FIRE SAFETY STRATEGY, ST EDMUNDS – BENJAMIN HOUSE NW8 7EF

Cooper Group Developments

Carried out by

TRI FIRE

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1 Introduction

1.1 General

Tri Fire Ltd have been commissioned by Cooper Group Developments (St Edmunds) Limited to provide fire safety engineering advice on the proposed single floor extension of Benjamin House project located in London. This document is confidential and for the exclusive benefit of the Client. This strategy report may be used by the end user of the building in the development of any fire safety management procedures and plans considered necessary to fulfil their responsibilities under the Regulatory Reform (Fire Safety) Order 2005 (FSO) and any other applicable fire safety legislation.

It should be noted that any alternative design solutions proposed within this report are subject to formal approval by the relevant Approval Authorities.

1.2 General

The objectives of this report are to:

1. Demonstrate how the fire safety design can meet the requirements of the Building Regulations 2010 (as amended) in terms of life safety, namely;
    a. Regulation 7 – Materials and workmanship
    b. Part B1 – Means of warning and escape
    c. Part B2 – Internal fire spread (linings)
    d. Part B3 – Internal fire spread (structure)
    e. Part B4 – External fire spread
    f. Part B5 – Access and facilities for the fire and rescue service
2. Provide fire safety engineering advice using the guidance given in the BS 9991 and other supporting documentation.
3. Highlight areas of the design that may deviate from the guidance given in BS 9991 and its supporting documentation and propose alternative solutions.

The design approach detailed in this report will ensure that a satisfactory level of occupant safety is attained whilst ensuring that operational requirements and architectural aspirations are achieved. This design approach is concerned only with the life safety of occupants and the main text does not specifically include property protection measures. It is recommended that the client confirms any insurer's requirements that may need to be considered.

1.3 General

This strategy is developed based upon the project documentation referenced in Table 1. This report should be read in conjunction with these drawings and other supporting documentation prepared and submitted by other consultants who are acting on behalf of the design team.

This report is a performance based, strategic design document and shall not contain any detailed construction methods or specify any materials to be used during construction.

Table 1 – Project documentation referenced

Description	Reference	Revision
Site Visit 11.05.2022	-	-
Design Directive 1 – St Edmunds Terrace 2201-20	-	-

1.4 Regulatory Reform (Fire Safety) Order 2005

Under the Regulatory Reform (Fire Safety) Order 2005 each and every owner, occupier and operator of a premises is required to adequately manage the safety of the areas under their control. Under this legislation a 'Responsible Person or Persons' is required to be appointed in order that the necessary level of safety can be implemented, with an inherent necessity for competence in the area of fire safety. The fire authority having jurisdiction has the power to inspect the premises to check that the Responsible Person(s) comply with the duties under the Order and will look for evidence that the Responsible Person(s) has carried out a suitable fire risk assessment and acted upon the significant findings of that assessment.

This report should form part of the information pack handed over to the building operators under Regulation 38 (of the Building Regulations) to aid the Responsible Person(s) in maintaining the fire risk assessment for the premises.

It is important therefore that the Responsible Person takes on board the information provided in this fire strategy when preparing the fire risk assessment reports accordingly to reflect any changes that may need to be made to current fire safety policies and procedures.

1.5 The Construction (Design & Management) Regulations 2015

Projects undertaken within the UK are subject to the requirements of the Construction, Design and Management Regulations (CDM). This report defines the strategy for meeting the functional and performance requirements for fire safety in the finished building only. Where any conclusions or recommendations have been arrived at which specify particular materials, products or forms of construction these will have been assessed, in accordance with CDM Regulation 9 (Duties for Designers). In the event that these involve significant residual risks or health and safety critical assumptions, this information will be made available, to the Principal Designer. Where the architect or other consultants use the standards put forward in this report to specify works, they are understood to be competent in alerting the Client, Principal Designer, Principal Contractor and Building Occupiers of CDM issues.

1.6 Fire Safety Guidance

This report provides a detailed account of the fire safety provisions that will be used to demonstrate compliance with Part B (Fire Safety) of the Building Regulations 2010 (as amended). The principle guidance document to the Building Regulations 2010 (as

amended) adopted for the scheme is BS 9991: 2015, Fire safety in the design, management and use of Residential buildings. Code of practice, along with other associated British Standards. It is noted that these guidance documents, do not set out statutory requirements. They are intended to provide guidance only for generic building designs. An alternative solution can be applied to achieve an acceptable level of safety commensurate with the functional requirements of the Building Regulations 2010 (as amended). Reference is also made to Approved Document B Volume 1 with relation to the latest recommendation on residential sprinkler provision.

On the basis that the recommendations made within the guidance documents are followed, it is considered that the Requirements of the Building Regulations 2010 (as amended) will be fulfilled; and that an adequate level of fire safety will be provided throughout the premises.

1.7 Alternative Fire Engineering Solutions

Fire engineering principles are employed to support alternative solutions where strict adherence to the codes would conflict with the wider aspirations for the scheme. The use of a fire safety engineering approach is recognised within BS 9991 as an acceptable means of complying with the Functional Requirements. Apart from where noted in this report, the design will be in accordance with the recommendations of BS 9991. Departures from the code guidance are identified and alternative solutions proposed following the methodology outlined in PD 7974 where appropriate. In accordance with the fire safety engineering principles detailed in the PD 7974 codes of practice, all fire precautions are determined based on there being one seat of fire, as considered suitable for accidental fires.

2 Project Background

Benjamin House is an existing residential development located in London. The proposed works consists of a single floor extension to the existing building to provide an additional four apartments.

It is noted that all the apartments are provided with a protected entrance hall and that the height to the top habitable floor level is greater than 11m and thus a residential sprinkler system is recommended.

It should be noted that no works are proposed to the existing parts of the building with the exception of the provision of the additional floor. It is not proposed to utilise the exising common corridor smoke control system, however, the existing means of escape stair will be extended up to serve the new floor.

The figure below shows an indicative layout of the proposed extension.

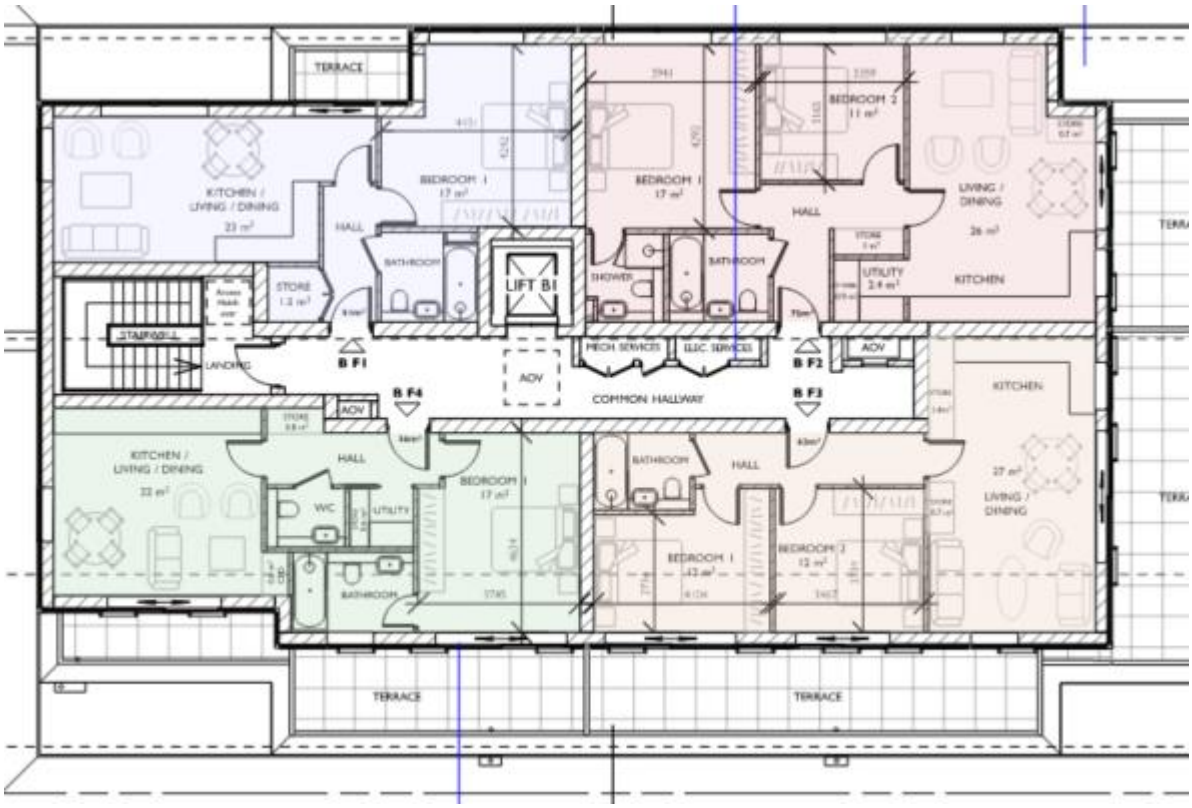

Figure 1 – Site layout plan

3 Fire Safety Systems

3.1 Automatic Detection & Alarm Systems

All flats shall be provided with a protected entrance hall from which all habitable rooms can be directly accessed. Therefore, each of the residential apartments is required to be provided with an independent Category D, LD2 detection and alarm system designed, installed and maintained in accordance with BS 5839-6 -2019+A1-2020.

The communal corridors serving the flats shall be provided with a Category L5 fire detection and alarm system. The primary purpose of this system is to operate the smoke ventilation systems within the corridors. Activation of this system shall not raise an audible or visual alarm to signal an evacuation to the flats. It is recommended for the detector head spacing for the L5 systems within the corridor to follow the recommendations for a Category L4 type system in accordance with BS 5839-1.

3.2 Electromagnetic Locking / Hold-open Devices

Where doors are provided with electromagnetic locking or hold-open devices, these devices are to operate (either release the door to close normally, or release the door to be opened) upon:

- Activation of the detection and alarm system;
- Failure of the power supply;
- Operation of a hand operated switch located to the side of the door;
- Malfunction.

3.3 Emergency lighting

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. Emergency lighting will be installed in accordance with the recommendations of BS 5266, BS EN 1838 and BS EN 60598-2-22.

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. Primary and emergency lighting will be required for any external escape routes that will not be lit by surrounding street lighting. Discharge lighting installations may operate at voltages that are a hazard to firefighters. An exterior discharge lighting installation, or an interior discharge lighting installation operating unattended, operating at a voltage exceeding low voltage (as defined in Statutory Instrument number 1018, part of the Building Regulations), should be controlled by a fire-fighter's emergency switch, installed and situated in accordance with and the requirements of the fire authority.

3.4 Fire safety signage

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 accordance with BS ISO 3864-1, BS 5499-4 and BS 5499-10. 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. Fire notices should be permanently displayed in conspicuous positions throughout the building, including storey exits, and should be specific to it.

All fire doors, other than bedroom doors and lift landing doors, will be marked with the appropriate fire safety sign conforming to BS 5499-1 (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').

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.

3.5 Smoke Ventilation Systems – Communal Corridors

In accordance with BS 9991, the portions of the common corridors serving the stairs are required to be provided with a smoke ventilation system. As per BS 9991, the primary purpose of this system is to protect the staircase enclosure.

Therefore, it is proposed that a 1.5m^2 Automatic Opening Vent (AOV) direct to the outside will be provided from the common corridor for the additional floor.

3.6 Automatic Suppression Systems

In accordance with the recommendations of latest design guidance, as the proposed extension to the building is greater than 11m in height a residential sprinkler system is recommended. It should be noted that the current proposal is for only providing sprinklers to the new apartments on the new floor. This approach will need to be discussed and agreed with the approving authority.

3.7 Emergency (life-safety) power supply

All life-safety systems will be provided with robust power supplies in accordance with Figure 1 or 2 of BS 8519. 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;
- Automatic smoke ventilation systems;

- Fire and smoke curtains.

There must be minimal delay in change over if the main power fails and it must occur automatically. In accordance with BS9991, power supplies should be provided via two separate intakes into the building from the same external substation or via a single intake and a standby generator.
Where neither of these options is technically viable, e.g. a risk assessment has been undertaken which concludes that a life safety generator would not be suitable, a single intake from the external substation may be provided as the only alternative option remaining, provided that the following recommendations are met.

The life safety system should be connected to an independent distribution board used exclusively for that system. The life safety distribution board should be clearly marked at the point of isolation with a warning explaining that isolation would switch off the life safety system. The life safety distribution board should be located in a separate fire-resisting enclosure (with a minimum of 60 minute fire-resisting construction) to the primary main electrical distribution board and should not be accessible directly from the communal areas of the building or from a part of the building where dual supply is required (such as a shaft serving an evacuation lift). The enclosure surrounding the primary main electrical distribution board should be provided with a minimum of 60 minute fire-resisting construction.
The substation or transformer room should be either located outside the building, or separated by 120 minute fire-resisting construction and directly accessible from the outside. The diverse (primary and secondary) power cables should only come together in the fire compartment housing the control panel by means of an automatic change-over switch, unless the cable route is via a fire compartment which does not open onto areas requiring protection via the relevant life safety system.

3.8 General Provisions

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. 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.
- On loss of power or system error.
- On activation of a manual door release unit (Type A) that is designed to BS EN 54-11 and is 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.

Doors should generally be hung to open in the direction of escape and should always do so where the number of persons expected to use the door at the time of a fire is more than 60. In corridors, where escape is possible in two directions doors are to swing in both directions.

Vision panels should be provided where doors on escape routes sub-divide corridors, or where doors are hung to open in both directions.

4 Means of Escape and Warning

4.1 Evacuation Philosophy – Residential Areas

A 'stay-put' (also known as 'defend-in-place') strategy will be implemented in all residential units, whereby, in the event of fire, only the unit of fire origin will receive a signal to evacuate. No other units / areas shall receive a signal to evacuate.

4.2 Horizontal Means of Escape – Internal Flat Design

All flats shall be provided with a protected entrance hall with a minimum of 30 minutes fire resistance. Each habitable room shall be accessed directly from the protected entrance hall. The maximum travel distance within the protected entrance hall shall be limited to 9m. It is understood that there shall be no open plan flats (i.e. flats where the bedroom is an inner room) within this development.

4.3 Horizontal Means of Escape – Common Corridors / Lobbies – Upper Floor Levels

The maximum travel distance within the common corridor (measured from the flat entrance door to the door enclosing the escape stair) is less than 7.5m. However, in accordance with the recommendations outlined in BS 9991 when sprinklers areprovided this travel distance can be increased to 15, Measuring from the drawings these limits are not exceeded as the single direction of travel is a maximum of 13m and thus comply with the recommendation of BS 9991.

4.4 Horizontal Means of Escape – Final Exit Level

It is proposed to use the existing final exit from the building and thus as no changes are proposed to this area and the fact that the situation is not being made any worse is approach is considered reasonable.

4.5 Vertical evacuation – Upper Floor Levels

All stairs are required to have a minimum clear width of 750mm. Upon review, this has been adhered to within the design as the stair is greater than 1200mm in width. Handrails which do not intrude more than 100mm into the clear escape route width may be disregarded as impacting upon the recommended width.

4.6 Fire doors and escape doors

All doors on escape routes will either not be provided with a securing device, or be provided with a securing device that is easily openable without the use of a key and without having to manipulate more than one mechanism. The escape provisions should be coordinated with the security / access design. Any fire doors fitted with hold-open devices, including cross-corridor doors should release on:

- actuation of the fire alarm system;
- manual operation or operation of a hand-operated switch fitted in a suitable position, if necessary; and

- failure of the electricity supplies.

Doors fitted with an electronic latch (e.g. operated by a swipe card reader) on the un-secure side (e.g. leading to plant areas, etc.) should have door latches operated by a handle on the secure side (so people inside the room will always be able to get out).
Vision panels will be provided in doors that swing in both directions and in doors subdividing corridors on escape routes. Other vision panels may be required as part of accessibility requirements. Fire doors will be specified in accordance with section 6.3. Fire door assemblies will comply with:

1. BS 476-22 [1] or BS EN 1634-2 [2] for fire resistance; and where applicable
2. BS 476-31 [3] or BS EN 1634-3 [4] for smoke leakage.

4.7 Fire safety signage

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 accordance with BS 5499-4 [5] and BS 5499-10 [6].

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.

5 Internal Fire Spread - Linings

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. 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. 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. All wall and ceiling linings within the building should meet the recommendations in Approved Document B, Table 4.1

Classification of linings

4.1 The surface linings of walls and ceilings should meet the classifications in Table 4.1.

Table 4.1 Classification of linings

Location	Classification
Small rooms of maximum internal floor area of 4m²	D-s3, d2
Garages (as part of a dwellinghouse) of maximum internal floor area of 40m²	
Other rooms (including garages)	C-s3, d2
Circulation spaces within a dwelling	
Other circulation spaces (including the common areas of blocks of flats)	B-s3, d2[1]

NOTE:

1. Wallcoverings 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.

Figure 2 – Surface spread of flame for internal linings

6 Internal Fire Spread - Structure

6.1 Automatic fire suppression

Based on the height of the extension to the building being greater than 11m in height an automatic suppression system is recommended to be provided within new apartments on the new floor only. This approach will need to be discussed and agreed with the approving authority.

6.2 Structural fire resistance

In accordance with BS 9991, the height of the building is taken from ground level to the finished floor level of the top storey. The ground level is measured from the lowest ground level adjoining a building. In accordance with the definitions within the building regulations, a 'building' can refer to part of a building or an entire structure.

The height of the building when the new floor is provided is less than 18m when measured from access level to the building and thus in line with the recommendation of BS 9991 the elements of structure need to achieve 60 minutes fire resistance.

6.3 Compartmentation and fire-resisting construction

All floors are required to be designed as compartment floors with the same period of fire resistance as the building structure. Walls separating flats from all other areas are required to be designed as compartment walls with a minimum of 60 minutes fire resistance.

All stairs, service shafts, lift shafts and smoke shafts are required to have at least the same fire resistance as the compartment floors they penetrate.

The following fire resistance requirements apply to this development based on the information above:

Table 2 – Periods of fire resistance

Elements	Fire Resistance (minutes)
Structure	60
Floors (compartment floors)	60
Walls between apartments	60
Walls between apartments and corridor	60
Protected stair	60

6.4 Fire Doors

Fire doors should be provided in all fire rated enclosures in accordance with BS 476-22. Where required, fire doors shall be specified with cold smoke seals in accordance with BS 476.

The required fire performance of the doors is shown in Table 3 below:

Table 3 – Fire door provisions

Location	Fire Resistance (minutes)
Door within protected entrance hall	FD20
Door to residential apartment	FD30s
Door to lifts	FD30
Door to protected stair	FD30s
Door to Risers	Refer to Section 6.5 of this report.

6.5 Risers

Risers throughout the building can be protected in two methods:

Method 1: Vertical Riser – This method permits the riser to be open throughout the entire height of the building. The enclosure of the riser will have the same fire resistance as the compartment floor through which it passes. The door to the riser will be 30 minutes fire rated. Grillage at each floor level should be provided to prevent falls; or

Method 2: Vertical riser with fire stopping at compartment floor – The horizontal compartmentation is continued inside the riser at each floor level. The fire resistance inside the riser therefore has the same fire resistance as the compartment floor. The vertical enclosure of the riser and the door to the riser will not require any fire resistance rating.

6.6 Fire-stopping and penetrations through fire-resisting construction

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 to achieve the same fire resistance as the separation.

All pipes, ductwork and services passing through fire-resisting separations should 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. Further information is available in Table 10 of BS 9991 which has been outlined below for ease of reference.

Table 10 **Maximum nominal interior diameter of pipes passing through a compartment wall/floor**

Dimensions in millimetres

Situation	Maximum nominal internal diameter		
	a) Non-combustible material [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 which 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 non-combustible material (such as cast iron or steel) which, if exposed to a temperature of 800 °C, does not soften or fracture to the extent that flame or hot gas passes through the wall of the pipe.

[B] uPVC pipes conforming to BS 4514 and uPVC pipes conforming to BS 5255.

[C] These diameters are only in relation to pipes forming part of an above-ground drainage system and enclosed as shown in Figure 29. In other cases the maximum diameters against situation 3) apply.

Figure 3 – Pipe dimensions passing through a compartment wall/floor

Where ducts cross 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. 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".

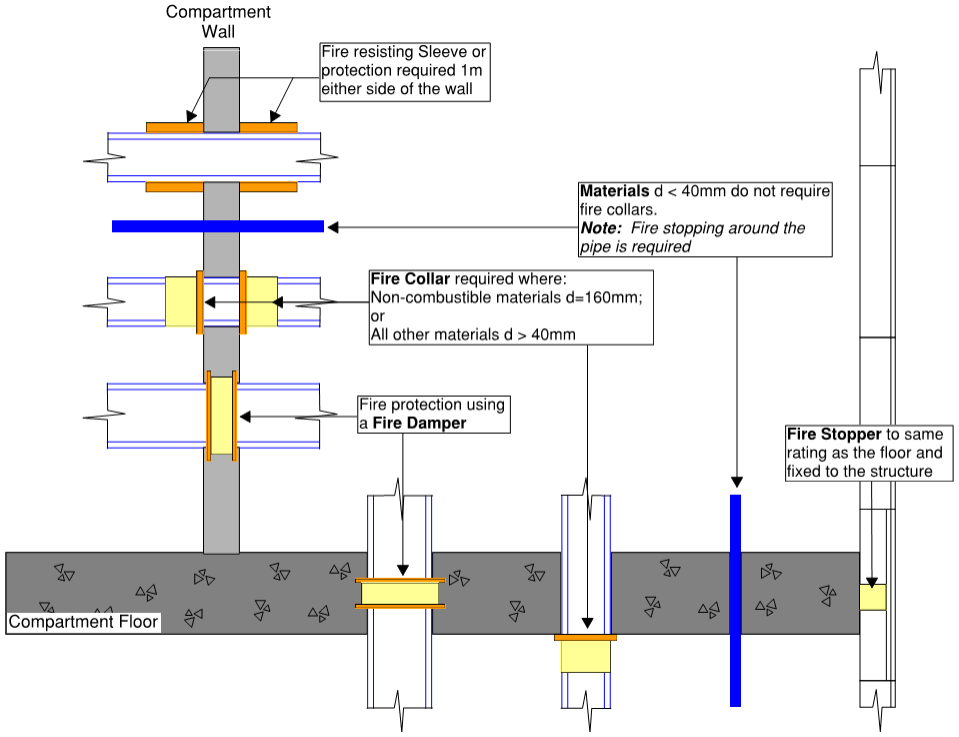

Figure 4 – Penetration protection

Where ducts cross 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. All ductwork serving the kitchen should not be fitted with dampers, instead the duct should be fire resisting or be enclosed within fire resisting (this includes both inlet and extract ductwork).

6.7 Concealed Spaces

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.

All cavity barriers should have a fire resistance rating of at least 30 minutes for integrity (E) and 15 minutes for insulation (I). Concealed cavities require cavity barriers to sub-divide them, in accordance with Approved Document B. These recommendations are summarised as:

- Cavity barriers should be provided within the external wall cavity:
    - to seal around any openings (windows or doors) in the external wall and to close the top of the cavity wall;
    - be positioned so as to align with the internal fire-resisting walls and floors; and
    - to limit the extent of wall cavities, unless constructed in accordance with Diagram 5.3 of Approved Document B.
- 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. However, given the high degree of internal sub-divisions and that all internal walls are proposed to extend up to soffit level (i.e. underside of the slab overhead), there will be limited internal extensive cavities.

Cavity barriers provided around an opening 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.

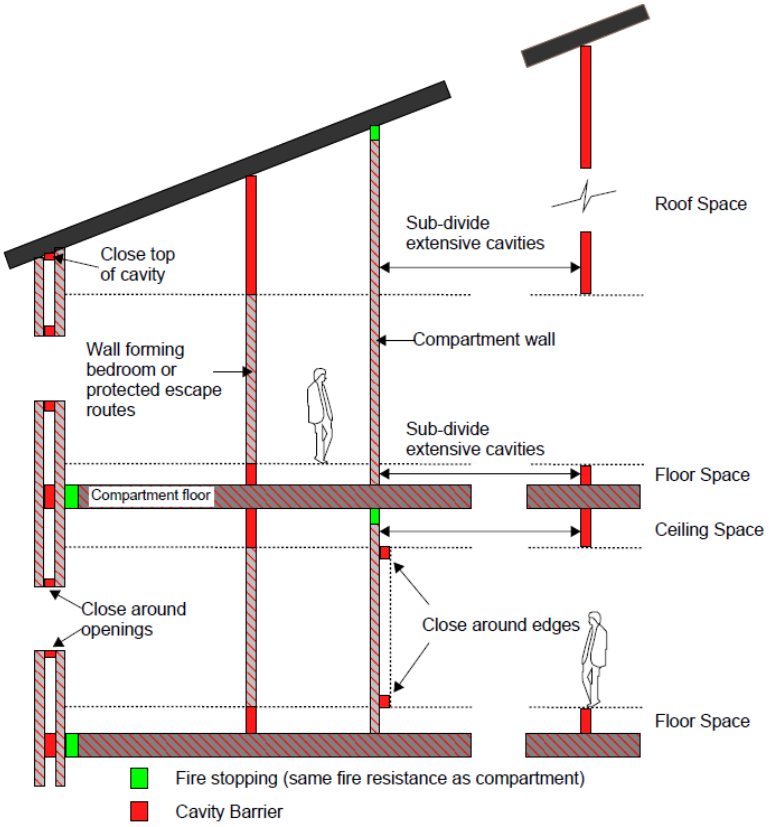

Figure 5 – Fire stopping and cavity barrier provision

7 External Fire Spread

7.1 External Wall Construction

External walls should be constructed such that they will not support fire spread at a speed that is likely to threaten people in or around the building. External wall surfaces near other buildings should not be readily ignitable, to avoid fire spread between buildings.

In accordance with Regulation 7(1), building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled "Fire classification of construction products and building elements. Classification using test data from reaction to fire tests" (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November 2009.
Note: a "relevant building" means a building with a storey (not including roof-top plant areas or any storey consisting exclusively of plant rooms) at least 18 metres above ground level and which–

- contains one or more dwellings;
- contains an institution; or
- contains a room for residential purposes (excluding any room in a hostel, hotel or boarding house); and
- "above ground level" in relation to a storey means above ground level when measured from the lowest ground level adjoining the outside of a building to the top of the floor surface of the storey."

The information in paragraph 7.1.3 does not apply to:

- cavity trays when used between two leaves of masonry;
- any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;
- door frames and doors;
- electrical installations;
- insulation and water proofing materials used below ground level;
- intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
- membranes;
- seals, gaskets, fixings, sealants and backer rods;
- thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1; or
- window frames and glass.

As this building is less than 18m in height and therefore not a relevant building and in accordance with the recommendations of ADB, there is no restrictions on the products that can be used in the construction of the external wall. However, it is a strong suggestion of this report tht all materials used in the construction of the external wall are Class A2 or better.

7.2 External Surfaces

The external surfaces of the walls should comply with the Table 10.1 of ADB which has been included below for ease of reference. The provisions in the table below apply to each wall individually in relation to its proximity to the relevant boundary.

Table 10.1 Reaction to fire performance of external surface of walls

Building type	Building height	Less than 1000mm from the relevant boundary	1000mm or more from the relevant boundary
'Relevant buildings' as defined in regulation 7(4) (see paragraph 10.10)		Class A2-s1, d0[1] or better	Class A2-s1, d0[1] or better
Assembly and recreation	More than 18m	Class B-s3, d2[2] or better	From ground level to 18m: class C-s3, d2[3] or better From 18m in height and above: class B-s3, d2[2] or better
	18m or less	Class B-s3, d2[2] or better	Up to 10m above ground level: class C-s3, d2[3] or better Up to 10m above a roof or any part of the building to which the public have access: class C-s3, d2[3] or better[4] From 10m in height and above: no minimum performance
Any other building	More than 18m	Class B-s3, d2[2] or better	From ground level to 18m: class C-s3, d2[3] or better From 18m in height and above: class B-s3, d2[2] or better
	18m or less	Class B-s3, d2[2] or better	No provisions

Figure 6 – External wall surface spread of flame

It is noted from Table 10.1 of ADB that as each façade is more than 1m from the boundary and is less than 18m in height therefore there are no provisions for the external wall surface spread of flame.

7.3 Roof coverings

The relevant test and classification standards for the external fire performance of roof systems are BS 476-3 and BS EN 13501-5.

The properties of a roof covering are only of relevance:

- If the roof is close enough to a boundary to be at risk of ignition from a fire in other buildings;
- In the vicinity of a compartment wall to avoid fire spread between compartments via. a roof covering.

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.
Table 7 below summarises the separation distances from the boundary according to the type of roof covering as described in Table 12.1 of ADB.

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 1500m³.
3. Acceptable on buildings not listed in (1) if both of the following apply.
   a. Part of the roof has a maximum area of 3m² 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 7 – Roof covering provisions

For this building as the distances to the boundary is less than 6m the roof coverings must achieve Broof(t4).

7.4 Space separation and unprotected façade areas

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. This area is known as the unprotected area. The distance of the building from other buildings, the use of the building and the compartment size are all factors in determining the acceptable degree of unprotected area for each elevation.
Only small unprotected areas in an otherwise protected façade do not contribute to the extent of unprotected area. These are shown in Figure 10 from Figure 21 of BS 9991.

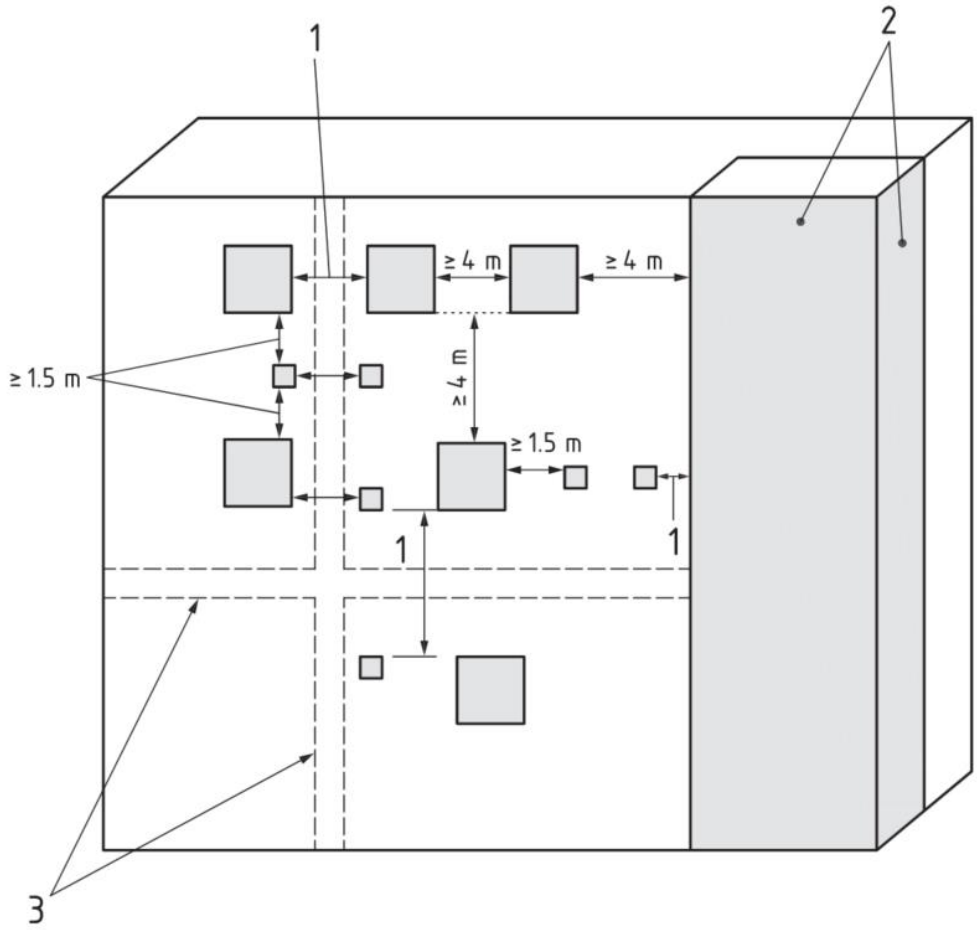

Figure 8 – Small unprotected areas

The relevant boundaries can be taken to:

- The site boundary;
- A notional boundary created on the centreline of an adjacent carriage way; or
- A national boundary created midway between this building and the nearest adjacent building.

Using the calculation process outlined in BR 187 "External fire spread: building separation and boundary distances" an analysis of the distance between the building and the adjacent site boundaries suggests that the protected areas to external façades should be in accordance with Table 4 and Figure 9 which outlines the facades naming system this assessment has been based on.

As recommended in BR 187, different radiation intensities have been applied, depending on the different occupancy types, as follows:

- 84kW/m^2 for residential & office spaces;
- 168kW/m^2 for retail, loading bay and other ancillary accommodation;

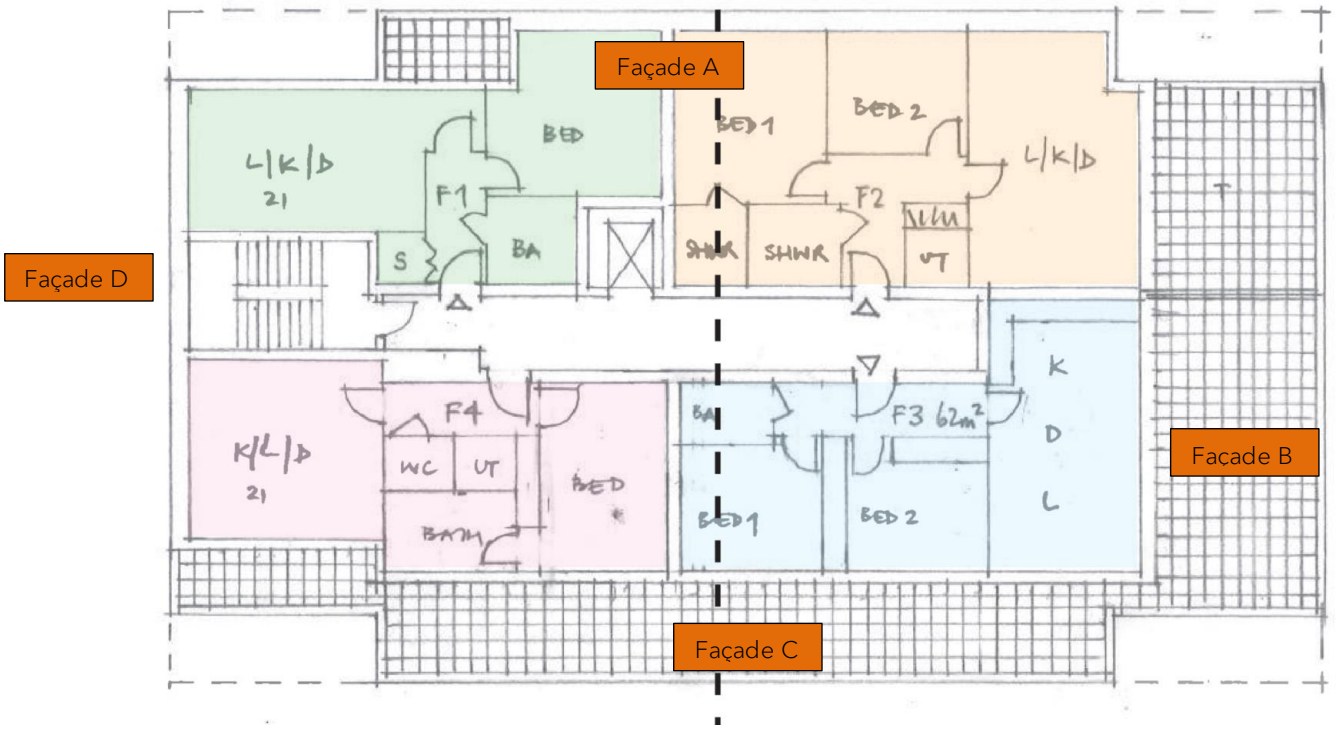

Figure 9 – External fire spread facades

Table 4 – External fire spread assessment

Façade	Storey of Flat	Length x height (m x m)	BRE Length x BRE height (m x m)	Distance required (m)	Available Distance (m)	Acceptable (Y/N)
A	4th Floor	11.91 x 3.00	12.00 x 3.00	3.50	10.00	Y
B	Ground	6.95 x 3.00	9.00 x 3.00	3.50	9.00	Y
C	Ground	11.63 x 3.00	12.00 x 3.00	3.50	5.00	Y
D	Ground	4.55 x 3.00	12.00 x 3.00	3.50	12.00	Y

From Table 4 it is noted that all the facades are permitted to be 100% unprotected. However, the available distances to site or notional boundaries should be confirmed to Tri-Fure as being accurate and correct.

8 Access and Facilities for the Fire and Rescue Service

8.1 Overview

The recommendations of BS 9991 suggests that the requirements of the Building Regulations 2010 can be satisfied through provision of:

- access between the building entry points to affect rescue and fire-fighting operations; and
- sufficient fire-fighting water supply and facilities to assist fire-fighters in their tasks.

The fundamental objective of all these provisions is to ensure that the FRS can rapidly attend the development and once on site, they can proceed to the scene of operations without undue delay caused by the nature and characteristics of the development. In the event of fire, the fire and rescue service will be notified by a member of staff or member of the general public.

8.2 Firefighting Shafts

Based on the height of the building following the completion of the extension being less than 18m in height when measured from fire service access level to the finished floor level firefighting shafts are not required. Notwithstanding the information above, dry rising mains shall be required within the escape stair.

8.3 Vehicle access to and around the site

The existing provisions are not being altered and therefore considered reasonable.

8.4 Access into and through the building

The existing provisions are not being altered and therefore considered reasonable. However, it is proposed that a new dry riser outlet will be located within the stair of the new floor.

8.5 Water supplies

The existing provisions are not being altered and therefore considered reasonable.

9 Fire Safety Management

Overview

Management procedures have a pivotal role to play in fire prevention, control and evacuation of occupants should a fire incident occur. Within domestic dwellings, this management is the responsibility of tenants, 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.

This section is intended to introduce the FSO, its obligations and provide initial guidance in fulfilling these duties. 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.

Regulatory Reform (Fire Safety) Order 2005

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.

In workplaces, the responsible person is the employer. In other cases, the owner or person in control of the premises is the responsible person. 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.

The act also extends the duties and obligations of the responsible person to anyone who has any extent of control over the premises. Some examples include a branch manager, building supervisor, the facilities management company and the head teacher of a school.

Management responsibilities in support of the fire strategy

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. This should be a senior appointment preferably at Head or Deputy-Head level. 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.

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:

- managing the building to minimise the incidence of fire (fire prevention); 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 or unusual construction materials such as sandwich panels)
- being aware of their responsibilities towards disabled people
- being in attendance on the premises whenever members of the public are present or when the building is occupied. It is acceptable for a competent person other than the fire safety manager to be in attendance at such times, 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 public areas are suitably controlled
- ensuring that tenants, concessionaires and caretakers are appropriately briefed
- ensuring that all necessary and 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 exit doors/passageways are kept unobstructed and doors operate correctly
- ensuring that fire detection and protection systems are maintained and tested and proper records are kept; and
- ensuring any close down procedures are followed

Good housekeeping will be encouraged to ensure that the effectiveness of the fire safety provisions are not adversely affected. This will include the adequate provision for the disposal of waste and / or rubbish. Where appropriate, these facilities will be emptied on a daily basis and the rubbish stored in a suitable area outside the building. Maintenance procedures will be developed to ensure that all equipment and services are able to operate effectively. Maintenance staff will be trained in the importance of the fire safety systems and planned maintenance programmes developed.

It is recommended that all held-open doors should be released overnight to reduce the risk of the doors distorting. They should also be checked regularly to ensure they close correctly on activation of the fire alarm.

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

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 and manufacturer's guidelines should be followed with respect to maintenance and replacement of their products. Display features or items such as posters, artwork pieces, etc. may be included with appropriate consideration, justification and on-going control