

# Fire Safety Technical Report

[REDACTED] Hounslow.  
[REDACTED]

Date: [REDACTED], 2021

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## 1 Executive summary

Pentrevion Fire has been appointed to propose a set of fire safety measures to meet the functional requirements of the Building Regulations for the building in relation to B1 and B5 only. The goal of the report is to support the client to achieve regulatory compliance and a final certificate from the London Borough of Hounslow's Building Control.

A site visit was carried out on [REDACTED], 2021 where the entire building and vehicle access routes were viewed and assessed.

The following improvements are required:

- A fire detection and alarm system will be fitted within each flat, to conform with BS 5839: Part 6, to an LD1 standard - see Section 7.2.1
- The fire detection and alarm system that is within the common areas is not required and does not support the Defend in Place evacuation strategy. It should therefore be either disabled or removed – see Section 7.2.1
- An automatic water fire suppression system (AWFSS) will be fitted throughout the building - see Section 8
- The two skylights at the head of the staircase will be changed to remotely operated, opening vents (AOV) - see Section 9

The Regulatory Reform (Fire Safety) Order 2005 will apply to the building once it is occupied and this Technical Report should be included within the Fire Risk Assessment for the building.

The information within this report should only be used as preliminary information for the obtaining of quotes and planning purposes, until such time as formal approval is received from the Building Control Body. Any works that are carried out prior to this approval being received, will be at the client's own risk.



## 2 Statutory Requirements

The Regulatory Reform (Fire Safety) Order 2005 applies to the building and a suitable Responsible Person within Envirotech Limited holds the responsibility for ensuring that fire safety arrangements for the building are appropriate.

This report has been completed by competent a person in terms of fire safety and can be utilised to inform the management arrangements and procedures for the building.

It is critical that the Responsible Person understands and accepts the assumptions and control measures upon which this report is based. Any variation from these elements may have a significant impact on the suitability of the overall fire safety arrangements for the building. Any proposal to alter arrangements or procedures for the building must be carefully considered and assessed by a competent person, prior to implementation.

## 3 General

### 3.1 Assumptions

The following assumptions have been made;

- This report and the recommendations within it, will only be used for [REDACTED]
- For the purposes of this strategy, it has been assumed that a fire is an accidental event and that there is a single seat of fire. No account is taken of the potential for arson, which may typically be characterised by multiple seats of fire and the use of accelerants.
- There is no reliance placed on the fire service to rescue people from the building; the assumption being that people, who are in the building at the time of a fire, should be able to escape from the building by unaided efforts.
- That the owner of the building, has control over the entire building and can ensure that fire safety standards and systems will be maintained.
- That a copy of this report will be passed to any subsequent owner of the building.

### 3.2 Purpose Group

The purpose group of the building being assessed is Residential (Dwellings) – Flat 1(a).

### 3.3 Evacuation Strategy

The evacuation strategy will be Defend in Place. Each apartment will have its own fire detection and alarm system. On activation of a fire alarm, only the flat containing the relevant detector will experience an alarm. No other alarms will sound throughout the building.

There will not be a common fire detection and alarm system within the building.

### 3.4 Reference Information

This Technical Report has been developed based upon a site visit on March 2<sup>nd</sup>, 2021 and on information contained in the design drawings provided by Envirotech Limited. This report should be read in conjunction with these drawings.

Drawing Number	Description	Date
835/ RDP/ BRO1	Ground, First and Second floor plans	Oct 2013
835/ RDP/ BRO2	Elevations	Oct 2013
835/ RDP/ BRO3	Sections & Details	Oct 2013
835/ RDP/ BRO4	Service Plans	Oct 2013
835/ RDP/ BRO5	Doors, Window Schedule & Roof Plan	Oct 2013
835/ RDP/ BRO6	Fire Brigade Travel Distance	Oct 2013

Table 1 Drawing Plan

## 4 Building Description

The building is a three-storey block of flats, that was converted from an office block approximately 7 years ago. The uppermost occupied floor is approximately 6m above the access level. The building is therefore over 5m, but less than 11m in height.

The building is served by a single, internal staircase and has two flats on each floor. In terms of fire safety guidance, it is classified as a 'small building'.



Access to the building is via [REDACTED] Road and [REDACTED] Road, which is a relatively narrow access road, with a restricted junction with [REDACTED] Road.

The access and turning requirements for a fire appliance do not meet current guidance. Section 10 provides further details.

## 5 Design Guide

BS9991 has been utilised as the base guidance document to demonstrate that a reasonable level of safety is provided within the building.

Where appropriate, fire engineering methods and/or compensatory arguments will be used to justify departures from this guidance.

## 6 Key Design Challenges

No.	Design Challenge	Proposal	Report Section
1	Apartment No. 5 has a bedroom that is an inner room to the kitchen and living area	Provide the following to the apartment: <ul style="list-style-type: none"> <li>• An automatic water fire suppression system (AWFSS)</li> <li>• An LD1 fire detection and alarm system</li> <li>• A cut-off device to the hob and cooker</li> </ul>	7.3
2	The apartments on the uppermost floor do not have protected entrance hallways	Provide an additional door and screen to create protected entrance hallways for apartments 5 and 6.	7.4
3	The staircase is not provided with any vents that can be utilised effectively by the Fire Service to remove smoke.	Convert the existing skylights to openable vents with a remote means of operating for use by the Fire Service	9
4	A fire appliance cannot be guaranteed to get within 45m of all parts of the building.	The building will be protected by an automatic water fire suppression system with a 30-minute discharge duration and enhanced discharge density.	8 & 10

Table 2 - Principal Design Challenges



## **7 Means of Warning and Escape**

### **7.1 Introduction**

The Building Regulations and Regulatory Reform (Fire Safety) Order 2005 state that the building must be provided with an appropriate means of raising the alarm in the event of a fire and with means of escape that are suitable and adequate for the number and distribution of the people likely to be on the premises at any given time.

The existing building has a fire detection and alarm system that is designed to support a simultaneous evacuation strategy. This system will require adaptation to support a defend in place strategy as described within this section.

### **7.2 Category of Fire Detection and Alarm System**

#### **7.2.1 Within Apartments**

The fire detection and alarm system within each apartment will be designed to provide an early warning for the occupants, in the form of a category LD1, Grade D1 in all flat units. The minimum standard of fire detection to conform to BS9991 and BS5839-6, is an LD2 system, which would involve a detector within the entrance lobby, the kitchen and the lounge area.

The higher standard being proposed for this building, which will include detectors within the bedrooms and boiler cupboard, is to improve the detection time and therefore reduce the evacuation time for residents as a partial compensation for the extended hose lengths for the Fire Service.

As the evacuation strategy in the building is defend in place, only the sounders in the apartment where a local detector activates should operate.

#### **7.2.2 Within Common Areas**

There is no requirement for fire detection within the common areas, as there is no requirement for a common alarm, or for other devices to be activated or operated by a detection system e.g., automatically opening smoke vents.

There will be a smoke vent within the staircase, but this will be an openable vent that can be operated remotely by the Fire Service. See Section 9 for details.



The fire detection and alarm system that is within the common areas should therefore be disabled or removed, as it does not support the Defend in Place evacuation strategy.

### **7.3 Apartment Number 5**

Within flat 5 there is an inner-room bedroom situation.

This arrangement is not suitable for occupants who are not capable of independent evacuation. As the building is not provided with a lift, this is not perceived to be an issue, but the owners of the building should be cognisant of this fact when renting or selling this apartment.

BS9991 provides guidance on additional measures that are required to compensate for this arrangement. The provision of an AWFSS and enhancement of the fire detection to an LD1 standard provides appropriate compensation for the open plan arrangement of the apartment.

Both of these features will be provided and in addition, the fire detection system within apartment 5 will be linked to the cooker and hob electrical supply. In the event of an alarm activation, the power supply to these devices will be interrupted.

A means of a local reset to this system will be provided within the apartment.

### **7.4 Fire Protection to Escape Route**

The staircase and lobbies are currently protected by fire resisting construction to a 60-minute standard and all doors giving access to these areas are FD30(S) fire doors. The apartment entrance doors should have suitable self-closing devices fitted, that comply with BS EN 1154; and the service riser cupboards should be kept locked shut and have signs affixed to them accordingly.

The two apartments on the 2<sup>nd</sup> floor do not currently have protected entrance hallways. This situation should be remedied by providing an additional door and partition to each of these apartments. See Figure 1.

The Service Riser cupboards are accessed from the stair lobbies and are separated from the means of escape with fire resisting construction and FD30(s) fire doors. This is acceptable.

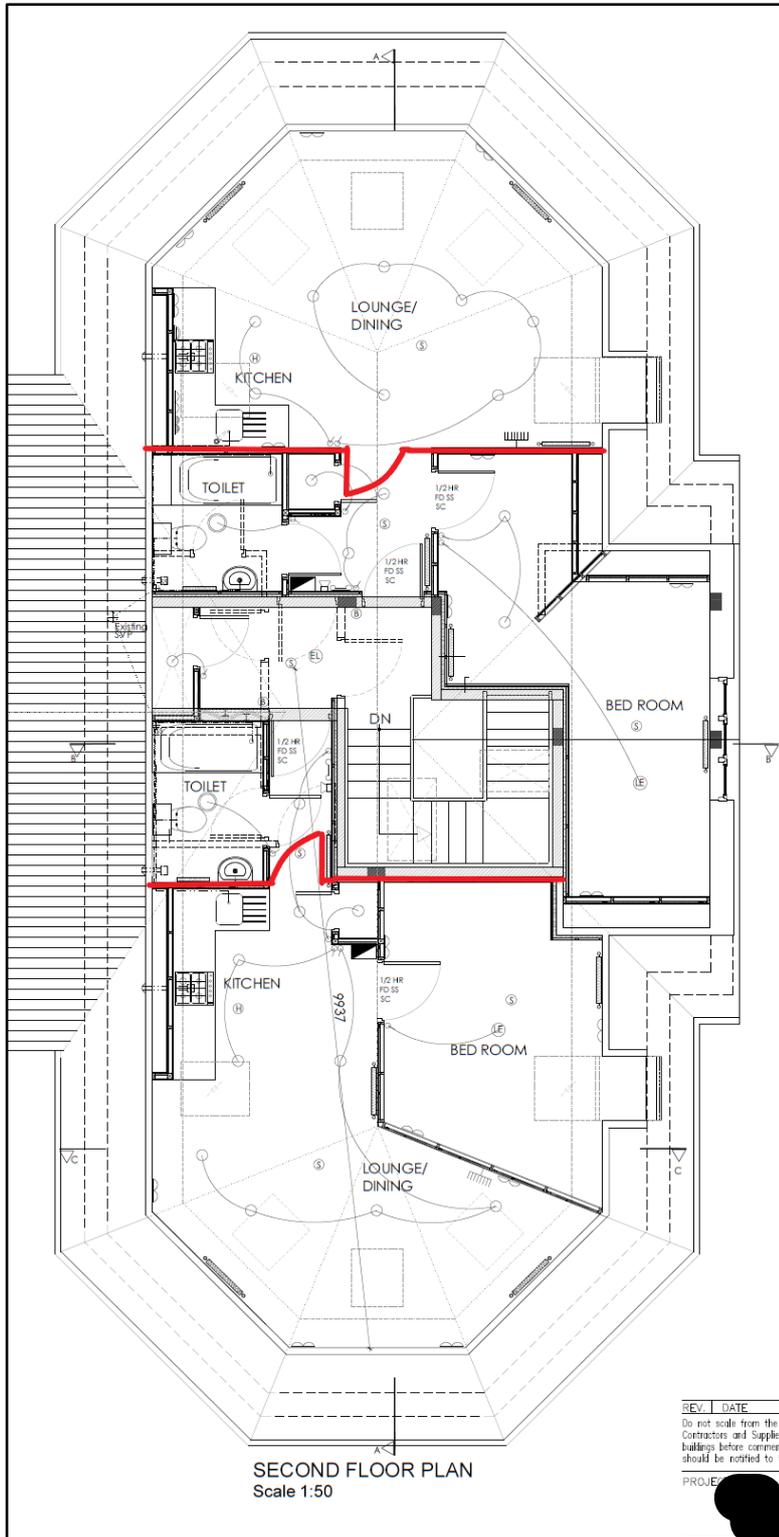


Figure 1 - Lobby provision to flats 5 & 6

## 7.5 Emergency Lighting

The means of escape is provided with emergency lighting that conforms to BS5266.

## 7.6 Doors on Escape Routes

Other than apartment front doors, all doors on escape routes, including the building's front door should be easily openable with a single action.

## 7.7 Fire Doors

All fire doors within the building will comply with the requirements of:

- BS 476-22 or BS EN 1634-2 (fire resistance)
- BS 476-31 or BS EN 1634-3 (smoke leakage) ("S" denotes smoke seals)
- BS 8214 (Fire door sets)
- BS EN 1154 – Self-closing devices

Door Locations	Minimum fire resistance of door (min)	Smoke seal (S)	Self-closing
Apartment front doors	FD30(S)	Yes	Yes
Apartment entrance hallways	FD30	No	No
Service riser	FD30(S)	Yes	No (KLS <sup>1</sup> )
Staircase doors	FD30(S)	Yes	Yes

<sup>1</sup> Keep Locked Shut

**Table 3 - Fire door specifications**

## 8 Automatic Water Fire Suppression System (AWFSS)

There are two fundamental design challenges relating to this project:

- Flat 5 has an inner-room bedroom
- The access arrangements for fire appliances are such that it cannot be guaranteed that they could get within 45m of all areas of the building

To compensate for these departures, the guidance within BS9991 will be followed and a residential sprinkler system will be designed and installed throughout the building in accordance with BS 9251.

The benefits of an AWFSS are considerable, and fire safety guidance recognises this. The AWFSS will be used as part of the compensatory package for the following:

See Table 4 below for an overview of the AWFSS specification.

Design Parameter	Specification
Specification	BS 9251 - Fire sprinkler systems for domestic and residential occupancies
Category	2 (Subclause B)
Minimum Design Discharge Density	Minimum design discharge density should be 4 mm/min for single head operation, or 2.8 mm/min through each sprinkler operating simultaneously, up to a maximum of four sprinklers in a single area of operation.
Number of Design Sprinklers	2
Minimum Duration of Supply	30 minutes
Coverage	Apartments only
Emergency Power Supply	Yes
Specialist Company	The design, installation, and commissioning of the AWFSS should be carried out by a specialist company registered with a third-party accreditation scheme accredited by the United Kingdom Accreditation Service (UKAS).

**Table 4: AWFSS Design Parameters Overview**

It is recommended that the design, installation, commissioning, and maintenance of the AWFSS is discussed at the earliest stage possible with a specialist company, as the system design may incur wider design implications, such as the required space for water storage.

## 9 Smoke ventilation

Within a small single stair building, there should be a means of ventilating smoke from the staircase in the event of a fire. This ventilation can be provided by automatically opening vents (AOVs), or manually openable vents that can be remotely operated via controls for the Fire Service.

The skylights at the head of the stairs will require adaptation to enable them to be opened remotely from the ground floor. This will provide the Fire Service with a remote means of ventilating the staircase should it become necessary for tactical purposes.

The controls to operate these vents should be positioned within the entrance lobby to the building. The control equipment will be arranged to open both vents at the same time. There must also be a facility for the Fire Service to remotely close the vents if and when required. The facility should be appropriately indicated and have clear instructions as to the mode of operation.

Collectively the roof vents must provide a minimum of 1m<sup>2</sup> of free area when in the open position.

## 10 Access and Facilities for the Fire Service

The dimensions of [REDACTED] Road; the presence of vehicle parking within [REDACTED] Road; and the arrangements at the junction with [REDACTED] Road, mean that access to within 45m of the building cannot be guaranteed. It is also not possible to guarantee turning facilities that meet the recommendations of BS9991 due to the parking arrangements of the dwellings in the road.

Whilst it is reasonable to assume that the Fire Service would be able to overcome these issues in the event of a fire in the building, it is considered appropriate to provide them with the time necessary to do this.

[REDACTED] Road is a straight road from the junction with [REDACTED] Road and is narrow for the first section of approximately 15m – the road is 3.3m wide between kerbs. There is a row of terraced houses behind [REDACTED] House, so it is assumed that the access arrangements have been accepted by London Fire Brigade at some point.



The actual distance from the entrance to [REDACTED] Road, where a hydrant is positioned and is suitable for parking a fire appliance, to the furthest most internal point of the building, measured on a route suitable for laying fire hose, is approximately 90m.

BS9991 provides guidance that for an apartment building with one floor more than 4.5m above ground level, if the building is fitted with an AWFSS conforming to BS9251, then the distance from the fire appliance to all parts of the building may be increased to 75m.

Although the arrangements in this building are approximately 15m beyond the recommended distance in the guidance, the principle of ensuring that the Fire Service are provided with adequate time to make preparations for entering a fire compartment still hold true.

As the building will be provided with an enhanced fire detection system – LD1 rather than the recommended LD2, occupants of the flats will be provided with early warning in the event of a fire, and will be able to make their escape prior to the arrival of the Fire Service.

The design discharge duration for the AWFSS of 30 minutes, will provide adequate time for attending appliances to carry out their activities to conduct firefighting operations before the sprinkler operation ceases.

## **11 Management**

Management procedures are critical to any fire safety plan and the following should be adhered to:

- All fire safety systems should be subject to regular testing and maintenance
- In the event that the building is sold, it must be ensured that all fire safety information, including this report and details of the testing and maintenance requirements for the fire safety systems, is passed on to the new owner

### **11.1 Fire Risk Assessment**

To ensure that the measures provided within the building remain adequate over time, a Fire Risk Assessment must be in place when the building is first occupied and be reviewed at least on an annual basis.



## 12 Conclusion

This technical report has presented a set of recommendations that will ensure that the functional requirements of B1 and B5 of the Building Regulations are met for this building.

This report should form part of the Fire Risk Assessment for the building.

## 13 Limitations

Our advice is strictly limited to the scope of our current Project and relates solely to [REDACTED] House in [REDACTED] Road, Hounslow

Pentrevion Fire Limited has not reviewed any other issues within the project other than those identified in our report. We offer no comment on any other aspects of the development and any absence of comment on such issues should not be regarded as any form of approval. The advice should not be used for building other than [REDACTED] House, [REDACTED] Road, Hounslow.

Any alterations that are carried out on the building prior to receiving full approval from the Building Control Body, will be at the risk of the client.



## 14 References

BS 9991: 2015 Fire safety in the design management and use of residential buildings. UK: BSI

BS 5839-6: 2019 Fire detection and fire alarm system for buildings. Code of practice for design, installation, commissioning and maintenance of system in domestic premises. UK: BSI

BS 5266-1,7: 2016 Emergency Lighting. Code of practice for emergency lighting of premises. UK: BSI

BS9251: 2014 Fire sprinkler systems for domestic and residential occupancies – Code of practice. UK: BSI

BS 7974: 2001 *Application of fire safety engineering principles to the design of buildings.* UK: BSI

CIBSE, Guide E: 2010 *Fire Safety Engineering. 3rd ed.* London: The Chartered Institution of Building Services Engineers: UK

Quintiere, G. J: 1998 *Principles of Fire Behaviour.* United Kingdom: Delmar.