

Outline Fire Strategy

Project Name	Belvedere
Client	Bellway
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Author	Elodie Maurice Christy
Reviewer	Shaun McKeever

Scope of Report

This outline fire strategy has been produced at RIBA Stage 2 to provide a review of the fire safety provisions that will be provided for the Belvedere development, Kent. It summarises the basic principles applied to the building, the guidance adopted, and will highlight any areas of concern.

Relevant Guidance

The block of flats and houses have been designed to the guidance within Approved Document B (ADB) Volume 1 2019 including amendments up to June 2022.

Part B of the Building Regulations 2010 consists of 5 parts: B1-B5. This document will review each area in turn.

General Building Description

Belvedere development is a collection of 11 blocks of flats and houses. The proposed blocks of flats consist of residential use except for Block B, as of the ground floor is commercial use only and the upper floors are residential.

All blocks of flats are single stair buildings. Buildings A and F are designated as small single stair buildings as they have no more than 3 storeys above ground level.

Buildings B, C & E are split into two blocks a with single stair configuration. These blocks do not have internal access between each other.

Buildings B and C consist of duplex flats at ground and first floor only.

An evacuation lift is provided to all blocks of flats. As the height of the top floor level of all buildings are less than 18m above ground floor level, the required minimum structural fire resistance is 60 minutes.

All blocks of flats are accessed from an entrance lobby at ground floor level, providing access to a vertical core that continues to upper levels. Flats are currently proposed to comprise of a single or double storey with protected entrance halls.

As the height of top occupied storey of Building A and F are less than 11m, sprinklers are not required. However, sprinklers are required to all other blocks of flats.

The houses across the site are three storey properties.



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Figure 1 - Ground floor site plan of all buildings

The proposed 11 blocks of flats and houses ranges from 3-5 storeys

Building	Storeys	Approximate top storey height*
A1	4	9m
A2	4	9m
A3	4	9m
A4	4	9m
A5	4	9m
B	5	12m
C	5	12m
D1 (houses)	3	6m
D2(houses)	3	6m
D3(houses)	3	6m



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Building	Storeys	Approximate top storey height*
D4(houses)	3	6m
D5(houses)	3	6m
D6(houses)	3	6m
D7(houses)	3	6m
E1&E2	5	12m
E3&E4	5	12m
E5&E6	5	12m
F	4	9m

*Based on the assumption of 3m floor to floor height

B1 – Means of Escape

Fire Alarm and Detection

In this development, all blocks of flat fitted with a sprinkler system will require a minimum of a Grade D2 LD1 fire detection and alarms system in accordance with BS 5839 Part 6 and LD2 for non-sprinklered buildings, with detection throughout each flat. This means occupants will be afforded as early warning as possible and leave their flats in the early stages of fire to safely escape the building. The lifts within any development will only go to ground once smoke has been detected in the communal areas, which means they will be available for any occupants escaping in the early stages of fire development. Evacuation lifts are provided to all blocks of flats.

A category LD2 fire detection and alarm system, in accordance with BS 5839-6 will be provided in all houses. This will likely include a heat detector in the kitchen and smoke detector within the stair/hallways. Where a separate lounge is provided, this will also be provided with a smoke detector.

The proposed minimum level of fire detection and fire alarm system for the commercial areas is Category L2/M in accordance with BS 5839 Part 1. Manual call points will be provided at every exit in the commercial areas from the building. Detectors will be installed in all commercial escape routes, rooms opening onto them and areas of special fire risk.

Evacuation Strategy

The block of flats are designed to operate a 'stay put' evacuation strategy. A 'stay put' policy involves the following approach:

- When a fire occurs within a flat, the occupants alert others in the flat, make their way out of the building and summon the fire and rescue service.
- If a fire starts in the common parts, anyone in these areas makes their way out of the building and summons the fire and rescue service.
- All other residents not directly affected by the fire would be expected to 'stay put'
- and remain in their flat unless directed to leave by the fire and rescue service.



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Any ancillary spaces, such as the cycle storage, refuse areas and plant areas will operate a simultaneous evacuation strategy where any occupants of these spaces will evacuate immediately once they become aware of a fire.

There are commercial units provided on the ground floor in Building B. There is no internal access or share escape routes between the commercial and residential areas in this building. The commercial areas will operate a simultaneous evacuation strategy where any occupants of these spaces will evacuate immediately once they become aware of a fire.

Houses have been designed to individually operate a simultaneous strategy, so that any occupants of a house would evacuate immediately on becoming aware of a fire.

Escape from houses

Three storey houses will have a 30-minute protected stair, with minimum FD20 fire doors to any rooms. The bathroom does not require a fire door, provided the 30-minute protection encloses the bathroom within the hallway.

All habitable rooms will open directly onto a protected hall/stairway leading to a final exit.

Escape within Flats

All flats have an internal hallway and must be constructed to be 30 minutes fire resistance with at least FD20 fire doors. The distance from the flat entrance door to the furthest door into a habitable room must be no more than 9m. Where cupboards are located within the protected hallways, they will be separated by 30-minute fire resisting construction with FD30 fire doors. The bathroom does not require a fire door, provided the 30 minute encloses the bathroom within the hallway. However, if this does occur, FD30 fire doors will be provided to the bathroom.

Flat entrance doors should be FD30S fire door sets.

Horizontal Escape

Buildings A1-A5

Buildings A1-A5 are small stair buildings having no more than 3 storeys above ground level with a travel distance within 4.5m from the furthest flat to the stair door, therefore, do not require smoke control.

Buildings A1-A5 require a minimum 1m² OV at the head of the stair and all other buildings require a minimum of 1m² AOV at the head of the stair.

Building B

Building B split into two blocks, B1 and B2 with a single stair configuration. These blocks do not have internal access between each other. The two blocks consist of 2-bed and 3-bed duplex flats at ground and first floor only. The lobby to the stair must be ventilated by a 1.5m² AOV shaft therefore, the distance from the stair lobby door to the furthest flat entrance door can be up to 7.5m in a single direction of travel.

Building C

Building C split into two blocks, C1 and C2 with a single stair configuration. These blocks do not have internal access between each other. The two blocks consist of 2-bed duplex flats at ground and first floor only. The lobby to the stair must be ventilated by a 1.5m² AOV window therefore, the distance from the stair lobby door to the furthest flat entrance door can be up to 7.5m in a single direction of travel.



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Buildings E1 to E6

Building E1&E2 are split into two blocks with a single stair configuration and do not have internal access between them. The lobby to the stair must be ventilated by a 1.5m² AOV window therefore, the distance from the stair lobby door to the furthest flat entrance door can be up to 7.5m in a single direction of travel.

Building E3&E4 are split into two blocks with a single stair configuration and do not have internal access between them. The lobby to the stair must be ventilated by a 1.5m² AOV window therefore, the distance from the stair lobby door to the furthest flat entrance door can be up to 7.5m in a single direction of travel.

Building E5&E6 are split into two blocks with a single stair configuration and do not have internal access between them. The lobby to the stair must be ventilated by a 1.5m² AOV window therefore, the distance from the stair lobby door to the furthest flat entrance door can be up to 7.5m in a single direction of travel.

Building F

Building F is a small stair building having no more than 3 storeys above ground level with a travel distance within 7.5m from the furthest flat to the stair lobby door, therefore the lobby to the stair must be ventilated by a 1.5m² AOV shaft.

Vertical Escape

All blocks of flats will have a protected stair, which will be 1100mm in width.

The stairs in Blocks of flat except for Block A are protected from the flats by a ventilated lobby at every floor level.

A 1m² AOV will be provided at the head of each. The escape route from the stair cores in all blocks are directly to open air via an entrance lobby and must be kept free from fire loading, and the escape route must be kept completely clear.

Every protected stairway should lead to a final exit, either directly or 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 in accordance with 3.81 of Approved Document B.

The ground floor escape routes from each building must be provided with the necessary ventilation from ancillary areas and protection from any high hazard spaces.

Mobility Impaired persons

The relevant fire safety design guidance for residential Blocks of flats requires no specific measures for disabled occupants. This is because the 'stay put' evacuation strategy is based on only the occupants within the flat of fire origin evacuating when they become aware of fire.

Sprinklers

As the height of top occupied storey of Building A and F are less than 11m, sprinklers are not required. However, sprinklers are required for all other blocks of flats, this also includes the commercial units at ground level for Building B. Houses are not required to be sprinklered.

The residential sprinkler system will be provided to all dwellings in accordance with BS 9251:2021. This will be to category 2 system (30-minute duration) as the buildings are less than 18m in height. All ground floor 'residential ancillary areas', for example any corridors, entrance lobbies, plant rooms and cycle stores and commercial areas will also be sprinkler



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protected using with BS 9251:2021 as the commercial units will be less 100m². Detailed designs of the sprinkler system will be carried out by a LPCB approved contractor.

B2 – Internal Fire Spread (Linings)

The below table should be adhered to when specifying surface linings:

Location	European Class
Small rooms of area not more than 4m ²	D-s3, d2
Other rooms (Including garages)	C-s3, d2
Circulation spaces within dwellings	
Other circulation spaces, including the common areas of blocks of flats	B-s3, d2

B3 –Internal Fire Spread (Structure)

Elements of Structure

The party wall between Block of flats and houses should offer a fire resistance of 60 minutes as all buildings are less 18m.

Any commercial units should be separated from the remainder of the building by the fire time of the building which 60 minutes fire resistance.

Compartmentation

Houses

Three storey houses require 60 minutes structural fire resistance.

All houses should be separated from one another by 60 minutes fire resistance, with any internal floors offering 30 minutes protection. This is in addition to the 30-minute protected internal stair, which acts the same as a protected internal hallway within flats.

Flats

In blocks of flats, all floors should be constructed as compartment floors meeting the fire rating of the elements of structure; 60 minutes fire resistance.

Any compartment walls, or sub-division within corridors, should be provided with 60 minutes fire resistance.

Stairs and lifts should be enclosed and separated from the remainder of the building by 60 minutes fire resistance.

All corridors should be constructed as protected corridors, with 60 minutes fire resistance.

Any high hazard rooms should be contained within 60 minutes fire resisting construction.

Service risers will conform to the fire rating of the building, 60 minutes. This can be achieved by containing the shaft as a whole or at each floor level. The service risers must not be accessed within the stairs.

Any stores and any ancillary accommodation spaces be separated from the residential areas of the building, enclosed in 60 minutes fire resisting construction with FD30S doors. Any high hazard rooms within the ancillary spaces, should be enclosed in 30-minute construction, with FD30S fire doors.



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Each flat should be enclosed in 60 minutes fire resisting construction horizontally; between the flat and the corridor, and between flats. Any vertical separation between flats should meet the elements of structure requirement of 60 minutes.

Internal protected hallways within flats, where required, should be provided with 30 minutes fire resistance. This includes walls to cupboards accessed off the hallway.

B4 – External Fire Spread

A review of the external fire spread has been carried out, against the criteria outlined in BR 187. The extent of unprotected openings for the elevations of the buildings close to the site boundary has been assessed. The other elevations from the buildings that are close to the road have no limitation on the extent of unprotected areas of the façades. Unprotected opening does not only include windows and doors, rather it applies to any part of the elevation that is not fire resistant. The permitted unprotected percentage can be doubled if sprinklers are provided to the buildings. As the proposed buildings do benefit from compartment floors, the opening height will be taken to be one storey level. The width of the elevations is taken on a compartment-by-compartment basis.

There is a house in proximity to the site boundary shown in Figure 5.

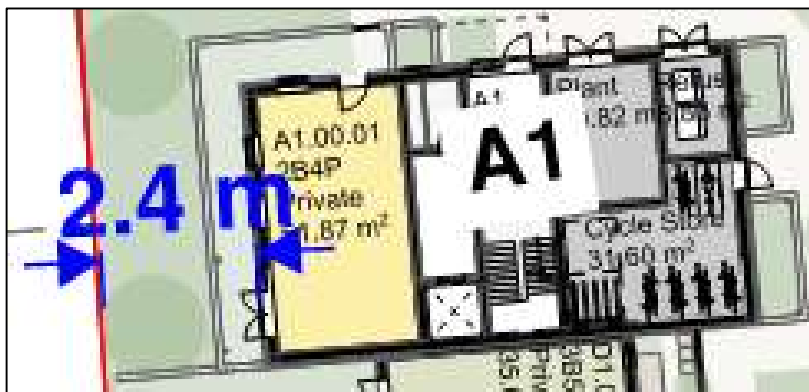


Figure 2 - Site plan of Building A1

Block A1

- West Elevation– Area of elevation is 3.9m x 3m. which gives an appropriate enclosing rectangle of 6m x 3m. With a notional boundary distance of 2.4m, the permitted unprotected opening is 80% of the 18m² area which is 14.4m².
- South Elevation– This elevation shares a party wall with House D1.00.01, therefore, this elevation is required to be 100% protected with 60 minutes fire resistance in accordance with Approved Document B.



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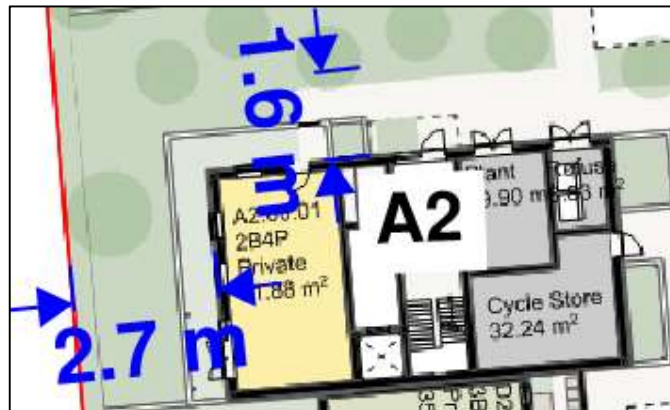


Figure 3 - Site plan of Building A2

- North Elevation– Area of elevation is 2.1m x 3m. which gives an appropriate enclosing rectangle of 3m x 3m. With a notional boundary distance of 1.6m, the permitted unprotected opening is 75% of the 9m² area which is 6.8m².
- West Elevation– Area of elevation is 3.9m x 3m. which gives an appropriate enclosing rectangle of 6m x 3m. With a notional boundary distance of 2.7m, the permitted unprotected opening is 95% of the 18m² area which is 17.1m².
- South Elevation– This elevation shares a party wall with House D2.00.01, therefore, this elevation is required to be 100% protected with 60 minutes fire resistance in accordance with Approved Document B.

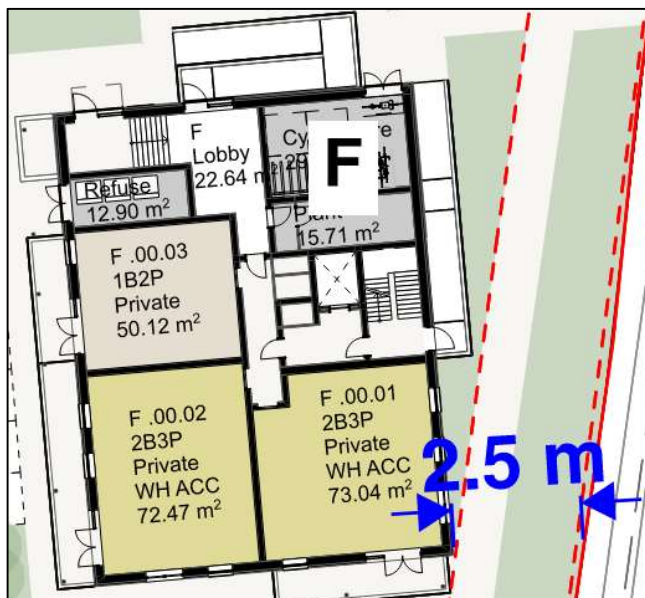


Figure 4 - Site plan of Building F

- East Elevation– Area of elevation is 3.6m x 3m. which gives an appropriate enclosing rectangle of 6m x 3m. With a notional boundary distance of 2.5m, the permitted unprotected opening is 90% of the 18m² area which is 16.2m².



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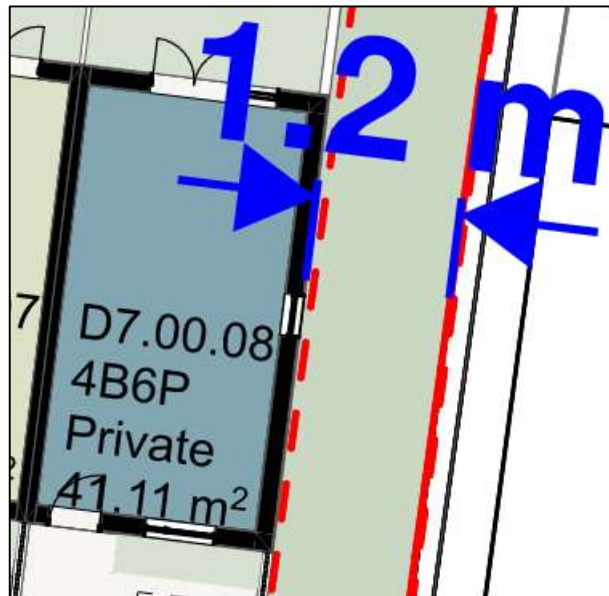


Figure 5 - Site plan of House D7.00.08

- East Elevation– Area of elevation is 3.6m x 3m. which gives an appropriate enclosing rectangle of 6m x 3m. With a notional boundary distance of 1.2m, the permitted unprotected opening is 35% of the 18m² area which is 6.3m².

There is no limitation on the extent of unprotected areas of the other façades of all buildings as the nearest boundaries are over 3m in any direction.

External Wall Construction

The materials present, and that will be used, must comply with the requirements of the amendments to Regulation 7 of the Buildings Regulations. This includes all external wall materials and roof coverings.

The external wall of a building should not provide a medium for fire spread. Combustible materials and cavities in external walls and attachments to them can present such a risk.

The below table details the surface lining ratings recommended for the external walls.

Building Type	Building Height	Less than 1m from the relevant boundary	1m or more from the relevant boundary
All 'residential' purpose groups	More than 11m	Class A2-s1, d0 ⁽¹⁾ or better	Class A2-s1, d0 ⁽¹⁾ or better
	11m or less	Class B3-s3, d2 or better	No provisions



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B5: Access and Facilities for the Fire Service

Buildings A1-A5 and houses are not fitted with fire mains and should have vehicle access for a fire appliance not more than 45m from all points within each flat, measured on a route suitable for laying hose. Hydrants should be provided within 90m of an entry point to the building and not more than 90m apart.

All other blocks of flats must be provided with a dry rising main. It is a Kent fire service request for dry risers to be located in common corridors and not in stairs. The site access will need to be set out to ensure that the fire tenders can drive to within 18m of and in sight of the dry riser inlets, typically positioned on the face of the building. The inlet shall be visible from the appliance at a location to be agreed with the Kent fire and rescue service. All buildings with a fire main except for Building F is protected by an automatic sprinkler suppression system, then every part of every storey is no more 60m from a fire main outlet in the common corridor, as measured on a route suitable for laying a hose. Building F is required to have a hose length no more than 45m from a fire main outlet in the common corridor. Hydrants should be provided within 90 m of dry fire main inlets on a route suitable for laying hose with the recommendations of Section 14.9 of Approved Document B.



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