alarm beacons shall also be provided to the external terrace spaces and roof, in accordance with BS EN 54-23.

Flashing warning beacons are also to be installed within disabled washrooms to ensure deaf / hard of hearing occupants within these spaces are alerted.

The system will operate a two-stage alarm, whereby operation of one detector will send an alert to the fire alarm panel, prompting the building management to investigate. The investigation period is proposed as 6 minutes at this stage. Management procedures associated with this process are to be detailed in later stages of the design. If the alarm system is not manually reset within the investigation period or another detector is activated during the investigation period, the system will automatically escalate into the confirmed fire state.

2.3.2 Automatic sprinkler system

Since the building is higher than 30 m, an automatic sprinkler system shall be provided throughout the building.

Upon request by the incoming tenant, MSD, the sprinkler system shall be designed in accordance with FM Global Property Loss Prevention Data Sheet (LPDS) 3-26 instead of BS EN 12845. The MEP engineer has carried out a review to compare the important design criteria between a BS EN 12845 system and the proposed FM Global system, which concluded that the FM Global standard is more onerous.

Hazard Category HC-1 has been assumed for office and HC-3 for labs, based on FM Global LPDS 2-0. These hazard categories should be reviewed by MSD to agree what is appropriate.

2.3.3 Emergency lighting

Emergency lighting shall be provided in accordance with BS 5266-1:2006.

2.3.4 Exit signage

Exit signs shall be provided in accordance with BS ISO 3864-1:2011.

2.3.5 Secondary Power Supplies

In accordance with BS 9999:2017 Clause 37.2.3.3, a secondary power supply will be provided to all life safety systems, including (but not limited to) the following:

- Automatic fire detection and alarm system;
- Emergency voice communication (EVC) system;
- Emergency lighting;
- Stair lobby ventilation system;
- Firefighting shafts (associated equipment, such as smoke control, and normal lighting);
- Fire control centre (FCC) systems;
- Evacuation lifts.

Secondary power supplies shall be in accordance with BS 8519:2020. The means of power supply to different life safety systems will be developed by the MEP engineer.

2.4 (D12) B.4 Firefighting facilities

*B.4. Access for fire service personnel and equipment: how this will be achieved in an evacuation situation, water supplies, provision and positioning of equipment, firefighting lifts, stairs and lobbies, any fire suppression and smoke ventilation systems proposed, and the ongoing maintenance and monitoring of these.*

2.4.1 Firefighting facilities within the building

2.4.1.1 Firefighting shafts

As the development’s topmost storey is over 18 m in height from the fire and rescue service access level and the floor plate area is over 900 m², at least two firefighting shafts are required for compliance with BS 9999.

Two firefighting shafts (East and West) are provided for the building, each comprising firefighting stair, firefighting lobby provided with a fire main (dry riser) and firefighting lift installation, in accordance with BS 9999 Table 17.

The firefighting lift provisions in each core are summarised as follows, and in the schematic (section) in Figure 7:

- East core with two firefighting/goods lifts. FF/GL1 serves B1-L09 while FF/GL2 serves all levels (B1-L10).
- West core with three firefighting/passenger lifts. The FF lifts do not serve the dedicated plant level L10, however the FF stair does. Two of the FF lifts serve Level B1.

Firefighting lobby sizes exceed the prescriptive floor area limits in both the West and East core. However, given the FF lobbies are frequently used circulation spaces, any storage / decorations (which are not permitted) is unlikely and Building Management will also ensure that no fuel load exists in the FF lobbies. Therefore, the proposed design is not considered to be detrimental to the level of life safety for occupants in the building and the fire service.

	WEST CORE						EAST CORE	
	PL1/ FF	PL2/ FF	PL3/ FF	PL4	PL5	PL6	GL1/ FF	GL2/ FF
L10								
L09								
L08								
L07								
L06								
L05								
L04								
L03								
L02								
L01								
L00								
LG								
B1								

Figure 7: Illustrative lift schematic showing the levels served (indicated by filled cells) by each lift.

2.4.1.2 Fire control centre (FCC)

The development is provided with a combined building management (BM) room and fire control centre (FCC) on L00. BM shall direct the fire and rescue service to the FCC. The FCC is accessed directly off the West core’s final exit corridor as shown in Figure 8.

The FCC shall be equipped in line with Clause 24 of BS 9999:2017.

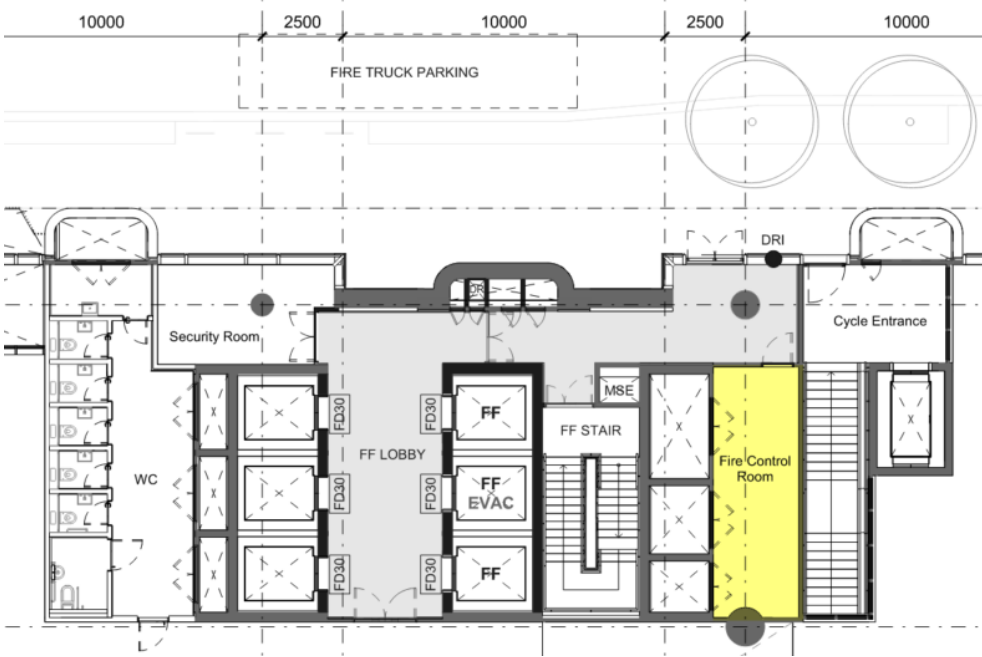


Figure 8: Fire control centre (FCC) accessed from outside via the entrance to the West core

2.4.2 Water Supply for firefighting operations

Hose coverage guidance in BS 9999 recommends that all areas of the floor plate are reachable within 60 m of the fire main outlet point in a firefighting shaft, measured over a route suitable for laying hose.

Where internal layouts are not known, two-thirds of this distance (i.e. 40 m) is used to measure directly instead. This is met in the current design. Three examples are illustrated in Figure 9.

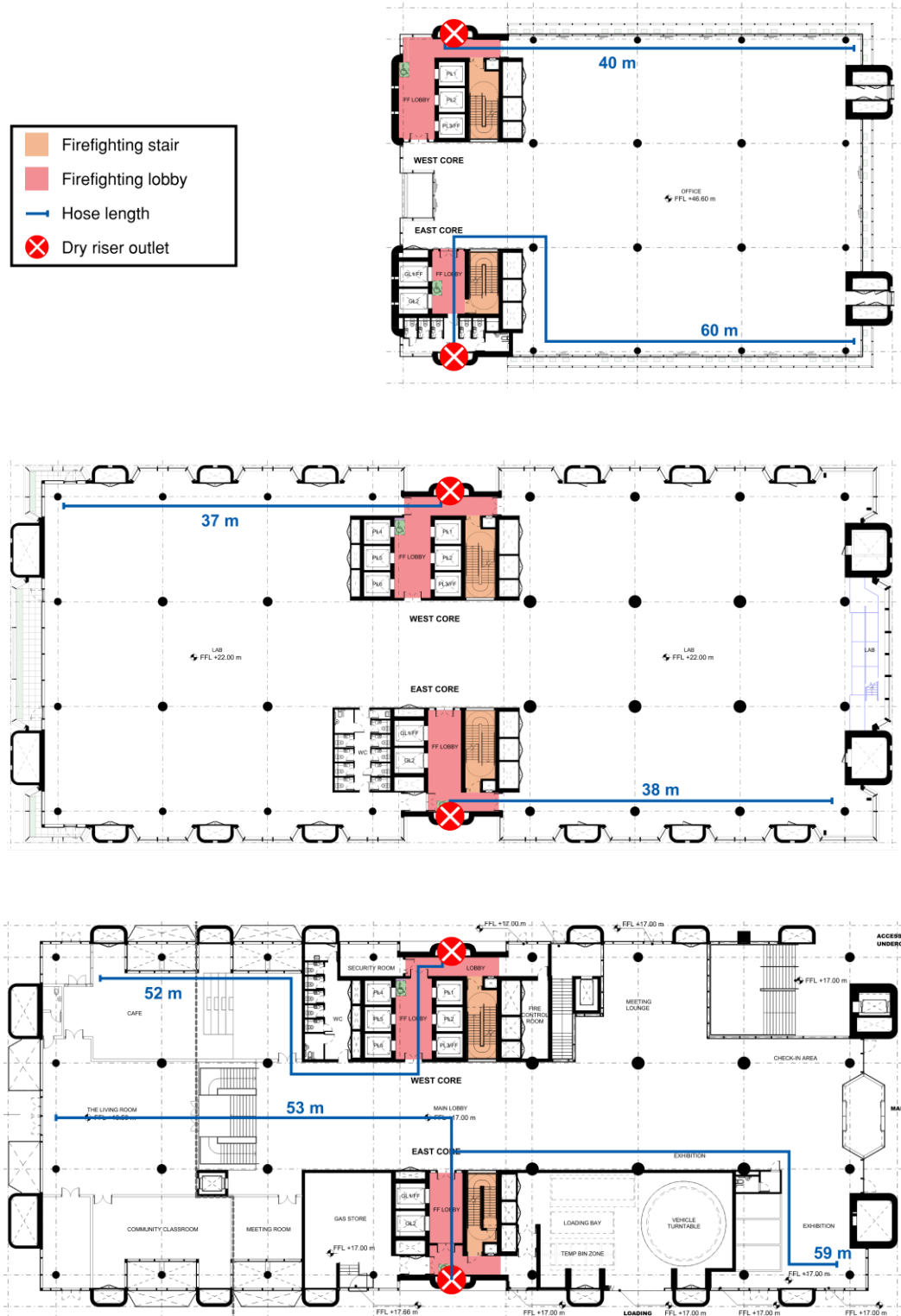


Figure 9: Mark-ups of Ground floor (L00), a typical laboratory floor (L01) and office floor (L07) showing FF shafts and hose coverage.

2.5 (D12) B.5 Fire vehicle access

B.5. How provision will be made within the curtilage of the site to enable fire appliances to gain access to the building.

2.5.1 Fire service vehicle access

Fire and rescue service vehicles can park on all streets surrounding the development, as shown in Figure 10. This includes adjacent to the East and West cores (firefighting shafts) on Crestfield Street and Belgrove Street respectively, where vehicle access is provided within 18 m of the dry riser inlet points and entrances, as per BS 9999. The West core (Belgrove Street) provides direct access to the fire control centre (FCC).

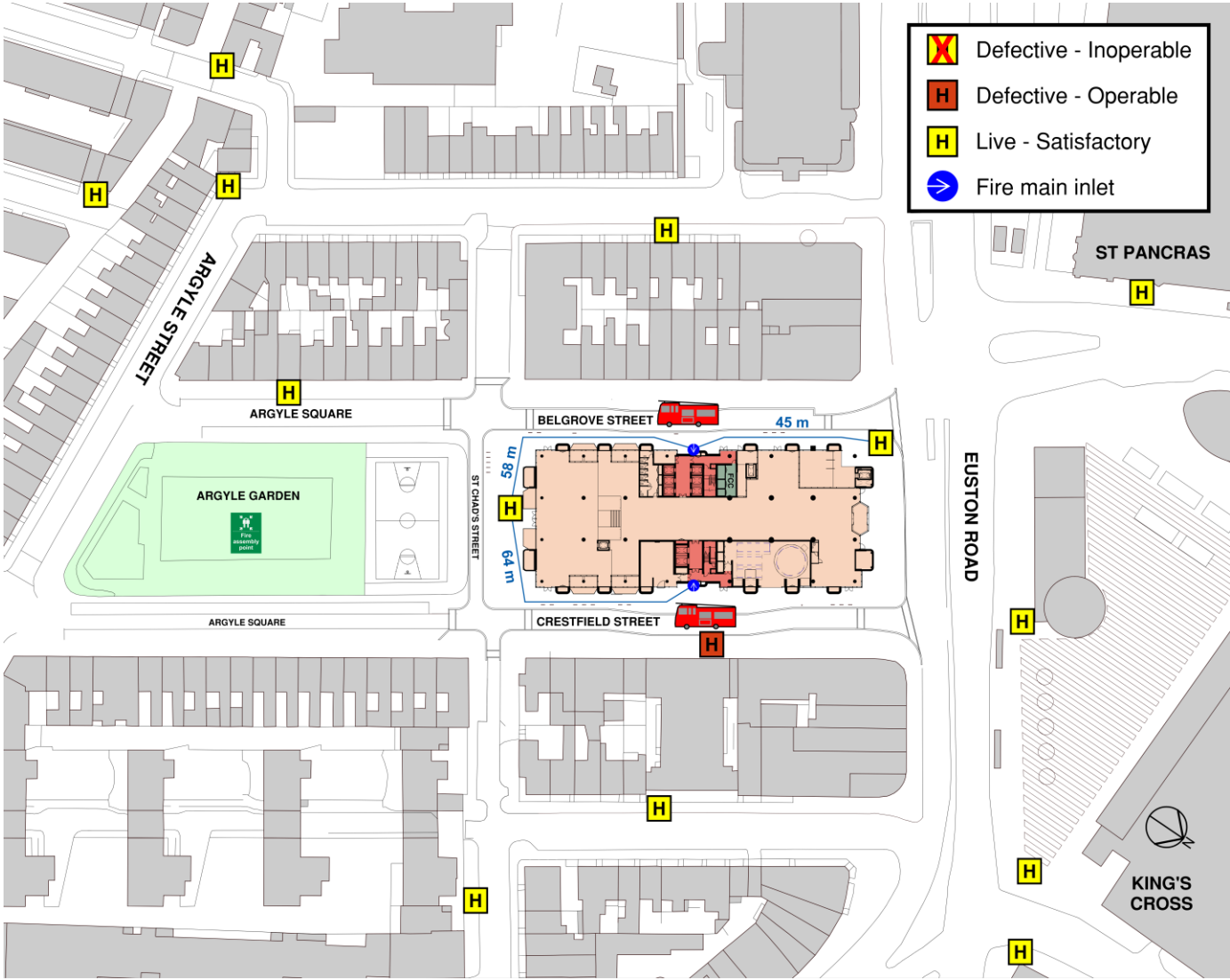


Figure 10: Annotated Ground floor and site plan showing fire hydrants and their operational status (sent by LFB on 16 Dec 2021 via email), dry riser inlets and assembly point.

2.5.2 Hydrants

The fire and rescue service will be provided with water for firefighting from the fire hydrants surrounding the site. External hydrant locations have been confirmed by LFB (see Figure 10). The closest hydrant to the West core is located approx. 45 m from the fire main inlet, on the corner of Belgrove Street and Euston Road. This meets the requirement for external hydrants to be located within 90 m of a dry fire main inlet from BS 9999. There are two additional hydrants available – one on St Chad's Street and one on Crestfield Street – both are within 90 m of the proposed dry riser inlets.



**2.6 (D12) B.6 Future building changes**

*B.6. Ensuring that any potential future modifications to the building will take into account and not compromise the base build fire safety/protection measures*

Any changes to the building design or use type will need to be assessed with regards to the proposed fire strategy to ensure the strategy satisfies the functional life safety requirements of the Building Regulations 2010 (as amended).

The Responsible Person as defined in the FSO will be responsible for ensuring that this assessment is undertaken.

The fire safety management plan will need to ensure that any potential future modifications to the building will consider and not compromise the base build fire safety/protection measures.

**2.7 (D5) Inclusive design**

*B.4 The development should be entered, used and exited safely, easily and with dignity for all*

*B.5 The development should be designed to incorporate safe and dignified emergency evacuation for all building users. In all developments where lifts are installed, as a minimum at least one lift per core (or more subject to capacity assessments) should be a suitably sized fire evacuation lift suitable to be used to evacuate people who require level access from the building.*

Refer to Section 2.2.6 for the proposed provisions to satisfy aspects of inclusive design with regards to safe and dignified evacuation.

A key aspect of the proposal to satisfy Policy D5 requirements is the provision of evacuation lift in addition to the two firefighting lifts, one in each core, to be used by the building management team to support evacuation of any persons with restricted mobility, that would require assistance.

Occupants will be provided with a dedicated refuge in each protected lobby of both firefighting shafts and communication devices to be able to contact the building management and alert them about the need for assistance in evacuating.

**3. Competency statement**

This report has been prepared by Katherine Wong, checked by Eoin O'Loughlin CEng MIFireE, and approved by David Stow CEng MIFireE.