

### FIRE ENGINEERING PROOF OF EVIDENCE

6 AVONMOUTH STREET, ELEPHANT AND CASTLE, LONDON SE1 6NX

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Date: 16 11 2022

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### **REPORT DETAIL**

Project: Mixed-use

Address: 6 Avonmouth Street, Elephant and Castle, London, SE1 6NX

Document: Design Note

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#### Report Version History

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This report is formulated and based on the information and experience available at the time of preparation. It is applicable to the above-mentioned project only in accordance with the client's instructions. It is only valid provided no other modifications are made other than those for which a formal opinion has been sought and given by Clarke Banks (Fire Engineering) Limited.



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# **1** INTRODUCTION

### 1.1 SCOPE

Clarke Banks (Fire Engineering) has been appointed to provide a proof of evidence for the project known as 6 Avonmouth Street, Elephant and Castle, London SE1 6NX.

This document has been developed to document the review and response that has been carried out in relation to the latest HSE comments to provide further information against the compliant design.

### **1.2 DEVELOPMENT DESCRIPTION**

Demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and / or community health hub and / or Class F1(a) education use and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure.



Figure 1: Proposed site plan

#### **1.3 QUALIFICATIONS AND EXPERIENCE**

I am Adam Melrose, the Fire Safety Engineer that has provided the Fire Safety advice on the project at Avonmouth.

My experience within the construction industry and Fire Safety started in 2004 as a trainee Building Control Consultant, spanning some 17 years. Through my experience over the last 17 years, I have dealt with the



approval and construction of all sectors within the industry but in particular, considerable experience on highrise residential buildings, low-rise residential buildings, medical care facilities, industrial buildings, retail developments, office sectors, public buildings, power station facilities and education offerings from nursery level up to higher education in the form of both public and private entities. Over the last 6 years, I have been involved at all levels of Fire Engineering project delivery including the consultation stages with multiple statutory bodies, such as local fire services, crown property services / The Crown Estate, the NHS, Ministry of Defence, Ministry of Justice and international parent companies that have their own standards and procedures. This experience has provided me with the in-depth knowledge of all sectors within the industry in relation to the Fire Safety design and minimum requirements specified within The Building Act 1984 and The Building Regulations 2010.

#### 1.4 APPOINTMENT

Clarke Banks (Fire Engineering) was appointed by Tribe to provide fire safety advice on the project at Avonmouth on the 18 May 2021.

### 1.5 DECLARATION OF TRUTH

I declare that the evidence provided within this document is a true representation of the facts, and follows good practice measures. These comments are all my own opinions and follow the rules and regulations set out by the industry and professional bodies for which I am accredited.





## 2 HSE COMMENTS – DATED 07-02-2022

The following is an extract from the HSE Substantive response (ref:pgo-0793) and it covers the Means of Escape and fire service access comments made to the application:

- 1.1 The fire statement (section 2) states that the above ground floors will be served by a single stair core, which will be designed as a firefighting stair. The plan drawings illustrate the proposed stair continuing down to the basement level 2 and connecting with the ancillary areas. The fire safety guidance and standard require that, in single stair buildings, the stair should not continue down to the basement and the same applies to the firefighting lifts. This is due to the risk of smoke and heat from the basement compromising the Means of Escape and fire service access. Additionally, where a common stair forms part of the only escape route from a flat, it should not serve any ancillary accommodation. The proposed solution, illustrated on the ground floor plan, to separate the stairs at the ground level is acceptable only in small buildings, under 11m height. Resolving this issue may affect land use planning considerations such as design and layout of the building.
- 1.2 The fire statement (section 6) states that the proposed building is over 50m and that a dry fire main will serve the firefighting shaft (fire statement, section 10). Where there are floors higher than 50m above firefighting access level, wet fire mains should be installed because of the pressures required to provide adequate water supplies at the landing valves at upper floors and to ensure that water is immediately available at all floor levels. The provision of a wet fire main will require water tanks and pumps which is likely to affect land use planning considerations, such as design and layout of the building.
- 1.3 The ground floor plan illustrates the final exit for the escape route from the common stairs next to the bin store. The fire standard states that the access to refuse storage chambers should not be sited adjacent to escape routes or final exits. Further engineering analysis may be necessary to determine if a fire emanating from the bin store, could impede escape from the residential accommodation. Any consequent design changes may affect land use planning considerations such as design and appearance of the building.
- 1.4 The ground floor plan illustrates the access for firefighters to the firefighting shaft via the concierge which connects with ancillary accommodation. The entry to a firefighting shaft should be available either directly from the open air or by way of a protected corridor, which should not be used as a circulation space and should be separated from adjoining accommodation by lobbies. Resolving this issue may affect land use planning considerations such as design and layout of the building.
- 1.5 The upper floor plan drawings illustrate each floor having a flat with the exit door directly to the firefighting lobby. The access to the accommodation from the firefighting lift or stair should be through a firefighting lobby, as a single fire door cannot provide adequate protection to the firefighting stair and lift, from a fire in the accommodation. Resolving this issue may affect land use planning considerations such as design and layout of the building.



## **3 RESPONSE TO HSE COMMENTS**

#### Response to Comment 1.1:

Following the comments received from the HSE, the internal arrangement at ground floor level has been slightly amended by the architect. The staircase serving the upper student accommodation floor has now been separated from the staircase serving basement level -2. In addition, at ground floor level, each staircase has its own separate independent egress route which leads directly to a final exit and the external escape route along the northwest side of the building.

Now that these minor changes have been made to the design of the staircase arrangement, it is our opinion that although the design complied with BS 9991 previously, now these minor amendments have been made, all stairs are compliant with the guidance provided in BS 9991, resulting in no staircase connecting with both the basement and the upper levels in a single shaft.

#### Response to Comment 1.2:

The height to the upper most habitable storey (the top floor in the building which contains habitable accommodation and is not exclusively plant space) has been confirmed by the architect to be 49.65m. This dimension is less than 50.0m and it can be confirmed that a wet rising main is not required as part of the design. The building will be provided with dry rising mains which will satisfy the guidance as set out in BS 9991.

#### Response to Comment 1.3:

The design has been slightly amended at ground floor level so that all Means of Escape do not have to discharge, near or past the access point to a refuse storage facility. It is our opinion that although the design complied with BS 9991 previously via a fire engineered solution, now these minor amendments have been made, this now means that the intended design complies fully with the guidance set out in BS 9991 as all egress from the main staircase shafts do not discharge near any fire risk and they provide access to a place of relative and ultimate safety.

#### Response to Comment 1.4:

The architect has now slightly amended the design of the ground floor layout following the comments made by the HSE. It is our opinion that although the design complied with BS 9991 previously, now these minor amendments have been made, the new design results in all staircase shafts being accessible directly from the outside of the building into the Firefighting staircase shaft. This design approach now complies with the guidance provided in BS 9991.

#### Response to Comment 1.5:

The firefighting shaft achieves direct compliance with Figure 35 of BS 9991:2015. This is compliant with the guidance provided in BS 9991 for the following reasons:

 a) The staircase can open directly into the common corridor – this is confirmed in the diagram and the design drawings at Avonmouth and directly mirrors the diagram in the guidance – also see Figure 2 below.



- b) The Firefighting lift can open directly into the common corridor. This is confirmed in the diagram and the design drawings at Avonmouth and directly mirrors the diagram in the guidance.
- c) The Firefighting staircase shaft and the accommodation entrance door are both provided with fully compliant fire doors. This means that the staircase shaft has 2 methods (2 doors) of protection in the event of a fire. Therefore, the staircase shaft has two lines of protection in the event of a fire to stop the effects of combustion (smoke and heat) getting into the firefighting shaft.
- d) The Firefighting lift shaft and the accommodation entrance door are both provided with fire doors. This means that the lift shaft has 2 methods (2 doors) of protection in the event of a fire. Therefore, the lift shaft has two lines of protection in the event of a fire to stop the effects of a fire getting into the firefighting lift shaft.



Figure 35 Components of a residential fire-fighting shaft

Figure 2 : Figure 35 – BS 9991 – Components of a residential Firefighting shaft



### 4 PLANNING POLICY D5(B5)

The policy states that proposals 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".

#### Design Response

The building design will be provided with two lifts within the single lift shaft of the building - as a minimum, one of the lifts will be designated as an evacuation lift and one will be a Firefighting lift.

The Evacuation lift will be designed in line with the guidance presented BS EN 81-20 & Annex G of BS 9991:2021 DRAFT or BS 9999.

The evacuation lifts will be appropriately protected as per BS 9991 recommendations and will serve all floors where occupants with mobility issues are expected. Refuge points with Emergency Voice Communication (EVC) system will be provided near each EVAC lift landing. The building management will be able to control the EVAC lifts during an emergency.

The management plan, and the level of reliance of the evacuation lift operation on management staff input, should be reviewed against the proposed staffing levels / strategy for the scheme.



# 5 PLANNING POLICY D12(B) – FIRE STATEMENTS

#### Requirement

The policy states that:

"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 building's 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 associated evacuation strategy approach
- 3. features which reduce the risk to life: fire alarm systems, passive and active fire safety measures and associated management and maintenance plans
- 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
- 5. how provision will be made within the curtilage of the site to enable fire appliances to gain access to the building
- 6. ensuring that any potential future modifications to the building will take into account and not compromise the base build fire safety / protection measures."

#### Design Response

- 1. The construction methods on product limitations will be driven by the primary use of the blocks. It is expected that the building structure will be formed by either reinforced concrete or steel frame construction. The external wall construction will comply with the Regulation 7 requirements throughout.
- 2. The Means of Escape provisions are outlined below:
  - a) Student residential areas (B2, G, 2F and above):
    - The residential units will be either cluster flats or studio flats. All cluster flats will be designed in line with the requirements listed in Section 9.8 of BS 9991. Studio flats are expected to be designed in line with Section 9.4.2a) of BS 9991;
    - ii. The common Means of Escape for the protected internal corridors serving residential areas will be provided in line with Figure 6b of BS 9991. Common corridor travel distances (i.e from the entrance door of a studio flat or cluster to the door into the stair) will be limited to 15m. The common corridors are expected to include natural and / or mechanical smoke ventilation (as appropriate to the building height and corridor layout); and



- Users who are disabled or require level access will be provided with egress via the aforementioned evacuation lift. The ground floor Means of Escape are expected to be fully accessible to users who are disabled.
- b) Higher education use areas (B1, G, 1F):
  - i. The occupants on B1 and 1F will be provided with egress via either of the two protected stair cores serving the premises. These stair cores will be discharging directly to the outside at ground. Ground floor occupants will be provided with exits directly to the outside; and
  - ii. Users who are disabled or require level access will be provided with access to the evacuation lift which will be located within the South Core serving the premises. The other protected stair core (North Core) will be provided with accessible refuge points. All ground floor areas are expected to be provided with level egress direct to outside.
- 3. The features which reduce the risk to life are outlined below:
  - a) Fire detection and alarm systems: Standalone residential detection and alarm systems (BS 5839-6, Grade D1 Category LD1) for the flats and Category L2 detection and alarm systems (BS 5839-1) for the common residential areas of the block. An evacuation alert system to BS 8629 is also recommended. For the higher education use areas, a standalone Category L2 system (BS 5839-1) is expected to be provided, to be fully confirmed upon fit-out.
  - b) The compartmentation strategy will be developed to BS 9991 (for the residential areas, including residential ancillary accommodation) and to BS 9999 for the educational premises on B1-1F. The compartmentation strategies will be commensurate with the proposed evacuation strategies, scale and expected use for the scheme. Openings within passive fire compartmentation elements will be fitted with suitably rated doors, fire dampers, or active fire barriers.
  - c) Active fire safety measures: The residential flats (and corridors) will be covered by BS 9251:2021 automatic fire suppression, while the remainder of the areas (both residential ancillary areas which cannot be covered off the BS 9251 system, and higher education use areas) will be covered by a BS EN 12845 automatic suppression system. The primary residential stair and lift lobby will be provided with a mechanical smoke ventilation system comprising mechanical extract and mechanical or natural air supply. The residential stair core will be provided with 1m<sup>2</sup> Automatic Opening Vents (AOVs), sited at high level above the stair core. Additional ventilated lobbies are expected to be required where the residential stair connects to residential ancillary areas. The firefighting lift will be designed based on BS EN 81-72. The five evacuation lifts (one for each of the premises) will be designed based on BS EN 81-20, BS EN 81-70 and BS EN 81-76. The dry rising mains and associated equipment should be designed based on the guidance of BS 9990.
  - d) Maintenance and monitoring: All of the aforementioned systems are expected to be regularly monitored and maintained in line with manufacturer's requirements and the relevant design standards for each system. The maintenance and monitoring operations for all such systems must be adequately recorded.

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- 4. The access for fire service personnel and equipment are discussed in detail in below:
  - a) The Fire Service access provisions are based on the requirements listed in BS 9991 and BS 9999;
  - b) Fire Service vehicle access will be provided via Avonmouth Street and Tiverton Street, which run north and east, and south of the proposed development, respectively. This will provide immediate access to the ground floor firefighting lobby serving the residential floors (both above- and below-ground);
  - c) The proposed route will also provide immediate access to the two protected stair cores serving the higher education use areas on the first floor and Basement level -1, as well as direct access to the ground level of the educational areas. These areas will also be provided with one evacuation lift, located in the South Core;
  - d) The residential premises will be provided with one residential type firefighting core (comprising a firefighting lift and evacuation lift, a firefighting stair including a dry rising main, connected by the protected residential lobbies);
  - e) The residential premises will also include an evacuation lift as detailed above sited adjacently to the firefighting lift. This is intended to avoid the need for occupants to use the firefighting lifts in the event of an emergency;
  - f) Special signage will be provided to the residential stair core to enable the Fire Service to conduct operations effectively. Wayfinding signage in accordance with the amended Approved Document B Volumes 1 & 2:2020 will be provided in support of firefighting operations;
  - g) All internal flat areas will be reachable within 60m from a dry main outlet located in the firefighting stair, on a route suitable for laying hose, given that the building has been provided with full sprinkler systems in accordance with BS 9251;
  - h) The dry rising main inlet point for the residential premises will be located on the face of the building, within 18m and a clear line of sight from the fire service appliance parking location;
  - i) The higher education use areas will be provided with at least 15% accessible perimeter, expected to be provided via the south-west façade.
- 5. The access for fire service vehicles is discussed in detail below:
  - a) Due care will be given to ensure that the vehicle access route (consisting mainly of the public Avonmouth Street and Tiverton Street) achieves the requirements for a pump appliance as shown in Guidance Note 29 (London Fire Brigade). Any access / security measures in and around the site (especially any barriers or bollards preventing vehicle access) will need to be by-passable by the Fire Service. This will be confirmed by tracking exercises.
  - b) Access is via existing public roads.
  - c) Fire Service vehicle access will be provided via Avonmouth Street and Tiverton Street, which are both public roads. These run north, east (Avonmouth Street) and south (Tiverton Street) of the proposed development;
  - d) This will allow fire appliances to park within 18m from, and have a clear line of sight to, the dry riser main inlet point for the residential areas. Immediate access into the residential lobby is expected to be provided next to the dry riser inlet point; and



- e) This will also allow fire appliances to park within 18m from entrance points located as part of the accessible perimeter serving the Basement level -1, Ground and the 1<sup>st</sup> floor higher education areas
- Public hydrants (existing) are expected to be provided within 100m of this building, as it is in a prominent central location. A request for information has been made to the London Fire Brigade Water Team via email on 10 09 2021, with a response received on 13 09 2021;
- g) The existing hydrant is located on the east of the proposed development, on the pavement running east of the site boundary. This hydrant is located approximately 15m away from the likely inlet point for the residential core. Similarly, it would be located approximately 30m away from the entrance points located on the accessible perimeter serving the higher education use areas;
- h) This hydrant has been confirmed as operational by the London Fire Brigade;
- 6. Ensuring that any potential future modifications to the building will take into account and not compromise the base build fire safety / protection measures:
  - a) The continuity and development of the Golden Thread is the responsibility of the whole design team with the Duty holder taking the lead. Clarke Banks (Fire Engineering) will continue to ensure the Golden Thread of information is kept in line with direction and leadership coming from the Duty holder. Clarke Banks (Fire Engineering) aim to support the appointed Duty holder in collating the Golden Thread of building information, insofar as applicable and relevant to the strategic fire safety design requirements.
  - b) The design team are committed to incorporating all information that this statement has discussed, including any further developments which may arise as the design progresses, into the main fire strategy. This information shall be made available to any building owner throughout the life span of the building. This will culminate in a package of information being handed over to the building owner as per Regulation 38 of The Building Regulations 2010.
  - c) This will ensure that the information to understand the building, including any steps needed to keep both the building and people safe throughout its lifespan are readily available.



## **6 SUMMARY AND CONCLUSION**

- It can be confirmed that the design of the building at Avonmouth from the outset was always planned to be in line with the guidance published in BS 9991 – 2015 Fire Safety in the design, management and use of residential buildings – code of practice and BS 9999 – 2017 Fire Safety in the design, management and use of buildings – code of practice.
- 2. The design complies with the guidance set out in both BS 9991 and BS 9999.
- 3. Following the comments which were received by the HSE, the architect has made some very slight amendments to the design so that the proposal can be directly related to the guidance detailed above.
- 4. In addition, some further clarifications were provided on the height to the top occupied storey and the validation that wet risers are not applicable to the design due to the height being under 50m. The building will be provided with dry rising mains to the Firefighting shaft as specified in BS 9999.
- 5. The staircase arrangement at the lower levels has now been slightly amended following the comments made by the HSE and all stairs are separated and discharge in accordance with guidance.
- 6. Further to the comments made by the HSE, the discharge point of the staircase shafts and any access point to a refuse store have been slightly amended so that these areas do not have to pass or discharge close to each other, and compliance has been indicated.
- 7. HSE comments were made in reference to the staircase arrangement at the upper levels and the fact that accommodation was being accessed directly off the Firefighting lobby. We now trust that the design has been shown to comply with the guidance set out in BS 9991 and that the Firefighting lobby has been afforded with the correct level of protection via fire rated construction and a minimum of two fire doors between the Firefighting staircase and the Firefighting lift shaft.
- 8. I can conclude that the proposed design for the project at Avonmouth complies with the relevant guidance set out in the BS 9991 and BS 9999 documents and these cover all purpose groups that are contained with the development.



## **REFERENCED DRAWINGS & DOCUMENTS**

Author	Description	Drawing ref. / no.	Revision
Stitch	Proposed site plan	21235-STCH-XX-DR-A-1050	-
	Basement 2 Plan	21235-STCH-XX-B2-DR-A-01100	D
	Basement Plan	21235-STCH-XX-B1-DR-A-01101	В
	Ground Floor	21235-STCH-XX-00-DR-A-01102	F
	Level 01	21235-STCH-XX-01-DR-A-01103	-
	Level 02	21235-STCH-XX-02-DR-A-01104	В
	Level 03-06	21235-STCH-XX-ZZ-DR-A-01105	В
	Level 07	21235-STCH-XX-07-DR-A-01106	В
	Level 08-13	21235-STCH-XX-ZZ-DR-A-01107	В
	Level 14-15	21235-STCH-ZZ-XX-DR-A-01108	В
	Roof	21235-STCH-XX-RF-DR-A-01109	A
HSE	SE Substantive response	ref:pgo-0793	-

This report is based on the following plans and revision shown:

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