



Broadwater Farm Fire Strategy Report

Townhouses RIBA Stage 4

Issuing consultant: Alex Manning Issue: 01 Date: 10/02/2026

Project No: 250911 Document No: MZ-250911-02-FSS-02-ISS01

Executive Summary

No.	Fire Safety Measure	Performance Standard
1	Evacuation Philosophy	As the buildings in question are individual dwellinghouses, each house will be individually alerted and evacuated.
2	Fire Detection system	In accordance with the requirements in BS 9991 for dwellinghouses, a Grade D2 category LD2 detection system shall be provided to the houses in accordance with the guidance in BS 5839-6 to provide early notification of a fire to occupants. The non-residential aspects of the development will be provided with a Category L2 fire detection and alarm system designed and installed in accordance with BS 5839-1.
3	Audible Alarm system	Audible warning will be provided to the development using sounders in accordance with BS 5839-6 for the residential areas and BS 5839-1 for non-residential areas.
4	Back-up Power Supply	Where such systems are required, power and control cables should be installed in accordance with BS 8519:2020.
5	Internal Fire Spread (Linings)	All internal linings shall limit the surface spread of flame when tested under the European classifications in accordance with BS EN 13501: Part 1.
6	Sprinkler System	Sprinkler protection will be provided in accordance with BS 9251 and will be designed to meet the sprinkler hazard classification requirements of a minimum Category 1 system.
7	Loadbearing Elements of Structure	For the two-storey houses, 30 minutes fire resistance will be applied to the structure. For the three-storey shouses, 60 minutes fire resistance will be applied to the structure.
8	External Fire Spread	Given the level of compartmentation for residential units, the provision of sprinklers and the available distance to relevant boundary, the permitted unprotected area is 100%.
9	Fire Service Access	Vehicle access will be provided to within 90m hose distance of the two-storey houses, and 75m of the three-storey houses.
10	Private Fire Hydrants	Existing hydrants are located within 100m of each dry rising main inlet.
11	Emergency Lighting and Exit Signage	Emergency lighting should be in accordance with BS 5266-1. Emergency lighting must be automatic and provide a minimum of 1-hour illumination. Exit signage is not required in dwellinghouses.
12	Portable Fire Extinguishers	Portable fire extinguishers are not required in dwellinghouses.
13	Smoke Management Systems	Stair ventilation is not required in dwellinghouses.

The development is considered to comply with the Codes and Standards as listed within this document, provided that the recommendations within this report are adopted and the deviations from the prescriptive code requirements as listed below are accepted by the Authority having Jurisdiction (AHJ). Note: The deviations from the prescriptive code requirements have been discussed with the Design Team. However, should the prescriptive code deviations not be accepted by the AHJ, then the proposed design will need to be revised to ensure prescriptive code compliance can be achieved.

Quality Management

Issue	Date	Reason for Issue	Prepared by	Reviewed by
01	10/02/2026	First issue	 Alex Manning Associate	 Andrew Martyn Associate

Validity

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

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1. Introduction

1.1 Client and Project

Maze Fire Consulting Limited (referenced throughout This Report as 'Maze Fire') has been appointed by Formation Design & Build as a specialist fire and life safety consultant for the design of the Broadwater Farm development in London.

The ultimate client is London Borough of Haringey: 5th floor, Alexandra House, 10, Station Road, London N22 7TR.

1.2 Project Address

The development is located in the land adjacent to the junction of Gloucester Road and Willen Road junction, London, N17, UK.

1.3 Project Description

The project is understood to entail building work constituting a 'new build' development.

The Broadwater Farm Townhouses development consists of the following (see Figure 1):

- 14 three-storey dwellinghouses in a connected terrace
- 3 two-storey dwellinghouses in a connected terrace

1.4 Description of Work

This fire safety strategy (hereby referenced as 'This Report') covers the fire safety design of the entirety of the scheme described herein.

This Report presents a performance specification of the fire safety measures provided in the design in order to satisfy the fire regulations. For the purposes of This Report, the fire safety objectives are for the design to meet the regulatory requirements described in Section 1.8.

1.5 Authority Having Jurisdiction

The Authority Having Jurisdiction (AHJ) is an organisation, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

The authority having jurisdiction for the project will be Building Safety Regulator.

1.6 Stage of Project

The project follows the RIBA Plan of Work to coordinate the overall brief, design, construction and operation of the building.

This Report has been based on the design information provided by others, as described in Section 1.8.8. The project is currently at RIBA Stage 4 and This Report represents a fire safety strategy to a 'Technical Design' stage of works.

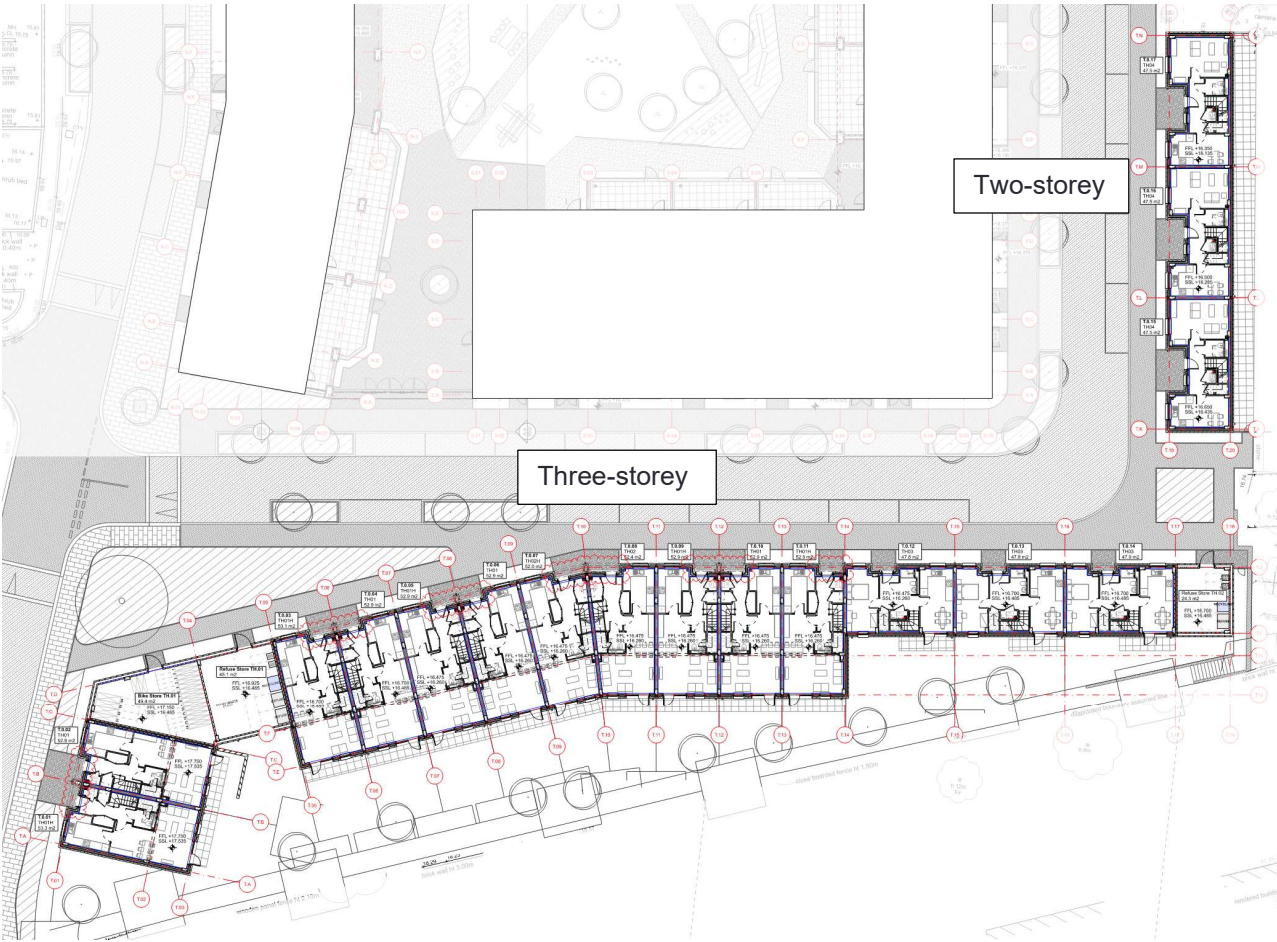


Figure 1: Site Layout

1.7 Limits of Report

It is important to note that This Report does not represent a detailed design or specification of all aspects of a building; it is a series of recommendations that others may consider and relate to the scheme. The information contained herein constitutes a performance specification and therefore does not address detailed aspects of design, such as system design (active or passive) nor construction details.

This Report has been developed with reference to statutory guidance documents and their impact on the strategic aims of the Fire Strategy. This Report will reference relevant design standards however it is not practical to reproduce all details contained within those documents.

Where a detailed design has to be developed by others, on the basis of this performance specification, it would be appropriate for the reader to refer to, and read in conjunction with, those documents referenced in This Report.

Any diagrams incorporated into This Report are illustrative and intended to further convey specific aspects of the fire safety strategy only. Diagrams are not a substitute for the architectural general arrangement, fire strategy drawings or the detailed systems drawings and specifications, which should be referred to in conjunction with This Report.

This Report is primarily concerned with life safety. Property protection is not specifically considered although the fire safety provisions described herein will offer some inherent degree of property protection by nature. Unless otherwise specified, the information herein does not specifically address:

- Insurance requirements
- Property protection or loss of operation
- Fire safety during construction

- Detailed management procedures or duties under the Regulatory Reform (Fire Safety) Order (RRO).

It is noted that This Report addresses so far as necessary, the evacuation of persons with restricted mobility. This Report however does not address the requirements of any specific accessibility issues (outside of those directly related to means of escape) and separate advice should be sought from others on this topic accordingly.

While arson as a single point of ignition will be incorporated in the analysis, simultaneously multiple ignition sources, use of accelerants, sabotage of fire protection systems or terrorism are not included as part of This Report scope.

It should however be noted, as is advised, that when requested to develop alternative fire safety design solutions for the project, fire and smoke damage may vary when compared to a building design that wholly complies with the prescriptive guidance.

It is recommended that the building owners or occupiers liaise with their relevant insurers as to the fire safety design contained herein.

This Report has been developed for RIBA Stage 4 and represents a fire safety strategy to a 'Technical Design' stage of works. It is limited to the scope of works as defined for RIBA Stage 4 in our fee proposal dated 21/08/2025.

1.8 Regulatory Framework

1.8.1 General

The following legislation has been considered in the preparation of this fire safety strategy.

- The Building Regulations 2010 (including amendments issued prior to This Report)
- The Building Safety Act 2022
- The Regulatory Reform (Fire Safety Order) 2005
- The Construction (Design and Management) Regulations 2015

1.8.2 The Building Regulations

The building will be subject to the Building Regulations 2010 (hereafter stated as 'The Regulations') and will therefore need to comply with the requirements of Schedule 1 Part B of The Regulations relating to, the following areas.

- 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 Service.

The Ministry of Housing, Communities and Local Government (MHCLG) – formerly called the Department for Levelling Up, Housing and Communities (DLUHC) between September 2021 and 8th July 2024 reverting to MHCLG on that latter date – have produced a number of guidance documents to assist designers in meeting the relevant requirements of The Regulations; these 'Approved Documents' provide guidance on different aspects of The Regulations.

Approved Document B – Volumes 1 and 2 (referred to as ADB) provide design guidance on ways in which the fire safety functional requirements of The Regulations can be satisfied. However, these documents are intended to provide guidance on the more common building situations and there is no obligation to adopt any particular solution contained within an Approved Document if the relevant requirement can be met in some other way for example by using the following, as applicable:

- the guidance contained within British Standard 9999 Fire Safety in the design management and use of buildings – Code of practice (BS 9999) and / or

- British Standard 9991 Fire safety in the design, management and use of residential buildings. Code of practice (BS 9991).

1.8.3 Regulation 38

Regulation 38 of the Building Regulations states that, where building work involves the erection or extension of a relevant building or relevant change of use of a building which affects fire safety, it is necessary that the fire safety information for the building shall be given to the Responsible Person at the completion of the project or when the building or extension is first occupied. This is to be provided to the Responsible Person by the person carrying out the work.

This information will facilitate the production of the fire risk assessment which is a requirement of the Regulatory Reform (Fire Safety) Order, outlined below. The list of information considered in the preparation of this report should be provided with this report as detailed in Section 1.8.8.

The fire safety information in this fire safety strategy may be used to supplement the information required to be given to the responsible person. As a minimum it will be necessary for the occupier of the building to be given this fire safety strategy and all 'as built' fire strategy plans.

The level of detail provided in the fire safety information should also align with the 'Essential Information' outlined in Sections 17.3 and 17.4 of Approved Document B Volume 1 (2019, as amended 2020 and 2022) – as relevant to this building as follows:

- An as-built plan of the building should be provided showing all of the following.
 - Escape routes – this should include exit capacity (i.e. the maximum allowable number of people for each storey and for the building). (note – for this building the primary evacuation policy is 'stay-put' and the exit capacities are more than sufficient for the envisaged occupancy in all areas, as set out elsewhere in this strategy)
 - Location of fire-separating elements (including cavity barriers in walk-in spaces).
 - Fire doorsets, fire doorsets fitted with a self-closing device and other doors equipped with relevant hardware.
 - Locations of fire and/or smoke detector heads, alarm call points, detection/alarm control boxes, alarm sounders, fire safety signage, emergency lighting, fire extinguishers, dry fire mains and other firefighting equipment, and hydrants outside the building.
 - Any sprinkler systems, including isolating valves and control equipment.
 - Any smoke control systems, or ventilation systems with a smoke control function, including mode of operation and control systems.
 - Any high-risk areas
- Details should be provided of all of the following.
 - Specifications of fire safety equipment provided, including routine maintenance schedules.
 - Any assumptions regarding the management of the building in the design of the fire safety arrangements.
 - Any provision enabling the evacuation of disabled people (including the location and mode of operation of evacuation lifts)

Additional information for complex buildings should be provided as per 17.5 and 17.6 of ADB Volume 1 (2019, as amended 2020 and 2022)

See also Section 1.10 of this strategy.

1.8.4 Applied Guidance to the Building Regulations

This fire safety strategy adopts the following guidance as the basis of design for the project, noting the scope and limits of This Report outlined in this chapter.

Approved Document B

ADB Volume 1 gives guidance on each of the functional requirements stated within Part B, schedule 1 of The Regulations with respect to dwellings including blocks of flats.

ADB Volume 2 similarly gives guidance on each of the functional requirements stated within Part B, schedule 1 of The Regulations with respect to buildings other than dwellings.

The Approved Documents provide guidance for common building situations. In addition to guidance, some Approved Documents include or refer to provisions that must be followed exactly, as required by regulations or where methods of test or calculation have been prescribed by the Secretary of State. See notes on Regulation 38 above as an example. Each Approved Document relates only to the particular requirements of The Regulations that the document addresses. However, building work must also comply with all other applicable requirements of The Regulations and all other applicable legislation.

BS 9991

BS 9991: Fire safety in the design, management and use of residential buildings provides recommendations and guidance for:

- Dwellings (single-family dwelling houses, self-contained flats or maisonettes).
- Residential accommodation blocks (e.g. for students or hospital staff), with individual bedrooms and the provision of kitchen/sanitary facilities constructed within a fire compartment, accommodating not more than six persons.
- Sheltered housing and extra care housing.

BS 9991 is not applicable to hotels, caravans/mobile homes, hospitals, residential care/nursing homes, places of lawful detention, hostels or houses of multiple occupancies.

This guidance of BS 9991: 2024 is proposed as the basis of the residential design.

Where BS 9991 is silent on a particular aspect of fire safety design, Approved Document B will be referred to in this strategy, if appropriate.

Performance Based Design

Where aspects of the design deviate from the above design guidance, fire safety engineering analysis may be required to demonstrate compliance with the functional requirements of The Regulations or equivalence to the prescriptive guidance.

1.8.5 The Regulatory Reform (Fire Safety) Order 2005

The operation of the building will be subject to The Regulatory Reform (Fire Safety) Order 2005, (FSO).

Responsibility for complying with the FSO rests with the “responsible person” as defined by Article 3, reproduced as follows:

- (1)

in relation to a workplace, the employer, if the workplace is to any extent under his control;
- (2)

in relation to any premises not falling within paragraph (a)—

a.

the person who has control of the premises (as occupier or otherwise) in connection with the carrying on by him of a trade, business or other undertaking (for profit or not); or

b.

the owner, where the person in control of the premises does not have control in connection with the carrying on by that person of a trade, business or other undertaking.

If there is more than one responsible person in any type of premises, all must take reasonable steps to work with each other.

Under the FSO, the Responsible Person must carry out an assessment of the risks stemming from the possibility of fire within and around the premises and must implement fire precautions where necessary to the extent that is reasonable and practicable to control those risks.

On occupation of the building, or part thereof, the ‘responsible person’ as defined in the FSO is required by law to undertake a ‘suitable and sufficient’ fire risk assessment. This fire safety strategy will not satisfy this obligation; instead, it should be used as a basis for understanding the fire safety provisions provided in the building in order to undertake the risk assessment. The fire risk assessment will help identify risks that can be removed or reduced and to decide the nature and extent of the general fire precautions that need to be taken to protect people against the fire risks that remain. It should pay particular attention to those especially at risk, such as disabled and impaired persons and those with special needs and must include consideration of any dangerous substance likely to be on the premises.

1.8.6 Fire Safety (England) Regulations 2022

The Fire Safety (England) Regulations 2022 (made under article 24 of the Regulatory Reform (Fire Safety) Order 2005) came into effect on 19 January 2023 for the following buildings in England:

- High-rise residential buildings;
- Residential buildings with storeys over 11m in height;
- All multi-occupied residential buildings with two or more sets of domestic premises.

For high-rise residential buildings (a multi-occupied residential building at least 18 metres in height or 7 or more storeys), responsible persons must:

- share electronically with their local fire and rescue service (FRS) information about the building’s external wall system and provide the FRS with electronic copies of floor plans and building plans for the building;
- keep hard copies of the building’s floor plans, in addition to a single page orientation plan of the building, and the name and UK contact details of the responsible person in a secure information box which is accessible by firefighters;
- install wayfinding signage in all high-rise buildings which is visible in low light conditions;
- establish a minimum of monthly checks on lifts which are for the use of firefighters in high-rise residential buildings and on essential pieces of firefighting equipment;
- inform the FRS if a lift used by firefighters or one of the pieces of firefighting equipment is out of order for longer than 24 hours.

For multi-occupied residential buildings over 11 metres in height, responsible persons must:

- undertake quarterly checks on all communal fire doors and annual checks on flat entrance doors.

In all multi-occupied residential buildings, responsible persons must:

- provide residents with relevant fire safety instructions and information about the importance of fire doors.

1.8.7 Construction (Design and Management) Regulations 2015

The Construction (Design and Management) Regulations 2015 (CDM) are applicable for the design and construction stages of this project. The CDM aims to integrate health and safety into the management of the project and to encourage everyone involved to work together to

- Improve the planning and management of projects from the very start.
- Identify hazards early on, so they can be eliminated or reduced at the design or planning stage and the remaining risks can be properly managed.
- Target effort where it can provide the most benefit in terms of health and safety.
- Discourage unnecessary bureaucracy.

These CDM Regulations are intended to focus attention on planning and management throughout construction projects, from design stage and onwards. The aim is for health and safety considerations to be treated as an essential, but normal part of a project’s development - not an afterthought or bolt-on extra.



Guidance on fire safety for construction sites is given in the HSE publication HSG 168 however does not form part of this fire safety strategy.

Where our role on the project involves the preparation or modification of designs, this will be undertaken in conjunction with the project's principal designer and CDM Coordinator to ensure that any foreseeable risks during construction and the maintenance and use of the building are sufficiently controlled. These risks will typically be summarised in the principal designer's or principal contractor's risk register.

1.8.8 Information Considered

The following information has been considered in the preparation of this fire safety strategy.

- Architectural drawings prepared by A&Q Partnership architects as listed in the table below

Table 1: Referenced Architectural Drawings

Title	Number
Ground Floor Plan GA Plan Townhouses	TAN-AQP-ZZ-RF-DR-AR-0210
First Floor Plan GA Plan Townhouses	TAN-AQP-ZZ-RF-DR-AR-0211
Second Floor Plan GA Plan Townhouses	TAN-AQP-ZZ-RF-DR-AR-0212

Any change in the information listed above to suit future re-organisation will require further assessment to confirm compliance with the intent of the design objectives, and a potential revision of This Report or a subsequent Fire Strategy may be required.

1.9 Record of Statutory Consultation

At the date of issue of this document, no formal consultation has taken place with the Building Safety Regulator. The consultation feedback will be documented in future revisions of This Report.

1.10 Reference Documents

Figure 2 outlines the key codes and standards that will be used as a basis of design. This list is not exhaustive. Where referenced in This Report, codes and standards will follow the guidance of the editions outlined.

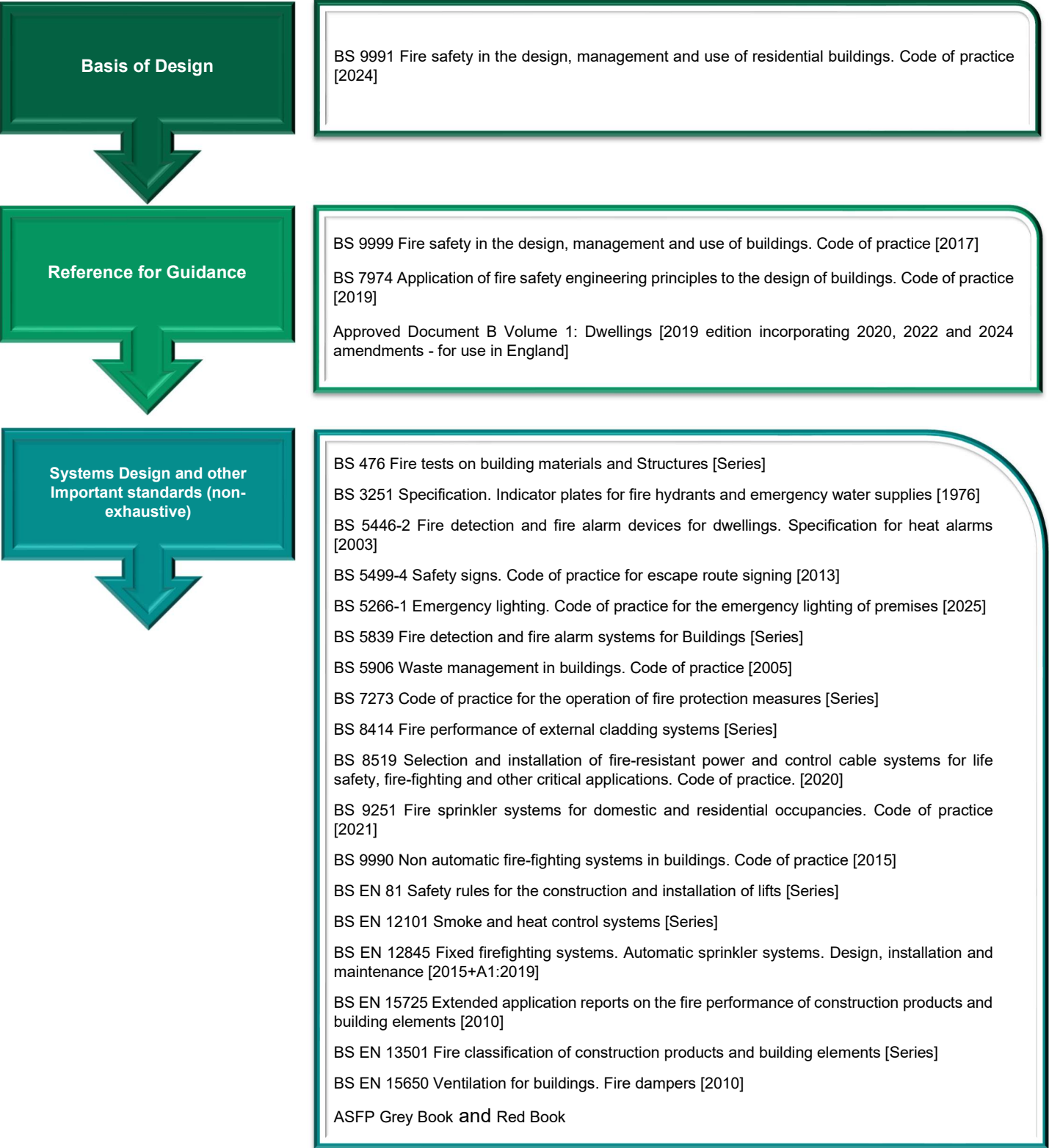


Figure 2: Design Basis



1.11 Project Stakeholders

This Report has been developed with the relevant project stakeholders as identified in the table below:

Table 2: Project Stakeholders

Organisation	Role
Building Safety Regulator	Authority Having Jurisdiction
A&Q Partnership Architects	Architecture
NLY Building Services	MEP Engineer
MWP	Structural Engineer
Maze Fire Consulting Ltd.	Fire and Life Safety Engineer
Formation Design & Build	Contractor
London Borough of Haringey	Client



2. Building Characteristics

2.1 General Site Description

The project is understood to entail building work constituting a 'new build' development.

The Broadwater Farm Townhouses consists of two terraces of dwelling houses; one of 14 three-storey houses, and one of 3 two-storey houses.

Indicative ground floor plans of the scheme are shown in the Figure below.

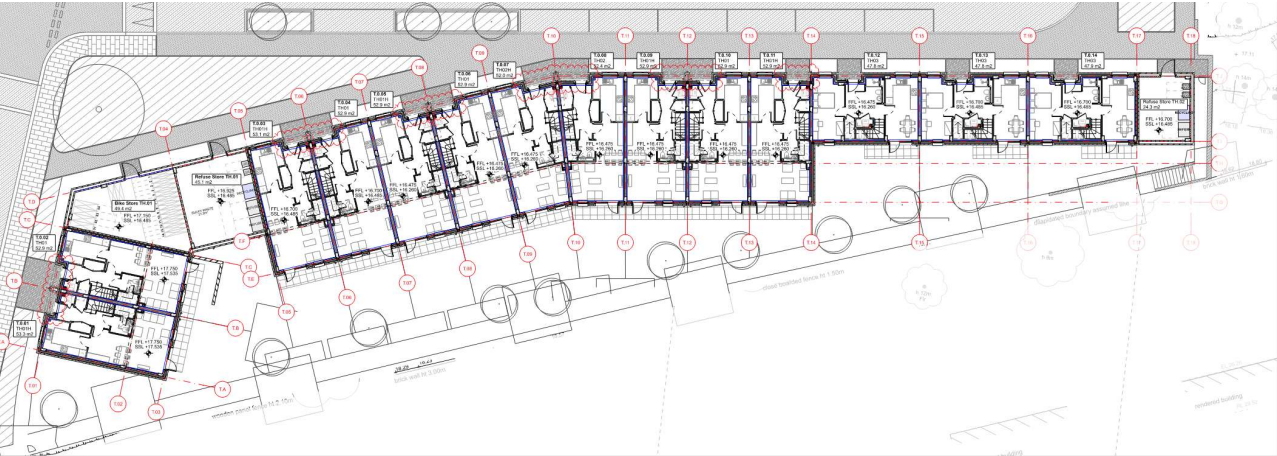


Figure 3: The layout of the ground floor of the three-storey townhouses

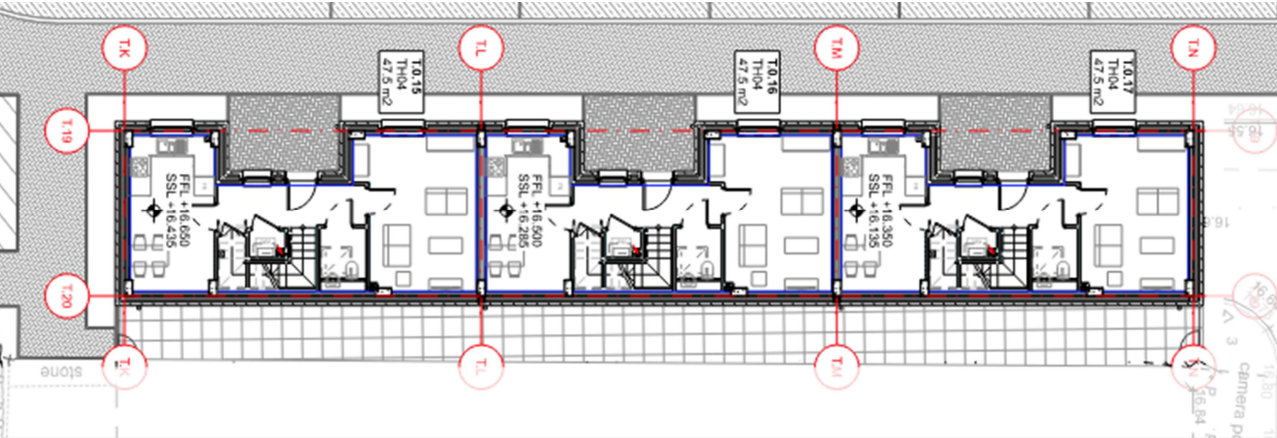


Figure 4: The layout of the ground floor of the two-storey townhouses

2.2 Building Particulars

The following building particulars have been used in the development of this fire safety strategy:

- Number of storeys: 0 basement storeys and both 2 above grade (ground + 1) and 3 above grade (ground + 2)
- Height of the buildings: 8.3m (two-storey) and 11m (three-storey)
- Height of floor of top storey above ground level: 3.6m (two-storey) and 6.3m (three-storey)
- Approximate floor area (excluding balconies): Largest ~50m²

2.3 Fire Hazards

2.3.1 Activities

Activities are considered to be consistent with a building containing mainly Residential (dwellings) occupancies. No processes or activities have been identified that indicate excessive fire risks.

BS 9991 specifies in Section 37 that all ancillary accommodation, with the exception of communal lounges, common amenity areas and transformer, switchgear and battery rooms for low voltage or extra low voltage equipment, should be treated as places of special fire hazard.

2.3.2 Ignition Sources

Typical ignition sources comprise the following:

- Smoking related materials - lighters etc
- Matches and Candles
- Cooking appliances - Cooker incl. oven, Deep fat fryer, Grill/Toaster, Microwave oven, Ring/hot plate etc
- Space heating appliances
- Central and water heating appliances
- Electrical distribution - batteries, generators, Wiring, cabling, plugs, Heating equipment etc
- Electric lighting - Fairy lights, Fluorescent Lights, Spotlights etc
- Other domestic style appliances - Audio equipment, Battery charger, Dishwasher, Electric blanket, Kettle, TV, Hoover, Washing Machine, Personal Computer etc
- Oil/Incense burners
- Food warming equipment (not cooking)

The potential ignition sources are expected to be consistent with well managed Residential (dwelling) building types.

3. B1 – Means of Warning and Escape

3.1 Functional Requirement of the Building Regulations

The functional requirement contained within Schedule 1 Part B1 of The Building Regulations states that:

- (1) *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.*

3.2 General Philosophy

The general principle to be followed when designing for means of escape is that when occupants are confronted by fire within a building they can turn away and walk to a place of safety in a different direction by their own unaided efforts. Escape in a single direction is only allowed when the distances are short, and people could be expected to escape before the fire becomes large enough as to block the escape route.

3.3 Evacuation Policy

Each individual dwellinghouse will be alerted and evacuated upon action of the fire alarm in that dwellinghouse. Neighbouring areas do not need to be alerted or evacuated.

For ancillary areas such as plant rooms and waste rooms the protocol will be 'simultaneous' evacuation in response to a fire in those areas.

3.4 Means of Warning

In accordance with BS 9991 the minimum standard of fire alarm should be based on the type of dwelling and the means of escape strategy for the building.

BS 5839-1 Fire detection and fire alarm systems for buildings, and BS 5839-6 Fire detection and fire alarm systems for buildings Part 6: Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises) are to be consulted to provide guidance on the system to be used.

In accordance with the requirements in BS 9991 for individual dwellinghouses, a Grade D2 category LD2 detection system shall be provided to each house in accordance with the guidance in BS 5839-6.

An LD2 category is specified as a system incorporating detectors in all circulation areas that form part of the escape routes from the premises, and in all rooms and areas, that pose a higher fire risk, such as kitchens and store rooms.

A Grade D2 category is specified as a system of one or more mains-powered detectors, each with an integral standby supply consisting of a user-replaceable battery or batteries.

In the case of Grade D systems, where more than one smoke alarm is installed, the smoke alarms normally need to be interlinked. Any heat alarms also need to be interlinked with the smoke alarms.

These grades are defined in such a way that a requirement for one grade of system can be satisfied by the installation of a higher grade of system; for example, if the fire risk justified the installation of a Grade D system, it would be acceptable to install a Grade A or Grade C system.

The ancillary areas of the development will be provided with a Category L2 fire detection and alarm system designed and installed in accordance with BS 5839-1.

3.4.1 Audible Warning

Audible warning will be provided to the development using sounders in accordance with BS 5839-6 or BS 5839-1 as appropriate to the residential / non-residential locations.

3.5 Means of Escape

The horizontal means of escape considers the escape from any point on a level to a storey exit on that level. The general principle is that any person confronted by a fire within a building can turn away from it and escape safely. Protected escape routes (residential corridors, stairs) are designed to function as a sterile space where a fire should not be able to break out. Were a fire to break out there should be virtually no combustible material to provide fuel to the fire.

The means of escape design depends on the occupancy, occupancy numbers, number of escape routes, escape route widths and travel distances.

For all house types, all habitable rooms should be provided with either:

- Direct access to a protected internal stairway (minimum REI 30) leading to outside; or
- An emergency escape window or door (for floors no more than 4.5m high from ground only).

It is proposed that all dwellinghouses in both blocks will be provided with internal protected stairs, with 30 minutes fire rated enclosure and FD30 doors. This will ensure that all occupants will be provided with a safe and compliant means of escape

3.5.1 Means of Escape from Balconies (Clause E.3 of BS 9991)

The extent of balcony provision on the scheme is to be established but principles for design should be as follows:

It may be noted that Section E.3 of BS 9991 states that where / if balconies are present at heights of more than 4.5m, they should meet the following recommendations:

- The escape route from the balcony should not pass through more than one access room
Each private balcony is accessible via the living room. As the living room leads directly to the exits via an internal hall, the above is considered met
- The interior of the access room should be clearly visible from all parts of the balcony unless provided by a fire detection and alarm system in accordance with BS 5839-6:2019, giving an audible warning with the external door in the closed position.
For some balconies, the access room is not visible from all points. However, a Category LD1 fire detection system, audible from every part of the balcony with the door closed, will be installed in each apartment, complying with the guidance recommendations.
- Any cooking risk in the access room should be enclosed with fire-resisting construction unless:
 - The open cooking risk is remote from the balcony and is positioned in such a way that it does not prejudice the escape route through the access room; and,
 - A fire detection and alarm system in accordance with BS 5839-6 is provided to the access room with an alarm system on the balconyThe above is met for all the balconies in the development.
- Where the travel distances from the balcony access door to the furthest point on the balcony exceeds 7.5m, it should be provided with an alternative escape route without going via the same access room, or the access room should be provided with automatic fire detection

Travel distances are within 7.5 in all the balconies of the development.

3.5.2 Air circulation systems in houses with a protected stairway or entrance hall enclosure

For systems circulating air only within an individual flat, the following will be met:

- Transfer grilles should not be fitted in any wall, door, floor or ceiling of the stair enclosure.
- Any duct passing through the stair enclosure should be rigid steel. Joints between the ductwork and stair enclosure should be fire-stopped.

- Ventilation ducts supplying or extracting air directly to or from a protected stairway should not serve other areas as well.
- Any system of mechanical ventilation which recirculates air and which serves both the stair and other areas should be designed to shut down on the detection of smoke within the system.
- Thermostats be mounted at a height between 1370mm and 1830mm above the floor. The maximum setting should be 27°C for ducted warm air heating systems. However, the building will not feature a ducted heating system; therefore, no maximum setting for the thermostat is required.

3.5.3 Final Exits

Discharge from common stairs and final exits should meet the recommendations from ADB Volume 1. Whilst the basis of design for this fire strategy is BS 9991, ADB Volume 1 provides more detailed guidance which is outlined here:

- Every protected stairway should lead to a final exit, either
 - directly.
 - via a protected exit passageway.
- Any protected exit corridor or stair should have the same standard of fire resistance and lobby protection as the stair it serves.
- People should be able to rapidly leave the area around the building. Direct access to a street, passageway, walkway or open space should be available. The route away from the building should comply with the following:
 - be well defined.
 - if necessary, have suitable guarding.
- Final exits should not present a barrier for disabled people. Where the route to a final exit does not include stairs, a level threshold and, where necessary, a ramp should be provided.
- Final exit locations should be clearly visible and recognisable.
- Final exits should avoid outlets of basement smoke vents and openings to transformer chambers, refuse chambers, boiler rooms and similar risks.

BS 9991 is silent on the width of the final exit from residential accommodation. This is because residential accommodation typically employs a 'stay put' policy and has a relatively low number of occupants for the size of the premises. BS 9991 does prescribe that the final exits should not be narrower than the stair and/or corridor that serves them in order to avoid 'pinch points'.

3.5.4 Width of Escape Stairs

The absolute minimum for escape stairs should be no less than 1000mm for downward travel, with the provided stairs having a width of 1100mm.

The development has been designed to operate a “stay put” evacuation strategy for the residential accommodation. However, it is considered prudent to ensure that in the event that the Fire and Rescue Service should require an evacuation of all residential apartments, that the staircases provide sufficient capacity. The minimum width of an escape stair is calculated as 3.6mm per person as per Table 13 of BS 9999.

3.5.5 Enclosure of Stairs

The stair should be a protected stair, enclosed in fire resisting construction (120min to each side separately), leading to a final exit.

3.5.6 Construction of Escape Stairs

The flights and landings of the escape stair should be constructed of materials of limited combustibility.

3.5.7 Use of Space Within Protected Stairs

Since the stair is the only stair serving the building, cupboards should not be included in the protected stairs even if this is enclosed in fire resisting construction.

If sanitary accommodation opens into the protected stairway, it must not be used as a cloakroom. A gas water heater or sanitary towel incinerator may be installed in the accommodation, but no other gas appliances may be installed.

3.6 Ancillary Spaces – Means of Escape

There are a number of ancillary spaces located on Ground Floor in both Blocks, including:

- Bin Stores
- Bike Stores
- Plant Rooms

All ancillary spaces are provided with a single entrance/exit, and therefore will be limited to 60 people in total. Each exit door will be at least 750mm clear width

Travel distances to ancillary areas will be as follows (based on Table 16 of BS 9991):

Table 3: Travel Distances

Single Direction Only (m)	Multiple Directions (m)
18	45

Travel distances are assessed to be within the limits of the table above.

3.7 Sprinklers

Sprinkler protection is to be provided throughout the building in accordance with BS 9251, which recommends that the system be designed to meet the sprinkler hazard classification requirements of a Category 1 system.

BS 9251 provides guidance in relation to non-residential areas which may be adequately protected by a residential sprinkler system (with cognisance of the use of appropriate sprinkler heads i.e. BS EN 12259-1 or BS EN 12259-14)). A hazard review should be carried out to determine the correct classification of occupancy. BS 9251 details areas which may be provided within the proposed development which could (following review) be adequately protected by the BS 9251 sprinkler system (subject to correct sprinkler head selection, BS 9251 category, minimum design density and number of design sprinklers as detailed in Table 3 and Table 4 of BS 9251), as follows:

- Bin Stores
- Resident's stores (cycle stores, scooter store, caretaker room, bulk store)
- Plant rooms (water tank, secondary power supply room)

If a BS 9251 is deemed suitable for an ancillary area, Category 2 System would be suitable for this area.

The final design and validation of the sprinkler system would be subject to the appointed 3rd party specialist sprinkler contractor in due course.

BS 9251:2021 identifies certain areas where sprinkler protection may be omitted as shown below unless required by a fire strategy or risk assessment), which also excludes staircases (with some limitations regarding the construction of the staircase), but not corridors and lobbies:

- bathrooms or water closets with a floor area of less than 5m², with linings conforming to Class A1, A2-s3, d2 and B-s3, d2 (in accordance with BS EN 13501-1 and which are not prepared for white goods;
- enclosed staircasing containing only materials conforming to Class B-s3 (d0, d1 or d2) or better for construction materials and B (fl) (s1 and s2) or better for flooring, surface spread of flame (in accordance with BS EN 13501-1 (2018)) and constructed as a fire-resistant separation;



- enclosed vertical shafts (e.g. service shafts) containing only materials conforming to Class B-s3 (d0, d1 or d2) or better for construction materials and B (fl) (s1 and s2) or better for flooring, surface spread of flame (in accordance with BS EN 13501-1 (2018)) and constructed as a fire-resistant separation;
- cupboards and pantries with a floor area of less than 2m² or where the least dimension does not exceed 1m and are not prepared for consumer units and electrical equipment (excluding a single light)
- attached buildings such as garages and boiler houses without direct access from within the protected building
- crawl spaces
- ceiling voids
- external balconies permanently open to the outside
- uninhabited loft/roof voids.

Sprinkler protection should cover all the areas of the building other than the one listed above), including sterile corridors and lobbies.

3.8 General Provisions

The following general provisions should be provided to all escape routes:

3.8.1 Headroom in Escape Routes

All escape routes should have clear headroom of not less than 2m.

3.8.2 Doors on Escape Routes

All doors on escape routes should not be fitted with lock, latch or bolt fastening, and are to be provided with simple fastenings i.e. thumb turns or push pads to allow them to be open. Any security devices should be provided with an over-ride that allows them to release without a key/fob.

Electrically powered locks should return to the unlocked position if the fire detection and alarm system operates, there is loss of power/system error, or the security mechanism override is activated.

Security mechanism overrides for electrically powered locks should be a Type A call point as described in BS 7273-4. The call point should be positioned on the side approached by people escaping. If the door provides escape in either direction, a call point should be installed on both sides of the door.

The door of any doorway or exit should always be hung to open in the direction of escape if the number of persons that might be expected to use the door at the time of a fire is more than 60.

Where doors are hung to swing both ways, they should be fitted with vision panels. Vision panels are also required if the door is dividing a corridor on an escape route.

3.8.3 Emergency Lighting

Emergency escape 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 sufficiently illuminated to enable occupants to escape. Additionally, emergency escape lighting will be provided as follows:

Table 4: Provisions for Emergency Lighting

Use of the building or part of the building	Areas requiring escape lighting
Residential	All common escape routes*
	Open-plan areas of more than 60m²
Other Areas	Switch room/battery room for emergency lighting system

Use of the building or part of the building	Areas requiring escape lighting
	Emergency control rooms

* Including external escape routes.

Typical mounting height of luminaires is at least 2m as specified in BS EN 1838. This may need adjusting based on effects of glare or specific smoke control strategies.

Emergency lighting should be in accordance with BS 5266-1. Emergency lighting must be automatic and provide a minimum of 1-hour illumination.

3.8.4 Exit Signage on Common Escape Routes

Every doorway or other exit providing access to a means of escape in the non-residential areas, other than exits in ordinary use (e.g. main entrances), should be distinctively and conspicuously marked by an exit sign in accordance with BS ISO 3864-1 and BS 5499-4.

Exit signage should be located and operated in accordance with BS 5499-4. The signs designated as E001 and E002 in BS EN ISO 7010:2020+A6:2023 should be used with the appropriate directional arrow in accordance with BS 5499-4.

Colorimetric and Photometric Requirements

Powered - internally illuminated escape route signs should be as follows:

- Colorimetric and photometric requirements specified in BS ISO 3864-4 Table 2 and the luminance contrast requirements specified in BS ISO 3864-4 Table 3 should be met.
- The minimum luminance of the safety colour green should be at least 2 cd/m² and the luminance of the contrast colour white 5 to 15 times that.
- The ratio of maximum to minimum luminance within either green or white should not exceed 10:1.
- Response times should conform to BS EN 1838.
- Durations should be the same as the Emergency Lighting.

Externally illuminated escape signs and unpowered internally illuminated escape route signs (i.e. normal lighting conditions) should meet the colorimetric and photometric requirements specified in BS ISO 3864-4 Table 1. The illuminance on any part of the face should not be less than 5 lx.

Sign Height and Viewing Distances

The maximum viewing distance normal to escape route signs should be determined from the sign height and distance factors using the recommendations given in BS 5499-4. The angle of viewing should also be considered when calculating these factors.

3.9 Primary and Secondary Power Supplies

All power supplies, electrical wiring and control equipment should be protected against fire for an appropriate period of time where the effects of fire are likely to result in the failure or incorrect operation of the life safety system.

Power and control cables should be installed in accordance with BS 8519:2020.

Where dual power supplies are recommended by the relevant British Standard or industry guide to any life safety system, the primary power source should generally be taken from the public electricity supply, with secondary power being supplied from an alternative utility supply from another substation, a generator, an uninterruptable power supply (UPS) or batteries. It is understood that the Broadwater Farm building is being provided with a secondary generator.

The output of each power supply should be sufficient to satisfy the maximum demands of the system.

Where practicable, power supplies should be provided via a single intake and a standby generator.



The secondary power supply will be provided by an automatically started standby generator. for the entire development, located in a ground floor room of Block 1.

Particular attention is drawn to the requirement in BS 7671 for suitable support of cabling to avoid obstruction of escape routes and firefighting access due to the failure of fixings.

If the primary power source fails, then the power supply should be automatically switched over to a secondary power source. Failure of or damage to one of the power sources should not cause the failure of the other power source or the failure of the supply of power to the system.

The electrical distribution system should conform to BS 7671, the relevant parts of BS EN 60947 and BS 7346-8.

Secondary power supplies (other than for provisions where batteries are suitable as a back-up source) will be required for the following fire safety provisions:

- Automatic fire alarm and detection systems;
- Automatic fire suppression systems;
- Illuminated emergency signage; and
- Emergency lighting.

It is expected that the fire alarm system and emergency lighting will have battery backup for the required duration, but this is to be confirmed by the MEP design



4. B2 – Internal Fire Spread (Linings)

4.1 Functional Requirement of the Building Regulations

The functional requirement contained within Schedule 1 Part B2 of The Building Regulations states that:

- (1) To inhibit the spread of fire within the building the internal linings shall –

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

b. Have, if ignited, a rate of heat release which is reasonable in the circumstances.
- (2) In this paragraph “internal linings” mean material lining any partition, wall, ceiling or other internal structure.

4.2 Surface Linings

The interior wall and ceiling surfaces in a building can have a significant influence on how fast a fire may develop. It is particularly important that, in circulation spaces including staircases, where the rapid spread of fire is most likely to prevent occupants from escaping, surface linings are restricted by making provision for them to have low rates of heat release and surface spread of flame.

The wall and/or ceiling linings must satisfy the classifications given in Section 20.1 of BS 9991 and Table 33 of BS 9999 when tested under the European classifications in accordance with BS EN 13501: Part 1.

Table 5: Classification of wall and ceiling linings

Area	European Class
Small rooms in residential accommodation not exceeding 4m²	D-s3, d2
Small rooms in non-residential accommodation not exceeding 30m²	D-s3, d2
Other rooms	C-s3, d2
Other circulation spaces	B-s3, d2*

*Wall coverings which conform to BS EN 15102, achieving at least class C-s3, d2 and bonded to a class A2-s3, d2 substrate, will also be acceptable.

Note 1: When a classification includes ‘s3, d2’ this means that there is no limit on the production of smoke or flaming droplets/particles.

Note 2: A product achieving a classification ‘A’ achieves a higher standard than the minimum classifications set out in the table above.

Note 3: Maze recommends that regardless of classification achieved, relevant metal composite material should not be used as an internal lining. This includes panels or sheets, having a thickness of no more than 10mm, which is comprised of a number of layers—

- (i)two or more of which are made of metal, alloy or metal compound; and
- (ii)one or more of which is substantial (at least 1mm thick or has a mass per unit area of at least 1kg per m²) and is made of a material having a gross calorific value of more than 35 MJ/kg when tested in accordance with BS EN ISO 1716

Parts of walls in rooms (not circulation spaces) may be of lower performance than stated in the table above, but no worse than class D-s3, d2. In any one room, the total area of lower performance wall lining should be less than an area equivalent to half of the room’s floor area, up to a maximum of 20m² in residential accommodation and 60m² in non-residential accommodation.

For the purposes of this requirement, a wall includes the internal surface of internal and external glazing (except glazing in doors) and any part of a ceiling which slopes at an angle greater than 70° to the horizontal.

A 'wall' does not include

- Doors and door frames.
- Window frames and frames in which glazing is fitted.
- Architraves, cover moulds, picture rails, skirtings and similar narrow members.
- Fireplace surrounds, mantle shelves and fitted furniture.

For the purposes of this requirement, a ceiling includes glazed surfaces, any part of a wall at 70° or less to the horizontal, the underside of a gallery or the underside of a roof exposed to the room below.

A 'ceiling' does not include

- Trap doors and their frames.
- The frames of windows or rooflights and frames in which glazing is fitted.
- Architraves, cover moulds, picture rails, exposed beams and similar narrow members.

4.3 Specific Products

There is specific guidance provided for some internal lining products which may be additional to or an alternative to the requirements detailed in Section 4.2 of This Report. Specific products include:

- Plastic rooflights;
- Flexible membranes;
- PTFE-tension based roofs and structures;
- Insulated core panels;
- Thermoplastic windows;
- Thermoplastic lighting diffusers; and
- Suspended or stretched-skin ceilings.

Thermoplastic lighting diffusers are commonly used in buildings; therefore, further details are provided below. Maze Fire is not aware of any of the other products listed above being specified for Broadwater Farm. If any are to be used Maze Fire must be informed to enable them to provide relevant information.



5. B3 – Internal Fire Spread (Structure)

5.1 Functional Requirement of the Building Regulations

The functional requirement contained within Schedule 1 Part B3 of The Building Regulations states that:

- (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.
- (3) To reasonably inhibit the spread of fire within the building, it shall be sub-divided with fire-resisting construction 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.

5.2 Loadbearing Elements of Structure

The period of fire resistance required is linked to the risk profile for the building taking into account the height of the top floor, depth of any basement and whether the building is sprinklered or not.

Where any element supports another the supporting element should possess at least the resistance of the other which it is supporting.

The low rise Residential houses with a floor height less than 5m, and sprinkler protected, will require 30 minutes fire resistance applied to the structure.

The Residential houses with a floor height greater than 5m but less than 11m, and sprinkler protected, will require 60 minutes fire resistance applied to the structure.

Structure that only supports the roof may be excluded from the definition of element of structure (and therefore not fire rated) unless:

- The structure is essential to maintain the stability of the building
- The roof serves as a floor (i.e. supporting plant) or
- Its failure leads to unreasonable or disproportionate damage that could render the building inoperative for a prolonged period.

It is noted that the roof is proposed to have solar panels installation over the whole area of the roof, hence it is proposed that fire rating would be required for the roof structure to avoid any approval risks.

5.3 Compartmentation

Compartment walls and floors will form a complete barrier to fire between the compartments they separate. Where a compartment wall or floor meets another compartment wall or external wall the junction should maintain the fire resistance of the compartmentation. Key requirements are as follows:

- Houses will be compartmented from each other using 60 minutes fire rated construction.
- Floors are not required to be compartment floors.
- Secondary power supply and life safety systems will be enclosed in 120 minutes fire rated construction.

5.3.1 Typical Compartmentation Provisions

Compartmentation in residential buildings is of fundamental importance to the safety of the occupants. The development has been designed to operate a 'stay put' evacuation strategy.

Such a strategy relies on the compartmentation between units and occupancies protecting those occupants for a sufficient period of time for the Fire and Rescue Service to arrive and to commence firefighting operations.

Compartment walls should be able to accommodate the predicted deflection of the floor. This should be achieved in one of the two following ways:

- a head detail should be provided between the compartment wall and the floor, which is capable of deforming while maintaining its integrity when exposed to a fire; or
- the design of the compartment wall should be such that it maintains its integrity by resisting the additional vertical load from the floor above when forced to sag under fire conditions.

The table below sets down typical compartmentation provisions for the scheme. Where walls are shared between fire separating elements, the higher standard of fire rating should be applied to the shared wall.

Table 6: Fire resistance requirements

Area	Above Ground Storeys	Fire resistance of any doors (Integrity only)*
	Fire resistance of construction	
Structural frame, beam or column	R 60 to exposed faces	N/A
Loadbearing wall	R 60 to each side separately	Based on location
Floors	R 60 from the underside	N/A
Any part of an external wall a maximum of 1000mm from any point on the relevant boundary	REI 60 to each side separately	FD 60
Any part of an external wall a minimum of 1000mm from the relevant boundary (for loadbearing resistance requirement of loadbearing external walls see above)	E 60 and I 15 from inside the building	FD 60
Any part of an external wall beside an external escape route (for loadbearing external walls see above)	E 30 from inside the building	FD 30
Compartment walls separating occupancies	REI 60 to each side separately	FD 60 S
Compartment walls	REI 60 to each side separately	FD 60 S
Enclosure to a protected stairway	REI 30 to each side separately	FD 30
Construction that encloses places of special fire hazard	REI 30 to each side separately	FD 30
Enclosure in a flat to a protected entrance hall, or to a protected landing	REI 30 to each side separately	FD 30
Cavity barriers	E 30 and EI 15 to each side separately	FD 30
Ducts passing through cavity barriers	E 30 from the outside	FD 30
Casing around a drainage system	E 30 from the outside	FD 30
Flue walls	EI 30 from the outside	FD 30



* S = Smoke resisting door
R = Loadbearing
E = Integrity
I = Insulation

Ancillary accommodation will be protected as follows:

- Bin Stores
- Resident’s stores (cycle stores, scooter store, caretaker room, bulk store)
- Plant rooms (water tank, secondary power supply room)

Table 7: Fire resistance requirements for ancillary rooms

BS 9991 Structural fire protection of areas of ancillary accommodation	Requirement	Fire resistance of any doors (Integrity only)*
Bin Stores	REI 60 to each side separately	not required in the development as doors open to outside
Resident’s stores (cycle stores, scooter store, caretaker room, bulk store)	REI 60 to each side separately	not required in the development as doors open to outside
Plant rooms (water tank, secondary power supply room)	REI 60 to each side separately	not required in the development as doors open to outside

5.3.2 Fire Doors

Fire doors should normally be self-closing unless they give access to cupboards or service risers, in which case they should be kept locked. Fire doors should meet the specified level of integrity but do not usually need to be insulated as there is no fire load immediately adjacent to a door.

Doors installed on site should conform, in dimensions and workmanship, to the manufacturer’s specification for the appropriate fire resistance test report/assessment. Doors should be hung to ensure a good fit to the frame when closed, and the junction between door assembly and surrounding structure should be adequately sealed.

Security requirements should not override the need to provide adequate means of escape.

Integrated elements such as locks, letter plates and security viewers should not reduce the fire resistance of the door.

5.3.3 Securing of External Wall Cladding

Aluminium cladding (intended as made of solid single-layer aluminium sheets) fixed on blockwork and covering the ground floor ancillary area walls should be restrained at the junction of compartment walls and floors to resist movement in the event of fire.

5.3.4 Junction of Compartment Wall with Roof

In accordance with ADB, the detail at the head of a compartment wall must not permit fire spread via materials from a compartment on fire to an adjacent compartment. Fire stopping at the head of the wall must also be appropriate. Diagram 5.2 in ADB shows the requirements for typical construction at the head of a compartment wall where it junctions with the roof. This diagram is reproduced in the Figure below.

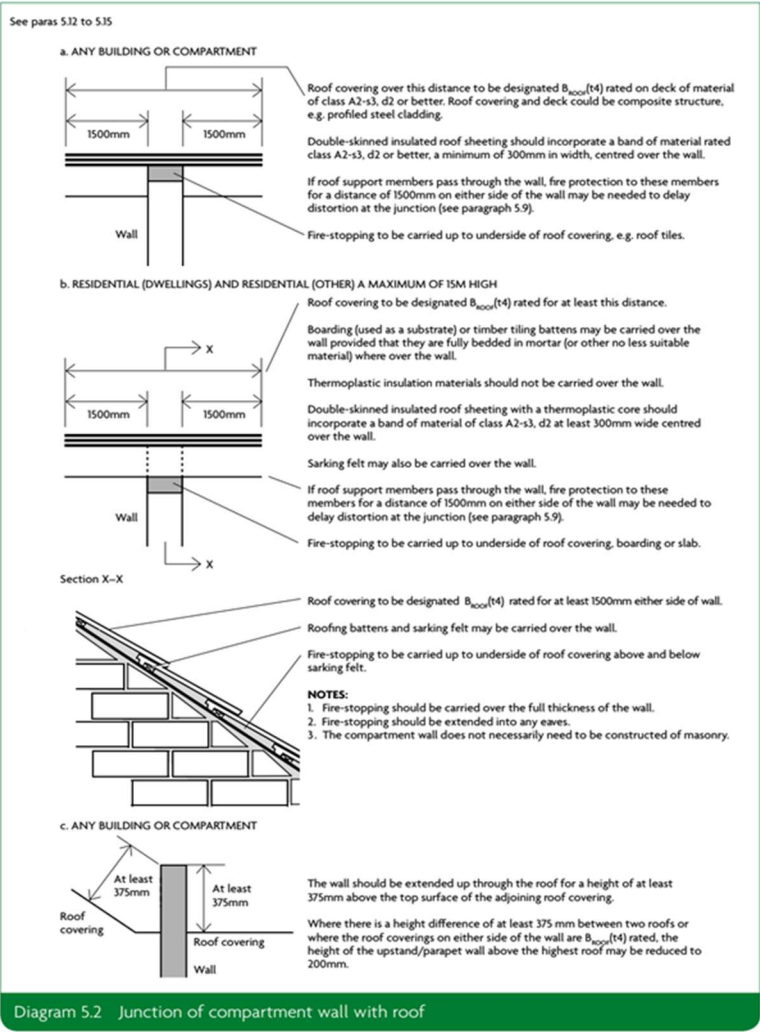


Figure 9: Junction of compartment wall with roof (ABD diagram 5.2)

5.3.5 Risers / Service Ducts / Shafts

Where any service risers pass through compartment floors, they will be treated as protected shafts and enclosed in fire resisting construction equal to the compartment floor through which they are passing (60 minutes).

5.3.6 Cavity Barriers

There are limits to the extent to which any cavities can exist, for example between walls and cladding and between ceilings and roofs. Cavity barriers should close gaps around windows and separate cavities on compartment lines.

Cavity barriers shall be provided in floor and ceiling voids (where these are present) to sub-divide the concealed space and reduce the potential for fire or smoke to spread over large areas of the building unchecked. They shall be located not more than 20m apart in the large open plan spaces and they shall be aligned with partition walls wherever practicable. In areas where there are smaller rooms cavity barriers shall be provided such that no undivided void is greater than 20m in any one direction. The maximum distance between cavity barriers must be reduced to 10m if the surfaces of the cavity do not have a Class 0 or Class 1 surface spread of flame rating.

Cavity barriers shall also be provided at the junction of compartment walls and other construction where there is a void and in other construction where there are large, concealed voids and around openings.



Cavity barriers shall be constructed to achieve at least 30 minutes fire resistance for integrity and 15 minutes fire resistance for insulation.

Cavity barriers should generally be provided in accordance with Figure 24 of BS 9991 (reproduced in the following figure).

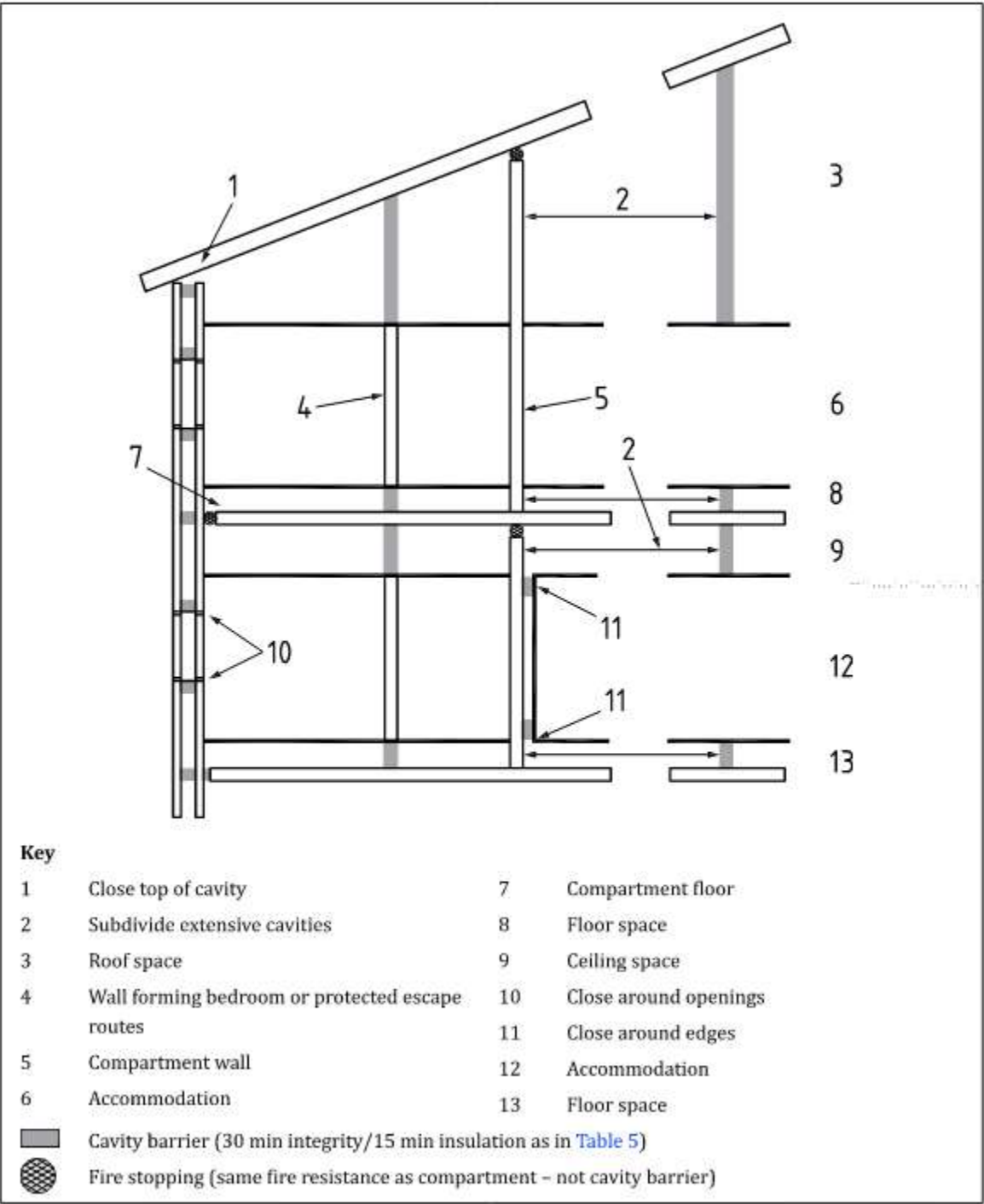


Figure 10: Cavity barrier and fire-stopping provision (Figure 40 of BS 9991)

Cavity barriers should be provided to close the edges of any cavities, including around openings* (but see also note below: Figure 41 of BS 9991). As set out in BS 9991, cavity barriers are also required:

- at the junction between an external cavity wall* and every compartment floor and compartment wall and

- at the junction between an internal cavity wall* and every compartment floor, compartment wall or other wall or door assembly which forms a fire resisting barrier.

*This provision is not required where the cavity wall conforms with Figure 25 of BS 9991. This figure is reproduced below. Note that in this type of configuration it is permissible for combustible material (lowest classification Euroclass B) to be placed within the cavity.

Every cavity barrier should be constructed to provide at least 30 min fire resistance. It may be formed by any construction provided for another purpose if it meets the provisions for cavity barriers. Cavity barriers in a stud wall or partition, or provided around openings, may be formed of:

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

Further information regarding the requirements for construction and fixing of cavity barriers is set out in Section 5 of 33.1 of BS 9999, including requirements to specific configurations and reaction to fire requirements for surfaces within or adjacent to cavities.

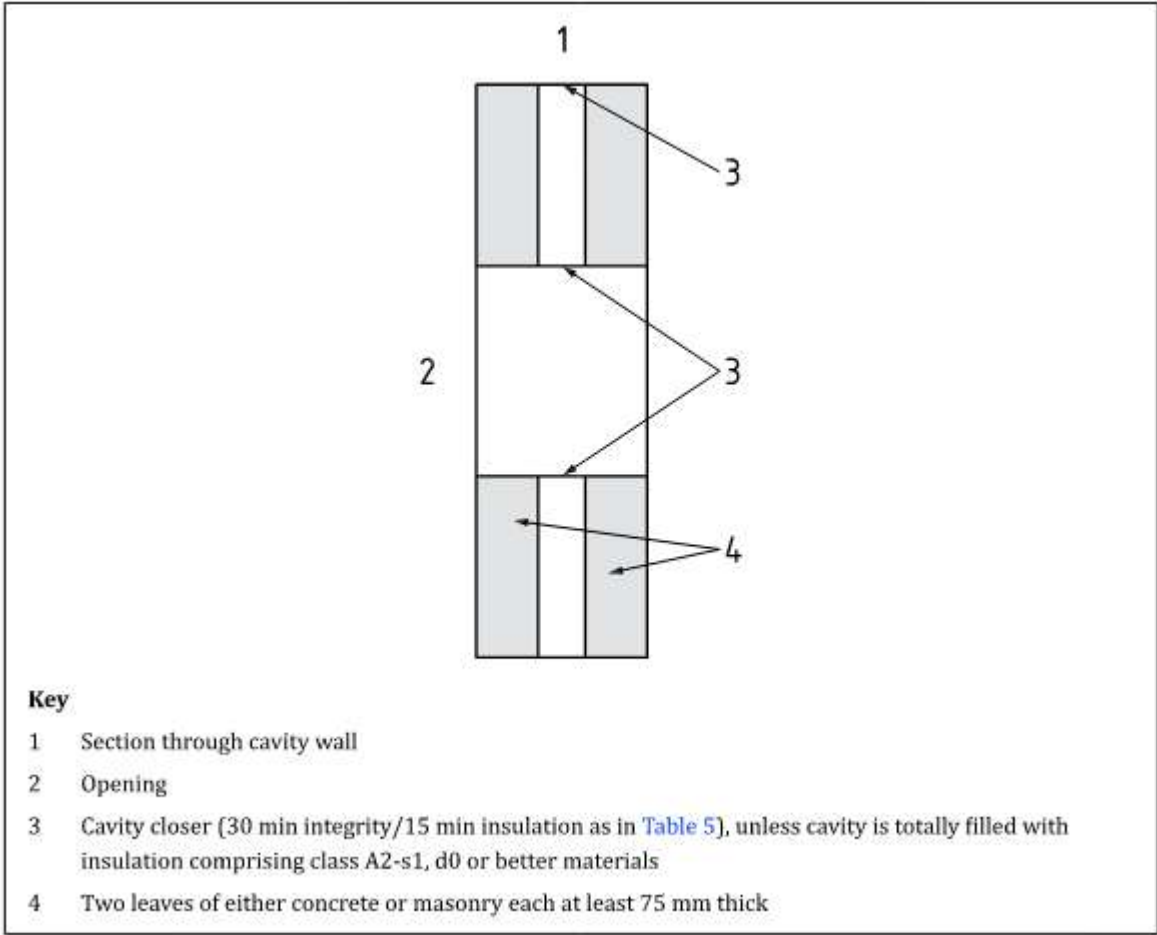


Figure 11: Cavity wall excluded from provisions for cavity barriers (Figure 41 of BS 9991)

5.3.7 Installation of Ductwork Systems

Ductwork that passes through escape routes or breaches compartmentation will be fire rated in line with the methods outlined in Section 32.5.2 of BS 9999 as follows:



- Method 1 – thermally actuated fire dampers.
- Method 2 – fire-resisting enclosures.
- Method 3 – protection using fire-resisting ductwork.
- Method 4 – automatically activated fire and some dampers triggered by smoke detectors.

Both fire dampers and fire, and smoke dampers shall be tested to BS EN 1366-2:1999 and be classified to BS EN 13501-3: 2005. They require an E (fire dampers) or ES (smoke and fire dampers) classification to be the same fire resistance standard or 60 minutes (whichever is greater) as the wall/floor through which the duct passes.

5.3.8 Protection of Openings

Where services penetrate compartment walls, floors and between the junction with the walls or façade; suitable fire stopping should be provided.

Pipes which pass through a fire separating element (unless within a protected shaft) will meet the following provisions:

Option 1 - proprietary seals (any pipe diameter)

Provide a proprietary sealing system which has been shown through test evidence to maintain the fire resistance of the compartmentation.

Option 2 – pipes with a restricted diameter

When a proprietary sealing system is not used, fire stopping may be used around the pipe, where every effort is made to keep the opening as small as possible. Any mastic used for the protection of pipe penetrations should be compatible with the pipework material and size to maintain the prescribed standard of fire resistance, tested and installed in accordance with the manufacturer’s instructions.

The nominal internal diameter of the pipe should not be greater than that detailed in Table 13 of BS 9991 and graphically represented in the figure below:

Table 13 — Maximum nominal interior diameter of pipes passing through a compartment wall/floor

Situation	Dimensions in millimetres		
	Maximum nominal internal diameter		
	a) High melting point materials ^{A)}	b) Lead, aluminium, aluminium alloy, PVC ^{B)} , fibre-cement	c) Any other material
1) Structure (but not a wall separating buildings) enclosing a protected shaft that is not a stairway or a lift well	160	110	40
2) Compartment wall or compartment floor between flats	160	160 (stack pipe) ^{C)} 110 (branch pipe) ^{C)}	40
3) Any other situation	160	40	40

^{A)} A class A1 material (such as cast iron or steel) that, 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.

^{B)} uPVC pipes conforming to BS 4514 or BS EN 1329-1. Products of any diameter that fall within the scope of BS EN 1366-3 should be provided with fire stopping.

^{C)} These diameters are only in relation to pipes forming part of an above-ground drainage system and enclosed as shown in Figure 44. In other cases, the maximum diameters against situation 3) apply.

Figure 12: Permitted Pipework diameters (Table 13 of BS 9991)

Option 3 – sleeving

A pipe of lead, aluminium, aluminium alloy, fibre-cement or uPVC, with a maximum nominal internal diameter of 160mm, may be used with a sleeving of non-combustible pipe as per Figure 30 of BS 9991.

5.3.9 Above Ground Drainage Systems

Where a compartment floor is carried through the enclosure to an above-ground drainage system (e.g., SVP stack) then the pipe diameters and materials noted in Item 2b of Table 13 of BS 9991 will be permissible subject to footnote C of the table being observed. This requires enclosure and fire-stopping to the degree set out in Figure 44 of BS 9991 (excerpted below).

With respect to the casing construction the more recent ADB Vol.1 Diagram 9.1 gives further guidance as follows:

- The enclosure should meet all of the following conditions:
 - Be bounded by a compartment wall or floor, an outside wall, an intermediate floor or a casing
 - Have internal surfaces (except framing members) of class B-s3, d2 or better.
- Note: when a classification includes ‘s3, d2’, this means that there is no limit set for smoke production and/or flaming droplets/particles).
 - Not have an access panel which opens into a circulation space or bedroom.
 - Be used only for drainage or water supply or vent pipes for a drainage system.
- The casing should meet all the following conditions.
 - Be imperforate except for an opening for a pipe or an access panel.
 - Not be of sheet metal.
 - Not have fire resistance less than E 30 (including any access panel).
- The opening for a pipe, in either the element of structure or the casing, should be as small as possible and fire-stopped around the pipe



Figure 44 — Enclosure for drainage or water supply pipes

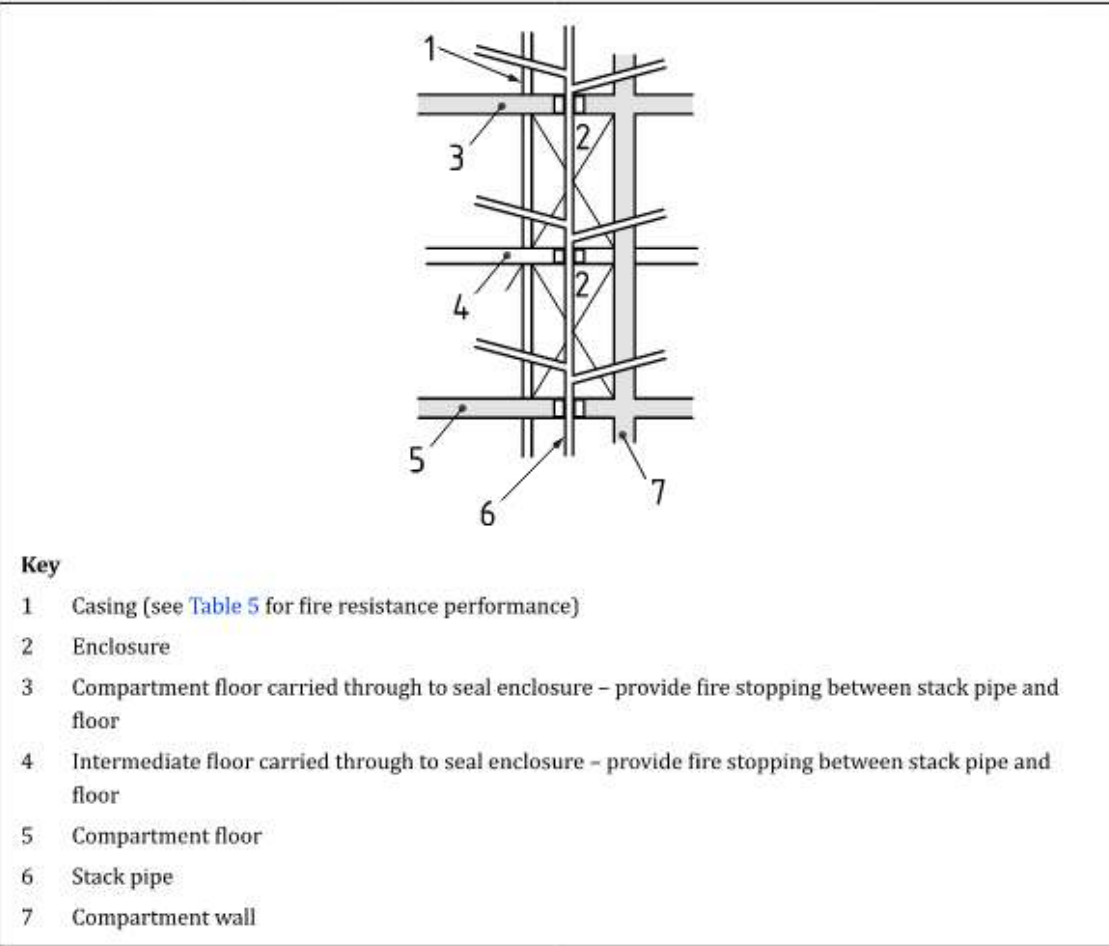


Figure 13: Enclosure for drainage or water supply pipes (Figure 44 of BS 9991)

5.3.10 Fire Stopping

Penetrations through lines of fire-resisting separation will be fire-stopped to achieve the same fire resistance as the separation.

All pipes, ductwork and services passing through fire-resisting separations will be either enclosed in fire-resisting construction (i.e. shafts) of matching fire resistance or provided with fire dampers of matching fire resistance. Certain small-diameter pipes require only fire-stopping around the pipe, dependent on pipe material and the type of fire-resisting barrier penetrated. The ASFP Red Book provides information on fire stopping and penetration seals, the following figure is recreated from the Red Book and gives examples of where fire stopping is typically required.

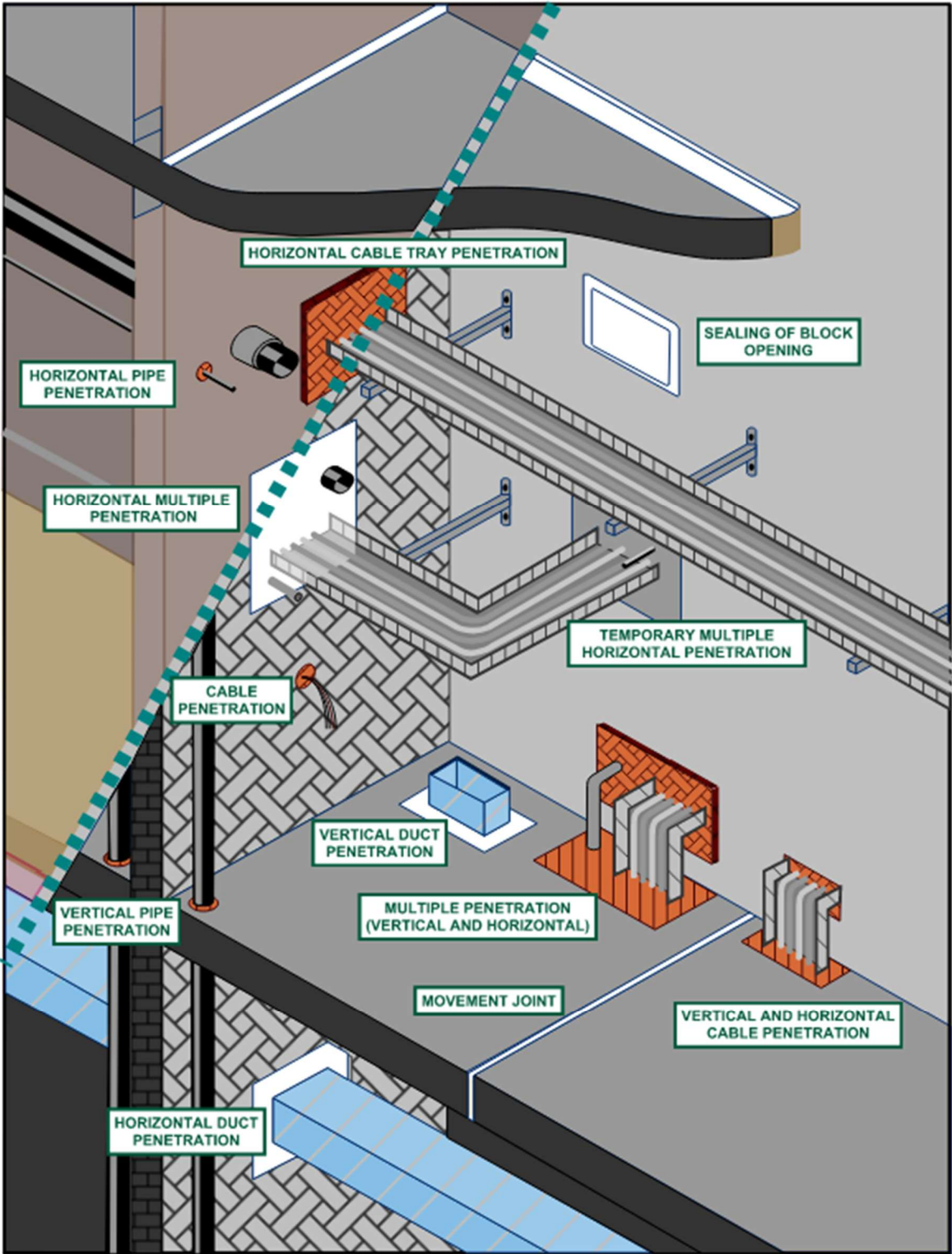


Figure 14: Examples of locations where fire stopping should be provided (Recreated from ASFP Red Book)

6. B4 – External Fire Spread

6.1 Functional Requirement of the Building Regulations

The functional requirement contained within Schedule 1 Part B4 of The Building Regulations states that:

- (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.

6.2 General

The guidance in this section is designed to reduce the risk of vertical fire spread as well as the risk of ignition from flames coming from adjacent buildings.

Consideration should be given to the choice of materials (including their extent and arrangement) used for the external wall, or attachments to the wall, to reduce the risk of fire spread over the wall. Flame spread over or within an external wall construction should be controlled to avoid creating a route for rapid fire spread bypassing compartment floors or walls. This is particularly important where a stay put strategy is in place.

The external envelope of the building should not provide a medium for undue fire spread to an adjacent building or be readily ignitable by fires in adjacent buildings. In addition to restricting the risk of ignition of the external wall, the amount of thermal radiation that falls on a neighbouring building in the event of a fire is also restricted. Furthermore, the flame spread over and / or fire penetration from an external source through the roof is restricted.

6.2.1 Summary of external wall build up for the scheme

The external wall built up for the scheme is to be confirmed for the external wall (from outside to inside).

Maze have not been appointed to review the external wall construction details, but in all instances, these will be required to adhere to the guidance set out below.

6.2.2 Metal Composite Materials

Regulation 7(1A) prohibits the use of relevant metal composite materials in the external walls of all buildings of any height.

Relevant metal composite materials are defined (in regulation 2(6)(c)) as any panel or sheet, having a thickness of no more than 10mm which is composed of a number of layers two or more of which are made of metal, alloy or metal compound and one or more of which is a substantial layer made of a material having a gross calorific value of more than 35MJ/kg when tested in accordance with BS EN ISO 1716. A substantial layer is defined as a layer which is at least 1mm thick or has a mass per unit area of at least 1kg/m².

No composite panel will be installed in the external envelope of the development. Aluminium cladding (intended as made of solid single layer aluminium sheets) fixed on blockwork will be installed in the ground floor ancillary area walls.

6.2.3 External Surfaces

The external surfaces of walls should meet the provisions in Table 9 of BS 9991, but where Regulation 7(2) applies, that regulation prevails over these provisions. The requirements are summarised below:

Table 8: Reaction to fire performance of external surface of walls

Less than 1000mm from the relevant boundary	1000mm or more from the relevant boundary
Class B-s3, d2 or better	No provision

6.2.4 Cavities and Barriers

Cavity barriers should have sufficient fire test evidence that they will operate in the proposed façade system.

They should be provided in accordance with Section 5.3.6 of This Report.

Surfaces which face into cavities should also meet the provisions of Table 10.1 of ADB, and provisions in Section 5.3.6.

6.2.5 Balconies

Specific advice is provided in BS 8579 in respect to balconies and terraces.

Balconies comprising an open structure and open pedestrian surface should be fitted with a non-combustible imperforate tray or soffit to reduce the risk of fire spreading to balconies below via firebrands or burning droplets and to protect the balcony and adjacent internal areas from the risk of fire spread from below. A tray can act as a water collecting surface and/or a visual soffit to the balcony. Where a drainage pipe penetrates this protective layer, the risk of fire spread via this penetration should be assessed and minimized.

The area where a balcony abuts a wall has numerous components and is likely to have complex detailing. Some balconies are supported by brackets fixed back to the structure of the building, which can pass through the wall cavity. The design should ensure that fire separation is continuous and that no routes for the passage of smoke, flame or hot gases are created within this zone even when adjacent elements distort. Loadbearing and other components of a balcony should not compromise continuity of any cavity barriers or fire stopping. Loadbearing components should also provide insulation criteria to meet the performance in fire of adjacent cavity barriers or fire stopping.

Where slab depths allow, the fire stopping or cavity barrier may be designed to pass over or under the brackets. Where this is not possible, the brackets should incorporate means to ensure the continuity of fire separation by the fire stopping or cavity barrier if interrupted by the bracket. The bracket may incorporate a thermal wrapping which also performs as fire stopping or cavity barrier, thus allowing continuity of fire spread prevention where space is not available to run it past the brackets. Any such brackets should only be used in the design where suitable fire test evidence exists.

6.3 Space Separation

The requirements of B4 of the Building Regulations are considered to be met if the external walls of the building 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. External fire spread calculations were therefore carried out to ensure that the proposed scheme would not create an unacceptable risk to adjacent sites.

A minimum horizontal distance is usually required to prevent fire spread between adjacent buildings. Alternatively, the facade can be fire rated. This horizontal separation is measured at a 90-degree angle to the exterior wall.

The worst case scenario has been analysed in the table below, using the Enclosing Rectangles (ER) Method from BR 187.

Table 9: External Fire Spread Worst Case Scenario Analysis

ELEVATION	WIDTH (m)	FLOOR HEIGHT (m)	ELEVATION AREA (m²)	DISTANCE TO BOUNDARY (m)	PERMITTED UNPROTECTED AREA	ELEVATION AREA REQUIRING PROTECTION (m²)
House TH.012, North to Block B	9.54 ER 15m	11.5 ER 12m	109.71 ER 180m²	7.1	71% of ER 127.8m²	0

Given the level of compartmentation for residential units, the provision of sprinklers and the available distance to relevant boundary, the permitted unprotected area is 100%.



6.4 Roof Construction

The recommendations in this section are principally concerned with the performance of roofs when exposed to fire from the outside. The separation distance is the minimum distance from the roof (or part of the roof) to the relevant boundary. Separation distances should be as recommended in the following table by the type of roof covering and the size and use of the building.

It is noted that due to the presence of solar panels, roof covering is recommended to meet B_{roof}(T4) rating, to limit fire spread due to a fire starting in the solar panels.

Table 12.1 Limitations on roof coverings				
Designation ⁽¹⁾ of covering of roof or part of roof	Distance from any point on relevant boundary			
	Less than 6m	At least 6m	At least 12m	At least 20m
B _{ROOF} (t4)	●	●	●	●
C _{ROOF} (t4)	○	●	●	●
D _{ROOF} (t4)	○	● ⁽²⁾⁽³⁾	● ⁽²⁾	●
E _{ROOF} (t4)	○	● ⁽²⁾⁽³⁾	● ⁽²⁾	● ⁽²⁾
F _{ROOF} (t4)	○	○	○	● ⁽²⁾⁽³⁾
● Acceptable. ○ Not acceptable.				
NOTES:				
Separation distances do not apply to the boundary between roofs of a pair of semi-detached dwellinghouses and to enclosed/covered walkways. However, see Diagram 5.2 if the roof passes over the top of a compartment wall.				
Polycarbonate and uPVC rooflights that achieve a class C-s3, d2 rating by test may be regarded as having a B _{ROOF} (t4) designation.				
1. The designation of external roof surfaces is explained in Appendix B.				
2. Not acceptable on any of the following buildings.				
a. Dwellinghouses in terraces of three or more dwellinghouses.				
b. Any other buildings with a cubic capacity of more than 1500m ³ .				
3. Acceptable on buildings not listed in (2) if both of the following apply.				
a. Part of the roof has a maximum area of 3m ² and is a minimum of 1500mm from any similar part.				
b. The roof between the parts is covered with a material rated class A2-s3, d2 or better.				

Figure 15: Limitations on roof coverings (Table 12.1 ADB)

In addition, roof covering products (and/or materials) defined in Commission Decision 2000/553/EC of 6 September 2000, implementing Council Directive 89/106/EEC, can be considered to fulfil all of the requirements for the performance characteristic ‘external fire performance’ without the need for testing, provided that any national provisions on the design and execution of works are fulfilled, and can be used without restriction.

6.5 Solar Panels

The presence of the solar panels and their mounting system may contribute to fire spread across the roof causing greater damage to the roof. Currently there are no UK fire tests to assess the fire spread properties of the solar panels, however the commercially available products are tested to standard UL1703 (UL 1703 Standard for Flat-Plate Photovoltaic Modules and Panels), this standard includes variety of performance test to solar panels including the fire spread properties.

The UL1703 standard classifies the solar panels in terms for fire spread properties ranges from Class C (fundamental fire resistance) to Class A (highest fire resistance).

To pass the test standard, the flame spread may not exceed the following:

- Class A – 1.82m (after 10 minutes exposure to flame)
- Class B – 2.40m (after 10 minutes exposure to flame)

- Class C – 3.90m (after 4 minutes exposure to flame)

It is recommended to use solar panels with Class B or better as tested to UL1703.



7. B5 – Access and Facilities for the Fire Service

7.1 Functional Requirement of the Building Regulations

The functional requirement contained within Schedule 1 Part B5 of The Building Regulations states that:

- (1) The building shall be designed and constructed so as to provide reasonable facilities to assist firefighters 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.

7.2 Access for Vehicles

For the two-storey houses, which are sprinklered, access to within 90m of all parts of the house from where a fire service pumping appliance can park will be required, measured along the path a hose would take.

For the three-storey houses, which are sprinklered, access to within 75m of all parts of the house from where a fire service pumping appliance can park will be required, measured along the path a hose would take.

This is achieved via the proposed road access around the site.

The required dimensions of access routes and hard-standings vary according to the fire appliances that are used, typical access route requirements are provided in Table 18 of BS 9991. The requirements are detailed in the below table:

Table 10: Measurements for pumping appliance vehicle access route (Table 18 of BS 9991)

Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
3.7	3.1	16.8	19.2	3.7	12.5

Any security features added to the access route (e.g. gates), will be provided with a means to override/open/unlock etc to ensure these do not prevent the fire service gaining access to this route.

7.3 Hydrants

A building requires additional fire hydrants if both of the following apply:

- It has a compartment with an area more than 280m²,
- It is being erected more than 100m from an existing fire hydrant.

There are four existing hydrants located around the site, which will be located within 100m (see Figure 16) of the dry riser inlets for each block. Therefore, no additional hydrants are required.

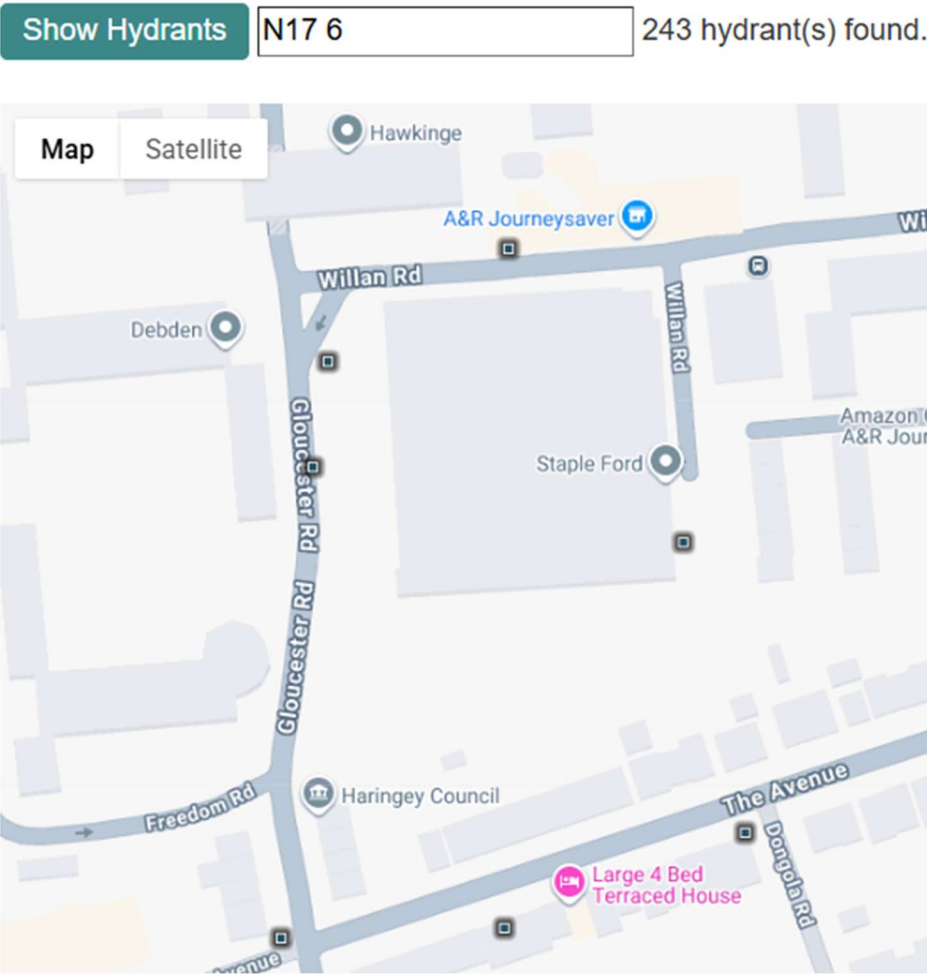


Figure 16: Hydrant locations (taken from RISC Authority Hydrant Mapping tool website)



8. Appendix A – Competency Statement

We can confirm our competency concerning the design of your building project, in alignment with the requirements and standards outlined in the Building Safety Act and PAS 8671.

Since the inception of Maze Fire in 2022 we have worked on ca. 20 health related schemes (including current projects) providing diverse fire consultancy services ranging from RIBA Stage 2 – 4 fire strategy development utilising the latest Approved Document or BS 9991 as appropriate (inclusive of supporting engineering analysis such as CFD smoke modelling), RIBA 5 construction stage support, Planning Gateway 1 statements, London Plan Fire Statements (where applicable), internal fit-out variation reviews, PAS 9980 external wall assessments and fire risk assessments. Maze Fire have also provided 3rd Party review services in relation to high-rise residential projects.

All of our staff either carry similar memberships and/or have been trained internally with demonstrable experience and competence. Individual fire engineers will be members, at varying grades, of one or more of the following:

- Institute of Fire Engineers (IFE);
- Institute of Fire Safety Managers (IFSM);
- Fire Protection Association (FPA);
- The Confederation of Fire Protection Association Europe (CFPA);
- Chartered Association of Building Engineers (CABE).

Our staff have a hugely diverse and rich experience of applying fire engineering principles across the majority of sectors. All engineers work in accordance with our strict quality assurance processes, and all work is reviewed by a more, or equally, experience member of staff. All Maze projects are led by a Principal Consultant (or higher grade).

CV's and certificates are available upon request.

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