Developed for:
Kier Construction

Fire Safety Strategy
Pinn River SEND School

Hillingdon
London

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Fire Safety Strategy

Pinn River SEND School

Project Reference: AF3177
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Issue	Date	Description	Author	Checked	Approval
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The checker has provided an internal review of the technical content of the report.

The approver confirms the report has received quality assurance in accordance with the principles of ISO 9001 and authorises external release of the document on behalf of Ashton Fire.

EXECUTIVE SUMMARY

Ashton Fire have been commissioned by Kier Construction Ltd to provide fire safety consultancy services for the development of Pinn River SEND School in Hillingdon, London.

This document details the fire safety strategy design as developed for the scheme, intended to assist the design team in progressing the detailed fire safety provisions for the project.

This fire safety strategy has been developed to provide an equivalent level of safety as recommended within the life safety requirements with respect to fire under the Building Regulations 2010 (including amendments). This has been achieved through compliance with the prescriptive recommendations for life safety through the application of BS 9999: 2017 in the first instance. This has been further supplemented by the guidance within HTM 05-02 to account for non-ambulant pupils within the demise.

Apart from where noted in this report, the design will be in accordance with the recommendations of the aforementioned guidance documents. To facilitate ease of review, the fire safety systems proposed in the report are outlined in Summary Table 1.

The proposed development will consist of a new two storey (G+1) school to be built on the site of an existing school. Pinn River School will accommodate 180 pupils, with allowance for a further 90 members of a staff (resulting in a maximum design occupancy of 270). The school will cater to pupils aged between 3 and 19 years old with a wide range of learning disabilities and physical needs.

The first floor will predominantly feature workshops, classrooms, activity spaces, meeting rooms and open dining and activity areas. The ground floor will contain further classrooms and workshops, in conjunction with a hydrotherapy room, therapy and development rooms and staff ancillary areas.

The building will principally operate a simultaneous evacuation regime, supported by an automatic detection and alarm system. However, in recognition of there potentially being a small number of non-ambulant pupils, the evacuation strategy will also allow for a progressive horizontal evacuation protocol. Means of escape from the upper floor will be facilitated by the three protected stairs and two evacuation lifts, all of which discharge either directly to outside or via a protected corridor. In addition to this, independent exits to outside are also available on the ground floor.

An automatic suppression system is not required to meet the minimum recommendations of BS 9999 but will be provided in accordance with DFE requirements. The school will have a structural fire resistance rated to a period of 30 minutes.

Firefighting operations will be carried out primarily through vehicle perimeter access to the building, achieved via suitable access routes within the site. Hydrants are to be provided so that they are within 90m of the building entry points, otherwise new hydrants are to be provided.

Summary Table 1 – Fire safety systems

Item	Description	Report Ref.
Detection and alarm	Category L2(M) system to BS 5839-1	3.2
Smoke Ventilation	Not required	N/A
Emergency lighting	Provided throughout occupied areas and escape routes.	3.12
Fire safety signage	Provided to indicate fire exits and escape routes.	3.13
Stand-by power	Internal battery back-up supplies to all other fire safety systems	3.14
Automatic suppression system	Provided for property protection only	5.1
Fire mains	Not required	7.4

CONTENTS

1. INTRODUCTION 6
1.1 General 6
1.2 Legislation and basis of design 6
1.3 Reference information 6
2. PROJECT OVERVIEW 7
2.1 Building description 7
2.2 Risk profile 7
2.3 Design occupancy 8
3. MEANS OF WARNING AND ESCAPE 10
3.1 Evacuation philosophy 10
3.2 Means of detection and alarm 10
3.3 Visual Alarms 10
3.4 Smoke ventilation systems 10
3.5 Fire shutters 10
3.6 Travel distances 10
3.7 Exit width factors 11
3.8 Horizontal means of escape 11
3.9 Vertical means of escape 12
3.10 Means of escape for disabled persons 13
3.11 Escape beyond the final exits 13
3.12 Emergency lighting 13
3.13 Fire safety signage 13
3.14 Emergency (life-safety) power supply 13
4. INTERNAL FIRE SPREAD - LININGS 15
4.1 Internal wall and ceiling linings 15
5. INTERNAL FIRE SPREAD - STRUCTURES 16
5.1 Automatic fire suppression 16
5.2 Structural fire resistance 16
5.3 Compartmentation and fire-resisting construction 16
5.4 Fire doors 16
5.5 Fire-stopping and penetrations through fire-resisting construction 17
5.6 Fire-stopping and penetrations through fire-resisting construction 17
5.7 Cavity barriers and concealed spaces 18
5.8 Protection of ductwork 18
5.9 Cavity barriers and concealed spaces 18
6. EXTERNAL FIRE SPREAD 20
6.1 External wall construction 20
6.2 Roof coverings 20
6.3 Space separation and unprotected areas of the façade 20
7. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE 22
7.1 Means of notifying the fire and rescue service 22
7.2 Water supplies 22
7.3 Vehicle access to and around the site 22
7.4 Access into and through the building 22
8. FIRE SAFETY MANAGEMENT 23
8.1 Overview 23
8.2 Regulatory Reform (Fire Safety) Order 2005 23
8.3 Management responsibilities in support of the fire strategy 23
APPENDIX A – FIRE STRATEGY MARK-UPS 24
9. EXTERNAL REFERENCES 25

1. INTRODUCTION

1.1 General

1.1.1 Ashton Fire has been commissioned by Kier Construction to provide fire safety consultancy services in support of Pinn River SEND School located in Pinner, Hillingdon.

1.1.2 Pinn River School is a school that will consist of two storeys (G+1) and will cater for a total of 180 pupils aged between 3 and 19. The pupils will include those with wide range of learning difficulties, behavioural issues and physical needs.

1.1.3 This report documents the fire safety strategy developed for the scheme. It is intended that this strategy report supports the design team in progressing the detailed fire safety provisions for the project.

1.1.4 This document is not intended to portray detailed design information for fire safety systems or construction specifications. This report should be submitted for review by the building control body as part of the Building Regulations approvals process at the next stage (i.e. Contractor's Proposal stage) of the project.

1.1.5 It should be noted that any alternative design solutions proposed within this report are subject to agreement and eventual approval by the relevant authorities having jurisdiction (AHJs). This includes the appointed building control body and the London Fire Brigade.

1.2 Legislation and basis of design

1.2.1 Fire safety in buildings is governed by two pieces of legislation in the UK. The Building Regulations 2010, Part B, Fire Safety applies to building design, whilst for fire safety management in buildings, compliance with the Regulatory Reform (Fire Safety) Order 2005 (FSO) is required.

1.2.2 This strategy has been developed to meet the level of fire safety expected under the Building Regulations 2010 (as amended), namely:

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

1.2.3 The fire safety strategy will be developed to satisfy the requirements for fire safety as set out by the Building Regulations. The strategy has not been specifically developed to address property protection or insurer's requirements. However, the features that are included for life safety, as required by the Building Regulations 2010, will contribute in some extent to business and property protection.

1.2.4 In general, the necessary level of life safety will be achieved utilising BS 9999: Code of practice for fire safety in the design, management and use of buildings (2017) and documents referenced therein in the first instance. Fire engineering principles are employed to support alternative solutions where strict adherence to the codes would conflict with the wider aspirations for the scheme. In addition to this, aspects of the Healthcare Technical Memorandum 05-02: Firecode (referred to as HTM 05-02 henceforth) have been utilised as the basis of the fire strategy in recognition of a proportion of the pupils being non-ambulant.

1.2.5 Unless otherwise stated, it is expected that provisions will be provided according to recommendations of BS 9999 and supplemented by HTM 05-02 where applicable.

1.2.6 Departures from the guidance documents are identified and alternative proposals (including associated analysis) are documented for facilitating review with the project's approvers. In accordance with the fire safety engineering principles detailed in the PD 7974 [1] codes of practice, it is considered appropriate that all fire precautions are determined based on there being one seat of fire (i.e. accidental fires).

1.2.7 The strategy has been developed in cognisance of the Construction (Design and Management) Regulations 2015 (CDM 2015) [2], which sets out what designers are required to consider, to protect anyone involved in the construction or ongoing use of a project. A summary of management and maintenance issues are provided in Section 8.

1.2.8 This strategy does not provide a comprehensive assessment of site fire safety during the building works or the phasing of these works, though a designer's review of construction site fire safety issues is recommended to be conducted during technical design. The Fire Protection Association [3] and the Health and Safety Executive (HSE) [4] issue guidance on identifying and managing fire precautions during the works, which should be consulted by the contractor or their specialist advisor when developing their construction fire safety plan.

1.3 Reference information

1.3.1 This strategy is based on information provided by the design team to Ashton Fire as listed in Table 1. Additional contradictory information or subsequent design variations to the information supplied may render the findings and recommendations of this report invalid.

Table 1 – Project documentation referenced

Description	Reference	Revision	Author
GA Plan - Ground Floor	FS0728-NOV-V1-00-DR-A-2.101	P7	Noviun Architects
GA Plan – First Floor	FS0728-NOV-V1-01-DR-A-2.102	P6	
GA - Roof	FS0728-NOV-V1-02-DR-A-2.104	P5	
GA Sections	FS0728-NOV-V1-XX-SR-A-2.201	P4	
GA Elevations	FS0728-NOV-V1-XX-DR-A-2.301	P4	
Schedule of Accommodation	--	Nov 2020	DfE

2. PROJECT OVERVIEW

2.1 Building description

2.1.1 Pinn River SEN School is a proposed school located in Hillingdon, London that will cater to pupils with learning difficulties, pupils on the spectrum, pupils with behavioural issue and pupils with special physical needs

2.1.2 The new school building will comprise of two storeys (G+1) and will feature a top storey height of circa 3.75m . Three protected stairs and two evacuation lifts will be provided to serve the upper floors of the building.

2.1.3 The floors of the building will be arranged as follows:

- First floor – will predominantly feature workshops, classrooms, activity spaces, meeting rooms and open dining and activity areas.
- Ground floor – will contain further classrooms and workshops, in conjunction with main hall, a hydrotherapy pool, therapy and development rooms and staff ancillary areas.

2.1.4 The new school building will cater for up to 180 pupils and a further 90 members of staff, resulting in a maximum design occupancy of 270. It is understood that the school may accommodate some pupils who are non-ambulant and will therefore require assistance to escape.

2.1.5 Rooms/areas commissioned for community-use, or out-of-hours events are to be confirmed.

2.1.6 Indicative floor layouts for the school are depicted Figures 1 and 2.

2.2 Risk profile

2.2.1 As per the guidance contained within BS 9999, a risk profile is required to be established for the building to ascertain the minimum fire safety parameters recommended in BS 9999. The risk profile is a function of the occupancy characteristic and fire growth rate for the building.

2.2.2 The occupants of the school shall primarily be pupils and staff who will attend the building on a regular basis for scheduled lessons and other activities.

2.2.3 As pupils will occupy the school grounds on a regular basis, it is expected that they will be familiar with their surroundings. However, given the potential cognitive disabilities of the pupil population, the young age of some of the pupils and the presence of non-ambulant students, a 'B – Awake and Unfamiliar' risk profile is deemed more appropriate.

2.2.4 Staff areas, and areas within the building that will be only accessible for maintenance (e.g. staff rooms, kitchen, plant) are also assigned an occupancy characteristic of 'A – Awake and Familiar'.

2.2.5 For community-use areas, a 'B – Awake and Unfamiliar' risk profile will also be assigned during out-of-hours events to account for the fact that visitors to the school may not be familiar with the building layout and the escape routes.

2.2.6 The fire loading / content of the school is considered as analogous to that of a general office space. The appropriate fire growth rate for the building is therefore taken to be 2 – Medium. Plant rooms, kitchens, laboratories, and other similar areas are considered to have a fire growth rate of 3 – Fast and shall be separated from the rest of the building by fire-resisting construction.

2.2.7 A sprinkler system will be installed in the premises but for primarily for property protection. Therefore, the benefits derived from it will not be factored into the risk profiles.

2.2.8 A summary of the risk profiles in the buildings, and various areas within are summarised in Table 2.

Table 2 - Risk profiles

Area	Occupancy characteristic	Fire growth rate	Risk profile
Areas occupied by pupils (i.e. wider school)	A – Awake & Familiar	2 – Medium	B2
Areas commissioned for community use (dining area and main hall)	B – Awake & Unfamiliar	2 – Medium	B2
Areas of higher fire hazard occupied only by members of staff (e.g. plant, kitchen)	A – Awake & Familiar	3 – Fast	A3
Note: Sprinkler provision has not been factored into the risk profiles. .			

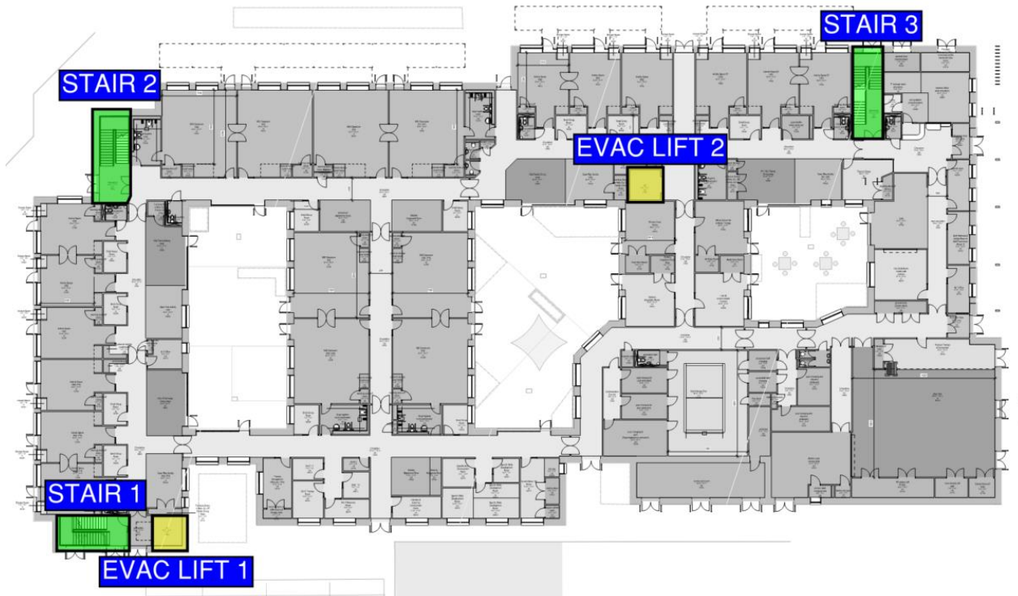


Figure 1 – Proposed ground floor layout

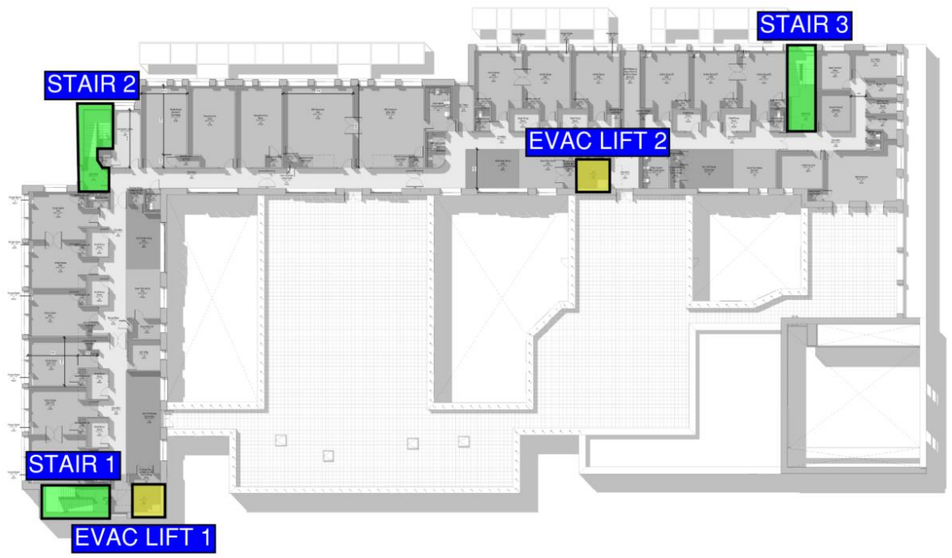


Figure 2 – Proposed first floor layout

2.3 Design occupancy

2.3.1 The proposed school building is expected to accommodate up to 180 pupils, and 90 members of staff, totalling at a peak occupancy of 270 during school hours.

2.3.2 The expected occupancy numbers for various areas on each floor of the school building are based on the Schedule of Accommodation referenced in Table 1.

2.3.3 The estimated design occupancy for the building is summarised in Table 3.

Table 3 - Occupancy

Floor	Room	Occupants
First	Activity space (x12)	84
	Small group room (x8)	32
	MSI Classroom (x2)	16
	Science & Technology	3
	Secondary life skills	3
	Secondary food room	3
	Secondary library	6
	Staff wellness	24
	Conference room	10
	SLT office (x2)	16
	Head teacher's office	6
	AHT office	4
	Small meeting room	5
	Bursar / PA	2
	Staff work room	24
	Total first floor occupancy	**238[A]**
Ground	Main hall	64
	Physical development and Therapy	8
	Kitchen prep	6
	Pupils changing and showers (ambulant) (x4)	20
	Pupils changing (non-ambulant)	3
	Hydrotherapy Pool	16
	Special skills and development room (x5)	11
	Attention and listening room	3
	Salt room (x4)	16
	Therapy management office	7
	Activity space (x12)	84
	Staff workroom (x3)	25
	Small group room (x11)	44
	MSI classroom (x8)	64
	SLT office (x2)	16
	Primary food room	4
	i-lab	11
	Whole school art & music therapy	2
	Sensory integration room	4
	Theme space	4
	Cafe	24
	Life skills room	7
	Staff wellness	24
	Parents room	6
	General office	6
	Total ground floor occupancy	**479[A]**

Floor	Room	Occupants
Notes A) The combined pupil and staff population will not exceed 270 at any given time and therefore it is not expected that all rooms in the school will simultaneously be occupied at maximum occupancy. Egress provisions for each floor have been designed to accommodate no more than 270 occupants.		

3. MEANS OF WARNING AND ESCAPE

Building Regulations requirement B1:

"The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times."

3.1 Evacuation philosophy

3.1.1 A simultaneous evacuation regime will be implemented in the building, whereby, in the event of fire anywhere in a building, all occupants will receive the signal to evacuate.

3.1.2 Notwithstanding the above, allowance has also been made for a progressive horizontal evacuation protocol in the fire strategy in recognition of there being a small proportion of non-ambulant pupils in the building. This has been introduced due to the limited number of refuge spaces and evacuation lifts and involves pupils escaping into the adjacent fire compartment which will serve as a place of safety (with the aid of a suitably trained member of staff). So should they not be able directly via a storey exit, they have the option to escape into the adjacent compartment where they may wait in a place of safety to continue their escape.

3.1.3 Therefore, upon detection of a fire anywhere in the building, non-ambulant pupils on the first floor shall:

(i) Escape via the stair storey exit in their respective compartment (should a refuge space be available); or

(ii) Escape via the evacuation lift storey exit in their respective compartment (should this be available - note that an evacuation lift is not available within Compartment 3); or

(iii) Should the above not be available, escape into an adjacent compartment, where they may temporarily reside in a place of relative safety whilst they await assistance and availability of a storey exit.

3.1.4 Occupants should not reside in the adjacent compartment indefinitely. They are to make their way to a suitable storey exit upon receiving assistance.

3.1.5 Members of staff should be suitably trained in the evacuation of non-ambulant pupils, taking into account the number of mobility impaired pupils requiring assistance on the first floor and any specific/individual evacuation needs.

3.1.6 The automatic fire detection and alarm system will be provided in support this evacuation philosophy, as set out in Section 3.2.

3.2 Means of detection and alarm

3.2.1 Areas with a B2 risk profile are required to be provided with a minimum of a Category M (manual) detection and alarm system only. However, to provide early warning in the event of a fire, a Category L2 detection and alarm system shall be provided throughout the school building, designed and installed in accordance with BS 5839-1 [5]. The enhanced provision of the detection and alarm system will permit limited increases in travel distances and reduction in exit widths for areas with an A2 and B2 risk profile.

3.2.2 Automatic detection and alarm is proposed to be fitted within all rooms and escape routes within the building. It is recommended that heat detection is provided within the kitchen so as to limit the potential for false alarms to occur.

3.2.3 Where provided, automatic fire safety systems (e.g. automatic fire curtain) may be activated by the wider Category L2 system or by a local detector provided in a strategic location.

3.2.4 Manual call points are to be provided as part of the automatic detection and alarm system installed within the building. In accordance with BS 5839-1, these should be of Type- A and provided to every storey exit within the building, or so that they are located within 45m of each other.

3.2.5 The sound of the alarm may be altered/reconfigured such that it does not have a detrimental effect on pupils who may respond adversely to the noise. However, the required decibel levels of the alarm should nevertheless be maintained.

3.2.6 In accordance with the recommendations of BS 5839-1, the fire alarm and detection engineer must submit the design certificate for the scheme to the approving authority prior to commencement of the installation on site.

3.3 Visual Alarms

3.3.1 Visual alarms will be provided where required in accordance with BS 5839-1.

3.3.2 In addition, areas that could facilitate occupants with hearing difficulties shall also be provided with a visual alarm as well as in areas with high ambient sound levels.

3.4 Smoke ventilation systems

3.4.1 In accordance with BS 9999 recommendations, there are no requirements for smoke ventilation systems within the building.

3.5 Fire shutters

3.5.1 The kitchen shall be separated from the main hall by a minimum of 30 minutes fire resistance. Any servery openings shall therefore be provided with fire shutters which descend upon activation by a local heat sensor, such as a fusible link or heat detector, in the immediate vicinity of the shutter.

3.5.2 The fire shutters are required to have a minimum of 30 minutes fire resistance. Shutter assemblies should achieve the appropriate level of fire resistance in terms of integrity when tested or classified in accordance with BS 476-22 [6] or BS EN 13501-2 [7].

3.6 Travel distances

The maximum travel distances for this building are shown below for the appropriate risk profile. Escape from all areas within the building are within the single, and multi-directional travel distance limits given in Table 4.

Table 4 - Travel distance limitations

Risk profile	Travel distance [A]	
	Single direction (m)	More than one direction (m)
B2 (wider school and community-use areas)	23 [(1)]	57.5 [(1)]
A3 (kitchens, plant)	18	45
Open air / roof areas	60	200
Notes: A) The travel distance has been increased by 15% based on the provision of an L2 detection system.		

3.7 Exit width factors

3.7.1 The required width of exit doors, corridors and stairs are based upon the number of occupants in the building / area and the relevant factors given in Table 5.

3.7.2 Irrespective of the door widths calculated from the factors given in Table 5, BS 9999 recommends that all doors should have a minimum clear width of 800mm (to be increased to 850mm for doors that accommodate wheelchair users).

3.7.3 Corridors are to have a minimum clear width of 1,200mm in accordance with BS 9999. Cross corridor doors sub-dividing corridors should have a clear width no less than the corridor minus 150 mm. See Section 3.8.1 for additional discussion on sub-division of corridors.

3.7.4 Rooms serving more than 60 occupants should be provided with at least two exits, and they should be hung to swing towards the direction of escape. Doors hung to swing against the flow of escaping occupants are to serve a maximum of 60 people, irrespective of the available clear exit width.

Table 5 - Exit width factors

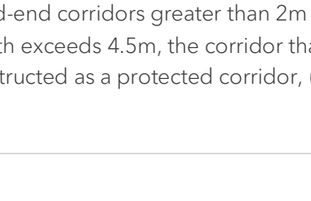
Risk Profile	Exit component	Minimum width factor (mm/person) [A]
B2 (Pupil and Community-use areas)	Doors, corridors and escape routes	3.49
A3 (kitchen, plant)	Doors, corridors and escape routes	4.6

Notes:

A) The exit widths have been decreased by 15% based on the provision of an L2 detection and alarm system.

Capacity of doors with a width of less than 1,050mm shall be assessed on the basis of 'Door capacity = 500mm / exit factor'

Exit widths are for clear widths measured in accordance with Figure 14 of BS 9999



Key

1 Effective clear width (door stop to projecting building hardware)

2 Effective clear width (door stop to door leaf)

3.8 Horizontal means of escape

3.8.1 Corridors connecting storey and final exits that exceed 12m in length shall be sub-divided by cross-corridor doors. The cross-corridor doors are required to achieve 30 minutes fire resistance with smoke seals and should be configured such that they swing in both directions for escape. Where more than 60 occupants are located either side of the cross-corridor doors, these should swing in both directions.

3.8.2 Inner rooms are rooms that are accessed from a room or area containing a fire load which pose a higher risk to the escape of occupants.

3.8.3 BS 9999 provides recommendations to mitigate the risks presented to occupants in inner room arrangements, which include the following:

- Automatic detection will be provided in the classrooms and the corridor, with a fire alarm provided in the inner room, in the process alerting occupants to a fire within the access room;
- The occupancy of each classroom will be less than the stipulated limit of 60 for inner rooms;
- The travel distance from the remotest point of each classroom to the nearest exit from the access room is within the single-direction travel distance limit of 25.3 for rooms with an A2 risk profile; and
- The access rooms (i.e. corridors / circulation spaces with a fire load) are not considered a place of special fire hazard.

3.8.4 Transient spaces such as store rooms are not deemed to be inner rooms due to occupants residing in them infrequently and for a relatively short duration.

3.8.5 Dead-end corridors greater than 2m are to be enclosed in 30 minutes fire resistance. Where this length exceeds 4.5m, the corridor that the dead-end subsequently discharges into should also be constructed as a protected corridor, using 30 minutes fire resisting construction and FD30S fire doors

(provided with cold smoke-seals) to ensure that the escape of the occupants is not prejudiced. Furthermore, the total occupancy of all rooms adjoining onto a dead-end should not exceed 60.

3.8.6 As stated in Section 3.1.2, each floor will be divided into three compartments, with each featuring at least one storey/final exit and an escape into an adjacent compartment in accordance with HTM 05-02. The compartmentation for each floor shall be as per the figures below.

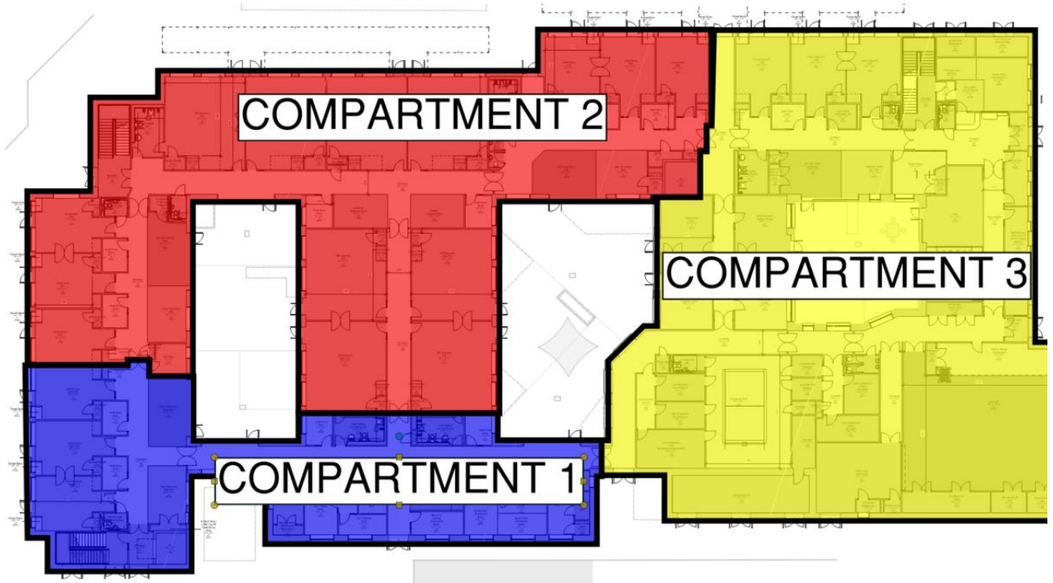


Figure 3 - Compartmentation on the ground floor

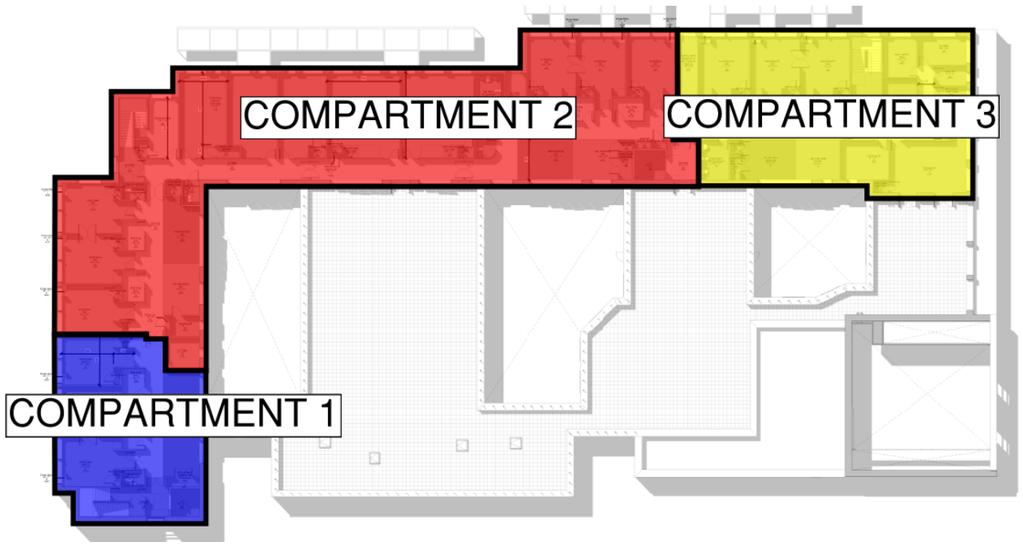


Figure 4 - Compartmentation on the first floor

3.8.7 Occupants on the ground floor should escape directly to outside in the first instance via the multiple exits provided around the building perimeter, alongside the independent exits assigned to individual rooms. Where there is a change in level for a final exit, a suitable ramp should be provided achieving a maximum gradient of 1:12.

3.8.8 Compartmentation is provided on the ground floor to facilitate escape from the first floor. On the first floor, occupants may escape into an adjacent compartment as opposed to a storey exit if there is a fire within their current compartment. This is due to the limited number of refuges spaces and evacuation lifts available for mobility impaired individuals. However, members of staff and pupils should not reside within the adjacent compartment indefinitely and should seek to escape (with the aid of a suitably trained member of staff) via a storey exit to outside at the earliest available opportunity.

3.8.9 The main hall is assigned an occupancy of more than 60 persons. Therefore, it will feature two exits, both swinging in the direction of escape, resulting in a total capacity of 143 persons.

3.8.10 The escape routes from the hydrotherapy pool pass through the changing rooms. It should therefore be ensured that these rooms are unlocked upon detection of a fire anywhere in the building (including subsequent doors that lead to main circulation corridor of the school).

3.8.11 The ground floor contains six independent exits to outside. In conjunction to this, the majority of rooms on the ground floor have their own independent exit to outside. Consequently, as the school maximum occupancy equates to 270 persons, there is more than sufficient capacity available via the ground floor exits to accommodate the school occupancy without having to consider merging flows with the stairs. As a result of this, the stairs should not be signed as storey exits on the ground floor.

3.8.12 Any laboratories containing fume cupboards that are located next to the room exit should be provisioned with a secondary means of escape, either to outside the laboratory or via passage doors to the adjacent room. Alternatively, the fume cupboard should be re-located remotely from the exit of the room.

3.8.13 Any automatic doors should be configured to fail-open upon loss of power and should remain in the open position upon detection of a fire to facilitate ease of escape.

3.8.14 Doors along escape routes should not narrow,ensuring bottlenecks are avoided.

3.8.15 Lockers should be of non-combustible construction and feature sloped tops to deter storage being placed on top of them. Furthermore, lockers and furniture/equipment should not be located within dead-end corridors.

3.9 Vertical means of escape

3.9.1 The school building will be provided with three protected stairs serving the internal floor areas, The three stairs will not be lobby protected and as such BS 9999 requires that one of the stairs is discounted in the vertical egress calculation.

3.9.2 BS 9999 recommends stair width factors for calculating the minimum allowable stair width, based on the number of occupants on the upper floors of the building and number of floors served by each stair. As discussed in Section 3.2.1, the provision of an automatic detection and alarm system in the school building is taken into account in BS 9999, by permitting a 15% relaxation of the proposed stair width factor where this has been applied. This results in a stair width factor of 4.08mm/person.

3.9.3 Accordingly, conservatively assuming that the entire school occupancy of 270 is present on the first floor, each stair is required to achieve a minimum clear width of 1000mm (resulting in capacity of 245 for each stair and 490 for the entirety of the first floor).

3.9.4 It is understood that greater width may be required by other guidance such as Approved Document M or BB 102.

3.9.5 Handrails which do not intrude more than 100mm into the clear escape route width may be disregarded as impacting upon the recommended width.

3.9.6 Travel distances on the roof are limited to 60m where a single exit is available and 200m where there are at least two means of escape.

3.9.7 In addition to the three protected stairs, two evacuations lifts will be provided in Compartments 1 and 2. The evacuation lifts should be operated by a suitably trained member of staff as part of the emergency evacuation plan. Both evacuation lifts will discharge to outside via a protected lobby/corridor.

3.10 Means of escape for disabled persons

3.10.1 It should be noted that under the Regulatory Reform (Fire Safety) Order 2005, it is the duty of the responsible person along with their appointed safety assistants to assist everyone to a place of ultimate safety outside the buildings in the event of an emergency.

3.10.2 Disabled persons shall be provided with suitable refuge areas (each at least 900 x 1,400 mm) protected from the effects of fire, e.g. within each protected stairway separated from the location of the fiire. This will enable them to wait in a place of safety while the majority of the building occupants descend before they make their way out of the building at their own pace with assistance.

3.10.3 Each refuge shall be provided with an emergency voice communications system (EVC). The system shall comply with BS 5839-9 and consist of a Type B outstation which communicate with a master station located near the building or the fire alarm panel.

3.10.4 Refuges should be located not to impede on the movement of occupants onto stairways or escape routes, be clearly identified and provided with emergency voice communication between the refuges and management / security positions.

3.10.5 Due to there being non-ambulant occupants present in the school, it is recommended that as many refuges as possible are provided in each protected stair (the minimum requirement is one).

3.10.6 Disabled refuges are to be provided on each floor, though they may be omitted from the ground floor level provided that level egress (or suitable ramp escape) to the outside ground level is provided

3.10.7 Any disabled pupils and members of staff should have a Personal Emergency Evacuation Plan (PEEP) and the procedures should be practised. A General Emergency Evacuation Plan (GEEP) will need to be written for members of the public who would need assistance to escape. Further information can be found in BS 8300-2 and the DCLG Publications "Fire Safety Risk Assessment Supplementary Guide – Means of Escape for Disabled People".

3.11 Escape beyond the final exits

3.11.1 Travel beyond the building final exits must be away from the building, towards a place of safety, and not be jeopardised by unprotected openings of the building. It is proposed that this is achieved through a combination of some of the following (relevant to each location):

- external fire-rated construction provided to a minimum height of 1,800mm above ground level where people are required to pass within 1,800mm of an external wall;
- where final exits discharge within 1,800mm of an external wall at 90° or less to the plane of the final exit, fire-rated construction will be provided to external walls within 1,800mm of the final exit;
- exit paths provided that lead away from the building; and
- alternative paths along the building that cannot be impacted by a single fire location.

3.11.2 Where escape around the building is within 1.8m of an external elevation, the corresponding elevation should be fire rated for 30 minutes (from inside to outside).

3.12 Emergency lighting

3.12.1 Emergency lighting will be installed to provide temporary illumination in the event of failure of the primary power supplies to the normal lighting system. As part of the emergency lighting system, escape lighting will be provided to ensure the escape routes are illuminated at all material times. Adequate artificial lighting will be provided in all common escape routes and will be of a sufficient standard to enable persons to see to escape.

3.12.2 Emergency lighting will be installed in accordance with the recommendations of BS 5266 [8], BS EN 1838:2013 [9] and BS EN 60598-2-22:2014 [10].

3.12.3 Emergency lighting will illuminate all occupied areas, common evacuation routes (internal and external as necessary) and essential areas including plant areas. It will also illuminate a safe exit route including fire exits, fire alarm call points, changes in level or direction and fire-fighting equipment. Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route.

3.12.4 Primary and emergency lighting will be required for any external escape routes that will not be lit by surrounding street lighting.

3.13 Fire safety signage

3.13.1 Fire safety signs will be installed where necessary to provide clear identification of fire precautions, fire equipment and means of escape in the event of fire. All parts of the development will be fitted with appropriate fire safety signage to comply with The Health and Safety (Signs and Signals) Regulations 1996, i.e. signage to be specified in according to BS ISO 3864-1 [11], BS 5499-4 [12] and BS 5499-10 [13].

3.13.2 The purpose of fire signs is to direct persons towards fire exits, or to provide specific information or warning about particular equipment, doors, rooms or procedures. They should be recognisable, readable and informative, as they convey essential information to regular and infrequent users of the premises, and the fire and rescue service.

3.13.3 Fire notices should be permanently displayed in conspicuous positions throughout the building, including storey exits, and should be specific to it.

3.13.4 All fire doors will be marked with the appropriate fire safety sign conforming to BS ISO 3864-1:2011 (white on blue) according to whether the door is:

- to be kept closed when not in use ('FIRE DOOR – KEEP SHUT');
- to be kept locked when not in use ('FIRE DOOR – KEEP LOCKED'); or
- held open by an automatic release mechanism ('AUTOMATIC FIRE DOOR – KEEP CLEAR').

3.13.5 Any emergency securing device fitted to doors on escape routes are to be provided with instruction notices, adjacent to the device, indicating the method of operation.

3.14 Emergency (life-safety) power supply

3.14.1 All life-safety systems will be provided with robust power supplies in accordance with BS 8519:2020.

3.14.2 The following fire safety systems shall comply with their respective British Standards regarding secondary power supplies:

- Emergency lighting and signage;

- Automatic fire detection and alarm system;
- Emergency Voice Communication (EVC) system;
- Fire shutter (unless gravity-fed)
- Evacuation lifts

3.14.3 There must be minimal delay in change over if the main power fails and it must occur automatically.

3.14.4 A secondary power supply independent of the primary power supply to the building, such as an automatically started generator or a supply from another substation, shall be provided.

3.14.5 Alternatively, emergency lighting / internally illuminated signage and fire detection and alarm systems may utilise internal batteries to provide back-up power supply where appropriate. These batteries should be capable of a continuous stand-by supply in accordance with the relevant design standard and be fully rechargeable within a period of 24 hours.

4. INTERNAL FIRE SPREAD – LININGS

Building Regulations requirement B2:

"(1) To inhibit the spread of fire within the building, the internal lining shall:

a) Adequately resist the spread of flame over their surfaces; and

b) Have, if ignited, a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.

(2) In this paragraph 'internal linings' mean the materials or products used in lining any partition, wall, ceiling or other internal structure."

4.1 Internal wall and ceiling linings

4.1.1 During the development of a fire in a building, the choice of material for the lining of walls and ceilings can significantly affect the spread of fire and its rate of growth.

4.1.2 Restrictions are placed on the wall and ceiling lining materials within certain areas of buildings to limit the spread of fire and production of smoke in these areas.

4.1.3 It is particularly important that in circulation spaces, where the rapid spread of fire is most likely to prevent occupants from escaping, the surface linings are restricted, by making provision for them to have low rates of heat release and surface spread of flame.

4.1.4 All wall and ceiling linings within the building should meet the recommendations of BS 9999 when tested under the European Classifications (in accordance with BS EN 13501-1 [15]) as summarised in Table 6.

4.1.5 The surface linings of walls and ceilings should generally conform to the classification recommended above for the appropriate location. However, parts of walls in rooms may be of a lower class but not lower than European Class D-s3, d2, provided that the floor area of those parts in any one room does not exceed half of the floor area of the room, subject to a maximum area of 60 m^2.

Table 6 – Surface spread of flame requirements

Location	Euro Class
Small rooms ≤30m^2	D-s3, d2
Circulation spaces	B-s3, d2
Other rooms	C-s3, d2

4.1.6 Any non-plastic rooflights are to meet the recommendations of Table 6.

4.1.7 Where thermoplastic materials are used in the building, these are to comply with the various recommendations provided in Sections 34.1.2 of BS 9999.

5. INTERNAL FIRE SPREAD – STRUCTURES

Building Regulations requirement B3:

"(1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.

(2) A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings. For the purposes of this sub paragraph a house in a terrace and a semi-detached house are each to be treated as a separate building.

(3) Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following:

(a) sub-division of the building with fire resisting construction;

(b) installation of suitable automatic fire suppression systems.

(4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited."

5.1 Automatic fire suppression

5.1.1 Based on the height of the building being less than 30m, an automatic suppression system is not required in accordance with BS 9999. However, in line with DfE requirements in the Technical Annex 2A for multi-storey SEN schools, a sprinkler system will be installed through the premises.

5.1.2 This sprinkler system is conservatively assumed to be for property protection only and therefore any benefits derived from it will not be taken into account.

5.2 Structural fire resistance

5.2.1 The new school building will have a top floor level less than 5m above ground floor level. In accordance with BS 9999, buildings with a B2 risk profile and a top floor height of not more than 5m above ground floor level require a structural fire resistance of 30 minutes.

5.2.2 If a structure with lower fire resistance supports or provides stability to another element of structure, then the protection to the supporting structure should be at least the same as the structure it is supporting.

5.2.3 Where the roof supports an additional load (e.g. plant rooms, air handling units), the relevant structural elements should be fire rated so that evacuation and firefighting operations are not jeopardised.

5.3 Compartmentation and fire-resisting construction

5.3.1 Based on the overall risk profile for the building (i.e. B2), each compartment is limited to an area of 8,000m^2. This has been observed for the three 60-minute compartments provided in the building.

5.3.2 A compartment floor will not be provided in the building. This is a departure from the recommendations in HTM 05-02 however a compartment floor at the first-floor slab level is not deemed necessary due to occupants not remaining in the building indefinitely. Unlike hospital and healthcare buildings, occupants are not required to remain in the building (as would be the case with patients in an operating theatre or patients that are unable to be moved) and therefore can continue their escape to final escape. Furthermore, should there be a fire on the ground floor, occupants are able to move into an adjacent compartment which will be fully separated from a fire below by virtue of the vertical compartmentation provided.

5.3.3 Notwithstanding the above, each compartment wall should run the entire length of the building. Where compartment walls do not align between storeys, the respective portions of the floor should be constructed as compartment floors (see Appendix A for further details). This is to ensure that the 60-minute compartment wall is continuous and cannot be breached between storeys.

5.3.4 Any penetrations through the compartment wall should be suitably fire-stopped for a period of 60 minutes.

5.3.5 Rooms and areas that are considered to present a higher fire risk should be separated from the rest of the building by a minimum of 30 minutes fire resistance. This includes rooms such as Science studios / workshops, kitchens, art rooms, store rooms, and the plant room.

5.3.6 It is proposed that the changing rooms for the hydrotherapy pool are enclosed collectively. This is due to the wet environment that reduced the risk of a fire and to avoid issues with the operation and maintenance of fire dampers within a wet environment.

5.3.7 Storey exits are to be separated by a continuous 30-minute fire resisting line using cross-corridor doors in the circulation spaces to ensure that a single seat of fire doesn't jeopardise multiple storey or final exits.

5.3.8 Protected corridors and lobbies are to be enclosed using 30 minutes fire resisting construction. A protected lobby is to be provided to both evacuation lifts on the first floor

5.3.9 The ground floor kitchen shall be enclosed using 30 minutes fire resisting construction. Where the opening is provided between the kitchen and the main hall, a 30-minute fire shutter should be fitted over the opening. This should be arranged to deploy immediately upon detection of a fire in the kitchen, or alternatively by a fusible link.

5.3.10 The server room is to be enclosed in 120 minutes fire resisting construction in line with DfE requirements (note that 30 minutes fire resistance is sufficient for life safety).

5.3.11 The fire resistance requirements for the new school buildings are summarised in Table 7 overleaf.

5.4 Fire doors

5.4.1 Fire doors should be provided as summarised in Table 8, in accordance with the recommendations of BS 9999.

5.4.2 Doors on escape routes should not be fitted with locks, latch or bolt fastenings or should only be fitted with simple fastenings that can be readily operated (without the use of a key) from the side approached by occupants making an escape.

5.4.3 Where doors on escape routes need to be secured against unauthorised use by electrically powered access control measures when the building or part of the building is occupied, it should also be overridden from the side approached by occupants making an escape. Electrically powered doors should return to the unlocked position;

- on operation of the detection and alarm system; and
- on loss of power or system error

5.4.4 Manual door release units (Type A) should be designed to BS EN 54-11 and should be positioned at side of the door that is approached by people making their escape. Where the door provides escape in either direction, a unit should be installed on both sides of the door.

Table 7 – Periods of fire resistance for fire-separating elements (in minutes)

Part of Building	Minimum Fire Resistance rating when tested to the relevant part of BS 476 (mins)			Methods of Exposure
	Loadbearing	Integrity	Insulation	
Structural elements	30	n/a	n/a	Exposed Faces
Compartment wall	60	60	60	Each side separately
Compartment floor (where applicable)	60	60	60	From the underside
Lift shafts	30	30	30	Each side separately
External walls				
Any part more than 1,000 mm from the relevant boundary [A)]	30	30	15	From the inside
Any part adjacent to an external escape route or stair	30	30	n/a	From the inside
Protected lobbies / corridors	30	30	30	Each side separately
Science studio / art and design / food room / kitchen	30	30	30	Each side separately
Distribution boards / plant rooms / chemical store	60	60	60	Each side separately
Cavity barriers	n/a	30	15	Each side separately

Notes:

A) As required by Section 5.3 to resist external fire spread to neighbouring buildings

Table 8 - Fire doors

Position of Door	Tested to BS 476-22 [6]	Tested to BS EN1634-2 [16]
Enclosing ancillary accommodation	As per the wall it is fitted in	As per the wall it is fitted in
Enclosing a protected stair	FD 30S	E 30S$_a$
Enclosing a riser	FD 30	E 30
Enclosing a protected corridor	FD30S	E 30S$_a$
Cross-corridor doors	FD 30S	E 30S$_a$

Notes:

The ratings shown above are for integrity only.

Smoke seals are indicated by the suffix 'S' (to BS 476-31 [17]) or Sa (to BS EN 1634-3 [18]) and are required in all doors which form the enclosure to protected escape routes.

All fire doors should be self-closing except for doors which are normally locked shut, such as to places of special fire hazard or service risers, which should also be provided with appropriate signage.

5.5 Fire-stopping and penetrations through fire-resisting construction

5.5.1 Fire-stopping should be provided at the junction of fire-separating walls and external walls in order to maintain the fire resistance period of fire-separating walls, and thereby prevent a fire from travelling around the junction and into the neighbouring space. Penetrations through lines of fire-resisting separation should be fire-stopped using a system which will achieve the same fire resistance rating as the penetrated wall or floor.

5.5.2 In order to maintain the fire resistance of separating construction, any pipe or cable penetrations through lines of fire-resisting separation should be fire-stopped in accordance with one of the following methods set out by BS 9999, unless located within a protected shaft.

- for pipes of any diameter, a proprietary seal which has been shown by test to meet the fire-resistance rating of the wall, floor, or cavity barrier for the penetration circumstance; or
- for pipes with a restricted diameter, keeping the opening as small as possible and providing fire-stopping around the pipe. The nominal interior diameter of the pipe should not be more than the relevant dimensions given in Table 31 of BS 9999.

5.5.3 Any gas supply pipe through a protected stair will be of a screwed-steel or all-welded steel construction, installed in accordance with the "Pipelines Safety Regulations 1996, SI 1996 No 825" and the "Gas Safety (Installation and use) Regulations 1998. SI 1998 No 2451".

5.5.4 Where a duct crosses fire-resisting construction protecting escape routes, dampers on fusible links are not sufficient. Either combined fire-and-smoke dampers activated upon smoke detection (ES-type dampers) are provided, or the duct should be fire-resisting / enclosed within fire-resisting construction.

5.5.5 Any gas supply pipe through a protected stair will be of a screwed-steel or all-welded steel construction, installed in accordance with the "Pipelines Safety Regulations 1996, SI 1996 No 825" and the "Gas Safety (Installation and use) Regulations 1998. SI 1998 No 2451".

5.5.6 Any extraction ductwork serving the kitchen is recommended to avoid passing through fire-resisting construction where possible. If this cannot be avoided, then the ductwork should not be fitted with dampers, and should instead be fire-resisting or be enclosed within fire-resisting construction. Access hatches will be required at least every 3 m within kitchen extraction ductwork to assist with cleaning to prevent the accumulation of flammable grease within the duct.

Table 9 - Maximum diameter of pipes

Situation	Pipe material and maximum internal diameter		
	Non-combustible material (1)	Lead, Aluminium, Aluminium Alloy, uPVC (2), Fibre Cement	Any other material
Structure enclosing a protected shaft which is not a stairway or lift shaft	160 mm	110 mm	40 mm
Any other situation	160 mm	40 mm	40 mm

Notes:

1) Any non-combustible material which, if exposed to a temperature of 800° C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.
2) uPVC pipes conforming to BS 4514 and uPVC pipes conforming to BS 5255.

5.6 Cavity barriers and concealed spaces

5.6.1 All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). In general, cavity barriers should be at 20 m centres in cavities with exclusively Class C-s3, d2 linings or better (European Classification) or Class 0 or 1 linings (National Classification). For other linings, the spacing between cavity barriers should be reduced to 10 m.

5.6.2 Cavity barriers provided around openings within the external wall may be formed of:

- steel at least 0.5mm thick or timber at least 38mm thick; or
- polythene-sleeved mineral wool, or mineral wool slab under compression when installed cavity; or
- calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

5.6.3 Likely areas which may feature new extensive concealed cavities include within cavity walls forming facades, and above any suspended ceiling provided in the kitchen area.

5.7 Protection of ductwork

5.7.1 One of the following methods is to be implemented where a ventilation duct passes through a fire resisting element to maintain the integrity of the element being breached:

- Protection using fire and smoke dampers activated upon smoke detection (ES-type dampers). It should be noted that fire dampers only are not suitable to protected escape routes;
- Protection using fire-resisting enclosure achieving the fire resistance rating equivalent to the highest rated compartmentation it penetrates;
- Protection using fire-resisting ductworks achieving the fire resistance rating equivalent to the highest rated compartmentation it penetrates.

5.7.2 If dampers are the preferred form of ductwork protection, smoke detector operated fire and smoke dampers shall be provided where the ductwork crosses fire-separated or smoke-separated sections of escape routes. Such dampers should be tested in accordance with BS EN 1366-2 and an ES classification equal to or greater than 30/60 minutes in accordance with BS 13501-3.

5.7.3 The fire resistance of duct and dampers should be equal to the fire-resistance required for the element being penetrated. All ducts should be fire-stopped where they penetrate compartments and fire-resisting enclosure of escape routes.

5.7.4 Any extraction ductwork serving the kitchen is recommended to avoid passing through fire-resisting construction where possible. If this cannot be avoided, then the ductwork should not be fitted with dampers, and should instead be fire-resisting or be enclosed within fire-resisting construction. Access hatches will be required at least every 3 m within kitchen extraction ductwork to assist with cleaning to prevent the accumulation of flammable grease within the duct.

5.8 Cavity barriers and concealed spaces

5.8.1 Cavity barriers are provided in order to prevent the rapid spread of unseen fire or smoke in voids, and to prevent the spread of fire around compartmentation via voids. Extensive internal concealed cavities (e.g. roof voids or the void between suspended ceilings and the soffit of the floor above) generally require cavity barriers to sub-divide them, as illustrated in Figure 6.

5.8.2 All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). In general, cavity barriers should be at 20 m centres in cavities with exclusively Class C-s3, d2 linings or better. For other linings, the spacing between cavity barriers should be reduced to 10 m.

5.8.3 Cavity barriers provided around openings within the external wall may be formed of:

- steel at least 0.5mm thick or timber at least 38mm thick; or
- polythene-sleeved mineral wool, or mineral wool slab under compression when installed cavity; or
- calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

5.8.4 Likely areas which may feature extensive concealed cavities include within the facade, and above any suspended ceiling provided in the main hall or other open areas.

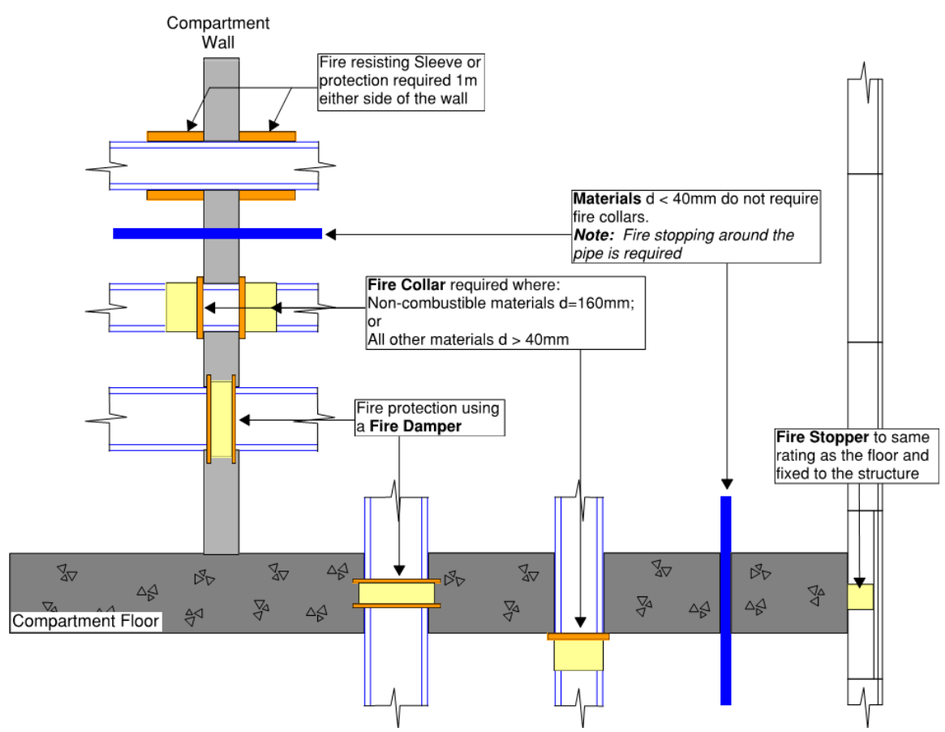


Figure 5 – Fire-stopping expectations

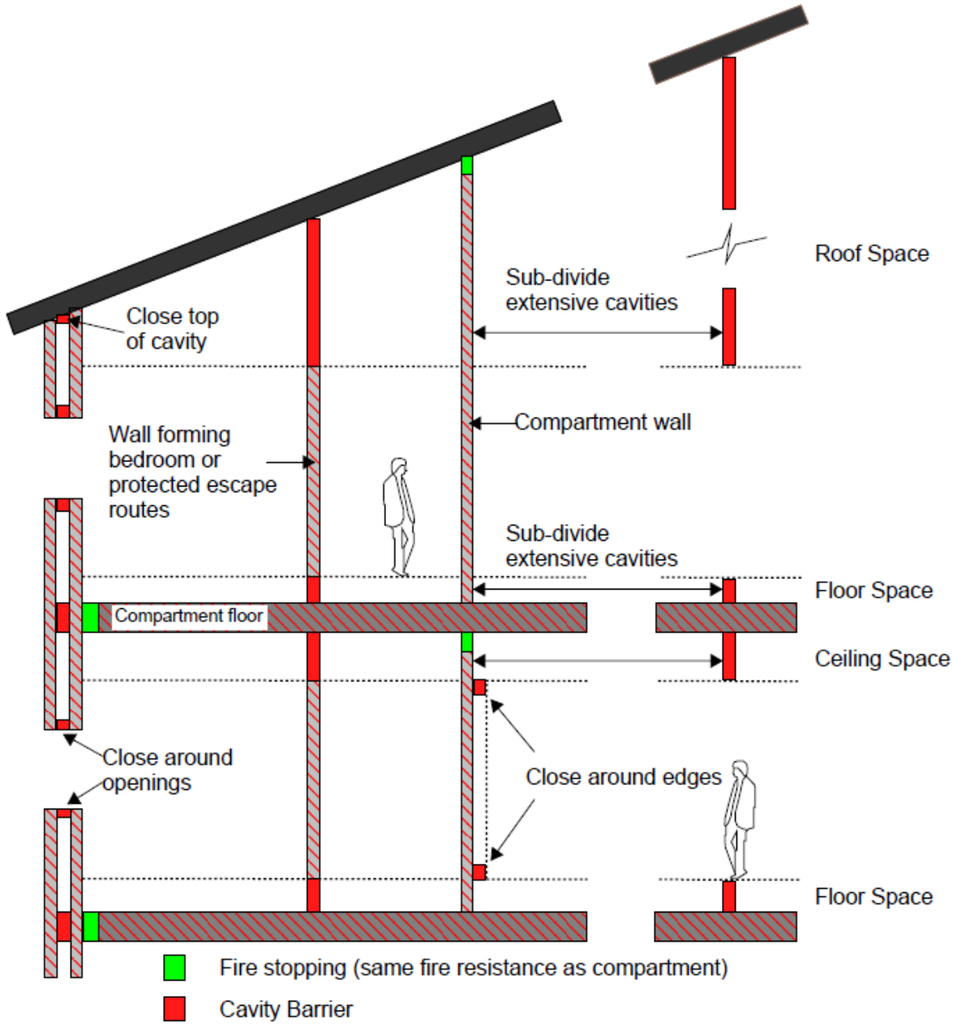


Figure 6 - Cavity barrier and fire-stopping locations

6. EXTERNAL FIRE SPREAD

Building Regulations requirement B4:

"(1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.

(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building."

6.1 External wall construction

6.1.1 In order to prevent the spread of flame across the surface of a building at a speed which may pose a threat to life, materials forming the external cladding to buildings are meet the performance criteria given in BR 135 [19] for cladding systems using full scale test data from BS 8414-1 or BS 8414-2, or should meet the following recommendations:

- External surface of wall should be in accordance with 6.1.2;
- Cavity barriers in accordance with section 5.6;
- For walls which are not subject to the maximum cavity barrier spacing (by virtue of their masonry construction), the surfaces of materials which face into cavities should also meet the provisions set in 6.1.2.

6.1.2 Given the building has a top floor height of less than 18m above ground level, for facades less than 1 m from the adjacent boundary, the linings should conform to the following surface spread of flame classifications or better:

- Class B-s3, d2 or better (Europeans standards); or
- profiled or flat steel sheet at least 0.5 mm thick with an organic coating of no more than 0.2mm thickness is also acceptable.

6.1.3 For facades greater than 1 m from the adjacent boundary, no performance criteria are specified..

6.1.4 For buildings less than 18 m in height, insulation or filler materials in the external wall are permitted to be combustible, provided that the external façade does not actively promote fire spread and meets the remainder of the recommendations for the external façade construction and materials.

6.2 Roof coverings

6.2.1 Roof coverings are recommended to be resistant to fire spread where either close enough to a boundary to be at risk of ignition from a fire in other buildings or where needed to avoid fire spread between compartments via the roof covering.

6.2.2 The relevant test and classification standards for the external fire performance of roof systems is BS EN 13501-5 [20] (European Class).

6.2.3 Roof coverings refer to a construction that can consist of one or more layers of material but does not refer to the roof structure as a whole.

6.2.4 Should photovoltaic panels provided on the roofs, these should either also be in accordance with these recommendations or should meet suitable alternative guidance. **Error! Reference source not found.**Table 10 summarises the separation distances from the boundary according to the type of roof coverings as described in Section 35.4 of BS 9999.

Table 10 - Limitations of roof coverings

Distance from relevant boundary	B_{ROOF}(t4)	C_{ROOF}(t4)	D_{ROOF}(t4)
Less than 6 m	✓	×	×
At least 6 m	✓	✓	×
At least 20 m	✓	✓	✓

6.3 Space separation and unprotected areas of the façade

6.3.1 Should a fire occur in a building, heat will radiate through non-fire resisting openings in the external walls. This heat can be enough to set fire to nearby buildings. In order to reduce the chance of this occurring, the Building Regulations place limits on the area of the external elevation with no fire resistance, known as the unprotected area.

6.3.2 The relevant boundaries are the reference point at which the potential for fire spread, being:

- the site boundary;
- a notional boundary created on the centreline of an adjacent carriage way;
- a notional boundary created midway between the adjacent buildings across the site boundary; or
- a notional boundary created midway between adjacent buildings.

6.3.3 A common radiation intensity of 84 kW/m^2 has been applied to the building as recommended in BR 187 [21]. The benefits derived from a fully operational sprinkler system in the building are not considered as a sprinkler system will not be installed in the building.

6.3.4 Considering the guidance of the BR 187, the size of the emitter will correspond to the width and height of each elevation and analysis of the results will be dependent on the relevant boundaries for the building as noted above. The height of the emitter will be taken to the top of the parapet which is measured to be circa 9.2m.

6.3.5 The dimensions of the emitter will correspond to the height and width of each emitter. Walls between compartment walls are to be constructed as full height compartment walls. However, this protection may be omitted from the courtyard where the compartments do not directly interface. Where the distance from the elevation to the site boundary is within 1m, the entire façade is to be fully protected.

6.3.6 The external fire spread analysis is carried out overleaf for each compartment.

Table 11 - External fire spread assessment for Compartment 1

Elevation	Enclosing rectangle [m]		Radiation intensity [kW/m^2]	Boundary distance (m)	Permitted unprotected area (% / m^2)
	W	H			
1	20.2	9.2	84	4.3	37% / 69m^2
2	25.5	9.2	84	<1	0% / 0m^2
3	9.9	9.2	84	<1	0% / 0m^2
4	52.0	9.2	84	<1	0% / 0m^2

Table 12 - External fire spread assessment for Compartment 2

Elevation	Enclosing rectangle [m]		Radiation intensity [kW/m^2]	Boundary distance (m)	Permitted unprotected area (% / m^2)
	W	H			
1	25.4	9.2	84	2.2	21% / 49m^2
2	60.7	9.2	84	<1	0% / 0m^2
3	17.1	9.2	84	<1	0% / 0m^2
4	44.3	9.2	84	<1	0% / 0m^2

Table 13 - External fire spread assessment for Compartment 3

Elevation	Enclosing rectangle [m]		Radiation intensity [kW/m^2]	Boundary distance (m)	Permitted unprotected area (% / m^2)
	W	H			
1	46.2	9.2	84	<1	0% / 0m^2
2	28.4	9.2	84	11.5	100% / 261m^2
3	46.2	9.2	84	<1	0% / 0m^2
4	43.8	9.2	84	<1	0% / 0m^2

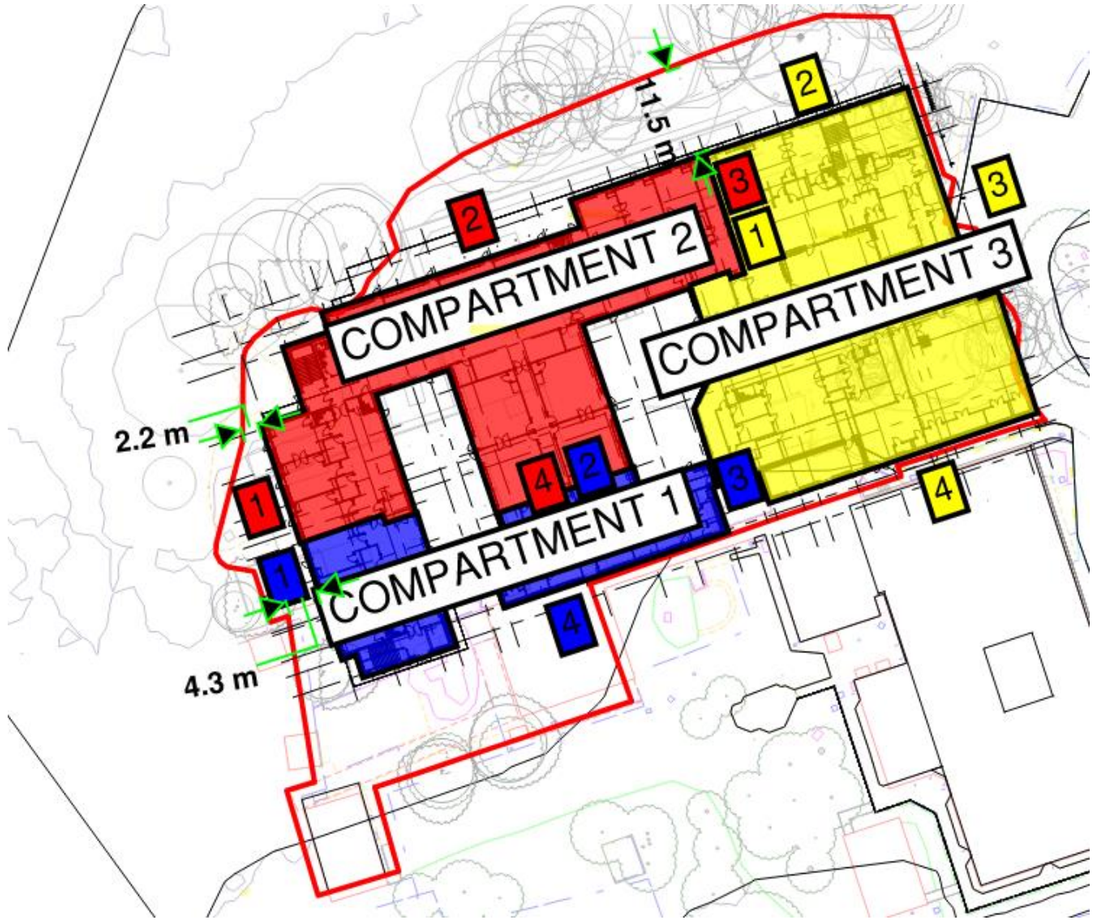


Figure 7 - Overview of external fire spread elevations

7. ACCESS AND FACILITIES FOR THE FIRE AND RESCUE SERVICE

Building Regulations requirement B5:

"(1) The building shall be designed and constructed so as to provide reasonable facilities to assist fire fighters in the protection of life.

(2) Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building."

7.1 Means of notifying the fire and rescue service

7.1.1 In the event of fire, the fire and rescue service (FRS) will be notified by a member of staff. The fire and rescue service will be met by a member of staff when they arrive on site.

7.2 Water supplies

7.2.1 Hydrants will be required in the building on site to support firefighting operations. The location of active fire hydrants local to the building should be investigated on-site and confirmed with the local fire service.

7.2.2 BS 9999 recommends that where a building is located so that entry points and dry riser inlets are within 90 m of an existing hydrant, this is sufficient without further hydrant provision.

7.2.3 Hydrants should be designed and installed in accordance with BS 9990 and should be capable of achieving a flow rate of 1500 litres/minute. In addition to this, all hydrants should have signage in accordance with BS 3251.

7.3 Vehicle access to and around the site

7.3.1 The building will have a top storey height of less than 11m above ground floor level, and a gross internal floor area of less than 8,000m^2. As such, BS 9999 recommends that access to up to 15% of the building perimeter should be provided for the fire service. Entry doors into the school should be provided along the portion of the elevation that is designated for perimeter access.

7.3.2 The maximum reversing distance for fire service vehicles is 20m. Should this be exceeded then suitable turning facilities are to be provided.

7.3.3 The access routes for the fire service vehicle should meet the values noted in Table 11. It should be noted that a typical carrying capacity is presented in the table and the final loadbearing capacity for new roads should be confirmed by the local fire and rescue service.

7.4 Access into and through the building

7.4.1 Both storeys of the building have been assigned an A2 risk profile and have a top floor height of less than 7.5m above ground. As such, a fire main or firefighting shaft is not required for the buildings where sufficient perimeter access is provided.

7.4.2 Within the building, access to the ground floor is provided via multiple doors in the building façade, and access to the upper floor provided by access directly into the stairs. In each case, access into the building will be by doors with a minimum width of 750mm.

Table 14 - Typical pump-type firefighting appliance access requirements

Minimum access route specification	Dimension
Width between kerbs	3.7 m
Width between gateways	3.1 m
Turning circle between kerbs	16.8 m
Turning circle between walls	19.2 m
Clearance height	3.7 m
Carrying capacity	14.0 tonnes

8. FIRE SAFETY MANAGEMENT

8.1 Overview

8.1.1 Management procedures have a pivotal role to play in fire prevention, control and evacuation of occupants should a fire incident occur. This management is the responsibility of the responsible person, supported by the building fire safety design and handover of fire safety information. In all other areas, the Regulatory Reform (Fire Safety) Order 2005 (FSO) places legal obligations on management.

8.1.2 This section is intended to introduce the FSO, its obligations and provide initial guidance in fulfilling these duties. It is the responsibility of the landlords/ building management to ensure that all fire safety systems are tested and maintained to ensure their continuous effectiveness. Building management need to be aware of all fire safety features provided and their purpose.

8.1.3 It is important that management are aware of their responsibilities detailed in this document and agree that they are sufficiently capable of adequately performing them. Effective arrangements should be put in place to manage all aspects of fire safety in the premises and the details of those arrangements need to be recorded, e.g. within a fire safety management plan.

8.1.4 In accordance with BS 9999:2017, there are two management system levels. One of which should be implemented and are summarised in Table 15.

Table 15 – Management levels

Level	Management	Robustness	Minimum assurance	Conformity
1	Enhanced	Best Practice	High level of assurance	Conformity with a management level such as BS 9997:2019
2	Adequate	Good Practice	Adequate level of assurance	Conformity with requirements of legislation

8.2 Regulatory Reform (Fire Safety) Order 2005

8.2.1 The Fire Safety Order came into effect in October 2006 and replaced over 70 pieces of fire safety law. The Order applies to all non-domestic premises in England and Wales, including the common parts of blocks of flats or houses in multiple occupation. The Order removed the legal status of fire certificates, which are no longer enforceable by the Fire Authorities. The 'responsible person' has a duty to make the premises safe and must undertake regular fire risk assessments. It is the responsible person who will be held accountable under the new legislation for any breaches in fire safety. It is expected that the building is managed and maintained to a standard in accordance with the expectations of the FSO.

8.2.2 In workplaces, the responsible person is the employer. In other cases, the owner or person in control of the premises is the responsible person, e.g. building management company, headteacher.

8.2.3 Under the Order, the 'responsible person' must carry out a fire safety risk assessment and implement and maintain a fire management plan. The assessment should be kept under regular review and reassessed if the use of the building has been varied or a material alteration has been made. The significant findings must then be recorded, along with the measures taken to address the risks identified. A competent person should carry out the fire risk assessment.

8.3 Management responsibilities in support of the fire strategy

8.3.1 Management of fire safety must be integrated with all other management systems. If this management is lacking, then there is a danger that all the other areas such as security measures and alarm systems will be ineffective. To ensure there is no doubt as to where the responsibility for fire safety rests, and to enable consistency of approach, it is important that each establishment appoints a designated Fire Safety Manager. It may be possible to appoint a professional to take on this role but that will depend on the size of the premises, costs, etc.

8.3.2 The appointed person should have the necessary authority and powers of sanction to ensure that standards of fire safety are maintained. The main duties of the Fire Safety Manager include:

- management to minimise the incidence of fire; e.g. good housekeeping and security;
- producing an Emergency Fire Plan;
- being aware of all of the fire safety features provided and their purpose;
- being aware of any particular risks on the premises (e.g. issues relating to hot work);
- being aware of their responsibilities towards disabled people;
- attendance at the premises when members of the public are present, or the building is occupied. It is acceptable for a competent person other than the fire safety manager to be in attendance, provided that this person has been delegated in writing and that cover is not interrupted;
- liaising with, and where necessary seek the advice of, the fire authority, the licensing authority and other relevant enforcing authorities;
- having powers to deal with individuals who sabotage or tamper with safety systems, who ignore any smoking policy or who block exits;
- liaising with other fire safety managers in a multi-occupancy arrangement;
- ensuring that tenants, concessionaires and caretakers are appropriately briefed;
- ensuring that appropriate communication systems are in place to deal with any fire incident;
- checking the adequacy of fire-fighting equipment and ensuring its regular maintenance;
- ensuring fire escape routes and fire exits are unobstructed and doors operate correctly;
- ensuring that fire detection and protection systems are maintained, tested, with records kept; and
- ensuring any close down procedures are followed.

8.3.3 Good housekeeping is to ensure that the effectiveness of the fire safety provisions are not adversely affected, including the adequate provision for the disposal of waste and / or rubbish. Maintenance procedures are to be enacted so that equipment will able to operate effectively. Maintenance staff will are to be trained in the importance of the fire safety systems and planned maintenance.

8.3.4 Suitable assembly points outside the building should be identified. These should be remote from the access routes used by the FRS.

8.3.5 Internal escape routes should generally have wall and ceiling linings achieving a Class 0 surface spread of flame standard, apart from permitted exceptions noted in this report. These finishes must be maintained for the life of the building. Display features or items such as posters, artwork pieces, etc. may be included with appropriate consideration, justification and on-going control.

APPENDIX A – FIRE STRATEGY MARK-UPS

Notes:

General comment: Fire door symbols to also be shown (differentiating between smoke sealed and non-smoke sealed doors)

30 mins protection does not need to extend past the store room

Store room should be fully enclosed in 30 mins fire resistance

Please extend 30 mins fire resistance line as shown

30 minute protection to the stair should be extended by a further 1.8m

General comment: All risers should be enclosed in 30 mins (upgraded to 60 mins for electrical risers)

Please extend 30 mins fire resistance line to the external elevation

30 mins protection does not need to extend past the store room

Store room should be fully enclosed in 30 mins fire resistance

Store room should be fully separated from the stair by 30 mins fire resistance (including on the underside of the stair)

30 minute protection to the stair should be extended by a further 1.8m

Dead-end should be enclosed in 30 mins as shown in blue

Dead-end should be enclosed in 30 mins as shown in blue

General comment: All risers should be enclosed in 30 mins (upgraded to 60 mins for electrical risers)

Store room should be fully enclosed in 30 mins fire resistance

Please confirm what sort of equipment/processes will take place within this lab

Please remove 60 mins compartment line clouded in red and provide new 60 mins and 30 mins lines shown (below the lift).

Entire changing room enclosure should be enclosed in 30 mins as shown in blue

KEY

- Fire Curtain to provide 30 mins fire resistance
- 30 mins fire resistance
- Wall lining to provide 30 mins fire resistance against break-out from hazard room
- 60 mins fire resistance
- Travel Distance (if required to be shown on plans)
- Fire Exit

FD: Fire door, 30, 60, 120 mins etc
SS: Smoke seals required
KL: Keep locked shut
Fire Alarm Call Point at Each Exit
30 mins re-entrant corner
Running man Fire Exit Sign

Note:
All elements on a line of fire integrity will need to be constructed / fire stopped to at least the mins shown. All penetrations through these elements will also need to be treated in the same way (ie: stopping around penetrations).

Note:
Fire Cavity Barriers to be applied around all structural openings.

Amendments

No.	Description	Date	Issued by
1	Draft ITT Issue	2022 09 09	MR

Use figured dimensions only. All levels and dimensions to be checked on site. This drawing is to be read in conjunction with all other relevant drawings and specifications.

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Project Name:
Pinn River SEND School LB Hillingdon

Dwg Reference
Fire Strategy Plan - Ground Floor

Drawn: MR Checked: RG
Scale: 1 : 100 @ A0 Project Issue Date: September 2022

Project:	Originator:	Volume:	Level:	Type:	Role:	Number:
FS0728	NOV	V1	00	DR	A	14000

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Revision: P 1 — Revison Description: ITT SUBMISSION — Noviun Job No: Z0575

Notes:

General comment: Fire door symbols to also be shown (differentiating between smoke sealed and non-smoke sealed doors)

30 minute protection to the stair should be extended by a further 1.8m

Please extend 30 mins fire resistance line as shown

General comment: All risers should be enclosed in 30 mins (upgraded to 60 mins for electrical risers)

General comment: All risers should be enclosed in 30 mins (upgraded to 60 mins for electrical risers)

30 mins protection required across the door to complete dead-end protection

Rooms should be enclosed in 30 mins

Store room should be fully enclosed in 30 mins and extend 30 mins cross-corridor line to the external wall

Where horizontal compartment line doesn't align with the floor above, a section of the floor will need to be a 60 minute compartment floor to ensure that 60 mins separation is continuous across both storeys

Please amend fire rated lines as shown in the clouded region

30 mins protection does not need to extend past the store room

120 min rating to server room should supersede lesser fire rated lines

Where horizontal compartment line doesn't align with the floor above, a section of the floor will need to be a 60 minute compartment floor to ensure that 60 mins separation is continuous across both storeys

Stair should be fully enclosed in 30 mins fire resistance (and continue to the lift lobby)

KEY

- Fire Curtain to provide 30 mins fire resistance
- 30 mins fire resistance
- Wall lining to provide 30 mins fire resistance against break-out from hazard room
- 60 mins fire resistance
- Travel Distance (if required to be shown on plans)
- Fire Exit

FD: Fire door, 30, 60, 120 mins etc
SS: Smoke seals required
KL: Keep locked shut
Fire Alarm Call Point at Each Exit
30 mins re-entrant corner
Running man Fire Exit Sign

Note:
All elements on a line of fire integrity will need to be constructed / fire stopped to at least the mins shown. All penetrations through these elements will also need to be treated in the same way (ie: stopping around penetrations).

Note:
Fire Cavity Barriers to be applied around all structural openings.

Amendments

No.	Description	Date	Issued by
1	Draft ITT Issue	2022-09-09	MR

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Project Name:
Pinn River SEND School LB Hillingdon

Dwg Reference:
Fire Strategy Plan - First Floor

Drawn: Author Checked: Checker
Scale: 1 : 100 @ A0 Project Issue Date: September 2022

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FS0728	- NOV -	V1	- 01 -	DR	- A -	14001

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Orig Paper Size: A0
Revision: P 1 Revision Description: ITT SUBMISSION
Noviun Job No: Z0575

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